



Specifications sheet: Synchronizer

Introduction

The synchronizer is designed to synchronize a mode-locked 75-MHz Ti:Sapphire laser system to an 3 GHz oscillator with less than 100 fs phase jitter. In pump-probe measurements it is the delay between the pump and the probe which is of prime importance. Changing the frequency of the oscillator with the highest control bandwidth is to be preferred, because in a stable well-designed feedback system this bandwidth will determine the residual jitter. The control bandwidth of electronic oscillators often exceeds the control bandwidth of laser oscillators by more than three orders of magnitude. Typically, the control bandwidth of the 75-MHz laser oscillator is of the order of 1 kHz compared to a few MHz for the 3-GHz electronic oscillator. By making the laser the master oscillator in the design of the PLL Synchronizer the relative phase-jitter is improved by almost 2 orders of magnitude, resulting in an RMS jitter of less than 100 fs

Applications

- Ultrafast electron diffraction
- ToF electron energy loss spectroscopy
- RF Acceleration

Features

- External photodiode
- Synchronized 3 GHz output
- Phase error output
- Remote control
- In-range relay

General

Operating temperature : 0 – 40°C

RF

Central frequency : 2.9985 GHz
frequency range : ± 1.5 MHz
RF output : SMA connector - 50 Ω - 10 dBm
RF switch : BNC connector - 50 Ω - TTL
Switch loop open/close : constant frequency (2.9985 GHz) in case opened
RF phase error output : BNC connector - 150 Ω - ± 3 V, typical 0.1 mV rms
Phase control : Dial or Remote (minimal 0 – 2π rad)
Phase stability : < 2 mrad or < 100 fs

Electric

Power supply : 110 or 230V (auto switching)
Ratio monitor : Digital front panel meter
In-range relay : Back panel connectors, max +24 V and 50 mA

Photodetector

Type : Centronic AEPX65
Photodetector bias : SMA connector (+15 V)
Central wavelength : 800 nm
Input power : > 10 mW

Dimensions

Size : 19" \times 3U \times 500 mm
Weight : ~ 9 kg

Technical drawing

