IGM for External Antenna (IGM-1100x v2)

Small Form Factor 1588 PTP Grandmaster

IGM-1100x Unit

Features

- Small form factor with single 1 GbE RJ45 port
- PTP profiles: ITU-T G.8265.1, ITU-T G.8275.1 (L2 multicast), ITU-T G.8275.2 (L3 unicast), Telecom 2008, and Ethernet default
- One-step and two-step clock
- SyncE input, output
- PTP input, GNSS backup
- APTS, asymmetry compensation
- PRTC-compliant
- Up to 32 clients
- IPv4 and IPv6
- Cable compensation
- 802.1Q VLANs
- GNSS receiver
- GPS, Glonass, Beidou, SBAS, and Galileo-ready
- Time to First Fix (TTFF) of 10 minutes to less than one hour until system lock

Benefits

- Leverages existing GNSS antennas when available
- Small form factor 1588 PTP grandmaster
- Enables most cost-effective mini GM deployments at the very edge of mobile networks
- Plug and play features reduce deployment time and cost
- Best-in-class sync solution
- Serves precise time and phase to locations such as racks, small buildings, huts, and cabinets
- Deployment flexibility (small size, wall- or ceiling-mount, and indoor)

The synchronization needed for the latest mobile deployments requires a high accuracy 1588 Precision Timing Protocol (PTP) to be installed at the very edge of the network with a limited number of hops to the eNodeBs or small cells.

Such high-precision PTP grandmasters exist in the market today. As a matter of fact, Microsemi has deployed more than 300 mobile networks worldwide for 2G, 3G, and LTE using products such as the TimeProvider 5000 and TimeProvider 2700. However, such solutions are often too costly and are a challenge to deploy at the very edge of mobile networks due to power, space, form factor, and other considerations.

For deployments where the distance between the PTP 1588 grandmaster, the eNodeBs and small cells is long, and when the focus is serving indoor cells, then Integrated GNSS Master IGM-1100i is the perfect solution.

But when a GNSS antenna is already deployed in the environment or when the length of the GNSS cable would be short and thus the cost of the GNSS deployment limited, then IGM-1100x is a perfect low-cost, small form factor, mini grandmaster solution for installation in cabinets, huts, or racks serving a limited number of nodes.

The Microsemi IGM-1100x does not integrate a GNSS antenna, but does provides an additional port to the Ethernet RJ45 output, allowing an external antenna such as a L1 GNSS antenna to connect to the unit for precision time.

Problem to Solve

LTE-TDD, LTE-A, and LTE-FDD require tight coordination (eICIC, CoMP) and very tight UTC-aligned phase synchronization. The only cost effective solution to provide this level of phase synchronization is to use GNSS PTP grandmaster timing systems. GNSS timing systems require an antenna to pick up the satellite signals. Due to the very low power of these signals, an external GNSS antenna—often mounted on the roof for indoor small cells—has been the primary technique for signal acquisition.

In scenarios where the needed GNSS antenna already exists at the desired location, or where the GNSS cabling would be short enough for cheap and easy installation, then a cost effective solution is to deliver precise time and phase with a low-cost 1588 PTP grandmaster connected to an external GNSS antenna.

In a small, one-floor retail building or at a hut/cabinet location, installing a GNSS antenna (such as a patch antenna and a short cable) is very realistic. Connecting IGM-1100x to this antenna is a feasible, quick, and simple solution to bring the accurate PTP grandmaster timing closer to the eNodeBs or small cells.

Solution: 1588 PTP Mini Grandmaster with External Antenna

The Microsemi small form factor IEEE 1588 IGM grandmaster with integrated GNSS receiver and external antenna delivers precise time in scenarios where a GNSS antenna is already deployed on premise, or where it would be cost-effective deployment in a small one-story building, rack, hut, or cabinet. A single Ethernet connection is used for auto configuration management and Power over Ethernet (PoE) is used for the IGM and PTP grandmaster operations to precisely synchronize the eNodeBs. The plug and play operation, leveraging DHCP and TR-069 communication to the auto configuration server (ACS), is meant for quick and easy installation, similar to installing a typical indoor Wi-Fi antenna hot spot. IGM can also be managed with static IP and CLI over SSHv2. IGM-1100x provides a cost effective alternative to existing 1588 grandmasters that typically present space, power, and cost consideration hurdles.

Specifications

Management and Interfaces
In-band using Ethernet port
SMA connector to external antenna (L1 or patch GNSS)
IPv4 and IPv6 with up to 20 VLANs
TimePictra support through SNMP, fault only
TR-069-based auto configuration server (ACS)
CLI over SSHv2
SNMP v2/v3
Internal log

Outputs
PTP 1588v2 GM output
SyncE output with ESMC support
1 PPS test point

Inputs
PTP client with APTS capability
SyncE input
GNSS input

Diagnostics	
Alarms	SNMP traps
LEDs	Sync, Network, Alarm

Plug and Play
Auto-configuration through TR-069 to ACS
Communicate with external servers (DHCP or static IP, ACS)

Redundancy
Achieved by deploying two or more IGM units at a site with client failover capabilities

Power	
PoE Class 3 input	
Power	<12.95 W

Capacity
Base model four unicast slaves at 128 pkt/sec. Upgrades by license to 8, 16, and 32 1588 PTP slaves.

Mechanical	
Size	Height: 7.766 in; Width: 6.638 in; Depth: 1.456 in
Weight	1.65 lbs

Installation	
Indoor mounting	Vertical wall-mount or ceiling-mount with same unit

Regulatory and Environmental Compliance	
Operating	0 °C to 65 °C (operating), 5% to 90% non-condensing
Storage	−40 °C to 70 °C
EMC Certifications	FCC part 15 Class B, ICES-003 Class B, VCCI, AS/NZS CISPR22/24 Class B, and EN 55022/EN55024, BSMI Class B EMC Directive 2014/35/EU
Safety Certifications	NRTL UL 60950-1 2nd edition, NRTL CSA C22.2 No. 60950-1 2nd edition, CE Mark EN 60950-1:2006 2nd edition w/Am1, CB scheme IEC 60950-1 2nd edition w/BSMI
Environmental Certifications	ETSI EN 300 019-2-1—Storage Tests, Class T1.2, ETSI EN 300 019-2-2—Transportation Tests, Class T2.3, ETS 300 019-2-3—Operational Tests, Class T3.1, Weather-Protected (Temperature-Controlled Locations), RoHS (6/6)

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