



**GPS-MXS** is a Time and Frequency multi-output signal generator (PPS, 10 MHz).

It differs from other apparatus for signal synchronization because all the previous devices have been regulated exclusively by GPS. Currently the GPS is surely the best support tool to control signals, ensuring known reliability. Downside is that it's totally under control of the US Department of Defense, and as such, presents technical and geopolitical risks.

**GPS-MXS** is innovative, because allows the possibility of using alternative sources, so as to ensure continuous operation, regardless of any fault or degradation of GPS system. Has four different input for four source types. The traditional source, until now used for every apparatus Digital Instruments, and more generally, for synchronization applications.

External Reference (Ext): supports many types of time (1 PPS) and frequency (1 MHz, 2 MHz, 2.048 MHz, 5 MHz, 10 MHz) signals, which can be provided independently. These inputs can be supplied with signals from high-precision clock as Cesium, Rubidium or MASER, depending of the network's type.

E1/T1: This signals work at nominal value of 2.048/1.536 Mbps and are widely used in digital communications over the world (except Japan). Can be used to spread the synchronization from a device, used as Master, connected to high-quality source (GPS if possible, or atomic clock), to the Slave devices all over the territory, through SDH (Synchronous Digital Hierarchy) protocol, used for transmission of data over cable or optical fiber.

IEEE 1588: time and frequency reference transported over Ethernet networks that can support it. The feature of **GPS-MXS** to be able to handle different types of signal, making it the ideal device to operate in areas of crucial importance for the future of telecommunications.

Another interesting feature of **GPS-MXS** is the possibility to characterize the quality of the sources provided to the apparatus through the analysis of the ratio  $\delta f/f$  of each source.

- Internal high stability OCXO aging rate of  $\pm 1 \cdot 10^{-10}$  /day,
- 12 channels GPS receiver with automatic tracking and timing error management system,
- New generation DPLL fast lock,
- Multi reference inputs: GPS, E1 (G.703/9) or T1, 1PPS, IRIG Time Code, PTP/IEEE1588v2,
- 1x Ethernet interface for NTP or PTP synchronization,
- 2x PSU (AC or DC),
- Size: 1U/19' – depth 300 mm (connector excluded),
- Weight: 1.5 Kg,
- Certification CE.

**Frequency reference**

Signal: 10 MHz sine wave.

Spectral purity: -70 dBc at full output power. (harmonics), -75 dBc at full output power (non-harmonics).

Phase noise: -125 dBc at 1kHz.

Output: 4 independents.

Output level: 13 dBm each output.

Output impedance: 50 Ω.

Output connectors: BNC.

Stability: 1e-12 daily average OCXO locked at GPS in SA.

OCXO Standard: 1e-10 daily average OCXO in free run,

OCXO SC: 2e-11 daily average OCXO on free run.

**Time reference**

Signal: 1 PPS, 100µs Duty, Rising Edge.

Output: N° 4 independents.

Output level: TTL 5 Vpp, Square wave.

Output impedance: 50 Ω.

Output connectors: BNC.

**GPS section**

Receiver: 12 Channels L1 1575.42 MHz.

Tracking: correlation over 12 satellites.

PPS precision: < 50 ns on SA.

Antenna connector: TNC

Capture time: < 4 min.

**External section - frequency**

Standard frequencies: 1 MHz, 2 Mhz, 2.048 MHz, 5 MHz, 10 MHz

Output level: from -2 dB to 16 dB sine wave

**External section - time**

Standard period: 1 PPS

Input level: TTL 5 Vpp, Square wave.

Input impedance: 50 Ω.

Connectors: BNC.

**E1 section**

Standard signal: E1 256S multiframe CRC-4 (16 frame per multiframe)

Input impedance: 75  $\Omega$ .

Output impedance: 75  $\Omega$ .

Connectors: BNC

**PTP section**

Protocol: IEEE 1588-2008 (PTPv2) - PTPv1 optional

Role: Grandmaster clock source (GPS) or Slave

Timestamping: Hardware

Precision: < 1 us

**NTP section**

Protocol: NTP Version 4

Role: Grandmaster clock source (GPS)

Timestamping: Software

Precision: < 10 ms

Status: 1

**Supply**

Network: 95 Vac – 240 Vac, Plug IEC320 integrated, filter EMI/RFI.

Battery: 20 Vdc - 50 Vdc filter EMI/RFI integrated.

**Signaling**

Serial connection: RS-232 Connector DB9 Male  $\pm$  15 kV (ESD).

Network connection: Ethernet interface 10/100, TCP/IP protocol.

Signaling: Dry Contact: 7 dry contact over Weidmuller connector step 3.5 mm.

**Size**

Width: 1 Unity 19".

Depth: 300 mm connectors excluded.

Weight: 1.5 Kg.