

## **ETHERNET / GIGABIT ETHERNET MEDIA CONVERSION**

[www.cxr.anderson-jacobson.com](http://www.cxr.anderson-jacobson.com)

Ethernet - Fast-Ethernet - Gigabit-Ethernet  
Copper/Fiber and Fiber/Fiber media converter  
Stand alone and  
Concentration center with In-Band management  
Optical Ethernet infrastructure  
Ethernet & SDH over CWDM



# ETHERNET OVER FIBER OPTIC & LAN EXTENSION

## From 10FL to 1000LX, over 2 fibers or WDM and CWDM

### FIBER OPTIC LAN

How to choose the right technology to fit your needs  
According to the distance, the number of available fiber and the type of fiber

#### FEW THEORICAL INFORMATION :

All CXR fiber optic Ethernet devices are compatible with all active equipments of the market according to the standards IEEE-802.3, 802.3u, 802.3z, 802.3ab.

#### The Ethernet over OPTICAL FIBER

- 10FL : this technology is less and less used for the transportation 10BaseT Ethernet, mainly use MM fiber at 850nm
- 100FX : 10BaseT and 100BaseT Ethernet are transported mainly by MM fiber at 1310nm and SM at 1310 or 1550nm.
- 1000SX : Giga Ethernet and 10/100/1000BaseT are transported by MM fiber at 850nm up to 550m.
- 1000LX : Giga Ethernet and 10/100/1000BaseT are transported by SM fiber at 1310nm and 1550nm.
- 1000ZX : few manufacturers are using this name for Giga SM at 1550nm

Usage	Rate	Type of fiber	IEEE distance	CXR distance
10Base-FL	10	Multimode 850nm	2 km	2km
100FX-MM850	100	Multimode 850nm	220m	ND
100FX-MM	100	Multimode 1310nm	2 km	2km
100FX-SM	100	Monomode 1310nm	10 km	30/60km
100FX-SM	100	Monomode 1550nm	80 km	100/150km
1000SX	1000	Multimode 850nm (50/125 ou 62,5/125)	220/550m	550m
1000LX-MM	1000	Multimode 1310nm	5 km	-
1000LX-SM	1000	Monomode 1310nm	5 km	10/30km
1000ZX-SM	1000	Monomode 1550nm	80 km	80km

The **OPTICAL MODE OF TRANSMISSION** and associated fiber:  
The **Multimode fiber** ( MM ) or 50/125µm or 62,5/125µm and the **Single-mode fiber** ( SM ) or 9/125µm are characterized by the internal diameter of the fiber (50/62,5 or 9µm) and external 125µm but also by the attenuation of the optical signal per Km.

**OPTICAL BUDGET** necessary to match the distance :  
To transmit an optical link over a distance "D", the optical power (dB) of the both devices (Emitter—Receiver) must provide a minimum Optical Budget of:

$$D = \frac{\text{Budget} - x C - y E}{\text{Fiber attenuation per Km}}$$

C = loss per connector  
E = loss per splice

#### WAVELENGTH AND ATTENUATION

#### IMPORTANT ELEMENTS TO CHOOSE A CONVERTER

When you like to choose a solution of conversion Ethernet copper to fiber or fiber to fiber you need to know the following elements:

- The Ethernet mode both side: copper/fiber and rate
- The number and type of fiber available: Multimode MM, 50/125 ou 62,5/125 ou Singlemode SM (singlemode) 9/125nm
- The wavelength of the transmission With MM: 850 or 1310nm - With SM: 1310 or 1550
- The requested distance
- The attenuation of loss per km of this fiber
- Then you can calculate the requested budget to match the distance
- And don't miss the type of connectors

#### Few elements can make the difference : The Transparency

Within few case, like the server duplication, the full transparency to all traffic need to be absolute. Then you need to chose True Converter.  
True converter is transporting the Ethernet frame from copper to fiber or fiber to fiber without buffering or filtering in full duplex.

Switch convert is stocking the Ethernet frame in buffer and provide the rate adjustment, full/half duplex control between Ethernet copper and fiber.

The length of Ethernet frame be consider. VLAN frame are using 1548 bytes. Faster communication between server in Gigabit Ethernet can be processed with Jumbo Trames up to 9216 bytes.

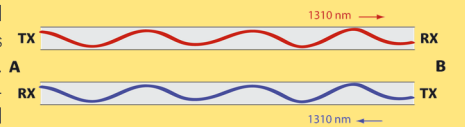
These typical attenuations are corresponding to brand new fiber, but they can be different from the different manufacturers and they will increase with the age of the fiber.

Type of fiber	Wavelength	Attenuation used	Attenuation typical
Multimode 50/125nm	850nm	3,5 db	2,5 db
	1300nm	1,5 db	0,8 db
Multimode 62,5/125nm	850nm	3,5 db	3,0 db
	1300nm	1,5 db	0,7 db
Monomode 9/125nm	1310 nm	0,4 db	0,35 db
Monomode 9/125nm	1550 nm	0,3 db	0,22 db

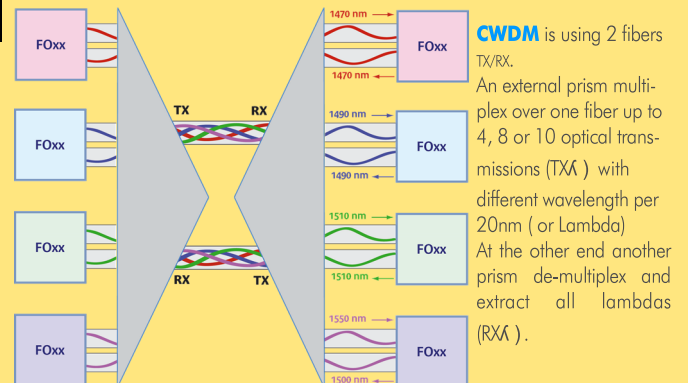
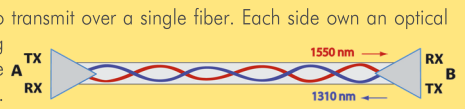
To this attenuation we need to deduct also the loss generate by  
· the connectors (0,75db)  
· the splices (0,1db) when 2 fibers have been soldered

#### TRANSMISSION and NOMBRE of FIBER:

Generally bidirectional fiber optic transmissions are using a pair of fibers. A Emission is done simultaneously in A->B and B->A with the same wavelength.

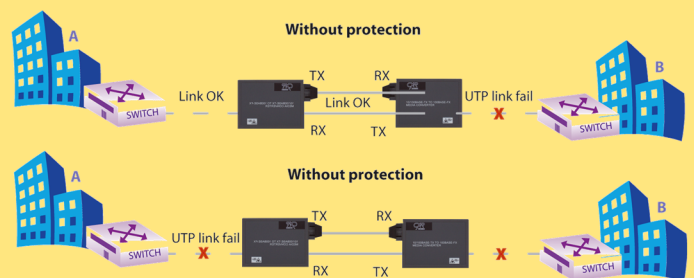


The **WDM** is solution to transmit over a single fiber. Each side own an optical prism to mix out-going signal from TX and the in-going signal to RX. One side is transmitting at 1310nm and other side at 1550. Both transmissions are received without attenuation. Modem must choose as pair (exp:FOC-SM20W-13 & FOC-SM20W-15).



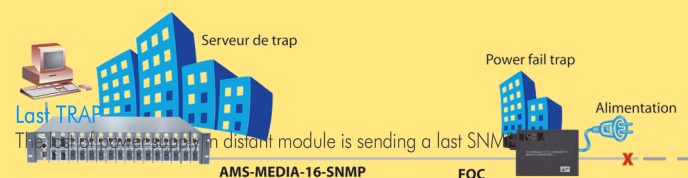
#### Link Pass Through protection

When this protection is activated the disconnection of B UTP port is generating the disconnection of the A UTP port or send a TRAP. This feature will advise the switch of server in side A that the B client is no more reachable and avoid to miss UDP frame.

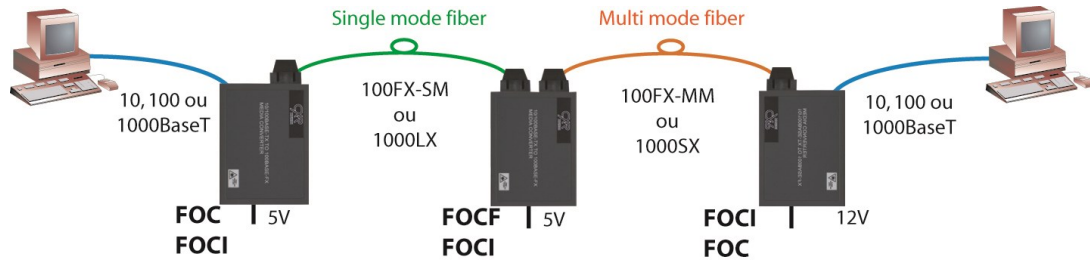


#### Link Alarm protection

When this protection is activated the disconnection of fiber will generate the disconnection of the A UTP port.



## Non Manageable Media Conversion FOC, FOCF, RACK-MEDIA, SW-xTTX-yFX



### FOC Media Converter /switch Ethernet: copper/fibre

The FOC media converters are interconnecting Copper Ethernet LAN section, or devices, to Fiber Ethernet LAN section. The FOC are also use to interconnect two LAN's over one or two fibers from building to building up to 150Km. FOC are also connecting active devices and networks which are using old technologies like the 10FL or new one's like the Gigabit-Ethernet transparent to the Jumbo frames. The automatic set-up of features can be deactivated manually by micro-switch.

The FOC-GTX-SFP is a version Gigabit Ethernet copper to fiber using SFP fiber modules. The FOC are delivered with an external 230Vac/5Vdc converter, but they can be use in a chassis with fans and single or redundant power supply the RACK-MEDIA16.

### FOCF Ethernet media converter fiber/fiber

This pure Ethernet media converter from multimode fiber to single-mode fiber is used to extend optical Ethernet networks in long distance but also to save cost of integrated

### FOCI Manageable converter copper/fiber/fiber

The FOCI, media converters copper/fiber or fiber/fiber, are used for infrastructure or application requiring the control of the distant device like for the Telco services. They are managed in the band of the fiber, including the control distant user interface by a FOIR card inside an AMS-MEDIA16-SNMP as describe in page 4/5 . The FOCI are

### RACK-MEDIA16 Rack system for 16 FOC

This 19"2U rack is installed in large industrial and military sites. It is optimizing the redundancy power supply and ventilation for 16 FOC converters.

- RACK-MEDIA16S** rack for 16 FOC with one fixed AC power and 3 fans.
- RACK-MEDIA16N** rack for 16 FOC 2 slots power, 3 fans
- RACK-MEDIA-AC** AC 110/240V power
- RACK-MEDIA-DC** DC -48V power



From	10/100 BT	1000 BT	1000BT	100 FX-MM	10/100 Bt	10/100/1000	1000 SX
To	100 FX	1000 SX/LX	1000 SX/LX	100 FX-SM	100 FX	1000 SX/LX	1000 LX
Module are compatible	<b>FOC-TTX-FX</b>	<b>FOC-GTX-GSX/LX</b>	<b>FOC-GTX-SFP</b>	<b>FOCF-FX-FX</b>	<b>FOCI-TTX-FX</b>	<b>FOCI-GTX-GSX/GLX</b>	<b>FOCI-GSX-GLX</b>
with RACK-MEDIA16	Yes	Yes	Yes	No	No	No	No
Set-up or manageable by	DIP switch	DIP swich	DIP switch	No	FOCIR-xxx-FX	FOCIR-xxx-GSX/GLX	FOCIR-GLX or FOCIR-GSX

#### STANDARD TYPE OF FIBER—Other distance on demand

	2km	550m	All choose of SFP modules	ND	2km	550m	550m
Multimode 2 fibers	2km	550m		ND	2km	550m	550m
Single mode 2 fibers	30 to 100km	10 to 80 km		30 to 100 km	30 to 100 km	10 to 80 km	10/30 km
Single mode 1 fiber - WDM	20 to 40km	20/40/60km		20 & 40km	20 & 40km	20 & 40km	NC
Single mode CWDM	-	-	-	80km	-	80km	

#### ETHERNET MEDIA CONVERTER & SWITCH

Auto-negotiation: rate and flow	Yes				Yes	Yes	
Pure converter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transparent to VLAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transparent to Jumbo frames		Yes	Yes		Yes	Yes	Yes
Link Pass Through	Yes	Yes	Yes		Yes	Yes	

#### PHYSICAL

L x D x H	71x97x26	71x97x26	71x97x26	119x86x25	140x78x26	140x78x26	140x78x50
Weight	220g	220g	220g	350g	350g	350g	480g
Power Supply	5V/1,6A	5V/1,6A	5V/1,6A	12V/0,5A	12V/0,5A	12V/0,5A	12V/0,8A





## Ethernet/Internet optical distribution for Telco/ISP Media conversion center for LAN infrastructure AMS-MEDIA-16-SNMP, FOCR, FOCIR and distant FOCI

This powerful solution is giving help to the network administrator along the set-up and monitoring of the distant sites. Is it possible to open or limit the user's bandwidth, control and monitor the events on the ports, the Ethernet frames and the power supply.

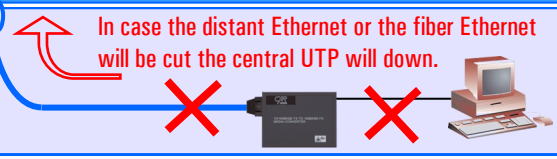
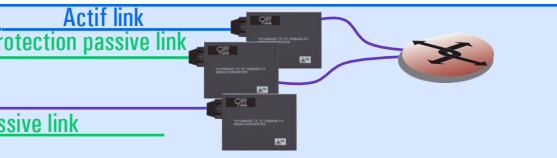

**A/ LOCAL: Management**  
**DISTANT: Non Management**

- Rack: AMS-MEDIA16-SNMP  
Media converter card with management: FOCIR  
Distant: Non managed by AMS-MEDIA16-SNMP
- Card Converter: FOC, FOCF
  - Non manageable Switch: SW-xTTX-FX/GSX/ GLX
  - SNMP only Switch: SWM-xTTX-yFX/GSX/ GLX

**B/ LOCAL: Management**  
**DISTANT: IN-BAND Management**

- Rack: AMS-MEDIA16-SNMP  
Media converter card with management: FOCIR  
Distant: managed over Fiber (In-Band)
- Module converter: FOCI
  - In-band managed Switch par rack SWMI-xTTX-yFX / GSX / GLX



A	B	Functions :
X	X	Link alarm Link path through 
X	X	Links 1 + 1 protection 
	X	Rate limitation per link per 1Mbps step 
X	X	Automatic Set-up: Half/Full duplex, 10/100/1000BaseT, MDI/MDIX Manual set-up of the card : Half/Full/Auto duplex, speed, rate limitation , switch or transparent mode Broadcast storm filtering : Set-up from 1 to 27% Status of the cards and the links : Inventory of the card with full status of each. Status of distant converter/switch: Inventory of module and monitoring of power, speed, mode, link down, activity, Set-up of distant converter/switch: Half/Full/Auto duplex, speed, flow control, MDI/MDIX Test : Test loop on local and distant modules Traffic analysis : RMON probe for statistic on frames, traffic counter and analysys Alarm information (TRAP SNMP): from card and FO links from distant SWMI-7TTX-2FX et SWMI-7TTX-2GLX Manageable from AMS-MEDIA16-SNMP : VLAN 802.1q, QoS and rate per port SWMI-xx / SWM-xx Level2, Protocole Spanning Tree & RST, IGMP support, 1 + 1protection , daisy chain SWM-7TTX-2FX et SWM-7TTX-2GLX Manageable with own IP address: VLAN 802.1q, QOS et débit par port



# Manageable Media Converter/Switch Administration of the card and "IN-Band" for distant AMS-MEDIA16-SNMP, FOCIR and FOCI/SWMI distant

FIBER OPTIC LAN

CXR offers a powerful solution of long distance Ethernet distribution with a sophisticated administration of the links and the distant customer's accesses. This system is used by Telco for multi-site services, by ISP for high rate Internet access, but also by large organisations/enterprises to distribute Ethernet links in campuses, to the block or the floor without using extra protocols for administration.

## AMS-MEDIA-16-SNMP Converter/switch administration center

This 2U chassis center holds 16 hot swappable FOCIR media converter cards doing Ethernet copper to fiber or fiber to fiber conversion. It's can be fitted with two redundancy and load balancing AC or DC48v power supplies, and with 4 FAN.

This center system owns an administration card with a consol port and an Ethernet port to manage in Telnet with text menu, in html with a web browser or in SNMP with a management system like SNMPc. This powerful system provides alarm/Trap for system-cards-links-distant, but also the full management of the Ethernet flow with 4 level of account management and an integrate SNMP server.

This system can support and manage together:

- Simple or WDM **FOCIR** card and the CWDM colored lambda **FOCIR-xxx-Ccc**
- Distant **FOCI** modules or **SWMI** switches connected over fiber to the FOCIR

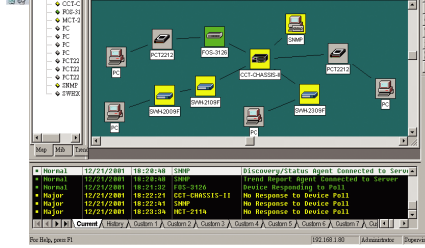
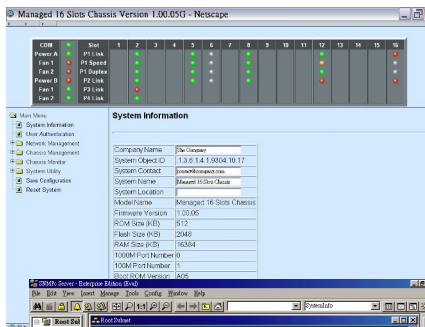
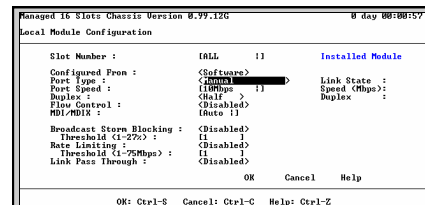
The centralized administration support:

- The Inventory management of FOCIR card and distant modules
- The display of full status of the card and link
- The ON/OFF per links with rate control per 1Mbps step
- The manual or auto setup of the speed and duplex-mode
- The management of the broadcasts storms
- The Ethernet frame monitoring with an embedded RMON probe
- The 1+1 link redundancy of 2 adjacent cards
- The Link Alarm from fiber cut
- The Link Pass Through from distant device
- The full wire speed in-band diagnostic
- The monitoring and alarm of link, power and temperature

... and for all FOCI and SWMI distant

- The full status display of the module or switch per port.
- The remote monitoring per ports of speed, duplex, MDI/MDIX.

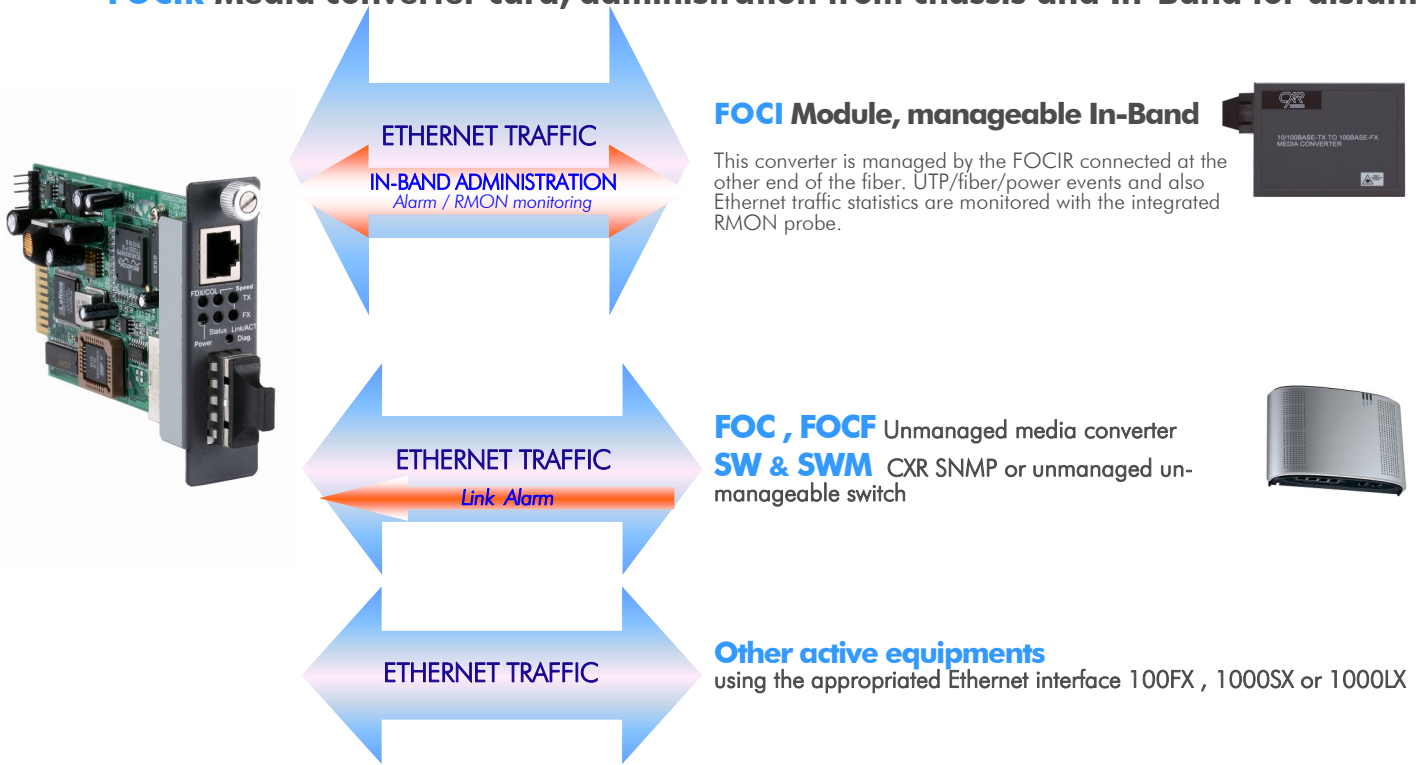
Administration in Telnet, html and SNMP



**AMS-MEDIA16-SNMP** 19" 2U chassis for 16 FOCIR card including Telnet/ HTML/ SNMP management, FAN with 2 slots for 2 power supply modules . Weight 8,5kg  
**AMS-MEDIA16-LW-SNMP** same 19" chassis, low weight 3,7kg in aluminum

**PS-AC-AMS-MEDIA** AC power supply module 16W and 55W w 16 modules, FAN  
**PS-DC-AMS-MEDIA** DC 48V power supply module 20W and 65W w 16 FOCIR, FAN  
**PS-xx-AMS-MEDIA-LW** low weight power module, 1,05kg

## FOCIR Media converter card, administration from chassis and In-Band for distant



# ETHERNET CONVERTER/SWITCH COPPER/FIBER/FIBER

## From 10FL to 1000LX over 2 fibers or WDM or CWDM

How to choose the right CXR Anderson Jacobson reference

Due to the high number of possibilities we are proposing the following CXR codify:

Choose your converter

FOCx—yyy—zzzww

Choose your switch

SWx—byyy—czzzww

CXR coding the copper Ethernet:

10BaseT T  
 100BaseT TX  
 10/100BaseT TTX  
 1000BaseT GTX  
 10/100/1000BaseT TGTX

CXR coding the fiber optic Ethernet

10FL multi-mode FL at 850nm  
 10FL single-mode FL-SM25 1310nm  
 distance 25Km  
 100FX multi-mode FX ou FX-MM  
 1310nm distance 2Km  
 100FX single-mode FX-SMvv  
 distance of vv Km  
 1000SX multi-mode GSX  
 1000LX single-mode GLX-SMvv  
 distance of vv Km

CXR coding of connectors

FOCx is delivered in standard with SC connector  
 Default SC/PC Ref or Ref-SC  
 ST Ref-ST for 10FL & 100FX  
 LC Ref-LC

Choose the type of model : ( x )

**FOC** Is a non manageable module non, with an external AC/5Vdc power adapter.  
 This module can be used also in a rack RACK-MEDIA-16 to share power supply and fan.  
**FOCF** This module is a fiber to fiber converter with controlled ventilation  
**FOCIR** Is a manageable card for AMS-MEDIA16-SNMP with the capability to manage in the band the distant FOCI.  
**FOCI** Is an In-Band manageable module, with an external AC/12Vdc power adapter.

Choose your starting copper media: ( yyy )

FOCx-T-zzz Copper 10BaseT  
 FOCx-TTX-zzz Copper 10/100BaseTX with auto-switch  
 FOCx-FX-zzz Fiber 100FX multimode  
 FOCx-GTX-zzz Copper 1000BaseT  
 FOCx-TGTX-zzz Copper 10/100/1000BaseT  
 FOCx-GSX-zzz Fiber 1000FX multimode

Choose your ending fiber optic media: ( zzzww )

FOCx-y-FL Fiber 10FL multimode 850nm  
 FOCx-y-FL-SMvv Fiber 10FL single-mode, distance vvKm  
 FOCx-yyy-FX Fiber 100FX multimode 1310nm  
 FOCx-yyy-FX-SMvv Fiber 100FX single-mode distance vvKm  
 FOCx-yyy-FX-SMvv-Ccc Fiber 100FX single-mode CWDM color Ccc, distance vvKm  
 FOCx-yyy-FX-SMvvW13 Fiber 100FX single-mode, single fiber WDM, distance vvKm  
 FOCx-yyy-FX-SMvvW15 Fiber 100FX single-mode, single fiber WDM, distance vvKm  
 Pair of FOCx-yyy-FX-SMvvW13 + FOCx-yyy-FX-SMvvW15 need to be used together.  
 FOCx-yyy-GSX Fiber 1000TX multimode 850nm  
 FOCx-yyy-GLX-SMvv Fiber 1000FX single-mode distance vvKm  
 FOCx-yyy-GLX-SMvv-Ccc Fiber 1000FX single-mode CWDM color Ccc, distance vvKm  
 FOCx-yyy-GLX-SMvvW13 Fiber 1000FX single-mode monofiber WDM, distance vvKm  
 FOCx-yyy-GLX-SMvvW15 Fiber 1000FX single-mode monofiber WDM, distance vvKm

Choose your optical/copper Switch

**SW** Un-manageable Switch, external AC/5Vcc adapter.  
**SWM** SNMP manageable Switch  
**SWMI** In-band manageable from the AMS-MEDIA16-SNMP with FOCIR over the fiber.

Choose the number of optical/copper ports

SWx—bTTX—cFXww Switch (7ou 8) ports 10/100BaseT to (1or 2) FX (MM ou SM)  
 SWx—bTTX—cGSX Switch (7ou 8) ports 10/100BaseT to (1ou 2) GSX MM  
 SWx—bTTX—cGLXww Switch (7ou 8) ports 10/100BaseT to (1ou 2) GLX SMvv

Choose the right version of optical power to your need.

REFERENCE	FL-MM	FL-	FX-MM	FX-SM30	FX-SM50	FX-SM80	FX-SM100	FX-SM 20W13	FX-SM 20W15	FX-SM 40W13	FX-SM 40W15
Ethernet	10FL	10FL	100FX	100FX	100FX	100FX	100FX	100FX	100FX	100FX	100FX
Type of Fiber	MM	SM	MM	SM	SM	SM	SM	SM	SM	SM	SM
Number of fiber	2	2	2	2	2	2	2	1	1	1	1
Wavelength	850nm	1310nm	1310nm	1310nm	1310nm	1310nm	1550nm	1310nm/1550nm	1550nm/1310nm	1310nm/1550nm	1550nm/1310nm
Budget	16 db	14 db	11 db	19 db	29 db	37 db	36 db	19db	19db	25 db	25 db
Typical distance	2 km	25 km	2 km	30 km	50 km	80 km	100 km	20 km	20 km	40 km	40 km

REFERENCE	GSX	GLX-SM10	GLX-SM30	GLX-SM50	GLX-SM 20W13	GLX-SM 20W15	GLX-SM 40W13	GLX-SM 40W15	GLX-SM 80W13	GLX-SM 80W19
Ethernet	1000SX	1000LX	1000LX	1000LX	1000LX	1000LX	1000LX	1000LX	1000LX	1000LX
Type of Fiber	MM	SM	SM	SM	SM	SM	SM	SM	SM	SM
Number of fiber	2	2	2	2	1	1	1	1	1	1
Wavelength	850nm	1310nm	1310nm	1550nm	1310nm/1550nm	1550nm/1310nm	1310nm/1550nm	1550nm/1310nm	1550nm/1590nm	1590nm/1550nm
Budget	8,5 db	12 db	19 db	19 db	12 db	12 db	20 db	20 db	24 db	24 db
Typical distance	550 m	10 km	30 km	50 km	20 km	20 km	40 km	40 km	80 km	80 km



# CWDM solutions of Optical multiplexing for Ethernet and SDH, PDH and PON networks

## CWDM passive multiplexer

FIBER OPTIC

### Active conversion to co-

CXR is offering a powerful and economical solution to transport over one pair of fiber (duplex) up to 11 independent pairs of fiber. This give the capability to transport independently up to 11 links Ethernet, Gigabit Ethernet, SDH or Video over a single pair of fiber. The CWDM optical multiplexing provides a secure transport with an absolute independence between applications. This solution is including the generation of colored fiber signals at different wavelengths (or Lambda) from the active equipment and a passive CWDM multiplexing and de-multiplexing.

#### The CXR CWDM is build with:

The 1U passive chassis **CWDM-1U-1310-Cx-to-Cy**, with one CWDM optical prism multiplexer and one optical prism de-multiplexer. Three versions are available to multiplexed in one duplex fiber:

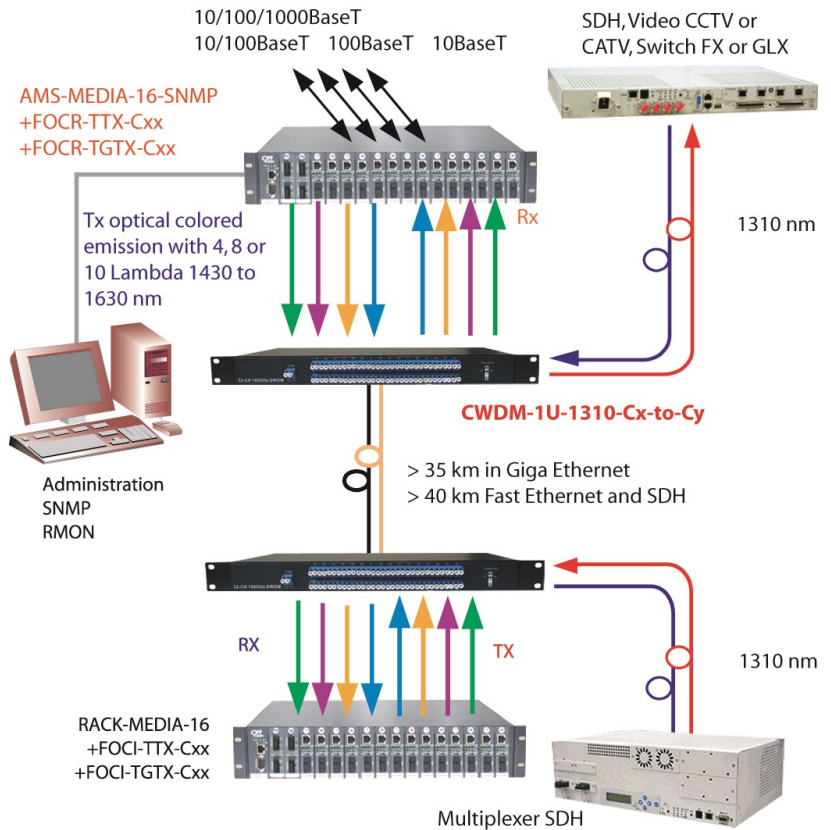
- 4 lambdas (4 duplex fibers) + one standard single mode 1310 nm (1 duplex fiber)
- 8 lambdas (8 duplex fibers) + one standard single mode 1310 nm (1 duplex fiber)
- 10 lambdas (10 duplex fibers) + one standard single mode 1310 nm (1 duplex fiber)

This passive chassis is multiplexing the optical flows, from active equipments, with different wavelengths or colors, in the same fiber. At the other end the CWDM chassis is de-multiplexing and extracting all colored optical flows to the active devices.

These colored flows use a wavelength of 1430nm to 1610 nm at +/- 7nm and with a delta of 20nm between adjacent canals. This colored wavelengths or Lambda are named C09 to C18. In addition the CWDM-1U chassis is multiplexing a simple single mode link at 1310nm +/- 50nm.

- CXR provides colored wavelengths or Lambda in:
- The media converter with IN-Band management **FOCIR-Cxx** card or **FOCI-Cxx** module, in Ethernet or Gigabit Ethernet version
  - The un-manageable Gigabit Ethernet converter **FOC-SFP** with SFP module **SFP-GLX-Cxx**
  - The SDH multiplexer **HX9400/HX9500** with SFP module **SFP-STM1/4-Cxx**
  - All other Ethernet equipment using CXR **SFP-Cxx** CWDM modules.

All management of FOCIR-Cxx slided into AMS-MEDIA-16-SNMP is done by the hot-swappable chassis . This solution is used in infrastructure up to 40/50 km in order to save fibers.



**CWDM-1U-1310-Cx to Cy** passive 19" 1U chassis (430 x 44 x 210mm)  
 Content one CWDM multiplexer and one CWDM de-multiplexer  
 3 version with SC/PC connector:  
**CWDM-1U-1310-C12-to-C15** Multiplex one 1310 & 4 Lambda CWDM C9/10/11/12 or 1430/1450/1470/1490 nm  
 Loss of insertion <= 3,0 dB  
**CWDM-1U-1310-C11-to-C18** Multiplex one 1310 & 8 Lambdas CWDM C11 to C18 or 1470/1490/1510/1530/1550/1570/1590/1610 nm  
 Loss of insertion <= 4,2dB  
**CWDM-1U-1310-C9-to-C18** Multiplex one 1310 & 10 Lambdas CWDM C9 to C18 or 1430/1450/1470/1490/1510/1530/1550/1570/1590/1610 nm  
 Loss of insertion <= 5,0dB  
 Isolation between adjacent channels >30dB and non adjacent >40dB  
 Working temperature -10 to 70°C, variations of wavelength <0,005nm/°C  
 Maximum optical power 500mW.  
 Passband Ripple ≤0.5 nm; Uniformity ≤1.0 dB; Return Loss ≥45 dB;  
 Directivity ≥50 dB; Polarization Dependent Loss (PDL) ≤0.15dB  
**Lambda available in CXR catalogue**  
**FOCIR-TTX-FX-25D-Cxx** conversion card for 10/100BaseT to 100FX  
**FOCIR-TGTX-LX-25D-Cxx** conversion card 10/100/1000BaseT to 1000LX  
**FOCI-TTX-FX-25D-Cxx** conversion module 10/100BaseT to 100FX  
**FOCI-TGTX-LX-25D-Cxx** conversion module 10/100/1000BaseT to 1000LX  
**SFP-STM1-SMxxD-Cxx** SFP for STM1 SDH  
**SFP-STM4-SMxxD-Cxx** SFP for STM4 SDH

The FOCIR-Cxx and FOCI-Cxx can be used in an existing CWDM infrastructure with another passive CWDM equipment.

Lambda 1000LX	C09	C10	C11	C12	C13	C14	C15	C16	C17	C18
Wavelength	1430 nm	1450 nm	1470 nm	1490 nm	1510 nm	1530 nm	1550 nm	1570 nm	1590 nm	1610 nm
Typical distance	80km	80km	80km	80km	80km	80km	80km	80km	80km	80km
TX min/Max	-1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm	1,0/3,0dBm
Sensitivity RX	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm	-26dBm
Budget before CWDM	25dB	25dB	25dB	25dB	25dB	25dB	25dB	25dB	25dB	25dB







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