Single Fiber, Single wavelength, Dual Rate GbE / FE transceiver

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Data Rate issues

- Specification can include 125Mb/s with same range parameters
- ONE PMD IS POSSIBLE for 1.25Gb/s and 125 Mb/s
- At high volume - negligible cost difference
SFWG - Single Fiber Single Wavelength GbE

- Dual Rate performance
  - 4b/5b coding for 125Mb/s
  - 8b/10b coding for 1.25Gb/s
  - Today OC-3 IC’s can handle 72 CID (Consecutive Identical Digits). DC balancing is not an issue for either the laser driver or the limiting amp.

- Dual voltage 3.3v and 5v demonstrated (DC or AC coupled LD driver)

- Cost:
  - Main difference: testing cost
  - Secondary: chip-set (laser driver, and TIA)
  - Same laser
SFWG - Single Fiber Single Wavelength GbE

Half Duplex [10km fiber; 6 connections]
PRBS $2^7-1$

- Bit Error Rate
- Sensitivity [dBm]

- 125Mb/s
- 1.25Gb/s
SFWG - Single Fiber Single Wavelength GbE

Full Duplex [10km fiber; 6 connections]
PRBS $2^7-1$

Bit Error Rate vs. Sensitivity [dBm]

- 125Mb/s
- 1.25Gb/s
SFWG - Temperature effect on sensitivity

Half Duplex [10km fiber; 6 connections]
PRBS 27-1

Bit Error Rate

Sensitivity [dBm]

-30 -29 -28 -27 -26 -25

-30 -29 -28 -27 -26 -25

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## PMD Specification

<table>
<thead>
<tr>
<th>Description</th>
<th>ONU/OLT Module</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter Type</td>
<td>Bi-directional, 1 fibre</td>
<td></td>
</tr>
<tr>
<td>Signaling speed</td>
<td>1.25 / 0.125</td>
<td>GBd</td>
</tr>
<tr>
<td>Link length (range)</td>
<td>0.5 to 10,000</td>
<td>m</td>
</tr>
<tr>
<td>Power Budget</td>
<td>10</td>
<td>dB</td>
</tr>
<tr>
<td>Wavelength (range)</td>
<td>1270 to 1360</td>
<td>nm</td>
</tr>
<tr>
<td>$T_{\text{rise}}/T_{\text{fall}}$ (Max. 20%-80% response time)</td>
<td>0.26</td>
<td>ns</td>
</tr>
<tr>
<td>RMS spectral width (max)</td>
<td>2.4</td>
<td>nm</td>
</tr>
<tr>
<td>Average launch power (min)</td>
<td>-9</td>
<td>dBm</td>
</tr>
<tr>
<td>Average launch power (max)</td>
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<td>dBm</td>
</tr>
<tr>
<td>Extinction ratio (min)</td>
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<td>dB</td>
</tr>
<tr>
<td>RIN (max)</td>
<td>-120</td>
<td>dB/Hz</td>
</tr>
<tr>
<td>Receiver sensitivity (min)</td>
<td>-19</td>
<td>dBm</td>
</tr>
<tr>
<td>Return loss of ODN (min)</td>
<td>20</td>
<td>dB</td>
</tr>
<tr>
<td>Return Lc of module (min)</td>
<td>18</td>
<td>dB</td>
</tr>
</tbody>
</table>
SFSW Dual rate benefits

- One PMD in lieu of 3 or 4 !!!
- Cost impact insignificant
- Enables future CATV overlay and upgrade path (e.g. SFP units in hardened switch)