1X4 ROADM/100 GHz

Multi-degree ROADM for Flexible Optical Networks

The 1x4 reconfigurable optical add-drop multiplexer (ROADM) is a powerful part of the Infinera XTM Series, enabling optimized and cost-efficient capacity networks based on dense wavelength-division multiplexing (DWDM) technology.

Optimized for Dynamic Network Applications

The 1x4 ROADM is a compact solution for all network topologies aiming for a dynamic traffic design, with hitless changes in wavelength allocation. The 1x4 ROADM unit – fully supported as a plug-in unit in the TM-3000 and TM-3000/II chassis – serves as a building block for reconfigurable add-drop nodes in up to four dimensions.

The 1x4 ROADM has four individual add-drop ports. The add ports use a wavelength selective switch (WSS) to dynamically select which of the 40 DWDM channels on the ITU-T 100 GHz C-band grid to add to the line signal for each add port. An optical coupler is used to distribute the incoming line signal to the drop ports. A DWDM add-drop filter or mux/demux unit is used for locally terminating traffic.

The 1x4 ROADM includes variable optical attenuator (VOA) functionality on all wavelengths added to the line signal. This facilitates channel power balancing in amplified networks.

Grouping of ports on different units can be done in the node management software to enable the setting of identical channel selection. Also, restrictions on channel selection can be made on individual or grouped ports to simplify commissioning and minimize risk of faulty handling.

Key benefits:

- Creates the ability to add-drop any wavelength from/to any port, giving maximum flexibility in wavelength allocation
- Dynamic selection of add-drop wavelengths per port enables hitless topology changes
- Built-in VOA for easier channel power balancing
- Four individual add-drop ports enable multidimensional nodes
- Compact design with a small footprint
- Fully integrated with XTM Series and Digital Network Administrator for XTM Series (DNA-M)
- Low power design ensures low total cost of ownership
Linear Add-drop Applications

For ring and bus network structures, the 1x4 ROADM enables dynamic add-drop nodes with two-dimensional east- and westbound traffic by pairing two units and connecting them via one of the add-drop ports for the express traffic.

Initially, locally terminating traffic may be allocated to one of the add-drop ports, keeping the remaining ports for traffic upgrades or for scaling into multidimensional nodes.

A DWDM add-drop filter or a mux/demux unit is used to separate the terminated channels. The 1x4 ROADM operates at 100 GHz so that fixed or tunable, as well as small form-factor pluggable (SFP)/10 gigabit small form-factor pluggable (XFP) transponders, may be used for all DWDM channels.

Multidimensional Node Applications

The four individual add-drop ports of the 1x4 ROADM enable hitless redirection of traffic in multidimensional nodes. By grouping four units and interconnecting the add-drop ports, a four-dimensional node may be created, where traffic from any line can be directed to any other line or be locally dropped.

Low Power Design

A 1x4 ROADM consumes less than 6 watts (W). Low power consumption in combination with a small footprint reduces site costs and enables more capacity to be handled at sites with restrictions on power consumption, cooling and space.

The 1x4 ROADM can be mounted in a TM-3000 or TM-3000/II chassis, where it occupies two full-size slots.
## Specifications

| Insertion Loss (See Figure) | Add (A/D Rx) – (Line Tx) : 7.5 dB  
Drop (Line Rx) – (A/D Tx) : 7.1 dB |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>40 channels on 100 GHz ITU-T C-band grid</td>
</tr>
<tr>
<td>Add Ports</td>
<td>Wavelength selective switch (WSS)</td>
</tr>
<tr>
<td>Drop Ports</td>
<td>Passive optical coupler</td>
</tr>
</tbody>
</table>
| Line Side Features        | Variable optical attenuator (VOA) functionality on all individual wavelengths  
Monitor port (2% coupler) |
| No. of Add-drop Ports     | 4 |
| Switching Time            | Max 250 ms |
| VOA                       | Range: 0–15 dB  
Step size: 0.1 dB |
| Dimensions                | Occupies two full-size slots in a TM-3000 or TM-3000/II chassis |
| Power Consumption         | 6 W |

Specifications and Features Are Subject to Change