Outdoor Integrated GNSS Master (IGM-1100o v2)

Small 1588 PTP GM for Outdoor Scenarios

IGM-1100o 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 for GNSS backup
- Up to 32 clients
- PRTC-compliant
- IPv6 support for 1588 traffic
- 802.1Q VLANs
- Integrated GNSS receiver
- GPS, Glonass, Beidou, SBAS, and Galileo-ready

Benefits

- Reduced installation costs and simplified cabling
- Plug and play features reduce deployment time and cost
- Ruggedized device that supports a wider temperature range
- Best-in-class sync solution
- Provides precise time for environments where temperature range is an issue, or environmental constraints require ruggedization

The synchronization needed for indoor small cell operations requires a high-accuracy timing receiver nearby. Until now, this proximity required an expensive and often complicated GNSS antenna installation for a few small cells. In some scenarios, it is not possible to deploy the Microsemi IGM-1100i due to limited building materials, urban canyons, or other constraints. The Microsemi IGM-1100o (also referred to as the Outdoor IGM) addresses this use case. The IGM-1100o brings precise timing indoors and serves indoor small cells, but is located on the roof of the building instead of on a wall or ceiling.

The Microsemi IGM-1100o does not require Assisted-GNSS as it is placed outdoors, where GNSS signal reception is optimal. However, in urban canyons or other situations where GPS reception is challenging, the Outdoor IGM can leverage Assisted-GNSS. The IGM-1100o uses Power over Ethernet (PoE) to further simplify the installation. When mounted on the roof and connected to the network with PoE, the unit automatically self-configures through TR-069, locks to GNSS signals, and begins PTP grandmaster operations. On-premise user configuration is not necessary.

Problem to Solve

LTE-TDD, LTE-A, and LTE-FDD, which require tight coordination (eICIC, CoMP), also need 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 satellite signals. Due to the very low power of the signals, indoor operation of an IGM-1100i may not be possible in some situations. IGM-1100o is the outdoor version in the IGM portfolio that enables service to indoor small cells from the roof. The Outdoor IGM, though not as cost effective as IGM Indoor, still leads to considerable deployment cost savings, as it integrates the PTP 1588 grandmaster and the GNSS antenna into the same device. The device is connected to the rest of the network through a simple RJ45 Ethernet port. As a result, the device produces Ethernet as an output rather than an L1 cable, providing cost savings and deployment flexibility.

Beyond serving indoor small cells, the Outdoor IGM also provides precise time and phase to eNodeBs in a cost effective way for cases where these nodes are served from challenging environments such as huts, cabinets, or other settings where temperature range and ruggedness are key requirements.

Outdoor Integrated GNSS Master (IGM-1100o v2)

Small 1588 PTP GM for Outdoor Scenarios

Solution: Integrated GNSS Master

The Microsemi Outdoor IEEE 1588 IGM grandmaster with integrated GNSS receiver and antenna solves the problem of delivering precise time and phase to indoor small cells in challenging environments by placing the integrated unit on the roof. A single Ethernet connection is used for automatic configuration management: a PoE connection for the IGM and PTP grandmaster operations to precisely synchronize all the small cells in a building. The integrated solution can also be used in environments such as outdoor cabinets and huts where temperature range and environmental ruggedness are key. Therefore, it can serve eNodeBs from the very edge of the mobile network with very few hops to the nodes. The plug and play operation that leverages DHCP and TR-069 communication to the auto configuration server (ACS) allows for quick and easy installation similar to creating a typical indoor Wi-Fi antenna hotspot. The IGM can also be managed with static IP and CLI over SSHv2. After installation, the IGM locks to GNSS signals and provides accurate and precise PTP grandmaster synchronization for optimum small cell operations.

Specification

Management and Interfaces	
In-band through Ethernet port	
IPv4 and IPv6 with up to 20 VLANs	
TimePictra support through SNMP, fault only	
TR-069-based ACS	
CLI over SSHv2	
SNMP v2/v3 (traps only)	
Internal log	
Outputs	
PTP 1588v2 GM output	
SyncE output with ESMC support	
Inputs	
PTP client with APTS capability	
SyncE input	
GNSS input	
Diagnostics	
Alarms	SNMP-traps
Plug and Play	
Auto-configuration through TR-069 to ACS	
Communication 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	Diameter: 6 in; Height: 4 in
Weight	1.5 lbs
Installation	
Mounting	Pole-mount on roof or cabinet, hut, and so on
Safety Certifications	
UL60950-1/CSA C22.2	
IEC60950- 1:2005(2nded)/AM 1:2009/AM 2:2013	
EN60950-1: 2ed. 2006/A11:2009/A1:2010/A12:2011/A2:2013	
EMC Compliance	
ETSI 300 386 v1.6.1; CISPR 32: 2102, Class B limits; CISPR 24: 2010; EN 55032: 2012/AC2013, Class B limits; EN 55024: 2010; FCC Title 47 Part 15, ICES-003, AS/NZS, Class B limits; VCCI V-3/2015.04/V-4/2012.04, Class B limits; KN 55032/35, Class B limits; EN 301 489-1 v2.1.1 pending; ITU-K.20*	
EMC Certifications	
EMC Directive 2014/30/EU Class B	
RED Directive 2014/53/EU pending	
BSMI pending	
VCCI	
KCC	
Environmental	
ETSI 300 019-2-1 Storage Tests Class T1.2	
ETSI 300 019-2-2 Transportation Tests Class T2.3	
ETSI 300 019-2-4 Operational Tests Class T4.1E	
1.3 Expected Operational Temperature and Humidity Range • –40 °C to 46 °C solar load (optional 70 °C) –40 °C to 70 °C • <5% to 100% RH with condensation	
6.1 Salt Fog Exposure	
6.2.2 Seismic under GR-63 and ANSI T1-329	
RoHS 2 Directive 2011/65/EU	
WEEE Directive 2012/19/EU	
IEC 60529 Ed. 2.2 2013, IP66 Compliant	

*: Non-compliant K.20 table 4b test #4.3.1 under 160-ohm test. All seven other resistor values pass.

Microsemi
a Microchip company

Microsemi Headquarters
One Enterprise, Aliso Viejo, CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996
email: sales.support@microsemi.com
www.microsemi.com

Microsemi, a wholly owned subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Learn more at www.microsemi.com.

900-00725-000 Rev D. 1/19