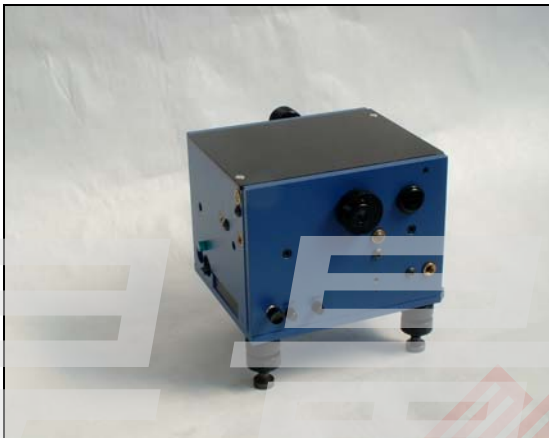




**FEMTOCHROME<sup>®</sup>**  
**RESEARCH, INC.**

## FR-103PD

### RAPID SCANNING AUTO/CROSSCORRELATOR



#### Specifications:

- Resolution < 1fs
- Scan Range > 50ps
- Pulse Width Range: 5fs - 15ps
- Interferometric
- Polarization insensitive
- Fiber Coupled/Free space
- Computer Interface
- Any Rep Rate (> 4Hz)
- Compact Size: 4.25" x 5" x 5.5"

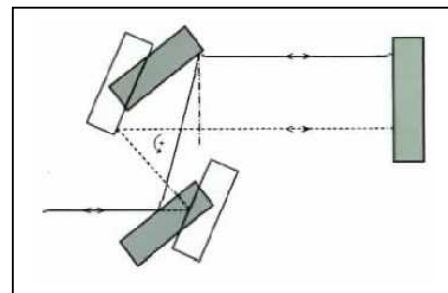
The FR-103PD Autocorrelator utilizes Two Photon Conductivity (TPC) in photodetectors\*. The NL crystal/PMT combination of conventional autocorrelators (FR-103XL, FR-103MN) is replaced by a photosensor in the TPC mode, acting as both the NL element and detector. The stringent phasematching condition of the NL crystal being eliminated, polarization sensitivity and wavelength dependence are greatly reduced, resulting in a simple operation with easy alignment.

#### DISPERSION-FREE, HIGH RESOLUTION

Using only metallic high-reflective optics [the sole transmissive element is an ultrathin (~1 $\mu$ m) pellicle beamsplitter] dispersion-free operation with high resolution is attained. Resolution is limited by the generally broad wavelength response of the photosensors.

#### ROTATING PARALLEL MIRROR ASSEMBLY

FEMTOCHROME's rotating //mirror assembly\*\* is utilized to generate periodic linear delay, with a scan range of > 50ps, convenient for pulse width in the fs to < 10ps domain. [For longer pulses, FR-103XL (> 175ps scan range) is recommended.]



\* Y.Takagi, et al., Opt. Lett., V.17, 658 (1992)

\*\* Z.A.Yasa and N.M.Amer, Optics Commun., V36,406 (1981)

## **HIGH SENSITIVITY**

Depending on the photosensor module, detectable signal level can be as low as  $P_{av}P_{pk} = (10)^{-6}W^2$ , for a resolution of 1ps. Lower resolution settings require proportionally higher signal levels.

## **INTERFEROMETRIC OPERATION**

The collinear Michelson set-up of the FR-103PD is of interferometric resolution and provides fringe resolved autocorrelation, when the highest resolution setting is selected.

## **OPTIONS:**

### **WAVELENGTH RANGE (/600, /800, /1400)**

Different wavelength ranges are covered by a set of easily interchangeable photosensor modules. Three detectors are available for the wavelength range of 600-2000nm: [/600 (600-1100nm)], [/800 (800-1400nm)], [/1400 (1400-2000nm)]. Each module operates over a range determined by the strength of the NL (2nd order) absorption as compared to the linear absorption. The linear response is increasingly significant towards shorter wavelengths and limits the detector wavelength range. As a general rule, a low duty cycle is an essential requirement ( $P_{pk} > 10P_{av}$ ). Operation close to the short wavelength edge of a detector's range may require a much lower duty cycle.

### **FIBER COUPLED/VARIABLE APERTURE INPUT (/FC/VA)**

The input port of the FR-103PD must be ordered as fiber coupled (/FC)(FC/PC or FC/APC) or with a variable aperture (/VA) for a free-space beam.

### **CROSSCORRELATION OPTION (/CC)**

An auxiliary port is provided in the FR-103PD for the input of a second beam for crosscorrelation. An extra corner-mirror is required for this option. An optional Fiber Adapter (/FA) can be installed at this port for use with fiber coupled beams. Other detector modules may be necessary for crosscorrelation, depending on the wavelengths of operation.

### **COMPUTER DATA ACQUISITION OPTION (/CDA)**

Optionally, an A/D converter is installed in the FR-103PD. Using its associated interface and application software, signal display, averaging and analysis in a PC is facilitated. In conjunction with a laptop PC, a complete and compact ultrashort pulse monitoring system is obtained.

### **LOW REP RATE OPTION (/LRR)**

The rotation rate of the // mirrors can be locked to the rep rate (or submultiple) of the input beam, with linear phase modulation. Using this option in conjunction with the /CDA, autocorrelation traces can be accumulated in the order of 10secs, and continuously monitored for input rep rates as low as 4Hz.

### **kHz REPETITION RATE VERSION (/kHz)**

The // mirror assembly is converted to operate in a differential delay mode, for rapid scan ('real-time') monitoring of amplified fs pulses (< 2ps) at kHz rep rates, on a standard oscilloscope.

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## **SPECIFICATIONS**

Resolution :	< 1fs
Scan Range :	> 50ps
Pulse Width Range:	5fs - 15ps
Wavelength Range:	600-2000nm
Dimensions :	4.25" x 5" x 5.5"