

Integrated GPS (GNSS) SFP Module

*Integrated and Managed GPS (GNSS) Solution for
LTE-TDD and LTE-A Networks*

The Coriant® Integrated GPS (GNSS) SFP Module is an embedded synchronization solution in Coriant® 8600 Smart Routers. Through the 8600 Series, the integrated GPS of the GPS (GNSS) SFP Module along with the IEEE 1588v2 Boundary Clock enable flexible, cost-effective system deployment and optimal performance.

The Integrated GPS (GNSS) SFP Module offers accurate Time-of-Day and phase synchronization for evolving access networks including current LTE-TDD and LTE-A as well as 5G in the future.

DELIVERING TIME-OF-DAY AND PHASE SYNCHRONIZATION IN MOBILE BACKHAUL

Traditionally, GPS-based synchronization has been provided to base station sites through a GPS antenna and receiver at each site. However, this approach may become costly as each site requires a dedicated GPS receiver system, and physical site limitations may become prohibitive. The GPS receiver functionality of the Integrated GPS (GNSS) SFP Module addresses these challenges.

The 8600 Smart Routers provide an IEEE 1588 Boundary Clock, minimize the cost of deploying GPS antennas, and deliver the performance guarantees of strict link-by-link processing. The 8600 Smart Routers can distribute timing synchronization accurately using the IEEE 1588 Boundary Clock function where the nodes pass synchronization to LTE base stations. The 8600 Smart Routers can also act as a local source of time using the Integrated GPS (GNSS) SFP Module. GPS can be provisioned on selected 8600 Smart Router aggregation sites as Primary Reference Time Clocks bypassing the parts of the network where IEEE 1588 Boundary Clock is not supported. Synchronous Ethernet (SyncE) provides additional holdover accuracy to protect against GPS outages. Additionally, the 8600 Smart Routers can accept a time input via a Pulse-Per-Second (PPS) and Time-of-Day (TOD) port from a co-located Synchronization Supply Unit (SSU).

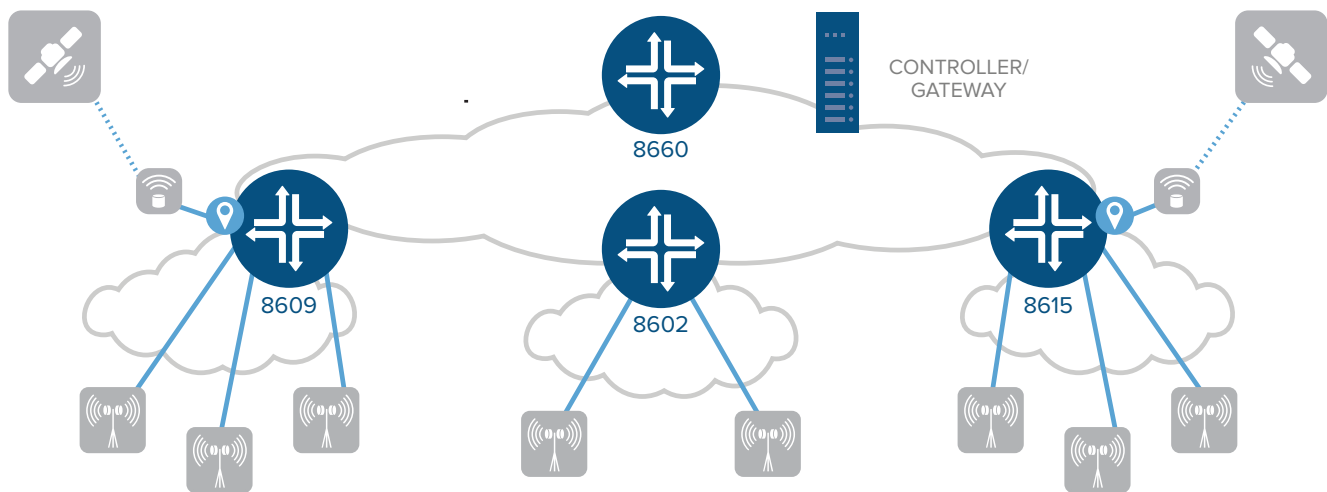
Installing the Integrated GPS (GNSS) SFP Module at aggregation sites offers substantial savings over installing GPS at every base station. Along with the 8600 Smart Routers, the Integrated GPS (GNSS) SFP Module is fully supported by the Coriant® 8000 Intelligent Network Manager (INM), and therefore, a separate management system is not required to manage the external synchronization infrastructure.

BENEFITS OF THE CORIANT® INTEGRATED GPS (GNSS) SFP MODULE

- Provide accurate **Time-of-Day and phase synchronization**
- Offer **frequency synchronization**
- Support **LTE-TDD and LTE-A networks**
- Deliver **cost-effective solution** for access networks
- **Protect** against GPS (GNSS) failure

The Coriant® Smart Router Series

The Smart Router series offers versatile and scalable solutions for mobile backhaul from small aggregation sites to controller and gateway sites. In addition, Smart Routers serve fixed and mobile convergence and cloud computing networking needs. These solutions are designed to meet the ever-growing requirements of data hungry mobile and enterprise users. All of the Smart Routers are LTE-ready and provide an extensive Ethernet and IP/MPLS feature set. Simultaneous support for multiservice applications in access and aggregation networks protects earlier network investments. The Smart Router product family is supported by the 8000 INM, which is an easy to use end-to-end network management solution. The 8000 INM minimizes operational and maintenance costs and scales up to tens of thousands of network elements.



IMPLEMENTING AN OPEN, PROGRAMMABLE, AUTOMATED SDN SOLUTION

The 8600 Series is fully supported by the Coriant Transcend™ SDN Packet Controller. The Packet Controller is an integral component of the overall Coriant Transcend™ SDN Solution suite, a modular SDN software suite that combines the benefits of open, programmable, and automated multi-layer (Layer 0-3) SDN architecture and a proven portfolio of IP/MPLS edge routing and packet optical transport solutions to enable dynamic, end-to-end network control.

SUPPORTING A MODULAR, MANAGED PRIMARY REFERENCE TIME CLOCK

The Integrated GPS (GNSS) SFP Module is powered and managed as an integral part of the 8600 Series. The Integrated GPS (GNSS) SFP Module accepts an active or passive antenna and implements a Primary Reference Time Clock (PRTC) with +/-50 ns to UTC, together with the synchronization module embedded in the network element. GPS (phase, time, frequency) and GLONASS (frequency) are supported.

OFFERING A COST-EFFECTIVE SYNCHRONIZATION SOLUTION FOR A NON 1588-CAPABLE CORE

GNSS (Global Navigational Satellite System) provides the main source of timing worldwide including timing to the 8600 Smart Routers on a link-by-link basis. Where the existing core network is not IEEE 1588-capable, the 8600 Smart Routers offer an integrated, cost-effective GNSS solution for synchronization. At an aggregation site, the 8600 Smart Router uses the Integrated GPS (GNSS) SFP Module to act as a local IEEE 1588 master. This process is repeated at aggregation sites where each site may support from 2 to 50 base stations. A typical scenario may be 10 LTE-TDD base stations per aggregation site. As connectivity allows, IEEE 1588 masters on different aggregation sites can provide redundancy to other sites.

DELIVERING PROTECTION AGAINST A GPS (GNSS) FAILURE

SyncE can be used to provide a stable frequency reference to the GPS time source, referred to as a PRTC as specified in G.8272. SyncE allows the 8600 Smart Routers to provide high quality holdover in a very cost-effective solution. Two Integrated GPS (GNSS) SFP Modules can also protect each other with the IEEE 1588 Boundary Clock Grand Master algorithm that selects the next best clock source if the used source fails, for example, due to GPS jamming efforts.

TECHNICAL SPECIFICATIONS

Physical Dimensions

- Small Form Factor Pluggable 8.5 x 13.4 x 56.5 mm / 0.3 x 0.5 x 2.2 in (H x W x D)

Power and Cooling

- Power output for active antennae (5 V @ 100 mA)
- Power consumption: typical 1 W, maximum 2 W

Supported Nodes

- 8665 Smart Router
- 8660 Smart Router (CDC2 + ELC1)
- 8630 Smart Router
- 8625 Smart Router
- 8615 Smart Router
- 8609 Smart Router
- 8602 Smart Router

Functionality

- PRTC according to G.8272
- IEEE 1588 Master Clock
- IEEE 1588 Boundary Clock
- Clock selection per IEEE 1588-2008

Synchronization

- ITU-T G.8262
- GPS and GLONASS
- Synchronous Ethernet
- SSM over Ethernet [G.8264]

Safety and EMC

- EN60950-1:2006
- IEC60950-1:2005
- EN300386:2008
- FCC CFR 47 Part 15 Subpart B Class A
- EC Compliance RTTE Directive 1995/5/EC

Environmental Conditions

- Storage: ETS 300 019-1-1:2003-04 Class 1.1
 - Temperature: -5°C to 45°C / 23°F to 113°F
- Transportation: ETS 300 019-1-2:2003-04 Class 2.3
 - Temperature: -40°C to 70°C / -40°F to 158°F
- Operating: ETS 300 019-1-3:2004-07 Class 3.2 (non-condensing)
 - Temperature: -40°C to 65°C / -40°F to 149°F
 - Relative humidity: 5% to 95%

These trademarks are owned by Coriant or its affiliates: Coriant®, Coriant CloudWave™, Coriant Dynamic Optical Cloud™, Coriant Groove™, Coriant Transcend™, mTera®, Nano™, and Pico™. Other trademarks are the property of their respective owners. Statements herein may contain projections regarding future products, features, or technology and resulting commercial or technical benefits, which may or may not occur. This publication does not constitute legal obligation to deliver any material, code, or functionality. This document does not modify or supplement any product specifications or warranties. Copyright © 2016 Coriant. All Rights Reserved. 74C.0003 Rev. C 02/16