Product Overview

The OSA 5335 Modular PTP Grandmaster is a scalable and high-performance IEEE 1588v2 standard compliant Grandmaster Clock for distribution of frequency, phase and time synchronization over packet-based network infrastructure including IP/MPLS, Carrier Ethernet, PON and DSL networks. Its carrier-class design provides high client capacity and a wide range of redundancy options to deliver scalable performance and maximum availability. The OSA 5335 is designed to deliver precise and reliable frequency, phase and time-of-day information in markets including telecommunications, media broadcast and power utility communications.

Reliable Clock Performance

Reliable and accurate delivery of frequency, phase and time has become increasingly critical in many applications building on distributed intelligence and processing. In order to meet this increasing industry trend, the OSA 5335 comes with universal input modules accepting a wide range of input signals. It can be equipped with up to two GNSS input modules, each supporting GPS and GLONASS to achieve precise synchronization, therefore enabling operators to meet Stratum 1 requirements without the need to install and manage external receivers or Cesium reference clock sources. The synchronization distribution hierarchy can consequently be flattened, resulting in reduced overall provisioning, operations and maintenance costs. Auxiliary input signals serve as an alternative frequency reference to guarantee maximum synchronization service availability and enable operation in locations without GNSS. Active reference input auto-selection between GNSS and auxiliary input interfaces can be triggered by quality level, priority settings or performance threshold masks. Jitter and wander on input interfaces is filtered by high-quality oscillator and DDS technology, utilizing Rubidium or Double Oven Quartz (OCXO) technology. The unique output module design of the OSA 5335 provides two 1PPS outputs and 20 auto-configurable output interfaces. Ten universal output groups can be configured flexibly to support unprotected and protected interfaces.

Modular Architecture

The OSA 5335 modular design accommodates up to three high-capacity PTP modules enabling a total capacity of more than 3,000 remote PTP slave clients. Each high capacity PTP module includes a hardware-based PTP engine with highly accurate time-stamping and supports

more than 1,000 PTP slave clients in IP unicast mode according to the ITU-T G.8265.1 Telecom Profile. The OSA 5335 also supports generation of Synchronous Ethernet timing signals including the Ethernet Synchronization Message Channel (ESMC).

Management and Performance Assurance

The SyncView™Plus management software provides powerful fault, configuration, inventory, performance and security management of the OSA 5335 through an intuitive graphical user interface either locally or from a remote location. Active inputs are constantly measured against the current output reference with 1ns resolution. MTIE, MRTIE, TDEV and Ym curves are compiled and used for input selection. Results can be compared to standard masks and trigger alarms when limits are exceeded. All results are forwarded to SyncView™Plus for display, user validation and storage. Local alarm indication is provided by means of an internal buzzer, electrical relay contacts and status LEDs on the front panel.

Features & Benefits

- ITU-T G.8272 Primary Reference Time Clock

- Stratum 1 Primary Reference Source for GPS and GLONASS

- Expandable system supporting a total capacity of more than 3,000 remote PTP slaves

- Full redundancy for every module and function

- Compliant with ITU-T G.8265.1 Telecom Profile

- Supports Synchronous Ethernet and optional NTP server

- Intuitive graphical user interface enabling full management via SNMP and TL1

Technical Information

Overall Architecture
- Up to 2 input signal modules
- Up to 2 GNSS module
- Up to 6 output modules
  - Max. 3 high capacity PTP modules for 1,024 remote clients each (TCC PTP V2)
  - Optional legacy PTP module (TCC PTP V1)
  - Optional NTP server module (TCC NTP)
- All input modules can be 1:1 protected

Inputs
- Up to 4 line inputs, optionally 1:1 protected, 4 inputs per module
- Input types: E1, 2.048MHz, 5 MHz, 10 MHz individually SW-selectable
- Up to 2 GNSS inputs (1 per module), active L1 antenna
- E1 inputs can be "terminated" (75Ω) or "bridged" (high impedance, kΩ)

Input Selection
- SSM value
- Priority table
- Performance threshold mask
- Manual selection

GNSS Module
- Multi-constellation GNSS (GPS and GLONASS) L1 32 channels receiver
- Optionally 1:1 protected – up to two GNSS modules for equipment and antenna failure protection
- Hot swappable
- Software configurable mode of operation
  - GPS (1575.42 MHz)
  - GLONASS (1601.5 MHz)
  - Combined GPS + GLONASS
- Voltage to antenna: 5VDC
- Antenna connector: 50Ω BNC-F

Outputs
- Optional physical clock output modules (E1/2.048MHz)
- Two 1PPS: 50Ω BNC-F
- 20 outputs per physical clocks output module (2 groups of 10, each group configured independently), E1/2.048MHz
- Optionally 1:1 protected

Telecom High-Capacity PTP Module (TCC PTP V2)
- Up to 1,024 remote slave clients at 128pps
- SW licenses for 256, 512 and 1024 remote slaves (128 by default per line card)
- One- or two-step clock
- G.8265.1 Telecom Profile compliant over IPv4 unicast
- Static and dynamic remote clients including unicast message negotiation
- Untagged and VLAN-tagged (IEEE 802.1Q customer-tagged)
- One combo Ethernet 100/1000BaseT or 100/1000BaseX (SFP) port
- Synchronous Ethernet (SyncE)
  - 100M/1G Ethernet egress interfaces for fiber (1G) and copper (100M/1G)
  - Compliant to the relevant sections – ITU-T G.8261/G.8262/G.8264
  - Ethernet Synchronization Messages Channels (ESMC)
- Can be inserted in any of the output slots

Generic PTP Module (TCC PTP V1)
- Up to 128 remote slave clients
- Compliant to IEEE 1588v2 PTP default profile (UNICAST, MULTICAST and MIXED addressing mode, Ethernet/UDP encapsulation)
- Untagged and VLAN-tagged (IEEE 802.1Q customer-tagged)
- Ethernet-over-SFP
  - Optical SFP: 1Gbit/s or 100Mbit/s
  - Copper SFP: 10/100/1000Mbit/s
- One or two-step clock
- Can be inserted in any of the output slots

NTP Server Module (TCC NTP)
- Stratum 1 NTP server
- Configuration by DHCP or fixed IP
- 64 MD5 Message-Digest Algorithm
- Plug-and-play installation
- Can be inserted in any of the output slots
- Up to 3 NTP server modules optionally

Frequency Tracking and Holdover
- DDS-based tracking and holdover functionality
- Stratum 1 reference with embedded GNSS or external Cesium source
- Stratum 2-based on Rubidium holdover < 2e-12/day (at 25°C)
- Stratum 3E-based on OCXO holdover < 1e-10/day (at 25°C)

Frequency and Time Tracking and Holdover
- DDS-based tracking and holdover functionality
- Time & Phase – G.8272 PRTC when locked to GNSS (+/- 100nsec from UTC)
- Frequency: G.811 PRC reference with embedded GNSS (or external Cesium) source
- G.812 Type II SSU based on Rubidium holdover< 5.0E-11/Month (at 25°C)
- G.812 Type I & III SSU based on OCXO SC-P3 holdover < 1E-10/day (at 25°C)

Standards Compliance
- ANSI T1.101
- Telcordia GR-2830/1244/378/253-CORE
- GR-1089 and GR-63 NEBS3, CE
- IETF RFC 2030 (SNTP v4), RFC 1305 (NTP)
- ITU-T G.703, G.811, G.812, G.704, G.781, G.8265.1, G.8272, G.8262, G.8264
- ETSI EN 300 462-6, -4

Management
- Status LEDs on front panel
- Contact relay alarm closures (2x3 N.O. or N.C. contacts)
- Electrical alarm collection inputs (10)
- Specific user-definable alarm messages
- Local RS232C port, TL1 protocol on front and rear panels
- SNMP v2 & v3
- Remote 10/100BaseT
- Remote management via SyncView™Plus and FSP NM
- Remote software upgrade
- Synchronization network management software supporting full FCAPS capability

Performance Measurement
- Phase measurement on all inputs incl. GPS/GLONASS
- 1ns measurement resolution
- MRTIE, MTIE, TDEV, Ym curves computed locally
- User-defined alarm thresholds

Power
- Dual -48VDC power input (-40 to -60VDC)
- Power consumption: max. 6A (master shelf)

Environmental
- Operating temperature: -5 to +45°C
- Storage temperature: -20 to +50°C
- Humidity: 5 to 95% no condensing

Simplified Maintenance
- Universal input and universal output modules
- Upgrade of all modules via SW download/shelf release
- Dynamic inventory data accessible via management SW
- All module software included in the same system release

Mechanical
- 5.25" x 19" x 9.7" (H x W x D)

Syncjack™