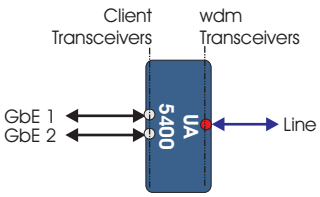
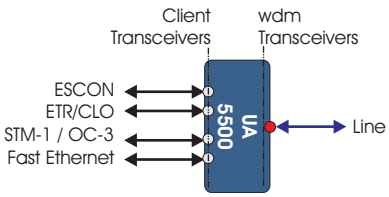
Muxponders





Muxponders 5400 & 5500

Muxponders enable more efficient use of the optical WDM channels via electrical TDM multiplexing of the client signals. The Muxponders can also be combined to address different traffic combinations and further enhance the wavelength utilization. Both 5400 and 5500 use pluggable tranceivers (SFP's) on both client and line interfaces enabling configurations that exact match current and future needs.

5400/03 and 5500/01 Muxponder

5400 Features

The Muxponder 5400 provides the lowest cost solution for carrying multiple GE or FC signals over a Transmode network. It is available in two different versions:

- 5400/03 which is optimized for carrying two Gigabit Ethernet channels.
- 5400/02 which carries two Fibre Channels or FICON signals.

The two input signals are aggregated onto an outgoing 2.5Gb/s line signal. The 5400/03 client ports can also accept the aggregated line side signal from the 5500 allowing 8x mid speed client signals or 4x mid speed + 1x Gigabit Ethernet to share a single wavelength.

5400/03 supports both performance monitoring and utilization. The 5400/03 is capable to display performance monitoring data on the line and client ports, which is automatically started at power on. The card will monitor utilization and block errors. Block error consists of CRC and 8B/10B errors.

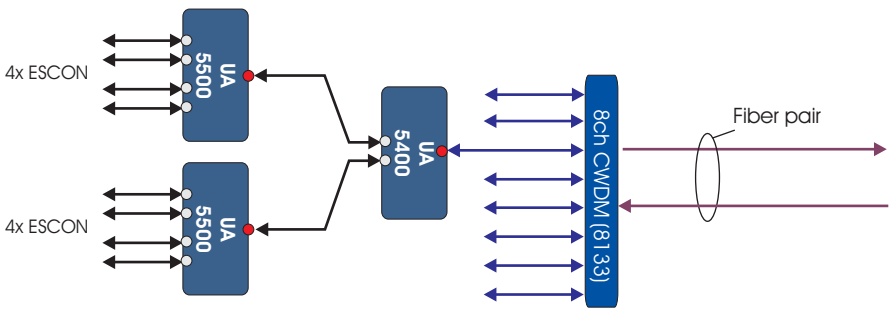
In addition to the wide range of optical pluggable optics options, 100Base-T and 1000Base-T electrical SFPs are also available for the 5400 allowing one or both channels to carry a Fast Ethernet signal. This is primarily aimed at delivering an out ofBand Management channel to the NE without the cost ofadding an additional wavelength.

5500 Features

The Muxponder 5500 unit aggregates 4 client signals with bit rates up to 200Mb/s onto a single 1.25 Gb/s wavelength channel. Protocols supported include ESCON, Fast Ethernet, FDDI, STM-1/OC-3, E3/E4 and ETR/CLO. Any combination of protocols are allowed to the same unit.

Combined 5400 and 5500 solutions

As mentioned above, the aggregation can be further increased by using a 5400 muxponder to combine the output from two 5500 units - allowing up to eight channels to share a wavelength (see the ESCON application example below).



TS-Series is a versatile platform with modularity both in channel count and transmission reach. It is scalable up to 16 CWDM channels and 38 C/DWDM channels by adding one or several channels at a time without any service downtime or impact on existing traffic.

The protocol transparent nature of TS-Series provides support for a wide range of services including Gigabit Ethernet, Fast Ethernet, SDH/SONET, Fibre Channel, FICON, ESCON, ETR etc.

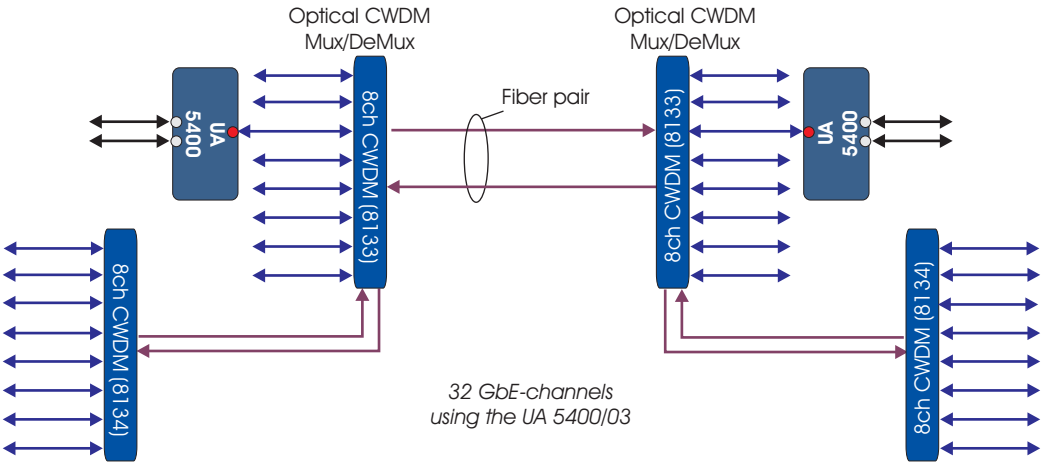
The protocols can be mixed between C/DWDM and even between TDM channels.

TS-1100
9013 Chassis

TS-100
9002 Chassis

MultiRate
Transponder
7700

4G FC
Transponder
7400



The 5400 Muxponder can be used to create CWDM network solutions for up to 32 GbE-channels using one fiber-pair. This configuration is shown in the figure above where up to 16x 5400 units can be connected to the 8ch Mux/DeMux units 8133 + 8134.

Networks with the Muxponders 5400 & 5500 are managed on a NE-basis via the Embedded Node Manager (ENM) and on network level via the Transmode Network Manager (TNM).

Technical Data

Parameter	Value	Comment
Power consumption	5400: 11,5W 5500: 13W	Fully equipped
Timing	Internal oscillators generate both line and client transmit timing	full 3R
Performance monitoring	- Optical parameters: Laser output power, Laser bias, Received optical power (not on all SFP's)	
Embedded management channels	No	
Supported protocols	5500: ESCON, STM-1, OC-3, Fast Ethernet, FDDI, ETR/CLO, E3/E4 5400/1: GbE. UA5500 5400/2: Fibre Channel (1G), FICON	

Non-wdm SFP's (normally used on client interfaces)						
Module type	007 "1310nm SM"	018 "1310nm MM"	006 "850nm MM"	019 "1310nm MM"	034 "100Base-T"	025 "1000Base-T"
Signal types	5400/03: GbE 5400/02: FC, FICON	5500: ESCON, FE, FDDI, STM-1/OC-3, E3/E4 ETR/CLO	5400/03: GbE 5400/02: FC, FICON	5500: ESCON, FE, FDDI, STM-1/OC-3, E3/E4 ETR/CLO	5400/03: FE	5400/03: Electrical GbE
Bit rate	100Mb/s - 2.7Gb/s	200Mb/s	100Mb/s - 1.25Gb/s	200Mb/s	125Mb/s	1.25Gb/s
Connector type	LC	Duplex MT-RJ	LC	LC	RJ45	RJ45
Input fiber type	SM	MM	MM	SM	Electrical	Electrical
Interface type	~2km	~10km	~100m	~15km	~100m	~100m
Output wavelength (nm)	1266 - 1360	1280 - 1380	830 - 860	1280 - 1380	-	-
Output power	-10dBm min -3dBm max	-20,5dBm min -15dBm max	-10dBm min - 4dBm max	-15dBm min -8dBm max	-	-
Receiver sensitivity @ 10^{12}	-18dBm	-29dBm	-15dBm	-28dBm	-	-
Overload	-3dBm	-14,5dBm	-4dBm	-8dBm	-	-
Link budget without System Margin	8dB	8,5dB	4,5dB	13dB	-	-
Used on: (C) = Client (L)=Line	5400/03: (C/L) 5400/02: (C/L) 5500: (L)	5500: (C)	5400/03: (C/L) 5400/02: (C/L) 5500: (L)	5500: (C)	5400/03: (C)	5400/03: (C)

	CWDM SFP Transceivers				DWDM SFP Transceivers [1]
Module type	"40km"	"80km"	"100km"	"120km"	"120km"
Bit rate	100Mb/s to 2.5Gb/s	100Mb/s to 2.5Gb/s	100Mb/s to 2.5Gb/s	100Mb/s to 1.25Gb/s	622Mb/s to 2.5Gb/s
Connector type	LC	LC	LC	LC	LC
Input fiber type	SM	SM	SM	SM	SM
Output wavelength (nm)	1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611nm (G.694.2)				G.694.1 100GHz spaced C-band
Output power	0dBm min +5dBm max	0dBm min +5dBm max	0dBm min +5dBm max	0dBm min +5dBm max	0dBm min
Overload	0dBm	-9dBm	-9dBm	-9dBm	-9dBm
Rec sensitivity @ 10 excl. System Margin	-20dBm	-28dBm	-30dBm	-32dBm	-28dBm
Link budget without System Margin	20dBm	28dBm	30dBm	32dBm	28dBm

1) Not supported by 5500. Supported by 5400/03 & /02

Transmode patented iWDM technology entails "Protocol Recognition" that introduces true Plug-and-Play simplicity to wdm networking by allowing the Transponders to recognize the attached signal and auto-provision the optimum parameters.

The TS-Series Transponders provide a completely integrated solution to convert client signals to run over C/DWDM channels. There are several modules available covering a wide range of protocols from 100Mb/s to 10Gb/s. The TS-Series Transponders are bit rate transparent requiring no pre-configuration or on-site provisioning.

Muxponder
5400/03

10G Transponder
7900

Mux/DeMux
&
AD-filters

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