

SW1050

GPS disciplined time-frequency generator



The SW1050 is a GPS synchronised Universal Time code generator, IRIG B coded. The equipment is housed in a 19" , 1 U or 2U rack mount. The equipment includes an oscillator with a long term oscillator disciplining algorithm.

On the front face, an alphanumeric LCD display, allows time, satellites visibility & operation mode visualisation. The status of the system is shown by mean of 3 LED's (power supply, satellites tracking, locked). A six keypads keyboard provide the man machine interface and the monitoring of the equipment. The equipment main function are :

- A frequency reference source with amplifier
- A GPS receiver
- A Time code generator (IRIGB and DCLS, EBU/SMPTE with option)
- A digital signal generator (frequency & pulses)
- An output multiplexer allowing the allocation of the different signal type to the programmable outputs.

Oscillators

There is a choice in internal oscillators between OCXO and Rubidium, depending on the stability and phase noise required. The oscillator is long term disciplined using the GPS signal or an external 1 PPS or 5/10 MHz frequency input reference. The native sine frequency of the oscillator is also available trough a dedicated BNC connector.

In case of GPS' time loss, when starting the equipment, the starting hour of the IRIG B generator could be entered using the front face keyboard.

The rear face of the equipment holds all the input/output signals.

13 connectors are used :

- GPS antenna input,

- 8 programmable outputs (available signals) :
 - IRIGB Time code (IRG),
 - 10 MHz sine frequency (FRE),
 - DCLS (Non modulated IRIGB code) (TS1),
 - PPS GPS (TS2),
 - Local PPS (TS3),
 - 1 KHz TTL frequency (TS4).
- One output : 1 PPS synchronized with 10 MHz
- One DB9 female (AUX2) RS232 serial link (Remote control or NMEA see option)
- One auxiliary output RJ45(AUX1)
- One network output RJ45(LAN)

With the EBU/SMPTE option, the two central programmable outputs are replaced by two EBU/SMPTE outputs (BNC).

Power supply uses a CEE standard 230V AC connector with fuse, filter & ON/OFF switch.

GPS

The GPS receiver is a 12 channels module able to acquire 12 satellites. The module delivers a high precision, top second reference.

Irig-B

The IRIG B generator provides an amplitude modulated 1 kHz analogue signal. This signal uses the internal frequency source, it's also automatically phase synchronised on the 1 PPS signal coming from the GPS or from an external source.

Remote control

A Windows® management & control software is provided with the equipment.

NTP Server

The equipment distributes time to precisely synchronize client computer clocks over a network. One mode is implemented : on request.

Time is acquired from the GPS and distributed over the network using the Network Time Protocol (NTP). Client computer clocks can be synchronized to 1 to 10 milliseconds. Information on the health and status of the NTP server and the primary time synchronization source is available by using the SNMP protocol Enterprise MIB.

The network connection is made trough the rear face RJ45-10 BaseT connector.

Initialisation of the NTP server is done via the standard RS-232 port or via the front panel keypad.

An NTP client/daemon is required for client-side synchronization with any network time server.

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Specifications

1 PPS precision : ± 12 ns with receiver 12 channels (the receiver is locked on a fixed position).
Time signal phase : ± 200 ns, with regards to the 1PPS reference signal.
Generated code : IRIG-B Amplitude modulated sine signal. 200-98 corresponding standard. 1/3, 1/1 - 3 Vpp , 50 Ohm.
Visualisation : Universal Time or Local Time.
Internal reference : OCXO or Rubidium. 10 MHz or 5 MHz.
Frequency output : Internal oscillator frequency : 10 or 5 MHz. Level +13 dBm/50 Ohm.
Programmable outputs : 8 independent outputs, able to receives one's of the following signal, according to user's choice :

oscillator frequency (sine), IRIG B, 1 PPS, or TTL outputs of the digital generator (frequency divider & 1 PPM).
Auxiliary ASCII output : Serial frame with Year, day of the year, hours, minutes, seconds. programmable emission period (dedicated to NMEA output with option M) standard NMEA GPS frames GGA & RMC . Emission speed : 4800 bauds, every second on DB9 connector.
Remote control : Settings & remote control using asynchronous serial link. RS232 levels.
GPS antenna : antennas & cables length in options.
Connectors : BNC for analog and pulse signals, 9 pins females Sub'D for serial RS232 links.
Dimensions : 1U rack when OCXO oscillators are used. Width = 19" (483 mm), Height = 1U

(44.5 mm), Depth = 295 mm. 2U rack in case of Rubidium

Weight : 5 Kg
Consumption : 30 W
MTBF = 65 000 h

Network Time Protocol : NTP (RFC 1305) SNTP (RFC 1361) ; TIME (RFC 868)
Network Transport Protocol : UDP/IP
Simple Network Management (SNMP) : SNMP provides the network administrator with the NTP Time Server Protocol, network status, and statistics.
Network Interface : UDP/IP (TCP/IP) Ethernet IEEE 802.3. 10Base-T connector
Network Timing Accuracy : 1 to 10 milliseconds typical

Oscillateurs stabilité court terme	OCXO standard	Rubidium	OCXO PULSAR-S210	OCXO PULSAR - FB210
1s	< 2.10 ⁻¹¹	< 1.5.10 ⁻¹¹	< 5.10 ⁻¹¹	< 2.10 ⁻¹¹
10s - 100s	< 2.10 ⁻¹¹	< 5.10 ⁻¹² - < 1.5. 10 ⁻¹²	< 5.10 ⁻¹¹	< 2.10 ⁻¹¹
Stabilité long terme				
Jour	< 5.10 ⁻¹⁰		< 2.10 ⁻¹⁰	< 2.10 ⁻¹⁰
Mois	< 1.5.10 ⁻⁹	< 5.10 ⁻¹¹	< 5.10 ⁻⁹	< 5.10 ⁻⁹
Année	< 1.10 ⁻⁷	< 5.10 ⁻¹⁰	< 5.10 ⁻⁸	< 5.10 ⁻⁸
Stabilité long terme avec GPS				
Jour	< 2.10 ⁻¹¹	< 1.10 ⁻¹¹	< 3.10 ⁻¹²	< 3.10 ⁻¹²
Mois	< 2.10 ⁻¹¹	< 1.10 ⁻¹¹	< 2.10 ⁻¹²	< 2.10 ⁻¹²
Année	< 2.10 ⁻¹¹	< 1.10 ⁻¹¹	< 2.10 ⁻¹²	< 2.10 ⁻¹²
Bruit de phase				
1 Hz	< -90 dBc/Hz	< -80 dBc/Hz	< -95 dBc/Hz	< -105 dBc/Hz
10 Hz	< -120 dBc/Hz	< - 98 dBc/Hz	< -125 dBc/Hz	< -135 dBc/Hz
100 Hz	< -135 dBc/Hz	< -137 dBc/Hz	< -140 dBc/Hz	< -145 dBc/Hz
1 KHz	< -140 dBc/Hz	< -150 dBc/Hz	< -145 dBc/Hz	< -155 dBc/Hz
10 KHz	< -145 dBc/Hz	< -156 dBc/Hz	< -150 dBc/Hz	< -160 dBc/Hz
Caractéristiques du signal				
Harmoniques			<-50 dBc	<-50 dBc
Spurious			<-80 dBc	<-80 dBc
Stabilité/Température [0, 50°C]			< 5.10 ⁻¹⁰ pp	< 5.10 ⁻¹⁰ pp

Ordering information

SW1050-O-F

O = X (OCXO), R (Rubidium), P (Pulsar), FB (low noise)
F = 5 (5 Mhz) or 10 (10 MHz) internal oscillator frequency

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Possible adaptations = SMPTE/EBU outputs, NMEA messages output for mobiles applications, IRIGB input for external discipline application.