

# Indoor Integrated GNSS Master (IGM and IGM Plus) 1100i Release 3.0

Easy-to-Deploy Small Indoor PTP Grandmaster for the Edge

## New Features

### Hardware - IGM Plus Model

- SC-cut oscillator for enhanced time keeping holdover
- GNSS receiver for additional Galileo and QZSS support

### Software

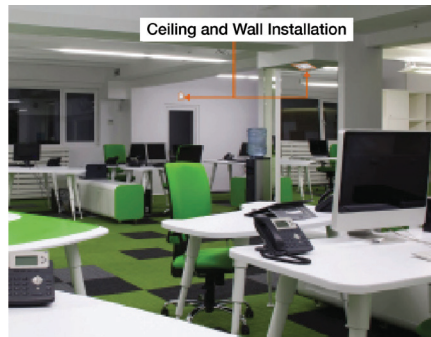
- IPv6 support for OAM/Management
- Group configuration with Zero Touch Provisioning through DHCP
- Individual device configuration and management through full CLI support

## 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 including PTP traffic and OAM/Management
- Up to 32 clients
- License control
- 802.1Q VLANs
- GNSS receiver with assisted GNSS support
- GPS, Glonass (Global Orbiting Navigation Satellite System; Russia), Beidou-ready, SBAS; IGM Plus model : Galileo and QZSS
- 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
- Best-in-class sync solution
- Reliability (no external environmental challenges)
- Deployment flexibility (small size, wall or ceiling-mount, and indoor)



*Ceiling and Wall Mounted In-Building IGM Unit*

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 Microchip 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 Microchip 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 Zero Touch Provisioning through DHCP, 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.



*IGM-1100i Unit*

## 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 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.

## Deployment Automation

Customers need to deploy multiple units in an automated fashion to avoid individual configurations (which can be accomplished through CLI). Zero Touch Provisioning can be accomplished with a configuration file that can be leveraged on a large number of devices through a DHCP server with Option 43 (IPv4) or Option 17 (IPv6).

## Solution: Integrated GNSS Master

The Microchip 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 Microchip timing algorithms result in a revolutionary indoor GNSS timing solution proven to work in many different indoor environments. 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
- Zero Touch Provisioning through DHCP Option 43 (IPv4) or Option 17 (IPv6)
- Full CLI over SSHv2
- SNMP v2/v3
- Internal log

### Outputs

- PTP grandmaster sync output
- 1PPS test point
- SyncE output with ESMC support

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## Inputs

- PTP client with APTS capability
- SyncE input

## Diagnostics

- Alarms: SNMP traps
- LEDs: Sync, Network, Alarm

## Plug and Play

- Auto-configuration through DHCP Option 43 (IPv4) or Option 17 (IPv6)
- Communicate with external servers (DHCP or static IP A-GNSS)
- 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

Specification	
<b>Operating</b>	0 °C to 65 °C (operating), 5% to 90% non-condensing
<b>Storage</b>	-40 °C to 70 °C
<b>EMC Certifications</b>	FCC part 15 Class B, ICES-003 Class B, VCCI, AS/NZS CISPR32/24 Class B, and EN 55032/EN55024, BSMI Class B, EMC Directive 2014/35/EU, CB scheme IEC 60950-1 2 <sup>nd</sup> edition w/BSMI (Pending)
<b>Safety Certifications</b>	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
<b>Environmental Certifications</b>	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)