

# T1 10MHz Time Reference



When it comes to digital systems, time counts – literally. The precise placement of data, the individual samples that constitute the musical signal, is critical to the accurate reproduction of the original signal. Any drift or error in the spacing of the samples will quickly erode the integrity of the signal, which is why designers of digital systems go to such great lengths to ensure the accuracy of the master clocks that provide a time domain reference for reading data, its transfer and decoding. This reduction in jitter has become the holy grail of digital design.

The problem is, that as soon as you have more than one box (and one master clock) in the system – for instance, if you use a transport and DAC – then the errors can increase exponentially. The easiest solution is to synchronize the two clocks, designating one as the master and slaving the other to it. That's exactly the solution provided by the Clock-Sync cards available for the CH Precision D1, C1 and I1, while the sophisticated software control incorporated into each of the units allows owners to designate master and slave according to circumstances and system topology. But what's better than syncing two or more units to a single master clock? Syncing them all to a single, superior, external reference point – a reference like the T1 Time Reference external clock.

The T1 generates a super accurate, low-jitter signal that delivers measurably lower phase noise and more accurate transfer and conversion of digital signals. It is built around a high-frequency 10MHz oven controlled oscillator (OCXO), its core temperature and output further stabilized by

encapsulation in a mechanically isolated billet aluminum block. Why not just use one of the popular and readily available Rubidium clock modules like everybody else? Because those Rubidium modules have a limited life span – generally between six and eight years – and they contain radioactive material. At CH Precision we expect our products to have a much longer working life than that, so incorporating components with a finite life is contrary to all our beliefs – especially if those components then present a serious disposal issue.

By paying attention to the physical engineering and temperature control of our OCXO circuit, providing it with multiple buffers and a sophisticated power supply, we can match or exceed the performance of Rubidium clocks – without their associated issues. And to ensure the absolute accuracy of the oscillator output, you can sync the T1 to the GPS network, its satellites controlled by Cesium atomic clocks, the most stable and accurate time source known to man. Their 1Hz sync signal prevents any drift in the T1's output, not just now but for years to come, ensuring that your digital signals are (and always will be) handled as accurately and carefully as humanly possible.

## Outputs

- High-Frequency (10MHz) delivers superior accuracy
- Square wave: 1V or 500mV peak to peak, selectable
- Sine wave: 1V or 500mV peak to peak, selectable
- 6 outputs, 75Ω BNC coaxial
- Transformer-coupled outputs to further limit phase noise and error
- Independent control for each output

## Inputs

- GPS input for CH Precision GPS time constant option
- 1 pulse per second (1 PPS) TTL signal for external synchronization
- Ethernet for remote control (CH-Control App)
- USB for firmware upgrade

## Power Supply

- Dedicated ultra low noise, three-stage, discrete regulated linear power supplies for each section
- Galvanically isolated power supplies for the OCXO, the OCXO buffer and the output buffers
- Magnetically and electrostatically shielded toroidal mains transformer

## Physical Arrangements

- OCXO mounted inside a heavy aluminum block for even greater stability of critical core temperature
- Complete OCXO housing mounted on soft silicon gel for maximum damping and isolation from vibration
- Power transformer mechanically isolated to reduce internal vibration

## Optional Hardware

- Unlike other CH Precision units, the T1 offers only one option – its unique GPS input
- Instead, the T1 is itself the option, offering improved performance with all CH Precision digital components (the D1, C1 and I1) a vital part of their scalable, upgradable topology



*“The T1 Time Reference let loose a barrage of detail beyond anything I’ve heard from digital source... But it was not a lopsided advance on the analytical front alone. It was balanced with enhanced timbre, full tone, and especially pace, rhythm and timing.”*

**MARSHALL NACK, POSITIVE-FEEDBACK**