TimeLink

TMC2205

- **GNSS / 1 PPS Synchronization**
- **Time Code Generators**
  - **IRIGB DCLS, HQ, NMEA, 1PPS**
- **Digital Frequencies Generator**
  - **10MHz and below**
- **PCI Express Card**

The TMC2205 card is a multi-synchronization card in PCI Express format allowing and providing a time base of particularly good stability from a GNSS source or   1 PPS signal.

Time Base

With a local oscillator, the board maintains an internal time which is synchronized with the GNSS reference or a 1 PPS input signal. This time is made available to the computer hosting the card through registers accessible via the PCI bus.

The internal oscillator is also frequency-controlled on the reference signal so as to ensure a minimum drift of the time delivered when the reference is not available.

The reference signal is software configurable (source GNSS or source 1 PPS).

GNSS Synchronization

The card includes a multi-constellations GNSS receiver which delivers a precision 1 PSS signal.

NMEA data including geographic position fix is made available to the user through a PCI register FIFO interface.

1 PPS Synchronization

A 1 PPS sync input is available on a SUB-D9 connector. A BNC adapter is available on request.

Time code and frequencies generation

Available outputs are:

- IRIG-B007
- STANAG 4430/HQ
- NMEA
- 1 PPS
- Frequencies (10 MHz & below)

Oscillator

The internal oscillator is a TCXO synchronized to the reference source which ensures optimization of the stability in stand-alone mode.

In autonomous operation, the intrinsic stability of the oscillator ensures a drift <100µs (typical: 30µs) per hour.

Option is available to upgrade the oscillator to a higher OCXO style to improve long term autonomous stability.

Periodic interrupt

The board can generate a periodic interrupt whose period is programmable in steps of 1 ms.

Configuration

In order to facilitate the updating of the software of the card by the user, the latter is loaded dynamically at the start of the driver/app of the card.

Moreover, FPGA firmware upgrade can be done in the field through the host PC interface.

Environments

The card is supported for Windows and Linux environments. The Linux driver is delivered in source code along with the programming API and usage examples.

A Windows driver is delivered as a signed binary supporting secured boot. A Windows PC time keeping service is also provided.

TMC2205 with large bracket

Specifications

GNSS receiver

Multi-constellations GNSS are available: GPS, GLONASS, GALILEO, BEIDOU with up to 3 simultaneous constellations support

SMA antenna connector with 3.3 V power supply

User configurable constellations and C/N threshold for satellite tracking, allowing optimal adaptation to the environment

Time to First Fix < 32 s from cold start

Digital Inputs/Outputs

4 digital Inputs/outputs are available which mode (in or out) and function can be independently configured

TTL (5V) or RS485 electric levels compatible

9 pin SUB-D female connector

Output Time Codes

- IRIG-B007 DCLS
- STANAG 4430/Have Quick
- NMEA
  - 8N1 460800 baud serial UART interface
  - GPRMC, GNGSA, GPGGA, GPVTG, G-GSV, GPZDA
- 1 PPS (local or GNSS)
  - +/- 25 ns accuracy
- Configurable Frequency (10 MHz & below)
- 1 User controllable GPIO

Access to information by host PC

The card incorporates registers that allow access to time information on the fly and to program modes of operation

All NMEA codes (GPRMC, GNGSA, GPGGA, GPVTG, G-GSV, GPZDA) are made available through a memory mapped FIFO register

Periodic interruption

Programmable with a Period accuracy of 1 ms synchronized to the 1 PPS signal

Interruption is also available to periodically inform of received NMEA data

Leap Seconds

Automatic or manual management

Software

- **Linux package**

  All Driver and API delivered as source code

  Example usages of API interfaces

  NTP SHM interface application example allowing microsecond time keeping and Stratum 1 NTP server implementation

- **Windows package**

  Microsoft signed binary driver for secure boot

  API source code examples and binaries

  Microsecond accurate, smooth (without jump) time keeping service that can implement leap second smearing

Python script example (for both Windows and Linux) that demonstrates interfacing with the card and asynchronous fix data acquisition

Dimensions

Low profile PCI Express card 65 mm x 120 mm
Suitable for rack mount PC servers

BUS

PCI express 1.1 1x

Weight

0.67 lb. means 0.3 Kg

Operating temperature

From 0 ° C to + 70 ° C
Hygrometry up to 95% non-condensing
The TMC2205 card supports the conditions of recovery of air conditioning after an electrical shutdown for example
The air blown into the false floors which can be at a temperature of 10 ° C will not interfere with the operation of the TMC2205 with a maximum humidity of 95% non-condensing

Power Consumption

5 W

Safety of operation

MTBF = 110 000 h

Options available

OPT1: OCXO oscillator upgrade,
OPT2: Battery backed RTC
OPT3: Miscellaneous GNSS: Cable, Antenna, Lighter

Contact us for any further need

Ordering code:

TMC2205:   Standard board
TMC2205 OPTx: See the code of options §