

# Redefining Measurement

## ID900 Time Controller

Timing, Delay Generation and Pattern Generation all with 20 picoseconds Precision



IDQ's Time Controller is designed for flexibility and it efficiently solves a large number of problems encountered in the laboratory. Its core consists of 4 high-speed (<math><20\text{ ps}</math> precision, 100 Mcps rate, 50  $\Omega$ ) inputs and 4 high-speed outputs, interconnected by reconfigurable logic. The Time Controller performs the functions of a number of devices: time-to-digital converter, coincidence counter, delay generator, pattern generator, counter and discriminator. This is complemented by a 10 Gbps link to the host computer for fast data transfers, by auxiliary analog and digital I/O for interfacing with external devices. An advanced synchronisation circuit allows for up to 16 devices to be "daisy chained" for a total of 64 fast input and output channels.

### Key Features

- ▶ Timestamping and histogramming
- ▶ Delay generation with multi-hit ability
- ▶ Pattern generation
- ▶ High-speed counter
- ▶ High precision discriminator
- ▶ Synchronise devices for up to 64 channels
- ▶ 4 input channels (-3 V to +3 V in 1 mV steps)
- ▶ 4 output channels (NIM + LVTTTL)
- ▶ High timing resolution (20 ps FWHM)
- ▶ Fast data transfer to a PC (100 Mcps)
- ▶ 1 GHz counters

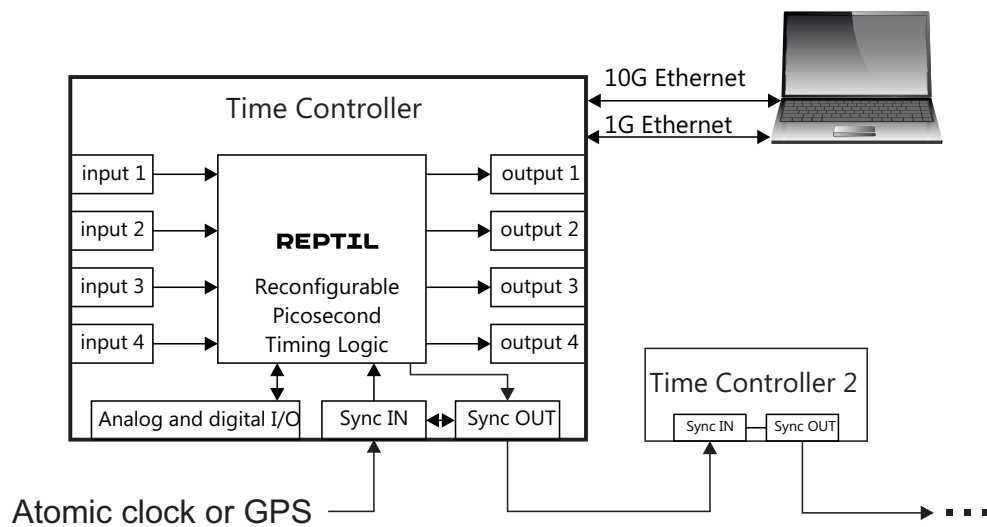
### Applications

- ▶ Quantum optics
- ▶ Quantum communication
- ▶ LIDAR
- ▶ Particle physics
- ▶ Time correlated single-photon counting (TCSPC)
- ▶ Fluorescence lifetime imaging
- ▶ Fluorescence correlation spectroscopy
- ▶ Single-photon counting
- ▶ Precision time measurement
- ▶ Correlation measurement
- ▶ Optical measurement

# TIME CONTROLLER

## Principle of Operation

The Time Controller works by having 20 ps inputs and outputs interconnected by Reconfigurable Picosecond Timing Logic (REPTIL). This architecture allows for low-latency, high throughput, high precision input-to-output logic. Besides the ability to emulate and outperform a number of standard laboratory instruments (TDC, delay generator, discriminator, pattern generator) this architecture enables new functions, such as multi-hit delay generation, conditional pattern generation or advanced detector gating. IDQ will be happy to discuss customisation to your application.



## Software

The Time Controller’s advanced functions are controlled through an intuitive graphical user interface or may be programmatically accessed through “SCPI” text commands, allowing its integration from a large number of programming languages: LabView, Python, Matlab, C/C++, etc.

