TodMaster**Clock**

A low-footprint, highly configurable, 100% hardware only NMEA Time of Day (ToD) Master Clock solution, specifically designed for high-performance distributed systems. Allows standalone synchronization via NMEA messages towards a NMEA source e.g. IED via UART. All frame creation and time conversions are done completely in hardware.

Key Features:

- NMEA (ToD) Master Clock
- 100% hardware only solution
- Vendor independent
- Hardware frame creator
- GxZDA, GxRMC, GxUTC support
- Hardware time conversion
- Local time and offset

Typical Applications:

- Legacy Networks
- Time converters
- Time serves with GPS
- Substation automation
- Distributed data acquisition
- Test and measurement
- Etc.

IP Core Architecture:



Specification:	
NMEA	Supports GxZDA and GxRMC messages for Time distribution Custom GxUTC NMEA message for UTC info transfer Selection if only one message type or both shall be sent Selection which GNSS system shall be used Sending is aligned with local second beginning Hardware UART with configurable baud rate: 9.6k - 1m baud Hardware conversion from seconds since midnight 1.1.1970 in- cluding leap years to time of day format. Configurable offset at the second overflow of the local clock to convert between UTC and TAI.
Performance Portability	 Local Time distribution Via hours and minutes and sign register. Offload frame creation and time format conversion. 100% hardware only solution, no dependency on external CPU or UART Vendor independent, written in plain VHDL Low footprint and low frequency requirements
Modularity Configuration	Slim and standardized interfaces are used No CPU required, standalone configuration with signals Axi4 lite slave support, for status and configuration

Deliverables:

- Ip core in plain VHDL
- Testbench in plain VHDL
- Reference Design with 1 PPS output
 - o Top level VHDL file
 - o Timing Constraint SDC files
 - o Vivado/Quartus Project file

Related Products:

- PPS Master/Slave
- PTP Ordinary Clock
- PTP Grandmaster Clock
- PTP Hybrid Clock

- IRIG Master/Slave
- TOD Slave
- Adjustable Clock
- Signal Generator



NetTimeLogic GmbH Synchronization Solutions Strassburgstrasse 10 8004 Zürich Switzerland contact@nettimelogic.com Tel. +41796716211 www.nettimelogic.com

Information contained in this product brief is subject to change without notice. Trademarks used are property of their respective owners. Copyright @ 2025 NetTimeLogic GmbH. All rights reserved.