

# TDS

## Timing Distribution System

**MenloSystems**

### APPLICATIONS

Timing distribution for

- free electron lasers
- synchrotron beam lines
- radio telescope arrays
- particle accelerators
- laser research centers
- laser amplifier chains

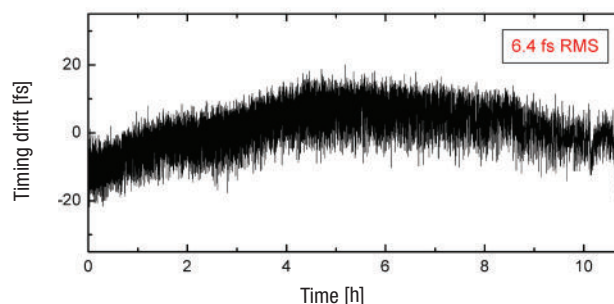


Menlo Systems' Timing Distribution and Synchronization System (TDS) is a solution for the distribution of stable optical frequencies and for the maintenance of synchronization and timing in large scale facilities.

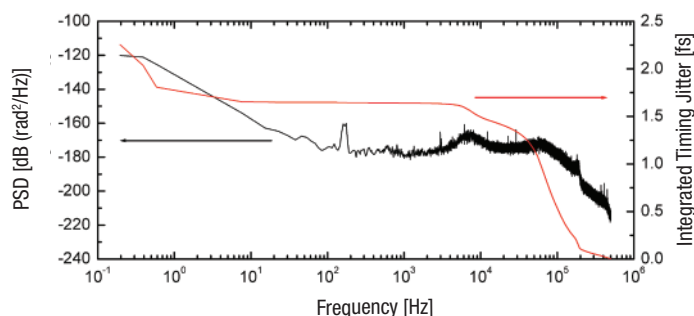
The system is fully integrated and remote controllable. A mode locked laser is used as the Optical Master Oscillator (OMO) which is synchronized to a low-noise RF oscillator or a cavity stabilized CW laser, to obtain optimum phase noise performance both close to and far away from the carrier. The signal from the laser is amplified using our Source Distribution Amplifier (SDA), and split up using our fully in-fiber design Splitter Box (SPBox) into the required number of ports. The pulsed, stable laser signal is then distributed across the facility using our Stabilized Fiber Links (SFL) to remotely synchronize lasers or RF systems with unprecedented overall precision and stability. Optionally, a drift-free a Pulse-Per-Second (PPS) signal is offered at each system backend with programmable frequency and delay. With all components such as the laser system, optics parts, electronics, and RF generation manufactured by Menlo Systems the TDS is an all-from-one solution allowing close interaction between user and manufacturer for fast and efficient system integration.

### MEASUREMENT DATA

Out-of-loop long term timing drift between two stabilized fiber links, measured below 1 Hz:



Out-of-loop timing jitter power spectral density (PSD) and integrated timing jitter between two stabilized fiber links, measured from 0.5 MHz to 0.2 Hz:



## Timing Distribution System

### OPTICAL UNIT

Added timing jitter (short term)*	<4 fs	integrated, [0.1 Hz, 500 kHz]
Added timing drift*	<10 fs	RMS over 8 hours
Fiber link length	<400 m	
Fiber links per TDS platform	up to 7	upgradable anytime to 14
Output type at backend	optical and RF	
Optical power per client	>10 mW	
Optical wavelength	1560 nm	
Design pulse repetition rate	50 - 250 MHz	to be specified prior to system order
Dimensions of one TDS platform enclosure	1156 x 986 x 182 mm <sup>3</sup>	
Drift-free pulse-per-second (PPS) distribution	optional	PPS output at system's backend with programmable frequency and delay; two independent channels
RF signal outputs at backend**	optional	low-noise RF signals at 5, 10 and 100 MHz; phase coherent to the optical pulses
GHz-signal extraction at backend**	optional	low-noise, low-drift RF signal with frequency in the range of 1 - 6 GHz
Ambient temperature requirement	20 – 25 °C	
Ambient temperature variation requirement	±1 °C	for full specifications
<b>SYSTEM ELECTRONICS</b>		
System control electronics	included	19" rack housing
Length of connector cables to optical units	max. 6 m	
Integrated feedback	included	SYNCRO-RRE for locking of the OMO to the RF reference
Control system interfaces	USB/RS232	
Auto lock	included	
Ambient temperature requirement	15 – 25 °C	
Ambient temperature variation requirement	±1 °C	for full specifications
*Stability and drift determination in-house and on user site		
** Please contact us for further details		

