TMG3040

Composite IRIGB time code generator

The TMG3040 is a GNSS disciplined time & frequency generator specifically designed to provide UT and countdown in a composite IRIGB time code.

The equipment is housed in 1U 19" standard case.
GNSS signal is used for long term disciplining of the internal oscillator.

Irig-B generator

The equipment includes an IRIGB time generator outputting modulated code on two outputs.
The generated IRIGB time code is a composite code including both UT and countdown.
As different composite code already exist in the IRIGB community, we propose to adapt and customize the IRIGB outputs in order to suit the clients requirements.

1PPS outputs

The 1PPS signal (one pulse per second) phase synchronized with the IRIGB signal is provided on two outputs.
When the GNSS reference pulse is available, the 1PPS is maintained within ±100 ns / UTC.

GNSS

The internal GNSS receiver is a specific receiver dedicated to time application. It's a bi-constellation model able to acquire both GPS and GLONASS satellites simultaneously. It delivers a very high precision UTC second reference pulse.

NTP Server

The TMG3040 includes a time server implementing standard NTP protocol (Network Time Protocol) allowing any computer or equipment linked to the network to synchronize. Customer's computers can be synchronized with an accuracy of 1 to 10 ms. NTP client software must be installed on each client for its synchronization with the server.

Oscillator

An internal OCXO type oscillator provides a 10 MHz frequency used to maintain time with a stability of (Δ F/F) 1x10-9/day in case of loss of external time source.
When disciplined by the GNSS, the stability is better than $5x10^{-11}$.

User interface

On the front panel, an alphanumeric LCD display, allows for visualization of time, satellite & operation mode.
The status of the system is also shown by mean of 3 LED's (power supply, satellites tracking, oscillator).
A six key keyboard provides for navigating through the different screens and menus.

Remote control

The remote control of the equipment is done via the network, using:

- The SNMP standard protocol (MIB provided) used for monitoring
- A proprietary TCP/IP protocol used for control and monitoring

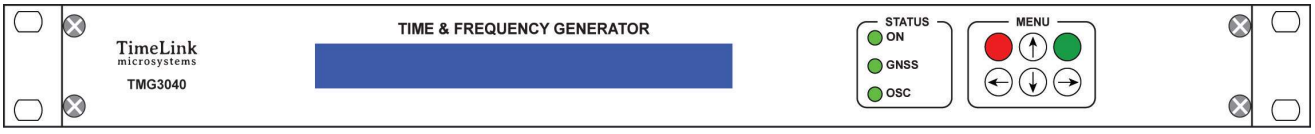
H0 and CountDown

At each local 1PPS, UT is incremented, CD and H0 are computed . The rule: UT = CD + H0 is always true.
If the CD is stopped, H0 evolves and if the CD is running, the H0 is fixed. The H0 information is not transmitted in the IRIGB generated code but is displayed on the front panel display. H0 indicates the moment when the CD will cross zero.
The management of the countdown (CD) is only done using the remote control software. The main orders are:

- Preload the CD.
- When the CD is stopped, passed the preloaded value in the CD.
- START/STOP the CD
- CD Recovery from the previously stored value.

Configuration

The overall configuration of the unit is stored on a removable SDCARD memory. It allows configuration and software update easily.



TMG3040 front panel

Specifications

Network Protocols

NTP

(Network Time Protocol)
NTP (RFC 1305) SNTP (RFC 1361) using UDP 123 port.
Server configuration V3, V4 or automatic V3/V4.
RJ45 connector
Ethernet IEEE 802.3. 10/100 Base TX

SNMP

(Simple Network Management Protocol)
(RFC 1155, 1157, 1213) V2c
SNMP provides to the network administrator the equipment status.

Outputs

1 PPS output

BNC connectors
2 outputs
0-5V level
Accuracy: ± 100 ns relative to UTC when locked to GNSS.

IRIGB outputs

BNC connectors
2 outputs
Modulated output: 4V ±2V peak-peak
1/1: 1/3 ratio isolated by transformer.
Composite code UT+CD

10 MHz Outputs

BNC connectors
2 outputs
Level +13 dBm ±1 dBm
Guaranteed Phase noise:

1Hz	-90 dBc/Hz
10Hz	-110 dBc/Hz
100Hz	-130 dBc/Hz
1KHz	-140 dBc/Hz
≥ 10KHz	-145 dBc/Hz

Relay outputs

SubD 9pin female connector
This connector provides three relays with dry contacts (Common, Normally Opened and Normally Closed). The three relays are used for:

- TD state : relay active for TD running
- Autonomous mode : relay active if clock in autonomous mode
- Clock drift : relay is activated when the Phase shift between local 1PPS and GPS 1PPS is greater than the maximum allowed(settable parameter).

The relay switching is synchronized with the local 1 PPS.

BCD outputs

The countdown is also available on a 25 pin SubD female connector. TTL levels.

Pin	Signal	Pin	Signal
1	1'S SECONDS 1	13	10'S MINUTES 1
2	1'S SECONDS 2	14	10'S MINUTES 2
3	1'S SECONDS 4	15	10'S MINUTES 4
4	1'S SECONDS 8	16	10'S MINUTES 8
5	10'S SECONDS 1	17	1'S HOURS 1
6	10'S SECONDS 2	18	1'S HOURS 2
7	10'S SECONDS 4	19	1'S HOURS 4
8	10'S SECONDS 8	20	1'S HOURS 8
9	1'S MINUTES 1	21	10'S HOURS 1
10	1'S MINUTES 2	22	10'S HOURS 2
11	1'S MINUTES 4	23	SIGN
12	1'S MINUTES 8	24	RUN/HOLD
		25	GROUND

Console

9 pins SubD female connector
RS232 compliant

Console for configuration & maintenance

Internal reference

10 MHz OCXO type oscillator,
Short term stability:
1s, 10s: < 5.10^{-12}
Long term stability in free running mode:
<1.10^{-9} / day,
<4.10^{-8} / month,
<3.10^{-7} / year.
Long term stability in locked mode:
< 5.10^{-11}.

GNSS receiver

Time dedicated receiver with TRAIM.
Bi-constellation GPS/GLONASS
< ±50 ns / UTC

GNSS Antenna

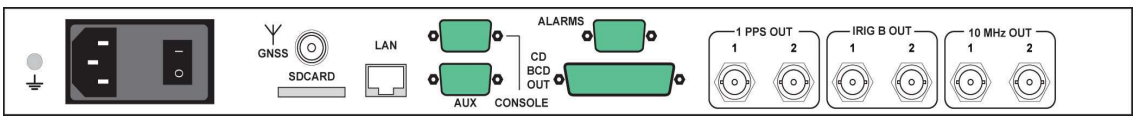
TNC connector
3V or 5V active antenna
Powered by receiver
(Antenna not included)

Dimensions

Standard 19" 1U case
Weight: 3 kg
Consumption: 30 W

MTBF

> 90 000 h



TMG3040 rear panel

Ordering code

TMG3040: standard model