



## RGN-8040 and RGN-8010 Quad Multi-Protocol Transponders

Optelian quad transponder and regenerator cards provide service demarcation and reach extension for optical connectivity of networking equipment over dedicated fiber, CWDM or DWDM networks. With very low power consumption and industry-leading port density in a compact footprint, they are an ideal solution for true private line services, providing transparent transport for any client protocol with ultra-low latency. They are fully NEBS qualified and can be used in any environment, including central offices, data centers, business campuses, outside plants, and remote locations.

CircuitFLEX



### RGN-8040 Quad Multi-Protocol OTN Transponder

OTN encapsulation with forward error correction and comprehensive service OAM features are offered on the RGN-8040. It provides client-side overhead termination and monitoring, allowing for full standards-compliant performance monitoring and user-specified threshold crossing alerts for client protocols from 8.5 Gb/s to 11.3 Gb/s.

All standard SFP+ interface types are supported, including fully tunable SFP+. Extended temperature range (ETR) capabilities are also featured, with GR-3108 Class 2 certification for outside plant applications.

Client signals are mapped into an OTN wrapper transparently, which maintains the timing and frequency of client signals bit for bit, while also ensuring client overhead termination and monitoring is 100% non-intrusive. Forward error correction can be disabled for very low latency applications, or enabled to extend reach and provide error-free transmission. Three types of forward error correction (GFEC, EFEC and UFEC) are supported on the line-side interface to maximize interoperability, and provide coding gains from 6 to 9 dB. OTU2 section monitoring, along with pre-FEC and post-FEC error monitoring, are provided for the line-side signal, with comprehensive performance monitoring statistics and threshold crossing alerts.

Each SFP+ pair is independently software configurable, allowing for any mix of protocols and the ability to add new services without affecting existing services. Each SFP+ pair can be configured as a bi-directional transponder, with the client signal wrapped into an OTN line signal, or as a fully bi-directional OTU2 regenerator with section and FEC monitoring.

#### Client Protocols

<b>10 GbE</b>	LAN/WAN
<b>OTN</b>	OTU2/OTU2e
<b>SONET/SDH</b>	OC-192/STM-64
<b>Storage</b>	8G/10G Fibre Channel

## RGN-8010 Quad Multi-Protocol Transparent Transponder

The RGN-8010 provides transparent transponding and/or regeneration for any mix of protocols operating from 100 Mb/s to 11.3 Gb/s. Unlike the RGN-8040, which provides OTN encapsulation, the RGN-8010 provides pure OEO conversion between the client and line interfaces. Both a 2R and 3R regeneration mode are supported, allowing it to work with any signal format, including burst-mode protocols.

Protocols	
<b>Ethernet</b>	GbE, 10 GbE LAN/WAN
<b>OTN</b>	OTU1(e)/OTU2(e)(f)
<b>SONET/SDH</b>	OC-1/3/12/48/192, STM-1/4/16/64
<b>Storage</b>	1G/2G/4G/8G/10G Fibre Channel
<b>CPRI</b>	CPRI 1-8 (614 Mb/s to 10.1 Gb/s)
<b>Video</b>	SD/HD/3G SDI, DVB-ASI
<b>Generic</b>	100 Mb/s to 11.3 Gb/s

As a purely transparent transponder or regenerator, the RGN-8010 has ultra-low latency that is less than 50 ns, making it ideal for latency-sensitive applications, such as financial trading. Its ability to work with any protocol over a very wide range of data rates makes it the most flexible and versatile transponder available.

The RGN-8010 is able to auto-lock to any data rate, and can generate an alarm when the rate of the incoming signal does not match the expected rate. It has a built-in BERT for each line port, allowing for service continuity and performance testing and troubleshooting. In PRBS mode, the client signal is used as the clocking source for a built-in PRBS generator that drives the corresponding line port, while the far-end RGN-8010 provides error detection and BER measurements. Coupled with its facility loopback capabilities, this allows for quick and easy troubleshooting of connectivity problems, and facilitates service assurance or birth certificate testing as part of service turn-up.

All standard SFP and SFP+ interface types are supported, including fully-tunable SFP+. Each SFP or SFP+ pair is independently software configurable, allowing for any mix of protocols and the ability to add new services without affecting existing services. Each SFP or SFP+ pair can be configured as a bi-directional transponder or a fully bi-directional regenerator.

## Applications

The use of FEC on the RGN-8040 allows for a higher link budget in any network application. Moreover, with its much lower OSNR requirement in an optically amplified DWDM system, it allows the noise-limited reach to be extended significantly compared to the RGN-8010. This means the signal can traverse many more spans and hops through ROADMs or OADMs without the need for OEO regeneration. Its comprehensive client and line performance monitoring capabilities provide clear and complete service demarcation for SLA assurance and fault localization. For these reasons, the RGN-8040 is an ideal low-cost solution for providing true private line wavelength services for all common protocols in the range 8.5 to 11.3 Gb/s. When installed in an OMS-2190 (2RU) shelf, it also supports ETR applications, making it suitable for both environmentally controlled and harsh outside plant uncontrolled environments.

For cases where extremely low latency is required, or where support for an even wider range of data rates and protocols is required, the RGN-8010 is an ideal transponder solution. It is also an ideal low-cost regenerator. Specifically, the RGN-8040 transponder can be used at service endpoints to provide comprehensive service demarcation and OTN encapsulation, while the RGN-8010 can be used for lower-cost regeneration between service endpoints, where needed. This provides the combined benefits of low-cost and ultra-low latency regeneration, while also providing comprehensive service demarcation and OSNR-limited reach extension.

## Flexible Applications

- Router/Switch WAN Interconnect
- Data Center Interconnect
- Video Distribution
- Low-latency Financial Networks
- CRAN/CPRI Interconnect and Fronthaul
- Cell Backhaul
- Metro/Regional Transport
- Enterprise Private Line
- Wholesale Wavelength Services
- Inter-Operator Handoff

