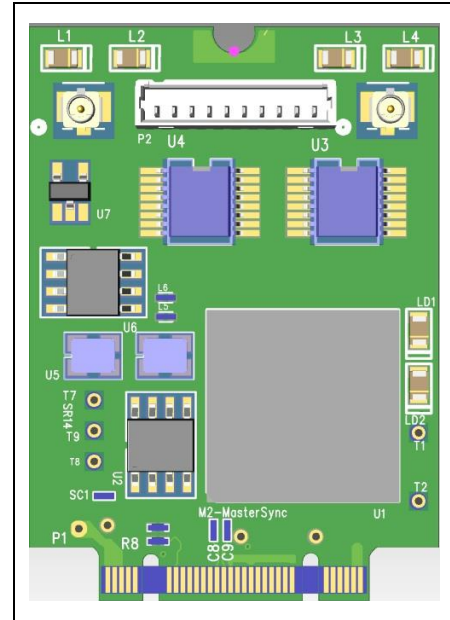# Precision Time Master Reference
## M.2 30x42mm

Features

- M.2 30mm x 42mm board size
- M.2 PCI Express x1 lane interface
- M.2 3042 Key B & M
- IRIG A, B NASA 36, 1 PPS sync inputs
- IRIG-B time code output
- HaveQuick sync input
- Disciplined TCXO
- Zero latency time reads
- Propagation delay correction
- Match Time status / interrupt
- External event time tag
- User-programmable heartbeat rate interrupt
- GPS RS-232 Interface
- PPS Input

Block Diagram and Operational Overview

The M.2-PTSyncMaster provides its host system with a zero-latency Precision Time Master reference. Reference signal inputs can be 1 PPS, IRIG, NASA or HaveQuick. The clock accepts IRIG A, B or NASA 36 input and user input reference signal delay information. An IRIG B code generator is included.

Advanced features that include **Event Time** input, **Match Time** and **Heartbeat Timing** provide the host system with complete Precision Time Master reference capability.
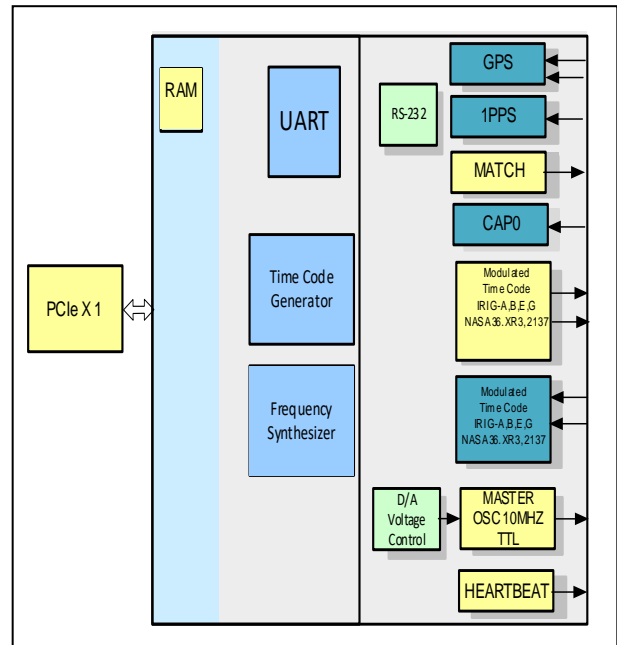
The **M.2-PTSyncMaster** continuously measures the time error between the on-board clock and the reference input and adjusts the error measurement for propagation delay. An adaptive gain loop uses the residual error to adjust the oscillator's frequency for minimum error. If the incoming time code is missing or corrupted, the on-board clock is updated using the TCXO until the input code becomes available.

The **Event Time** input may be used to capture the exact time of occurrence of external events. When the event input is sensed, the current time is saved in a buffer, with a resolution of 100ns.

The **Match Time** feature can be used to initiate or terminate internal or external processes, with a resolution of 1μs. Match Ready status is asserted when the clock's time matches user input start time. Output is terminated under user control or when a pre-programmed stop time occurs.

Heartbeat Timing is provided by a generator that is programmable over the range 2-65,535 with a divider selectable to 3 MHz or 100 Hz.

Time data are available via 58 bits of BCD, using two zero latency time reads. The time data contain units of microseconds thru units of years. An additional read gives a status byte.

Input/Output Specifications
- Input Codes: IRIG A B, NASA 36 (1KHz carrier)
- Input Amplitude: .25 to 10 Vpp
- Input Impedance: >10KΩ
- Ratio: 2:1 to 6:1
- Frequency Error: 100 PPM max
- Code Sync Accuracy: 1μs
- 1PPS Input: TTL, positive edge
- External Event: TTL, positive or negative edge
  Resolution: 100ns-units of year
  Minimum event spacing: None
- BCD Time: Microseconds-unit year on demand zero latency 58 bits in two 32 bit words
- Status word: 8 bits
- Status LED: Flashing coded patterns
- Interrupts: External Event, RAM FIFO, Heartbeat, Match Time
- Flags: Dual port RAM data ready, FIFO data ready, In sync, Heartbeat, Match Time, External Event
- Connectors: U.FL micro coax & GPS Connector 10 pins Picoblade 1.25mm

Operating Environment
- Operating temperature
  Industrial: -40ºC to +85ºC
- Non-operating: -50ºC to +90ºC
- Airflow requirement: .5CFM
- Humidity: 5 to 90% (non-cond)
- Altitude: 0 to 10,000 feet

Available Software Drivers
- Linux® drivers
- Windows® drivers
- VxWorks® drivers

Mechanical
- Size: M.2 Module Key B & M (30mm x 42mm)
- Power: 5W max
- Front panel I/O
- Vibration: 0.5G, 20-2000Hz rand
- Shock: 20G, 11ms, ½ sine
- Weight: 10g (0.4oz)
- MTBF: >250,000 hours

Ordering information

Part Number	Description
M.2-PTSyncMaster	Precision Time Master Reference **Option** (add following the part number) **C** (Conformal coat)

Optional Accessories

CBL-MINI-10-12	10 pins housing to 12" pigtail