

# MicroPulse Synchronizers

The MicroPulse 825 and 1625 models are proprietary-design, programmable, high-precision master timing controllers. They act as a master controller to synchronize the timings of multiple system's hardware and software components during the undergoing experiment. It offers 8 or 16 separate output channels and two external input hardware channels for phase lock with an unprecedented accuracy of 0.25 ns. Each of the outputs can control up to four external devices for a total of 32 or 64 connections and each of the inputs can receive signals from up to 4 independent external devices for a total of 8 connections. It uses programmable trigger logic timing with hardware and software settings and allows a single MicroPulse Synchronizer to control the timing and support the entire PIV system. It uses a USB 2.0 interface to communicate with the computer and Microvec software.



*MicroPulse 825 model*



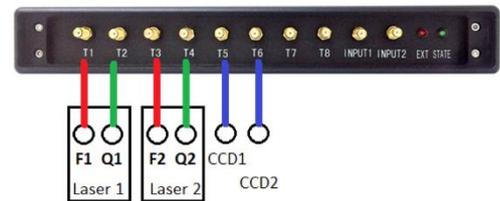
*MicroPulse 1625 model*

## Innovative Software and Hardware Control Design

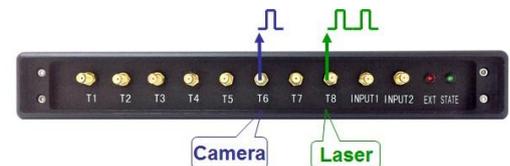
MicroPulse is a programmable controller that uses a combination of software and hardware to operate. It has a built-in communication module with C language-based software control. The trigger signal timing is designed to be controlled from a PC to give the users wide signal control options. By connecting it via USB 2.0 cable to a computer USB port, the user can gain the ability to control all the synchronizing functions and manage the timing through complex trigger and logic circuitry. All the functions have no need for the use of hardware jumpers or switches since everything is in the hands of the MicroPulse software.

## Functional Integration Design

MicroPulse can control and synchronize the timings on multiple digital cameras, trigger pulse lasers, shutters, coils, switch controllers and a variety of other devices. Eight/Sixteen channels can be independently programmed with the clock delay trigger or with different trigger logic. All time and/or logic parameters are software programmable with an unprecedented accuracy of 0.25 ns.



*Fig. 1. Double Pulse laser control.*

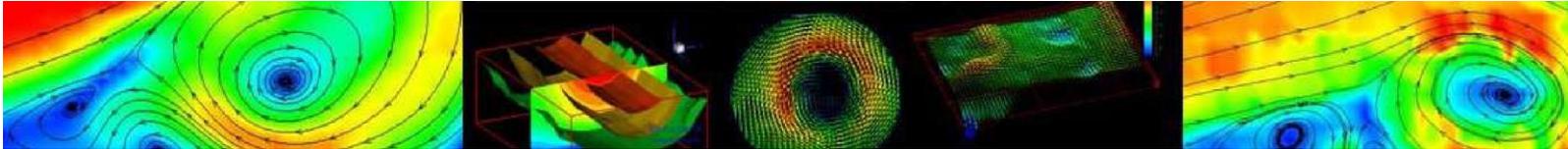


*Fig. 2. Continuous Wave laser control*

## Beyond the Ordinary Signal Generator:

MicroPulse demonstrates outstanding performance and design, showing that it is an improvement when compared to ordinary signal generators. Both types of signal generators utilize a specialized programmable control array processing chip, with all input and auxiliary output signal being processed in parallel within a 1ns range. Our software, however, allows complete computer control for each channel and can change its settings to work in different complex control modes:





**Synchronous Operating Mode:** The entire system is based on the TTL signal output within the cycle that is set by the software, with the adjustable operating continuous frequency ranging from 1 Hz to 3 MHz.

**External Sync Mode:** The system automatically monitors the external input sync signal by measuring and analyzing it. Then, through the internal firmware, the hardware logic control signal output of each channel is set according to the parameters pre-set by the software.

**External Trigger Mode:** The system automatically monitors the external input trigger signal, and it adjusts (phase locks) each channel to it by adding values defined by the software within the synchronization parameters until the software is set to stop working.

**Flexible Parameter Settings:** The software sets the rising or falling edge of the system output pulse. The pulse width can be defined and modified by the software.

**Common USB Interface Control:** The latest low-power hardware circuit design allows the entire system to be connected via a USB cable to the computer power supply and to communicate through the software.

**Pulse Delay Control:** The 8 or 16-channel output pulses can be set to have a certain delay (1 ns to 1 s) and the output can be set to be a certain width of the pulse signal (1 ns to 1 s).

## Simple Software Programming

MicroPulse control software is designed to help setup a complex logic control system. Windows-based user interface design allows step by step operation for flexible settings of each channel separately. Written in the C programming language with real-time testing and debugging modules, the software is full-featured and made flexible so that users can program additional features. With the simple and clearly defined SDK, it is easy to use and gives users the ability to create proprietary functions. Sample code is included with the software to help the users understand the complex functionality of MicroPulse. The sample provided controls the synchronization of two lasers and high-speed digital cameras for high-speed pulsed laser illumination image acquisition.

## Main Features:

- Programmable synchronous master timing control unit
- Integrated scientific grade time signal generator
- 8 or 16 input channels with high-precision independent delay time controller
- Simple control with software via USB
- Professional hardware timing logic control circuit
- 1ns TTL circuit set step 0.25 ns delay accuracy
- Upgradable hardware and software design
- No need for external power supply

## Applications:

- Experimental mechanical testing
- MEMS / BioMEMS
- Analysis of materials science
- Mechanical synchronization
- Digital image control
- Life sciences
- Production line testing
- Aerospace equipment

