product data

GPS-19 and GPS-19R

GPS Master Clock

GPS Precision

- **Precision OCXO and Rubidium oscillators** for stability and accuracy
- **High accuracy** and stability level on hold-over mode
- **Provides reference frequency**, timing and time code outputs
- **Rack space saver**, only 1U high
- **External 24V DC backup** for power supply redundancy
- **Intuitive** user interface
- **Everything needed comes as standard:** 6x 10MHz, 1x 5MHz, 2x 1-pps, 2x Timecode outputs and 1x Event time stamping
- **Built-in** test system

The GPS-19 is a Precision Time and Frequency reference using the GPS satellite signals to discipline a high-stability, low-noise oscillator. Applications include DAB and DVB-T transmitters, cellular communications, calibration labs, satellite ground stations and any application where accuracy and continuous availability are critical.

GPS-19 Overview

Its high accuracy, stability and functionality, allows the GPS-19 offering top performance in critical application such as military communication systems, satellite ground stations, calibration labs, and other applications particularly in connection with the development and manufacturing of high tech products.

The GPS-19 incorporates most of the well tried functions of its predecessor the GPS18, which position this as an excellent solution for audio and video broadcasting, mobile networks and telecom timing.

The GPS-19 comes with a choice of two different time base oscillators:

- Quartz referenced unit (standard)
- Rubidium referenced unit (option 14)

Quartz referenced units has become virtually an industry standard for numerous broadcast applications. In particular it has been successful for Digital Audio Broadcast (DAB) and Digital Video Broadcast (DVB) in Single Frequency Networks where the control of both frequency and timing is crucial.

A Rubidium-reference version offers exceptional accuracy for calibration-standard work and has outstanding performance as as a Master clock for satellite control centers and Telecommunications Timing. The 'stand-alone' accuracy of the reference oscillator is more than two orders-of-magnitude higher than a Quartz-referenced unit.

Flexible Configuration

Apart from a very intuitive front panel user-interface, it is possible to control and manage the GPS-19 through a dual bi-directional RS232 set of ports. It permits all the aspects of the GPS-19 to be controlled and monitored. If an extensive flexibility is required, adding the option 1874 provide Ethernet communication port.

The many standard features, makes the GPS-19 ideal as the heart of a timing and frequency generation system for every application.

Acting along with other Pendulum Instrumentation modules, two GPS-19 can build the basis of a distribution network with change over function. It will offer fully redundant operation and automatic reconfiguration on the even of fault.

Everything Included

The GPS-19 offers a powerful combination of accuracy, functionality and versatility. The instrument status and settings are adjustments easily accesible via an intuitive user interface. The standard unit contains everything needed for the time and frequency lab.

Standard outputs include 6x 10MHz, 1x 5MHz, 2x 1-pps, and 2x time code outputs. There is also an event input that will time stamp any input trigger event with a resolution of 1 microsecond.

A relay contact alarm output is standard and a combined 24Vdc and TTL-level alarm too. Dual communication ports (RS232) give full details of error conditions.

This impressive range of standard features, makes the GPS-19 a true **GPS Master Clock**.

GPS-19 and GPS-19R Technical Specifications

General Specifications

Cabinet: 1U x 19 inches – rack mount

Temperature range:

Operating: 0°C to +50°C

Storage: -40°C to +71°C

Size: 483mm (width) x 44mm (height) x 350mm (depth)

Weight (approx): 3.8 kg

Power Supply

115/230V nominal. Switch selectable.

Tolerance +/- 10% (45 to 66 Hz)

DC Input Connector:

DIN7 (as diagram 3719-6345)

Type: Power supply backup

Level: +18V to 32V

1PPS x 2

Connector: BNC

Output level: TTL, Approx 0V to 2V in 50Ω

Time-Code x 2

Connector: BNC

Codes available: IRIG-A, IRIG-B, XR3, 2137

Alarm Contact

Connector: BNC

Output level: Contact

Type: Normally Closed

DC Output + Alarm

Connector: DIN8

DC output Levels: 24V - 0V

Alarm levels: TTL

Oscillators

Phase noise

	OCXO 10MHz	Rb 10MHz
Offset from carrier	dBc/Hz	dBc/Hz
1Hz	-100	-80
10Hz	-125	-100
100 Hz	-135	-130
1kHz	-145	-145
10kHz	-150	-150

Performance

	OCXO 10MHz	Rb 10MHz
Ageing (after 30 days operation)	<1 in 10^{-10}/day	<3 in 10^{-11}/month
Short term stability (ADEV)	<1 in 10^{-12} @1s	<3 in 10^{-12} @10s
Temperature coefficient 0°C to 50°C	<2 in 10^{-9} p-p	<1 in 10^{-10}
Temperature coefficient +25°C ±10°C - Typical	±3 in 10^{-10}	±5 in 10^{-11}

Accuracy and Stability at quasi-constant Temperature in the range 26C° ± 10C°

GPS-locked mode

Frequency	Accuracy (24h averaging)	±5 in 10^{-11}	±3 in 10^{-12}
	Stability (ADEV 1000S)	±1 in 10^{-10}	±1 in 10^{-11}
Timing	Accuracy – Uncalibrated (ref UTC-GPS)	±300nS	±300nS
	Stability (typical, 95% probability)	±100nS	±100nS

Hold over mode

Frequency	Initial Error (After loss GPS-lock)	<1 in 10^{-10}	<1 in 10^{-11}
	Max uncertainty (after 8h)	<1.5 in 10^{-10}	<1.5 in 10^{-11}
Timing	Initial Error (After loss GPS-lock) (ref UTC-USNO)	<1uS	<300 nS
	Max uncertainty (after 8h)	<4uS	< 700 nS

Standard Output

10MHz x 6

Connector: BNC

Output level: +10dBm (0.7Vrms) in 50Ω

5MHz x 1

Connector: BNC

Output level: +10dBm (0.7Vrms) in 50Ω

Standard Input

GPS Antenna

Type: L1 input (+5V DC output to antenna LNA)

Connector: N-type female

Input Event time-stamping

Connector: BNC

Level: TTL (around +2V threshold)

Impedance: >5kΩ

DC Input (see Power supply)

AC Input Mains (see Power supply)

Communications Port

RS232 x 2

Connector: 9 way 'D' Socket (DB9)

Operating mode: Refer to manual

Command set: Refer to manual

Front Panel Indicators

AC power	Green, AC supply on
DC power	Green, DC supply on
Reset	Red, Processor watchdog fault
Display	Red, Display module fault
BIT	Red, Fault (any) detected by BIT
GPS	Green, GPS receiver doing fixes
Control	Green, Oscillator control operational

GPS Receiver

Channels: 12 correlation, TTFF <4min typ

Connection: N-type female

Ordering Information

GPS-19: GPS Master Clock, OCXO, 10 MHz, 5 MHz, 1-pps, time code outputs, event input, alarm output, RS232

GPS-19R: GPS Master Clock, Rubidium, 10 MHz, 5 MHz, 1-pps, time code outputs, event input, alarm output, RS232

Included with shipment

Mains cable
User manual on CD
18 months warranty

Built-in options

Option 12: Synthesizer

Setting frequency 100kHz – 10MHz

Setting resolution 0.01Hz

Outputs 2 x 10 dBm sinewave 50Ω (BNC)
1 x TTL-levels in 50Ω (BNC)

Option 13/01: 1PPS x 5

Option 13/05: 5MHz x 5

Option 13/10: 10MHz x 5

Optional accessories

Option 18/10:	RS232 to Ethernet converter option plus digital input/output
Option 01:	GPS Antenna
Option 01/50:	GPS Antenna Mounting Kit
Option 02:	Antenna cable, 20m
Option 02/50:	Antenna cable, 50 m
Option 02/130:	Antenna cable, 130 m
Option 90/06:	Calibration certificate with protocol, OCXO oscillator
Option 90/07:	Calibration certificate with protocol, Rubidium oscillator
Option 90/00:	Calibration certificate hold-over ageing/week
Option 95/03:	Extended warranty from 18 months to 3 years
Option 95/05:	Extended warranty from 18 months to 5 years
OM-19	Printed Users Manual (PDF-file is included as standard)

Specifications subject to change without notice

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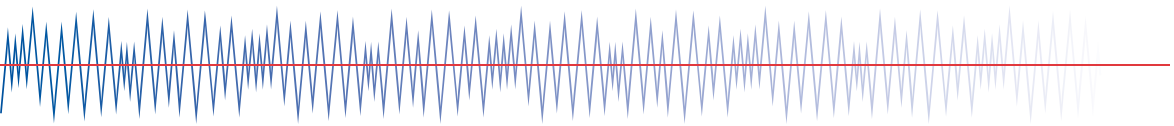
- Experts in time & frequency calibration, measurement & analysis

Pendulum Instruments is a company of the Orolia Group



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