The Universal Aggregation and Access over 10G PON Transceiver brings more value to the aggregation network edge, enabled by flexible, open deployment within Ciena's Routing and Switching platforms to address key opportunities in next-generation business services, cable MSO access, 4G/5G RAN, and low-cost metro access.

The Small Form-factor Pluggable+ (SFP+) symmetrical 10 Gb/s OLT module works with Ciena's extensive Routing and Switching platforms to address key 10G XGS-PON (X=10, G-Gigabit, and S-Symmetrical) market opportunities related to fiber deep, 4G/5G xHaul, and business services to maximize ROI. The simple pluggable solution reduces edge transport, routing and switching costs, footprint, and power consumption by right-sizing the high-density OLT platforms.

Driving the industry toward 10G PON service delivery

Most network operators' environments are very challenging, as they experience surging IP traffic growth in both their wireless and wireline networks. Complicating this enormous growth is that the majority of traffic is IP-based—a trend that has been complicated in recent years by flat to declining revenues and associated margins, but that is expected to continue well into the future.

For the past 15 years, Passive Optical Networks (PONs) have become extremely popular due to surges in IP television (IPTV) and high-speed internet access. However, bandwidth demands, and competition are driving network operators to 10G PON, as 15-year-old asymmetrical Ethernet PON (EPON) and Gigabit PON (GPON) technologies are running out of steam and can't keep up with network growth at least by a factor of 10 in the next decade.

The network edge is where content lives and, to operators, where successful business outcomes are determined. For network operators, improving the ability to offer new service revenue opportunities and improve margins is essential to maintaining existing customers as well as attracting new ones.

Features and Benefits

- Concurrent 10G PON and Active Ethernet services
- Multi-vendor interop
- Compliant with ITU-T G.9807.1 specifications
- Rich OAM for all access/service types
- Multiple over-subscription rates for multiple downstream devices
- Operates at extended temperature range (Check host/density specifications)
- Advanced Synchronization including 1588v2 over PON support
- Ciena's Manage, Control and Plan (MCP) multi-layer support for end-to-end network management, control, and planning
Universal aggregation/access

Efficient use of real estate assets is a growing concern for network operators, who either host their own network equipment or lease power and space in collocation facilities. As services multiply, operators have been forced to stack 10G-capable equipment, incurring additional collocation rental and power costs.

Network operators now can bring more value to their networks by supporting concurrent PON, IP, and Ethernet services on the same Ciena aggregation platform, taking advantage of tightly integrated Class of Service (CoS) per-service and per-Optical Network Unit (ONU) traffic management and statistics.

XGS-PON wavelengths

Ciena’s 10G PON transceiver supports 10 Gb/s XGS-PON downstream and upstream. Downstream wavelengths operate at 1577nm wavelengths; upstream operate at 1270nm. While increasing PON data rates to 10 Gb/s symmetrical, G-PON, XGS-PON, and NG-PON2 can operate in the overall PON transmission window of 1260nm to 1650nm window—enabling co-existence of multiple PON services due to each technology using different wavelengths. Operators can seamlessly migrate services to XGS-PON or offer differentiated levels of services (business, residential, etc.).

Ciena’s 10G PON transceiver meets the N2 class maximum optical link budget in the ITU-T G.9807.1 standard, supporting symmetrical 10 Gb/s data rate up to 1:64 split ratio on 20km links.

XGS-PON applications

As a last-mile technology, used between the subscriber and network operator, Ciena’s 10G PON transceiver solution increases operator competitiveness by doing more with less, and network operators are able to turn up services more quickly, such as those related to Multi-Dwelling Units (MDUs), Fiber-To-The-Cabinet (FTTC), and Fiber-To-The-x (FTTx), by simply adding Ciena’s 10G PON transceiver in one of Ciena’s feature-rich switching and routing platforms.

Each 10G XGS-PON micro-OLT SFP+ is capable of supporting up to 128 ONUs.

### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tx Operating Wavelength</td>
<td>1575</td>
<td>1577</td>
<td>1580</td>
<td>nm</td>
</tr>
<tr>
<td>Tx Spectral Wavelength</td>
<td></td>
<td>1</td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Average (Tx) launch power</td>
<td>4.0</td>
<td>7.0</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Rx Operating Wavelength</td>
<td>1260</td>
<td>1270</td>
<td>1280</td>
<td>dBm</td>
</tr>
<tr>
<td>Rx Sensitivity</td>
<td>-7</td>
<td>-28</td>
<td></td>
<td>dBm</td>
</tr>
</tbody>
</table>

Ciena’s Routing and Switching products

Learn more
10G PON transceiver functions

Ciena's 10G PON transceiver contains the following functions:

- 10G Ethernet-to-XGS-PON OLT MAC bridge
- 10G optical transceiver
- Supports XGS OMCI (ITU) or Ethernet OAM (IEEE) management channel
- Digital Diagnostics and Monitoring (SFF-8472)
- PHY-layer OAM (PLOAM) layer discovery and registration for new ONUs
- Grant and track upstream PON bandwidth
- Service Level Agreement (SLA) via Dynamic Bandwidth Allocation (DBA) for upstream traffic
- Layer 2 (L2) switching, broadcasting of all multicast and broadcast traffic flooding on the PON
- VLAN-based switching, add, pop, or translate SVLAN or CVLAN tag
- Up to 500 Allocation IDs (AllocIDs) and up to 128 ONUs
- Upstream bandwidth traffic shaping

Synchronization

The PON physical layer includes WDM optics and line encoding. By accomplishing line encoding in the OLT hardware, the OLT can maintain strict 125 microsecond spacing for the Physical Synchronization Block downstream (PSBd) frames and provide timing alignment of the resulting bitstream and ONUs. These PSBd frames and embedded time stamps can be aligned to synchronization inputs from the host device.

Ciena’s 10G PON transceiver enables frequency and phase alignment to IEEE 1588v2 from the host device. This is accomplished when phase accuracy to device reference time is aligned to native PON time stamps to the 1588v2 reference. This capability allows Ciena’s 10G PON networks to support mobile backhaul and other synchronization-dependent applications, such as TDM circuit emulation.

Technical Information

Interface

XGS-PON

Management and support

Management via Ciena’s Service-Aware Operating System (SAOS)

Host device compatibility

3924, 3926, 3928, 5144, 5160, 5162, 5164, 5166, 5170, and 5171 platforms

Mechanical

Conforms to SFP 20-pin Multi Source Agreement (MSA) LC connector supports XGS-PON

Physical dimensions (millimeters)

Length 80.65 mm
Width 13.95mm
Height 18.95 mm

Operating Temperature

Dependant on host platform (39xx, 51xx) and transceiver density.
Typical Range:
Minimum: -40°C
Maximum: +50° to +65°C

Ordering information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCVR-SGPL02</td>
<td>10G PON UOLT SFP+, N2 CLASS, EXTENDED TEMP</td>
</tr>
</tbody>
</table>

Ciena may make changes at any time to the products or specifications contained herein without notice. Ciena and the Ciena Logo are trademarks or registered trademarks of Ciena Corporation in the U.S. and other countries. A complete list of Ciena’s trademarks is available at www.ciena.com. Third-party trademarks are the property of their respective owners and do not imply a partnership between Ciena and any other company. Copyright © 2021 Ciena® Corporation. All rights reserved. DS351 B.2021