Campus/Metro Area 8 Channel DWDM module

Rainbow D8 by Obsidian

Synopsis

Rainbow D8 is a passive C-band Dense Wavelength Division Multiplex (DWDM) module, capable of bi-directionally interfacing up to 8 DWDM wavelengths (100GHz spacing) with a single fiber pair, suitable for driving up to 80Gbits/second of full-duplex InfiniBand traffic over tens of kilometers.

Four Rainbow D8 devices fill a 1RU shelf, delivering a high-density wavelength management capability – 32GBytes per second over a single fiber pair using 10Gbits/second LAN port modulation rates.

Rainbow D8 is an un-managed, passive and bit-rate/ protocol agnostic optical device, consuming no power and providing highly reliable operation with minimal insertion loss.

Background

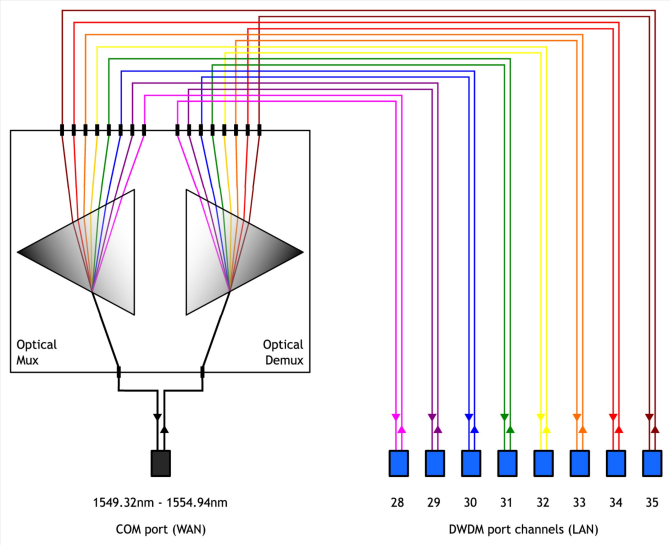
Obsidian's Longbow C400 devices allow parallel 4X QDR InfiniBand channels to be transparently range extended up to 1,600km through buffer credit extension and bit-stream serialization over 10Gbits/second optical light paths.

Due to the maturity and cost-effectiveness of 10Gbit/second optical components, it is preferable to achieve high link bandwidths by deploying multiple 10Gbits/second channels rather than, say, 40Gbits/second optics. InfiniBand distributes traffic across multiple parallel links - and this approach also provides some level of protection against certain link or component failures.

In environments where fibers are abundantly provisioned, each Longbow pair can drive its own fiber pair. However for many links this is not possible, and this is where the Rainbow D8 plays a role:

Function

Each Rainbow D8 module has nine front-facing duplex-LC optical ports:



The eight local DWDM ports are each associated with a different wavelength/ frequency, and must be connected to optical transceivers that are matched to that wavelength. Each local port is labelled with the channel number associated with the frequency it is tuned to, according to the standard ITU wavelengths grid – channels from 28, 29, 30 ... 35 corresponding to frequencies of 192.8THz to 193.5THz in 100GHz increments. See specifications for specific channel wavelengths.

The WAN port, labelled 'COM', aggregates all 8 wavelengths of independently modulated LAN data.

The Rainbow D8 is a full duplex device, performing both the combination of eight local wavelengths onto the single outgoing WAN fiber, and the splitting of the single incoming WAN fiber's light into its eight local wavelengths.

Specifications

Chassis

Mounting (Quad Pack)	19" rack-mount shelf, front mounting no-rail system
Physical	1.5"x4.25"x13"
System power	Passive; 0W, no airflow

Optical

Connector	Duplex-LC (ceramic couplers)
WDM wavelengths (nm)	1554.94, 1554.13, 1553.33, 1552.52, 1551.72, 1550.92, 1550.12 & 1549.32
Insertion loss (dB)	2.8 (typ.) 3.5 (max)
Pass band width (nm)	0.24
Adjacent isolation (dB)	25 (min) 30 (typ.)
Non-adjacent isolation (dB)	40 (min), 45 (typ.)
Maximum power (mW)	300
Insertion latency (ns)	2 (max)

(A pair of interconnected Rainbow D8s create an insertion loss of 7dB (max), which must be accommodated by the link budget)

Signal

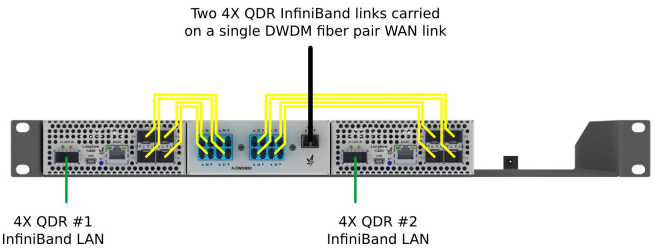
Protocol	Agnostic
Bit-rate	Agnostic

Management

Rainbow D8 itself is passive and un-managed, however, important set up and diagnostic measurements such as optical power levels, bit error rates, real time eye diagrams and traffic volumes can be determined through the management mechanisms of the Longbow C400 devices driving the 4X QDR InfiniBand channels.

Applications

Rainbow D8 can be used to combine up to eight optical signals of arbitrary protocol and bit-rate - providing the center wavelengths and pass bandwidths are respected. Thus, the device can combine parallel Longbow InfiniBand links with other traffic, such as 10Gbit Ethernet or Fibrechannel, or carry two full 4X QDR LAN interfaces across a DWDM WAN connection:



Rainbow D8 models (Longbow Accessory)

Rainbow D8 8 Channel, 100GHz, passive DWDM accessory, type 0

(call for different DWDM channel ranges)

Contacts

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