# VersaSync Rugged Time and Frequency Reference



## Applications

### Ground
- Mobile radio and C3I sync
- Anti IED jamming systems
- Robotics
- Satcom On The Move (SOTM)

### Airborne
- Communication network sync
- Intelligence, Surveillance, and Reconnaissance Platforms (radar, optical, electronic warfare) Flying test bench
- Flight analysis

### Marine/Naval
- Communication network sync
- Sensor support (radar, sonar, optical, electronic warfare)
- Offshore/DSO platforms
- Buoys

## Accurate in All Conditions

- GNSS (GPS SAASM option) + precision oscillator
- Airborne, ground and marine applications
- MIL-STD environmental qualified
- Up to 45,000 ft, -40 to +71°C, IP65

## Flexible

- Wide variety of analog and digital time and frequency signals
- Software configurable inputs/outputs
- Network sync, set-up and management
- Customized COTS available
- VICTORY compatible (optional)

## Compact/Rugged

- Optimized SWaP
- < 1 Liter, < 10 Watts, < 1 kg
- VITA 75 form factor
- Conduction-cooled
- Mil-performance connectors
- Standby power mode

## High-Performance Time Server

VersaSync is a low SWaP high performance GNSS master clock and network time server that delivers accurate, software configurable time and frequency signals under all circumstances, including GNSS-denied environments. Its compact size and high level of ruggedization make VersaSync suitable for mobile applications in harsh environments. Its small footprint allows for easy integration of the time and frequency functionality into any systems' architecture.

Backed by more than four decades of timing solution expertise from Orolia, VersaSync includes all the timing functionality required in modern, network-centric applications:

- NTP/PTP precise time transfer over Ethernet, including security protocols that prevent network vulnerabilities
- Low phase noise 10 MHz frequency distribution
- Configurable pulse signals, including IRIG or HaveQuick timecodes
- Serial link Time Of Day (ToD) messages

## A Perfect Fit for GNSS-Denied Environments

VersaSync accommodates a wide range of precision oscillators, allowing the unit to maintain frequency and time accuracy for long periods of GPS/GNSS outage. These options include OCXO quartz oscillators and a micro-rubidium option, which brings unprecedented time stability and reliability in such a compact form factor. In addition, it can be re-synchronized by an alternative external reference.

## Highly Reliable, Versatile, and Configurable Solution

VersaSync physical inputs and outputs are software configurable and can adapt to various application requirements for mission-to-mission configurability.

I/O pins can be configured as TTL, 10 V pulse, RS232, or RS485. This allows VersaSync to provide a high number of outputs of the same, or different types, while still fitting into a small form factor. However, if the combination of software configurable outputs is not enough, VersaSync can accommodate an option board, designed to customer requirements to provide additional outputs of the standard types or future interfaces (IRIG-AM).

VersaSync is designed for exceptional intrinsic reliability. Comprehensive status monitoring capability, either locally or remotely, allows quick fault diagnoses. Physical alarm (dry contact) and network alarms (SNMP traps) are raised in real time. An internal, exportable log can be accessed either locally or remotely.

## Timing Interface Summary (Standard Configuration)

Some of the VersaSync I/O interfaces are configurable in terms of type and coding/modulation. When the number of available interfaces is identified as "Max" the actual number of available inputs or outputs is dependent on configuration of other signals. If "Max" is not identified for an interface, it does not depend on the product configuration.

## Timing Signals

| Timing Signal | Coding/Modulation | Input/Output | Connector |
|---|---|---|---|
| GNSS RF | L1 GPS, GLONASS 72 channels, T-RAIM integrity monitoring Option: L1/L2 SAASM | 1 input | SMA, 5 VDC power supply to antenna |
| 10 MHz | Sine, 10 dBm | 4 outputs | SMA |
| Pulse/DCLS TTL level | 1PPS, xPPS, IRIG, HaveQuick, alarm | Max: 2 inputs Max: 5 outputs | I/O connector |
| Pulse/DCLS 10 VDC | 1PPS, xPPS, IRIG, HaveQuick, alarm | Max: 1 input Max: 1 output | I/O connector |
| RS232 | NMEA 0183, other ASCII ToD formats | Max: 3 inputs Max: 3 outputs | I/O connector |
| RS485 | HaveQuick, xPPS | Max: 3 inputs Max: 4 outputs | I/O connector |
| NTP over LAN (GbE) | NTP v3, v4; client, server | 2 | LAN connector |
| PTP over LAN (GbE) | PTP v1, v2; Master | 2 | LAN connector |

## Timing and Frequency Performance

| Performances | OCXO** | OCXO High Perf |
|---|---|---|
| **Timebase Performances** | | |
| Relative Frequency Variation with Aging: - 24 hours - One month - One year | $5 \times 10^{-10}$ $1 \times 10^{-8}$ $5 \times 10^{-8}$ | $2 \times 10^{-10}$ $4 \times 10^{-9}$ $2 \times 10^{-8}$ |
| Relative Frequency Variation with Temperature | $\pm 1 \times 10^{-8}$ (-40°C to 65°C) | |
| Short Term Stability (Allan Deviation): @ 1 s @ 10 s @ 100 s | $2 \times 10^{-10}$ $5 \times 10^{-11}$ $3 \times 10^{-11}$ | |
| Phase Noise on 10 MHz Output: @ 10 Hz @ 100 Hz @ 1 kHz @ 100 kHz | -120 dBc/Hz -140 dBc/Hz -150 dBc/Hz -155 dBc/Hz | |
| Harmonic Distortion | -40 dBc | |
| Spurious | -60 dBc | |

| Performances | OCXO** | OCXO High Perf |
|---|---|---|
| **System Performance*** | | |
| Frequency Accuracy Averaged Over 24 hour when Locked on GNSS | $3 \times 10^{-12}$ | $2 \times 10^{-12}$ |
| Phase (1 PPS) Drift in Holdover (no reference available) - 4 hours - 24 hours - 7 days | 3 µs 40 µs 1.2 ms | 2.8 µs 30 µs 0.6 ms |
| Phase (1 PPS) Accuracy to UTC | ±50 ns | |

*While locked to GNSS, and at constant temperature.
** A Rugged, Low Phase Noise OCXO option is available for high-vibration environments such as aircraft and maritime. Contact Orolia for details.

## Front Panel Connections

| Interface | Type of Data | Connector* |
|---|---|---|
| GNSS RF in | GNSS signal | SMA |
| Power in | DC power | Circular mil-type |
| Frequency out | 10 MHz sine | SMA |
| Timing in/out | Pulse/DCLS, RS232, RS485; also USB communications | Circular mil-type |
| GbE | NTP, PTP Navigation messages Monitoring | Circular mil-type |
| SAASM keyloader | DS101, DS102 | Circular mil-type |

*connector pin-outs available in the user manual.

## Operational Readiness

1PPS time of day available (hot start)
- 60 s: 1ms accuracy to UTC
- 200 s: 1µs accuracy to UTC

## Management & Monitoring

User, local:
- Power and Status LEDs on front panel
- USB: ASCII Command Line Interface

User, remote (LAN):
- Status, configuration, event log, software update through web pages

Machine, remote (LAN):
- SNMP
- JSON RPC

### Network Security
- Password protected administration accounts
- SSL/SSH-based https, ftps protocols supported for secured access to user interface
- NTP implementation supports MD5, Autokey

### Network Synchronization
- NTP v2, v3, v4: Conforms with or exceeds RFC 1305 and RFC 5905. Supports unicast, broadcast, multicast, peering, stratum 2, MD5 encryption, autokey
- PTP v1 and v2: Master – conforms with default profile IEEE1588. Supports layer 2/layer 3, unicast/multicast.
- GPSD (GNSS receiver data)
- VICTORY Interface compatible (optional)

### Environmental
- Tested to MIL-STD-810G CH1
- Temperature, in operation: -40°C to +71°C with OCXO
- Mounting plate temperature, in storage: -45°C to +85°C
- Humidity: 95% RH, non-condensing
- Altitude: 45,000 ft
- Environmental Protection: IP 65
- VibrationMIL-STD-810G CH1 Method 514.7, Categories 12,13,14,20,21,24
- Shock: 20 g, 11 ms, sawtooth

### EMI/EMC
- Tested according to MIL-STD-461F

### Physical
- Size (WxHxD): 5.8"x 2.5"x 5.0" (147.3 x 127.5 x 63.0 mm) VITA 75 compliant
- Weight: 0.91 kg (2.0 lbs)
- Mounting: On a plate, optimized for conduction cooling, 6 through holes

### Power
- Input Voltage: 10-32 VDC
- Standby mode (only oscillator is powered): 0.4 W, DC power supply must be within 10 - 32 VDC

### Certification/Marking
- RoHS, WEEE compliant

### Warranty
- 2 years

## Ordering Information

### Typical configurations

| VersaSync Model | Oscillator | GNSS Receiver |
| --- | --- | --- |
| 1228-1110 | OCXO | GNSS L1 |
| 1228-1410 | High Perf OCXO | GNSS L1 |
| 1228-1121 | OCXO | SAASM GPS L1/L2 |

Inquire with your Orolia Sales Representative configuration availability.

### VersaSync Evaluation Kit
- VersaSync EVK:  Includes a carrying case, L1 GNSS antenna (8230), 5 meter GPS RF cable, AC to DC power supply and cable, Ethernet cable, and signal breakout cable. VersaSync unit sold separately.

### Accessories
- GPS/GNSS antenna, GNSS RF cables, lightning protection, splitters,line amplifiers

### Additional Options
- GNSS spoofing/jamming detection
- GPS l1/L2 SAASM
- IRIG-AM support (1228-2XX4)

### Service
- Premium Support Package (PSP)
- Yearly Warranty extension
- Long-life support package

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