MA MS WDM RS

Your Access to Access

...THE COMPANY

FibroLAN

Established in 1996, has been continuously building up it's expertise in the area of Fiber-Optic Networking.

In our first years we have been providing mainly FO connectivity solutions,
targeting the Enterprise and Government markets.

Early this century, our forces began its shift towards Carrier Access solutions.
With our ***MetroStar™*** system and the MA technology, we turned out to be one of the first vendors to provide (already in 2002) fully integrated Ethernet Access Systems with advanced and comprehensive IP-less OAM. Continuously keeping open mind and ears to carriers' needs and wishes, our technology expanded to include 2.5G and 10G transmission, extremely fast link protected devices, PDH integration (Ethernet over PDH and PDH over FE/GBE), affordable WDM and other features. Our new gigabit product-family named **FALCON**, is probably the most attractive NTU available in the market, offering very high data-throughput, PDH integration and Synchronous Ethernet.

With a wide-ranging suit of products - combined with state of the art technology, competitive pricing, record high product reliability, willingness to adapt to specific requirements and dedicated customer support - no wonder that dozens of tier 1-2-3 carriers made FibroLAN their choice, some of them deploying our solutions for the fifth year in row.

FibroLAN's successful positioning in the markets has resulted in the restructuring of our channels: we currently have OEM/reselling agreements with some of the world's most prominent Telecommunications equipment vendors, increasing further our exposure to carriers. Based on its outstanding business performance, FibroLAN became - in March 2006 - a public company, successfully traded in TASE - the Tel Aviv Stock Exchange (symbol: FIBR). Funds raised (followed by more private equity investments) provide us with a solid financial basis required to meet the challenges of accelerated technology and business growth.

FibroLAN thrives to become a key player in the Access market. Carriers will seriously consider our technology offering before deciding on the most advatageous way to implement the Access layer of their legacy and NG networks.

...CONTENTS

MA

MANAGEMENT (MA™)

Functional Description

The FibroLAN's MA™ (Micro Agent) is an on-chip management system facilitating the OAM management and maintenance of remote access devices without the need of an expensive and complex processor or the allocation of unavailable IP addresses.

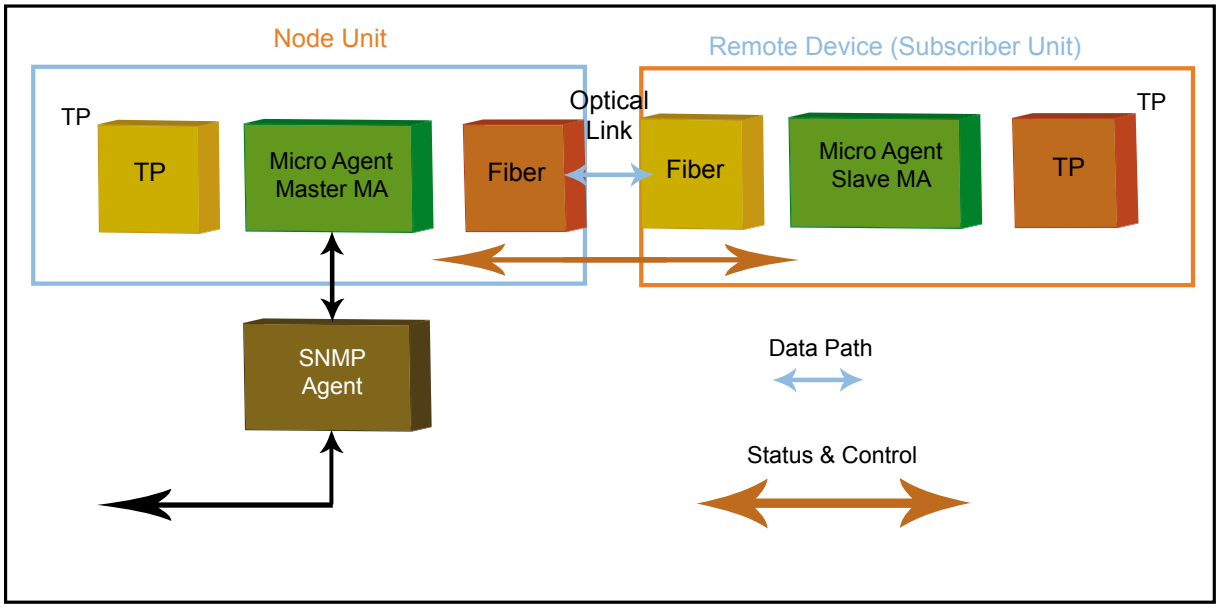
The chip is embedded in both the remote (home) unit, mostly referred to as a CPE and in the access concentrator device deployed in the access node. A unique protocol allows the two components communicating between themselves over the fiber link bi-directionally therefore both monitoring and commands can be remotely performed on the CPE. All managed signals are absolutely blocked to the user port (RJ-45) of the CPE so the user cannot monitor or interfere with them, preventing intentional or accidental access to the network management system.

The chip embedded in the concentrator transmits management signals to the user unit and strips management signals from user data flow. While user data is forwarded intact to higher network layers, the management signals are being transmitted over the internal management bus to a local SNMP agent. Finally, the CPEs are being presented to the network administrator as standard SNMP devices.

When MA™ enabled devices are deployed at both ends of the fiber link, they automatically learn about each other's presence and begin providing full remote management functions shortly after establishing the link. However, if an MA™ enabled devices cannot complete such handshake within that time, it concludes that the opposite end device is not MA™ enabled, subsequently it bypasses its special functions and operates like a standard, straight forward access device.

Therefore there are no interoperability issues between network devices which have MA™ chips embedded in them and those that have not. This Data Sheet describes the full set of functions facilitated by the MA™. The actual functions may, however, vary from product to product, depending on the applicability of such functions to specific products of FibroLAN or of vendors utilizing FibroLAN's MA™ chips. The MA™ Firmware can be updated via remote management.

Micro Agent Basic System Block Diagram



MA

MANAGEMENT (MA™)

FibroLAN MA™ enabled Product Line

All 100/1000 Mbps *MetroStar™* system modules:

MCM100, MCM110, ACM110
MCM100-1E1/2E1/4E1, MCM100-1T1/2/1/4T1
PCM110-4/8E1, PCM110-4/8T1
MCM100-RL, MCM1000T, MCM1000S, MCM1000X
MCM1000-XRL, MCM1000-XRL-4E1,
MCM1000-XRL-4T1

S.CON1M/MA, GSM1000M, GSM1010M
H.CON/MA, LTA41/MA
F.CON1/MA, F.CON1F/MA
ATARA1000-RM
GSM1000/MA, GSM1010/MA
GSM1000x

MA™ Function Set

Following are the management (maintenance) functions available for an MA™ enabled remote device (CPE) through an MA™ enabled and SNMP managed Access Concentrator

F/O Link Status:

The incoming path as seen by the CPE. Every change
(link down to up and vice versa) generates an alarm to the manager.

T/P Link Status:

Integrity of user connection. Every change (link down to up and vice versa)
generates an alarm to the manager.

Fiber Link Integrity:

Continuous (every 10ms) verification of the fiber link.

Fault Propagation:

when activated, a CPE MA device sensing a loss of its F/O link, will automatically
cuts its TP port link. ***MetroStar™*** modules incorporate bi-directional Fault Propagation mechanism (FO>TP, TP>FO)

Link Segmentation Test (LST):

FibroLAN GBE devices are equipped with this powerful link status alert
and link testing mechanism

Subscriber Link Emulation (SLE):

A most advanced Fault Propagation mechanism propagates failure of the subscriber
(connected to FibroLAN's CPE) all the way to the Access switch respective port
(and vice-versa) without affecting the fiber link connecting the 2 sites (CPE remains under full control)

Loop-Back:

A special test pattern transmitted to the CPE is looped back as close as possible to the USER port,
and positively verified at the access concentrator, confirming the good condition of the CPE and the link.
This function is performed upon request. This function tests more than 90% of the CPE's active parts.
The LB test is performed without disruption of user traffic thus may be used as a basic preventive maintenance operation.

Extended Loop-Back (ELB):

Activating this function initiates a series of individual Loop-Back tests providing a precise
measurement of the entire link quality. The length of this test is user definable.

MA

MANAGEMENT (MA™)

MA™ Function Set

Signal Detect:

presence of a valid analog optical signal at the receive port of the CPE. This indication – together with the F/O Link as above – provides a powerful diagnostics tool for the optical link integrity and troubleshooting.

Power On:

CPE Power On; equivalent to CPE's log-into the network.

Set A/N Mode:

CPE's TP port may be set to Auto-Negotiation or non A/N mode.
This function is not applicable to non-buffered CPEs (F.CON series).

Set 10/100:

when CPE set to A/N disable mode, this function allows forcing 10 or 100Mbps onto the TP port.
This function is not applicable to non-buffered CPEs (F.CON series).

Set Duplex Mode:

when CPE set to A/N disable mode, this function allows forcing HDX or FDX onto the TP port.
This function is not applicable to non-buffered CPEs (F.CON series).

Port enable/disable:

all modes

VLAN and QoS:

CPEs operation profile (e.g. for multi media applications) can be set or changed remotely by changing VLAN and QoS settings.
Port Priority: per port priority, 802.1p and DSCP port priority Applicable to CPE models supporting all these features.

Statistics:

provide information regarding the overall traffic through the LTA41/MA device
(error packet counters, good packet counters, refresh/clear counters)

Last Gasp:

Upon occurrence of a supply power failure, which may result from a local failure or any failure in the supply network (apartment, building, block etc), the CPE alerts the NOC– using last "drops" of energy left. This will automatically be followed by a Link-Loss alert from the concentrator. Both alerts combined allow the NOC take the right decision regarding action to be taken.

Rate Limiting:

A robust layer 1 algorithm allows providing users with a partial bandwidth out of the nominal rate of 100Mbps or 1000Mbps to facilitate SLA, mainly in MTUs. Consequently, available bandwidth in the network can be utilized to the fullest, maximizing revenues and profits of the service provider. Bandwidth can be set in more than 100 steps starting from 256Kbps both symmetrically and asymmetrically up and down stream. The applicability of this function depends on the architecture and implementation of upper layers of the network

Reset Device and Restore factory default parameters

Specifications are subject to change without prior notice

MA

METROVIEW

MetroView Management System for Windows

The ***MetroView™*** platform provides a comprehensive high level management of FibroLAN ***MetroStar™*** based fiber Access Networks product lines. The ***MetroView™*** incorporates a friendly graphical user interface (GUI) for maximum efficiency network operation with minimum handling. The ***MetroView™*** design uses client-server architecture to allow database centralization, with GUI applications that are easy to install and maintain, all connected to a single server. The clients may reside on any machine to the network, including the server workstation. The ***MetroView™*** manages a large number of systems over the network serving as a fiber-based communication access platform for multiple customers.

One of the greatest benefits of the ***MetroView™*** platform is the minimal skill-level and training required to operate it effectively, resulting in record-low cost of maintenance per subscriber. All these features allow carriers to keep tens of thousands of subscribers under close monitoring and supervision, through a single management interface, with great ease and flexibility

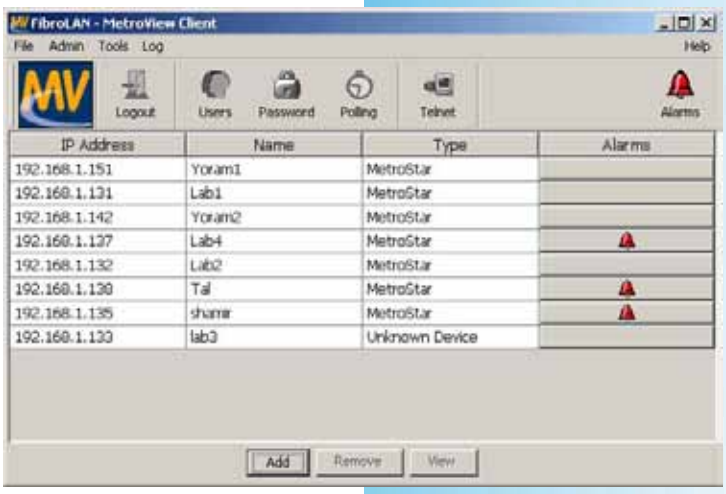
Key Features

- *Simple and intuitive graphical user interface*
- *Complete management of all FibroLAN product lines*
- *Flexible client-server architecture*
- *Alarm logging and maintaining*
- *Comprehensive user administration*
- *Adjustable polling intervals*
- *Instant Telnet session initilization*
- *Quick installation*
- *HPOV plug-in opttion*
- *Windows 2000 or Solaris versions available*

Typical MetroView chassis display

METROVIEW

MetroView Client Display



Ordering Information

Product	P/N	Description
MV-FW-ENL	6001	***MetroView*** SNMP management platform, MS Windows, supporting up to 10 ***MetroStar™*** chassis
MV-FW-ENA	6002	Annual fee for MV-FW-ENL. Entitles buyer for free upgrades and up to 10 hours remote support
MV-FW-SCL	6003	***MetroView*** SNMP management platform, MS Windows, supporting up to 100 ***MetroStar™*** chassis
MV-FW-SCA	6004	Annual fee for MV-FW-SCL. Entitles buyer for free upgrades and up to 15 hours remote support
MV-FW-LCL	6005	***MetroView*** SNMP management platform, MS Windows, supporting up to 1000 ***MetroStar™*** chassis
MV-FW-LCA	6006	Annual fee for MV-FW-SCL. Entitles buyer for free upgrades and up to 30 hours remote support
MV-FS-SCL	6007	***MetroView*** SNMP management platform, Solaris supporting up to 100 ***MetroStar™*** chassis
MV-FS-SCA	6008	Annual fee for MV-FS-SCL. Entitles buyer for free upgrades and up to 15 hours remote support
MV-FS-LCL	6009	***MetroView*** SNMP management platform, Solaris supporting up to 1000 ***MetroStar™*** chassis
MV-FS-LCA	6010	Annual fee for MV-FS-LCL. Entitles buyer for free upgrades and up to 30 hours remote support

Specifications are subject to change w/o prior notice

FibroLAN FIBEROPTIC NETWORKING

Modules

MMM

MCM

MS

MS

METROSTAR

Carrier Access Platform

The ***MetroStar™*** System is a compact Multi Service Media Access Concentrator. This Carrier Class 19" Rack-Mountable platform is a modular multi-slot and multi-channel (10/100/155/622/1000/2500Mbps) Access Concentrator providing up to 48 access channels, housed in a 3U chassis, yielding an unprecedented density factor of 16/1RU. It provides altogether 16 slots: 3 for power supplies, 1 (2) for the management module and 12 for interface modules (up to 4 user interfaces per module). All modules, connectors and indicators are located on the front panel for easy and space saving installation (including double back-to-back installation in cabinets). Its light weight allows installation by a single technician. The ***MetroStar™*** is normally equiped with dual load sharing power supplies while an additional slot allows the insertion of a third redundant power supply, increasing MTBF. All modules are hot swappable. Even the cooling fans-integrated in the modular PS rather than fixed in the chassis, are hot swappable.

All these result in record high MTBF and virtually zero MTTR. Most of the modules are equipped with FibroLAN's MA™ technology, which allows low cost OAM of the link partners. SNMP management is provided either by a single management module or by a combination of Master and Slave modules which allow the stacking of up to 8 devices, providing full management of hundrets of users by a single SNMP agent. The optional cable organizer facilitates neat and safe deployment even in the densest configurations.

The ***MetroStar™*** provides a comprehensive range of services for access, aggregation, transmission and extension of IP traffic (10/100/1000/2500Mbps), with integrated TDM/PDH, and SONET/SDH support. All these features make ***MetroStar™*** the industry's most efficient Access Platform for FTTx applications, as well as for miscellaneous transmission scenarios.

Key Features

- *Demaraction point between Service Providers' and Users' Networks*
- *Ethernet Service OAM to quarantee SLAs*
- *Versatile carrier Ethernet Services*
- *Supported protocols: TDM/PDH, Ethernet, Fast Ethernet, ATM, Gigabit Ethernet, SAN (Fibre Channel and Escon), SONET/SDH and 10GE*
- *Multi-purpose customer and network interfaces.*
- *Carrier Class - redundant PS, -48VDC PS, all modules (including fans) are hot-swappable. All modules and indicators are - front loaded, no active components on back-plane and comprehensive alarming.*
- *Cost effective CWDM*
- *PDH (E1/T1-E3/T3) over Ethernet support for backhauling wireless base stations*
- *Management - Stand Alone, redundant or stackable*
- *Top Density: up to 48 F/0 interfaces*
- *Largest variety of modules (10/100/155/622/1000/2500Mbps)*
- *Covered distances: up to 150km (for 200Mbps rate), 120 km (GBE)*
- *Light Weight, Space Saving*
- *MA™ support for remote management (IEEE 802.3ah compliant) - only one agent and one IP adress to control hundrets of remote users*
- *Managed by **MetroView** Device Manager and by any standard SNMP platform available in the market.*

General Specifications

Slots
16. 3 for Power Supplies, 1 (2) for management and 12 for interface modules (1,2 or 4 channels each)
Management
Stand Alone, redundant or stackable, SNMP V1&V2, Telent, RS232, TFTP, CLI/ Menus, Radius, NTP, Syslog ***MetroView*** Device Manager
Power Supplies
(2, third optional) 100 to 240 VAC, 50 to 60 Hz, load-sharing -48 VDC (-36 + -72VDC)
Temperature
Operating: 0 to +45 Centigrade
Storage: -20 to +80 Centigrade
Safety EN60950-1:01
NEBS compliant
Cooling
Forced air, fans integrated in Power Supplies, hot swappable
OAM
Remote devices monitored via MA™ technology.
Third party's NTUs managed via IEEE802.3ah
Power Consumtion 120 Watts maximum
Humidity 10% to 90% non-condensing
EMC EN 300 386 V1.3.3:05
Weight 7 kg max. (fully loaded)
Dimensions 441 x 210 x 132mm

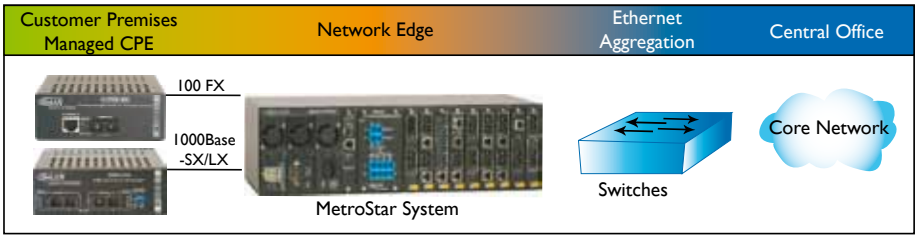
Ordering information

MS-CH/A	***MetroStar™*** Chassis, 3U, 16 slots, including 2 AC Power supplies + 6*BP-01
MS-CH/D	***MetroStar™*** Chassis, 3U, 16 slots, including 2 DC Power supplies + 6*BP-01
MS-CH/D/ST	***MetroStar™*** Chassis, 3U, 16 slots, including 2 DC Power Supplies (screw terminal connector), 6*BP-01, 1*BP-02, 19" Rack-mount bracket set.
MS-CH/00	***MetroStar™*** Chassis, 3U, 16 slots, 6*BP-01, 1*BP-02, 19" Rack-mount bracket set.
BP-01/BP-02	Black Panel for conversion module slots/Power Supply slot
PMM	Power Monitor Module (installed in slot M in an unmanaged ***MetroStar™*** chassis)
COT	Cable Organizer Tray
FPS5033A	Redundant power supply, 100 to 240 VAC, 50 to 60Hz
FPS5033D	Redundant power supply, D-type connector, -36 to -72 VDC
FPS5033D/ST	Redundant power supply, screw terminal connector, -36 to -72 VDC
MMM-01	SNMP managed module - stand alone configuration
MCM100-01x	100TX-FX converter module, SC, ST, MTRJ, MM, SM, SFS, 1310/1550nm, up to 150 km, MA management
MCM100-02x	Dual Channel 100TX-FX converter module SC, ST, MTRJ, MM, SM, SFS, 1310/1550nm, up to 150 km, MA
MCM110-01x	10/100TX-FX converter mdule SC, ST, MTRJ, MM, SM, SFS, 1310/1550nm, up to 150 km, MA
MCM110-02x	Dual Channel 10/100TX-FX converter module SC, ST, MTRJ, MM, SM, SFS, 1310/1550nm, up to 150 km, MA
ACM110-12xx	2:1 - 2 LC connectors to 1 100TX Aggregating converter module, SM 1310nm, 15/25 km, MA
ACM110-14xx	4:1 - 4 LC connectors to 1 100TX Aggregating converter module, SM 1310nm, 7/15/25 km, MA
MSM100U	MM to SM, SFS 100FX/ATM/OC3 Conversion module, 2*SC, 7/15/25/40/70/100/150 km
MSM100U-SME	100FX/ATM/OC3 SM to SM Conversion module, 2*SC, 7/7, 7/25, 40/40, 100/100 km
MSM622U	MM/SM (1-10 km) to SM ATM/OC12/STM-4 Media Converter, 20/40/80 km, 2*dual SC
MSM2500U	Universal Extender module, 100 Mbps to 2,5 Gbps, includes 2 SFP slots, use SFP transceivers (SFxG series)
MCM1000T-xx	1000Base-TX to 1000Base-SX/LX (10/20/40/80/120 km) Conversion Module, SFS - 20/40 km, MA
MCM1000S/L-yy	1000Base-SX/LX to 1000Base-LX /10/20/40/80/120 km) Conversion/Extender Module, 2*SC, MA
MCM1000X	Flexible Gigabit Ethernet conversion module with 2 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver, MA
MCM100-xE1/T1	Single Channel 100Base-TX to FX converter and one/two or four tunneled E1/T1, RJ48, MM, SM, Dual SC connectors, 2/7/15/25/40/70/100 km, MA management
PCM110-xE1/T1	inverse PDH Multiplexer, transporting 10/100 TX over 4/8 E1/T1 channels; 1+4/8 RJ-45 ports, Dual slot module
MCM100-RL	Redundant Link 100Base-TX to FX converter, MM, SM, 2 duplex SC + 2 RJ45 connectors, 2/7/15/25/40/70/100 km, MA
MCM1000XRL	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver, MA
MCM1000XRL-4E1	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver and 4 E1 channels tunneled over GBE, 4* RJ-45 ports, MA dual slot
MCM1000XRL-4T1	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver and 4 T1 channels tunneled over GBE, 4* RJ-45 ports, MA dual slot
MDX-41	CWDM multiplexer-demultiplexer, 5:1 ports III window (1311/1471/1511/1551/1591nm), 2.5Gbs bandwith, SC/UPC connectors, occupies 4 slots
MDX-81	CWDM multiplexer-demultiplexer, 9:1 ports III window (1311/1471/1491/1511/1531/1551/1571/1591/1611nm), 2.5Gbs bandwith, SC/UPC connectors, occupies 4 slots
MCM1000xZXxCWW	CWDM 1000T/SX/LX to 1000ZX 1471-1591nm range, 40/80 km, 2*Duplex SC, MA

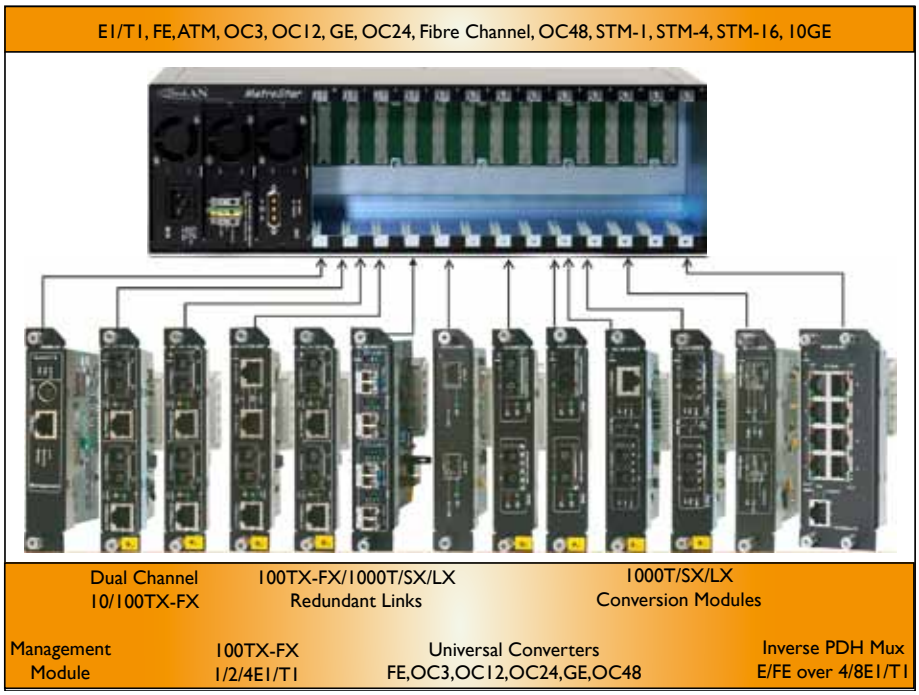
Specifications are subject to change w/o prior notice

Applications

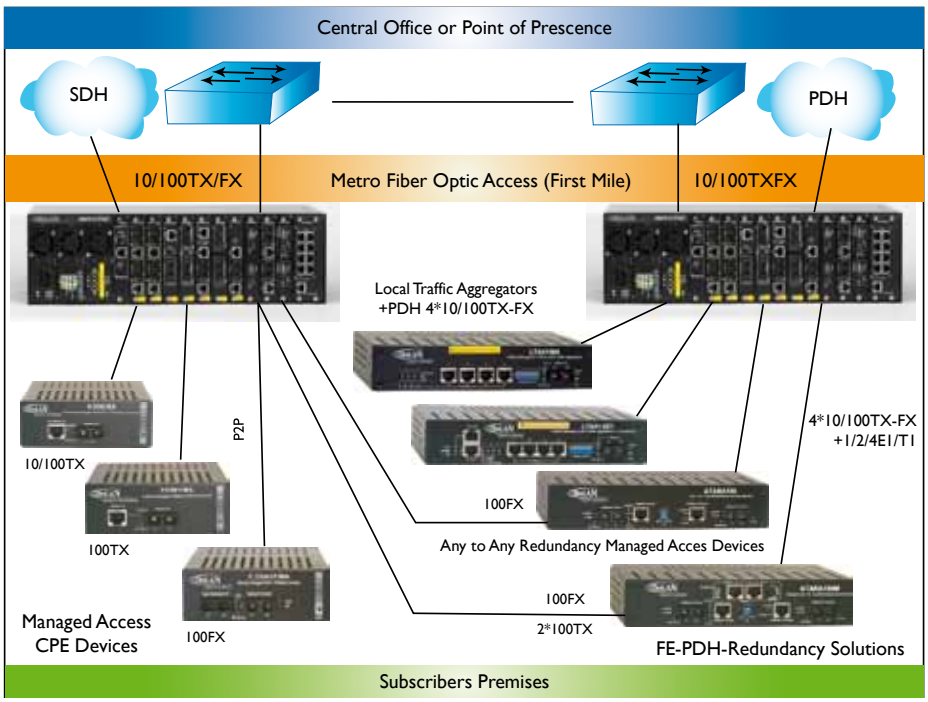
Basic Topology



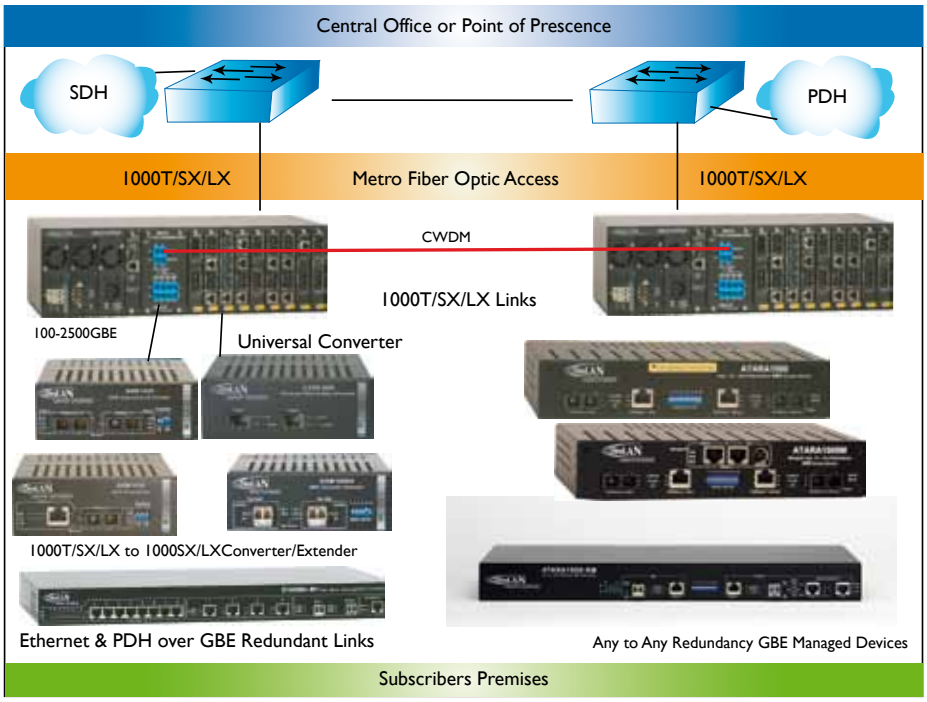
MetroStar™ System and typical modules



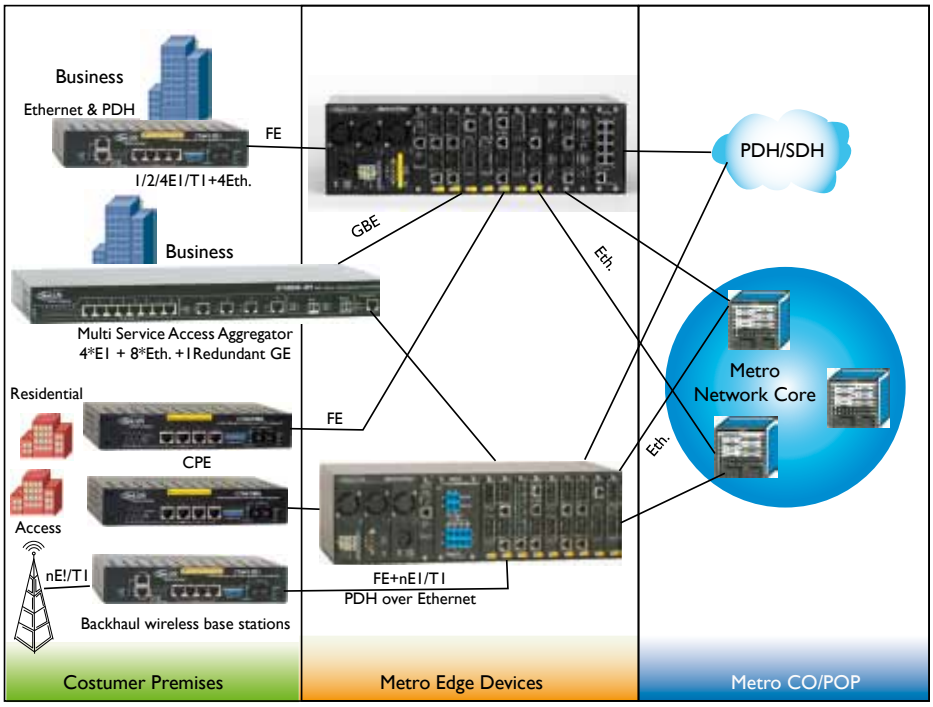
Manged FE NTUs



Managed GBE NTUs



Carrier Miscellaneous Solutions



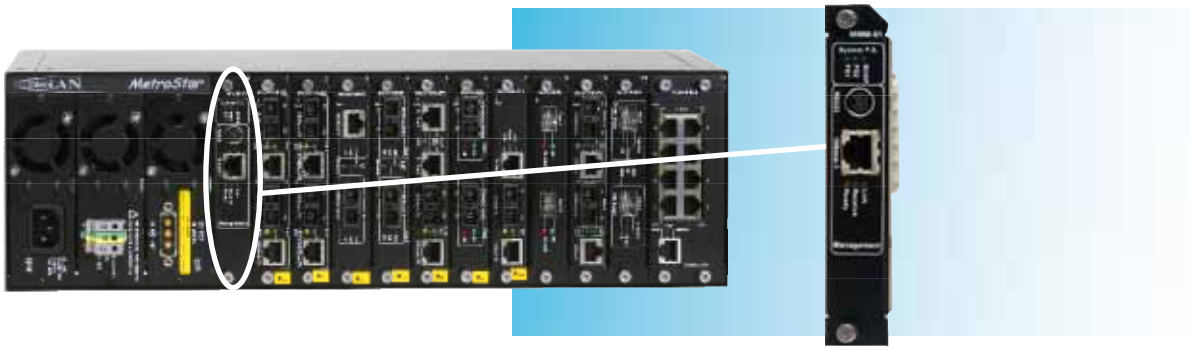
MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's ***MetroView***, HP OpenView, SNMPc, etc)

MS

MMM-01

MetroStar™ System Management Module

The MMM-01 module is a powerful platform for the management of up to 12 ***MetroStar***™ modules that connect up to 48 remote (MA enabled) devices, which in turn may support a total of 192 subscribers. It supports MIB II (RFC1213/RFC1215), FibroLAN's private MIBs, Telnet and TFTP for easy field upgrades. It automatically recognizes the type of module inserted in each ***MetroStar***™ slot and enables the relevant menus, no H/W setup is needed while installing. In addition to common management functions it is the system's vehicle to convey the rich suit of MA related functions (status and control) into a standard management (SNMP/Telnet) environment. In addition the module is equipped with 3 LEDs monitoring the status of the Power Supply plant of the system. All ***MetroStar***™ modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected.



Key Features

- *System Information*
  Power Supply status (1 to 3), Up time,
  System Contact, Location, Description,
  Modules Population, Chassis and Remote devices Temperature
  Modules and Remote devices Firmware revision

- *Supported Equipment*
  MCM100xx, MCM110xx, MCM1000xx, ACM110xx,
  MSM100U,MSM622U, MSM2500, PCM110-xE1/T1,
  MCM100-xE1/T1, MCM100-RL,MCM1000-RL, MCM1000X
  CWDM modules AND all remote MA enabled CPE devices

- *Alarms*
  PS insertion/removal/failure, Temperature exceeding threshold,
  Links UP/DOWN, Modules insertion/removal,
  Remote device connection/disconnection/power fail,
  Remote device port link up/down, signal detect/loss
  LOS (Loss of signal) and AIS (Alarm Indicator Signal) conditions

General Specifications

Standard Compliance
SNMP V1v2c, MIB II (RFC1213/RFC1215), Telnet, TFTP, RADIUS, Syslog, NTP

RJ-45 Port
Shielded, 10Base-T, 100m over UTP/STP Cat 5 cable

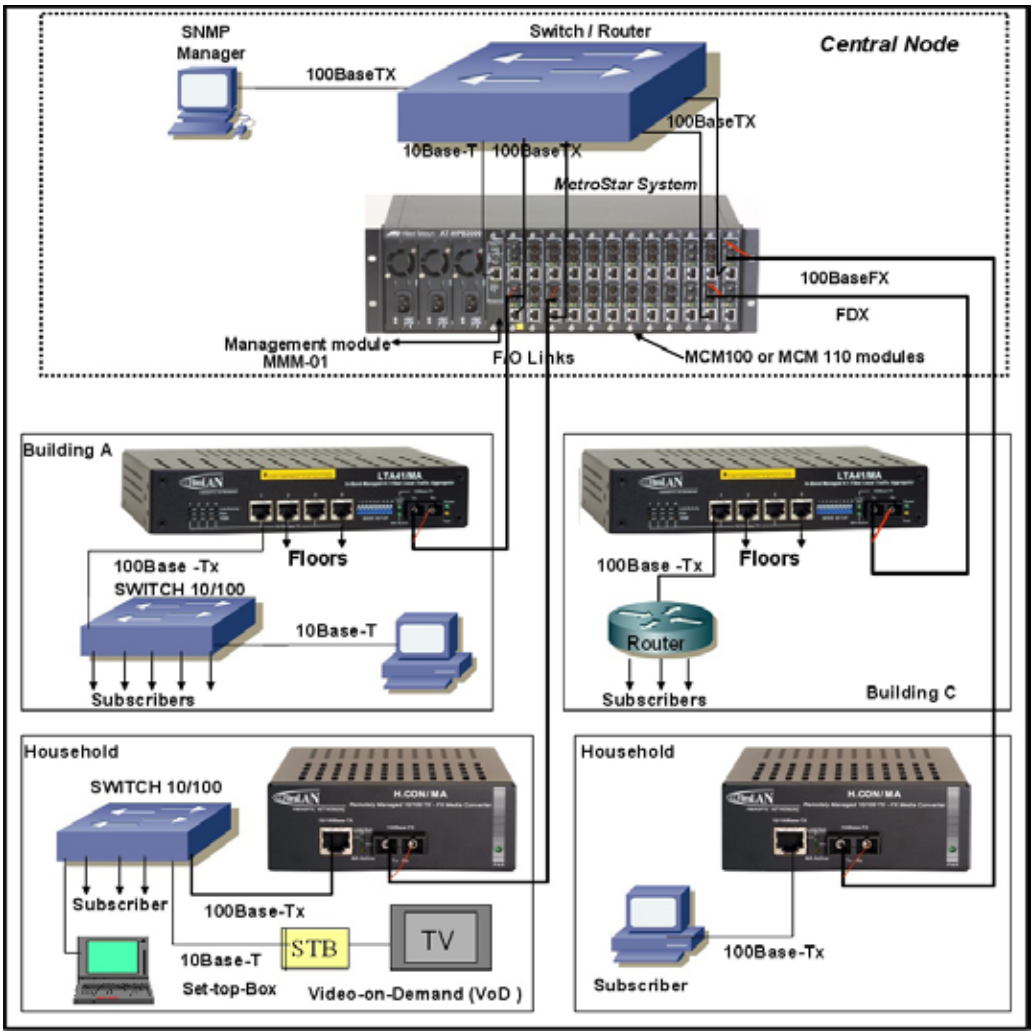
MiniDIN:
RS232 for CLI

Diagnostic LEDs
System PS section: PS1, PS2, BCKP
Management Section: Link, Receive, Ready

Physical
MetroStar™ Single Slot, Hot-Swappable
Dimensions: 23.8x128.0 mm (W x H)

Management of Remote Devices
Via MA technology

Typical Topology



The MMM-01 Management module installed in the ***MetroStar™*** System will monitor, control and manage the modules installed in the ***MetroStar™*** chassis and the remote H.CON/MA and LTA41/MA devices. It will report alerts and traps to the SNMP Manager station located at the Central Node. ***MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc)***

Ordering Information

MMM-01	2121	Management Module for one ***MetroStar™*** System
MMM-02	2122	Management Module for 8 ***MetroStar™*** Systems - MASTER
MMM-03	2123	Management Module for ***MetroStar™*** Systems - SLAVE

Specifications are subject to change w/o prior notice

MS

MCM100

100Base-TX to 100Base-FX Converter Module

This module provides one or two direct and independent 100Base-TX to 100Base-FX conversion channels. As a layer one converter, it is independent from frame size. The module is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150 km. The bi-directional Fault Propagation (FP) allows the network redundancy (provided that he switch/router to which it is connected is properly set to activate an alternate path). The TEST switch disables FP function and it is used for diagnostics purposes. Its RJ-45 port is Auto-Cross compliant, making installation fault free. The Subscriber Link Emulation (SLE) - when link partner is an MA™ enabled device - allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Like other ***MetroStar™*** modules, the MCM100 is fully SNMP managed.

The embedded MA chip controllerallows full management of remote (MA enabled) devices eliminating the need of costly SNMP processors and IP adresses in such devices. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected. The module supports additional features: Flow Control and Far End Fault Signaling (FEF).

General Specifications

Standard Compliance
IEEE 802.3u, 100Base-TX, 100Base-FX.

Conversion Method
Direct with FDX advertising and Fault Propagation

RJ-45 ports
Shielded, Auto Cross compliant, 100m over STP Cat 5 cabling. Default: 100Mb FDX

F/O ports
See table in next page

LEDs
Per module - Power ON
Per channel - F/O Link/Activity, TP Link/Activity

DIP switches (on board)
HDX/FDX Selector for TP ports
Per channel - Fault Propagation/Test mode

Management
FibroLAN Management System
SNMP through ***MetroStar™*** Management Module
Management of remote device: via MA
Loop Back Test
Over selected link

Management Functions

*The following management functions are available for the MCM100 module through the **MetroStar™** System Management:*

Module Status
Link TP and F/O port status, Channel bandwidth, TP Duplex mode (DX), FP modes (FO>>TP and TP>>FO), SLE modes, (Up and Downstream), Channel Pause mode (Flow Control), Remote MA device Status (type and power)

Module Control
Channel 1 and 2 Controls, restore module default values, Reset module

Channel X Control
Set port description, FP/SLE control, enable/disable TP port, Set duplex mode, Set pause mode

Channel X FP/SLE control:
TP>>FO FP mode, FO>>TP FP mode, Down/Upstream SLE mode

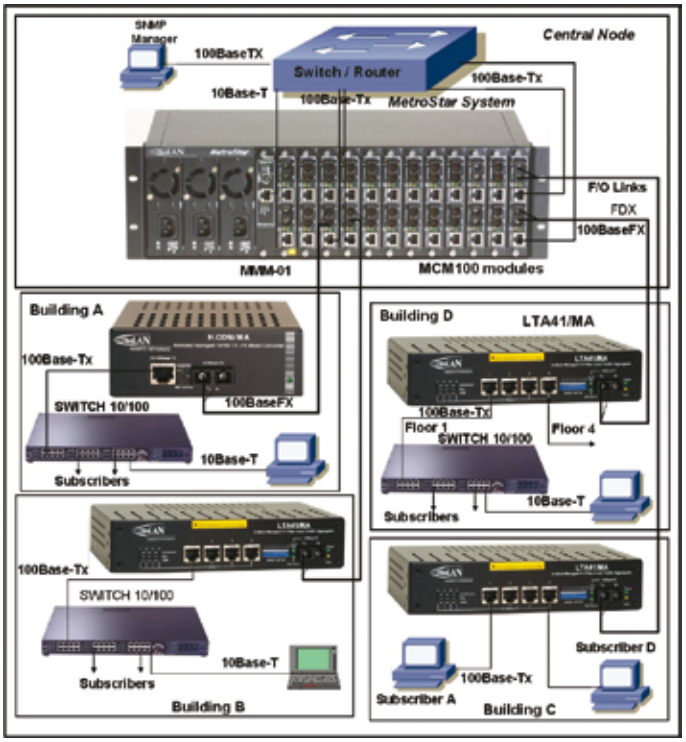
Link Management
Link status, set link bandwidth, perform Loop-back test, Remote Device Control and Status, Restore link default parameters.

MS

MCM100

Typical Topology

MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc)



Ordering Information and F/O ports specifications

Part#	Model	Channels	Port 1	Each Channel Port 2	Transmit WL	Minimal Output Power	Receive WL	Typical Receive Sensitivity	Distance km
2200	MCM100-01SC	1	RJ-45	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2201	MCM100-01ST	1	RJ-45	Duplex ST, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2202	MCM100-01MT	1	RJ-45	MTRG, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2203	MCM100-01SMR7	1	RJ-45	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
2204	MCM100-01SMR	1	RJ-45	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
2205	MCM100-01SM	1	RJ-45	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
2206	MCM100-01SML	1	RJ-45	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
2207	MCM100-01SML2	1	RJ-45	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
2208	MCM100-01SML3	1	RJ-45	Duplex SC, SM	1550nmDFB	-2dBm	1550nm	-38dBm	40-100
2209	MCM100-01SMLX	1	RJ-45	Duplex SC, SM	1550nmDFB	0dBm	1550nm	-38dBm	70-150
2210	MCM100-01SMRF15	1	RJ-45	Sinmplex SC, SM	1550nm	-15dBm	1310nm	-30dBm	0-15
2222	MCM100-01SMLF15	1	RJ-45	Sinmplex SC, SM	1550nmDFB	-5dBm	1310nm	-35dBm	10-60
2211	MCM100-02SC	2	RJ-45	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2212	MCM100-02ST	2	RJ-45	Duplex ST, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2213	MCM100-02MT	2	RJ-45	MTRJ, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2214	MCM100-0SMR7	2	RJ-45	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
2215	MCM100-02SMR7	2	RJ-45	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
2216	MCM100-02SM	2	RJ-45	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
2217	MCM100-02SML	2	RJ-45	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
2218	MCM100-02SML2	2	RJ-45	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
2219	MCM100-02SML3	2	RJ-45	Duplex SC, SM	1550nmDFB	-2dBm	1550nm	-38dBm	40-100
2220	MCM100-02SMLX	2	RJ-45	Duplex SC, SM	1550nmDFB	0dBm	1550nm	-38dBm	70-150
2221	MCM100-02SMRF15	2	RJ-45	Simplex SC, SM	1550nm	15dBm	1310nm	-30dBm	0-15

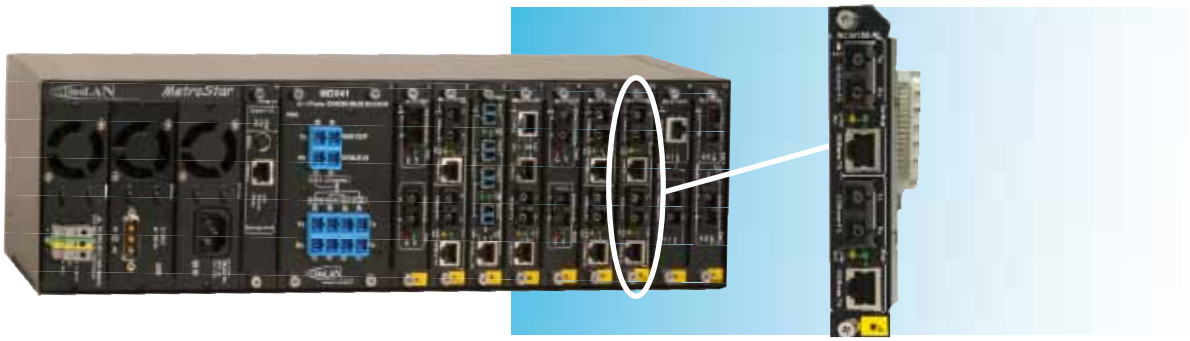
Specifications are subject to change w/o prior notice

MS

MCM100-RL

100Base-TX to 100Base-FX Redundant Links - Converter Module

The MCM100-RL is an "Any To any" 100TX to 100FX Redundant Link Conversion module for the ***MetroStar™*** chassis. It automatically selects the active port on each F/O and TP sides (with priority to "MAIN" ports) and interconnects them. It has two TP and two F/O connectors. This way, end-to-end path and device redundancy is achieved disregarding the type of the remote device, catering to various network resilience scenarios. Upon failure of a MAIN port, the module switches traffic within less than 10µsecs to the Backup port and alerts the network manager. When the MAIN link is restored, the traffic will automatically or manually switch back to it, providing operational consistency and easy tracing of the active path. The switch-back occurs immediately after link restoration or following a tunable delay (via the management systems) to avoid network instability during the repair process. Inactive Ports (normally Backup) are continuously monitored for link integrity, providing the network manager with valuable information of his system's readiness.



Using an on-board switch (or via management), the Redundant Links mode may be disabled. In such case, the module functions exactly like a dual channel converter, each 2 adjacent ports forming a channel. As a layer 1 converter, it is independent from frame size. The module is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150km. Selective Fault Propagation (FP) from the F/O port to the TP or vice-versa provides link status forwarding. The TEST switch disables the Fault Propagation and allows link failure detection. The RJ-45 ports are Auto-Cross compliant, making installation fail free. The Subscriber Link Emulation (SLE) - when link partner is an MA enabled device – allows real time notification of the remote user failure while maintaining the fiber link active.

The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Like other ***MetroStar™*** modules, the module is fully SNMP managed. The embedded MA™ chip controller allows full management of remote (MA enabled) devices eliminating the need of costly SNMP processors and IP addresses. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected. The MCM100-RL module is managed through an SNMP management station, Telnet or CLI management.

Management Functions

*The following management functions are available for the MCM100-RL module through the SNMP managed **MetroStar™** System:*

Module Status

TP/FO Link status, Link state (TP and FO), Pause mode (Flow Control), Channel's Enable mode, FP modes, SLE modes, Remote device type and its Power status, Redundant mode enabled/disabled, Firmware revision

Module Control

Module status, Channel control, Redundancy control, Set redundant mode, Restore module defaults, Reset module

Channel Control

View configuration, Set channel description, FP/SLE control, Enable/Disable TP port, Set Pause mode, Set downstream bandwidth

Link Management

Link status, Perform Loop-back test, invoke remote device
Main menu, Restore Link default parameters

Key Features

- *Any-to-Any Redundant Links – fits any network scenario*
- *Tunable delayed switch-back - enhanced network stability*
- *Transparent 100TX to 100FX with FDX Advertising - interoperability*
- *Dual Channel operation – optimized logistics*
- *Selective Fault Propagation - total network resilience*
- *Subscriber Link Emulation (SLE) – for mission critical networks*
- *Auto-Cross TP ports – for ease of installation*
- *In Band (MA) Management of remote devices - comprehensive Access management*
- *Offline Configuration Facility support*

MS

MCM100-RL

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 100Base-FX

Conversion Method
Direct with FDX advertising

RJ-45 Ports (x2)
Shielded, Auto-Cross, 100m over STP Cat 5 cabling

F/O Ports (x2)
Simplex and Duplex SC connectors

MAIN to Backup switchover
10 µsec max. from link fail detection

Backup to MAIN switchover
Tunable to 0/5/10/20/ sec or manually

Diagnostic LEDs
Power ON
Link/activity MAIN F/O, Link/activity MAIN TP
Link/activity Backup F/O, Link/activity Backup TP

DIP switches (on board)
Mode (Redundant Links/ Dual Channel Converter)
Fault Propagation: FO>>TP ON/OFF, TP>>FO ON/OFF
Management overrides DIP switches setting

Management:

FibroLAN ***MetroView*** Device Manager
SNMP , Telnet and CLI

Management of Remote Devices
via MA™ Technology

F/O ports Specifications

Model	F/O Ports (x2)	Transmit WL	Minimal Output Power	Receive WL	Typical Receive Sensitivity	Distance km
MCM100-01SC	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
MCM100-01ST	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
MCM100-01MT	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
MCM100-01SMR7	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
MCM100-01SMR	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
MCM100-01SM	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
MCM100-01SML	Duplex SC, SM	1550nm, DFB	-2dBm	1550nm	-38dBm	40-100
MCM100-01SML2	Duplex SC, SM	1550nm, DFB	0dBm	1550nm	-38dBm	70-150
MCM100-01SML3	Simplex SC, SM	1550nm	-15dBm	1310nm	-30dBm	0-15

Ordering Information

Part#	Model	Description
2250	MCM100-RLSC	Redundant Link 100Base-TX to FX converter, Multi-mode 2km, 2 duplex SC + 2 RJ45, MA
2251	MCM100-RLSMR7	Redundant Link 100Base-TX to FX converter, SM, 1310nm, 7km, 2 duplex SC + 2 RJ45 ,MA
2252	MCM100-RLSMR	Redundant Link 100Base-TX to FX converter, SM, 1310nm, 15km, 2 duplex SC + 2 RJ45 ,MA
2253	MCM100-RLSM	Redundant Link 100Base-TX to FX converter, SM, 1310nm, 25km, 2 duplex SC + 2 RJ45 ,MA
2254	MCM100-RLSML	Redundant Link 100Base-TX to FX converter, SM, 1310nm, 40km , 2 duplex SC + 2 RJ45 ,MA
2255	MCM100-RLSML2	Redundant Link 100Base-TX to FX converter, SM, 1310nm, 70km , 2 duplex SC + 2 RJ45 ,MA
2256	MCM100-RLSML3	Redundant Link 100Base-TX to FX converter, SM, 1550nm, DFB, 100km , 2 duplex SC, 2 RJ45 ,MA
2257	MCM100-RLSMLX	Redundant Link 100Base-TX to FX converter, SM, 1550nm, DFB, 150km , 2 duplex SC, 2 RJ45 ,MA
2258	MCM100-RLSMRF15	Redundant Link 100Base-TX to FX converter, SM, Single Fiber Strand, 1550nm Tx, 1310nm Rx, 20km, 2 simplex SC + 2 RJ45, MA

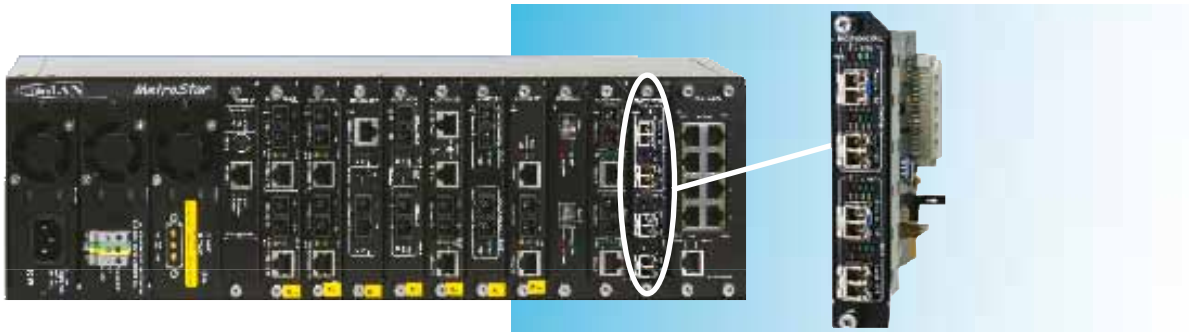
Specifications are subject to change w/o prior notice

MS

MCM1000-XRL

Gigabit Ethernet Redundant Links - Converter Module

The MCM1000-XRL is an "Any to any" 1000TX/SX/LX to 1000TX/SX/LX Redundant Link Conversion single module for the ***MetroStar™*** chassis, with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceivers, for ease of deployment, maintenance and logistics. The main advantages of the hot-swappable SFP optical interfaces are the density, flexibility, and cost savings. SFP modules can be easily interchanged, thus fiber optic networks can be upgraded more conveniently than with traditional modules. The MCM1000XRL- 4E1 or 4T1 dual slot module includes also 4E1/4T1 channels tunneled over the Fiber GBE active link (Main or Backup).



These module with E1/T1 ports have been designed to operate with Fibro-LAN **FALCON** devices. The PDH (E1/T1) over GBE offers a unique and cost effective solution for E1/T1 transport (e.g. backhauling wireless base stations). The MCM1000XRL is based on 3R technology: full 3R Regeneration (re-amplification, re-shaping, re-timing) is implemented between the two Main ports and Backup ports. It automatically selects the Local and Remote active ports (with priority to "MAIN" ports) and interconnects them.
It may be configured as two Local TP and two Remote F/O connectors with appropriate SFP transceivers. This way end-to-end path and device redundancy is achieved disregarding the type of the remote device, catering to various network resilience scenarios. Upon failure of a MAIN port, the module switches traffic within Failover Time is less than 5µsec to the Backup port and an alert is send to the network manager upon such events. When the MAIN link is restored, the traffic will automatically switch back to it, providing operational consistency and easy tracing of the active path. The switch-back occurs immediately after link restoration or following a tunable delay (via the management system) to avoid network instability during the repair process.

Inactive ports (normally Backup) are continuously monitored for link integrity, providing the network manager with valuable information of his system's readiness. The module supports Auto-Negotiation for each SFP port. The module is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 120km. Selective Fault Propagation (FP) from the Local port to Remote or vice-versa allows further network resilience. The Subscriber Link Emulation (SLE) - when the link partner is an MA enabled device - allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Each SFP port provides various LEDs indications for monitoring and enhanced diagnostics. Like other ***MetroStar™*** modules, the MCM1000RXL is fully SNMP managed. The embedded MA™ chip allows full management of remote (MA enabled) devices eliminating the need of costly SNMP processors and IP addresses in such devices. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are established.

Key Features

- *Any-to-Any Redundant Links - fits any network scenario*
- *SFP (Small Form –factor Pluggable) optical transceivers*
- *Tunable delayed switch-back - enhanced network stability*
- *Network Extension – up to 120km*
- *1000X-Auto Negotiation is supported for each SFP F/O port*
- *SFP TP ports are by default set to Auto-Negotiation enabled*
- *Selective Fault Propagation - total network resilience*
- *Subscriber Link Emulation (SLE) - for mission critical networks*
- *RSLE (Redundant SLE) - enhanced resilience*
- *Local and Remote Loop-Back Test - enhanced diagnostics*
- *Rate Limiting (0-1000Mbps, 10Mbps step increment)*
- *MA™ management for Remote Main and Backup SFP FO ports*
- *E1/T1 ports tunneled over GBE link - extends life of traditional WANs*
- *PDH (E1/T1) over GBE - for backhauling wireless base stations*
- *RFU (Remote Firmware Upgrade)*

Management Functions

The MCM1000XRL module may be managed through either CLI (serial connection) or a Telnet connection. The module's Main Menu contains the following management functions:

Module status
Link status (TP and F/O), Link state (TP and F/O), SD (Signal Detect), A/N status, Pause mode (Flow Control), FP modes, SLE modes, remote device status, Redundant mode, Firmware revision

SFP ports status
Port#, Part#, Type (TP, MM, SM, SM-SFS), Range, Tx/Rx Wavelength, S/N

Module control
Channel x control, Redundancy control, Set redundant mode, restore module defaults

Channel control
Channel status, Port SFP status, Set channel description, FP/SLE control, enable/disable TP port, Set Pause mode, Set downstream BW (rate limit), Set port A/N mode, set port LB mode, restore channel defaults

Link Management
Invoke remote device, perform Loop-back test

General Specifications

Standard Compliance
IEEE 802.3 2000 edition, 1000Base-T, 1000Base-SX, 1000Base-LX, IEEE 802.3z, IEEE 802.3ab, Flow Control

Conversion Method
Digital 3R Conversion

MTU
10k octets (8.5k when using copper SFP)

Features
Auto-Negotiation, Fault Propagation, SLE, RSLE, and Loop-Back - under management control

SFP Transceivers Ports (x4)
See table two pages later. The SFP TP transceiver supports Auto-Negotiation and Auto-Cross features

MAIN to Backup switchover
5µsec max. from Main link failure detection.

Backup to MAIN switchover
Tunable to 0/5/10/20/ sec or stay on backup

Diagnostics LEDs
For each SFP port (Local M1, Remote M2, Local B1, Remote B2): Link/Activity (green) - indicates Link and Activity; MA (green) - MA management is functioning; In-Use (green) - denotes device activity; TX-Low (Red): indicates low transmitted power in SFP, Blinking = when the SFP is not authenticated (in such case there will be no transmission)

Management
SNMP/MA via ***MetroStar™*** Management module
RS232/CLI or Telnet connection

Management of Remote Devices
via MA/AH (802.3ah)

DIP Switches (on board)
S1= Redundancy/Dual Channel selector
S2 = Auto-Negotiation for Local Main and Backup ports
S3= Auto-Negotiation for Remote Main and Backup ports
Management override DIP Switches setting

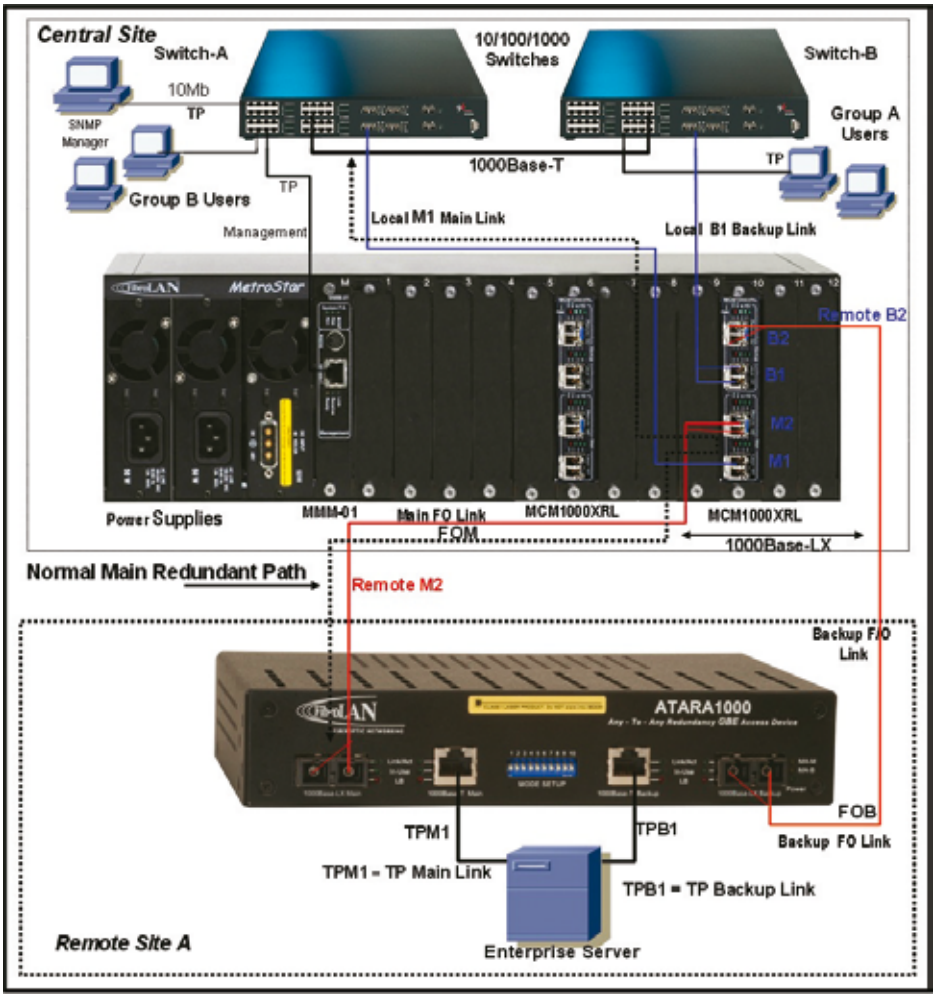
E1 section – Standards Compliance
Supports AMI/HDB3 Coding Types; Waveforms meet G.703; Transmit return loss specifications - ETSI ETS-300166; Jitter as per ETSI CTR12/13, ITU G.736, G.742, and G.823; LOS per ITU G.775

T1 section - Standards Compliance
Supports AMI/B8ZS Coding Types. Output Power Waveforms meet ANSI T1.102 Jitter attenuation per AT&T Pub 62411LOS per ANSI T1.231

E1 –delay
Total link latency (between 2 x MCM1000XRL-4 E1 devices, excluding signal over fiber propagation) = 850 µsec.

T1 –delay
Total link latency (between 2 x MCM1000XRL-4T1 devices, excluding signal over fiber propagation) = 1130 µsec.

Basic Topology



The above configuration provides full redundancy with a rich repertoire of management functions and is suitable for mission critical applications.

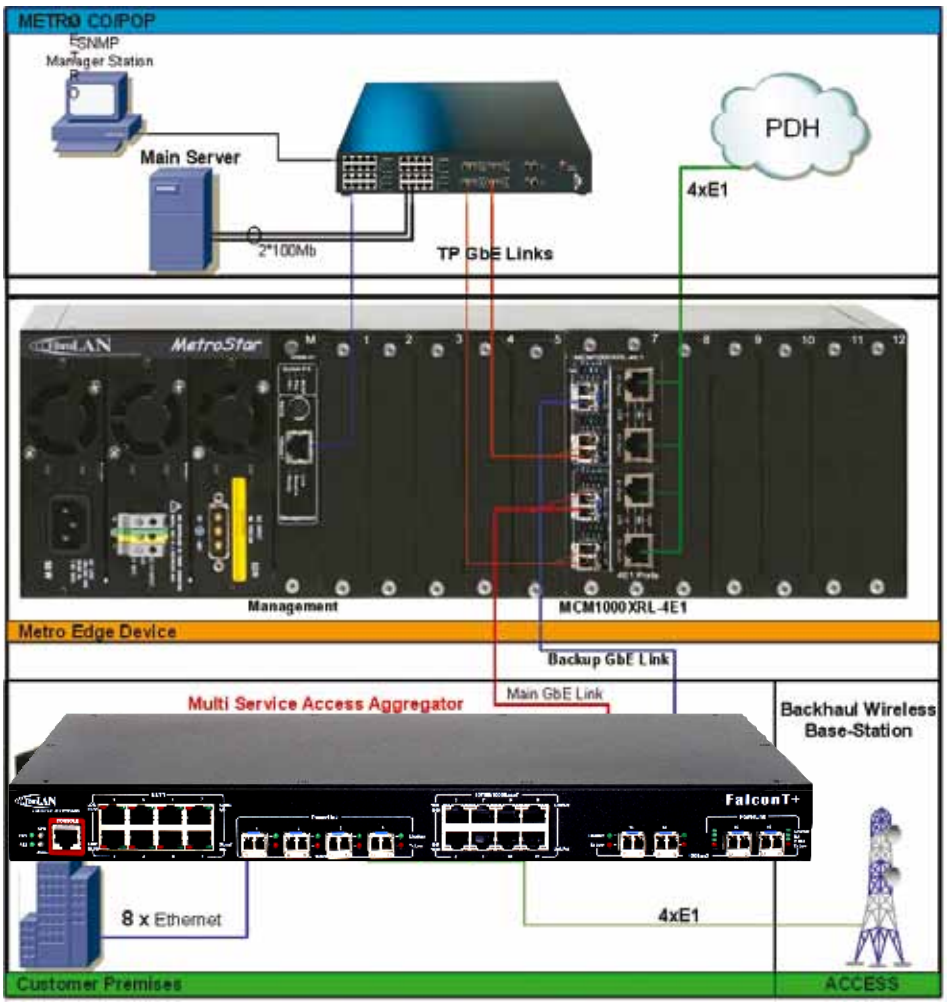
Ordering Information

Part#	Model	Description
2651	MCM1000XRL	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver, MA
2652	MCM1000XRL-4E1	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver and 4E1 channels tunneled over GBE, 4*RJ-45 ports, MA, dual slot
2653	MCM1000XRL-4T1	Any to Any link protection Gigabit Ethernet conversion module for ***MetroStar™*** with 4 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver and 4 T1 channels tunneled over GBE, 4*RJ-45 ports, MA, dual slot

MS

MCM100-XRL

E1/T1 over FO Backhaul resilient Solution



SFP (Small Form Pluggable) optical modular interfaces

B248	SF1G-T	SFP (Small Form-factor Pluggable) GBE STP transceiver, 1000BaseT, shielded RJ-45, 100m over Cat.6 cable
B235	SF1G-S1	SFP GBE F/O transceiver, Duplex LC connectors, MM, 850nm, 220/550m
B236	SF1G-LX1	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm,10km
B237	SF1G-LX2	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm, 20km
B238	SF1G-LX3	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 40km
B239	SF1G-LX4	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 80km
B240	SF1G-LX5	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB/APD, 120km
B241	SF1G-SF13	SFP, Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM, 1310nmTx – 1550nmRx, 20km
B242	SF1G-SF15	SFP SFS GBE F/O transceiver, Simplex LC connector, SM 1550nmDFB Tx – 1310nmRx, 20km
B243	SF1G-LF13	SFP SSFS GBE F/O transceiver, Simplex LC connector, SM 1310nmTx – 1550nmRx, 40km
B244	SF1G-LF15	SFP SFS GBE F/O transceiver, Simplex LC connector,SM,1550nmDFB Tx -1310nm Rx, 40km
B281-8	SF1G-LX5- 5C- WW	CWDM SFP, 1.25 Gbps F/O transceivers, dual LC connector, SM, 1471nm – 1611nm range, DFB/APD, 120km (ww=47=1471nm,49=1491nm, 51=1511nm, 53=1531nm, 55=1551nm,57=1571nm; 59=1591nm 61=1611nm)

Specifications are subject to change w/o prior notice

MS

MCM100-E1/T1

100Base-TX to 100Base-FX Converter with tunneled E1/T1

This module provides one Layer1 100Base-TX to 100Base-FX conversion channel plus one or two E1 or T1 channels tunneled over the 100Base-FX. The module integrates traffic coming from a legacy WAN with 100Mbps from the IP network onto a single bit stream, connected via 100Base-FX to a remote LTA41-E1 or LTA-41-T1 device where it interfaces customer's LAN and PABX - and vice versa. When both E1/T1 links are operational, they consume no more than 5% of the Fast-Ethernet bandwidth. Consequently, it allows the migration of existing infrastructure from WAN to Metro Ethernet. The module is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150 km. Fault Propagation is bi-directional (FO>TP and TP>FO) to allow network redundancy (provided that the switch/router to which it is connected is properly set to activate an alternate path).

The TEST switch disables FP function and it is used for diagnostic purposes. Its RJ-45 port is Autocross compliant, making installation trouble free. The Subscriber Link Emulation (SLE) - when link partner is an MA enabled device - allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over - subscription rates. Like other ***MetroStar™*** modules, the MCM100-E1/T1 is fully SNMP managed.

The embedded MA chip allows full management of a remote LTA41-E1 or LTA41-T1 device eliminating the need of costly SNMP processors and IP adresses in such devices. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected

General Specifications

Standard Compliance: IEEE 802.3u, 100Base-TX, 100Base-FX
RJ-45 ports: Shielded, Auto-Cross, 100m over STP Cat 5 cabling. The TP port is preset to 100 Mb and FDX with Auto-Negotiaton advertising
LEDS: Per module - Power ON; F/O Link/ Activity; TP (100Base-TX) Link/ Activity. The TP is preset to 100Mb and FDX; Per E1 or T1 channel: Local Signal, LOS
E1/T1 Ports (1 or 2): RJ-48 copper port, 120Ω, 210m
Management: FibroLAN ***MetroView*** Management System SNMP via ***MetroStar™***
Management module. Management of remote device: Through MA
Conversion Method: Direct Conversion
F/O ports: See table next page
E1 section - standard compliance: Supports AMI/HDB3 Coding Types; Waveforms meet G703; Transmit return loss specifications - ETSI ETS - 300166; Jitter as per ETSI CTR12/13, ITU G.736, G.742, and G.823; LOS per ITU G.775; Delay: total link latency: 2x E1 or 2x T1 ports excluding signal over fiber propagation - <800 µsec/ <1050 µsec
T1 section - standard compliance: Supports AMI/B8ZS Coding Types; Waveforms meet ANSI T1.102; Transmit return loss specifications - ETSI ETS - 300166; Jitter attenuation as per AT & T Pub 62411; LOS per ANSI T1.231
DIP switches (on board): Enable/Disable Loop-Back on E1 or T1 port(s). Fault Propagation (FO>>TP, TP>>FO) ON/OFF

Management Functions

The following management functions are available for the MCM100 module (Ethernet channel) through the ***MetroStar™*** *System Management:*

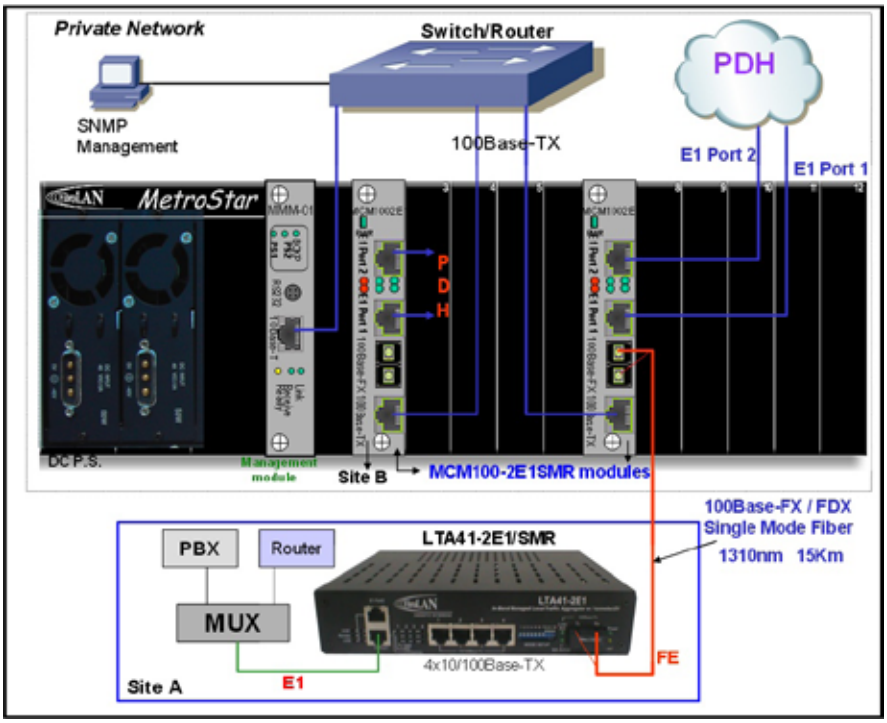
Module status
Link TP and F/O port status, Channel bandwidth, FP modes (F>>T and T>>F), SLE modes, (Up and Downstream), Channel Pause mode (Flow Control), Remote MA device Status (type and Power)
Module control
Channel control, restore module default values, Reset module
Channel control
Set port description, FP/SLE control, enable/disable TP port, Set Pause mode
Channel FP/SLE control
TPFO FP mode, FO>>TP FP mode, Down/Upstream SLE mode
Link Management
Link status, set link bandwidth, perform Loop-back test, Remote Device Control and Status, and Restore link default parameters
E1/T1 Management Menu
Under this menu, we may perform the following operations:
Ports status and configuration
Port Management
Reset E1 or T1 ports
Restore E1/T1 default configuration

MCM100-E1/T1

Typical Network

A ***MetroStar***™ system, loaded with 12x MCM-E1 or MCM100-E1 or MCM100-T1 conversion modules, can connect 12 x installed LTA41-E1/T1 devices and more than 48 subscribers (if Hubs and switches are attached to the LTA41-E1/T1 Ethernet TP ports). The MMM-01 Management module installed in the ***MetroStar***™ system will monitor, control and manage the modules installed in the ***MetroStar***™ chassis and the remote LTA41-E1/T1 devices. It will report alerts and traps to the SNMP Manager located in the Central Node.

MetroStar™ ***equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc)***



Ordering Information and F/O ports specifications

Part#	Model	E1/T1 Channels	F/O port Connector & mode	Transmit WL	Minimal Output Power	Receive WL	Typical Receive Sensitivity	Distance km
2701	MCM100-1E1SC	1	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2702	MCM100-1E1SMR7	1	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
2703	MCM100-1E1SMR	1	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
2704	MCM100-1E1SM	1	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
2705	MCM100-1E1SML	1	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
2706	MCM100-1E1SML2	1	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
2707	MCM100-1E1SMRF15	1	Duplex SC, SM	1550nm	-15dBm	1310nm	-35dBm	0-15
2711	MCM100-2E1SC	2	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
2712	MCM100-2E1SMR7	2	Duplex SC, MM	1310nm	-20dBm	1310nm	-30dBm	0-7
2713	MCM100-2E1SMR	2	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
2714	MCM100-2E1SM	2	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
2715	MCM100-2E1SML	2	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
2716	MCM100-2E1SML2	2	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
2718	MCM100-2E1SML3	2	Duplex SC, SM	1550nmDFB	-5dBm	1310nm	-38dBm	40-100
2717	MCM100-2E1SMRF15	2	Duplex SC, SM	1550nm	-15dBm	1310nm	-35dBm	0-15
2752	MCM100-1T1SMR7	1	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
2762	MCM100-2T1SMR7	2	Duplex SC, MM	1310nm	-20dBm	1310nm	-30dBm	0-7

Specifications are subject to change w/o prior notice

MS

MCM110

10/100Base-TX to 100Base-FX Buffered Converter Module

The MCM110 belongs to the ***MetroStar™*** modules family products. This module provides one or two buffered and independent 10/100Base-TX to 100Base-FX conversion channels. The module is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150km. The TP port is auto-negotiating; other modes can be forced to succesfully interconnect with any type of device. Selective Fault Propagation from the F/O port to the TP port or vice versa allows network redundancy (provided that the switch/router to which it is connected is properly set to activate an alternate path).

The module supports additional features: Flow Control, Far End Fault Signaling (FEF) for F/O Link testing, Subscriber Link Emulation (SLE) and Loop-back test over the selected link. Like other ***MetroStar™*** modules, the MCM110 is fully SNMP managed. The embedded MA chip allows full management of remote (MA enabled) devices eliminating the need of costly SNMP processors and IP addresses in such devices. All ***MetroStar™*** modules are hot swappable and equipped with two selfclinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and „alive“ even before links are connected.

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 10Base-T, 100Base-FX, FDX Flow Control (IEEE 802.3x), HDX Back Pressure flow control
RJ-45 ports
Shielded, 100m over STP Cat 5 cabling
Auto-Negotiation or Manual mode (A/N disabled)
Diagnostic LEDs
Per module - Power ON
Per channel - F/O Link/Activity, TP Link/Activity
Management
FibroLan ***MetroView*** management System SNMP through ***MetroStar™*** Management module. Management of remote device: via MA
Conversion Method
Buffered with bi-directional Fault Propagation Wire Speed Switching, 64kbytes Frame Buffers, 1k MAC addresses, Large frame (1536 Bytes) handling
F/O ports
operate at 100Mbps and FDX.
Features
Flow Control, Far End Fault,
bi-directional Fault Propagation and Subscriber Link Emulation (SLE)
DIP switches (on board)
Per channel; Fault Propagation ON/OFF (FO>TP,TP>FO)
Auto-Negotiation ON/OFF
TP port selection: HDX/FDX and 10/100Mb

Management Functions

*The following management functions are available for the MCM110 module through the managed **MetroStar™** System:*

Module Status
Link TP and F/Oport status, Channel bandwidth (upstream and downstream), FP modes (FO>>TP and TP>>FO), SLE modes (upstream and downstream), Channel Pause mode (Flow Control), TP Link configuration (Auto-Negotiation, Duplex mode and Line Data Rate), Remote MA device Status (type and Power)

Module Control
Channel 1 and 2 Controls, restore module default values, Reset module

Channel Control
Set port description, FP/SLE control, enable/disable TP port, Set Auto-Negotiation, Set Duplex Mode, Set Pause Mode, Set Line Data Rate (10/100Mb).

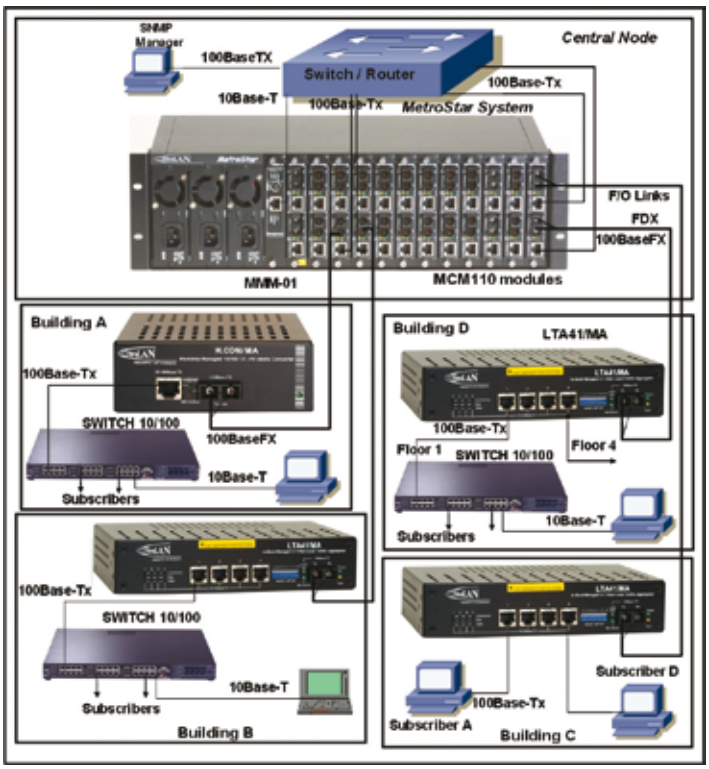
Channel X FP/SLE Control
TP>>FO and FO>>TP modes, Downstream and Upstream SLE modes

Link Management
Link status, set link bandwidth, perform Loop-back test, Remote Device Control and status, Restore link default parameters.

MCM110

Typical Topology

MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc).



Ordering Information

MCM110-01SC/ST/MT	Single Channel 10/100Base-TX to FX converter, Multi-mode 2 km, Dual SC/ST/MTRJ connectors, MA
MCM110-01SMR7	Single Channel 10/100Base-TX to FX converter, Single-mode 7 km, 1310nm, Dual SC connectors, MA
MCM110-01SMR	Single Channel 10/100Base-TX to FX converter, Single-mode 15 km, 1310nm, Dual SC connectors, MA
MCM110-01SM	Single Channel 10/100Base-TX to FX converter, Single-mode 25 km, 1310nm, Dual SC connectors, MA
MCM110-01SML	Single Channel 10/100Base-TX to FX converter, Single-mode 40 km, 1310nm, Dual SC connectors, MA
MCM110-01SML2	Single Channel 10/100Base-TX to FX converter, Single-mode 70 km, 1310nm, Dual SC connectors, MA
MCM110-01SML3	Single Channel 10/100Base-TX to FX converter, Single-mode 100 km, 1550nm/DFB, Dual SC connectors, MA
MCM110-01SMLX	Single Channel 10/100Base-TX to FX converter, Single-mode 150 km, 1550nm/DFB, Dual SC connectors, MA
MCM110-01SMRF15	Single Channel 10/100Base-TX to FX converter, Single-mode, Single fiber Strand, 1550nm Tx, 20 km, simplex SC, MA
MCM110-01SMLF15	Single Channel 10/100Base-TX to FX converter, Single-mode, Single fiber Strand, 1550nm/DFB Tx, 40 km, simplex SC, MA
MCM110-01SMRF1313	Single Channel 10/100Base-TX to FX converter, Single-mode, Single fiber Strand, 1310nm Tx/Rx 20 km, simplex SC, MA
MCM110-02SC/ST/MT	Dual Channel 10/100Base-TX to FX converter, Multi-mode 2 km, Dual SC/ST/MTRJ connectors, MA
MCM110-02SMR7	Dual Channel 10/100Base-TX to FX converter, Single-mode 7 km, 1310nm, Dual SC connectors, MA
MCM110-02SMR	Dual Channel 10/100Base-TX to FX converter, Single-mode 15 km, 1310nm, Dual SC connectors, MA
MCM110-02SM	Dual Channel 10/100Base-TX to FX converter, Single-mode 25 km, 1310nm, Dual SC connectors, MA
MCM110-02SML	Dual Channel 10/100Base-TX to FX converter, Single-mode 40 km, 1310nm, Dual SC connectors, MA
MCM110-02SML2	Dual Channel 10/100Base-TX to FX converter, Single-mode 70 km, 1310nm, Dual SC connectors, MA
MCM110-02SML3	Dual Channel 10/100Base-TX to FX converter, Single-mode 100 km, 1550nm/DFB, Dual SC connectors, MA
MCM110-02SMLX	Dual Channel 10/100Base-TX to FX converter, Single-mode 100 km, 1550nm/DFB, Dual SC connectors, MA
MCM110-02SMRF15	Dual Channel 10/100Base-TX to FX converter, Single-mode, Single fiber Strand, 1550nm Tx, 20 km, simplex SC, MA

Specifications are subject to change w/o prior notice

MS

MCM1000T

1000Base-T to 1000Base-SX /LX Converter Module

This module provides conversion from a copper GBE interface (1000Base-T) to a Multi-Mode (1000Base-SX) or Single Mode Link (1000Base-LX) to allow extension of up to 120km. Combining low cost GBE switches with multiple RJ-45 ports with a ***MetroStar™*** loaded with MCM1000T modules provides the most flexible and cost effective way to extend their reach over fiber The MCM1000T module is based on 3R technology: full 3R Regeneration (re-amplification, re-shaping, re-timing) is implemented between the two ports. This design provides a resilient and steady conversion, advanced control /diagnostic features and management. The unique Link Segmentation Tests (LST) provides a powerful diagnostic tool while the Subscriber Link Emulation (SLE) - when link partner is a GSM10xx/MA device – allows real time notification of the remote user failure while maintaining the fiber link active.

A Loop-Back function (on both ports) simplifies troubleshooting of link problems. Each port provides separate Link and Activity indications for enhanced diagnostics. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates.
Like other ***MetroStar™*** modules, the MCM1000T is fully SNMP managed. The embedded MA™ chip controller allows full management of remote (MA enabled) devices, eliminating the need of costly SNMP processors and IP addresses in such devices.
All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected. The module supports OFC (Offline Configuration Facility).

General Specifications

Standard Compliance: IEEE802.3 2000 edition, 1000Base-T, 1000Base-SX, 1000Base-LX, IEEE802.3z, IEEE802.3ab
1000Base-T port: Copper: Shielded RJ-45, Auto-Cross, 100m over Cat.6
The copper port supports Auto-Negotiation with
Advertising 1000Base-T Full Duplex
Conversion Method: Direct Digital (3R)
Features: LST(Link Segmentation Test) for TP and F/O port
SLE (Subscriber Link Emulation) Rate limiting (symmetrical/asymmetrical) at 10Mbps steps
F/O ports: Duplex SC,MMF 850nm 1000Base-SX (220/500m)
Duplex SC, SMF, 1310/1550nm, 1000Base-LX,
10/20/40/80/120km, Single Fiber Strand (SFS):1310/1550nm, 20/40km
Diagnostic LEDs: Per module - Power ON, MA Active
Per Port - Link, Activity, LST, LB (Loop-back)
DIP switches: (on board) per port:
LST (TP>FO, FO>TP) ON/OFF
Loop-Back ON/OFF (TP and F/O port)
Loop-Back mode: Diagnostic loop-back mode
Management: FibroLAN's ***MetroView*** Device Manager
RS232/CLI or Telnet connection
SNMP via ***MetroStar™*** Management module.
Remote MA devices management through
MA™ technology

Management Functions

The following management functions are available for the MCM1000T module (via CLI over serial or Telnet and SNMP):

Module status
Display the MCM1000T ports basic status and configuration settings:
Link TP and F/O status, Signal Detect status (F/O), Channel's enable, Auto Negotiation mode (LX), LST modes, Loop-back (TP and F/O ports), SLE modes, Remote MA device type and Power status, Pause mode

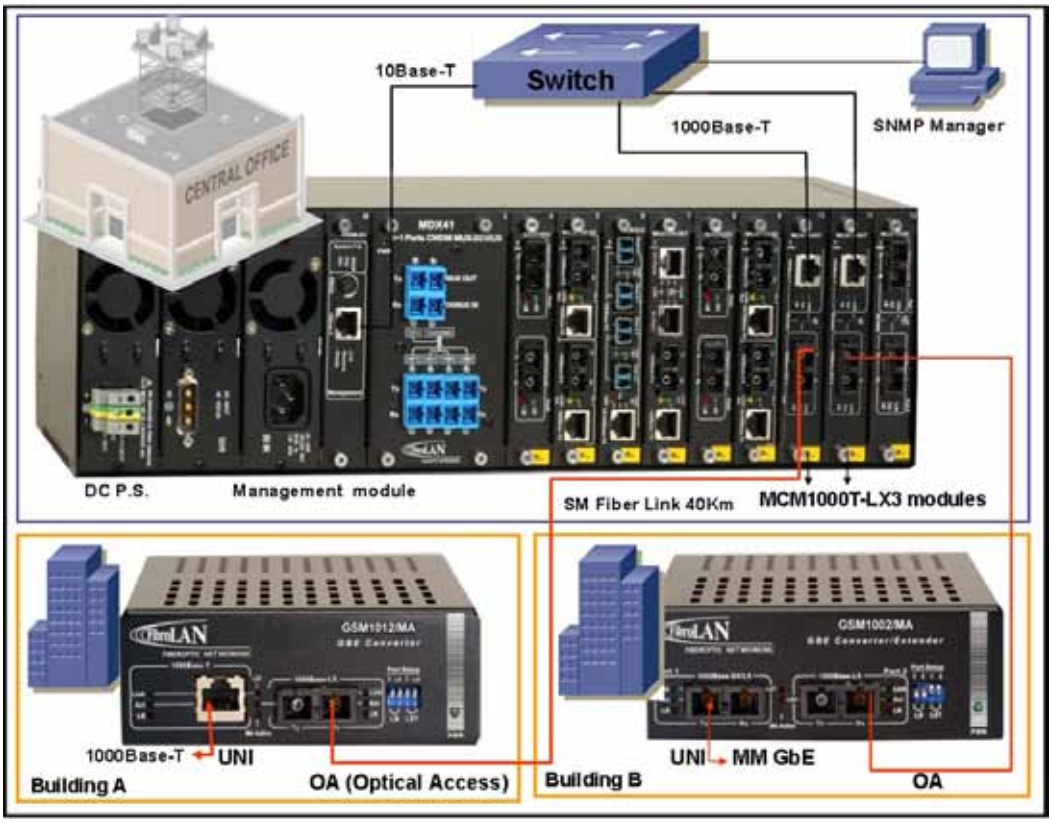
Module Control
Provides the user with options to set the channel's description, to invoke the LB/LST control menu, enable/disable channel, Set Auto-Negotiation mode (FO-LX), Set Pause mode (Flow Control), and to restore the module's defaults setting

Link management
Related to the complete MA link including both ends, the module channel on the local side and the remote CPE MA device:
Link Status, Set link bandwidth, Enable/Disable SLE Upstream/Downstream, invoke MA remote device menu, and Restore link default parameters of the local module channel and remote CPE

MS

MCM1000T

Typical Topology



MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc)

Ordering Information

Part#	Model	Description
2600	MCM1000T-S	1000T to 1000SX 850nm, MM Conversion Module, 220m duplex SC, MA
2601	MCM1000T-LX1	1000T to 1000LX 1310nm Conversion Module, 10km. duplex SC, MA
2602	MCM1000T-LX2	1000T to 1000LX 1310nm Conversion Module, 20km (over G.652 fiber). duplex SC, MA
2603	MCM1000T-LX3	1000T to 1000LX 1550nmDFB Conversion Module, 40km. duplex SC, MA
2604	MCM1000T-LX4	1000T to 1000LX 1550nmDFB Conversion Module, 80km. duplex SC, MA
2623	MCM1000T-LX5	1000T to 1000LX 1550nm DFB/APD Conversion Module, 120km.duplex SC, MA
2613	MCM1000T-LXF13	1000T to 1000LX, SFS, 1310nm Tx / 1550nm Rx Conversion Module, 20km (over G.652 fiber) simplex SC, MA
2614	MCM1000T-LXF15	1000T to 1000LX SFS 1550nm DFB Tx / 1310nm Rx Conversion Module, 20km (over G.652 fiber), simplex SC, MA
2618	MCM1000T-ZXF13	1000T to 1000LX SFS 1310nm DFB Tx / 1550nm Rx Conversion Module, 40km (over G.652 fiber).simplex SC, MA
2619	MCM1000T-ZXF15	1000T to 1000LX Single Fiber Strand (SFS) 1550nmDFB Tx / 1310nm Rx Conversion Module, 40km (over G.652 fiber), simplex SC, MA

Specifications are subject to change w/o prior notice

MS

MCM1000S/L

1000Base-SX/LX to 1000Base-LX Converter/Extender Module

This module provides conversion from a fiber-optic MM/SM GBE link (1000Base-SX/LX) to SM Link (1000Base-LX) to allow extension of up to 120km. Unlike other products available in the market, the MCM1000S/L is based on a full digital (3R) technology: Full 3R Regeneration (re-amplification, re-shaping, re-timing) is implemented between the two F/O ports. This design provides a resilient and stable conversion, advanced control and diagnostic features. In addition it facilitates special applications like cascading and management. FibroLAN's unique Link Segmentation Test (LST) allows easy link segmentation (selective per port) to facilitate network diagnostics and overcomes the fault propagation which is inherent to GBE F/O links. A Loop-Back function (separate for each port) simplifies troubleshooting of link problems. Each port provides separate Link and Activity indications for enhanced diagnostics.

The Subscriber Link Emulation (SLE) - when link partner is a GSM10xx/MA device - allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Like other ***MetroStar™*** modules, the MCM1000S/L is fully SNMP managed and MA™ enabled: it manages remote MA enabled devices (GSM1000/MA and GSM1010/MA series).

All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected. The module supports the Offline Configuration Facility.

General Specifications

Standard Compliance
IEEE802.3 2000 edition, 1000Base-SX, 1000Base-LX, IEEE802.3z, Flow Control

Conversion Method
Direct Digital (3R)

Management
FibroLAN's ***MetroView*** Device Manager
SNMP, Telnet and CLI (Terminal emulation)
Remote CPE MA™ Management

F/O Ports
Simplex and Duplex SC connectors
For FO ports specifications, refer to FibroLAN Data Sheet DS-FO

Diagnostic LEDs
Per module – Power ON, MA Active
Per Port – F/O Link, Activity, LST, LB

DIP switches
(on board) per port:
LST ON/OFF; Loop-Back ON/OFF
Management overrides DIP switches setting

Key Features

- *Two fiber (1000Base-SX/LX to 1000Base-LX) ports*
- *Covered distances: up to 80 km, extender up to 120 km.*
- *Conversion method: Direct Digital with LST capability.*
- *Managed by FibrLAN **MetroView** management system*
- *SNMP managed including Telnet and CLI*
- *Remote MA devices management*
- *Front panel MA Active LED*
- *Single Fiber Strand (SFS) modules (20 km and 40 km)*
- *LST: Link Segmentation Test for each port to locate a failing segment within a network*
- *Loop Back for each F/O port*
- *Diagnostic LED indicators for Link and Activity*
- *On board DIP switches for LB (Loop Back) and LST for each F/O port.*
- *Supports SLE (Subscriber Link Emulation) for mission critical networks*
- *Rate limiting 0-1000Mbps (symmetrical/asymmetrical) at 10Mbps increments*

MS

FibroLAN
FIBEROPTIC NETWORKING

MCM1000S/L

Management Functions

The following management functions are available for the MCM1000S/L module through an MA™ enabled and SNMP managed ***MetroStar™:***

Module status

Shows the MCM1000S/L ports basic status and configuration settings: Link status, Signal Detect status, Channel's enable, LST modes, Loop-back mode (SX and LX), SLE modes, Pause mode, Remote MA device type and Power status.

Module Control

Provides the user with options to set the channel's description, set Auto-Nego mode (FO-LX,SX),to invoke the LB/LST menu, enable/disable channel, set Pause mode, and to restore the module's defaults setting.

Link management

Related to the complete MA link including both ends, the module channel on the local side and the remote CPE MA device (if connected):
Link Status, Set link bandwidth, Enable/disable Downstream/Upstream SLE, invoke MA remote device menu, and Restore link default parameters of the local module channel and the remote device's channel.

Ordering Information

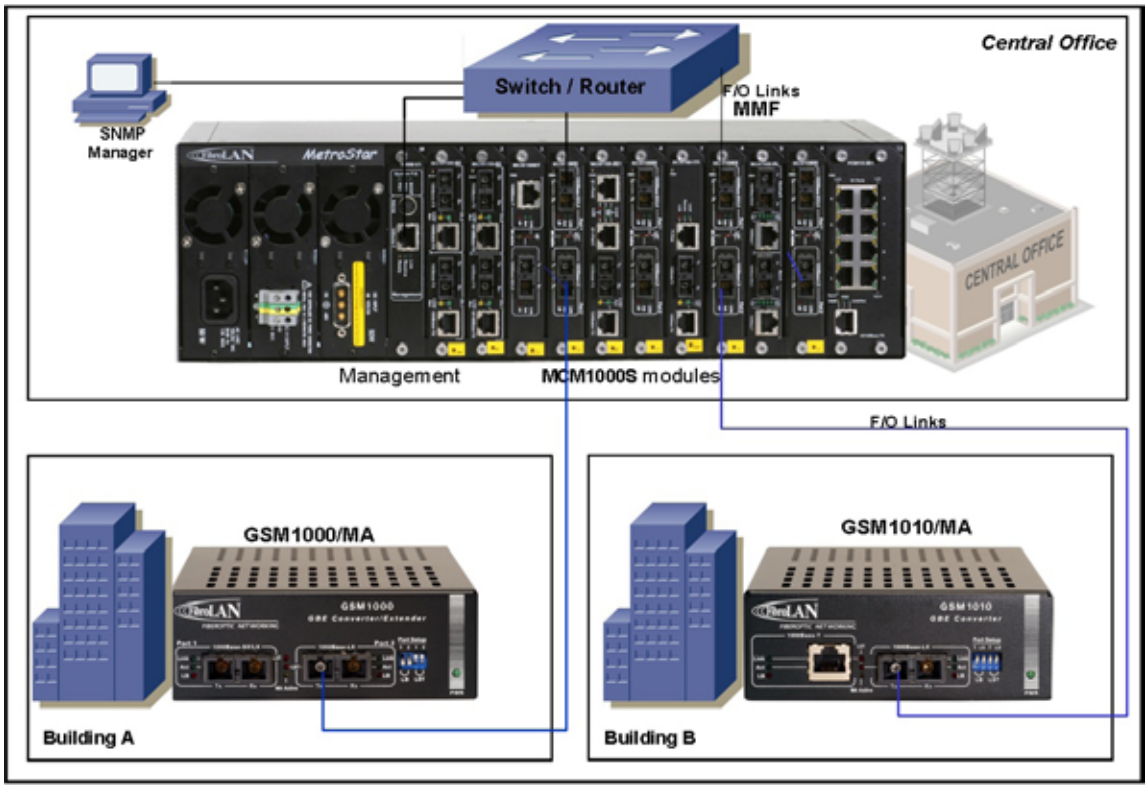
Part#	Model	Description
2605	MCM1000S-LX1	1000SX multi-mode 850nm, 220m, to 1000LX single mode 1310nm Conversion Module, 10km, 2*Duplex SC, MA
2606	MCM1000S-LX2	1000SX multi-mode 850nm, 220m, to 1000LX single mode 1310nm Conversion Module, 20km (over G.652 fiber), 2*Duplex SC, MA
2607	MCM1000S-LX3	1000SX multi-mode 850nm, 220m, to 1000LX single mode 1550nmDFB Conversion Module, 40km, 2*Duplex SC, MA
2608	MCM1000S-LX4	1000SX multi-mode 850nm, 220m, to 1000LX single mode 1550nmDFB Conversion Module, 80km, 2*Duplex SC, MA
2609	MCM1000S-LXF13	1000SX multi-mode 850nm, 220m, to 1000LX Single Fiber Strand, 1310nmTx/1550nmRx, Conversion Module, 20km (over G.652 fiber), 1xduplex/1xsimplex SC, MA
2610	MCM1000S-LXF15	1000SX multi-mode 850nm, 220m, to 1000LX Single Fiber Strand, 1550nmTxDFB/1310nmRx, Conversion Module, 20km (over G.652 fiber), 1xduplex/1xsimplex SC, MA
2620	MCM1000S-ZXF13	1000SX multi-mode 850nm, 220m, to 1000LX Single Fiber Strand, 1310nmTxDFB/1550nmRx, Conversion Module, 40km (over G.652 fiber), 1x duplex/1x simplex SC, MA
2621	MCM1000S-ZXF15	1000SX multi-mode 850nm, 220m, to 1000LX Single Fiber Strand, 1550nmTxDFB/1310nmRx, Conversion Module, 40km (over G.652 fiber), 1xduplex/1xsimplex SC, MA
2617	MCM1000L-LX1-2	1000LX single-mode 1310nm, 10km to 1000LX single-mode 1310nm Extender module 20km (over G.652 fiber), 2*Duplex SC, MA
2611	MCM1000L-LX1-3	1000LX single-mode 1310nm, 10km to 1000LX single-mode 1550nm DFB Extender module 40km, 2*Duplex SC, MA
2612	MCM1000L-LX1-4	1000LX single-mode 1310nm, 10km to 1000LX single-mode 1550nm DFB Extender module 80km, 2*Duplex SC, MA
2615	MCM1000L-LX3-3	1000LX single-mode 1550nm DFB, 40km to 1000LX single-mode 1550nm DFB Extender module 40km, 2*Duplex SC, MA
2616	MCM1000L-LX4-4	1000LX single-mode 1550nm DFB, 80km to 1000LX single-mode 1550nm DFB Extender module 80km, 2*Duplex SC, MA
2622	MCM1000L-LX4-5	1000LX single-mode 1550nm DFB, 80km to 1000LX single-mode 1550nm DFB/APD 120km Extender module, 2*Duplex SC, MA

Specifications are subject to change w/o prior notice

MS

MCM1000S/L

Typical Topology



F/O ports specifications

Modules	Port 1			Port 2			
	Minimal Output Power	Minimal Receive Sensivity dBM	Wavelength nm	Minimal Output Power	Minimal Receive Sensivity dBM	Wavelength nm	Suggested Distance km
MCM1000S-LX1	-9,5	-17	850	-10	-23	1310	0.22, 0.55/5-10
MCM1000S-LX2	-9,5	-17	850	-5	-23	1310	0.22, 0.55/5-20
MCM1000S-LX3	-9,5	-17	850	-3	-23	1550Tx/DFB	0.22, 0.55/10-40
MCM1000S-LX4	-9,5	-17	850	0	-23	1550Tx/DFB	0.22, 0.55/25-80
MCM1000S-LXF13	-9,5	-17	850	-5	-20	1310Tx/1550Rx	0.22, 0.55/5-20
MCM1000S-LXF15	-9,5	-17	850	-5	-20	1550Tx/DFB1310Rx	0.22, 0.55/5-20
MCM1000S-ZXF13	-9,5	-17	850	-3	-23	1320Tx/DFB1550Rx	0.22, 0.55/10-40
MCM1000S-ZXF15	-9,5	-17	850	-3	-23	1550Tx/DFB1310Rx	0.22, 0.55/10-40
MCM1000L-LX1-2	-9,5	-23	1310	-5	-23	1310	5-10/5-20
MCM1000L-LX1-3	-9,5	-23	1310	-3	-23	1550Tx/DFB	5-10/10-40
MCM1000L-LX1-4	-9,5	-23	1310	0	-23	1550Tx/DFB	5-10/25-80
MCM1000L-LX3-3	-9,5	-23	1550Tx/DFB	-3	-23	1550Tx/DFB	10-40/10-40
MCM1000L-LX4-4	-9,5	-23	1550Tx/DFB	0	-23	1550Tx/DFB	25-80/25-80
MCM1000L-LX4-5	-9,5	-23	1550Tx/DFB	0	-32	1550Tx/DFB/APD	25-80/80-120

Specifications are subject to change w/o prior notice

MS

MS

MCM1000X

Managed SFP 1000Base-T/SX/LX Module Converter

The MCM1000X module provides conversion from a 1000Base-T, Multi-Mode 1000Base-SX or Single Mode 1000Base-LX GBE link to 1000Base-T/1000Base-SX/LX GBE link, allowing extension of up to 120km. The MCM1000X is based on the 3R technology: optical signals from one port are converted to digital electrical signals, fully retimed, repeated, reshaped and then converted again to the second SFP port. The module is designed for use with SFP (Small Factor-factor Pluggable) optical modular transceivers. The power of the hot-swappable SFP is in the density, flexibility and cost-savings. SFP modules can be easily interchanged; therefore fiber optic networks can be upgraded and maintained more conveniently. The MCM1000X provides reliable and robust conversion, advanced control /diagnostic features and management.

Selective Fault Propagation from port 1 to port 2 and vice-versa allows link status forwarding. Each port provides separate and various LED indications for monitoring and enhanced diagnostics.
The device supports SLE (Subscriber Link Emulation) to enhance network resilience. When the link remote partner is a GSM1000X (enabled MA device), the SLE feature allows real time notification of the remote user failure while maintaining the fiber link and the MA management is maintained active and operational. The MA™ (Micro Agent) is an on chip management system enabling the management of remote access devices eliminating the need of an SNMP agent and IP address.

When the MCM1000X is connected through a F/O link to a remote device that is MA™ enabled, a comprehensive set of monitoring and controlling functions are implemented on the remote device. The module has MA management capability (or IEEE 802.3ah) for each port separately, thus each port may be connected to a remote CPE. Like other ***MetroStar™*** modules, the MCM1000X is fully SNMP managed and MA enabled or IEEE 802.3ah management: it manages remote enabled devices. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and “alive” even before links are connected.

Management Functions

Module status
Port type, Link and Signal Detect (SD) status, Port‘s enable/disable, A/N On/Off, Pause (Flow Control) On/Off, Loop back On/Off (P1, P2), SLE (Up/Down) On/Off, BW (Up/Downstream), End to End SLE modes, FP modes (P1>P2 and P2>P1) and Remote device
SFP modules status
(Port #, Part #, Type, Range, Tx-WL, Rx-WL, S/N)
SFP module digital diagnostics status
(Rx/Tx optical power, temperature, Tx bias current)
Module control
Display Module status, Port1/Port2 control, Enable/Disable End to End SLE, Enable/Disable Fault Propagation, Restore module defaults
Link management
Loop-back test, invoke Remote device menu
Port control
Display port status, SFP status, enable/disable port, Set Pause/LB (loop-back) mode, Set SLE (upstream/downstream), set bandwidth and restore port defaults, and set Management module (MA or IEEE 802.3ah)

Key Features

- *Versatility- different interfaces (1000Base-T/SX/LX) on both ports*
- *SFP (Small Form-factor Pluggable) optical interfaces*
- *MA™ or IEEE 802.3ah OAM management for each SFP port*
- *Feasible installation – desktop, shelf or wall-mount*
- *1000X –Auto-Negotiation is supported for each F/O port*
- *Fault Propagation-total network resilience*
- *Local and Remote Loop-Back Test – enhanced diagnostics*
- *SLE for enhancing network resilience*
- *Rate Limiting (0-1000Mbps- 10Mbps step increment)*
- *RFU (Remote Firmware Upgrade) and OFC (Offline Configuration Facility)*

MS

MCM1000X

General Specifications

Standard Compliance
IEEE802.3 2000 edition, 1000Base-T,1000Base-SX, 1000Base-LX, IEEE802.3z, IEEEE802.3ab, 1000base-ZX, Flow control

Conversion Method
Digital 3R conversion

Features
Auto-Negotiation, Fault Propagation, SLE and Loop-Back

Management
RS232/CLI or Telnet connection
MA™ /IEEE 802.3ah OAM management
FibroLAN ***MetroView*** (V2) Device Manager

Ports
Simplex and Duplex LC connectors
SFP (Small Form -factor Pluggable)
MSA and SFF-8472 compliant

Diagnostic LEDs
System LEDs: PWR-Power On (green)
MA1(green) MA port 1
FP (yellow) (P1>P2, P2>P1)
MA2 (green) MA port 2
SFP port 1 and 2 LEDs:
Link/Act (green) - Link and Activity
TX-LO(red)-lit = low power TX in SFP, blinking when not authenticated
LB (red) - loop-back for designated port

DIP switches (on board)
Loop-Back (LB P1, LB P2) enable/disable
Fault Propagation ON/OFF (FO port 1>2 (FO port 2>1)
Auto-Negotiation for Port 1 and Port 2 (enable/disable)
Management commands override DIP switches setting

Ordering Information

Part#	Model	Description
2650	MCM1000X	Flexible Gigabit Ethernet conversion module for ***MetroStar***™ with 2 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver, MA or IEEE 802.3ah management

SFP optical modular interfaces

B248	SF1G-T	SFP (Small Form-factor Pluggable) GBE STP transceiver, 1000BaseT, shielded RJ-45, 100m over Cat.6 cable
B235	SF1G-S1	SFP GBE F/O transceiver, Duplex LC connectors, MM, 850nm, 220/550m
B136	SF1G-LX1	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm,10km
B237	SF1G-LX2	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm, 20km
B238	SF1G-LX3	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 40km
B239	SF1G-LX4	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 80km
B240	SF1G-LX5	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB/APD, 120km
B241	SF1G-SF13	SFP, Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM, 1310nmTx - 1550nmRx, 20km
B242	SF1G-SF15	SFP Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM 1550nmDFB Tx - 1310nmRx, 20km
B243	SF1G-LF13	SFP Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM 1310nmTx - 1550nmRx, 40km
B244	SF1G-LF15	SFP Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM, 1550nmDFB Tx - 1310nm Rx, 40km
B269	SF1G-ZF49	SFP Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM, 1490nmDFB Tx -1570nm Rx, 80km
B270	SF1G-ZF57	SFP Single Fiber Strand GBE F/O transceiver, Simplex LC connector, SM, 1570nmDFB Tx – 1490nm Rx, 80km

Specifications are subject to change w/o prior notice

MS

PCM110

10/100Base-TX to 4E1/8E1 channels Protocol Converter Module

This module transports Fast Ethernet (10/100Base-TX) over up to 8 E1 circuits. This Inverse PDH Multiplexer allows carriers and enterprises to utilize their existing PDH infrastructure for delivering modern Ethernet services. The E1 channels form a Point-to-point Ethernet virtual connection. FibroLAN's advanced algorithms provide an unprecedented throughput of up to 19Mbps (small frames over 8xE1s). The Remote Loop back feature (enabled though management for each E1 port) is for enhanced diagnostics (verification of the E1 Links integrity).

The Fault Propagation feature is available from the 8 E1 ports to the Ethernet port: failure of all of the E1 ports will cause the shut down of the adjacent Ethernet TP Link port. The Ethernet RJ-45 port supports Auto-Negotiation, Autocross, Rate limiting, and Flow Control. The Subscriber Link Emulation (SLE) has an end to end functionality: failure of the Ethernet TP link port will cause the disconnection of the remote Ethernet TP port (and vice-versa).
The rate limiting mechanism provides the carrier with a tool to ensure SLAs of Ethernet services.

Like other ***MetroStar™*** modules, the PCM110-8E1 is fully SNMP managed. The module occupies 2 out of 12 available ***MetroStar™*** slots.
The PCM110-8E1 modules are hot swappable and equipped with four self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slots and "alive" even before links are connected. The module supports remote firmware upgrade.

General Specifications

Standard Compliance: Ethernet
IEEE802.3u, 10Base-T, 100Base-TX

Frame Size/Throughput
Up to 1916 bytes. Ethernet throughput: up 19Mbps (over 8xE1 channels)

RJ-45 Port
Shielded, Auto-Cross, 100m over STP Cat5 cabling; Auto-Negotiation and Flow Control; Speed and Duplex mode can be forced

Management
SNMP, CLI, Telnet via ***MetroStar™*** Management module. FibroLAN ***MetroView*** management system

Features
Fault Propagation, Flow Control, Subscriber Link Emulation, Loop-Back, Port configuration and Rate Limiting

Diagnostic LEDs (Per module)
PWR - Power ON/OFF; TP port (10/100Base-TX), Link/Act (green, lit=link, blinking=activity (Tx, Rx); FDX (green)= Full Duplex; 100M (orange LED) when ON =100Mbps, Off=10Mbps; Per E1 port - Signal (green), LOS (red, loss of Signal)

Standards Compliance E1
AMI /HDB3 line encoding/decoding; G.703; LOS per ITU G.775
Unframed E1 transmission

E1 ports
The E1 ports are RJ-45, 120Ω, balanced, short/long Haul.

Channels ordering
When two PCM110-8E1 are interconnected via a PDH/SDH network, these modules automatically determine the E1 channels connectivity and data synchronisation

DIP Slide switches (on board)
Ethernet port Auto-Negotiation; Ethernet port 10/100
Ethernet port Half/Full Duplex; All E1 ports Loop Back enable/disable;
Fault Propagation : E1 >TP (On/Off); Enable/disable SLE Functionality
Management functions override DIP switches setup

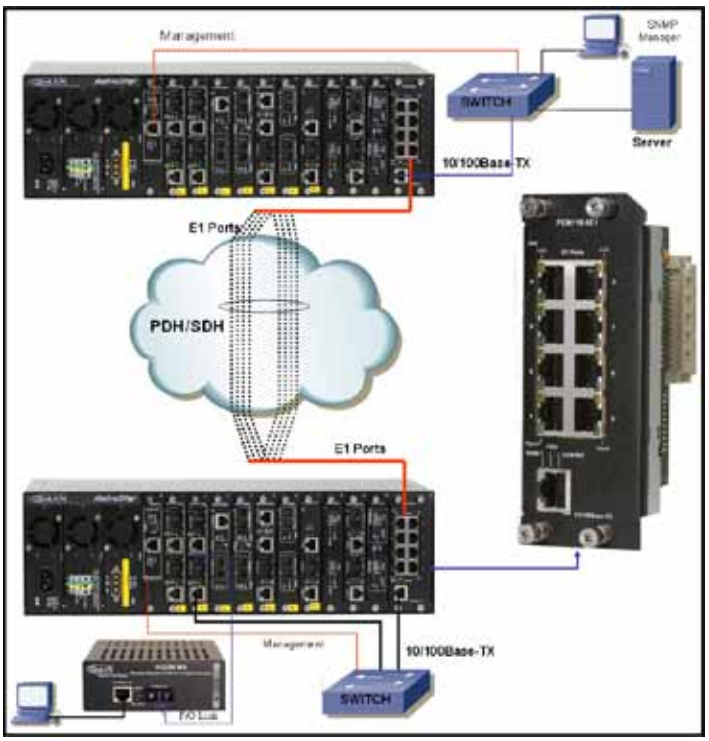
MS

PCM110

Typical Topology

A ***MetroStar™*** system, loaded with 6x PCM110-8E1 conversion modules can connect 48 E1 channels.
The MMM-01 Management module installed in the ***MetroStar™*** System will monitor, control and manage the modules installed in the ***MetroStar™*** chassis and the remote devices. It will report alerts and traps to the SNMP Manager located in the Central Node.

MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g., HP OpenView, SNMPc, etc as well as FibroLAN's MetroView) In the above network, the SNMP Manager station is able to monitor and control both MetroStar™ chassis.



Management Functions

Ethernet configuration menu

display module's status, Set Auto-Negotiation mode, Set Duplex Mode, Set Data Rate, Set Pause (Flow Control) mode, Set 8E1>Ethernet FP mode, Set SLE mode, Set port's Enable mode, Set Ingress bandwidth, Restore module's defaults.

E1 ports configuration

View status and configuration, enable/disable remote loopback, enable/disable transmitter, enable/disable receiver, enable/disable TAOS on LOS, select encoding, restore default setting.

Ordering Information

Part#	Model	Description
2731	PCM110-8E1	Inverse PDH Multiplexer, transporting 10/100TX over 8E1 channels;1+8 RJ-45 ports, dual slot mode
2730	PCM110-4E1	Inverse PDH Multiplexer, transporting 10/100TX over 4E1 channels;1+4 RJ-45 ports, dual slot mode

Specifications are subject to change w/o prior notice

MS

MSM100U

Universal Multi-Mode to Single-Mode Media Converter

The MSM100U module series for the ***MetroStar™*** System provides the network designer with a flexible, cost effective and a trouble-free tool for MM to SM conversion and network extension. The MSM100U is a universal protocol transparent device. Converting digital signals ranging up to 155Mbps from multi-mode to single-mode fibers and covering distances up to 150km (data rate covers range from 40 to 155Mbps). Being transparent, module's deployment is easy and does not require any settings for measurements. The device is protocol independent for the specified transmission speed, however it is delivered qualified for the 3 most popular standards in this range: ATM/OC3, Fast Ethernet (100Base-FX) and ESCON. MSM100U models may be used with Single Fiber F/O ports for network extension or wavelength converters.

All ***MetroStar™*** modules are hot swappable and equipped with self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and „alive" even before links are connected. As part of the ***MetroStar™*** System, module can be managed by the ***MetroStar™*** MMM-01 management module and by an SNMP Management station.

General Specifications

Standard Compliance
ATM-OC3, Fast Ethernet (100Base-FX), ESCON
F/O ports
Simplex SC and Duplex SC
Data Rate
40 to 150 Mbps
Network Extension
up to 150 km
Loop Back (LB)
test for each F/O port
DIP slide switches setting
S1: Enable/Disable LB for F/O port 1
S2: Enable/Disable LB for F/O port 2
S3: Disconnect between F/O ports (ON/OFF)
Conversion Method
Protocol Transparent
Diagnostic LEDs
Power ON/OFF; SD: Signal Detect for MM Rx port;
SD: Signal Detect for SM Rx port; LB: when lit indicates port 1
is in Loop-back mode; LB: when lit indicates port 2 is in Loop-back mode
Management

FibroLAN ***MetroView*** Management System. Through the ***MetroStar™***
MMM-01 module and/or via SNMP management station (CLI and Telnet)

Management Functions

*The MSM100U module is managed through either a serial connection (CLI through **MetroStar™** MMM-01 RS232 port) or via a Telnet connection. The following functions are implemented:*

Module Status
Signal Detect and Loop-Back (for both ports),
Channel's enabled mode

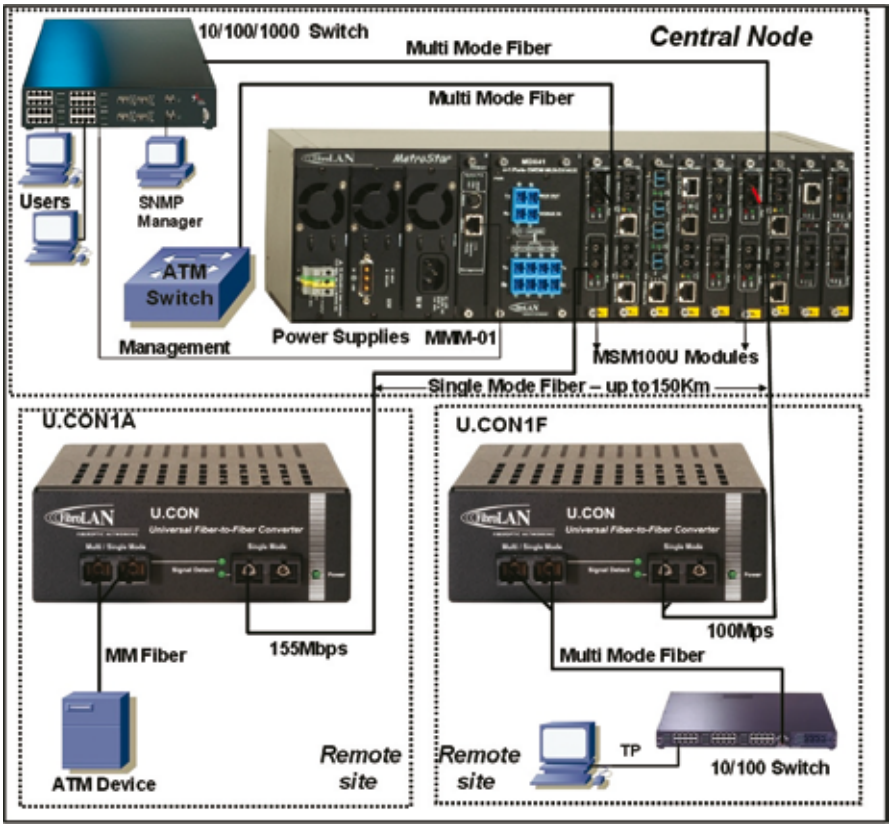
Module Controls
Change enabled mode, Change port1 LB mode,
Change port2 LB mode, Restore module defaults setting

MS

MSM100U

Typical Topology

MetroStar™ equipped with a management module can be monitored and managed from any SNMP management station running popular management platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc).



Ordering Information and F/O ports specifications

Part#	Modules	Port 1			Port 2			
		Minimal Output Power dBm	Typical Receive Sensivity dBm	Wavelength nm	Minimal Output Power dBm	Typical Receive Sensivity dBm	Wavelength nm	Suggested Distance km
2500	MSM1000U-SMR7	-18	-32	1310	-20	-30	1310	0-2, 0-7
2501	MSM1000U-SMR	-18	-32	1310	-16	-30	1310	0-2, 0-15
2502	MSM1000U-SM	-18	-32	1310	-15	-36	1310	0-2, 0-25
2503	MSM1000U-SML	-18	-32	1310	-11	-36	1310	0-2, 15-40
2504	MSM1000U-SML2	-18	-32	1310	-2	-36	1310	0-2, 25-70
2505	MSM1000U-SML3	-18	-32	1310	-5	-38	1550/DFB	0-2, 40-100
2506	MSM1000U-SMLX	-18	-32	1310	0	-38	1550/DFB	0-2, 70-150
2507	MSM1000U-SMRF13	-18	-32	1310	-15	-35	1310nm Tx	0-2, 0-15
2508	MSM1000U-SMRF15	-18	-32	1310	-15	-35	1550nm Tx	0-2, 0-15
2509	MSM1000U-SME	-20	-30	1310	-15	-36	1310	0-7, 0-25
2518	MSM1000U-SME-7-7	-20	-30	1310	-20	-30	1310	0-7, 0-7
2510	MSM1000U-SME L1-1	-11	-36	1310	-11	-36	1310	15-40, 15-40
2511	MSM1000U-SME L3-3	-5	-38	1550/DFB	-5	-38	1550/DFB	40-100, 40-100

Specifications are subject to change w/o prior notice

MS

MSM622U

Universal Fiber to Fiber - Media Converter/Extender

The MSM622U module series for the ***MetroStar™*** System provides the network designer with a flexible, cost effective tool for MM/SM to SM conversion and network extension. The MSM622U is a universal, protocol transparent device, converting digital signals ranging up to 622Mbps from multi-mode or single mode to single mode fibers and distances of up to 120km (data rate covers range from 100 to 622Mbps). Being transparent, their deployment is easy and does not require any settings or measurements. The device is protocol independent and supports the popular standards in this range: ATM/OC12 and STM-4. Product range includes models with both ports SM for network extension or wavelength conversion. As part of the ***MetroStar™*** system, the module is managed and allows advanced functions: Loop-Back and port connect/disconnect. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected.

General Specifications

Standard Compliance: ATM-OC12, STM-4
Conversion Method: Protocol Transparent
Diagnostic LEDs: Power On/Off; SD(Signal Detect)
Port 1; SD(Signal Detect) Port 2; Port 1 in loop-Back mode;
Port 2 in loop-Back mode
F/O Ports: Duplex SC
Data Rate: 100 to 622Mbps
Network Extension: up to 80 km
Loop Back (LB): test for each F/O port
DIP slide switches setting: Enable/Disable LB for F/O port 1;
Enable/Disable LB for F/O port 2; Disconnect between F/O ports(On/Off)

Management Functions

*The MSM100U module is managed through either a serial connection (CLI through **MetroStar™** MMM-01 RS232 port) or via a Telnet connection. The following functions are implemented:*

Module Status
Signal detect and Loop-Back (for both ports), Channel's enabled mode

Module Control
Change enabled mode; Change port1 LB mode; Change port 2LB mode;
Restore module defaults setting

F/O ports specifications

Model	Port 1			Port 2			
	Minimal Output Power dBm	Minimal Receive Sensivity dBm	Mode Wavelength nm	Minimal Output Power dBm	Minimal Receive Sensivity dBm	Mode Wavelength nm	Suggested Distance km
MSM622U-SM	-19	-26	MM-1310	-5	-23	SM-1310	0-2, 0-7
MSM622U-SML	-19	-26	MM-1310	-3	-23	SM-1550/DFB	0-2, 0-15
MSM622U-SML2	-19	-26	MM-1310	0	-23	SM-1550/DFB	0-2, 0-25
MSM622U-SME-SM-SM	-10	-23	SM-1310	-5	-23	SM-1310	0-2, 15-40
MSM622U-SME-SM-SM-L	-10	-23	SM-1310	-3	-23	SM-1550/DFB	0-2, 25-70
MSM622U-SME-SM-SM-L 2	-10	-23	SM-1310	0	-23	SM-1550/DFB	0-2, 40-100
MSM622U-SMLX5	-9,5	-17	MM-850	0	-32	SM-1550/DFB/APD	0-2, 70-150

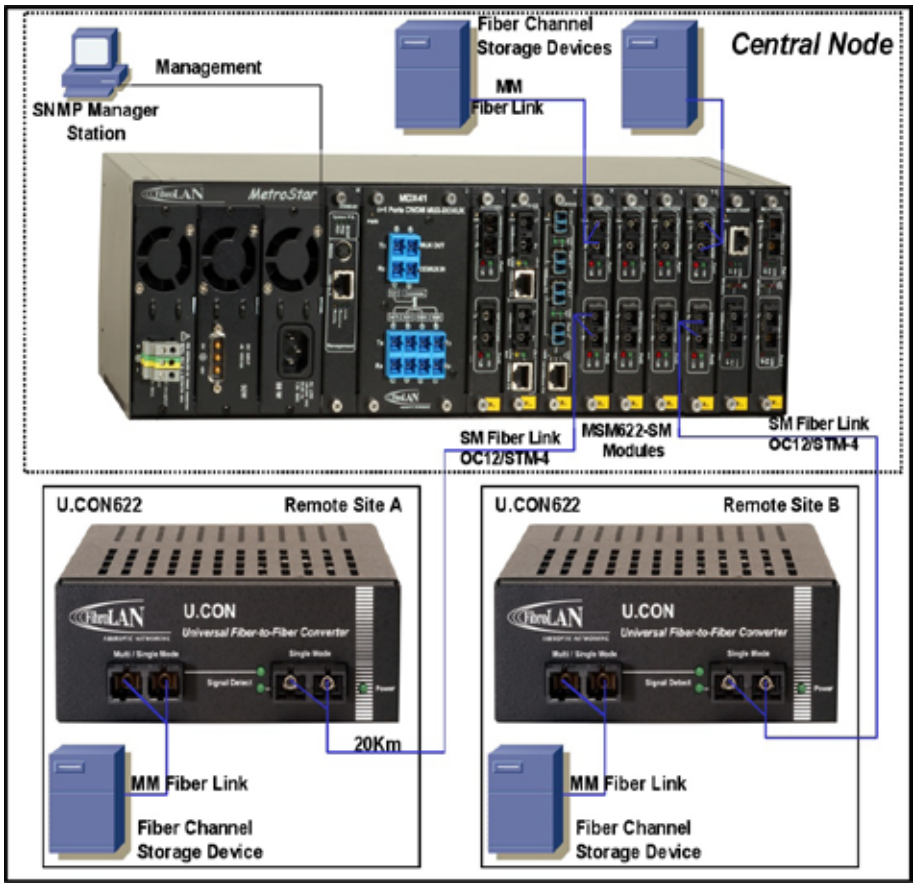
MS

MSM622U

Typical Topology

*The MMM-01 Management module installed in the **MetroStar™** chassis monitors, controls and manages all the modules installed in the **MetroStar™** system. It will report alerts and traps to the SNMP Manager station located at the Central Node.*

MetroStar™ equipped with a management module can be monitored and managed from any SNMP manage-ment station running popular manage-ment platforms (e.g. FibroLAN's MetroView, HP OpenView, SNMPc, etc).



Ordering Information

Part#	Model	Description
2512	MSM622U-SM	MM 1310nm to SM 1310nm ATM/OC12/STM-4 Media Converter, 20km, 2*dual SC
2513	MSM622U-SML	MM 1310nm to SM 1550nmDFB ATM/OC12/STM-4 Media Converter, 40km,2*dual SC
2514	MSM622U-SML2	MM 1310nm to SM 1550nm DFB ATM/OC12/STM-4 Media Converter, 80km, 2*dual SC
2515	MSM622U-SME-SM-SM	SM 1310nm 10km to SM 1310nm ATM/OC12/STM-4 Extender, 20km, 2*dualSC
2516	MSM622U-SME-SM-L	SM 1310nm 10km to SM 1550nm DFB ATM/OC12/STM-4 Extender, 40km, 2*dual SC
2517	MSM622U-SME-SM-L2	SM 1310nm 10km to SM 1550nm DFB ATM/OC12/STM-4 Extender, 80km, 2*dual SC
2520	MSM622U-SMLX5	MM 850nm to SM 1550nm DFB/APD ATM/OC12/STM-4 M. Converter 120km, 2*dual SC

Specifications are subject to change w/o prior notice

MS

MSM2500U

Universal Media Converter/Extender

The MSM2500U module for the ***MetroStar™*** System provides the network designer with a flexible and cost effective device for MM/SM to SM conversion and network extension. The MSM2500U is a universal protocol transparent device. The module converts digital signals from multi-mode/single-mode to single mode fibers and covers distances up to 80km and 120km for GBE (data rate is from 100Mbps to 2.5Gbps). It is equipped with two Small Form-Factor Pluggable (SFP) optical interfaces for ease of deployment, maintenance and logistics. The main advabtages of the hot-swappable SFP optical interfaces are the density, flexibility and cost savings. SFP modules can be easily interchanged, thus fiber optic networks can be upgraded more conveniently than with traditional modules. Module's deployment is easy and does not require any settings or measurements.

The MSM2500U is protocol independent for the specified transmission speed and efficiently supports Fast Ethernet, Gigabit ethernet, OC3, OC12, OC48, STM1, STM4 and STM16. All ***MetroStar™*** modules are hot swappable and equipped with self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and „alive" even before links are connected.

General Specifications

Standard Compliance
Fast Ethernet (100Base-FX), Gigabit Ethernet, OC3, OC12, OC48, STM1, STM4 and STM16

Diagnostic LEDs
Power ON/OFF (green LED)
SD: Signal Detect port 1 (green LED)
SD: Signal Detect port 2 (green LED)
TX-LOW LED for Port 1 and Port 2:
OFF=Transmission is OK
LIT RED = Transmission signal low (does not reach the required distance)
Blinking = Authentication invalid: implies that not a FibroLAN SFP is used (no TX will take place)

Conversion Method
Protocol Transparent

FX ports
Small Form-factor Pluggable hot-swappable dual LC connectors
Each F/O port may be disconnected via management

Management
SNMP managed via ***MetroStar™***

Key Features

- *Data Rate: 100Mbps to 2.5Gbps*
- *Network Extension: up to 80km (120km for GBE)*
- *Universal protocol transparent device*
- *Remote Firmware upgrade*
- *Status and Diagnostic LEDs*
- *SNMP managed (via **MetroStar™**)*

Management Functions

Main Menu contains:

Module status, SFP module status, enable/disable port command, Restore defaults command.

Module status
Signal Detect status, Ports enabled mode, channel description, Firmware revision.

Ordering information

2519	MSM2500U	Universal Extender module, 100Mbps to 2.5Gbps, includes 2 SFP slots, uses SFP optical transceivers
B289	SF155 - SMRF15	SFP (Small Form Pluggable) OC3,Single Fiber Strand (SFS),F/O transceiver, LC connector,SM S1550nmTX/1310nmRx,15km
B290	SF155 - SMRF13	SFP OC3, SFS F/O transceiver, LC connector, SM 1310nmTx/1550nmRx, 15km
B235	SF1G-S1	SFP module, GBE F/O transceiver, dual LC connector, MM 850nm, 220/550m
B236	SF1G-LX1	SFP module, GBE F/O transceiver, dual LC connector, SM 1310nm, 10km
B237	SF1G-LX2	SFP module, GBE F/O transceiver, dual LC connector, SM 1310nm, 20km
B238	SF1G-LX3	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB, 40km
B239	SF1G-LX4	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB, 80km
B240	SF1G-LX5	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB/APD, 120km
B241	SF1G-SF13	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1310nmTx/1550nmRx, 20km
B242	SF1G-SF15	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1550nmDFB Tx/1310nmRx, 20km
B243	SF1G-LF13	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1310nmDFB Tx/1550nmRx, 40km
B244	SF1G-LF15	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1550nmDFB Tx/1310nmRx, 40km
B269	SF1G-ZF49	SFP, SFS, GBE F/O transceiver, LC connector, SM 1490nmDFB Tx/1550nm Rx, 80km
B270	SF1G-ZF57	SFP, SFS, GBE F/O transceiver, LC connector, SM 1550nmDFB Tx/1490nm Rx, 80km
B281	SF1G-LX5-5C-47	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1471nm DFB/APD, 120km
B282	SF1G-LX5-5C-49	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1491nm DFB/APD, 120km
B283	SF1G-LX5-5C-51	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1511nm DFB/APD, 120km
B284	SF1G-LX5-5C-53	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1531nm DFB/APD, 120km
B285	SF1G-LX5-5C-55	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1551nm DFB/APD, 120km
B286	SF1G-LX5-5C-57	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1571nm DFB/APD, 120km
B287	SF1G-LX5-5C-59	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1591nm DFB/APD, 120km
B288	SF1G-LX5-5C-61	CWDM SFP, 1,25Gbps F/O transceiver, duall LC connector, SM 1611nm DFB/APD, 120km
B268	SF2G-S1	SFP module, 2,5Gbps F/O transceiver, dual LC connector, MM 850nm, 300/400m
B249	SF2G-S2	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nm, 2km
B250	SF2G-LX2-3	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nm DFB, 15km
B251	SF2G-LX2-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1550nm DFB, 15km
B252	SF2G-LX3-3	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nm DFB/APD, 40km
B253	SF2G-LX3-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1550nm DFB, 40km
B254	SF2G-LX4-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1550nm DFB/APD, 80km
B271	SF2G-LX3-5C-47	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1471nm DFB, 40km
B272	SF2G-LX3-5C-49	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1491nm DFB, 40km
B273	SF2G-LX3-5C-51	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1511nm DFB, 40km
B274	SF2G-LX3-5C-53	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1531nm DFB, 40km
B275	SF2G-LX3-5C-55	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1551nm DFB, 40km
B276	SF2G-LX3-5C-57	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1571nm DFB, 40km
B277	SF2G-LX3-5C-59	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1591nm DFB, 40km
B278	SF2G-LX3-5C-61	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1611nm DFB, 40km
B258	SF2G-LX4-5C-47	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1471nm DFB/APD, 80km
B259	SF2G-LX4-5C-49	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1491nm DFB/APD, 80km
B260	SF2G-LX4-5C-51	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1511nm DFB/APD, 80km
B261	SF2G-LX4-5C-53	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1531nm DFB/APD, 80km
B262	SF2G-LX4-5C-55	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1551nm DFB/APD, 80km
B263	SF2G-LX4-5C-57	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1571nm DFB/APD, 80km
B264	SF2G-LX4-5C-59	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1591nm DFB/APD, 80km
B265	SF2G-LX4-5C-61	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM1611nm DFB/APD, 80km

Specifications are subject to change w/o prior notice

The SFP transceivers from SF155-SMRF15 through SF2G-LX4-5C-61 are used in the following FibroLAN equipment: ***MetroStar™*** *module MSM2500U and U.CON2500 device. All recommended distances for CWDM active components assume direct point-to-point connection between them. If these are passing thru passive Mux/Demuxes,*
the additional attenuation introduced by such devices must be considered when assessing the actual distance.

MS

ACM110

10/100Base-TX to FX Aggregating Converter Module

This module connects 2 (ACM110-12 model) or 4 (ACM110-14 model) 100Base-FX inputs from remote users and aggregates them onto a single RJ-45 port, which in turn is normally attached to a switch port. Designed to optimize FTTH access nodes, it therefore reduces the total number of aggregation switch ports (by a factor of 2 or 4) saving on costs, space and power consumption. As even the highest density stackable switches available today seldom exceed 200 ports, using a ***MetroStar™*** loaded with ACM modules becomes then the only feasible way to accommodate all user fibers accessing such nodes. The TP port is auto-negotiating, but other modes can be forced (via management) to successfully interconnect with any type of device. The module's capability to handle large frames (up to 1916 bytes) eliminates possible interoperability problems with other vendors' switches.

Due to its most flexible software and firmware based design, network architecture can be implemented with this module: Creating a regional LAN for an enterprise, with up to 8 locations interconnected without an external switch or accessing the network core. The Subscriber Link Emulation (SLE) - when link partner is an MA enabled device – allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Like other ***MetroStar™*** modules, the ACM is fully SNMP managed. The embedded MA™ chip allows full management of remote (MA enabled) devices eliminating the need of costly SNMP processors and IP addresses in such devices. All ***MetroStar™*** modules are hot swappable and equipped with two self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and "alive" even before links are connected. The module supports also the Far-End Fault (FEF) signaling feature for F/O link integrity test.

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 10Base-T, 100Base-FX, port based VLANs, Tagged VLANs, IEEE802.1p, IEEE802.1Q, FDX Flow Control, and HDX Back Pressure Flow Control

RJ-45 Ports
Shielded, 100m over STP Cat 5 cabling or higher, Auto-negotiation, Auto-Cross support

F/O Ports (2 or 4)
SC and LC connectors

Conversion Method
Buffered aggregating (2:1 or 4:1) media converter
Wire Speed Switching, 64 Kbytes Frame Buffers, 1k MAC addresses, Rate Limiting and Large Frame (1536,1916 Bytes) handling

Slide Switches setting (on board)
S1: Enable/Disable VLAN (between TP port and each FO port)
S2: Backup enable/disable (between F/O ports 1 and 2)
S3: Backup enable/disable (between F/O ports 3 and 4)

Diagnostics LEDs
Power ON; F/O Link/Activity (for each fiber port);
TP port: Link/Activity; HDX/FDX, 10/100Mbps

Management

FibroLAN ***MetroView*** Device Manager

SNMP via ***MetroStar™*** Management module
Management of Remote Devices: via MA™ Technology

Management Functions

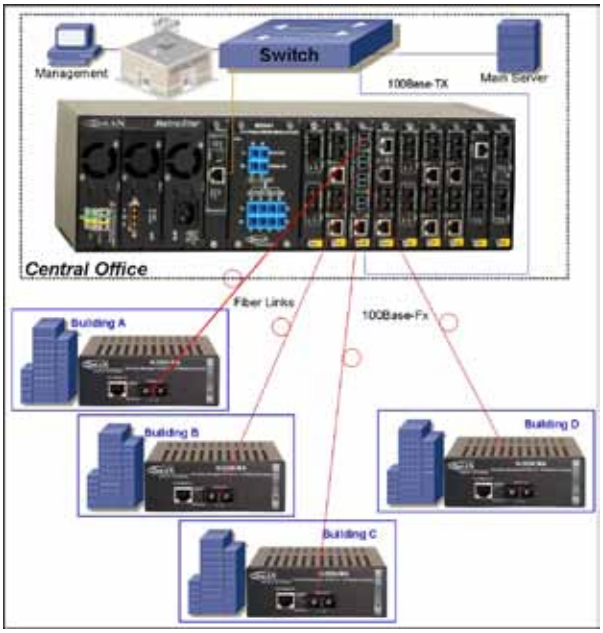
The main Menu enables the user to perform the following functions:

Overall status, Link management, Port configuration,
Global configuration, VLAN configuration, Priority settings
MAC address tables, Statistics, Diagnostics, Restart module,
Restore factory defaults

MS

ACM110

Typical Topology



F/O ports specifications

Model	TP Port	Ports 1, 2	Ports 3, 4	Transmit WL nm	Minimal Output Power dBm	Receive WL nm	Typical Receive Sensitivity dBm	Min Power Budget dB
ACM110-12SMR	RJ-45	Duplex SC, SM	N/A	1310	-16	1310	-30	14
ACM110-12SM	RJ-45	Duplex SC, SM	N/A	1310	-15	1310	-36	21
ACM110-12SMRF15	RJ-45	Simplex SC, SM	N/A	1550	-15	1310	-35	20
ACM110-14SMRF15	RJ-45	Simplex SC, SM	Simplex SC, SM	1550	-15	1310	-35	20
ACM110-14SM	RJ-45	Duplex LC, SM	Simplex LC, SM	1310	-15	1310	-36	21
ACM110-14SMR7	RJ-45	Duplex LC, SM	Simplex LC, SM	1310	-20	1310	-30	10

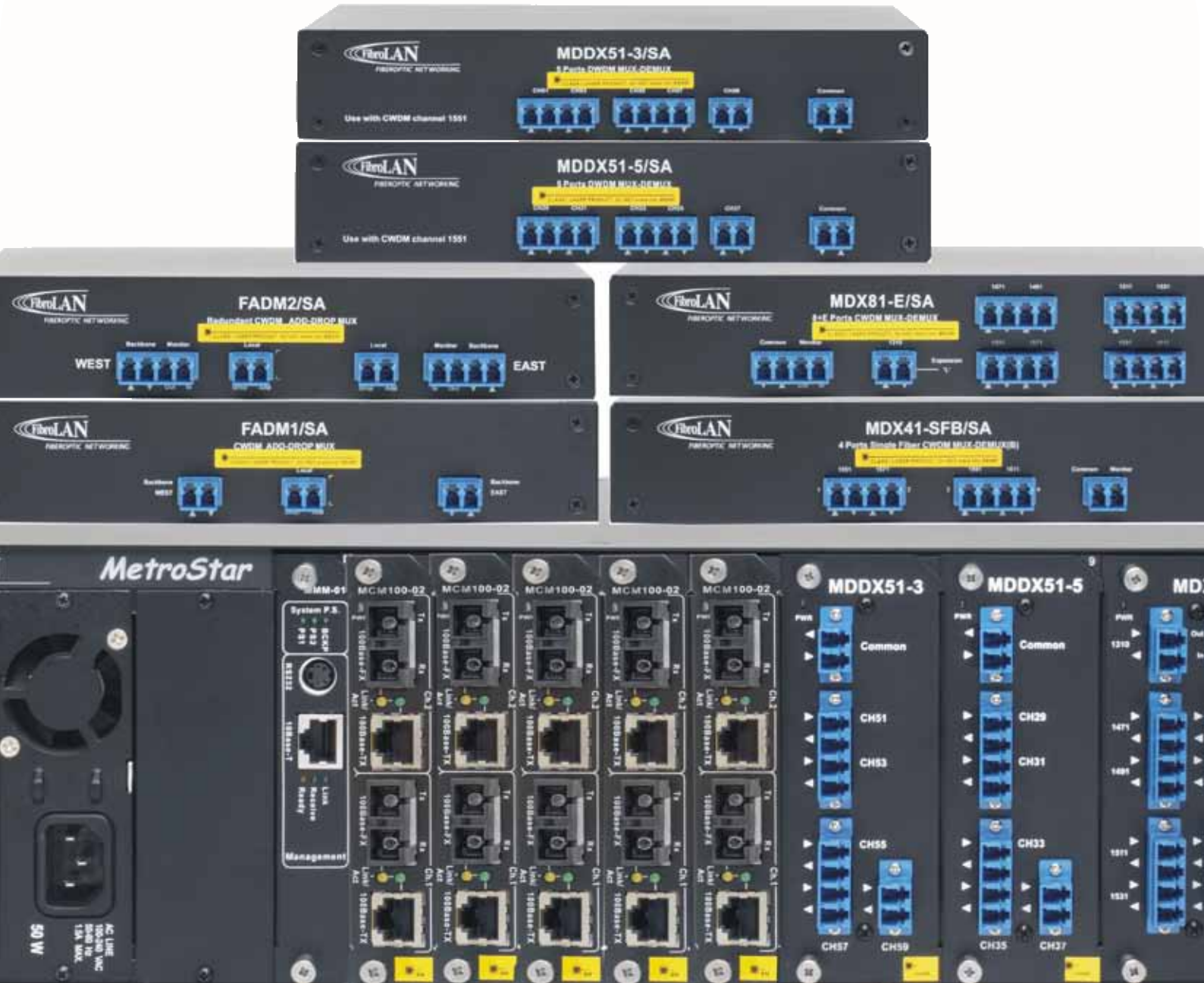
Ordering Information

Part#	Model	Description
2401	ACM110-12SMR	2:1 Aggregating Converter, Single-mode, 1310nm, 2 100Base- FX Dual Duplex LC connectors to 1 10/100Base-TX RJ45 port, 15km, MA
2403	ACM110-012SM	2:1 Aggregating Converter, Single-mode 1310nm,2 100Base- FX Dual Duplex LC connectors to 1 10/100Base-TX RJ45 port, 25km, MA
2406	ACM110-14SMR7	4:1 Aggregating Converter, Single-mode, 1310nm, 4 100Base- FX Duplex LC connectors to 1 10/100Base-TX RJ45 port, 7km, MA
2405	ACM110-14SM	4:1 Aggregating Converter, , Single-mode, 1310nm, 4 100Base- FX Duplex LC connectors to 1 1 0/100Base-TX RJ45 port, 25km, MA
2402	ACM110-12SMRF15	2:1 Aggregating Converter, Single Fiber Strand 1550nm Tx, 2 Simplex SC connectors to 1 10/100Base-TX RJ45 port, 20km, MA
2404	ACM110-14SMRF15	4:1 Aggregating Converter, Single Fiber Strand 1550nm Tx, 4 Simplex SC connectors to 1 10/100Base-TX RJ45 port, 20km, MA

Specifications are subject to change w/o prior notice

WDM ...WDM SOLUTIONS

WDM



WDM

WDM Solutions

Product Overview

The recent progress in telecommunication applications for voice, video and data has placed additional demands for fiber optic networks. Adding more fiber to existing networks can be cost- prohibitive to service providers. A better and less costly solution is provided by the WDM technology. FibroLAN has introduced its second generation of wavelength-division multiplexing (WDM) ***MetroStar™*** Modules and Stand-alone devices, providing increased functions and improved performance to extend the reach of metropolitan networks. FibroLAN's WDM series comprises a set of 10 new WDM building blocks. Some of the devices support „Monitor" ports to allow live monitoring and troubleshooting of the CWDM signals. FibroLAN's WDM equipment allows users and service providers to increase the capacity of the existing fiber with up to 8 CWDM wavelengths and two times 5 DWDM channels, allowing a total capacity of 16 channels. The devices are designed to fully fulfill ITU G.694.1, ITU G.694.2, ITU G.695 and RoHS requirements. The product family provides greater flexibility and performance to its users

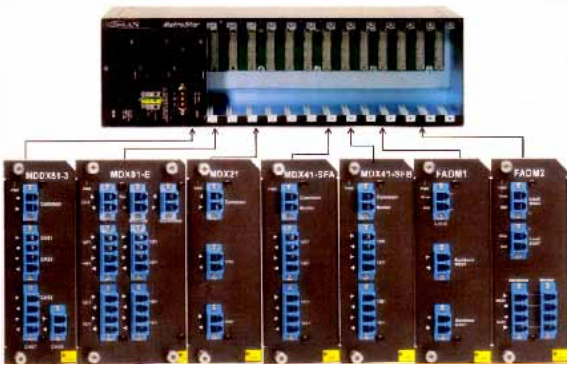
Product List Ordering Information

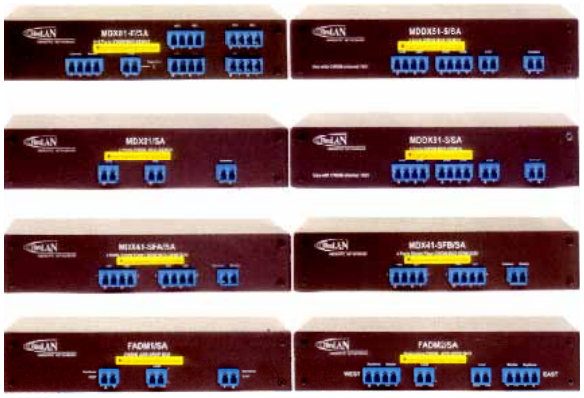
Model	P/N	***MetroStar™*** Passive Modules
MDX41	2801	5 channels CWDM multiplexer-demultiplexer, (1310/1471/1511/1551/1591nm) ,10Gbs bandwidth, SC/UPC connectors, occupies 3 slots
MDX81	2802	9 channels (1310/1471/1491/1511/1531/1551/1571/1591/1611nm) CWDM multiplexer-demultiplexer, 10Gbs bandwidth, SC/UPC connectors, occupies 4 slots
MDX21	2805	2 channels CWDM MUX/DEMUX module, 1550nm/1310nm , 10Gbs bandwidth, Duplex LC connectors, occupies 2 slots
MDDX51-5	2806	5 ITU grid channels DWDM multiplexer-demultiplexer, C-Band (channels 29/31/33/35/37),10Gbs bandwidth, Duplex LC Connectors, 2 slots module
MDDX51-3	2819	5 ITU grid channels DWDM multiplexer-demultiplexer, C-Band (channels 51/53/55/57/59),10Gbs bandwidth, Duplex LC Connectors, 2 slots module
MDX81-E	2807	8 channels CWDM MUX/DEMUX (1471/1491/1511/1531/1551/1571/1591/1611nm) plus expansion channel (1310nm) and one monitor port , 10Gbs bandwidth, Duplex LC connectors, occupies 3 slots
MDX41-SFA	2808	4 channels CWDM Single Fiber working multiplexer-demultiplexer (47/49/51/53), 10Gbs bandwidth, Monitor port, Simplex/Duplex LC connectors, occupies 2 slots
MDX41-SFB	2809	4 channels CWDM Single Fiber working multiplexer-demultiplexer (55/57/59/61), 10Gbs bandwidth, Monitor port, Simplex/Duplex LC connectors, occupies 2 slots
FADM1/XX	2810-XX	Single wavelength (1xx1nm) single channel CWDM Optical Add-Drop MUX-DEMUX (OADM), 10Gbps bandwidth, Duplex LC connectors, with Backbone ports (West/East), occupies 2 slots,(XX=denotes specific wavelength)
FADM2/XX	2811-XX	Single wavelength (1xx1nm) dual channel (Redundant), CWDM Optical Add-Drop MUX-DEMUX (OADM) with Monitor and Backbone ports, 10Gbps bandwidth, Duplex LC connectors, occupies 2 slots (XX=denotes specific wavelength).

Product List Ordering Information

Model	P/N	Stand-Alone Passive Devices
MDX41/SA	2803	5 channels CWDM MUX/DEMUX (1310/1471/1511/1551/1591nm) ,10Gbs bandwidth, SC/UPC connectors
MDX81/SA	2804	9 channels (1310/1471/1491/1511/1531/1551/1571/1591/1611nm) CWDM MUX/DEMUX , 10Gbs bandwidth, SC/UPC connectors
MDX21/SA	2812	2 channels CWDM MUX/DEMUX device, 1550nm/1310nm , 10Gbs bandwidth, Duplex LC connectors, Half 19”/1RU enclosure
MDDX51- 5/SA	2813	5 ITU grid channels DWDM multiplexer-demultiplexer device, C-Band (channels 29/31/33/35/37), 10Gbs bandwidth, Duplex LC Connectors, Half 19”/1RU enclosure
MDDX51- 3/SA	2820	5 ITU grid channels DWDM multiplexer-demultiplexer device, C-Band (channels 51/53/55/57/59), 10Gbs bandwidth, Duplex LC Connectors, Half 19”/1RU enclosure
MDX81-E/SA	2814	8 channels CWDM MUX/DEMUX (1471/1491/1511/1531/1551/1571/1591/1611nm) plus expansion channel (1310nm) and one monitor port , 10Gbs bandwidth, Duplex LC connectors, Half 19”/1RU enclosure
MDX41-SFA/SA	2815	4 channels CWDM Single Fiber working multiplexer-demultiplexer (47/49/51/53), 10Gbs bandwidth, Monitor port, Simplex/Duplex LC connectors, Half 19”/1RU enclosure
MDX41-SFB/SA	2816	4 channels CWDM Single Fiber working multiplexer-demultiplexer (55/57/59/61), 10Gbs bandwidth, Monitor port, Simplex/Duplex LC connectors, Half 19”/1RU enclosure
FADM1/XX/SA	2817-XX	Single wavelength (1xx1nm) single channel CWDM Optical Add-Drop MUX-DEMUX (OADM),10Gbps bandwidth, Duplex LC connectors, with Backbone ports (West/East), (XX=denotes specific wavelength), Half 19”/1RU enclosure
FADM2/XX/SA	2818-XX	Single wavelength (1xx1nm) dual channel (Redundant), CWDM Optical Add-Drop MUX-DEMUX (OADM) with Monitor and Backbone ports, 10Gbps bandwidth, Duplex LC connectors, (XX=denotes specific wavelength), Half 19”/1RU enclosure

WDM modules and Stand - Alone devices





FibroLAN
FIBEROPTIC NETWORKING

WDM

MS WDM

MDX-41

FibroLAN
FIBEROPTIC NETWORKING

CWDM 4+1 Channel MUX - DEMUX Module

The FibroLAN CWDM System includes the MDX41 module and its associated conversion modules. The MDX41 is a CWDM Mux/Demux ***MetroStar™*** module that multiplexes 5 CWDM optical input ports into a single optical output port, and demultiplexes its single optical input port into 5 CWDM optical output ports. It is a triple width ***MetroStar™*** module. Its operating wavelengths are: 1471, 1511, 1551, 1591 and 1310 nm. The 1310nm wavelength may be used as a monitor and service channel. FibroLAN ***MetroStar™*** system offers a full range of transponders (conversion modules). The MDX-41 may be used with ***MetroStar™*** conversion modules or with external suitable equipment. The conversion modules include three products family: the MCM1000T-ZX, the MCM1000S-ZX and the MCM1000L1-ZX modules.

Based on the ITU grid (ITU G.694.2) the MDX41 module provides alternate channels with 40nm spacing between adjacent channels and consequently improving channel isolation, stability and reliability. The MDX41 may work with any input signal originated from any vendor's standard devices. It may combine FE, GBE, OC3, OC12, OC24, STM-1 and STM-4 signals. The module may be deployed to provide access to large customers and adding transport functionality to the ***MetroStar™***. All ***MetroStar™*** modules are hot swappable and equipped with self-clinching screws for easy and safe module insertion and removal. A special LED indicates that the module is well inserted in its slot and „alive" even before links are connected (PWR LED). The MMM-0x ***MetroStar™*** management modules support the MDX41 and the conversion modules. The MDX41 CWDM unit is also available in a stand-alone version (MDX-41/SA).

Key Features

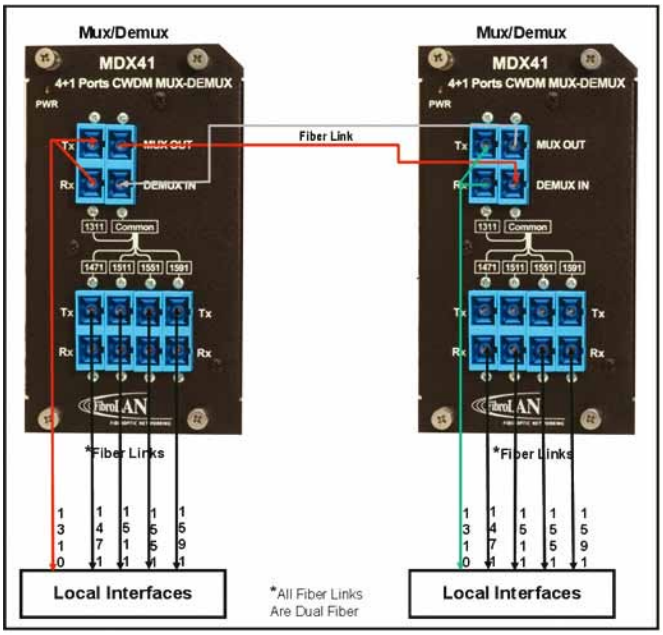
- *Wide Operating Wavelength and Temperature Range*
- *Thin Film Coarse WDM Mux/Demux*
- *2.5 GBS Bandwidth*
- *Operating Wavelength: 1471/1511/1551/1591/1310nm*
- *Low Insertion Loss and High Isolation*
- *High Stability and Reliability*
- *Central Wavelength Accuracy: +/- 1nm max*
- *Passband width @ 0.5dB: 13nm min*
- *Adjacent Channel Isolation: Mux=15dB min; Demux=30dB min*
- *Insertion Loss: Mux 2.0dB max; Demux=2.0dB max*
- *Insertion Loss 1310nm Channel: 1.2dB max*
- *Return Loss: 50dB min*
- *Directivity: 50dB min*
- *Bidirectional capability on all channels using dual fiber*
- *Transparency to data frame sizes, accommodating multiple protocols*
- *Temperature Stability: 0.005dB/°C max*
- *Temperature Wavelength drift: 0.005nm/°C max*
- *Power Handling: 300mW max*

Applications

The module may be deployed in various infrastructures:

- *Uni-directional/Bi-directional systems*
- *CWDM network*
- *Line Monitoring*
- *Access Network*
- *Metro Network*
- *FTTH Application*

MDX-41 Basic operation



Ordering Information

Part#	Model	Description
2801	MDX-41	CWDM Mux/Demux module, 5:1 ports, III window (1310/1471/1511/1551/1591nm), 2,5Gbps bandwidth, SC/UPC connectors
2803	MDX-41/SA	CWDM stand-alone Mux/Demux, 5:1 ports III window (1310/1471/1511/1551/1591nm), 2,5Gbps bandwidth, SC/UPC connectors
	CWDM Transporters	
2820	MCM1000T-ZX3C47	CWDM 1000T to 1000ZX 1471nm Conversion module, 40km, SC, MA
2821	MCM1000T-ZX3C51	CWDM 1000T to 1000ZX 1511nm Conversion module, 40km, SC, MA
2822	MCM1000T-ZX3C55	CWDM 1000T to 1000ZX 1551nm Conversion module, 40km, SC, MA
2823	MCM1000T-ZX3C59	CWDM 1000T to 1000ZX 1591nm Conversion module, 40km, SC, MA
2824	MCM1000T-ZX4C47	CWDM 1000T to 1000ZX 1471nm Conversion module, 80km, SC, MA
2825	MCM1000T-ZX4C51	CWDM 1000T to 1000ZX 1511nm Conversion module, 80km, SC, MA
2826	MCM1000T-ZX4C55	CWDM 1000T to 1000ZX 1551nm Conversion module, 80km, SC, MA
2827	MCM1000T-ZX4C59	CWDM 1000T to 1000ZX 1591nm Conversion module, 80km, SC, MA
2828	MCM1000S-ZX3C47	CWDM 1000SX 850nm to 1000ZX 1471nm Conversion module, 40km, SC, MA
2829	MCM1000S-ZX3C51	CWDM 1000SX 850nm to 1000ZX 1511nm Conversion module, 40km, SC, MA
2830	MCM1000S-ZX3C55	CWDM 1000SX 850nm to 1000ZX 1551nm Conversion module, 40km, SC, MA
2831	MCM1000S-ZX3C59	CWDM 1000SX 850nm to 1000ZX 1591nm Conversion module, 40km, SC, MA
2832	MCM1000S-ZX4C47	CWDM 1000SX 850nm to 1000ZX 1471nm Conversion module, 80km, SC, MA
2833	MCM1000S-ZX4C51	CWDM 1000SX 850nm to 1000ZX 1511nm Conversion module, 80km, SC, MA
2834	MCM1000S-ZX4C55	CWDM 1000SX 850nm to 1000ZX 1551nm Conversion module, 80km, SC, MA
2835	MCM1000S-ZX4C59	CWDM 1000SX 850nm to 1000ZX 1591nm Conversion module, 80km, SC, MA
2836	MCM1000L1-ZX3C47	CWDM 1000LX 1310nm 10km to 1000ZX 1471nm extension/"tinting" module, 40km, SC, MA
2837	MCM1000L1-ZX3C51	CWDM 1000LX 1310nm 10km to 1000ZX 1511nm extension/"tinting" module, 40km, SC, MA
2838	MCM1000L1-ZX3C55	CWDM 1000LX 1310nm 10km to 1000ZX 1551nm extension/"tinting" module, 40km, SC, MA
2839	MCM1000L1-ZX3C59	CWDM 1000LX 1310nm 10km to 1000ZX 1591nm extension/"tinting" module, 40km, SC, MA
2840	MCM1000L1-ZX4C47	CWDM 1000LX 1310nm 10km to 1000ZX 1471nm extension/"tinting" module, 80km, SC, MA
2841	MCM1000L1-ZX4C51	CWDM 1000LX 1310nm 10km to 1000ZX 1511nm extension/"tinting" module, 80km, SC, MA
2842	MCM1000L1-ZX4C55	CWDM 1000LX 1310nm 10km to 1000ZX 1551nm extension/"tinting" module, 80km, SC, MA
2843	MCM1000L1-ZX4C59	CWDM 1000LX 1310nm 10km to 1000ZX 1591nm extension/"tinting" module, 80km, SC, MA

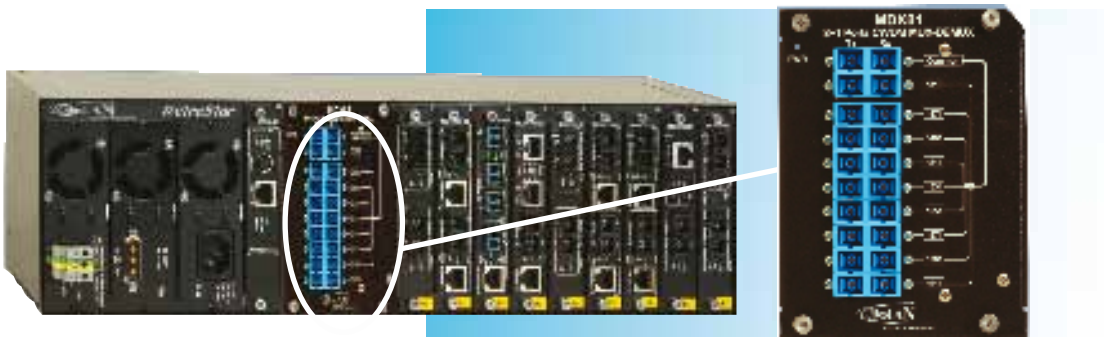
Specifications are subject to change w/o prior notice

MS WDM

MDX-81

CWDM 8+1 Channel MUX - DEMUX Module

The FibroLAN CWDM System includes the MDX81 module and its associated conversion modules. The MX81 module is a 9 channel CWDM Multiplexing/De-Multiplexing module that plugs into the ***MetroStar™*** chassis (occupies 4 slots). It passively multiplexes 9 channels carrying signals up to 2.5 Gbps rate, 8 in the third window and one 1310nm „service channel“ onto a single fiber and similarly de-multiplexes a composite signal to such 9 wavelengths. The module has filters incorporated, resulting in enhanced performance (isolation and directivity). Wavelengths are based on the ITU grid with a 20nm spacing (standard ITU G.694.2), allowing for un-cooled laser operation and lower cost mux-demux technology. The MDX81 works with any input signal coming from any vendor's standard devices.



It may combine FE, GBE, OC3, OC12, OC24, STM-1 and STM-4 signals.The MDX81 may be used to provide access to large customers as well as adding transport functionality to the ***MetroStar™***, making it to the most powerful and comprehensive platform of its kind. All ***MetroStar™*** modules are hot swappable and equipped with self-clinching screws for easy and safe module insertion and removal. While functionally passive, the MDX81 is equipped with a LED indicating that the module is well inserted in its slot and „alive“ even before links are connected. The module is supported by the ***MetroStar™*** MMM-0x management modules. The module is also available in a stand-alone version (MDX-81/SA). It may combine FE, GBE, OC3, OC12, OC24, STM-1 and STM-4 signals.

Key Features

- *Thin Film Coarse WDM Mux/Demux*
- *2.5 Gbps Bandwidth*
- *Bi-directional capability on all channels using fiber links*
- *High Isolation*
- *High Stability and Reliability*
- *Transparency to data frame sizes, accommodating multiple protocols*
- *Wide operating Wavelength and Temperature Range*

Applications

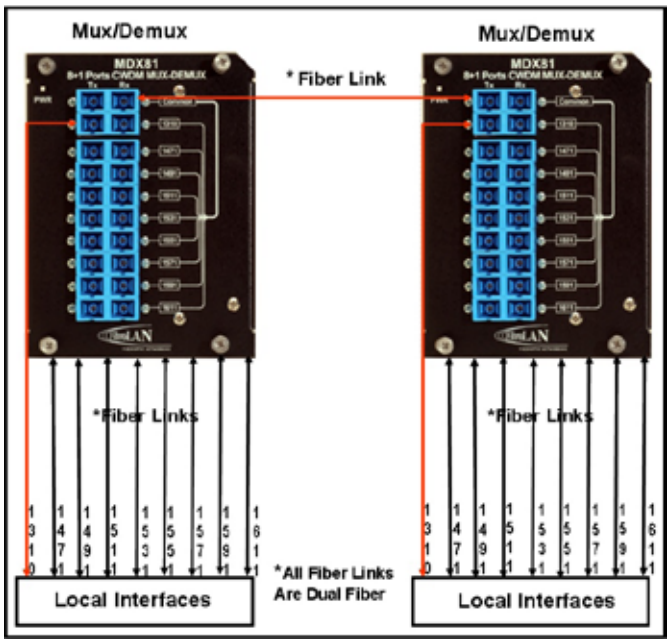
The module may be deployed in various infrastructures:

- *The module my be deployed in various infrastructures:*
- *Uni-directional/Bi-directional systems*
- *CWDM network*
- *Line Monitoring*
- *Access Network*
- *Metro Network*
- *FTTH Application*

General Specifications

Connectors: 10xDuplex SC/UPC
Operating Wavelength: 1310/1471/1491/1511/1551/1571/1591/1611nm
Central WL Accuracy: +/- 1nm max
Ripple in Pass-Band: 0.5dB
Insertion Loss: Mux=2.5dB max; Demux=2.5dB max
Insertion Loss: 1310nm: 1.0dB max
Return Loss: 50dB
Temperature Stability: 0.005nm/°C max
Temperature Wavelength drift: 0.005dB/°C max
Channel Isolation: Mux: 15dB min; Demux: 30dB max
Directivity: 50dB min
Power Handling: 300mW max
Operating Temperature: 0 to 70 Centigrade

MDX-81 Basic operation

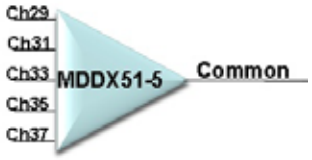
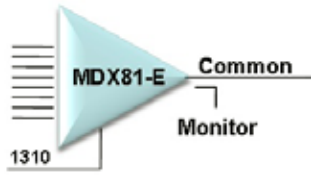
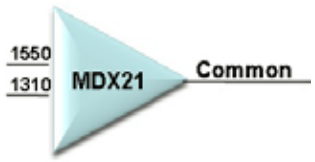
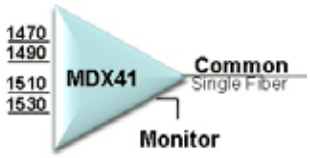
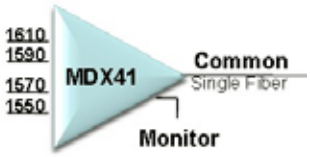
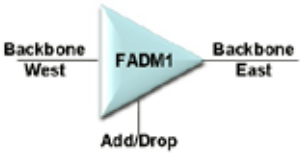
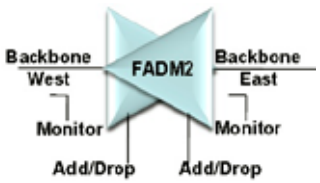


Ordering Information

Part#	Model	Description
2802	MDX-81	CWDM Mux/Demux module, 9:1 ports, III window (1310/1471/1491/1511/1531/1551/1571/1591/1611nm), 2,5Gbps bandwidth, SC/UPC connectors, occupies 4 slots
2804	MDX-81/SA	Stand-alone device - same characteristics as MDX-81 module
	CWDM Transporters	
2820	MCM1000T-ZX3C47	CWDM 1000T to 1000ZX 1471nm Conversion module, 40km, SC, MA
2821	MCM1000T-ZX3C51	CWDM 1000T to 1000ZX 1511nm Conversion module, 40km, SC, MA
2822	MCM1000T-ZX3C55	CWDM 1000T to 1000ZX 1551nm Conversion module, 40km, SC, MA
2823	MCM1000T-ZX3C59	CWDM 1000T to 1000ZX 1591nm Conversion module, 40km, SC, MA
2824	MCM1000T-ZX4C47	CWDM 1000T to 1000ZX 1471nm Conversion module, 80km, SC, MA
2825	MCM1000T-ZX4C51	CWDM 1000T to 1000ZX 1511nm Conversion module, 80km, SC, MA
2826	MCM1000T-ZX4C55	CWDM 1000T to 1000ZX 1551nm Conversion module, 80km, SC, MA
2827	MCM1000T-ZX4C59	CWDM 1000T to 1000ZX 1591nm Conversion module, 80km, SC, MA
2828	MCM1000S-ZX3C47	CWDM 1000SX 850nm to 1000ZX 1471nm Conversion module, 40km, SC, MA
2829	MCM1000S-ZX3C51	CWDM 1000SX 850nm to 1000ZX 1511nm Conversion module, 40km, SC, MA
2830	MCM1000S-ZX3C55	CWDM 1000SX 850nm to 1000ZX 1551nm Conversion module, 40km, SC, MA
2831	MCM1000S-ZX3C59	CWDM 1000SX 850nm to 1000ZX 1591nm Conversion module, 40km, SC, MA
2832	MCM1000S-ZX4C47	CWDM 1000SX 850nm to 1000ZX 1471nm Conversion module, 80km, SC, MA
2833	MCM1000S-ZX4C51	CWDM 1000SX 850nm to 1000ZX 1511nm Conversion module, 80km, SC, MA
2834	MCM1000S-ZX4C55	CWDM 1000SX 850nm to 1000ZX 1551nm Conversion module, 80km, SC, MA
2835	MCM1000S-ZX4C59	CWDM 1000SX 850nm to 1000ZX 1591nm Conversion module, 80km, SC, MA
2836	MCM1000L1-ZX3C47	CWDM 1000LX 1310nm 10km to 1000ZX 1471nm extension/"tinting" module, 40km, SC, MA
2837	MCM1000L1-ZX3C51	CWDM 1000LX 1310nm 10km to 1000ZX 1511nm extension/"tinting" module, 40km, SC, MA
2838	MCM1000L1-ZX3C55	CWDM 1000LX 1310nm 10km to 1000ZX 1551nm extension/"tinting" module, 40km, SC, MA
2839	MCM1000L1-ZX3C59	CWDM 1000LX 1310nm 10km to 1000ZX 1591nm extension/"tinting" module, 40km, SC, MA
2840	MCM1000L1-ZX4C47	CWDM 1000LX 1310nm 10km to 1000ZX 1471nm extension/"tinting" module, 80km, SC, MA
2841	MCM1000L1-ZX4C51	CWDM 1000LX 1310nm 10km to 1000ZX 1511nm extension/"tinting" module, 80km, SC, MA
2842	MCM1000L1-ZX4C55	CWDM 1000LX 1310nm 10km to 1000ZX 1551nm extension/"tinting" module, 80km, SC, MA
2843	MCM1000L1-ZX4C59	CWDM 1000LX 1310nm 10km to 1000ZX 1591nm extension/"tinting" module, 80km, SC, MA

Specifications are subject to change w/o prior notice

WDM devices

Modules	Device type Half 19"/1RU Enclosure	Schematic Diagram	General description	Performance Specifications
MDDX51-5 CH29-CH37 MDDX51-3 CH51-CH59	MDDX51-5/SA CH29-CH37 MDDX51-3/SA CH51-CH59		5 ITU grid channels DWDM MUX/DEMUX, C-Band (channels 29/31/33/35/37), (channels 51/53/55/57/59); 10Gbs bandwidth, Duplex LC Connectors, 2 slots module (may work in pair with MDDX51-5 module or MDDX51-5/SA device)	Passband @0.5dB = ITU +/-0.1nm Max. Insertion Loss: ≤ 2.4dB Max. Link Loss: ≤ 3.5dB Adjacent Channel Isolation (DEMUX): ≥ 30dB Optical Input Return Loss: ≥ 45dB Operating Temperature: 0~70 ºC
MDX81-E	MDX81-E/SA		8 channels CWDM MUX/DEMUX, (1471/1491/1511 /1531/1551/1571/1591/1611 nm) and one monitor port, 10Gbs bandwidth, Duplex LC connectors, 3 slots module (may work in pair with another MDX81-E module or MDX81-E/SA device) 1310nm±40=Expansion channel	Passband @0.5dB = ITU +/-6.5nm Channel spacing= 20nm Max. Link Loss: 1530/1550nm: ≤ 2.3dB 1570nm: ≤ 3.0dB 1310nm: ≤ 3.6dB-Expansion chan. 1470-1610nm: ≤ 5.1dB Adjacent Channel Isolation (DEMUX): ≥30dB Optical Input Return Loss: ≥ 45dB Operating Temperature: 0~70 ºC
MDX21	MDX21/SA		2 channels CWDM MUX/DEMUX 1550nm/1310nm , 10Gbs bandwidth, Duplex LC connectors, 2 slots module	Insertion Loss: Pass Channel (1550nm) = Max.=0.7, Typical =0.5.dB Reflect Channel (1310nm)= Max.=0,5, Typical =0,3.dB Optical Input Return Loss:≥ 45dB Operating Temperature: 0 ~ 65 ºC
MDX41-SFA	MDX41-SFA/SA		4 channels Single Fiber working CWDM MUX/DEMUX (47/49/51/53nm), 10Gbs bandwidth, one monitor port, Simplex/Duplex LC connectors, 2 slots (may work in pair with MDX41- SFB module or MDX41-SFB/SAdevice)	Passband @0.5dB = ITU +/-6.5nm Channel spacing = 20nm Link Loss: ≤ 4.0dB Adjacent channel isolation: ≥ 35dB Optical Input Return Loss: ≥ 45dB Operating Temperature: 0 ~70 ºC
MDX41-SFB	MDX41-SFB/SA		4 channels Single Fiber working CWDM MUX/DEMUX (55/57/59/61nm), 10Gbs bandwidth, one monitor port, Simplex/Duplex LC connectors, 2 slots (may work in pair MDX41-SFA mo-dule or MDX41-SFA/SA device)	Passband @0.5dB = ITU +/-6.5nm Channel spacing= 20nm Link Loss: ≤ 4.0dB Adjacent channel isolation: ≥ 35dB Optical Input Return Loss: ≥ 45dB Operating Temperature: 0 ~70 ºC
FADM1/xx	FADM1/xx/SA		Single wavelength (1xx1nm) single channel CWDM Optical Add-Drop MUX-DEMUX (OADM), 10Gbps bandwidth, Duplex LC connectors, with Backbone ports (West/East), 2 slots Operating Wavelength:1260~1620nm	Passband @0.5dB = ITU +/-6.5nm Channel spacing= 20nm Input to Drop or Add to Output: ≤ 1.2dB Input to Output: ≤ 1.0dB Adjacent channel isolation: ≥ 30dB Optical Input Return Loss:≥ 45dB Operating Temperature: 0~70 ºC
FADM2/xx	FADM2/xx/SA		Single wavelength (1xx1nm) Dual channel, Redundant, CWDM Optical Add-Drop MUXDEMUX (OADM), 10Gbps bandwidth, Duplex LC connectors, with Backbone ports (West/East), Monitor ports, 2 slots Ope-rating Wavelength:1460~1620nm	Passband @0.5dB = ITU +/-6.5nm Channel spacing= 20nm Insertion Loss: ≤ 1.6dB Line x to Monitor x = ≤ 23dB Adjacent channel isolation:≥ 30dB Optical Input Return Loss: ≥ 45dB Operating Temperature: 0~70 ºC

WDM Solutions

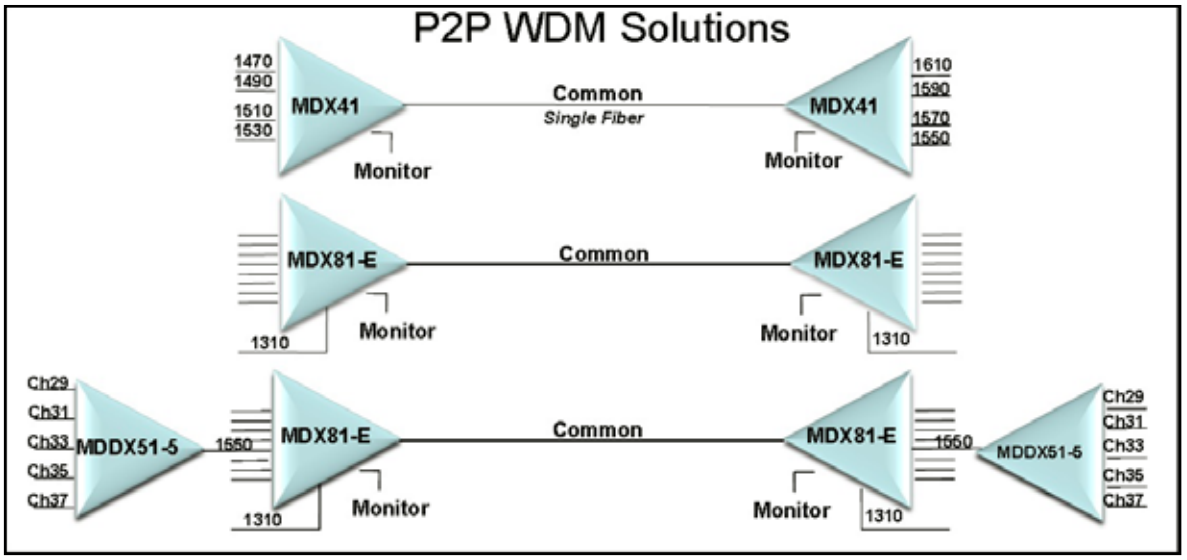
Main Features

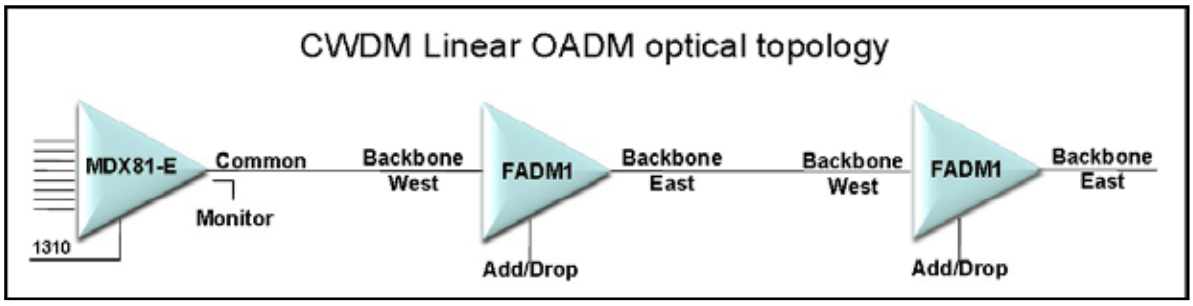
ITU Standard
Environmental Stability
Low Return Loss
Low Loss, low cross talk

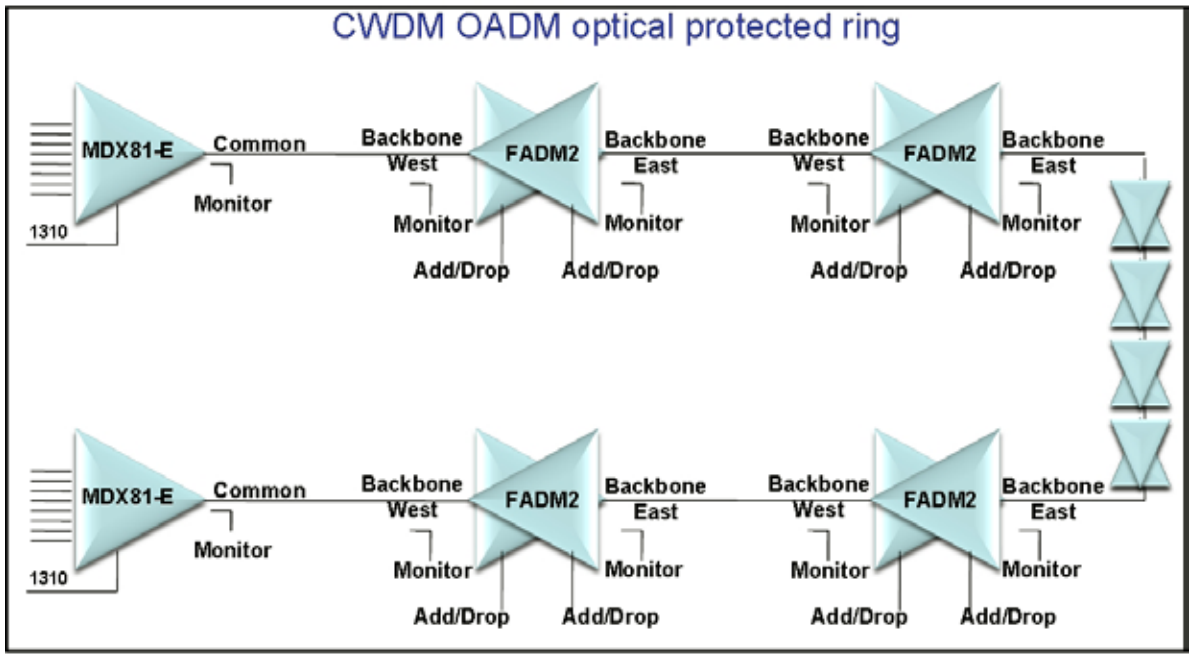
Typical Applications

Telecommunications
Local Area Networks
CWDM &DWDM
FTTx

Typical Applications







Specifications are subject to change w/o prior notice

...CONVERTERS

FibroLAN
FIBEROPTIC NETWORKING

F.CON

H.CON

S.CON

U.CON

GSM

DLA

GA10

F.CON1

Single Channel 100Base-TX-FX Media Converter

This compact yet rugged device provides 100Base-TX/FX Media Conversion. It allows network extension over MMF fiber of 2000m and up to 150 km over SM fibers. It is transparent to HDX/FDX transmissions. The F.CON1 TP port operates at 100Mbps with the capability to generate "FDX advertising" signals to force its TP link partner to 100Mbps/FDX mode if the latter supports Auto-Negotiation. The FEF (Far End Fault) mechanism supported in the device assures link integrity. The Fault propagation feature allows real-time alerting of link-loss for network resilience, while the TEST function provides diagnostic means. The F.CON1 is equipped with an internal quality auto-range power supply (-48VDC power supply is optional). The optional slide-in rack shelf allows easy yet safe installation of up to 3 F.CON1 devices in 1U height.

General Specifications

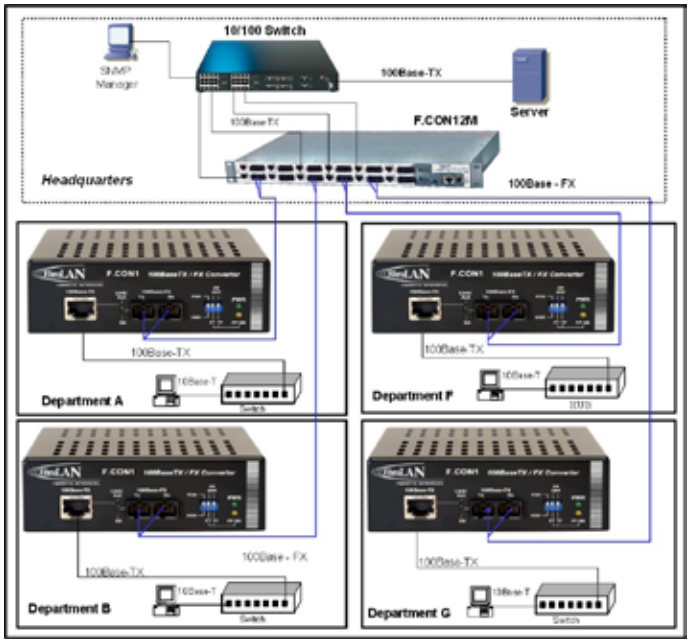
Standard Compilance
IEEE802.3/802.3u 100Base-TX, FDSE 100Base-FX
100Base-TX port
Shielded RJ-45, Auto-Negotiation with "FDX Advertising"
Auto-Cross support; Half/Full Duplex support; 100m over
STP Cat5 cable
Diagnostic LEDS
TP Port: Link/Act
F/O Port: Link/Act, SD (Signal Detect)
FP ON LED (yellow): lit when FP is enabled
(FO>TP, or/and TP>FO)
PWR (Power LED, green)
Conversion Method
Pass-Thru with FDX advertising
Features: FEF and Fault Propagation
100Base-FX Port
1310nm, multi-mode, SC connectors
Distance – 2000m (6600ft)
Output Power: -18dBm or better
Input Sensitivity: -32dBm or better
For single-mode specifications, refer to
DS-SM Options FibroLAN Data Sheet
Controls (DIP Switches)
Controls (DIP Switches)
S1= FDX/HDX (UP/Down) for TP and FO port
S2= FP (FO>TP) UP/Down(Disable/Enable)
S3= FP (TP>FO) UP/Down (Disable/Enable)
Default setting : S1/S2/S3 in UP position

Key Features

- *Network extension: maximal distances (2km MMF, SMF up 150km, Single Fiber Strand 15km)*
- *Flexible installation: desk-top or shelf-mounted*
- *Reliability: internal quality power-supply*
- *FEF (Far End Fault) for F/O integrity test*
- *Auto-Negotiation with FDX advertising*
- *Bi-directional Fault Propagation mechanism*
- *DC power supply (optional) for Telco applications*
- *ETR – extended temperature range – for industrial deployment*

F.CON1

Typical Topology



Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz,

Operating Temperature
0º÷ +45ºC

Humidity
10%÷90%
non-condensing

Power Consumption
6 Watts maximum

Weight
0,8 kg max.

Storage Temperature
-20º ÷ +80ºC

Safety
UL 60950 EN 60590

Dimensions
120x170x44mm
(excl. wall-mount brackets)

EMC
FCC Part 15, Subpart B, Class A;
ICES 003: 1997, Class A;
EMC Directive 89/336/EEC

Ordering Information

Part#	Model	Description
B050	F.CON1	Single Channel 100Base-TX to 100Base-FX, MC,SC, MM 2km, 100m STP
B099	F.CON1/T	Single Channel 100Base-TX to 100Base-FX, MC,ST, MM 2km,100m STP
B220	F.CON1/SX	Single Channel 100Base-TX -FX, MC,SC, 850nm MM 300m,100m STP
B089	F.CON1/SMR	Single Channel 100Base-TX -FX, MC, SC, SM 15km, 100m STP
B016	F.CON1/SMR7	Single Channel 100Base-TX -FX, MC, SC, SM 7km, 100m STP
B079	F.CON1/SM	Single Channel 100Base-TX -FX, MC, SC, SM 25km, 100m STP
B100	F.CON1/SM/L	Single Channel 100Base-TX -FX, MC, SC, SM 40km, 100m STP
B154	F.CON1/SMRF13	Single Channel 100Base-TX -FX MC, SC, Single-Fiber-Strand SMF, 15km,1310nmTx, 1550nmRx, 100m STP
B155	F.CON1/SMRF15	Single Channel 100Base-TX-FX MC, SC connector, Single-Fiber-Strand SMF 15km,1550nmTx, 1310nmRx, 100m STP
B097	PS48	DC (-36 ÷ -72V) power supply (instead of the AC Power Supply)
B151	CBPS-DC48V	DC Power Supply cable, 2m, for PS48
B012	CTF-RM	19“ Rack shelf for installation of up to 3 F.CON1
B161	SCH-WM	wall Mount Kit for all single channel converters
B098	ETR	Extended Temperature Range (-10° ÷ +70°C)
B267	ETRX	Extended Temperature Range (-25° ÷ +70°C)

Specifications are subject to change w/o prior notice

MA

F.CON1/MA

Remotely Controlled CPE/Media Converter

The F.CON1/MA is a Layer1 CPE for FTTx or corporate networks that can be remotely managed and maintained, eliminating the need of a costly SNMP agent and scarcely available IP addresses. It converts 100Base-FX signals from the CO into 100Base-TX signals connected to the user. It is transparent to frame size, thus ensuring interoperability with any 100Base-TX devices. The F.CON1/MA has been designed as a simple and fail-proof device, and a rich, comprehensive set of monitoring and control functions is available from any master unit (MA™ enabled) located at the CO or network center. The device is housed in a rugged metal case with free-air cooling and is equipped with an internal wide-range switching power supply for safety, ease of installation and reliability. Optional DC powered and industrial temperature range models are available. Distance ranges from 2km over MM fiber up to 150km over SMF. The F.CON1/MA is also available in SFS (Single Fiber Strand) versions saving up to 50% on the cable plant, an extremely significant factor in FTTx economy. The following special features are also supported: Far End Fault (FEF), Fault Propagation and SLE (Subscriber Link Emulation).

Remote Management Functions

When the F.CON1/MA is connected over its fiber link to a remote device that is MA™ enabled and SNMP managed (***MetroStar™*** module), the following management functions can be implemented onto the F.CON1/MA device via CLI serial connection or a Telnet connection:

When the attached remote device is not MA™ enabled, the F.CON1/MA switches automatically to an unmanaged CPE/Media Converter operation, consequently avoiding any interoperability issues.

CPE Status

-F/O-link, TP-Link status
-Channel upstream bandwidth (100Mbps)
-Channel Flow Control (Pause enable/disable)
-TP port enabled/disabled
-Flow Control (Pause) enabled/disabled
-Fault Propagation status
-Firmware revision status

CPE Control

-Set Upstream Bandwidth (from 256/512Kbps, 1,2…8, 9, 10, 20 and up to 100Mbps)
-Enable/Disable TP port
-Set Flow Control (Pause enable/disable)
-Set Fault Propagation (FO->TP) enable / disable
-SLE (Subscriber Link Emulation) enable /disable (from remote MA management)
-Reset device and Restore the device's defaults

Key Features

- *Far End Fault (FEF) feature- for link integrity test*
- *Fault Propagation mechanism-for enhanced resiliency*
- *Subscriber Link Emulation – for mission critical networks*
- *In –band MA™ Access management*
- *Managed by FibroLAN **MetroView** Device Manager*

F.CON1/MA

General Specifications

Standard Compilance
IEEE 802.3u 100Base-TX, 10Base-FX

TP Port
Shielded RJ-45, Auto-Cross, 100m over
STP Cat. 5 cabling or better.
Factors affecting the TP port: Fault Propagation and SLE

Diagnostic LEDS
Power ON, TP Link/Activity, F/O Link/Activity, MA Active

Conversion Method
Layer1 transparent conversion with FDX
advertising, MA™ managed

FX port
Duplex SC or ST, FDX, MM 1310nm; output power -18dBm min.,
Sensitivity -32dBm or better. For SM fiber specifications, refer to
FibroLAN Data Sheet DS-FO.
SFS: 1310Tx/1550nmRx or 1550Tx/1310nmRx

Management
Remote MA™ based
Managed by FibroLAN ***MetroView***
Device Manager

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz,
IEC Connector. -48VDC power
supply (-36 to -72VDC) Optional DC
power Suppply (PS 48)
Safety
UL 60950; EN60950

Humidity
10% ÷ 90%
non-condensing
Power Consumption
4 Watts maximum
Weight
400g

Temperature
Operating:0ºC ÷ +45ºC
Industrial Extended
Temperature Range Option
Storage: -20ºC ÷ +80ºC
Dimensions
120x170x44mm

EMC
FCC part 15, SubpartB, ClassA
EMC Directive 89/336EEC

Ordering Information

Part#	Model	Description
3401	F.CON1/MA	100TX-FX Converter/Access device, Duplex SC connectors, MMF, 2km, 1310nm, MA managed
3402	F.CON1/MA/T	100TX-FX Converter/Access device, Duplex ST, MMF, 2km, 1310nm, MA managed
3404	F.CON1/MA/SMR7	100TX-FX Converter/Access device, Duplex SC, SMF, 7km, 1310nm, MA managed
3403	F.CON1/MA/SMR	100TX-FX Converter/Access device, Duplex SC, SMF, 15km, 1310nm, MA managed
3405	F.CON1/MA/SM	100TX-FX Converter/Access device, Duplex SC, SMF, 25km, 1310nm, MA managed
3406	F.CON1/MA/SM/L	100TX-FX Converter/Access device, Duplex SC, SMF 40km, 1310nm, MA managed
B097	PS48	DC (-36 ÷ -72VDC) PS instead of AC
B216	PS24	DC (-18 ÷ -36VDC) PS instead of AC
B151	CBPS-DC48V	DC Power Suplly cable (for PS24 and PS48), 2m
B098	ETR	Extended Temperature Range (-10° ÷ +70°C) option
B012	CTF-RM	19“ Rack shelf for installation of up to 3 F.CON1/MA
B161	SCH-WM	Wall mount kit

Specifications are subject to change w/o prior notice

MA

F.CON1F/MA

Remotely Controlled CBE/Fiber to Fiber Converter

The F.CON1F/MA is a layer 1 CPE for FTTx or corporate networks that can be remotely managed and maintained, eliminating the need for a costly SNMP agent and scarcely available IP addresses. It converts SM 100Base-FX signals from the Central Node into MMF 100Base-FX (local) connected to the user. It is transparent to frame size, thus ensuring interoperability with any 100Base-FX device. The F.CON1F/MA had been designed as a simple and tamper-free device, and a rich and comprehensive set of monitoring and control functions is available from any master unit (MA™ enabled) located at the CO or network center. The MA™ (Micro Agent) is an on chip management system enabling the management of remote access devices eliminating the need of an SNMP agent and IP address. The device is housed in a rugged metal case with free-air cooling and is equipped with an internal wide-range switching power supply for safety, ease of installation and reliability. Optional DC powered and industrial temperature range models are available.

Distance ranges from 2km over MM fiber and up to 150km over SM fiber. The F.CON1F/MA is also available in SFS (Single Fiber Strand) versions saving 50% on the cable plant, an extremely significant factor in FTTX applications. The device is suitable for desktop, shelf and wall-mounted installations. The device does not require any kind of setup and does not have any external/internal controls minimizing installation time.

Remote Management Functions

When the F.CON1F/MA is connected over its fiber link to a remote device that is MA™ enabled and SNMP managed (***MetroStar™*** module), the following management functions can be implemented onto the F.CON1F/MA device via CLI serial connection or a Telnet connection:

CPE Status

-F/O (UNI and OA) ports Link and Signal Detect Status
-Channel upstream bandwidth
-Channel Flow Control (Pause enable/disable)
-UNI port enabled/disabled
-Fault Propagation status
-Temperature and Firmware revision status

CPE Control

-Set Upstream Bandwidth (from 256/512Kbps, 1,2…8, 9, 10, 20 and up to 100Mbps)
-Enable/Disable UNI port
-Set Flow Control (Pause enabled/disabled)
-Fault Propagation FO (OA) >> FO (UNI) enable / disable
-SLE (Subscriber Link Emulation) enable /disable (from remote MA management)
-Reset device and Restore the device's defaults

When the attached remote device is not MA™ enabled, the F.CON1F/MA switches automatically to an unmanaged CPE/Media Converter operation, consequently avoiding any interoperability issues.

Key Features

- *Far End Fault (FEF) feature- for link integrity test*
- *Fault Propagation mechanism-for enhanced resiliency*
- *Subscriber Link Emulation – for mission critical networks*
- *Signal Detect (SD LEDs) indication*
- *Loop-back test and Extended Loop-Back- enhanced diagnostics*

F.CON1F/MA

General Specifications

Standard Compliance
IEEE802.3/802.3u, 100Base-FX
Local 100BaseFX (UNI) port
Duplex SC or ST, FDX, FEF, MMF 1310nm; output power
-18dBm min., Sensitivity -32dBm or better, 2km rated distance

Diagnostics
Per device: Power ON, MA Active
For each fiber port: Link/Activity, Signal-Detect

Conversion Method
Layer 1 transparent conversion 100Base-FX
Remote port 100Base-FX port (Optical Access)
Duplex SC or ST, FDX, FEF, SMF distances up to 150km.See FibroLAN Data Sheet DS-FO

Management
MA™ management technology
Remote Firmware upgrade

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz, IEC connector
-48VDC (-36 ÷ -72VDC) power supply (optional)

Safety
EN60950-1

Humidity
10% ÷ 90%
non-condensing

Power Consumption
5 Watts maximum

Weight
400g

Temperature
Operating: 0ºC ÷ +45ºC;
Optional Industrial Temperature Range
Storage: -20º ÷ +80ºC

Dimensions
120x170x44mm

EMC
EN 300 386 V1.3.3,
AS/NZS CISPRESS: 04
EN55022\24, FCC part 15, Subpart B

Ordering Information

Part#	Model	Description
3451	F.CON1F/MA/SMR7	MA managed Single Channel Converter/Access device 100Base-FX MM fiber 1310nm, duplex SC to 100Base-FX SM fiber 1310nm, 7km, duplex SC
3452	F.CON1F/MA/SMR	MA managed Single Channel Converter/Access device 100Base-FX MM fiber 1310nm, duplex SC to 100Base-FX SM fiber 1310nm,15km, duplex SC
3453	F.CON1F/MA/SM	MA managed Single Channel Converter/Access device 100Base-FX MM fiber 1310nm, duplex SC to 100Base-FX SM fiber 1310nm,25km, duplex SC
3454	F.CON1F/MA/SM/L	MA managed Single Channel Converter/Access device 100Base-FX MM fiber 1310nm, duplex SC to 100Base-FX SM fiber 1310nm,40km, duplex SC
3455	F.CON1F/MA/SM/L3	MA managed Single Channel Converter/Access device 100Base-FX SM fiber 1310nm 25km, duplex SC to 100Base-FX SM fiber 1310nm,40km, duplex SC
3406	F.CON1F/MA/SM-SML	MA managed Single Channel Converter/Access device 100Base-FX MM fiber 1310nm, duplex SC to 100Base-FX SM fiber 1550nm DFB,100km, duplex SC
B097	PS48	DC (-36 ÷ -72VDC) PS instead of AC
B216	PS24	DC (-18 ÷ -36VDC) PS instead of AC
B151	CBPS-DC48V	DC Power Suplly cable (for PS24 and PS48), 2m
B098	ETR	Extended Temperature Range (-10° ÷ +70°C) option
B012	CTF-RM	19“ Rack shelf for installation of up to 3 F.CON1F/MA devices
B161	SCH-WM	Wall mount kit

Specifications are subject to change w/o prior notice

H.CON

10/100TX-FX Media Converter/Access Device

The H.CON is a 10/100Base-TX to 100Base-FX Media Converter designed to be used as a subscriber (CPE) Access Device in FTTx (x=Home, Business, Desk) Networks. The H.CON implements a non-repeater, full re-timing design. The TP port supports Auto-Negotiation to best determine link options and optimal settings. The F/O port operates at maximum performance of 100Mbps Full Duplex. The device is housed in a compact yet rugged metal case, providing it with strong free-air cooling for extended reliability. It is equipped with an internal wide-range switching Power Supply for safety, easy installation and reliable operation. H.CON SFS (Single-Fiber-Strand) versions make it a superb choice for FTTH deployment, saving 50% of the cable plant. The powerful FEF (Far End Fault) mechanism provides true link indication and alerts user of any failure of F/O both incoming and outgoing links. The H.CON does not require setup of any kind (minimizing installation time) and does not have any external controls to avoid tampering (intentional or accidental) by users. The H.CON is suitable for desk-top, shelf or wall-mount installation.

General Specifications

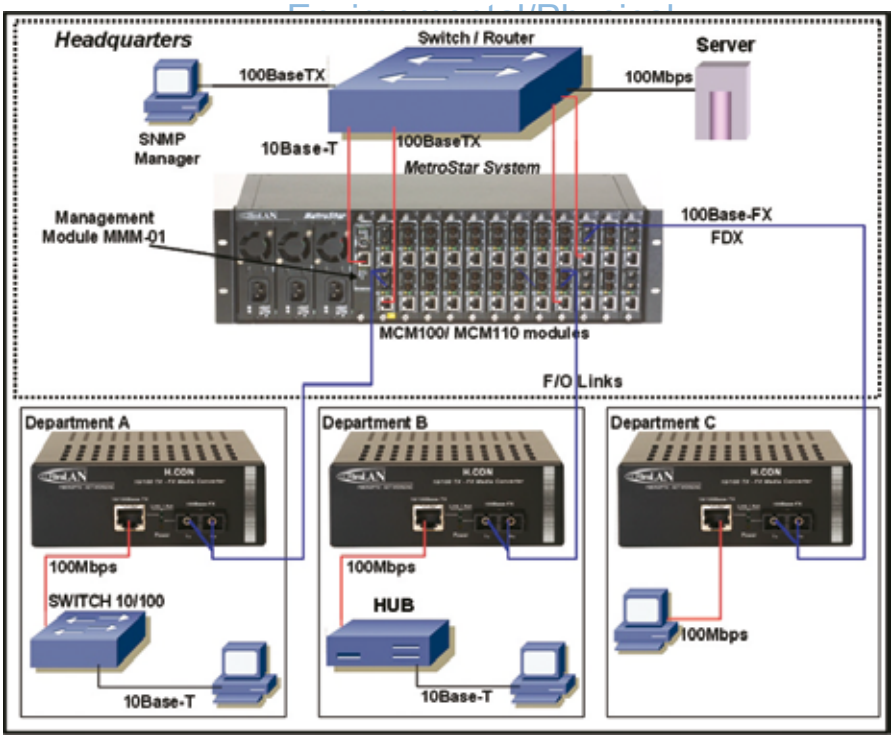
Standard Compilance
IEEE802.3/802.3u
10Base-T, 100Base-TX, 100Base-FX, FDSE
FDX Flow Control, HDX back-pressure flow control, CE compliance
TP port
Shielded RJ-45, MDI-X type, auto-polarity,
100m over STP 100Ω Cat5 cabling; Speed and duplex mode via Auto-Negotiation

Conversion Method
BMD (Buffered Media Domain),
1k Mac adresses
Frame range: 64 to 1536 bytes
FX Port
Duplex SC (ST optional, full Duplex FEF for testing F/O link integrity
Simplex SC (Single Fiber Strand)
Diagnostic LEDS
F/O Link/Activity, TP Link/Activity
Power ON/OFF
F/O port specifications
MMF 1310nm, 2km; min Out Power 18dBm
Sensitivity: -32dBm; SMF 1310 nm -7/15/25/40km, min Out
Power: -20/-16/-15/-11 dBm;
Sensitivity: -30/-30/-36/-36 dBm SM SFS:
15km Out Pw:-15dBm; Sens: -30dBm;
60km: -5 dBm; - 35dBm

Key Features

- *10/100Base-TX to 100Base-FX conversion*
- *Top performance: 2000m over MM fiber, 150km SMF, and 60km over Single Fiber Strand*
- *Supports 1k MAC addresses*
- *Supports Single Fiber Strand (15, 60km) for fiber savings*
- *Supports Far End Fault for FO link integrity indication*
- *Internal AC Power Supply (optional internal DC PS)*
- *ETR: Extended Temperature Range option*
- *Flow Control for optimal performance*
- *Desk-top, shelf or wall mount installations*

Typical Topology



Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz,
IEC Connector. Internal, optional
-48VDC power supply

Operating Temperature
0º ÷ +45ºC

Humidity
10% ÷ 90%
non-condensing

Power Consumption
4 Watts maximum

Weight
500g

Storage Temperature
-20º ÷ +80ºC

Safety
CE EN 60950-1:2001

Dimensions
120x170x44mm
(excl. wall-mount brackets)

EMC
ETSI EN 300 386 V1.3.2
EN 55022:1998+A1:2000
EN55024:1998+A1:2001
AS/NZS CISPR 22:04

Ordering Information

Part#	Model	Description
B090	H.CON	10/100TX-FX converter, multi-mode fiber,1310nm duplex SC, 2km
B219	H.CON/T	10/100TX-FX converter, multi-mode fiber,1310nm, duplex ST, 2km
B091	H.CON/SMR7	10/100TX-FX converter, single-mode fiber, 1310nm, duplex SC, 7km
B231	H.CON/T/SMR7	10/100TX-FX converter, single-mode fiber,1310nm, duplex ST, 7km
B092	H.CON/SMR	10/100TX-FX converter, SM fiber, 1310nm, duplex SC, 15km
B230	H.CON/SMR-48	10/100TX-FX converter, SM fiber, 1310nm, duplex SC, 15km, -48VDC PS
B093	H.CON/SM	10/100TX-FX converter, single-mode fiber, 1310nm, duplex SC, 25km
B094	H.CON/SM/L	10/100TX-FX converter, single-mode fiber,1310nm, duplex SC, 40km
B095	H.CON/SMRF13	SFS 10/100TX-FX converter, 1310nm transmit, simplex SC, 15km
B232	H.CON/SMLF13	SFS 10/100TX-FX converter, 1310nmTx/1550nmRx, simplex SC, 60km
B096	H.CON/SMRF15	SFS 10/100TX-FX converter, 1550nm transmit, simplex SC, 15km
B233	H.CON/SMLF15	SFS 10/100TX-FX converter, 1550nmFDBTx/1310nmRx,simplex SC, 60km
B097	PS48	-36 ÷ -72VDC power supply for H.CON devices (instead of the AC PS)
B098	ETR	Extended Temperature Range (-10° ÷ +70°C) option for all H.CON
B012	CTF-RM	19“ Rack shelf for installation of up to 3 H.CON devices

Specifications are subject to change w/o prior notice

MA

H.CON/MA

Remotely Controlled NTU/Media Converter

The H.CON/MA is the industry's first NTU for FTTx or corporate networks which can be remotely managed and maintained eliminating the need of a costly SNMP agent and scarcely available IP addresses (via embedded MA™ chip controller). It converts 100Base-FX signals from the Access node into 10/100Base-TX connected to the user, ensuring fail free interconnection to any type of device or network. While designed as a simple device, a rich and comprehensive set of monitoring and control functions is available from any master unit (MA™ enabled) located in the Access node or network center. The device supports the following features: FEF (Far End Fault) to verify the fiber link integrity, FP (Fault Propagation) for network resiliency and SLE (Subscriber Link Emulation). SLE, a most advanced Fault Propagation mechanism, propagates failure of the subscriber (connected to H.CON/MA) all the way to the Access switch respective port (and vice-versa) without affecting the fiber link connecting the two devices (the H.CON/MA remains under full control).

The SLE feature is enabled through remote management. The device is housed in a rugged metal case with massive free-air cooling and equipped with an internal wide-range switching power supply for safety, ease of installation and reliability. Optional DC powered, industrial temperature range (ETR) and wall mountable models are available. Distance ranges from 2km over MM fiber up to 150km over SM fiber. The H.CON/MA is also available in SFS (Single Fiber Strand) versions saving up to 50% on the cable plant, providing a cost effective and economical solution for FTTX environments. The device supports extended MTU (64 ÷ 1916 bytes). When remote device is not MA™ enabled, the H.CON/MA switches automatically to a normal NTU/Media Converter operation, consequently avoiding any interoperability issues. The H.CON/MA device supports the Offline Configuration Facility (OFC) and Remote Firmware Upgrade (RFU).

Remote NTU Management

*When the H.CON/MA is connected over a fiber link to a remote device which is MA™ enabled and SNMP managed (**MetroStar™** module, or S.CON1M/MA), the H.CON/MA Main Menu may be invoked. This menu contains the Device status and Device control.*

Device Status contains the following information:
F/O Link Status, T/P Link Status, TP Link Configuration (Auto-Negotiation, Duplex mode, and line data rate), Channel Upstream bandwidth, TP port connection mode, Pause mode (Flow Control), Fault Propagation mode, Firmware revision

Device Control provides the following management functions:
Fiber Link Integrity: continuous (every 10msec) verification of the fiber link.
Loop-Back test and Extended Loop Back (ELB) through remote management
Set A/N mode: NTU's TP port may be set to Auto-Negotiation or Non A/N mode.
Set data rate: Allows forcing 10 or 100Mbps onto the TP port.
Set Duplex mode: Allows forcing of HDX or FDX onto the TP port
Set Pause mode (Flow control), Set Fault Propagation (FO>>TP)
Set Upstream bandwidth: Allows supplying user with different service programs, from 256K to 100Mbps, either symmetrical or asymmetrical up and downstream.
Reset device and Restore device defaults
All these functions – unless intended otherwise – do not disrupt user data flow and do not affect the used bandwidth.

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz, IEC connector -48VDC (-36 ÷ -72VDC) power supply (optional)

EMC
EMC: EN 300 386 V1.3.3:2005-04
EN 55022/ EN 55024 AS/NZS CISPR 22:04
FCC CFR47 part 15 sub B Class A

Power Consumption
4 Watts max.

Safety
EN 60950-1:2001; cTUVus IEC60950-1

Temperature
Operating: 0ºC ÷ 45ºC. Extended Temperature Range (optional)
Storage: -20º ÷ +80ºC. Humidity 10% ÷ 90% non-condensing

Dimensions
120x170x40mm

Weight
400g

H.CON/MA

General Specifications

Standard Compliance
IEEE802.3/802.3u, 10Base-T, 100Base-TX, 100Base-FX, FDSE
Frame length range: 64 ÷ 1916 bytes
Supports 1k MAC addresses

Conversion Method
Buffered Media Domain, FDX Flow Control (IEEE 802.3X), HDX Back Pressure, Auto Negotiation, MA™ managed;
Far End Fault (FEF) and FP are supported

TP Port
Shielded RJ-45, MDI-X, 100m over STP Cat. 5 cabling; Auto-Negotiation or forced mode (10/100 and FDX/HDX) via management; Fault Propagation through SLE feature

FX Port
Duplex SC or ST, FDX, FEF, MM fiber 1310nm; output power -20dBm min., Sensitivity -30dBm or better; For SM: refer to Data Sheet DS-FO; SFS: 1310/1550nm or 1550/1310nm

Diagnostics
4 LEDs/6 functions: Power ON, TP Link/Activity, F/O Link/Activity, MA Active

Management
Remote, MA™ (Micro Agent) based technology
Managed by FibroLAN's ***MetroView*** Device Manager

Ordering Information

Part#	Model	Description
3101	H.CON/MA	10/100TX-FX Converter/Access device, duplex SC, MM, 2km, 1310nm, MA
3118	H.CON/MA/T	10/100TX-FX Converter/Access device, duplex ST, MM, 2km, 1310nm, MA
3102	H.CON/MA/SMR7	10/100TX-FX Converter/Access device, duplex SC, SM, 7km, 1310nm, MA
3103	H.CON/MA/SMR	10/100TX-FX Converter/Access device, duplex SC, SM, 15km 1310nm, MA
3119	H.CON/MA/SMR/T	10/100TX-FX Converter/Access device, duplex SC, SM, 15km 1310nm, MA
3104	H.CON/MA/SM	10/100TX-FX Converter/Access device, duplex ST, SM, 25km, 1310nm, MA
3111	H.CON/MA/SM-TL	10/100TX-FX Converter/Access device, wall mountable, extended MTU support, duplex SC, SM, 25km, 1310nm, MA
3115	H.CON/MA/SM-TL-48	10/100TX-FX Converter/Access device, wall mountable, extended MTU support, duplex SC, SM, 25km, 1310nm, -48VDC PS, including 3m power cable, MA
3105	H.CO N/MA/SM/L	10/100TX-FX Converter/Access device, SC, SM, 40km, 1310nm, MA
3108	H.CON/MA/SM/L2	10/100TX-FX Converter/Access device, SC, SM, 70km, 1310nm, MA
3109	H.CON/MA/SM/L3	10/100TX-FX Converter/Access device, SC, SM, 100km, 1550nmDFB, MA
3110	H.CON/MA/SM/LX	10/100TX-FX Converter/Access device, SC, SM, 100km, 1550nmDFB, MA
3106	H.CON/MA/SMRF13	10/100TX-FX Converter/Access device, simplex SC, SM, Single Fiber Strand (SFS), 20km, 1310nm Tx/1550nm Rx, MA
3107	H.CON/MA/SMRF15	10/100TX-FX Converter/Access device, simplex SC, 20km, SFS, 1550nm Tx/1310nm Rx, MA
3112	H.CON/MA/SMRF13-TL	10/100TX-FX Converter/Access device, wall mountable, extended MTU support, simplex SC, SM, 20km, SFS, 1310nm Tx/1550nmRx, MA
3113	H.CON/MA/SMLF13-TL	10/100TX-FX Converter/Access device, wall mountable, extended MTU support, simplex SC, SM, 40km, SFS, 1310nm Tx/1550nmRx, MA
3117	H.CON/MA/SMXF13-TL	10/100TX-FX Converter/Access device, wall mountable, extended MTU support, simplex SC, SM, 80km, SFS, 1310nm Tx/1550nmRx, MA
3116	H.CON/MA/SMRF1313	10/100TX-FX Converter/Access device, simplex SC, SM, 20km, SFS, 1310nm Tx/1310nm Rx, MA
3114	H.CON/MA/ETRX/SMLF13	MA managed 10/100 TX-FX converter/Access device, SC connector, SM Single fiber strand, 1310nmTx/1550nmRx, 40km, Extended temperature range -25C to +70C, -48DC power supply
B097	PS48	DC (-36÷-72VDC) PS instead of AC PS

Specifications are subject to change w/o prior notice

S.CON1

10/100Base Tx-Fx Media Converter

The SCON1 family products are 10/100Base-TX to 100Base-FX buffered media converters. These devices implement a non-repeater full re-timing design. Auto-Negotiation is deployed on TP port to determine link options and optimal settings. The F/O port operates at maximum performance: 100Mbps Full Duplex. Special attention is given to allow easy installation and maintenance: MDI-II/MDI-X switch to allow the usage of either a straight or crossed twisted pair cabling, extensive front-panel diagnostic LEDs and front panel DIP switches for optimal setup.

The SCON1 supports bi-directional Fault Propagation mechanism. The powerful FEF (Far End Fault) Signaling feature provides true-link indication and alerts user of any failure of both incoming and outgoing fiber links In case when more than one device must be installed in a wiring center, a special 19" shelf is available for safe installation while occupying minimal rack-space. Single-Fiber-Strand versions save 50% of the cable plant.

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz, IEC Connector -48VDC optional P.S. (PS48)

Operating Temperature
0º ÷ +45ºC
Humidity: 10% to 90% non-condensing

Safety
Designed to meet:
ICE-EN60950

Dimensions
120x170x44mm

Power Consumtion
5 Watts maximum

Storage Temperature
-20º ÷ +80ºC

EMC
designed to meet:
FCC part 15, Subpart B, Class A; EMC Directive 89/336/EEC
EN300 386 V1.3.3

0Weight
500g

Key Features

- *Fault Propagation: for additional resiliency*
- *ETR: Optional Extended Temperature Range for industrial environment*
- *Flow Control: for optimal performance*
- *Top Performance: maximum distances (2000m MM, 150km SM, 100m TP port) in any network architecture*
- *Front Panel DIP switches: easy TP and F/O port setup for optimal operation*
- *FEF: (Far End Fault) for F/O port Link integrity*
- *SFS: (Single Fiber Strand) models for fiber saving (20/40/80km)*
- *Flexibility: desk-top, shelf or wall mount installations*
- *Reliability: internal quality power-supply (AC or DC P.S)*
- *Maintainability: extensive (7LEDs/14 functions) front-panel diagnostics*

S.CON1

General Specifications

Standard Compilance
IEEE 802.3u
100Base-TX, 10Base-T, FDSE 100Base-FX

10/100Base-TX ports
Shielded RJ-45, Speed and Half/Full Duplex support via Auto-Negotiation or forced (DIP switches) 100m over STP Cat5 cable
Auto-Polarity correction MDI-II/MDI-X selection
(front panel switch) 10/100Base-TX support via auto-negotiation or forced (DIP switches)

Controls (Front panel DIP switches)
FX port: FDX/HDX selection
TX port: 10/100, FDX/HDX
Auto-Negotiation enable/disable
Enable/Disable Fault Propagation (F>T, T>F)
Reset device

Conversion Method
BMD (Buffered Media Domain), FDX flow control, HDX back-pressure flow control 1k Mac addresses, Frames: 64 to 1518 bytes

100Base-FX Port
FEF Signaling
Half for Full Duplex (DIP switch selectable)
1310nm, multi-mode, Duplex SC/ST
Distance - 2000m
Output Power: -18dBm or better
Input Sensitivity: -32dBm or better
Single Mode 7/15/25/40/70/100/150 km
Single-Fiber Strand 20/40/80km
Refer to FibroLAN F/O Specs DS (DS-FO)

Diagnostic LEDs
F/O port: Link/Activity, Signal Detect, FDX TP port: Link/Activity, FDX, 100Mbps
Power On/Off

Ordering Information

Part#	Model	Description
B017	S.CON1	Single Channel 10/100TX-FX converter, BMD, duplex SC, MM, 2km
B019	S.CON1/T	Single Channel 10/100TX-FX converter, BMD, ST connectors, MM, 2km
B060	S.CON1-48	Single Channel 10/100TX-FX converter, BMD, duplex SC, MM, 2km, -48VDC PS
B015	S.CON1/SMR7	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 7km, 1310nm
B059	S.CON1/SMR	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 15km, 1310nm
B061	S.CON1/SM	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 25km, 1310nm
B027	S.CON1/SM/L	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 40km, 1310nm
B028	S.CON1/SM/L2	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 70km, 1310nm
B147	S.CON1/SM/L3	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 100km, CFB 1550nm
B029	S.CON1/SM/LX	Single Channel 10/100TX-FX converter, BMD, 2* SC, SM, 150km, 1550nm DFB
B034	S.CON1/SMRF15	Single Channel 10/100TX-FX converter, BMD, simplexSC, Single Fiber Strand, SM, 20km, 1550nmTX/ 1310nmRX
B030	S.CON1/SMRF13	Single Channel 10/100TX-FX converter, BMD, simplexSC, Single Fiber Strand, SM, 20km, 1310nmTX/ 1550nmRX
B294	S.CON1/SMXF15	Single Channel 10/100Base-TX to 100Base-FX converter, BMD (Buffered Media Domain), simplex SC connector, single-mode-80km,1550nmTX DFB/1310nmRX, Single Fiber Strand
B295	S.CON1/SMXF13	Single Channel 10/100Base-TX to 100Base-FX converter, BMD (Buffered Media Domain), simplex SC connector, single-mode-80km,1310nmTX/1550nmRX, Single Fiber Strand
B097	PS48	Optional Power Supply (-36 to -72 VDC) instead of AC PS
B151	CBPS-DC48V	DC PS Cable, 2m for PS48
B098	ETR	Extended Temperature Range (-10 ºC to *70ºC) option for all S.CON devices
B012	CTF-RM	19" Rack shelf for installation of up to 3 S.CON1 devices
B161	SCH-WM	Wall mount kit

Specifications are subject to change w/o prior notice

S.CON1M

Managed Single Channel 10/100 BaseTX-FX Media Converter

While Media Converters are considered part of the cable plant, in many cases they must be remotely managed as any other network device. In particular this is true in mission-critical, fully managed networks as well as in networks dispersed over large areas to allow efficient control and maintenance. The S.CON1M is the only compact SNMP managed Media Converter available in the market. While vendors offer such feature for modular systems only, the need for management is more intense in single channel devices, being deployed away from the main wiring closets. This compact size device implements the innovative BMD (Buffered Media Domain) technology to provide an unconditioned network extension of up to 150km, in any network architecture (even when such includes repeaters). Its copper port is auto-negotiating to provide easy migration from 10Mbps to 100Mbps transmission rates.

A switch selectable VLAN allows choice of in-band (over the fiber) management or locally accessible (via the TP port) management. Special attention was given to allow easy installation and maintenance: MDI-II/MDI-X switch to eliminate crossed cables, internal quality power supply, extensive front-panel diagnostics and more. A powerful selective fault propagation mechanism facilitates the initiation of a redundant path to critical sites. In case that more than one device must be installed in a wiring center, a special 19" shelf is available for easy and safe installation while occupying minimal rack-space. All these features make the S.CON1M the most powerful device of its kind.

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz, IEC Connector -48VDC (-36 to -72VDC) power supply (optional), Power Consumption
10 Watts maximum

Operating Temperature
0º÷ +45ºC

Storage Temperature
-20º÷+80ºC

Safety
UL 1950: 1995
EN 60950

Dimensions
120x170x40mm

Humidity
10% ÷ 90%
non-condensing

EMC
FCC part 15, Subpart B, Class B; ICES 003: 1997, Class B; EMC Directive 89/336/EEC

Weight
500g max.

Installation
Desk-Top or (optional)
Shelf or (optional)
Wall-Mount

Key Features

- *SNMP in-band and out-band fully managed device*
- *Network resilience: Selective Fault Propagation*
- *Top Performance: maximal distances in any network architecture*
- *Protection of Investment: 10Base-T support for easy migration*
- *FEF: True Network Integrity Indication*
- *Flexible installation: desk-top, wall or shelf mounted*
- *Easy Network Design: no PDV calculations needed*
- *Reliability: internal quality power-supply*
- *Maintainability: extensive (9LEDs/11 functions) front-panel diagnostics*

S.CON1M

General Specifications

Standard Compilance
IEEE 802.3u
100Base-TX, 10Base-T, FDSE 100Base-FX

10/100Base-TX ports
Shielded RJ-45, Half/Full Duplex support via Auto-Sensing or manual (DIP switch), 100m over UTP/STP Cat5 cable
Auto-Polarity correction MDI-II/MDI-X selection
10Base-T support via auto-sensing or manual (DIP switch)

Controls (DIP switches)
TX po: 10/100 FDX/HDX
Auto-Negotiation enable/disable
VLAN enable/disable
Fault Propagation (F>T, T>F)

Management Functions
All diagnostic functions (see above)
All control functions (see above)
Device Temperature, Alerts of device's
any operational changes
System status

Conversion Method
BMD (Buffered Media Domain), Selective Fault Propagation

100Base-FX Port
1310nm, multi-mode, SCconnectors
Distance - 2000m (660 ft)
Half or Full Duplex (DIP switch selectable)
Output Power: -18dBm or better
Input Sensitivity: -32dBm or better
For Single Mode specifications see DS-SM

Diagnostics
Full Duplex, Link/Activity, SD-F/O port
Full Duplex, Link/Activity, 100Mbps-TP port
Power

Management Physical Interface
miniDIN connector (RS232) for setup and diagnostics 2 status LEDs (Activity, Readiness)

Management Standards
SNMP (V1 & V2), MIB II (RFC 1213)
FibroLAN private MIB extensions
Telnet, TFTP

Ordering Information

Part#	Model	Description
B017	S.CON1	Single Channel 10/100TX-FX converter, BMD, duplex SC, MM, 2km
B019	S.CON1/T	Single Channel 10/100TX-FX converter, BMD, ST connectors, MM, 2km
B060	S.CON1-48	Single Channel 10/100TX-FX converter, BMD, duplex SC, MM, 2km, -48VDC PS
B015	S.CON1/SMR7	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 7km, 1310nm
B059	S.CON1/SMR	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 15km, 1310nm
B061	S.CON1/SM	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 25km, 1310nm
B027	S.CON1/SM/L	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 40km, 1310nm
B028	S.CON1/SM/L2	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 70km, 1310nm
B147	S.CON1/SM/L3	Single Channel 10/100TX-FX converter, BMD, duplex SC, SM, 100km, CFB 1550nm
B029	S.CON1/SM/LX	Single Channel 10/100TX-FX converter, BMD, 2* SC, SM, 150km, 1550nm DFB
B034	S.CON1/SMRF15	Single Channel 10/100TX-FX converter, BMD, simplexSC, Single Fiber Strand, SM, 20km, 1550nmTX/ 1310nmRX
B030	S.CON1/SMRF13	Single Channel 10/100TX-FX converter, BMD, simplexSC, Single Fiber Strand, SM, 20km, 1310nmTX/ 1550nmRX
B294	S.CON1/SMXF15	Single Channel 10/100Base-TX to 100Base-FX converter, BMD (Buffered Media Domain), simplex SC connector, single-mode-80km,1550nmTX DFB/1310nmRX, Single Fiber Strand
B295	S.CON1/SMXF13	Single Channel 10/100Base-TX to 100Base-FX converter, BMD (Buffered Media Domain), simplex SC connector, single-mode-80km,1310nmTX/1550nmRX, Single Fiber Strand
B097	PS48	Optional Power Supply (-36 to -72 VDC) instead of AC PS
B151	CBPS-DC48V	DC PS Cable, 2m for PS48
B098	ETR	Extended Temperature Range (-10 ºC to *70ºC) option for all S.CON devices
B012	CTF-RM	19" Rack shelf for installation of up to 3 S.CON1 devices
B161	SCH-WM	Wall mount kit

Specifications are subject to change w/o prior notice

mS.CON2

Compact Dual Channel 10/100BaseTX-FX Media Converter

The mS.CON2 compact size device provides two independent conversion channels. Each channel includes a TP and a F/O port. The main purpose of the product is to connect each 10/100TX port to its respective F/O port. The two channels form two-separated security VLANs. The copper ports support Auto-Negotiation and MDI/MDI-X auto-crossover. Special attention is given to allow easy installation and maintenance: internal quality power-supply, extensive diagnostics and full performance.

The unique Fault Propagation feature will cut a TP port automatically whenever the device senses loss of the respective F/O link. Far End Fault Signaling (FEF) provides a true indication of the proper operation of the fiber links. TP ports can be connected to different networks or two ports of same router for network redundancy. The managed version, the mS.CON2M, provides full remote management via any SNMP platform or via a terminal application.

Environmental/Physical

Main Menu

Device status menu
basic and advanced status

Basic channel's status
channel number, FO and TP link status, Auo-Negotiation mode (enabled/disabled), TP Duplex Mode (FDX/HDX) Data Rate (10/100), Fault Propagation (on/off), Connection mode (connected/disconnected)

Basic device status
Test mode (on/off) and device's temperature (in C°)

Advanced channel's status
includes channel and port numbers, Tag insertion mode (Yes/No), Tag stripping mode (Yes/No), Port VID (0-4095)

Device control
Channel1/Channel2 control, Management control, Device control, Reset Device

Channel x control
TP basic control, TP advanced control, FO control, change Fault Propagation mode (FO<TP)

Key Features

- *Top Performance: maximal distances (150km F/O, 100m STP) in any network architecture*
- *Protection of investment: 10Base-T support for easy migration*
- *Versatile installation: desk-top, half rack, full rack or wall-mounted*
- *Feasibility: Front Panel 110 DIP switches facilitate the proper setting of the device*
- *Reliability: internal quality power-supply (AC or DC)*
- *Fault propagation: for mission critical applications (FO>TP)*
- *Port based security VLAN; VLAN tag frames are supported*
- *Frame length range: 64 to 1536 byte.*
- *FEF (Far End Fault): for true F/O link integrity*
- *Management (Out-of-Band/CLI, In-Band/SNMP)*

ms.CON2

General Specifications

Standard Compilance
IEEE 802.3u
100Base-TX, 10Base-T, FDSE 100Base-FX

10/100Base-TX ports (2)
Shielded RJ-45, Half/Full Duplex support via Auto-Negotiation or forced; 100m over STP Cat5 cable
Auto-Cross Support

Diagnostic LEDs
Power, F/O Link/Activity, TP Link/Activity 10/100M Test Mode ON (disables Far End Fault and Fault Propagation for both channels)

Conversion Methode
BMD (Buffered Media Domain) with Fault Propagation (FO>>TP)

100Base-FX ports (2)
Multi Mode Fiber: Output Power -18dBm min. Sensivity -32dBm or better; Single mode and SFS (Single Fiber Strand) - Refer to FibroLAN Datasheet - SM options

Controls (Front Panel DIP switches)
Per Channel: FP enable/disable, A/N enable/disable, 10/100Mbps, HDX/FDX. Per Device: Reset, FEF enable/disable

Power - Supply
Internal, 100 to 240 VAC, 50-60Hz; IEC connector -48VDC optional PS

Temperature
Operating: 0° to +45°C; Storage: -20° to +80°C
Humidity: 10% to 90% non-condensing

Safety
UL 60950, EN 60950

Dimensions/Weight
Max - 223x150x44nm/1kg max

Power Consumption
15 Watts maximum

EMC
ETSI EN 300 386 V1.3.2; EN55022:1988+A1:2000
EN55024:1998+A1:2001; AN/NZS CISPR 22:04

Management
Out-of-Band (RS232/CLI); In-Band (SNMP management platforms: SNMPc, HP OpenView, FibroLAN's ***MetroView*** Management System, etc...)

Ordering Information

Part#	Model	Description
B013	mS.CON2	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Duplex SC, Multi Mode, 2km, 1310nm
B014	mS.CON2M	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Duplex SC, Multi Mode, 2km, 1310nm, SNMP managed
B156	mS.CON2/SMR	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Duplex SC, Multi Mode, 15km, 1310nm
B157	mS.CON2M/SMR	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Duplex SC, Multi Mode, 15km, 1310nm
B158	mS.CON2M/SMRF13	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Simplex SC, Single Fiber Strand Single Mode, 15km, 1310nm Tx/1550nm Rx
B159	mS.CON2M/SMRF15	Compact Dual channel, 10/100Base-TX to 100BaseFX, BMD, Simplex SC, Single Fiber Strand Single Mode, 15km, 1550nm Tx/1310nm Rx
B160	RM2	19" Rack shelf for mounting up to 2 mS.CON2 devices
B098	ETR	Extended Temperature Range (-10°C to +70°C)
B097	PS48	DC (-36VDC to -72VDC) power supply instead of AC PS

Specifications are subject to change w/o prior notice

U.CON

Universal Multi/Single-Mode to Single-Mode Converter

The U.CON family products provide the network designer with a flexible, cost effective and reliabale device for network extensions. U.CON is an universal, protocol transparent device, converting digital signals ranging up to 622Mbps from multi-mode/single-mode to single mode fibers covering distances up to 150km. Being transparent, their deployment is easy and does not require any settings or measurements. The device is protocol independent for the specified transmission speed, however it is delivered qualified for the 3 most popular standards in this range: ATM/OC3 (U.CON1A series), 100Base-FX (U.CON1F), and ATMOC12/STM4 (U.CON622). Products may be ordered with both F/O ports Single-Mode fiber to be used as network extenders or wavelength converters. The U.CON is housed in a compact yet rugged chassis allowing both desktop and shelf mounting and powered by an internal auto-ranging power supply. Certain models are availablee in 19" rack-mount with redundant power supplies.

General Specifications

Standard Compliance
100Base-FX, FDDI, ATM-OC3, STM-1, ATMOC12, STM-4

Multi Mode Port 100Base-FX/OC3
Duplex SC connectors (ST optional); Multi Mode 1310nm,
Output Power: -18dBm, Input Sensitivity: -28dBm
U.CON622
Duplex SC; MM 1310nm
Out Power: -19 dBm
Sensitivity: --28 dBm

Single-Mode port-100Base-FX/OC3
Duplex SC connectors, 1310nm, 9/125m fiber
Output power: -20/-15/-11/-2 dBm for 7/25/40/70km
models respectively; Input Sensitivity: -30/-33/-33/-35 dBm
U.CON622
Duplex SC; SM 1310nm: 10/20/40/80km
Out Power: -10/-5/-3/0 dBm
Sensitivity: -23/-23/-23/-23 dBm

Diagnostic LEDs
SD: Signal Detect for MM/SM Rx port
SD: Signal Detect for SM Px port; Power

Conversion Method
Protocol Transparent

Key Features

- *Easy Installation - protocol independent, plug-and-play*
- *Network extension - up to 150km*
- *Data Rate - up to 155Mbps and 622Mbps*
- *Reliability - internal PS (optional internal -48VDC PS)*
- *Flexibility - desktop, shelf (optional) or rack-mount installation*

Environmental/Physical

Power Supply
Internal, 100 to 240 VAC, 50-60 Hz

Temperature
Operating: 0° to +45°C; Storage: -20° to +80°C
Humidity: 10% to 90% non-condensing

Safety
UL 60950, EN 60950

Dimensions, Weight
120x170x44 mm; 500 g

Power Consumption
5 Watts maximum

EMC
FCC part 15, Subpart B, Class A; VCCI Class A; ICES 003:1997, Class A; EMC Directive 89/336/EEC

Ordering Information

Part#	Model	Description
B152	U.CON1A/SMR7	MM to SM 1310nm ATM/OC3 Media Converter, 7km, 2*duplex SC
B080	U.CON1A	MM to SM 1310nm ATM/OC3 Media Converter, 25km, 2*duplex SC
B153	U.CON1F/SMR7	MM to SM 1310nm Fast Ethernet Media Converter, 7km, 2*duplex SC
B081	U.CON1F	MM to SM 1310nm Fast Ethernet Media Converter, 25km, 2*duplex SC
B082	U.CON1A-48	MM to SM 1310nm ATM/OC3, MC, 25km, 2*duplex SC, internal -48VDC PS
B083	U.CON1F-48	MM to SM 1310nm Fast Ethernet, MC, 25km, 2*duplex SC, internal -48VDC PS
B084	U.CON1A/L	MM to SM 1310nm ATM/OC3 Media Converter, 40km, 2*duplex SC
B085	U.CON1F/L	MM to SM 1310nm Fast Ethernet Media Converter, 40km, 2*duplex SC
B086	U.CON1A/L2	MM to SM 1310nm ATM/OC3 Media Converter, 70km, 2*duplex SC
B087	U.CON1F/L2	MM to SM 1310nmFast Ethernet Media Converter, 40km, 2*duplex SC
B149	U.CON1A2AC/SMR7LX	SM fiber 7km 1310nm to SM fiber 150km 1550nm converter ATM/OC3, 2*duplex SC, 19” 1U, dual redundant PS
B150	U.CON2A2AC/SMR7LX	Dual Channel SM 7km 1310nm to SM fiber 150km 1550nm converter ATM/OC3, 2*duplex SC, 19” 1U, dual redundant PS
B224	U.CON622	MM 1310nm to SM 1310nm ATM/OC12/STM-4 Media Converter, 2*duplex SC, 20km
B225	U.CON622/SML	MM 1310nm to SM 1550nm DFB ATM/OC12/STM-4 Media Converter, 2*duplex SC, 40km
B226	U.CON622/SML2	MM 1310nm to SM 1550nm DFB ATM/OC12/STM-4 Media Converter, 2*duplex SC, 80km
B227	U.CON622/SM-SM	SM 1310nm 10km to SM 1310nm ATM/OC12/STM-4 Extender, 2*duplex SC, 20km
B228	U.CON622/SM-SML	SM 1310nm 10km to SM 1550nm DFB ATM/OC12/STM-4 Extender, 2*duplex SC, 40km
B229	U.CON622/SM-SML2	SM 1310nm 10km to SM 1550nm DFB ATM/OC12/STM-4 Extender, 2*duplex SC, 80km

Specifications are subject to change w/o prior notice

U.CON2500

Universal Media Converter/Extender

The U.CON2500 provides the network designer with a flexible and cost effective device for optical signals conversion and network extension.
The U.CON2500 is a universal protocol transparent device. The unit covers distances up to 80km and 120km for GBE. Data rate is from 100Mbps to 2,5Gbps. It is equipped with two Small-Form-factor Pluggable (SFP) optical interfaces for ease of deployment, maintenance and logistics. The main advantages of the hot-swappable SFP optical interfaces are the density, flexibility, and cost savings. SFP devices can be easily interchanged, thus fiber optic networks can be upgraded more conveniently than with traditional devices. Device's deployment is easy and does nor require any settings or measurements. U.CON2500 units may be used with SFP SM F/O ports for network extension or wavelenggth conversion. The device is protocol independent for the specified transmission speed and efficiently supports Fast Ethernet, gigabit Ethernet, OC3, OC12, OC48, STM1, STM4, and STM16. The U.CON2500 is housed in a compact yet rugged chassis allowing both desktop and shelf-mounting and powered by an internal auto-ranging power supply.

General Specifications

Standard Compliance
Fast Ethernet (100Base-FX), Gigabit Ethernet, OC3, OC12, OC48, STM-1, STM-4, STM-16

Multi Mode Port 100Base-FX/OC3
Duplex SC connectors (ST optional) Multi Mode, 1310nm,
Output Power: -18dBm, Input Sensitivity: -28dBm

Diagnostic LEDs
Power On/Off (green LED)
SD: Signal Detect port 1 (green LED)
SD: Signal Detect port 2 (green LED)
TX-LOW LED for port 1 and port 2: OFF = Transmission is OK
LIT RED = Transmission signal low (does not reach required distance)
Blinking = Authentication invalid: implies that not a FibroLAN SFP is used (no TX will take place)

Conversion Method
Protocol Transparent

Temperature
Operating: 0° to +45°C; Storage: -20° to +80°C
Humidity: 10% to 90% non-condensing

F/O ports
Small Form-factor Pluggable hot-swappable dual LC connectors.
Refer to "Ordering Informaion" for SFP optical transceivers (see next page)

Power Supply
Internal 100 to 240 VAC, 50 to 60 Hz; Optional -48V DC PS (-36 to +72 VDC) ; Power Consumption: 4 watts; Safety designed to meet: EN60950
EMC designed to meet: FCC part 15, Subpart B, Class A; VCCI Class B; ICES 003:1997, Class A; EMC Directive 89/336/EEC

Dimensions/Weight
120x170x40mm, 500g

Key Features

- *Data Rate: 100Mbps to 2,5Gbps*
- *Network Extension: up to 80km (120km for GBE)*
- *Universal protocol transparent device*
- *Status and Diagnostic LEDs*
- *Hot swappable Small Form-factor Pluggable transceivers*

Ordering Information

Part#	Model	Description
B266	U.CON2500	Universal Extender module, 100Mbps to 2,5Gbps, includes 2 SFP slots, uses SFP optical transceivers
B289	SF155-SMRF15	SFP OC3, Single Fiber Strand (SFS), F/O transceiver, LC connector, SM, 1550nmTx/1310nmRx, 15km
B290	SF155-SMRF13	SFP, OC3, SFS F/O transceiver, LC connector, SM 1310nmTx/1550nmRx, 15km
B235	SF1G-S1	SFP module, GBE F/O transceiver, dual LC connector, MM 850nm, 220/550m
B236	SF1G-LX1	SFP module, GBE F/O transceiver, dual LC connector, SM 1310nm, 10km
B237	SF1G-LX2	SFP module, GBE F/O transceiver, dual LC connector, SM 1310nm, 20km
B238	SF1G-LX3	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB, 40km
B239	SF1G-LX4	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB, 80km
B240	SF1G-LX5	SFP module, GBE F/O transceiver, dual LC connector, SM 1550nm/DFB/APD 120km
B241	SF1G-SF13	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1310nmTx/1550nmRx, 20km
B242	SF1G-SF15	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1550nmDFB Tx/1310nmRx, 20km
B243	SF1G-LF13	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1310nmDFB Tx/1550nmRx, 40km
B244	SF1G-LF15	SFP module, SFS, GBE F/O transceiver, 1*LC, SM 1550nmDFB Tx/1310nmRx, 40km
B269	SF1G-ZF49	SFP, SFS, GBE F/O transceiver, LC connector, SM, 1490nmDFB Tx/1550nm Rx, 80km
B270	SF1G-ZF57	SFP, SFS, GBE F/O transceiver, LC connector, SM, 1550nmDFB Tx/1490nm Rx, 80km
B281	SF1G-LX5-5C-47	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1471nmDFB/APD, 120km
B282	SF1G-LX5-5C-49	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1491nmDFB/APD, 120km
B283	SF1G-LX5-5C-51	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1511nmDFB/APD, 120km
B284	SF1G-LX5-5C-53	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1531nmDFB/APD, 120km
B285	SF1G-LX5-5C-55	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1551nmDFB/APD, 120km
B286	SF1G-LX5-5C-57	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1571nmDFB/APD, 120km
B287	SF1G-LX5-5C-59	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1591nmDFB/APD, 120 km
B288	SF1G-LX5-5C-61	CWDM SFP, 1,25Gbps F/O transceiver, dual LC connector, SM 1611nmDFB/APD, 120km
B268	SF2G-S1	SFP module, 2,5Gbps F/O transceiver, dual LC connector, MM 850nm, 300/400 m
B249	SF2G-S2	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nm, 2km
B250	SF2G-LX2-3	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nmDFB, 15km
B251	SF2G-LX2-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1550nmDFB, 15km
B252	SF2G-LX3-3	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nmDFB/APD, 40km
B253	SF2G-LX3-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1550nmDFB, 40km
B254	SF2G-LX4-5	SFP module, 2,5Gbps F/O transceiver, dual LC connector, SM 1310nmDFB/APD, 80km
B271	SF2G-LX3-5C-47	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1471nm DFB, 40km
B272	SF2G-LX3-5C-49	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1491nm DFB, 40km
B273	SF2G-LX3-5C-51	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1511nm DFB, 40km
B274	SF2G-LX3-5C-53	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1531nm DFB, 40km
B275	SF2G-LX3-5C-55	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1551nm DFB, 40km
B276	SF2G-LX3-5C-57	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1571nm DFB, 40km
B277	SF2G-LX3-5C-59	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1591nm DFB, 40km
B278	SF2G-LX3-5C-61	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1611nm DFB, 40km
B258	SF2G-LX4-5C-47	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1471nm DFB/APD, 80km
B259	SF2G-LX4-5C-49	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1491nm DFB/APD, 80km
B260	SF2G-LX4-5C-51	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1511nm DFB/APD, 80km
B261	SF2G-LX4-5C-53	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1531nm DFB/APD, 80km
B262	SF2G-LX4-5C-55	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1551nm DFB/APD, 80km
B263	SF2G-LX4-5C-57	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1571nm DFB/APD, 80km
B264	SF2G-LX4-5C-59	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1591nm DFB/APD, 80km
B265	SF2G-LX4-5C-61	CWDM, SFP, 2,5Gbps F/O transceiver, dual LC connector, SM 1611nm DFB/APD, 80km

Specifications are subject to change w/o prior notice

The SFP transceivers from SF155-SMRF15 through SF2G-LX4-5C-61 are used in the following FibroLAN equipment: ***MetroStar™*** *module MSM2500U und U.CON2500 devices. All recommended distances for CWDM active components assume direct point-to-point connection between them. If these are passing thru passive Mux/demuxes, the additional attenduation introduced by such devices must be considered when assessing the actual distance.*

GSM1000

1000Base-SX-LX to 1000Base-LX Converter/Extender

This device provides conversion from a Multi-Mode (1000Base-SX) or Single Mode (1000Base-LX) link to a single-mode (1000Base-LX) link allowing its extension of up to 80km. As many of the GBE switches or NICs come with SX ports, combining such with the GSM1000 provides the most flexible and cost effective way to extend their reach over fiber. The GSM1000 is based on a full digital technology: analog signals from one port are converted to digital electrical signals, fully retimed then converted again to the second F/O port. This design provides a reliable and steady conversion, advanced control/diagnostic features and Management.

In addition it allows cascading of several devices, reaching distances of hundrets of km. FibroLAN's unique Link Segmentation Test (LST) allows easy link segmentation (selective per port) to facilitate network diagnostics and overcomes the fault propagation which is inherent to GBE F/O links. A Loop-Back function on each F/O port simplifies troubleshooting of link problems. Each port provides separate Link and Activity indications for enhanced diagnostics. The GSM1000 are also available in SNMP managed versions.

Alternatively, GSM1000/MA models may be remotely managed via ***MetroStar***™ system and support the SLE (Subscriber Link Emulation) feature. The device is housed in a robust metal case suitable for desktop, rack-shelf or wall-mount installation. It features an internal, wide-range, quality power supply for trouble free installation and reliable operation. DC powered versions (-48VDC) are available. The ETR (Extended Temperature Range) option allows deployment in non-office environments

Remote Management Functions (GSM1000/MA)

Device status:

The device ports basic status and configuration setting
(Link status, Signal Detect status, LST mode, Upstream Bandwith)

Device Control:

provides the user with options to set the channel description, to invoke the LB/LST control menu, set SLEe and to restore the devices's default setting

Key Features

- *Digital Conversion – stability, feature rich, cascading*
- *Network extension – up to 80km*
- *Reliability – internal PS (-48VDC PS optional)*
- *Versatile installation – desktop, shelf or wall-mount*
- *LST and Loop-Back– for enhanced diagnostics*
- *SLE (GSM1000/MA models)*
- *SNMP managed versions*
- *Remote In-Band MA™ management*

GSM1000

General Specifications

Standard Compilance
IEEE802.3 2000 edition
1000Base-SX, 1000Base-LX, IEEE802.3z
Conversion Method
Digital with Link Segmentation Test and Loop-Back
LED's
Power ON, MA Active (GSM1000/MA models) Per Port: Link Activity, LST, Loop Back
Management
GSM1000M
SNMP versions 1&2, Telnet, RS232
GSM1000/MA

Remote In-Band MA™ via ***MetroStar™***
Ports
2x Dual SC ports except in SFS models (see specifications below)
DIP switches (front panel) per port:
LST ON/OFF
Loop-Back ON/OFF

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz Optional DC PS.

Operating Temperature
0º÷ +45ºC

Storage Temperature
-20º÷+80ºC

Safety
Designed to meet UL60950, EN 60950

Dimensions
120x170x44mm

Power Consumption
5 Watts Maximum

Humidity
10%÷90% non-condensing

EMC
FCC part 15, Subpart B, Class A ICES 003: 1997, Class A EMC Directive

Weight
400g

Ordering Information and F/O port Specifications

Part#			Model	Port1			Port2			
GSM 1000 /MA	GSM 1000 M	GSM 1000		Minimal Output Power	Typical Receive Sensitivity	Wavelength	Minimal Output Power	Typical Receive Sensitivity	Wavelength	Suggested Distance
3701	B195	B162	GSM1000	-9,5dBm	-17dBm	850nm	-13dBm	-20dBm	1310nm	0-10
3702	B196	B163	GSM1001	-9,5dBm	-17dBm	850nm	-5dBm	-20dBm	1310nm	5-20
3703	B197	B164	GSM1002	-9,5dBm	-17dBm	850nm	-8dBm	-23dBm	1550nm/DFB	10-40
3704	B198	B165	GSM1003	-9,5dBm	-17dBm	850nm	0dBm	-24dBm	1550nm/DFB	25-80
3705	B299	B177	GSM1004	-13dBm	-20dBm	1310nm	-13dBm	-20dBm	1310nm	0-10/0-10
3706	B200	B178	GSM1005	-5dBm	-20dBm	1310nm	-5dBm	-20dBm	1310nm	5-20/5-20
3707	B201	B179	GSM1006	-8dBm	-23dBm	1550nm/DFB	-8dBm	-23dBm	1550nm/DFB	10-40/10-40
3708	B202	B180	GSM1007	0dBm	-24dBm	1550nm/DFB	0dBm	-24dBm	1550nm/DFB	25-80/25-80
3720	B214	B212	GSM1008	-13dBm	-20dBm	1310nm	-8dBm	-23dBm	1550nm/DFB	0-10/10-40
N/A	B215	B213	GSM1009	-13dBm	-20dBm	1310nm	0dBm	-24dBm	1550nm/DFB	0-10/25-80
3709	B203	B191	GSM1000F13	-9,5dBm	-17dBm	850nm	-5dBm	-20dBm	1310Tx/1550Rx	0-20/SFS
3710	B204	B192	GSM1000F15	-9,5dBm	-17dBm	850nm	-5dBm	-20dBm	1550TX/1310RX	0-20/SFS

Options

B097	PS48	DC (-36 ÷ -72VDC) option (instead of AC PS) for all GSM models
B098	ETR	Extended Temperature Range (-10ºC ÷ +70ºC) option for all GSM models
B012	CTF-RM	19" rack shelf for installation of up to 3 GSM devices
B161	SCH-WM	Wall Mount kit for all GSM models
B222	MCP5	Mode Conditioned Patch cord, Simplex, 50micron, SC/SC, 2m, for GBE 1310nm over Multimode links
B223	MCP6	Mode Conditioned Patch cord, Simplex, 62,5micron, SC/SC, 2m, for GBE 1310nm over Mm links

Specifications are subject to change w/o prior notice

GSM1000/MA

MA™ Managed 1000Base-SX/LX to 1000Base-LX Converter/Extender

The GSM1000/MA provides conversion from a Multi-Mode 1000Base-SX or Single Mode. 1000Base-Lx link to a single-mode 1000Base-LX link, allowing extension of up to 120km. As many of the GBE switches or NICs come with SX ports, combining them with the GSM1000/MA, provides the most flexible and cost effective way to extend their reach over fiber. The GSM1000/MA is based on 3R technology. Full 3R Regeneration (re-amplification, re-shaping, re-timing) is implemented betwween the two FO ports. The GSM1000/MA provides reliable and robust conversion, advanced control/diagnostic features and management.
It also allows cascading of several devices, reaching distances of hundreds of kilometers.

FibroLAN's unique Link Segmentation Test (LST) allows easy link segmentation (selective per port) to facilitate network diagnostics and overcome the fault propagation inherent to GBE F/O links. Each port provides separate Link and Activity indications for enhanced diagnostics. The device supports SLE (Subscriber Link Emulation) - which, when link partner is an MA™ enabled device - allows real time notification of the remote user failure while maintaining the fiber link active and consequently the management is still active and operational. The MA™ (Micro Agent) is an on chip management system enabling the management of remote access devices eliminating the need of an SNMP agent and IP adress. When the GSM1000/MA is connected through a F/O link to a remote Master Unit (at the Access Node or Network Center) that is MA™ enabled and SNMP managed (FibroLAN ***Metrostar***™, GSM1000M, GSM1010M Master devices), a comprehensive set of monitoring and controlling functions are implemented from any management station.
The device is housed in a robust metal case suitable for desktop, rack-shelf or wall-mount installation. It features an internal, wide-range, high quality power supply for trouble free installation and reliable operation. DC powered versions (-48VDC) are available. The ETR (Extended Temperature Range) option allows device deployment in industrial environments.

Remote Management Functions

When the GSM1000/MA remote CPE is connected via fiber link to a ***MetroStar***™ module, it may be managed through either the serial connection or a telnet operation (CLI). The GSM1000/MA Main Menu contains the following management functions:

Device status

the CPE status contains the following information: link status and Signal Detect status for SX and LX ports, LST mode (LX>SX), Loop back mode (LX), Upstream BW (0-1000Mbps, in 10Mbps increments), SX port Auto Negotiation mode, Flow Control status, Temperature and Firmware revision.

CPE Control

provides the user with options to set the channel description, invoke the LB/LST control menu, set the link's upstream BW, Reset channel, Set Auto-Negotiation mode (SX port), Set pause mode (Flow Control) and restore the device's defaults configuration. SLE is controlled through the remote MA management

Key Features

- *Digital Conversion - stability, cascading*
- *Network extension - up to 120km*
- *Reliability - internal quality power supply*
- *Versatile installation - desktop, shelf or wall-mount*
- *LST and local Loop-Back - for enhanced diagnostics*
- *SLE improving network resilience*
- *Rate Limiting (0-1000Mbps, at 10 Mbps increment steps)*
- *Last Gasp - power failure alert*
- *Remote i -Band MA™ feature rich management*
- *Managed by FibroLAN's **MetroView** Device Manager*

MA

GSM1000/MA

General Specifications

Standard Compilance
IEEE802.3 2000 edition
1000Base-SX, 1000Base-LX, IEEE802.3z,
Diagnostic Leds
Power ON, MA Active
For each FO Port - Link, Activity, LST, Loop-Back
Management
Remote In-Band MA™ via ***MetroStar™*** System or GSM1000M/ GSM1010M Master devices; Managed by FibroLAN ***MetroView*** Device Manager

Conversion Method
Digital based on 3R Technology
Ports
2x Dual SC ports, see F/O specifications below
MM, SM and SFS (Single Fiber Strand)
DPI switches
(front panel) for each port LST ON/OFF, LB (Loop Back) ON/OFF

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz
Optional DC P.S. (-36÷ -72VDC) -PS48

Operating Temperature
0º ÷ +45ºC

Storage Temperature
-20º÷+80ºC

Safety
EN 60950-1

Dimensions
120x170x44mm

Power Consumption
ca. 40W

Humidity
10% ÷ 90% non-condensing

EMC
FCC CFR 47 part 15 Subpart B, Class A
EN 300 386 V1.3.3, AS/NZS
CISPRESS:04, EN55022/24

Weight
400g

Ordering Information and F/O Specifications

Part#	Model	Port1			Port2			
		Minimal Output Power	Minimal Receive Senitivity	Wavelength	Minimal Output Power	Minimal Receive Senitivity	Wavelength	Suggested Distance km
3701	GSM1000/MA	-9,5dBm	-17dBm	850nm	-10dBm	-23dBm	1310nm	0,2-0,5/0-10
3702	GSM1001/MA	-9,5dBm	-17dBm	850nm	-5dBm	-23dBm	1310nm	0,2-0,5/5-20
3703	GSM1002/MA	-9,5dBm	-17dBm	850nm	-3dBm	-23dBm	1550nm/DFB	0,2-0,5/10-40
3704	GSM1003/MA	-9,5dBm	-17dBm	850nm	0dBm	-23dBm	1550nm/DFB	0,2-0,5/25-80
3728	GSM1020/MA	-9,5dBm	-17dBm	850nm	0dBm	-32dBm	1550nm/DFB -APD	0,2-0,5/80-120
3705	GSM1004/MA	-10dBm	-23dBm	1310nm	-10dBm	-23dBm	1310nm	0-10/0-10
3706	GSM1005/MA	-5dBm	-23dBm	1310nm	-5dBm	-23dBm	1310nm	5-20/5-20
3707	GSM1006/MA	-3dBm	-23dBm	1550nm/DFB	-3dBm	-23dBm	1550nm/DFB	10-40/10-40
3708	GSM1007/MA	0dBm	-23dBm	1550nm/DFB	0dBm	-23dBm	1550nm/DFB	25-80/25-80
3734	GSM1021/MA	0dBm	-32dBm	1550nm/DFB -APD	0dBm	-23dBm	1550nm/DFB	80-120/25-80
3726	GSM1018/MA	0dBm	-32dBm	1550nm/DFB -APD	0dBm	-32dBm	1550nm/DFB -APD	80-120/80-120
3720	GSM1008/MA	-10dBm	-23dBm	1310nm	-3dBm	-23dBm	1550nm/DFB	0-10/10-40
3718	GSM1009/MA	-10dBm	-23dBm	1310nm	-5dBm	-23dBm	1310nm	0-10/5-20
3721	GSM1016/MA	-10dBm	-23dBm	1310nm	0dBm	-23dBm	1550nm/DFB	0-10/25-80
3709	GSM1000 F13/MA	-9,5dBm	-17dBm	850nm	-5dBm	-20dBm	1310Tx/1550Rx	0,2-0,5/5-20
3710	GSM1000 F15/MA	-9,5dBm	-17dBm	850nm	-5dBm	-20dBm	1550DFBTx/1310Rx	0,2-0,5/5-20
3722	GSM1000 F13L/MA	-9,5dBm	-17dBm	850nm	-3dBm	-23dBm	1310DFBTx/1550Rx	0,2-0,5/10-40
3723	GSM1000 F15L/MA	-9,5dBm	-17dBm	850nm	-3dBm	-23dBm	1550DFBTx/1310Rx	0,2-0,5/10-40

Options

B097	PS48	Optional DC PS (-36 ÷ -72VDC) instead of AC PS
B151	CBPS-DC48V	DC Power Supply cable, 2m for PS48
B098	ETR	Extended Temperature Range (-10ºC ÷ +70ºC) option for all GSM1000/MA models
B012	CTF-RM	19" rack shelf for installation of up to 3 GSM1000/MA devices
B161	SCH-WM	Wall Mount kit for all GSM1000/MA models

Specifications are subject to change w/o prior notice

MA

FibroLAN
FIBEROPTIC NETWORKING

GSM1000X

Flexible 3R GBE Converter/Extender

The GSM1000X device provides conversion from a 1000Base-T, Multi-Mode 1000Base-SX, Single Mode 1000Base-LX or CWDM link to 1000Base-T/1000Base-SX/LX/CWDM link, allowing extension of up to 120km. The device is based on 3R technology: full 3R Regeneration (re-amplification, re-shaping, re-timing) is implemented from one SFP port to the second SFP. The unit is designed for use with SFP (Small Form-factor Pluggable) fiber optic and copper base transceivers. The versatility of the hot-swappable SFP is in the density, flexibility and cost-savings. SFP modules can be easily interchanged; therefore fiber optic networks can be upgraded and maintained more conveniently. The SFP port 1 is defined as UNI (User Network I/F) and SFP port 2 as OA (Optical Access). The GSM1000X provides reliable and robust conversion, advanced control /diagnostic features and management. It also allows cascading of several devices, reaching distances of hundreds km.

Selective Fault Propagation from port 1 to port 2, and/or vice-versa, allows further network resilience. Each port provides separate and various LED indications for enhanced diagnostics. The device supports SLE (Subscriber Link Emulation) to enhance network resilience. The MA™ (Micro Agent) is an on chip management system enabling the management of remote access devices eliminating the need of an SNMP agent and IP address. When the GSM1000X is connected through a F/O link to a remote Master Unit (located at the Network Center) that is MA™ enabled and SNMP managed (FibroLAN ***Metrostar™*** MCM1000X module), a comprehensive set of monitoring and controlling functions are implemented from any management station. The device is housed in a robust metal case suitable for desktop, rack-shelf or wall-mount installation. It features an internal, wide-range, high quality power supply for reliable operation. DC powered versions (-48VDC) are available. The ETR (Extended Temperature Range) option allows deployment in industrial environments. The device supports RFU (Remote Firmware Upgrade).

Management Functions

The Main Menu enables the User to display the device's status, the SFP modules status and to access the device's control menu.

Device status:

SFP type (UNI, OA, TP, FO) Link and Signal Detect (SD) status (UNI, OA), Port enabled (UNI), Auto Negotiation mode (UNI), Pause mode (UNI), FP mode OA>>UNI, Loop back mode (UNI and OA), Upstream BW (0-1000Mbps in 10Mbps increments), Temperature and Firmware revision

SFP Modules status

Port #, Part #, Type (TP, MM, SM, and SM-SFS), Range, TX/RX Wavelength, S/N

Device Control:

Display Device status, Port SFP status, Set the link's upstream bandwidth, Enable/disable channel (UNI), Enable/Disable A/N (UNI port), OA>>UNI FP mode, OA/UNI loop-back mode, Enable/disable Pause (Flow Control), Restore Device defaults. The SLE is enabled via remote management

Key Features

- *Digital Conversion – stability, cascading*
- *SFP (Small Form-factor Pluggable) copper/fiber optic interfaces*
- *Network extension – up to 120km*
- *Reliability – internal PS (-48VDC optional PS)*
- *Versatile installation – desktop, shelf or wall-mount*
- *1000Base-X Auto-Negotiation*
- *Fault Propagation-total network resilience*
- *Loop-Back– for enhanced diagnostics*
- *SLE for enhancing network resilience*
- *Rate Limiting (0-1000Mbps, 10Mbps step increments)*
- *Last Gasp*
- *Remote In-Band MA™ feature rich management*
- *RFU (Remote Firmware Upgrade) support*
- *Managed by FibroLAN's **MetroView** Device Manager*

MA

GSM1000X

General Specifications

Standard Compilance: IEEE802.3 2000 edition
1000Base-T, 1000Base-SX, 1000Base-LX IEEE802.3z, Flow Control
Conversion Method: Digital 3R conversion
LED's: Power ON (green), MA Active (green)
FP (yellow LED's): upper (UNI>OA), Middle (OA>UNI) F/O SFP Port: Link/Act (green), TX-LO (red) = Low Transmission in SFP, Blinking = when not authenticated; LB (red): Loop - Back for each port.

Management: Remote In-Band MA™ via ***MetroStar™*** System

FibroLAN's ***MetroView*** Device Manager
Ports: Simplex and Duplex LC connectors (Small Form-factor Pluggable) - See table below
DIP switches (front panel):
Loop-Back (LB UNI, LB OA) enable/disable; Fault Porpagation ON/OFF (UNI>OA, OA>UNI); Auto Negotiation for Port1 and Port2 (enable/disable; Management commands override DIP switches setup

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz DC P.S. range (-36 ÷ -72 VDC)

Operating Temperature
0º÷ +45ºC

Storage Temperature
-20º ÷ +80ºC

Safety
EN 60950-1

Dimensions
120x170x44mm

Power Consumption
5 Watts Maximum

Humidity
10%÷90% non-condensing

EMC
EN 300 386 V1.3.3, AS/NZS CISPRESS:04, EN55022/24, FCC part 15, Subpart B

Weight
400g

Ordering Information and F/O Specifications

Part#	Model	Description
3750	GSM1000X	MA™ Managed Gigabit Ethernet converter/access device/extender with 2 SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver. Internal AC power Supply
3751	GSM1000X-48	MA Managed Ethernet converter/access device/extender with 2SFP modular ports, each may accept any FibroLAN copper or fiber SFP transceiver. Internal -48DC power Supply (PS48)
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC)
B012	CTF - RM	19" Rack Shelf for installation of up to 3 GSM1000X devices
B151	CBPS - DC48V	DC Power Supply cable for PS48, 2m
B161	SCH - WM	Wall mount kit

SFP optical modular interfaces

Part#	Model	Description
B248	SF1G-T	SFP (Small Form Pluggable) GBE STP transceiver, 1000BaseT, shielded RJ-45, 100m over Cat.6 cable
B235	SF1G-S1	SFP GBE F/O transceiver, Duplex LC connectors, MM, 850nm, 220/550m
B236	SF1G-LX1	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm,10km
B237	SF1G-LX2	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1310nm, 20km
B238	SF1G-LX3	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 40km
B239	SF1G-LX4	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB, 80km
B240	SF1G-LX5	SFP GBE F/O transceiver, Duplex LC connectors, SM, 1550nm/DFB/APD, 120km
B241	SF1G-SF13	SFP, Single Fiber Strand (SFS),GBE F/O transceiver, Simplex LC connector, SM, 1310nmTx -1550nmRx, 20km
B242	SF1G-SF15	SFP Single Fiber Strand,GBE F/O transceiver, Simplex LC connector, SM, 1550nmDFB Tx - 1310nmRx, 20km
B243	SF1G-LF13	SFP Single Fiber Strand, GBE F/O transceiver, Simplex LC connector, SM, 1310nmTx - 1550nmRx, 40km
B244	SF1G-LF15	SFP Single Fiber Strand,GBE F/O transceiver,Simplex LC connector, SM,1550nmDFB Tx - 1310nm Rx, 40km
B269	SF1G-ZF49	SFP, SFS, GBE F/O transceiver, LC connector, SM, 1490nmDFBTx/ 1550nmRx, 80km
B270	SF1G-ZF57	SFP, SFS, GBE F/O transceiver, LC connector, SM, 1550nmDFBTx/1490nmRx, 80km
B281-8	SF1G-LX5-5C-WW	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM, 1471nm – 1611nm range, DFB/APD, 120km

Specifications are subject to change w/o prior notice

GSM1010

1000Base-T to 1000Base-SX/LX Converter/Extender

This device provides conversion from a copper (1000Base-T) interface to 1000Base-LX or a multi-mode (1000Base-LX) link allowing its extension of up to 80km. As most of the GBE switches or NICs come with low cost copper (RJ-45) ports, combining such with the GSM1010 provides the most flexible and cost effective way to extend their reach over fiber. The heart of the GSM1010 is a powerful conversion processor whereas link interfaces are implemented by industry standard components. This design provides a reliable and steady conversion, advanced control/diagnostic features and Management, thus maintaining maximal compatibility with other vendors' standard devices.

The device generates "FDX advertising" signals on its copper port to ensure that the interconnected device is set to Full Duplex - a critical mode in GBE. FibroLAN's unique Link Segmentation Test (LST) allows easy link segmentation (selective per port) to facilitate network diagnostics and overcomes the fault propagation which is inherent to GBE F/O links. A Loop-Back function on each port simplifies troubleshooting of link problems. Each port provides separate Link and Activity indications for enhanced diagnostics.

The GSM1010 are also available in SNMP managed versions as well as in MA™ versions, facilitating its remote in-band management from a ***MetroStar™*** system. The GSM1000/MA models support also the SLE (subscriber Link Emulation) feature. The device is housed in a robust metal case suitable for desktop, rack-shelf or wall-mount installation. It features an internal, wide-range, quality power supply for trouble free installation. DC powered versions (-48VDC) are available. The ETR (Extended Temperature Range) option allows deployment in non-office environments.

Remote Management Functions (GSM1010/MA)

Device status:

The device ports status and configuration settings (TP and F/O ports: Link status, Signal Detect (F/O port)
LST modes, Loop-Back status (F/O port)

Device Control:

provides the user with options to set the channel's description, to invoke the LB/LST control menu, set the link upstream bandwith, enable/disable the channel, set SLE and to restore the device's default setting.

Key Features

- *Network extension – up to 80km*
- *Reliability – internal PS (-48VDC PS optional)*
- *Versatile installation – desktop, shelf or wall-mount*
- *LST and Loop-Back– for enhanced diagnostics*
- *SLE (GSM1010/MA)*
- *SNMP and MA™managed versions*
- *Auto-Cross and Auto-Polarity Correction*

GSM1010

General Specifications

Standard Compilance:
IEEE802.3 2000 edition
1000Base-SX, 1000Base-LX, IEEE802.3z IEEE802.ab
Conversion Method:
Digital with FDX Advertising, Link Segmentation Test and Loop-Back
LED's:
Power ON, MA Active (GSM1010/MA models)
Per Port: Link Activity, LST, Loop Back
Management:
SNMP versions 1&2, Telnet, RS232
(GSM1010M) Remote via ***MetroStar™***
system (GSM1010/MA)
F/O Port:
Dual SC except in SFS models (see specifications below)
TP Port:
Shielded RJ-45, Auto-Cross, Auto Polarity Correction
DIP switches (front panel) per port:
LST ON/OFF
Loop-Back ON/OFF

Environmental/Physical

Power Supply
Internal, 100 to 240VAC, 50-60Hz Optional DC PS.

Operating Temperature
0º÷ +45ºC

Storage Temperature
-20º÷+80ºC

Safety
Designed to meet UL60950, EN 60950

Dimensions
120x170x44mm

Power Consumption
5 Watts Maximum

Humidity
10%÷90% non-condensing

EMC
FCC part 15, Subpart B, Class A ICES 003: 1997, Class A EMC Directive 89/336/EEC

Weight
400g

Ordering Information and F/O port Specifications

Part#			Model	F/O Port				
GSM 1010 /MA	GSM 1000 M	GSM 1000		Fiber	Minimal Output Power	Typical Receive Sensitivity	Wavelength	Suggested Distance
3712	B206	B166	GSM1010	S/M	-9,5dBm	-17dBm	850nm	0-10
3713	B207	B167	GSM1011	S/M	-9,5dBm	-17dBm	850nm	5-20
3714	B208	B168	GSM1012	S/M	-9,5dBm	-17dBm	850nm	10-40
3715	B209	B169	GSM1013	S/M	-9,5dBm	-17dBm	850nm	25-80
3711	B205	B186	GSM1014	M/M	-13dBm	-20dBm	1310nm	0-10/0-10
3716	B210	B193	GSM1010F13	SM/SFS	-5dBm	-20dBm	1310nm	5-20/5-20
3717	B211	B194	GSM1010F15	SM/SFS	-8dBm	-23dBm	1550nm/DFB	10-40/10-40

Options

B097	PS48	DC (-36 ÷ -72VDC) option (instead of AC PS) for all GSM models
B098	ETR	Extended Temperature Range (-10ºC ÷ +70ºC) option for all GSM models
B012	CTF-RM	19" rack shelf for installation of up to 3 GSM devices
B161	SCH-WM	Wall Mount kit for all GSM models
B222	MCP5	Mode Conditioned Patch cord, Simplex, 50micron, SC/SC, 2m, for GBE 1310nm over Multimode links
B223	MCP6	Mode Conditioned Patch cord, Simplex, 62,5micron, SC/SC, 2m, for GBE 1310nm over Mm links

Specifications are subject to change w/o prior notice

GSM1010/MA

MA™ Managed 1000Base-T to 1000Base-SX/LX Converter

The GSM1010/MA provides conversion from a copper 1000Base-T interface to 1000Base-LX or a multi-mode 1000Base-SX link, allowing extension of up to 120km. As most GBE switches or NICs incorporate low cost copper RJ-45 ports, combining them with the GSM1010/MA provides the most flexible and cost effective way to extend their reach over fiber. The heart of the GSM1010/MA is a powerful conversion processor while link interfaces are implemented by industry standard components. The GSM1010/MA provides reliable and robust conversion, advanced control/diagnostic features and management, while maintaining maximal compatibility with other vendors' standard equipment.

The TP port is set to Auto-Negotiation mode (configured to 1000Base-T Full Duplex), and supports Auto-Cross and Auto-Polarity correction. FibroLAN's unique Link Segmentation Test (LST) allows easy link segmentation (selective per port) to facilitate network diagnostics and overcome the fault propagation inherent to GBE F/O links. Each port provides separate Link and Activity indications for enhanced diagnostics. The device supports SLE (Subscriber Link Emulation) which, when link partner is an MA™enabled device, allows real time notification of the remote user failure while maintaining the fiber link active.
The MA™ (Micro Agent) is an on chip management system enabling the management of remote access devices eliminating the need of an SNMP agent and IP address.

The device is offered in a large variety of optical interfaces, both dual and single fiber strand (SFS).
When the GSM1010/MA is connected through a F/O link to a remote Master Unit (located at the Access Node or Network Center) that is MA™ enabled and SNMP managed (FibroLAN ***Metrostar™***, or GSM1000M, GSM1010M Master devices), a comprehensive set of monitoring and controlling functions are implemented from any management station. The device is housed in a robust metal case suitable for desktop, rack-shelf or wall-mount installation. It features an internal,wide-range, high quality power supply for fail free installation and reliable operation. DC powered models (-48VDC) are available. The ETR (Extended Temperature Range) option allows deployment in industrial environments.

Remote Management Functions

When the GSM1010/MA remote CPE is connected via a fiber link to a ***MetroStar™*** module, it may be managed through either the serial connection (CLI) or a Telnet operation.
The GSM1010/MA Main Menu contains the following management functions:

Device status:
device ports status and configuration settings: Link status (TP and F/O ports), Signal Detect (F/O port), LST mode, Loop-back status (F/O port), upstream bandwidth, Pause On (Flow Control), Temperature and Firmware revision

Device Control:
provides the user with the options to set the channel's description, invoke the LB/LST control menu, set the link upstream bandwidth, Reset channel, enable/disable Channel, Set Pause mode, and restore the device's defaults setting. SLE upstream/downstream is controlled via the remote MA™ management

Key Features

- *Network extension – up to 120km*
- *Reliability – internal quality power supply*
- *Versatile installation – desktop, shelf or wall-mount*
- *LST and Loop-Back – for enhanced diagnostics*
- *SLE to enhance network resilience*
- *Auto-Cross and Auto Polarity Correction*
- *Rate Limiting (0-1000Mbps, at 10Mbps increments)*
- *Last Gasp- power failure alert*
- *Remote In-Band MA™ feature rich management*
- *Managed by FibroLAN's **MetroView** Device Manager*

GSM1010/MA

General Specifications

Standard Compilance
IEEE802.3 2000 edition
1000Base-SX, 1000Base-LX, IEEE802.3z
IEEE802.3ab,

Diagnostic Leds
Power ON, MA Active
For each FO Port - Link, Activity, LST, Loop-Back

Management
Remote In-Band MA™ via ***MetroStar™*** System or GSM1000M/ GSM1010M Master devices

Conversion Method
Digital with FDX Advertising, Link Segmentation Test and Loop-Back

TP Port
Shielded RJ-45, 100m over Cat6 STP cabling
Auto-Cross support

DIP switches
(front panel) per port:
LST ON/OFF Loop-Back ON/OFF
Active MA overrides DIP switches settings

SNMP Management
FibroLAN ***MetroView*** Device Manager

Environmental/Physical

Power Supply
Internal, 100 to 240VAC,
50-60Hz Optional DC P.S. (PS48)

Power Consumption
5 Watts Maximum

Operating Temperature
0º ÷ +45ºC

Humidity
10% ÷ 90% non-condensing

Storage Temperature
-20º ÷ +80ºC

EMC
FCC CFR 47 part 15, Subpart B, Class A
EN 300 386 V1.3.3, AS/NZS
CISPRESS:04, EN55022/24

Safety
EN 60950-1

Weight
400g

Dimensions
120x170x44mm

Ordering Information and F/O Specifications

Part#	Model	F/O Ports				
		Fiber	Minimal Output Power	Minimal Receive Senitivity	Wavelength nm	Suggested Distance km
3711	GSM1014/MA	MM	-9,5dBm	-17dBm	850	220/500m
3712	GSM1010/MA	SM	-10dBm	-23dBm	1310	5-10
3713	GSM1011/MA	SM	-5dBm	-23dBm	1310	5-20
3731	GSM1011/MA-48	SM	-5dBm	-23dBm	1310	5-20
3714	GSM1012/MA	SM	-3dBm	-23dBm	1550/DFB	10-40
3715	GSM1013/MA	SM	0dBm	-23dBm	1550/DFB	25-80
3727	GSM1019/MA	SM	0dBm	-32dBm	1550/DFB-APD	80-120
3716	GSM1010F13/MA	SM/SFS	-5dBm	-20dBm	1310Tx/1550Rx	5-20
3717	GSM1010F15/MA	SM/SFS	-5dBm	-20dBm	1550DFB-Tx/1310Rx	5-20
3724	GSM1010F13L/MA	SM/SFS	-3dBm	-23dBm	1310DFB-Tx/1550Rx	10-40
3725	GSM1010F15L/MA	SM/SFS	-3dBm	-23dBm	1550DFB-Tx/1310Rx	10-40

Options

B097	PS48	Optional DC PS (-36 ÷ -72VDC) instead of AC PS
B151	CBPS-DC48V	DC Power Supply cable, 2m for PS48
B098	ETR	Extended Temperature Range (-10ºC ÷ +70ºC) option for all GSM1010/MA models
B012	CTF-RM	19" rack shelf for installation of up to 3 GSM1010/MA devices
B161	SCH-WM	Wall Mount kit for all GSM1010/MA models

Specifications are subject to change w/o prior notice

DLA22/22M

Dual fiber Link Access/Media Conversion device

The DLA22 is a powerful and most versatile device designed for a variety of Fiber-Optic Access and Media Conversion applications. It features 2 Fiber ports (SC or ST) and 2 TP (RJ45) ports for connection of local stations or LANs. The DLA22 flexible architecture, enhanced by factory set VLANs, allows the deployment as a point to point topology, as a Media Converter with a redundant link (fast recovery), and as an access device in ADM (add-and-drop) architecture in ring or string topologies. The powerful FEF (Far End Fault) mechanism provides true- link indication and alerts user of any failure of both F/O incoming and outgoing links. The DLA22 is equipped with an internal quality auto-range AC power supply (internal -48VDC power supply is optional). The TP ports support Auto-Negotiation, and Auto-Cross. The F/O port operates at maximum performance -100Mbps and Full Duplex. The compact yet robust enclosure allows installation as desk-top, shelf mounting (2 units on one 19" shelf) or directly in a Half 19" rack. DLA22M models are SNMP managed versions.

Environmental/Physical

Temperature
Operating: 0ºC ÷ +45ºC
Storage: -20º ÷ +80ºC
(ETR= -10ºC ÷ +70ºC
– optional)

Dimensions
223x44x150mm

Humidity
10% ÷ 90%
non-condensing

Power Consumption
15 Watts maximum

Weight
600g

Power Supply
Internal, 100 ÷ 240 VAC, 50 ÷ 60Hz

Safety
UL60950, EN60950

EMC
FCC part 15, Subpart B, Class A
VCCI Class A
ICES 003:1997, Class A
EMC Directive 89/336/EEC

DLA22M Management

-Main Menu: Device status, Device control and Software version control
-VLAN Tagging support (VLAN tag insertion and stripping)
-Per port based priority, 802.1p and TOS based priority schemes
-Broadcast storm protection (25%, 12%, 6%, 3%)
-Telnet support
-In-Band management
-Out-of-Band with any terminal emulation program (RS232 port, front panel)
-The firmware for the DLA22M can be downloaded through TFTP routine
-The DLA22M devices may be managed from any management station running popular management platforms (FibroLAN's ***MetroView***, HP OPV, SNMPc, etc)

Key Features

- *Network extension: maximum distances (up to 150km)*
- *Point-to-Point, Ring or String ADM architectures*
- *Redundant Link for mission critical applications*
- *VLANs: Factory set port based VLANs*
- *Reliability: internal quality power-supply*
- *DC power supply (internal, optional) for Telco applications*
- *Flexible installation: desk-top, shelf-mounted, rack mounted*
- *FEF mechanism – F/O Link integrity indication*
- *ETR: Extended Temperature Range option for industrial environment*

DLA22/22M

General Specifications

Standard Compliance
IEEE 802.3u, 10Base-T,100Base-TX,
100Base-FX, VLAN per port
VLAN Tagging, DSCP (RFC2474) DLA22M
100BaseTX ports (2x)
Shielded RJ-45 Half/Full Duplex support
10Base-T and 100Base-TX
100m over STP Cat5 cable
Full Auto-Negotiation with optional manual setting (DIP switch selectable) Auto Cross supports
Diagnostic Leds
F/O ports: FDX, Link/Activity
Copper ports: FDX, Link/Activity, 100MPower
Test mode (lit when FEF is enabled)
Management Section (DLA22M)
RS232 (miniDIN) terminal connector
LEDs: RCV, Ready

Conversion Method
BMD™ (Buffered Media Domain), Full wire speed, 1000 MAC addresses,
FDX flow-control (IEEE.802.3x) HDX back-pressure flow control
Frame range: 64 ÷ 1536 bytes
100Base-FX ports (2)
1310nm, multi-mode, SC connectors, 2000m
Output Power: -18dBm ; Input Sensitivity: -32dBm SM fiber
1310nm distances: 7/15/25/40/70km
Min. Out Power: -20/-16/-15/-11/-2 dBm
Typical Sensitivity: -30/-30/-33/-33/-35 dBm
Single-Fiber-Strand: 15km, 60km
Min. Out Power: -15/-5 dBm; Sensitivity: -30/-35 dBm
Controls (Front Panel Dip switches)
FDX/HDX (F/O ports) selection
Auto-Negotiation enable/disable
TP ports forced to 10Mbps/FDX (A/N disabled)
Back-Up mode/Topology selection
FEF enable/disable.
VLAN enable/disable (port based security VLANs)
Reset device

Ordering Information

Part#	Model	Description
B106	DLA22	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Multi-Mode, 2km
B125	DLA22/T	Versatile 10/100TX-FX, Dual F/O link, ST connectors, Multi-Mode, 2km
B218	DLA22/T/SMR7	Versatile 10/100TX-FX, Dual F/O link, ST connectors, Single-Mode 7km
B120	DLA22/SMR7	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Single-Mode 7km
B121	DLA22/SMR	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Single-Mode 15km
B122	DLA22//SM	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Single-Mode 25km
B123	DLA22/SM/L	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Single-Mode 40km
B221	DLA22/SM/L2	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Single-Mode 70km
B124	DLA22/SMRF135	Versatile 10/100TX-FX, Dual F/O link, SC, Single-Mode 15km, Single Fiber strand, One port 1310nm Tx/1550nmRx, Second port 1550nmTx/1310nmRx
B234	DLA22/SMLF135	Versatile 10/100TX-FX, Dual F/O link, 2*simplex SC, SM, 60km, Single Fiber strand, One port 1310nm Tx/1550nmRx, Second port 1550DFBnmTx/1310nmRx
B107	DLA22M	Versatile 10/100TX-FX, Dual F/O link, duplex SC, Multi-Mode, SNMP managed
B126	DLA22M/T	Versatile 10/100TX-FX, Dual F/O link, dual ST, Multi-Mode, SNMP managed
B127	DLA22M/SMR7	Versatile 10/100TX-FX, Dual F/O link, duplex SC, SM 7 km, SNMP managed
B128	DLA22M/SMR	Versatile 10/100TX-FX, Dual F/O link, duplex SC, SM 15 km, SNMP managed
B129	DLA22M/SM	Versatile 10/100TX-FX, Dual F/O link, duplex SC, SM 25km, SNMP managed
B130	DLA22M/SM/L	Versatile 10/100TX-FX, Dual F/O link, duplex SC, SM 40km, SNMP managed
B131	DLA22M/SMRF135	Versatile 10/100TX-FX, Dual F/O link, 2*simplex SC, SM 15km, single Fiber strand, One port 1310nm Tx/1550nmRx, Second port 1550nmTx/ 1310nmRx, SNMP
B097	PS48	-36÷ - 72VDC power supply for DLAxxx (instead of the 100÷240VAC,50÷60Hz PS)
B098	ETR	Extended Temperature Range option of up to 2 x DLAxxx (-10° ÷ +70°C)
B160	RM2	19" Rack Shelf for installation of up to 2x DLA22/22M devices

Specifications are subject to change w/o prior notice

MA

GA10

Managed 10 GE/NTU Extender

The GA10 is a 10Gbps NTU/Extender device based on the 10 Gigabit LAN standards. It provides conversion from any 10GBase-X port to another 10GBase-X port allowing extension of up to 80km. Built as a full 3R (Repeating, Retiming, Reshaping) device, it ensures robust extension to the maximal rated ranges. The basic 19" rack-mountable (with optional redundant power supplies) GA10 device is equipped with two XFP ports allowing flexible deployment of the optical transceivers. Port 1 is defined as OA (optical access) whereas port 2 is NNI/UNI (Network to Network interface/User Network Interface). The GA10 may be deployed as a demarcation device to connect 10G subscribers equipment to the network or as an Extender for long haul transmission. The device is designed for use with standard XFP optical modular transceivers and supports Jumbo Frames of up to 10k byte frame size. Each port provides comprehensive indications for enhanced diagnostics. The GA10 is managed by an SNMP management module FNM1613 (Rear slot).

Environmental/Physical

Temperature
Operating: 0ºC ÷ +45ºC;
Storage: -20º ÷ +80ºC

Dimensions
244x44x440mm

Humidity
10% ÷ 90%
non-condensing

Power Consumption
-30 Watts

Weight
-3,3 kg including
2 Power Supplies

Power Supply
Internal, 100 ÷ 240 VAC, 50 ÷ 60Hz
or DC Power Supply
(-36 ÷ -72VDC

Safety
Designed to meet: ICE EN60950-1

EMC
Designed to meet: FCC part 15,
Subpart A, Class A,
EMC Directive 89/336/EEC,
EN 300 386 V 1.3.3

Key Features

- *Structure - 19" rack mountable 1U housing*
- *Ports - 2 XFP Slots for optical transceivers*
- *Optical Interfaces - MM or SM for 10, 40, 80km ranges, DWDM for 40 and 80 km*
- *XFP Digital Diagnostics - XFP status information*
- *XFP Identifiers - Verification of type, range, Tx/Rx wavelengths, Vendor code, serial number*
- *Installation - Desktop or 19" rack mount*
- *Management - SNMP via FNM1613 module Out-of Band, CLI/Menu, Telnet/RS232*
- *Fault Propagation (FP) - Link status forwarding*
- *Loop-Back (LB) - Diagnostic loop-back mode*
- *Front panel diagnostic LEDs Advanced Diagnostics - frame statistics and counters*
- *Power Plant - Internal/ hot swappable AC or DC Power Supply. Optional redundant power supply*

Management Functions

The following management functions are available (via CLI over serial or Telnet, and SNMP):

Device status & configuration, XFP modules status, PSUs status, Device configuration, Device statistics, System configuration, Loop-Back, Software revision, Firmware revision control, Configuration File Upload.

General Specifications

Diagnostics LEDs –XFP ports

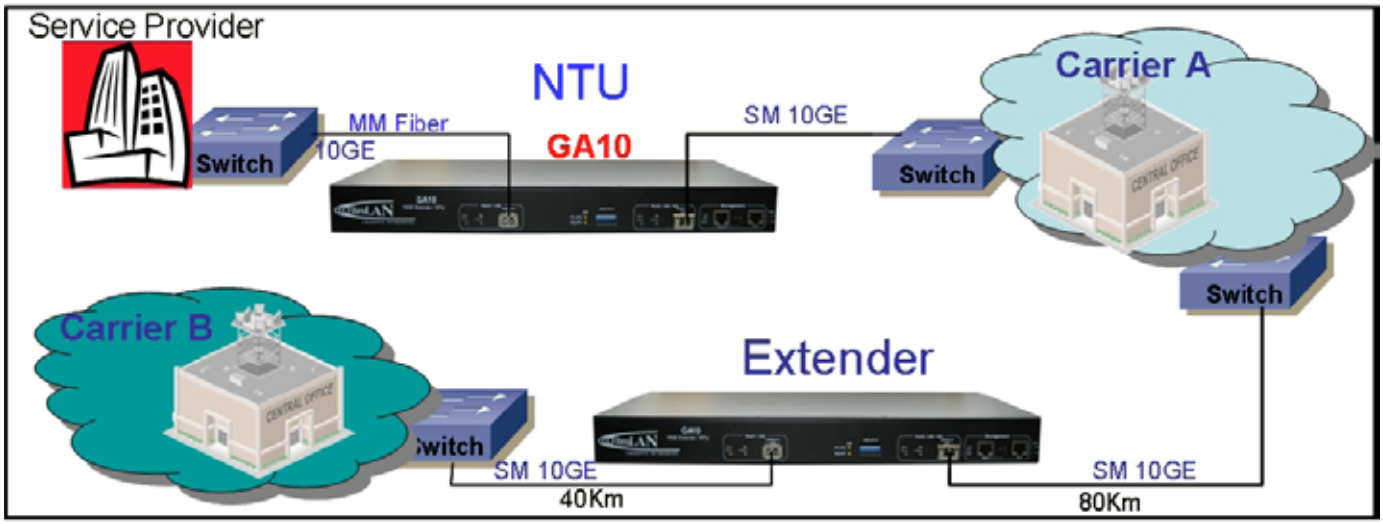
Standard Compliance
Link/Act: Link and data traffic indicator
IEEE802.3ae, 10GBASE-SR, 10GBASE-LR SD (Signal Detect)
10GBASE-ER, XFP MSA Error indicator for symbol errors

10GE Physical Interface
Pluggable and hot-swappable XFP
MM, SM, DWDM XFP transceivers
Duplex LC optical connectors

Management LEDs
Compliance XFP MSA Link, Rcv, Ready

Diagnostic LEDs
Power: Main, Bckp (green LEDs)
FP (yellow) Fault Propagation
Tx-Low Lit red = Low Transmission in XFP
LB (yellow): optical port in Loop-Back

General Specifications



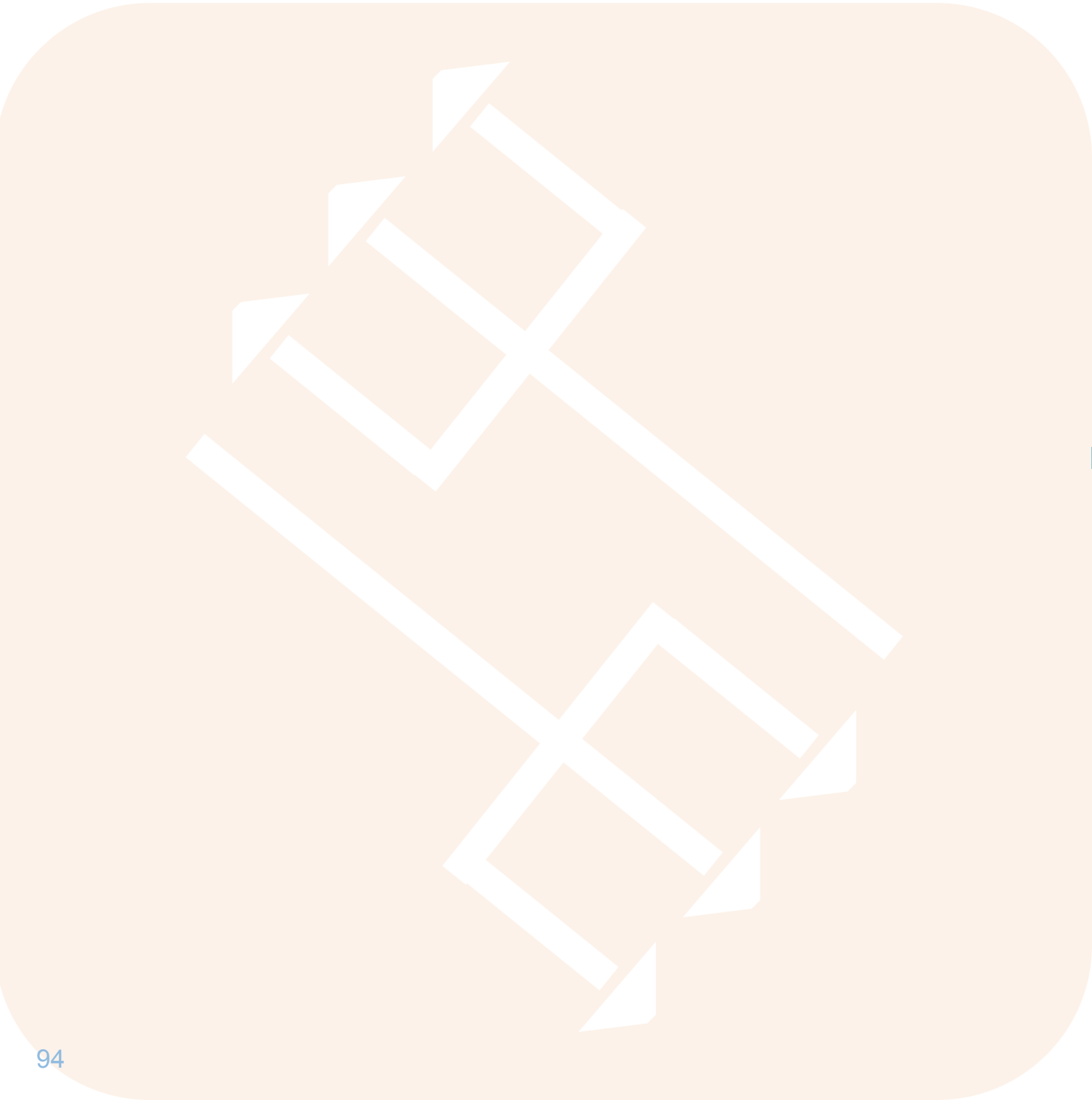
Ordering Information

Part#	Model	Description
3850	GA10	10 GE (LAN) NTU/extender, 2 FXP ports, 1 management slot, 19" 1 RU, 1 removable AC PS, redundant PS optional
3851	GA10-48	10 GE (LAN) NTU/extender, 2 FXP ports, 1 management slot, 19" 1 RU, 1 removable DC PS, redundant PS optional
2106	FPS5033A	Optional redundant power supply 100 to 240 VAC, 50 to 60 Hz
2107	FPS5033D	Optional redundant power supply, D-type connector, -36 to -72 VDC
2111	FPS5033D/ST	Optional redundant power supply, screw terminal connector, -36 to -72 VDC
3601	FNM1613	SNMP Management Module
3855	FXFP-85	XFP transceiver for GA10, Duplex LC, MM, 850nm, 300m over 50 micron fiber
3852	FXFP13-10	XFP transceiver for GA10, Duplex LC, SM, 1310nm, DFB, 10km
3853	FXFP15-40	XFP transceiver for GA10, Duplex LC, SM, 1550nm, EML, 40km
3854	FXFP15-80	XFP transceiver for GA10, Duplex LC, SM, 1550nm, EML/APD, 80km
3856-xx	FXFP -40D-XX	DWDM (Channel = XX) XFP transceiver for GA10, 40m
3857-xx	FXFP -80D-XX	DWDM (Channel = XX) XFP transceiver for GA10, 40km

Specifications are subject to change w/o prior notice

LTA

FALCON



LTA41/LTA31M

Fiber Local Traffic Aggregators

The LTA41 is a traffic aggregation device allowing four TP local users to share a single fiber link thus saving up to 75% on active and passive network infrastructure. Ideal applications are FTTD (Fiber to the Desk) where several users occupy an office and FTTH (Fibber to the Home) where several subscribers may be located in same multi-tenant building or even non the same floor. The device utilizes BMD (Buffered Media Domain) technology to allow connection of a variety of local users (PCs, hubs, switches, 10, 100Mbps, etc.) without the need to qualify the network or perform PDV calculations prior to the deployment of the F/O link. This is a real asset in FTTH projects as users are widely dispersed and have a large and unpredicted variety of equipment.
The BMD along with VLANs implemented in the device provide a basic level of security and separation between the users as they allow only traffic between each user and the F/O link, thereby blocking traffic between users.

The fiber link implements FEF (Far End Fault signalling) to provide a true 2-way link integrity indication and together with the TEST switch – a powerful diagnostic tool. The LTA41 is available in a variety of multi-mode and single-mode fiber interfaces (distances up to 150km) as well as single-fiber-strand (with full bi-dirctional traffic) models. The device is standard “half-rack” size for economical installation in both rack-mount and desk-top models. It is equipped with a reliable internal switching power supply for extended MTBF. The optional DC power supply facilitates deployment in Telco environments.

The LTA31M is a SNMP managed in-band version providing connection for 3 users. In addition to common monitoring functions, the service provider can control remotely the modes, allowed to subscribers. When ordered with the ETR option, the device will operate at a wide temperature range of –10°C to +70° for many outdoor applications.

Management Functions (LTA31M)

The Device Main Menu includes the following options:
1. Device status, 2. Device Control, 3. Software version control

The Device status

Includes Basic ports status and Advanced status

Basic port’s status

Provides the following information about each port: Port number, Interface type (TP/FO), Link status (On/Off), Duplex mode (FDX/HDX), Auto negotiation mode, Data rate (10/100M) connection, VLAN mode (enabled/disabled), Device’s temperature (in centigrade)

The device’s advanced status

Consists of: Test mode (FEF disable/enable), Priority ratio (always hi/10:1/5:1/2:1), Broadcast protection (25/12/6/3%), DSCP codes (64 bits), user priority classification (7 priority codes, set as high or low priority)

The device control menu

Enables the user to change the different setting and configuration of the LTA31M: TPx port control (x=1,2,3,4) Device rest, Basic device control, Advanced device control and Management control

Key Features

- *4:1 traffic aggregation for75% savings (LTA31M: 3:1 traffic aggregation)*
- *VLANs for users separation*
- *Easy deployment – connects to any network equipment*
- *Extensive remote monitoring and control*
- *Distances up to 150km*
- *Single Fiber-Stand option for Bi-Di traffic*
- *Extended Temperatur Range option for industrial deployment*

LTA41/LTA31M

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 10 Base-T, 100Base-Fx, VLAN per port

10/100Base-TX Ports 1 to 4 (1 to 3 in LTA31M)
Shielded RJ-45, Auto-Cross, auto-polarity 100m over STP Cat5 or higher cable. HDX/FDX via auto negotiation or forced (DIP)

Diagnostics LEDs per Port
FX port: Link/Activity, FDX
TX ports (each): Link/activity, FDX, 100M

Diagnostics per System
Power, Link Test

Management (LTA31M)
RS232 (miniDIN) terminal connector. LEDs: RCV, Ready

Conversion Method
BMD (Buffered Media Domain), Full wire speed, 1000 MAC addresses, FDX flow control, HDX back-pressure flow control

100Base-Fx Port
Duplex SC connector (ST optional)
Far End Fault Signaling; HDX/FDX selection
1310nm multi-mode -18 dBm min. output power, -32dBm or better sensibility. Optional single-mode for 7/15//25/40/70/100/150km Single Fiber Strand (SMRF1x) models

Controls (DIP switches)
FX port: FDX/HDX, Far End Fault enable/ disable
TX port #4:10/100, FDX/HDX, A/N enable-disable
TX ports 1 to 3: Auto-negotiation/ forced FDX-10Mbit
VLAN ports enable/disable
Reset device

Environmental/Physical

Power-Supply
Internal, 100 to 240VAC, 50 to 60Hz
Optional DC PS (-36 to -72VDC)

Power Consumption
15W max.

Operating Temperature
0° to 45°C; ETR = -10° to +70°C optional

Storage Temperature
-20° to +80°C

Humidity
10% to 90% non-cndensing

Weight
600g

Safety
UL 60950, EN 60950

Dimensions
223x44x150mm (WxHxD)

EMC
FCC part 15, Subpart A, Class B, VCCI Class A
INCES 003:1997, Class A, EMC Directive 89/336/EEC

Management (LTA31M only)
Out-of band (RS232 Port, terminal emulation)
In band SNMP management and Telnet

Ordering Information

Part#	Model	Description
B104	LTA41	4x10/100Base-TX to 100Base-Fx, MM, 2km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B174	LTA41/T	4x10/100Base-TX to 100Base-Fx, MM, 2km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex ST
B108	LTA41/SMR7	4x10/100Base-TX to 100Base-Fx, SM, 7km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B109	LTA41/SMR	4x10/100Base-TX to 100Base-Fx, SM, 15km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B110	LTA41/SM	4x10/100Base-TX to 100Base-Fx, SM, 25km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B111	LTA41/SM/L	4x10/100Base-TX to 100Base-Fx, SM, 40km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B112	LTA41/SM/L2	4x10/100Base-TX to 100Base-Fx, SM, 70km 1310nm, 4xRJ45 ports (switched, VLAN) and Duplex SC
B113	LTA41/SMRF13	4x10/100Base-TX to 100Base-Fx, SM, SFS 15km 1310nm Tx/ 1550nm Rx, 4x RJ45 ports (switched, VLAN), and single SC connector
B105	LTA31M	3x10/100Base-TX to 100Base-Fx, MM, 2km 1310nm, 4xRJ45 ports (switched, VLAN), and Duplex SC, SNMP managed

Specifications are subject to change w/o prior notice

MA

LTA41/MA

Managed 4:1 Fiber Local Traffic Aggregator

The LTA41/MA is an In-Band managed traffic aggregation device allowing four TP local users to share a single fiber link thus saving up to 75% on active and passive network infrastructure. Ideal Applications are FTTD (Fiber To The Desk) where several users occupy an office and FTTH (Fiber To The Home) where several subscribers may be located in same multi-tenant building or even on the same floor. The buffering capability and VLANs implemented in the device provide a physical level of security and separation between the users as they allow only traffic between each user and the F/O link, blocking traffic between users. The fiber link implements FEF (Far End Fault signaling) to provide a true 2-way link integrity indication and together with the SLE (Subscriber Link Emulation), Loop-Back and Last Gasp - a set of powerful diagnostic tools is provided. The LTA41/MA is available in a variety of multi-mode and single-mode fiber interfaces (distances up to 150km) as well as single-fiber-strand (with full bi-directional traffic) models.

The LTA41/MA is standard “half-rack” size for economical installation in both rack-mount and desktop modes. It is equipped with a reliable internal switching power supply for extended MTBF. The optional DC power supply facilitates deployment in Telco environments. The LTA41/MA is an MA™ enabled device: when connected over fiber to another MA™ enabled device (***MetroStar™*** System or S.CON1M/MA Master Device) it may be remotely in-band managed without the need of an expensive SNMP agent and IP address.

In addition this management architecture ensures full security as the management signals are physically confined into the fiber-link, not allowing the subscriber access of any kind. Rate Limiting, Loop-Back, QoS, Statistics, and Last Gasp, are unique features making the LTA41/MA the absolute choice for quality FTTx networks.

Environmental/Physical

Power-Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz
-36 ÷ -72VDC optional DC PS (PS48)
Power Consumption
5W max.
Operating Temperature
0º ÷ 45ºC, ETR = -10º ÷ +70ºC optional
Storage Temperature
-20ºC ÷ +80ºC
Humidity
10% ÷ 90% non-condensing
Weight
600g
Safety
designed to meet: ICE-EN60950
Dimensions
223x44x150mm (WxHxD)
EMC- designed to meet:
FCC part 15,Subpart B Class A,
EMC Directive 89/336EEC, EN 300 386 V1.3.3
Installation modes
Desk-top, wall-mount, half rack, 19” shelf

Key Features

- *4:1 traffic aggregation for 75% savings*
- *Wire speed reception and transmission*
- *VLANs (per port and tagging) for users separation*
- *Fail-free connectivity – connects to any network equipment*
- *FEF feature (Far-End-Fault) to verify F/O Link integrity*
- *SLE for enhanced diagnostics*
- *Extensive remote Monitoring and Control via MA™ Technology*
- *Distances up to 150km*
- *Single - Fiber – Strand versions*
- *Frame length range: 64 ÷ 1916 bytes*
- *Extensive MIB statistics and counters per port*

LTA41/MA

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 10Base-T, 100Base-FX
VLAN per port, VLAN Tagging/Routing, IEEE802.1p&q, Frame Size: 1916 bytes max. 1k MAC Addresses

Layer 2 Switching
Full wire speed, FDX flow control, HDX back-pressure flow control, SLE per user port

10/100Base-TX ports 1÷4
Shielded RJ-45, auto-cross, auto-polarity
100m over UTP/STP Cat5 or higher cable
HDX/FDX via auto-negotiation or forced (DIP switches)
10Base-T auto-negotiation or forced 10Mbps/FDX

100Base-FX port
Duplex SC connector (ST optional)
MM, SM and SFS (Single Fiber Strand) F/O Link connectivity
Far End Fault (FEF) Signaling
Diagnostics per port
FX port: Link/Activity
TX ports (each): Link/Activity, FDX, 100Mbps

Diagnostics per System
Power, MA Active

Controls (DIP switches)
FX port: FEF enable/disable
TX port #4: 10/100, FDX/HDX, A/N enable-disable
TX ports 1÷4: Auto-negotiation or 10Mbps/FDX
System: Aggregator/Switch selection, Reset device
Active MA management overrides DIP switches settings

Remote Management Functions

Monitor all ports status, force speed and duplex modes, rate limiting up-and downstream per port, Loop-Back, Last Gasp, Port connect – disconnect, set VID, set VLAN per port, Set FEF mode, Fiber-Link Integrity, Reset Device, set SLE mode, Extensive MIB counters, Broadcast/multicast storm limiting, hi-error rate alerts, MAC address tables, Diagnostics, Auto-cross enable/disable, Statistics, VLAN filtering, QoS, and restore factory defaults.

Ordering Information

Part#	Model	Description
3201	LTA41/MA	4:1 Local traffic aggregator, MM 2km 1310nm, Duplex SC connectors, MA™ managed
3209	LTA41/MA/T	4:1 Local traffic aggregator, MM 2km 1310nm, Duplex ST connectors, MA™ managed
3202	LTA41/MA/SMR7	4:1 Local traffic aggregator, SM 7km 1310nm, Duplex SC, MA™ managed
3203	LTA41/MA/SMR	4:1 Local traffic aggregator, SM 15km 1310nm, Duplex SC, MA™ managed
3211	LTA41/MA/SMR/T	4:1 Local traffic aggregator, SM 15km 1310nm, Duplex ST, MA™ managed
3204	LTA41/MA/SM	4:1 Local traffic aggregator, SM 25km 1310nm, Duplex SC, MA™ managed
3205	LTA41/MA/SM/L	4:1 Local traffic aggregator, SM 40km 1310nm, Duplex SC, MA™ managed
3206	LTA41/MA/SM/L2	4:1 Local traffic aggregator, SM 70km 1310nm, Duplex SC, MA™ managed
3208	LTA41/MA/SM/L3	4:1 Local traffic aggregator, SM 100km 1550nmDFB, Duplex SC, MA™ managed
3210	LTA41/MA/SM/LX	4:1 Local traffic aggregator, SM 150km 1550nmDFB, Duplex SC, MA™ managed
3207	LTA41/MA/SMRF13S	4:1 Local traffic aggregator, Single Fiber Strand, 20km, 1310nmTx/1550nm Rx, Simplex SC, MA™ managed
B097	PS48	-36÷-72VDC power supply (instead of the 100÷240VAC, 50÷60Hz PS)
B098	ETR	Extended Temperature Range option (-10°C ÷ +70°C)

Specifications are subject to change w/o prior notice

LTA41xE1/T1

Managed 4:1 Fiber Local Traffic Aggregator with tunneled E1/T1

The LTA41-E1/T1 is an In-Band managed traffic aggregation device allowing four TP local users to share a single fiber link along with up to two E1/T1 channels tunneled over the fiber link. It allows carriers with a WAN installed base to upgrade it (without changing the fiber infrastructure) for delivery of broadband services while maintaining the original E1/T1 connectivity, opening an excellent business opportunity at a minor capital investment. The LTA41-E1/T1, located at customer premises, needs to be connected to a ***MetroStar™*** system (equipped with appropriate modules) located at the access node, where the two services – broadband (Fast Ethernet) and WAN (E1/T1) are separated and connected to their respective networks. The device encapsulates E1/T1 data into Fast Ethernet frames. The E1/T1 frames are given highest priority. Each E1/T1 channel reduces the effective Fast Ethernet bandwidth by up to 3Mbps, however when E1/T1 ports are not connected, full 100Mbps is automatically regained.

The BMD (Buffered Media Domain) along with VLANs implemented in the device provide a physical level of security and separation between the users as only traffic between each user and the F/O link is allowed, therefore blocking traffic between users. The fiber link implements FEF (Far End Fault signaling) to provide a true two-way link integrity indication and together with the SLE (Subscriber Link Emulation), Loop-Back and Last Gasp form a set of powerful diagnostic tools. The LTA41-E1/T1 is available with a variety of multi-mode and single mode fiber interfaces (distances ranging up to 150km) as well as single-fiber-strand (full bi-directional traffic) models. The LTA41-E1/T1 is standard "half-rack" size for economical installation in both rack-mount and desktop modes.

It is equipped with a reliable internal switching power supply for extended MTBF. The optional DC power supply facilitates deployment in Telco environments. The LTA41-E1/T1 is an MA™ enabled device: when connected over fiber to another MA™ enabled device (***MetroStar™***) it is remotely in-band managed without the need of an expensive SNMP agent and IP address. In addition, this management architecture ensures full security as the management signals are physically confined into the fiber-link, not allowing the subscriber access of any kind. Rate Limiting, Loop-Back and Last Gasp, are unique features making the LTA41-E1/T1 the ultimate choice for high quality FTTB networks.

Environmental/Physical

Power-Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz
-36 ÷ 72VDC optional DC PS
Power Consumption
12W max.
Operating Temperature
0º ÷ 45ºC; ETR(Ext Temp) = -10º ÷ +70ºC optional
Storage Temperature
-20º ÷ +80ºC
Humidity
10% ÷ 90% non-condensing
Weight
600g
Safety
UL 60950, EN 60950
Dimensions
223x44x150mm (WxHxD)
EMC
FCC part 15, Subpart B, Class A
ICES 003:1997, Class A; EMC Directive 89/336/EEC
Installation modes
Desk-top, wall-mount, half rack, 19" shelf

Key Features

- *VLANs (per port and tagging) for users separation*
- *Trouble-free deployment – connects to any network equipment*
- *FEF and SLE for enhanced diagnostics*
- *Auto-Cross 10/100TX ports*
- *E1/T1 tunneled over FE – extends life of traditional WANs*
- *Extensive remote Monitoring and Control via MA™*
- *Distances up to 150km*
- *Single Fiber Strand option Bi-Di traffic*
- *Rate Limiting for comprehensive SLA implementation*

LTA41xE1/T1

General Specifications

Standard Compliance
IEEE802.3u, 100Base-TX, 10Base-T, 100Base-FX
VLAN per port, VLAN Tagging/Routing, IEEE802.1p&q, Frame Size: 1916 bytes max. , 1k MAC Addresses
Conversion Method
BMD (Buffered Media Domain), Full wire speed, 1k MAC addresses, FDX flow control, HDX back-pressure flow control, SLE per user port
E1 section – Standards Compliance
Supports AMI/HDB3 Coding Types. Waveforms meet G.703
Transmit return loss specifications: ETSI ETS-300166, Jitter as per ETSI CTR12/13, ITU G.736, G.742, and G.823; LOS per ITU G.775
E1 –delay
Total link latency (2x E1 devices, excluding signal over fiber propagation) = < 800 µseconds maximum
T1 section - Standards Compliance
Supports AMI/B8ZS Coding Types
Output Power Waveforms meet ANSI T1.102
Transmit return loss specifications: ETSI ETS-300166
Jitter attenuation per AT&T Pub 62411
LOS per ANSI T1.231
T1 –delay
Total link latency (2x T1 devices, excluding signal over fiber propagation) =<1050 µs maximum

10/100Base-TX port
Shielded RJ-45, Auto-Cross; 100m over STP Cat5 or higher cabling
HDX/FDX via auto-negotiation or forced (DIP switch)
10/100Base-Tx auto-negotiation or forced (DIP switch)
E1 /T1 ports
RJ-48, 120Ω, up to 210m (655ft)
100Base-FX port
Duplex SC connector (ST optional), Far End Fault Signaling
1310nm multi-mode -18dBm min. output power, -32dBm or better sensitivity.
Diagnostics per 10/100TX port
FX port: Link/Activity; TX ports (each): Link/Activity, FDX, 100
Diagnostics per E1/T1
Local Signal, Remote Signal, LOS (Loss of signal)
Diagnostics per System
Power, MA Active

E1 (DIP switches)	T1
TP 1,2,3,A/N, Force 10	T1 Local/Remote Loop-Back
TP4: A/N, 10/100,Duplex	Encode B8ZS/AMI
VLAN ports default setup	Cable length selector
FarEnd-Fault en/disable	TP1 A/N, 10/100, Duplex
Reset Device	LAN/Aggregator Select
E1 Loop-Back en/disable	

The LTA41-4E1/T1 models have a different DIP switches setting
Management commands override DIP switches setting

Remote Management Functions

Monitor all ports status, force speed and duplex modes, rate limiting up-and downstream per port,
Loop-Back, Last Gasp, Port connect – disconnect, set VID, set VLAN per port, set FEF mode, Fiber-Link Integrity, Reset Device, set SLE mode,
Extensive MIB counters, Broadcast/multicast storm limiting, MAC address table operations, Auto-cross enable/disable.
E1/T1 management: port status & config, port management, reset E1/T1 ports, restore E1/T1
default configuration, set remote/user loop-back mode, set TAOS mode, enable/disable output.

F/O port specification (applicable also to LTA41-xT1 models)

Model	F/O Port	Transmit WL	Min. Out - Power	Receive WL	Typ. Rec. Sens.	Sugg. Dis. (km)
LTA41-xE1	Duplex SC, MM	1310nm	-18dBm	1310nm	-32dBm	0-2
LTA41-xE1/SMR7	Duplex SC, SM	1310nm	-20dBm	1310nm	-30dBm	0-7
LTA41-xE1/SMR	Duplex SC, SM	1310nm	-16dBm	1310nm	-30dBm	0-15
LTA41-xE1/SM	Duplex SC, SM	1310nm	-15dBm	1310nm	-36dBm	0-25
LTA41-xE1/SML	Duplex SC, SM	1310nm	-11dBm	1310nm	-36dBm	15-40
LTA41-xE1/SML2	Duplex SC, SM	1310nm	-2dBm	1310nm	-36dBm	25-70
LTA41-xE1/SML3	Duplex SC, SM	1550nm DFB	-3dBm	1550nm	-36dBm	40-100
LTA41-xE1/SMRF13	Simplwex SC, SM, SFS	1310nm	-15dBm	1550nm	-35dBm	0-15

Specifications are subject to change w/o prior notice

FibroLAN FIBEROPTIC NETWORKING

Ordering Information

Part#	Model	Description
3301	LTA41-1E1	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1 tunneled channel, duplex SC, multi mode 2km
3302 3352	LTA41-1E1/SMR7 LTA41-1T1/SMR7	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1/T1 tunneled channel, duplex SC, single mode 1310nm, 7km
3303 3354	LTA41-1E1/SMR LTA41-1T1/SMR	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1/T1 tunneled channel, duplex SC, single mode 1310nm, 15km
3304	LTA41-1E1/SM	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1 tunneled channel, duplex SC, single mode 1310nm, 25km
3305	LTA41-1E1/SM/L	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1 tunneled channel, duplex SC, single mode 1310nm, 40km
3306	LTA41-1E1/SM/L2	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1 tunneled channel, duplex SC, single mode 1310nm, 70km
3307	LTA41-1E1/SMRF13	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with one E1 tunneled channel, duplex SC, single mode SFS 1310nmtX/1550Rx , 15km
3311 3350	LTA41-2E1 LTA41-2T1	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1/T1 tunneled channel, duplex SC, multi mode 2km
3312 3351	LTA41-2E1/SMR7 LTA41-2T1/SMR7	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1/T1 tunneled channel, duplex SC, single mode 1310nm, 7km
3312 3351	LTA41-2E1/SMR LTA41-2T1/SMR	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1/T1 tunneled channel, duplex SC, single mode 1310nm, 15km
3314	LTA41-2E1/SM	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1 tunneled channel, duplex SC, single mode 1310nm, 25km
3315	LTA41-2E1/SM/L	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1 tunneled channel, duplex SC, single mode 1310nm, 40km
3316	LTA41-2E1/SM/L2	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with two E1 tunneled channel, duplex SC, single mode 1310nm, 70km
3317	LTA41-2E1/SMRF13	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1 tunneled channel, duplex SC, single mode SFS 1310nmtX/1550Rx , 15km
3320 3360	LTA41-4E1 LTA41-4T1	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, multi mode 2km
3321 3361	LTA41-4E1/SMR7 LTA41-4T1/SMR7	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1310nm, 7km
3322 3362	LTA41-4E1/SMR LTA41-4T1/SMR	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1310nm, 15km
3323 3363	LTA41-4E1/SM LTA41-4T1/SM	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1310nm, 25km
3324 3364	LTA41-4E1/SM/L LTA41-4T1/SM/L	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1310nm, 40km
3325 3365	LTA41-4E1/SM/L2 LTA41-4T1/SM/L2	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1310nm, 70km
3326 3366	LTA41-4E1/SM/L3 LTA41-4T1/SM/L3	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode 1550nm DFB, 100km
3327 3367	LTA41-4E1/SMRF13 LTA41-4T1/SMRF13	MA managed four 10/100Base-TX to one 100Base-FX Local Traffic Aggregator with four E1/T1 tunneled channel, duplex SC, single mode, SFS, 1310nm Tx/1150nm Rx, 15km

Specifications are subject to change w/o prior notice

FALCON

Multi Service Network Termination Unit (NTU)

With a throughput of up to 16 Gbps, full TDM integration, most advanced functionality and comprehensive, standards compliant OAM - yet modestly priced, the **FALCON** is probably the most attractive NTU available in the market. This device is targeted at businesses that require gigabit connectivity to support large frame transfers and high bandwidth applications.

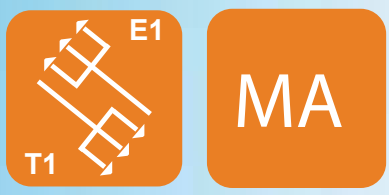
The various models of the **FALCON** family are optimized for three applications: NTU for business Ethernet services, NTU for residential FTTB MDUs and for massive backhauling of wireless base stations. These applications offer a great advantage to carriers allowing them to standardize on a single platform that resolves most of their NGN Access needs. Further advantage arises from its ability to operate under different network architectures: point to point, point to point under the ***MetroStar™*** platform, point to multipoint directly connected to any third party edge switch/aggregator, fast recovery ring, ultra-fast switchover for a 1+1 protection link and more. The **FALCON SE** models support Synchronous Ethernet, allowing robust wireless backhauling and applications requiring precise synchronization. The **FALCON** connects users to the edge at a BW ranging from 1 to 14Gbps.The **FALCON** brings a high-end carrier switch functionality at NTU costs.

The basic model provides 8 RJ-45 ports 10/100/1000T and 4 SFP ports each of them may be user- configured as either UNI port (copper or fiber) or optical access (OA) network port. Up to six of the SFP ports are PowerLink ports, providing Dying Gasp functionality and 1+1 link protection. Other models provide up to 8 E1/T1 ports allowing TDM/Ethernet transmission as well as inverse Mux functionality (Ethernet over TDM channels) and 4 additional GbE SFP ports. When deployed in conjunction with FibroLAN's MDX series WDM multiplexers, both the Network bandwidth and the number of supported users may be further expanded.

All **FALCON** devices are packaged in robust 19"/1RU housings that allow the installation of a redundant (AC or DC) Power Supply. The system supports a variety of management and OAM platforms: SNMP, CLI, IEEE802.3ah (E-OAM), EEE802.1ag (E-CFM), Web and MA™ Technology that in conjunction with FibroLAN's ProxiMA™ server allow the most comprehensive OAM and management in an open environment; all these facilitate easy deployment within multi-vendor networks with virtually no integration efforts. Depending on configuration, the **FALCON** is MEF9/14 fully compliant.

Key Features

- *NTU for Business Ethernet*
- *NTU for residential FTTB*
- *Wireless Backhauling*
- *16Gbps thraoughput*
- *Up to 8 OA Network ports*
- *Up to 14 UNI ports*
- *TDM/Ethernet, Ethernet/TDM*
- *Synchronous Ethernet (Stratum 3 level)*
- *Up to 8 E1/T1 ports*
- *8 Gbps trunking*
- *Sub 50msec Ring recovery*
- *Sub 10 µsec. 1+1 link protection*
- *Support for multiple rings*
- *Redundant Power Supplies*
- *SNMPv1/v2c/v3*
- *Web based management*
- *CLI (Telnet, SSH, console)*
- *MA, ProxiMA™*
- *SFP ports status and diagnostics*
- *10/100/1000 SFP ports*
- *IEEE802.3ah (E-OAM)*
- *IEEE802.1ag (Ethernet Connectivity Fault Management)*
- *ITU-TY.1731 per service - Performance Monitoring*
- *MEF compaliance: MEF9 and MEF14 (EPL, EVPL adn E-LAN)*
- *Embedded copper TDR for easy line fault location*
- *STP/RSTP support*
- *Jumbo Packets (programmable up to 9.6Kb MTU per port)*
- *Provider Bridging (VLAN Q-in-Q) support*
- *Extensive QoS Classification/Scheduling/Rate limiting*
- *Port/MAC based access control (IEEE802.1X)*
- *Per service Accounting*



FALCON

FibroLAN
FIBEROPTIC NETWORKING

System Features and Standard Compliance

IEEE802.3ah, IEEE802.1ag
MTU: from 1522 to 9600 bytes, user settable
VLAN: per IEEE802.1q, 4K entries, private VLAN
Q-in-Q: per IEEE802.1ad
Priority: per IEEE802.1p, 5 ingress queue, 5 egress queues
Address table: 8K MAC addresses per port adjustable aging
Rate Limiting: single and dual leaky bucket (TrTCM) (ingress/egress) policing and shaping
QoS: QCL for flexible wire-speed QoS classification based on all L2, L3 and L4 information
Storm Control: Unicast, Broadcast, Muticast rate limitation
Link Aggregation: user definable groups, up to 8 ports each
1+1 Link protection (PowerLink ports): 10 µsec Switchover
Comprehensive SFP diagnostics

IEEE802.3z/ab, 10/100/1000TX, 100Base-SX, 1000Base-LX, 100 Base-ZX, single Fiber strand
IGMP snooping
Port mirroring
Spanning Tree: STP, RSTP, sub 50msec ring recovery
Loop-Back: port based (per port) and ACL based (per flow)
Remote Device Temperature reading, overheat alarm
S/W and F/W remote upgrade: support for future standards and tailored applications
Dying Gasp (802.3ah or SNMP trap)
Alarms: user definable filters
Cascading, non p-t-p features maintained

Management

*The **FALCON** can be remotely managed via a variety of mechanisms/platforms at virtually no integration efforts:*

IP Based (in-band): SNMP (v1/v2/v3), Telnet, SSH, Web (HTTP).
Console: RJ-45, RS-232 (9600Bd) - CLI (Cisco like).
ProxiMA: allows an MA like feature rich management for thousands of NUTs disregarding third party devices or topology – maximal performance at full flexibility.
OAM/MA: when connected via FibroLAN's ***MetroStar***™ MAC at the edge.
OAM/IEEE802.3ah: when connected to third party edge switch that support the standard.
Other Standards: NPT, Syslog, Radius, DHCP, IGMP, LACP, LLDP.

Technical Specifications

10/100/1000Base-TX ports (8)
Shields RJ-45, 100m over STP 5/6 cable, Auto-Negotiation and Auto-Cross, Copper TDR. Per port configuration: speed, Duplex, A/N, Flow-Control, MTU
E1/T1ports (8)
RJ45/48 connectors, 120Ω/100Ω respectively
E1 Standard Compliance
AMI/HDB3 Coding Type
G.703 compliance
Transmit return loss specifications-ETSI ETS-300166
Jitter as per ETSI CTR12/13, ITU G.736 and G.823
LOS per ITU G.775
Diagnostic LEDs
System: PS1, PS2, CPU Status, System Alarm
Copper port: Link/Act, speed (10/100/1000)
E1/T1 LEDs: Signal (present /AIS), LOS (LOS, Remote LOS)
Signal= ON: signal present; blinking=AIS signal received
LOS ON= Loss of local signal; Blinking RLOS= Loss of remote signal

SFP ports (4 or 8)
Copper 10/100/1000
Fiber 100/1000 MM, SM, SFS, WDM transceivers
Simplex and Duplex LC connectors
T1 Standard Compliance
AMI/B8ZS Coding
Output Power Waveforms meets ANSI T1.102
Jitter as per AT&T Pub 62411, ITU G.824
LOS per ANSI T1.231
Diagnostic LEDs-SFP
Link/Act ON = Link Blinking=activity
Tx Low ON = Tx power low
Blinking = not a FibroLAN SFP
In-Use (Uplink ports) On/Off= port in use/not in use (relevant in 1+1 redundancy mode)
MA(Uplink ports) ON= MA active (In-band management)

Environmental/Physical

Power Plant: Internal, 100 - 240VAC, 50 - 60Hz or –36 to –72VDC Power Supplies, hot swappable, integrated cooling fan, Optional redundant PSU (Load Sharing Operation)
Operating Temperature: -10 to 50ºC
Humidity: 10% to 90% non-condensing
Safety: ICE EN60950-1: 2005 cTUVus
Power Consumption: up to 40W

EMC:
EN 300 386 V1.3.3; 05, AS/NZS CISPR22:06,
FCC CFR 47 part 15, Subpart B, Class A
Storage Temperature: -20°÷+80°C
Weight: ~3,5Kg with 2 Power Supplies
Dimensions: 244x44x440mm (WxHxD)
Installation: 19" Rack Mountable, 1U, brackets included

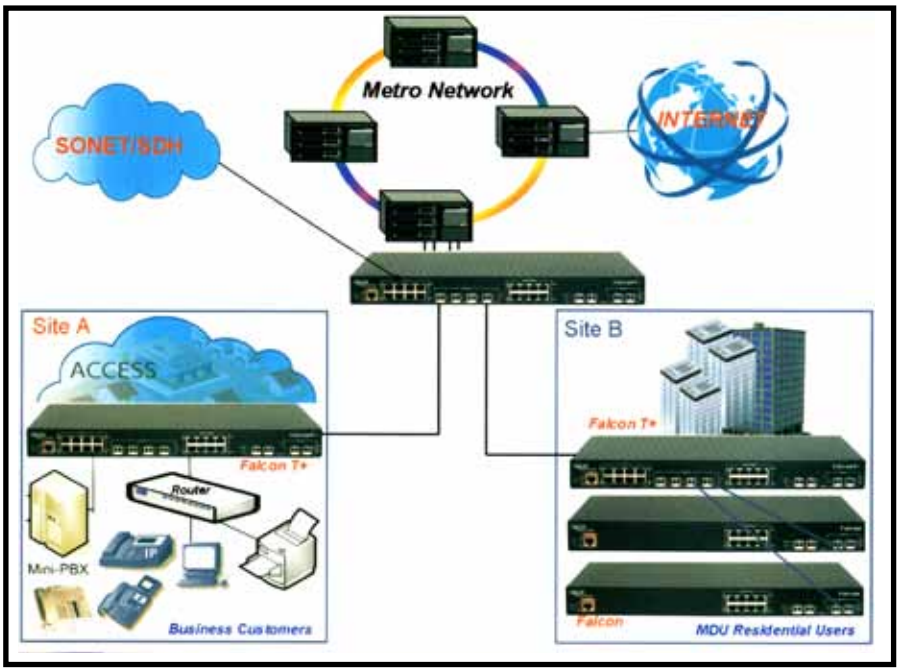
Typical Applications

NTU for Business Ethernet access

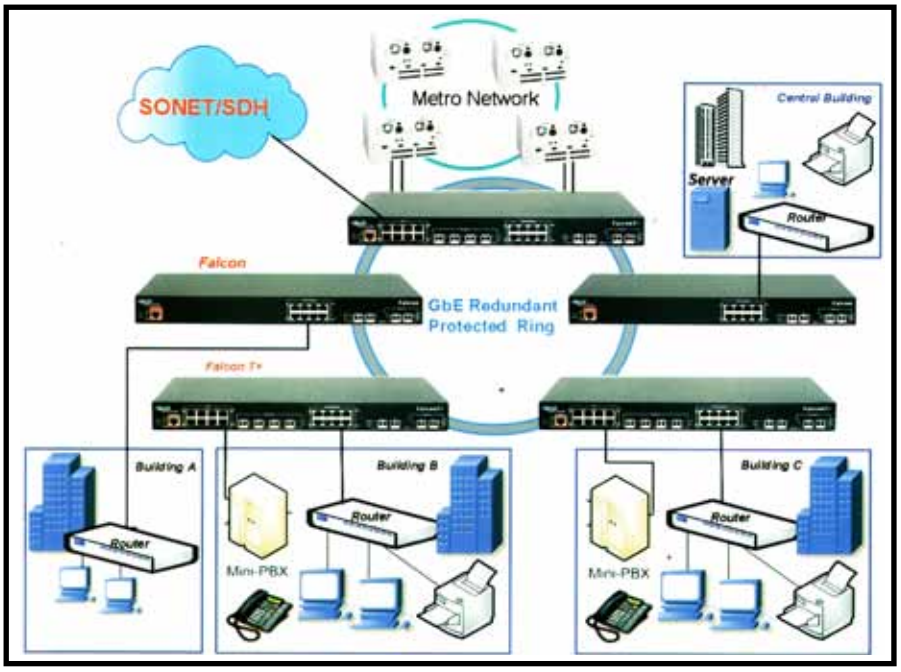
MDU for resisdential FTTB

Wireless Backhauling

Typical Applications and Topologies
Access Application

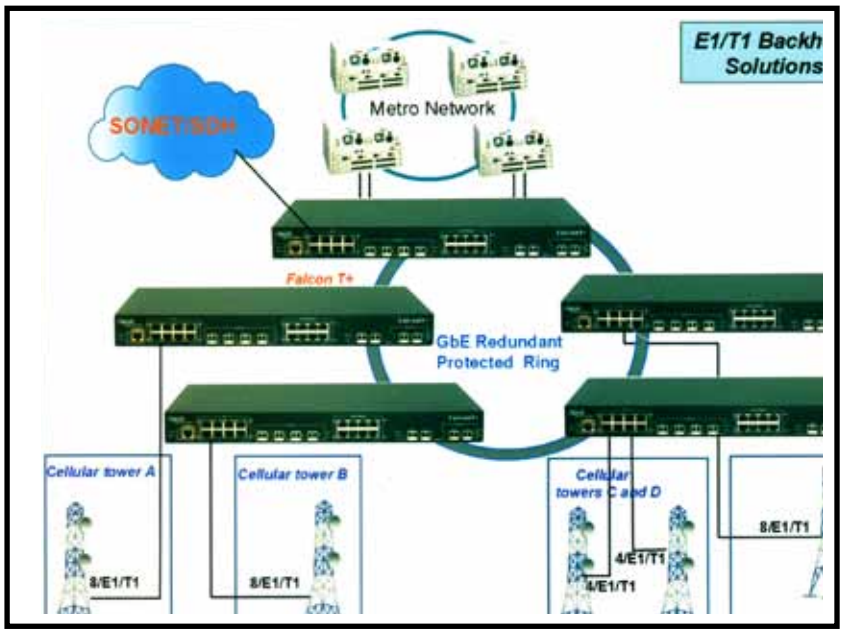


Ring Topology



FALCON

PDH over F/O Backhaul Solution



Ordering Information

Part#	Model	Description
7001	**FALCON**	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 4xSFP ports, 1 Removable AC (100-240VAC) Power Supply
7002	**FALCON**/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 4xSFP ports, 1 Removable DC (-36 -72VDC) Power Supply-ST (screw terminal) connector
7003	**FALCON**+	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 1 Removable AC (100-240VAC) Power Supply
7004	**FALCON**+/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 1 Removable DC (-36 -72VDC) Power Supply-ST (screw terminal) connector
7005	**FALCON** T	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 4xSFP ports, 8x E1/T1 RJ-45 120/100ohm ports, 1 Removable AC Power Supply
7006	**FALCON** T/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 4xSFP ports, 8x E1/T1 RJ-45 120/100ohm ports, 1 Removable DC (-36 -72VDC) Power Supply-ST (screw terminal) connector
7007	**FALCON** T+	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 8x E1/T1 RJ-45 120 /100ohm ports, 1 Removable AC Power Supply
7008	**FALCON** T+/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 8x E1/T1 RJ-45 120/100 ohm ports, 1 Removable DC (-36 -72VDC) Power Supply-ST (screw terminal) connector
7009	**FALCON** SE	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, supporting Synchronous Ethernet, 1 Removable AC (100-240VAC) Power Supply
7010	**FALCON** SE/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, supporting Synchronous Ethernet, 1 Removable DC (-36 -72VDC) Power Supply - ST (screw-terminal) connector
7011	**FALCON** SET	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 8x E1/T1 RJ-45 120/100ohm ports, supporting Synchronous Ethernet, 1 Removable AC Power Supply
7012	**FALCON** SET/D	Multi Service NTU, managed, 8xUNI RJ-45 10/100/1000Mbps ports, 8xSFP ports, 8x E1/T1 RJ-45 120/100ohm ports, supporting Synchronous Ethernet, 1 Removable DC Power Supply- ST (screw-terminal) connector

Some features may not be present in first product release

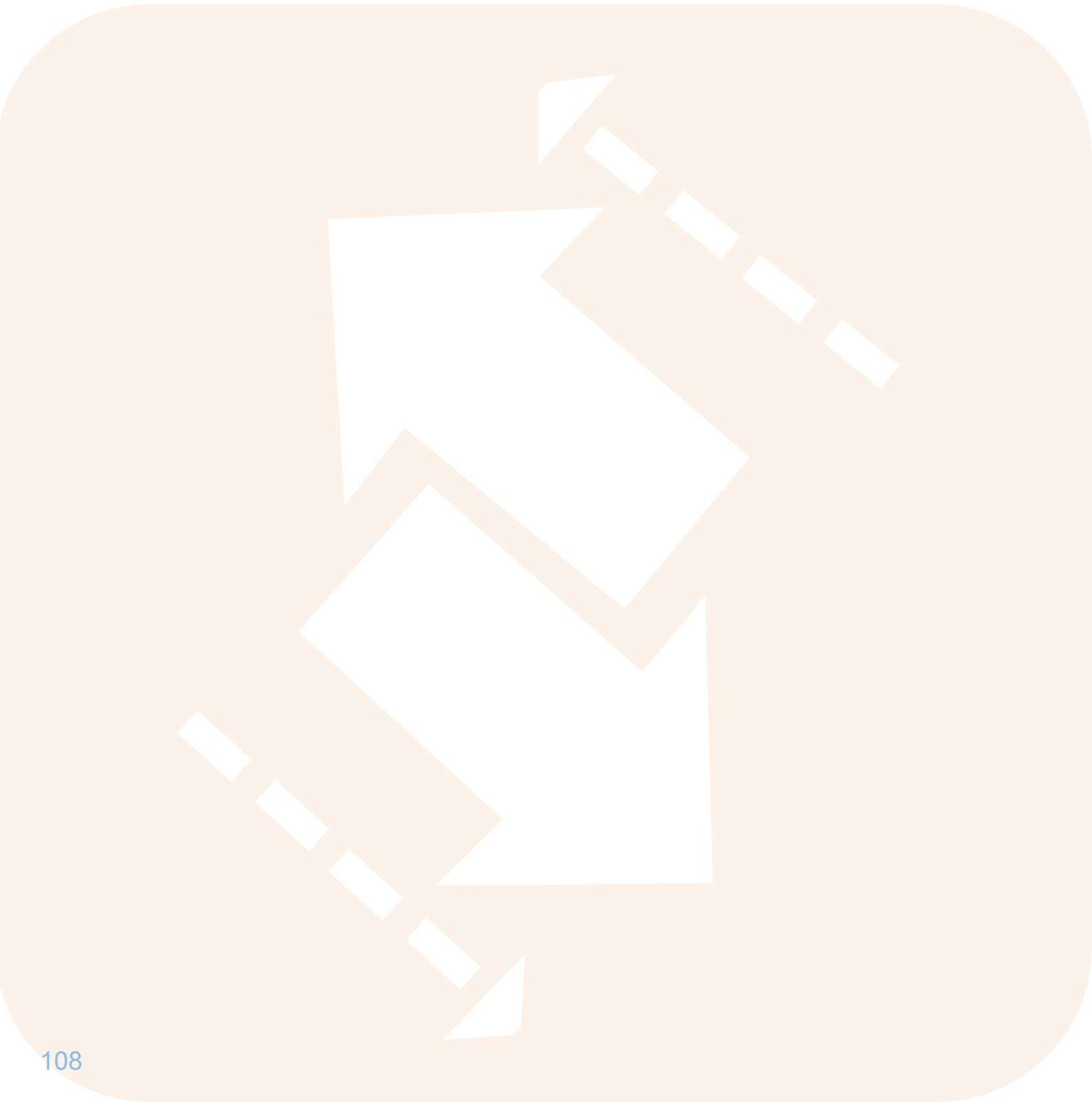
Specifications are subject to change w/o prior notice

...ANY - TO - ANY
REDUNDANT LINK ACCESS DEVICE

ATARA

Fast Ethernet

Gigabit Ethernet



MA

ATARA100

Any to Any Redundancy MA™ Managed Access Device

The ATARA100 is an MA™ managed "Any To Any" 100Base-TX to 100Base-FX Redundant Link Access Device. It is designed to suit the needs of connecting critical/large users to the network, ensuring fail-free operation by protecting both the fiber path and the user interface. The ATARA100 automatically selects the active port on each F/O and TP sides (with priority to "Main" ports) and interconnects them. It has two TP and two F/O connectors. This way, end-to-end path and device redundancy is achieved disregarding the type of the remote device, catering to various network resilience scenarios. Upon failure of a Main port, the module switches traffic within less than 10 µsecs to the Backup port and alerts the network manager. When the Main link is restored, the traffic automatically or manually switches back to it, providing operational consistency and easy tracing of the active path. The switchback occurs immediately after link restoration or following a tunable delay (via the management system) to avoid network instability during the repair process.

Inactive Ports (normally Backup) are continuously monitored for link integrity, providing the network manager with valuable information of his system's readiness. Using front panel switch (or via management), the Redundant Links mode may be disabled. In such case the module functions exactly like a dual channel converter, with each 2 adjacent ports forming a channel. The device is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150km. Selective Fault Propagation (FP) from the F/O port to the TP or vice-versa allows further network resilience. Its RJ-45 ports are Auto-Cross compliant, making installation trouble free.

The Subscriber Link Emulation (SLE) - when link partner is an MA™ enabled device – allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high over-subscription rates. Like other MA™ enabled devices, the ATARA100 is remotely managed via the ***MetroStar***™. The embedded MA™ chip allows full management, eliminating the need of costly SNMP processors and IP addresses. The ATARA100 supports also the Far End Fault (FEF) for F/O link integrity test.

Remote Management Functions

The remote CPE ATARA100 device is managed through the serial connection (CLI) or a Telnet connection,

when attached to as ***MetroStar***™ module. The Main Menu contains the following management functions:

Device status:
Main link status (TP and FO), Backup link status (TP and FO) and Firmware revision.

CPE local configuration:
View configuration menu of the local channel (Main or Backup), TP Port Configuration, Redundancy control parameters, Upstream bandwidth setting, FP (Fault Propagation) mode setting, Restore device's channel configuration

Key Features

- *Any-To-Any Redundant ,Links*
- *Dual Channel operation*
- *Transparent 100Base - TX to 100Base - FX with FDX*
- *Advertising-interoperability*
- *Far End Fault for F/O link integrity*
- *Selective Fault Propagation (FP) - total network resilience*
- *Subscriber Link Emulation (SLE) - for mission critical networks*
- *Loop-Back Test*
- *In Band MA™ Management –*
- *comprehensive Access management*
- *Management: FibroLAN's* ***MetroView*** *Device Manager*

ATARA100

General Specifications

Standard Compilance
IEEE802.3u, 100Base-TX, 100Base-FX
100Base-TX ports (x2)
Shielded RJ-45, Auto-cross,
auto-polarity100m over STP Cat5 or higher cabling
Preset to 100Base-TX and FDX
Main to Backup switchover
– 10 µsec. max
Diagnostic LEDs
Main: F/O-Link/activity, In-Use,
MA Backup: F/O - Link/activity, In-Use,
MA Main: TP-Link/activity, In-Use Backup: TP-Link/activity,
In-Use Power
Local Management
FibroLAN MA™ Technology

Conversion Method
Layer 1, between any FX to any TX port
100Base-FX ports (x2)
Dual Duplex SC connectors (ST optional)
Far End Fault Signaling and Loop-Back test
1310nm multi-mode -18dBm min. output power,
-32dBm or better sensitivity.
For SM and SFS versions see FibroLAN Datasheet DS-SM
Backup to Main switchback
tunable to 0/5/10/20 sec, or manually controlled
Controls (DIP switches)
Mode (Redundant Links/Dual Channel Converter)
FO>>TP Fault propagation ON/OFF.
TP>>FO Fault propagation ON/OFF
(for Main and Backup channels)
Management
FibroLAN ***MetroView*** Device Manager

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC,
50 ÷ 60Hz, -36 ÷ -72VDC (optional PS48)
Operating Temperature
0º ÷ 45ºC, ETR = -10º ÷ +70ºC optional
Humidity
10% ÷ 90% non-condensing
Safety
designed to meet: EN 60950
EMC
designed to meet: FCC part 15, Subpart B Class A,
Directive 89/366/EEC

Power Consumption
5W max.
Storage Temperature
-20ºC ÷ + 80ºC
Weight
600g
Dimensions
223x44x150mm (WxHxD)
Installation modes
Desk-top, wall-mount, half rack, 19” shelf

Ordering Information

Part#	Model	Description
3900	ATARA 100	100TX to 100FX Redundant Link Access Device, MM, 2km 1310nm, 2*Duplex SC,MA™ managed
3901	ATARA100/SMR7	100TX to 100FX Redundant Link Access Device, SM 7km 1310nm, 2*Duplex SC, MA™ managed
3902	ATARA 100/SMR	100TX to 100FX Redundant Link Access Device, SM 15km 1310nm, 2*Duplex SC, MA™ managed
3904	ATARA 100/SM	100TX to 100FX Redundant Link Access Device, SM 25km 1310nm, 2*Duplex SC, MA™ managed
3902	ATARA 100/SM/L	100TX to 100FX Redundant Link Access Device, SM 40km 1310nm, 2*Duplex SC, MA™ managed
3905	ATARA 100/SM/L/2	100TX to 100FX Redundant Link Access Device, SM 70km 1310nm, 2*Duplex SC, MA™ managed
3906	ATARA 100/SM/L/3	100TX to 100FX Redundant Link Access Device, SM 100km 1550nm, DFB, 2*Duplex SC, MA™ managed
3907	ATARA 100/SMRF13	100TX to 100FX Redundant Link Access Device, SM, Single Fiber Strand, 15km 1310nm Transmit/ 1550nm Receive, 2* simplex SC, MA™ managed
B097	PS48	-36÷-72VDC power supply (instead of the 100÷240VAC, 50÷60Hz PS)
B151	CBPS-DC48V	DC Power Supply cable for PS48, 2m
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC)
B160	RM2	19” Rack shelf for installation of up to two ATARA100 devices
B218	MBR	Set (pair) of rack-mounting brackets

Specifications are subject to change w/o prior notice

MA

ATARA100M

FibroLAN
FIBEROPTIC NETWORKING

Any to Any Redundancy SNMP Managed Access Device

The ATARA100M is a SNMP managed "Any To Any" 100Base-TX to 100Base-FX Redundant Link Access Device that includes an SNMP management module. It is designed to suit the needs of connecting critical/large users to the network, ensuring fail-free operation by protecting both the fiber path and the user interface. The ATARA100M automatically selects the active port on each F/O and TP sides (with priority to "MAIN" ports) and interconnects them. It has two TP and two F/O connectors. This way end-to-end path and device redundancy is achieved disregarding the type of the remote device, catering to various net-work resilience scenarios. Upon failure of the Main port, the device switches traffic within less than 10 µsec. to the Backup port and alerts the network manager. When the Main link is restored, the traffic automatically or manually switches back to it, providing operational consistency and easy tracing of the active path.

The switchback occurs immediately after link restoration or following a tunable delay (via the management system) to avoid network instability during the repair process. Inactive Ports (normally Backup) are continuously monitored for link integrity, providing the network manager with valuable information of his system's readiness. Using front panel switch or via management, the device may be switched from Redundant link mode to Dual channel mode of operation. In such case, the device functions exactly like a dual channel converter, with each 2 adjacent ports forming a channel.
As a layer one converter, it is independent from frame size. The device is offered in a large variety of optical interfaces, both dual and single fiber strand, allowing the extension of the network up to 150km.

Selective Fault Propagation from the F/O port to the TP or vice-versa allows further network resilience (provided that the switch/router to which it is connected is properly set to activate an alternate path). The RJ-45 ports are Auto-Cross compliant, making installation trouble free. The ATARA100M can be managed via a serial connection (RS232), using a Telnet terminal and through a standard SNMP management station. Diagnostic LEDs provide a visual indication of the device status and operation.

Management Functions

Device status:
Shows the ports status and their current logical role, redundant or dual channel mode, the firmware revision and current internal temperature.
Display Device Configuration:
(detailed status redundant link / dual channel mode)
Device Configuration Menu:
Redundancy menu, channel description, set bandwith, enable/disable TP ports, enable/disable Pause mode (Flow Control), set Fault Propagation mode (F0>TP, TP>F0), Reset device, Restore device defaults current or global mode.
System Configuration Menu:
View main system parameters, Network parameters SNMP parameters, Telnet parameters, Restore system parameters defaults.
Software version control Menu:
View software upgrade parameters, change TFTP server address, select upgrade software version, select remote path, start software upgrade.

Key Features

- *Any-To-Any Redundant ,Links - fits any network scenario*
- *Tunable delayed switch-back - enhanced network stability*
- *Transparent 100Base TX to 100Base FX with FDX*
- *Advertising-interoperability*
- *Dual Channel operation - optimized logistics*
- *Selective Fault Propagation - total network resilience*
- *Auto-Cross TP ports - for ease of installation*
- *Supports Far End Fault (FEF) for F/O Link integrity*
- *Flow Control (Pause enable/disable)*
- *Bandwith (Upstream and Downstream)*
- *Remote software upgrade*

ATARA100M

General Specifications

Standard Compilance
IEEE802.3u, 100Base-TX, 100Base-FX
100Base-TX ports (x2)
Shielded RJ-45, Auto-cross, auto-polarity
100m over STP Cat5 or higher cabling
Preset to 100Base-TX and FDX
Main to Backup switchover
<10 µsec. max
Management
SNMP, Telnet, CLI (RS232)
Diagnostic LEDs
Main: F/O-Link/activity, In-Use, MA
Backup: F/O-Link/activity, In-Use, MA
(MA Active LED not in use)
Main: TP-Link/activity, In-Use
Backup: TP-Link/activity, In-Use
Power LED

Conversion Method
Layer 1, between any F/O to any TP port
100Base-FX ports (x2)
Dual Duplex SC connectors (ST optional)
Far End Fault Signaling
Flow Control
Backup to Main switchover
tunable to 0/5/10/20 sec, or manually controlled
Frontal panel Management
Ports: 2x RJ45 10Base-T, RS232 (mini - Din)
LEDs: RDY, RCV, Link
Controls (DIP switches)
Redundant Links/Dual Channel mode
FO>>TP Fault propagation ON/OFF
TP>>FO Fault propagation ON/OFF

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz
-36 ÷ -72VDC optional
Operating Temperature
0º ÷ 45ºC, ETR = -10º ÷ +70ºC optional
Humidity
10% ÷ 90% non-condensing
Safety
designed to meet: EN 60950
EMC
designed to meet: FCC part 15, Subpart B
Class A, Directive 89/366/EEC

Power Consumption
5W max.
Storage Temperature
-20º ÷ +80ºC
Weight
650g
Dimensions
223x44x150mm (WxHxD)
Installation modes
Desk-top, wall-mount, half rack, 19” shelf

Ordering Information

Part#	Model	Description
3908	ATARA 100M	100Base-TX to 100Base-FX Redundant Link Access Device, MM 2km 1310nm, 2*Duplex SC,SNMP managed
3909	ATARA100M/SMR7	100Base-TX to 100Base-FX Redundant Link Access Device, SM 7km 1310nm, 2*Duplex SC,SNMP managed
3910	ATARA 100M/SMR	100Base-TX to 100Base-FX Redundant Link Access Device, SM 15km 1310nm, 2*Duplex SC,SNMP managed
3911	ATARA 100M/SM	100Base-TX to 100Base-FX Redundant Link Access Device, SM 25km 1310nm, 2*Duplex SC,SNMP managed
3912	ATARA 100M/SM/L	100Base-TX to 100Base-FX Redundant Link Access Device, SM 40km 1310nm, 2*Duplex SC,SNMP managed
3913	ATARA 100M/SM/L/2	100Base-TX to 100Base-FX Redundant Link Access Device, SM 70km 1310nm, 2*Duplex SC,SNMP managed
3914	ATARA 100M/SM/L/3	100Base-TX to 100Base-FX Redundant Link Access Device, SM 100km 1550nm, DFB, 2*Duplex SC, SNMP managed
3915	ATARA 100M/SMRF13	100Base-TX to 100Base-FX Redundant Link Access Device, SM 15km 1310nm Transmit/ 1550nm Receive, 2* simplex SC, SNMP managed
B097	PS48	-36÷-72VDC power supply (instead of the 100÷240VAC, 50÷60Hz PS)
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC)
B151	CBPS-DC48V	DC Power Supply cable for PS48, 2m
B160	RM2	19” Rack shelf for installation of up to two ATARA100 devices
B218	MBR	Set (pair) of rack-mounting brackets

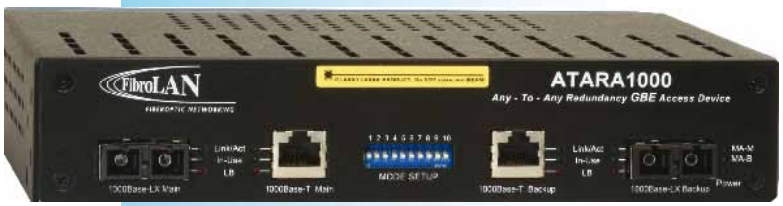
Specifications are subject to change w/o prior notice

MA

ATARA1000

Any to Any Redundancy GBE MA™ Managed Access Device

The ATARA100 is an MA™ managed “Any To Any” 1000 Base-T to 1000Base-LX Redundant Link Access Device. It is designed to connect mission critical/large network users to ensure fault-free operation by protecting both the fiber path and the TP user interface. The Atara1000 automatically selects the active port on each F/O and TP sides (with priority to “MAIN” ports) and interconnects them. It has two TP and two F/O connectors. In this way, end-to-end part and device redundancy is achieved disregarding the type of the remote device, catering to various network resilience scenarios. Upon failure of a MAIN port, the module switches traffic very fast to the Backup port and alerts the network manager. When the Main link is restored, the traffic automatically or manually switches back to it, providing operational consistency and easy tracing of the active path.



The switchback occurs immediatly after link restoration or following a tunable delay (via the management system) to avoid network instability during the repair process. Inactive Ports (normally Backup) are continuosly monitored for link integrity, providing the network manager with valuable information of his system’s readiness. Using front panel DIP switch (or via management), the Redundant mode may be disabled. In such case, the device functions exactly like a dual channel converter, with each 2 adjacent ports forming a channel. The device is offered in a large variety of optical interfaces, dual SC, S/M, 1330/1550nm, allowing the extension of the network up to 80km. FibroLAN’s unique Link Segmentation Test (LST) allows easy link segmentation to facilitate Network diagnostics. A Loop-Back function on each port simplifies trouble-shooting of Link problems.

The RJ-45 ports are Auto Cross compilant, making installation flexible. The Subscriber Link Emulation (SLE), when link partner is an MA-enabled device, allows real time notification of the remote user failure while maintaining the fiber link active. The rate limiting mechanism provides the carrier with a platform to ensure SLAs along with high oversubscription rates. Like other MA enabled devides, the ATARA1000 can be remotely managed via the ***MetroStar™***. The embedded MA chip allows full management eliminating the need of cosity SNMP processors and IP addresses. When the ATARA1000 is connected over a fiber link to a remote device that is MA™ enabled and SNMP managed (***MetroStar™***), its “MA” LED indicator will turn ON and a rich set of management functions is performed from any management station through the remote Master Unit.

Management Functions

The ATARA1000 remote CPE is managed through the serial connection (CLI) or a Telnet connection, when connected to a ***MetroStar™*** module. The Main Menu contains the following management functions:

Device status:
Main link status (TP and FO), Backup link status (TP and FO) and Firmware revision

CPE local configuration:
View configuration menu of the local channel (Main or Backup). Set channel description, Redundancy control parameters, Upstream bandwith setting, LB/LST control, TP port configuration, Restore device’s channel configuration, Set TP fail - over response time.

- *Any-To-Any Redundant Links - fits any scenario*
- *Tunable delayed switch-back - enhanced network stability*
- *Dual Channel operation - optimized logistics*
- *Link Segmentation Test (LST) - total network resilience*
- *Subscriber Link Emulation (SLE) for mission critical networks*
- *Auto - Cross and Auto Polarity Correction*
- *Reliability - internal PS (optional - 48VDC PS)*
- *Management - **MetroView** Device Manager*

ATARA1000

General Specifications

Standard Compilance
IEEE802.3 2000 edition
1000Base-T, 1000Base-LX, IEEE802.3z, IEEE802.3ab
100Base-T ports (x2)
Shielded RJ-45, auto-polarity correction
Automatic MDI/MDIX Crossover
100m over Cat6 STP cabling
Main to Backup switchover
<10 µsec.
Diagnostic LEDs
F/O - Link/activity, Port in-Use, LB (Loop Back)
TP- Link/activity, Port in-Use, LB (Loop Back)
Power, MA-M, MA-B (Main and Backup MA indicators)
Management

MetroView device Manager

Conversion Method
Layer 1, between any Fiber to any TP port
100Base-LX ports (x2)
Dual Duplex SC connectors
For SM and SFS (Single Fiber Strand) F/O specifications, refer to Fibro-LAN Data Sheet (DS-FO)
Backup to Main switchback – tunable to
0/5/10/20 sec, or manually via management
Controls (DIP switches)
Mode (Redundant Links/Dual Channel Converter)
LST ON/OFF
Loop-Back ON/OFF
Local Management
FibroLAN MA™ (Micro Agent) Technology

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz
-36 ÷ -72VDC optional (PS48)
Operating Temperature
0º ÷ 45ºC, ETR = -10º ÷ +70ºC optional
Humidity
10% ÷ 90% non-condensing
Safety
designed to meet: EN 60950
EMC
FCC part 15, Subpart A Class A,
EN 300 386 V1.3.3

Power Consumption
5W max.
Storage Temperature
-20º÷+80ºC
Weight
600g
Dimensions
223x44x150mm (WxHxD)
Installation modes
Desk-top, wall-mount, 19” Rack shelf

Ordering Information

Part#	Model	Description
3950	ATARA1000-LX1	1000T to 1000LX Redundant Link Access Device, SM, 10km 1310nm, 2*Duplex SC,MA™ managed
3951	ATARA1000-LX2	1000T to 1000LX Redundant Link Access Device, SM 20km 1310nm, 2*Duplex SC, MA™ managed
3952	ATARA1000-LX3	1000T to 1000LX Redundant Link Access Device, SM 40km 1550nm, DFB, 2*Duplex SC, MA™ managed
3953	ATARA1000-LX4	1000T to 1000LX Redundant Link Access Device, SM 80km 1550nm, DFB, 2*Duplex SC, MA™ managed
3958	ATARA1000-F13L	1000T to 1000LX Redundant Link Access Device, SM 40km Single Fiber Strand 1310nm, DFB Tx / 1550nm Rx, 2x Simplex SC, MA™ managed
B097	PS48	DC (-36÷-72VDC) Power Supply (instead of the AC Power Supply)
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC)
B160	RM2	19” Rack shelf for installation of up to two ATARA1000 devices
B218	MBR	Set (pair) of rack-mounting brackets

Specifications are subject to change w/o prior notice

MA

ATARA1000M

Any to Any Redundancy GBE SNMP Managed Access Device

The ATARA1000M is an SNMP managed “Any To Any” 1000Base-T to 1000Base-LX Redundant Link Access Device. It is designed to meet the needs of connecting critical/large users to the network, ensuring fail-free operation by protecting both the fiber path and the TP user interface. The ATARA1000M automatically selects the active port on each F/O and TP sides (with priority to “MAIN” ports) and interconnects them. It has two TP and two F/O connectors. In this way, end-to-end path and device redundancy is achieved disregarding the type of the remote device, catering to various network resilience scenarios. Upon failure of a MAIN port, the device switches traffic very fast to the Backup port and alerts the network manager. When the Main link is restored, the traffic automatically or manually switches back to it, providing operational consistency and easy tracing of the active path.

The switchback occurs immediately after link restoration or following a tunable delay (via the management system) to avoid network instability during the repair process. Inactive Ports (normally Backup) are continuously monitored for link integrity, providing the network manager with valuable information of his system’s readiness. Using front panel DIP switch (or via management), the redundant mode may be switched from redundant to dual channel mode of operation. In such case, the device functions exactly like a dual channel converter, with each 2 adjacent ports forming a separate channel. The device is offered in a large variety of optical interfaces, Duplex SC connectors, SM, 1330/1550nm, allowing the extension of the network up to 120km

FibroLAN’s unique Link Segmentation Test (LST) allows easy link segmentation to facilitate Network diagnostics. A Loop-Back function on each port simplifies troubleshooting of link problems. Its RJ-45 ports are Autocross compliant, making installation fail-proof. The rate limiting mechanism provides the carrier with a platform to ensure SLA along with high over-subscription rates. The ATARA1000M can be managed via a serial connection (RS232), using a Telnet terminal and through a standard SNMP management station. Diagnostic LEDs provide a visual indication of the device status and operation.

Remote Management Functions

Device status
shows the ports status and their current logical role, redundant or dual channel mode, including firmware revision, device temperature and the device’s serial number

Device Configuration
redundant link mode/dual channel mode detailed status

Device Configuration menu
Display configuration, Redundancy menu, channel description, set bandwidth, enable/disable TP ports, enable/disable A/N, set LST mode (FO>TP, TP>FO), Loop-back menu, enable/disable Redundant mode, Reset device, Restore device defaults current or global mode)

System Configuration menu (View main system parameters, Network parameters, SNMP parameters, Telnet parameters, Restore system parameters defaults)

Software version control menu (view software upgrade configuration, change TFTP server address, select upgrade software version, select remote path, start software upgrade)

- *Any-To-Any Redundant Links/Dual channel*
- *operation - fits any scenario*
- *Tunable delayed switch-back - enhanced network stability*
- *Link Segmentation Test (LST) - total network resilience*
- *Auto - Cross and Auto Polarity Correction*
- *SNMP managed*
- *100Base-X Auto Negotiation support*
- *Bandwith (Upstream and Downstream)*
- *Remote software upgrade*
- *Internal PS (optional - 48VDC PS) - reliability*
- *Loop-Back on each TP and FO port*

ATARA1000M

General Specifications

Standard Compilance
IEEE802.3 2000 edition
1000Base-T, 1000Base-LX, IEEE802.3z, IEEE802.3ab
Conversion Method
Digital with “FDX Advertising” and 1000Base-X Auto Negotiation
100Base-T ports (x2)
Shielded RJ-45, auto-polarity correction
Automatic MDI/MDIX Crossover
100m over STP Cat6 cabling
100Base-LX ports (x2)
Dual Duplex SC connectors
Main to Backup switchover
5 µsec. max

Backup to Main switchover
tunable to 0/5/10/20 sec, or manually
via management
Diagnostic LEDs
F/O - Link/activity, Port in-Use, LB (Loop Back)
TP- Link/activity, Port in-Use, LB (Loop Back)
Power, MA-M, MA-B (Main and Backup MA indicators)
Management
SNMP, Telnet, CLI
Controls (DIP switches)
Mode (Redundant Links/Dual Channel Converter)
LST ON/OFF, Loop-Back ON/OFF (for each port)
Enable Disable 1000Base-X Auto Neotiation and FEF (Far End Fault)
feature. DIP switches configuration or Management enabled selection
(via DIP switch 10)

Environmental/Physical

Power Supply
Internal, 100 ÷ 240VAC, 50 ÷ 60Hz
-36 ÷ -72VDC optional DC P.S.
Operating Temperature
0º ÷ 45ºC, ETR = -10º ÷ +70ºC optional
Humidity
10% ÷ 90% non-condensing
Safety
UL 60950, EN 60950
EMC
FCC part 15, Subpart A, Class A,
ICES 003:1997, Class A,
EMC Directive 89/336/EEC

Power Consumption
15W max.
Storage Temperature
-20º÷+80ºC
Weight
600g
Dimensions
223x44x150mm (WxHxD)
Installation modes
Desk-top, wall-mount, 19” Rack shelf

Ordering Information

Part#	Model	Description
3954	ATARA1000M-LX1	1000T to 1000LX Redundant Link Access Device, SM, 10km 1310nm, dual SC, SNMP managed
3955	ATARA1000-LX2	1000T to 1000LX Redundant Link Access Device, SM 20km 1310nm, dual SC, SNMP managed
3956	ATARA1000-LX3	1000T to 1000LX Redundant Link Access Device, SM 40km 1550nm, DFB, dual SC, SNMP managed
3957	ATARA1000-LX4	1000T to 1000LX Redundant Link Access Device, SM 80km 1550nm, DFB, dual SC, SNMP managed
B097	PS48	DC(-36÷-72VDC) Power Supply (instead of the AC Power Supply)
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC): allows employment in industrial environments
B160	RM2	19” Rack shelf for installation of up to two ATARA1000M devices

Specifications are subject to change w/o prior notice

FibroLAN FIBEROPTIC NETWORKING

FC

FibroLAN
FIBEROPTIC NETWORKING

RS

RS

FC32

FC32 Fiber Optic Line Extender

FibroLAN's FC32 is a stand alone device allowing full duplex transmission of RS232 signals over a fiber line at distances of up to 2km using multimode fiber cable and up to 100km with single mode fiber cables. A typical installation uses a set of two FC32 units connected to each other by a fiber cable while their copper ports are connected to the serial ports of the user's devices as illustrated in the below drawing. FibroLAN's FC32 line extender supports the full set of eight RS232 signals (TxD, RxD, RTS, CTS, DTR, DSR, DCD, Ri) as well as any subset of it. The device utilizes a unique design that is transparent to the protocol details such as number of stop bits or baud rate. FC32 devices must be deployed in pairs.

General Specifications

Standard Compliance
TIA/EIA - 574

Copper Port
Maximum baud rate - 256,000 baud automatic adjusting
Supports full 8 data and handshake lines or less.
DB-9 Male connector

Diagnostic LEDs
PWR - Power On
FL - Fiber Link locked
LOC - Local input lines connected/active
REM - Remote input lines connected/active

Conversion Method
Transparent High-speed data multiplexing

Fiber port
1310nm, multi-mode, SC connectors
Output Power: -18dBm or better
Input Sensitivity: -32dBm or better

Controls
DTE/DCE selection through DIP switch S3
(S3 Up = DTE, Down = DCE)

Key Features

- *Supports full set of 8 RS232 signals*
- *Extends distances between devices up to 100km*
- *Extensive diagnostics for easy maintenance*
- *Plug and Play operation*
- *Baud rates up to 256 Kbauds*
- *DC powered and Industrial Temperature Range options*

RS

FC32

Environmental/Physical

Power Supply
Internal, 100 to 240 VAC, 50 to 60 Hz
Temperature
Operating: 0° to +45°C; Storage: -20° to +80°C
Safety
Designed to meet EN 60950
Dimensions
120x170x40mm

power Consumption
13 Watt
Humidity
10% to 90% non-condensing
EMC - designed to meet
FCC part 15, Subpart B, class A;
ICES 003:1997, Class A
EMC Directive 89/336/EEC - EN55022, EN55024
Weight
400g max.

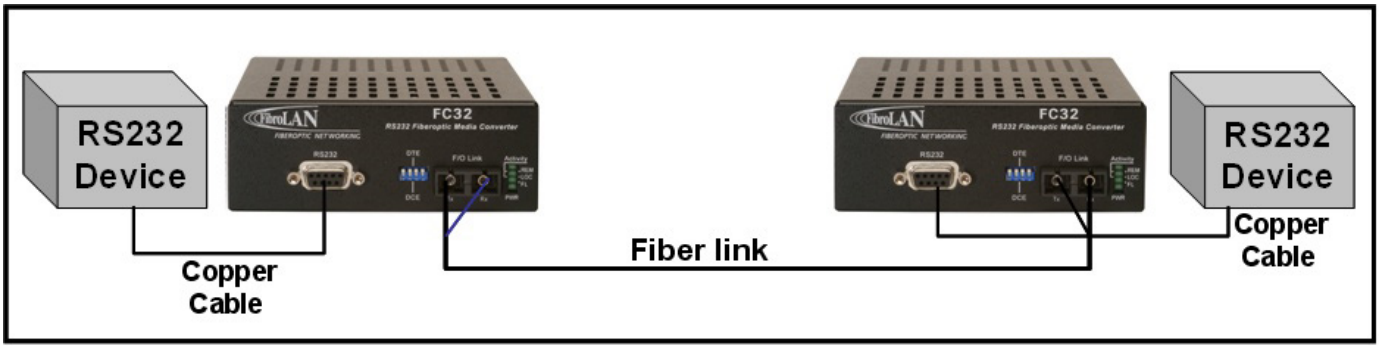
Ordering Information

Part#	Model	Description
B170	FC32	RS232 DB9 to fiber extender1310nm, MM, 3km, Duplex SC, internal PS
B171	FC32/SMR7	RS232 DB9 to fiber extender1310nm, SM, 7km, Duplex SC, internal PS
B172	FC32/SMR	RS232 DB9 to fiber extender1310nm, SM, 15km, Duplex SC, internal PS
B173	FC32/SM	RS232 DB9 to fiber extender1310nm, SM, 25km, Duplex SC, internal PS
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC) option
B267	ETRX	Extended Temperature Range option (-25ºC ÷ +70ºC) option
B097	PS48	DC (-36 to -72V) Power Supply (instead of AC PS (option)
B216	PS24	DC (24V) Power Supply (instead of AC PS (option)
B217	PS12	DC (12V) Power Supply (instead of AC PS (option)

For distances greater than 25km and for other options - contact FibroLAN

Specifications are subject to change w/o prior notice

Typical Topology



RS

FC42

FC42 Fiber Optic Line Extender

FibroLAN's FC42 is a stand alone device allowing the transmission of RS485 or RS422 signals over a fiber line at distances of up to 2km using multimode fiber cable and up to 100km with single mode fiber cables. A typical installation uses a set of two FC42 units connected to each other by a fiber cable while their copper ports connected to the serial ports of the user's devices as illustrated in the below drawing. FibroLAN's FC42 line extender supports RS485 four wire full duplex operation. DIP switches selectable terminations allow installation at the edge of the bus. The device utilizes a unique design that is transparent to the types of data being transmitted thus supporting NRZ and NRZI protocols. The line extender can be installed at any segment of an RS485 network as well as in between network segments. FC42 devices must be deployed in pairs.

General Specifications

Standard Compliance
ANSI/TIA/EIA-485-A

Copper Port
Maximum baud rate - 256,000 baud automatic adjusting
4 wire operation. DB-9 Male connector
Maximal distance - 1600m (5000ft)

Diagnostic LEDs
PWR - Power On/Off
FL - Fiber Link locked
LOC - Local FC42 activity
REM - Remote FC42 activity

Conversion Method
Transparent High-speed multiplexing

Fiber port
1310nm, multi-mode, SC connectors
Output Power: -18dBm or better
Input Sensitivity: -32dBm or better

Controls (DIP switches)
Line termination (x2) RS422/RS485 selection
DTE/DCE selection

Key Features

- *Supports both RS-422 and RS-485*
- *Extends distance between devices up to 100km*
- *Extensive diagnostics for easy maintenance*
- *Setup switches for diverse topologies*
- *Rates up to 256 Kbauds*
- *DC powered and extended Temperature Range options*

Environmental/Physical

Power Supply
Internal, 100 to 240 VAC, 50 to 60 Hz
Temperature
Operating: 0° to +45°C; Storage: -20° to +80°C
Safety
Designed to meet EN 60950
Dimensions
120x170x40mm

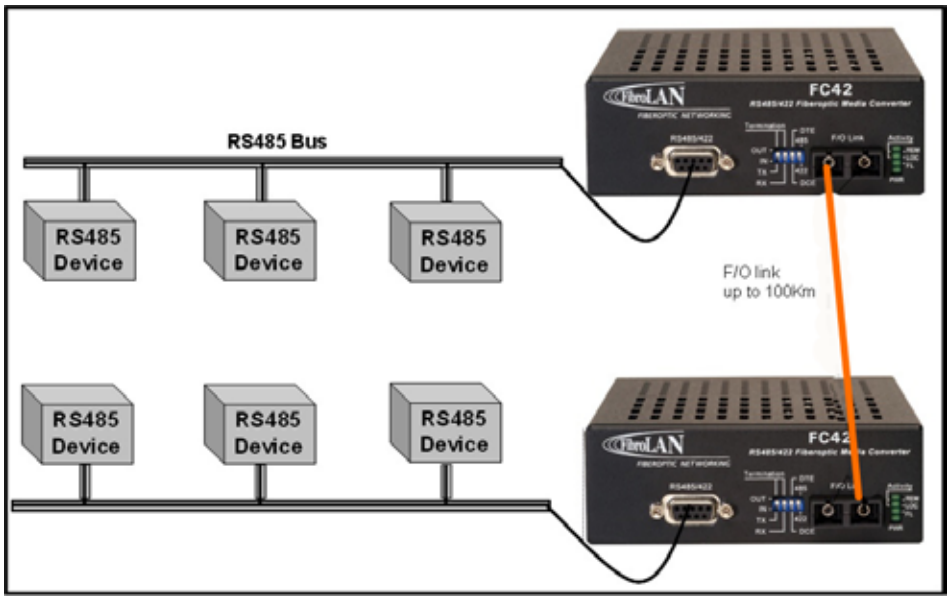
power Consumption
13 Watt
Humidity
10% to 90% non-condensing
EMC - designed to meet
FCC part 15, Subpart B, class A; ICES 003:1997, Class A
EMC Directive 89/336/EEC - EN55022, EN55024
Weight
400g max.

Ordering Information

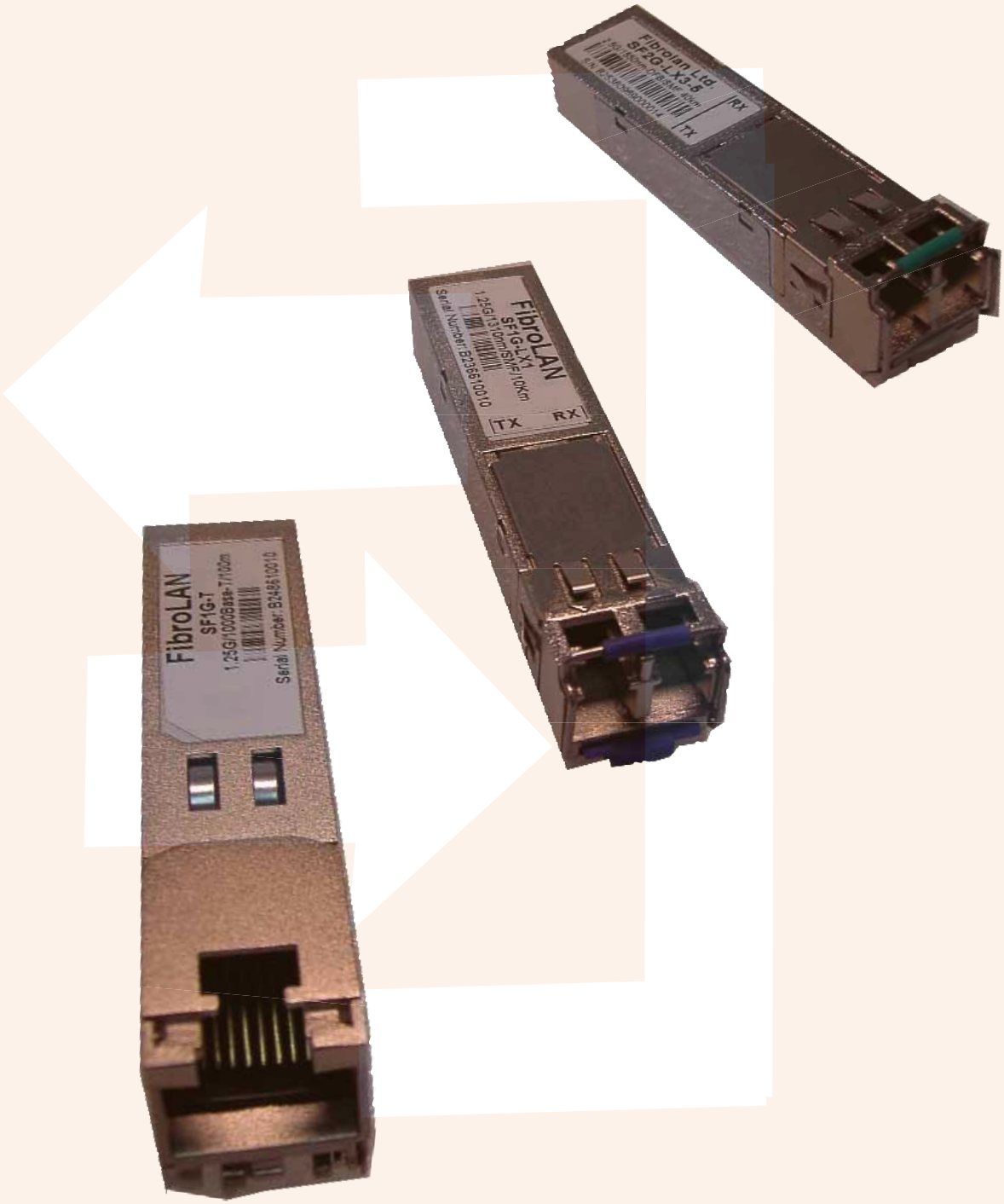
Part#	Model	Description
B187	FC42	RS422/485 DB9 to fiber extender1310nm, MM, 3km, Duplex SC, internal PS
B188	FC42/SMR7	RS422/485 DB9 to fiber extender1310nm, SM, 7km, Duplex SC, internal PS
B189	FC42/SMR	RS422/485 DB9 to fiber extender1310nm, SM, 15km, Duplex SC, internal PS
B190	FC42/SM	RS422/485 DB9 to fiber extender1310nm, SM, 25km, Duplex SC, internal PS
B098	ETR	Extended Temperature Range option (-10ºC ÷ +70ºC) option
B267	ETRX	Extended Temperature Range option (-25ºC ÷ +70ºC) option
B097	PS48	DC (-36 to -72V) Power Supply (instead of AC PS (option)
B216	PS24	DC (24V) Power Supply (instead of AC PS (option)
B217	PS12	DC (12V) Power Supply (instead of AC PS (option)

For distances greater than 25km and for other options - contact FibroLAN
Specifications are subject to change w/o prior notice

Typical Topology



SFP Transceivers



SFP TRANSCEIVERS

Small Form Factor Pluggable Transceivers

The FibroLAN 1.25/2.5 Gpbs Small Form Factor Pluggable (SFP) Optical Transceivers are Multi-Source Agreement (MSA) compliant and provide high performance duplex data links for bi-directional communication over Multi-mode and Single mode fiber. The SFP SF1G series are designed for Gigabit Ethernet data links and are deployed in FibroLAN's MCM1000X ***MetroStar™*** Module, GSM1000X remote Access device. The SF2X series are designed to operate from 100Mbps to 2.5Gbps and are deployed in FibroLAN's MSM2500U ***MetroStar™*** module and in MCM2500 remote Extender device. These FibroLAN devices are protocol independent for the specified transmission speed and efficiently support Fast Ethernet, Fiber Channel, Gigabit Ethernet, OC3, OC12, OC48, STM1, STM4, and STM16. The SF2G/C family transceivers are designed for CWDM data links and may be installed also in MSM2500U and MCM2500 devices. Small Form-factor Pluggable optical interfaces are suitable for ease of deployment, maintenance and logistics, and do not require any settings or measurements. The main advantages of the hot-swappable SFP optical interfaces are the density, flexibility, and cost savings. SFP modules can be easily interchanged, thus fiber optic networks can be upgraded more conveniently than with traditional modules. The SFP transceivers provide status information (SFP modules status and SFP port status). The key features are common to all SFP series.

General Specifications

Standard Compliance
Fast Ethernet (100Base-FX), Gigabit Ethernet,
Fiber Channel , OC3, OC12, OC48,
STM-1, STM-4, STM-16

Conversion Method
Universal protocol transparent device CWDM

F/O Ports
Simplex and Duplex LC connectors
Each F/O port may be disconnected via management

Temperature
Operating: 0º÷ +70ºC; Storage: -40°÷ +85°C

Management
SNMP managed via ***MetroStar™*** (MSM2500U)
MA™ management (MCM1000X,GSM1000x)

Diagnostic LED
(FibroLAN devices that support SFP)

TX-LOW LED for Port 1 and Port 2
OFF = Transmission is OK
LIT Red = Transmission signal low (does not reach the required distance)
Blinking = Transmission signal low (does not reach the required distance)

- *CWDM DFB Laser*
- *Spectral width (-20dB) = 1nm*
- *Side Mode Suppression ratio: 30dB*
- *Extinction Ratio: Min 8.2dB*
- *Receiver Optical Return Loss: Max = 27dB*
- *Output Eye Diagram: compliant with ITU-G957*
- *Qualified to meet Bellcore reliability practices*

- *Compliant with SFP and SFF-8472*
- *Data Rate: 100Mbps to 2.5Gbps*
- *Hot Pluggable SFP transceivers*
- *Compliant to full ICE825 and CDRH class 1 eye safety*
- *Digital diagnostic monitoring*
- *Metal enclosure for lower EMI*
- *Network Extension: up to 80km (120km for GBE)*
- *Pull de-latch mechanism for easy deployment*

Management

The SFP transceivers have status screens, which can be displayed via the menu of FibroLAN devices that support SFP (MCM1000X, GSM1000X and MSM2500U):

SFP modules status

Port#	Part#	Type	Range	Tx-WL	S/N
1	SF1G-SF15	SM-SFS	20000m	1310nm	FibroLAN-SER#1
2	SF2G-LX4-5C-61	SM	80000m	1611nm	FibroLAN-SER#100

The SFP port status contains the same info and a Tx Power indicator(Normal, Low, N/A=SFP unplugged)

Ordering Information

Part#	Model	Description
B289	SF155-SMRF15	SFP (Small Form Pluggable) OC3 Single Fiber Strand F/O transceiver, LC connector, SM 1550nmTx/1310nmRx, 15km
B290	SF155-SMRF13	SFP (Small Form Pluggable) OC3 Single Fiber Strand F/O transceiver, LC connector, SM 1310nmTx/1550nmRx, 15km
B248	SF1G-T	SFP module, GBE F/O transceiver, 1000Base-T, shielded RJ45, 100m over Cat.6 cable
B235	SF1G-S1	SFP module, GBE F/O transceiver,, dual LC connector, MM 850nm, 220/550m
B236	SF1G-LX1	SFP module, GBE F/O transceiver, dual LC connector, SM1310nm, 10km
B237	SF1G-LX2	SFP module, GBE F/O transceiver, dual LC connector, SM1310nm, 20km
B238	SF1G-LX3	SFP module, GBE F/O transceiver, dual LC connector, SM1550nm/DFB, 40km
B239	SF1G-LX4	SFP module, GBE F/O transceiver, dual LC connector, SM1550nm/DFB, 80km
B240	SF1G-LX5	SFP module, GBE F/O transceiver, dual LC connector, SM1550nm/DFB,/APD, 120km
B241	SF1G--SF13	SFP module, Single Fiber Strand GBE F/O transceiver, 1* LC, SM 1310nm Tx/ 1550nm Rx, 20km
B242	SF1G-SF15	SFP module, SFS, GBE F/O transceiver, 1* LC, SM 1550nmDFB Tx/ 1310nm Rx, 20km
B243	SF1G-LF13	SFP module, Single Fiber Strand GBE F/O transceiver, 1* LC, SM 1310nmDFB Tx/ 1550nm Rx, 40km
B244	SF1G-LF15	SFP module, SFS, GBE F/O transceiver, 1* LC, SM 1550nmDFB Tx/ 1310nm Rx, 40km
B269	SF1G-ZF49	SFP , SFS, GBE F/O transceiver, LC connector, SM 1490nm Tx/ 1570nm Rx, 80km
B270	SF1G-ZF57	SFP , SFS, GBE F/O transceiver, LC connector, SM 1570nm Tx/ 1490nm Rx, 80km
B281	SF1G-LX5-5C-47	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1471nm DFB/APD, 120km
B282	SF1G-LX5-5C-49	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1491nm DFB/APD, 120km
B283	SF1G-LX5-5C-51	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1511nm DFB/APD, 120km
B284	SF1G-LX5-5C-53	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1531nm DFB/APD, 120km
B285	SF1G-LX5-5C-55	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1551nm DFB/APD, 120km
B286	SF1G-LX5-5C-57	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1571nm DFB/APD, 120km
B287	SF1G-LX5-5C-59	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1591nm DFB/APD, 120km
B288	SF1G-LX5-5C-61	CWDM SFP, 1.25Gbps F/O transceiver, dual LC connector, SM 1611nm DFB/APD, 120km
B268	SF2G-S1	SFP module, 2.5Gbps F/O transceiver, dual LC connector, MM 850nm, 300/400m
B249	SF2G-S2	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1310nm, 2km
B250	SF2G-LX2-3	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1310nm, DFB, 15km
B251	SF2G-LX2-5	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1550nm, DFB, 15km
B252	SF2G-LX3-3	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1310nm, DFB/APD 40km
B253	SF2G-LX3-5	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1550nm, DFB, 40km
B254	SF2G-LX4-5	SFP module, 2.5Gbps F/O transceiver, dual LC connector, SM 1550nm, DFB/APD 80km
B271	SF2G-LX3-5C-47	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1471nm DFB, 40km
B272	SF2G-LX3-5C-49	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1491nm DFB, 40km
B273	SF2G-LX3-5C-51	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1511nm DFB, 40km
B274	SF2G-LX3-5C-53	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1531nm DFB, 40km
B275	SF2G-LX3-5C-55	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1551nm DFB, 40km
B276	SF2G-LX3-5C-57	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1571nm DFB, 40km
B277	SF2G-LX3-5C-59	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1591nm DFB, 40km
B278	SF2G-LX3-5C-61	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1611nm DFB, 40km
B258	SF2G-LX4-5C-47	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1471nm DFB/APD 80km
B259	SF2G-LX4-5C-49	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1491nm DFB/APD 80km
B260	SF2G-LX4-5C-51	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1511nm DFB/APD 80km
B261	SF2G-LX4-5C-53	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1531nm DFB/APD 80km
B262	SF2G-LX4-5C-55	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1551nm DFB/APD 80km
B263	SF2G-LX4-5C-57	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1571nm DFB/APD 80km
B264	SF2G-LX4-5C-59	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1591nm DFB/APD 80km
B265	SF2G-LX4-5C-61	CWDM, SFP 2.5Gbps F/O transceiver, dual LC connector, SM 1611nm DFB/APD 80km

The SFP transceivers from SF1G-T (B248) through SF1G-LX-SC-61 (B288) are deployed in the following FibroLAN equipment: ***MetroStar™*** *module MCM 1000X, CPE device GSM1000X and GTAxx00 series. The SFP transceivers from SF155-SMRF15 (except SF1G-T) through SF2G-LX4-5C-61 are used in the following Fibro-LAN equipment:* ***MetroStar™*** *module MSM2500U and U.CON2500 devices Note: All recommended distances for CWDM active components assume direct point-to-point connection between them. If these are passing thru passive MUX/Demuxes, the additional attenduation introduced by such devices must be considered when assessing the actual distances.*

FibroLAN Products Fiber Optic Specifications

Single-Mode for Fast Ethernet products

Part#	Model	Wavelength	Connectors	Min.Output Power (dBm)	Typical Receive Sensitivity dBm	Min.Power Budget, dB	Typical distance km
B057	SMR7-1	1310nm	Duplex SC	-20	-30	10	0-7
B058	SMR1	1310nm	Duplex SC	-16	-30	14	0-15
B022	SM1	1310nm	Duplex SC	-15	-36	21	0-25
B024	SM1/L	1310nm	Duplex SC	-11	-36	25	15-40
B045	SM1/L2	1310nm	Duplex SC	-2	-36	34	25-70
B146	SM1/L3	1550nm/DFB	Duplex SC	-2	-38	36	40-100
B047	SM1/LX	1550nm/DFB	Duplex SC	0	-38	38	70-150

Gigabit Ethernet products

Link Type	Receive Wavelength nm RX	Transmit Wavelength nm TX	Min. Receive Sensitivity dBm	Min. Transmit OutputPower (dBm)	Min.Power Budget, dBm	Typical distance km	Connectors
1000Base-SX	850	850	-17	-9,5	7,5	0,22-0,55	Duplex SC
1000Base-LX1	1310	1310	-23	-10	13	5-10	Duplex SC
1000Base-LX2	1310	1310	-23	-5	18	5-20*	Duplex SC
1000Base-LX3	1550	1550/DFB	-23	-3	20	10-40	Duplex SC
1000Base-LX4	1550	1550/DFB	-23	0	23	25-80	Duplex SC
1000Base-LX5	155	1550/DFB/APD	-32	0	32	80-120	Duplex SC
1000Base-LXF13	1550	1310	-20	-5	15	5-20*	Simplex SC
1000Base-LXF15	1310	1550/DFB -20	-5	15	5-20*	Simplex SC	
1000Base-ZXF13	1550	1310/DFB -23	-3	20	10-40	Simplex SC	
1000Base-ZXF15	1310	1550/DFB -23	-3	20	10-40	Simplex SC	

*(GSM1000, GSM1010, GSM10X0M, GSM10X0/MA, MCM1000T, MCM1000SL, ATARA1000, ATARA1000M, ATARA1000RM) *Over G. 652 fiber*

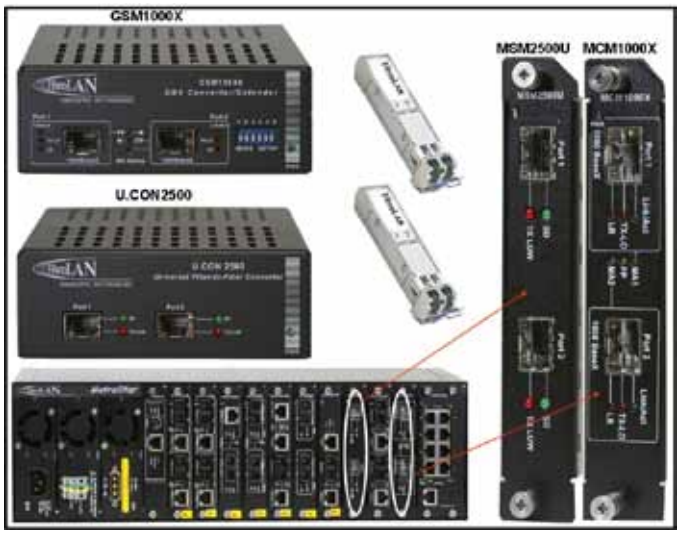
Single Fiber Strand (SFS) products

Fast Ethernet devices	Receive Wavelength nm RX	Transmit Wavelength nm TX	Min. Receive Sensitivity dBm	Min. Transmit OutputPower (dBm)	Min.Power Budget, dBm	Typical distance km
Xxx/SM/F1	1310	1310SC/APD	-30	-15	15	20
Xxx/SMRF13	1550	1310	-35	-15	20	0-15
Xxx/SMRF15	1310	1550	-35	-15	20	0-15
Xxx/SMLF13	1550	1310	-35	-5	30	10-60
Xxx/SMLF15	1310	1550/DFB	-35	-5	30	10-60
Gigabit Ethernet devices						
GSM10xxF13, MCM1000x-LXF13	1550	1310	-20	-5	15	1-20
GSM10xxF15, MCM1000x-LXF15	1310	1550/DFB	-20	-5	15	1-20
GSM10xxF13L, MCM1000x-ZXF13	1550	1310/DFB	-23	-3	20	10-40
GSM10xxF15L, MCM1000x-ZXF15	1310	1550/DFB	-23	-3	20	10-40

**Actual distances depend on the parameters of the cable plant (attenduantions, number and quality of splices, connectors/patch panels etc.) and on performance of the remote-end fiber optic interface. In cases of 1550nm transmission MAKE SURE that your fiber plant supports this (third window) transmission. Be aware that most of the fibers manufactured before 1992 do not support 1550nm transmission. Make sure fiber complies with ITU-T-G651/652*

FibroLAN Products Fiber Optic Specifications

FibroLAN devices deploying SFP optical transceivers



SFP (Small Form factor Pluggable) optical transceivers

Model	Min. Output Power	Typical Receive Sensitivity	Wavelength nm	Typical distance km
SF1G-S1	-9.5dBm	-17dBm	850 MMF	220/500m
SF1G-LX1	-10dBm	-23dBm	1310-SMF	0 -10
SF1G-LX2	-5dBm	-23dBm	1310- SMF	5 - 20
SF1G-LX3	-3dBm	-23dBm	1550/DFB- SMF	10 - 40
SF1G-LX4	0dBm	-23dBm	1550/DFB- SMF	25 -80
SF1G-LX5	0dBm	-32dBm	1550/DFB/APD - SMF	80 -120
SF1G-SF13	-5dBm	-23dBm	Tx1310/Rx1550 SFS	5-20
SF1G-SF15	-9dBm	-23dBm	Tx1550DFB/Rx1310	5-20
SF1G-LF13	-3dBm	-23dBm	Tx1310DFB/Rx1550 SFS	10-40
SF1G-LF15	-3dBm	-23dBm	Tx1550DFB/Rx1310	10-40
SF1G-ZF49	0dBm	-23dBm	1490TxDFB/1550Rx SFS	25-80
SF1G-ZF57	0dBm	-23dBm	1550TxDFB/1490Rx SFS	25-80
SF1G-LX5-5C-WW	0dBm	-30dBm	1550/DFB/APD	80-120
SF2G-S1	-9.5dBm	-17dBm	850 MMF	300-400m
SF2G-S2	-10dBm	-18dBm	1310 SMF	0 - 2
SF2G-LX2-3/LX2-5	-5dBm	-18dBm	1310DFB/1550DFB-SMF	5 - 15
SF2G-LX3-3/LX3-5	-2dBm/-3dBm	-27dBm/-18dBm	1330/DFB/APD/1550DFB-SMF	10 -40
SF2G-LX4-5	-2dBm	-28dBm	1550/DFB/APD-SMF	25 -80
SF2G-LX3-5C-WW	-3dBm	-18dBm	DFB/APD - CWDM	10-40
SF2G-LX4-5C-WW	0dBm	-28dBm	DFB/APD - CWDM	25 -80

WW=1471/1491/1511/1531/1551/1571/1591/1611nm

SF1G-S1 through SF1G-LX5-5C-WW are deployed in GBE devices (MCM1000X and GSM1000X)

SF155-SMRF13 through Sf2G-LX4-5C-WW are used in MSM2500U and U.CON2500 devices

Specifications are subject to change w/o prior notice

FibroLAN

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