MICROSYSTEMES

SW1050
GPS disciplined time-frequency generator

The SR1050 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
- An IRIG B generator
- 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. 14 connectors are used :

- GPS antenna input,
- 1 PPS external input or frequency input,
- Oscillator native frequency output (sine),
- eight user's programmable outputs : 10 MHz sinus, IRIG B, 1 PPS, frequency & TTL pulse (1 PPM, ...
-
- RS232 serial output for time frame periodic emission
- RS232 link for remote control & management of the equipment
- RJ45 for Ethernet TCP/IP link

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

GPS

The GPS receiver is an Oncore UT+ MOTOROLA module able to acquire 8 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. Two exclusives modes are implemented : on request & broadcast.

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.

Housing of the SW1050 equipment

MICROSYSTEMES
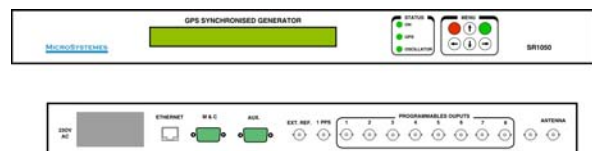
SW1050
GPS disciplined time-frequency generator

Specifications

1 PPS precision: ± 50 ns with UT+ Oncore receiver (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
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

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); SNMP v1 Enterprise MIB II

Network Transport Protocol: UDP/IP

Simple Network Management (SNMP): Availability 2d Q/2003. SNMP provides the network administrator with the NTP Time Server Protocol, network status, and statistics.

Network Interface: UDP/IP (TCP/IP) Ethernet or IEEE 802.3. 10Base-T connector

Network Timing Accuracy: 1 to 10 milliseconds typical

Oscillators	OCXO	Rubidium
Short term stability		
1s	< 2.10^{-11}	< 1.5.10^{-11}
10s – 100s	< 2.10^{-11}	< 5.10^{-12} – < 1.5. 10^{-12}
Long term stability		
Day	< 5.10^{-10}	
Month	< 1.5.10^{-9}	< 5.10^{-11}
Year	< 1.10^{-7}	< 5.10^{-10}
Long term stability with GPS		
Day	< 2.10^{-11}	< 1.10^{-11}
Month	< 2.10^{-11}	< 1.10^{-11}
Year	< 2.10^{-11}	< 1.10^{-11}
Phase noise		
1 Hz	< -90 dBc/Hz	< -80 dBc/Hz
10 Hz	< -120 dBc/Hz	< - 98 dBc/Hz
100 Hz	< -135 dBc/Hz	< -137 dBc/Hz
1 KHz	< -140 dBc/Hz	< -150 dBc/Hz
10 KHz	< -145 dBc/Hz	< -156 dBc/Hz

Ordering information
SW1050-O-F

O= X(OCXO) or R(Rubidium) Oscillator type
F=5(5 Mhz) or 10 (10 MHz) Internal oscillator frequency