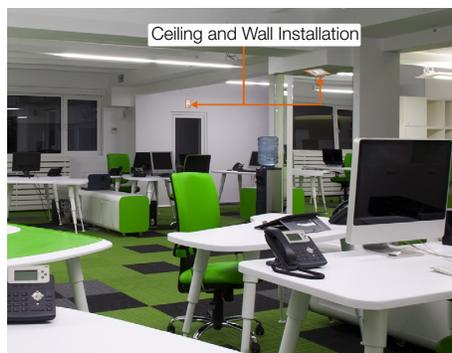


# Integrated GNSS Master (IGM-1100i v2)

Easily Brings GNSS PTP Timing Indoors

## Ceiling and Wall Mounted In-Building IGM Unit



## IGM-1100i 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 back-up
- APTS and asymmetry compensation
- IPv4 and IPv6
- Up to 32 clients
- License control
- 802.1Q VLANs
- GNSS receiver with assisted GNSS support
- GPS, Glonass, Beidou, SBAS, and Galileo-ready
- Time to First Fix (TTFF) of ten minutes to less than one hour until system lock

## Benefits

- Reduced installation costs and simplified cabling
- Enhanced indoor GNSS performance
- Receives GNSS signals when deployed indoors and/or in deep urban canyons
- Plug and play features reduce deployment time and cost
- Best-in-class sync solution
- Reliability (no external environmental challenges)
- Deployment flexibility (small size, wall- or ceiling-mount, and indoor)

Precise synchronization of indoor small cells requires a GPS timing source, especially for phase applications. Installing a GPS antenna on the roof of the building or enabling each small cell with GPS is complicated and expensive. The revolutionary Microsemi Integrated GNSS Master (IGM) solves this problem by bringing precise GNSS-based time to indoor small cell deployments. The IGM integrates a PTP grandmaster with a GNSS receiver and antenna in a small, fully-contained package designed to be mounted to an inside wall or ceiling.

The Microsemi IGM does not use an external antenna, significantly reducing the expenses related to purchasing, installing, and maintaining the external GNSS cable systems required for typical GNSS timing receivers. Furthermore, the IGM uses Power over Ethernet (PoE) to further simplify the installation. The unit will automatically self-configure using TR-069, lock to GNSS signals, and begin PTP grandmaster operations when it is mounted on a wall or ceiling (preferably near a window). On-premise user configuration is not required.

## 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. The problem is that indoor small cells that require synchronization are by nature often installed in areas of very low cellular and GNSS signal strength. As a result, the GNSS timing receiver must often run a very long and expensive cable to the roof of the building in order to provide support for the few small cells within.

In tall, multi-floor buildings, running an antenna cable to the roof is either very expensive or simply not feasible. The antenna installation costs—which often include expensive permits, labor, material, monthly roof rental fees, and more—can quickly exceed the cost of the GNSS PTP grandmaster and small cells alone. What is needed is a quick and simple solution to bring accurate PTP grandmaster timing closer to the small cells.

# Integrated GNSS Master (IGM-1100i v2)

## Easily Brings GNSS PTP Timing Indoors

### Solution: Integrated GNSS Master

The Microsemi indoor wall- or ceiling-mounted IEEE 1588 IGM grandmaster with integrated GNSS receiver and antenna entirely eliminates the external antenna along with its expensive related cabling costs. A single Ethernet connection is used for auto configuration management: a PoE connection for the IGM and PTP grandmaster operations to precisely synchronize the small cells in the building. The innovative and extremely sensitive GNSS receiver and patented Microsemi timing algorithms result in a revolutionary indoor GNSS timing solution proven to work in many different indoor environments. 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. Once installed, the IGM locks to GNSS signals and provides the accurate and precise PTP grandmaster synchronization needed for optimum small cell operations.

### Specifications

Management and Interfaces	
In-band using Ethernet port	
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 grandmaster sync output	
1 PPS test point	
SyncE output with ESMC support	
Inputs	
PTP client with APTS capability	
SyncE 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 A-GNSS, ACS)	
Minimal manual intervention with basic tools for deciding best placement of unit	
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 2 <sup>nd</sup> edition, NRTL CSA C22.2 No. 60950-1 2 <sup>nd</sup> edition, CE Mark EN 60950-1:2006 2 <sup>nd</sup> edition w/Am1, CB scheme IEC 60950-1 2 <sup>nd</sup> 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)



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

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