



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

2123 4<sup>th</sup> St., Berkeley, CA 94710 Ph#: 510-644-1869, Fx#: 510-644-0118  
e-mail: sales@femtochrome.com; http: [www.femtochrome.com](http://www.femtochrome.com)

## FR-103MC AUTOCORRELATOR



### Specifications

- Sensitivity  $(P_{av}P_{pk})_{min} : 10^{-4}W^2$
  - Resolution: ~ 1fs
  - Scan Range: > 50 ps
  - Wavelength Range: 420–3400nm
  - Interferometric
  - Polarization Insensitive (TPC)\*
  - Free-Space/Fiber-Coupled (/FA)
  - Computer Interface
  - Any pulse rep rate > 4Hz (w/CDA)
- \* Vertical polarization provides higher R/T ratio for pellicle beamsplitters

The **FR-103MC** is a low cost, palm-size interferometric Autocorrelator utilizing TPC (Two Photon Conductivity). Its collinear Michelson interferometer geometry yields interferometric autocorrelations. Ideal for OEM applications, the **FR-103MC** is suitable for a pulsewidth range of 5fs – 15ps. It is easy-to-use with good sensitivity and excellent resolution.

Optional Fiber Adapter (/FA) renders the **FR-103MC** alignment free for FC fiber-coupled inputs. It can be supplied with the Computer Data Acquisition (/CDA) option, for the display and analysis of autocorrelation traces on a PC.

The **FR-103MC** works with any input pulse rep rate >4Hz with the /SSO and /CDA options. (The standard version is suitable for any pulse rep rate >500Hz.)

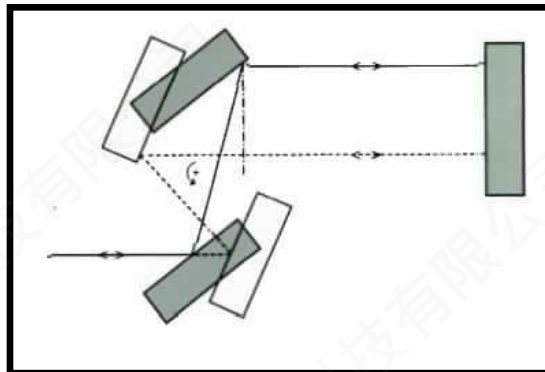
## DISPERSION-FREE, HIGH RESOLUTION

Dispersion is negligible in the **FR-103MC**. Using high reflective metallic-coated optics [the only transmissive element is an ultrathin ( $<1\mu\text{m}$ ) pellicle beamsplitter], an unprecedented resolution of  $\sim 1\text{fs}$  is attained.

With its high resolution, the **FR-103MC** is capable of measuring pulsewidths as low as  $\sim 5\text{fs}$ .

## ROTATING PARALLEL (//) MIRROR ASSEMBLY

Rapid scan, periodic optical delay is introduced by means of a parallel (//) mirror assembly.\* This unique mechanism results in uniform and error-free delay generation with interferometric resolution.



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

## NONLINEAR PHOTSENSOR MODULES

The NL detector module selections for the **FR-103MC** are:

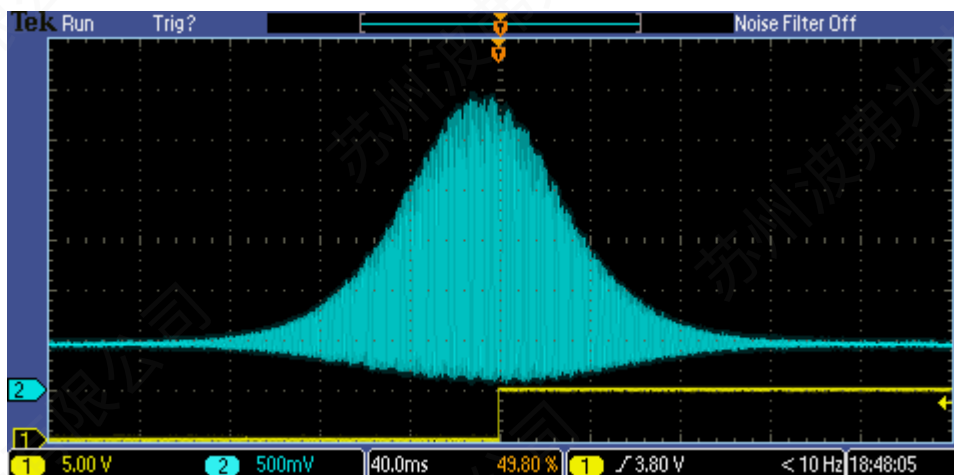
- /400 → 420-700nm
- /700 → 700-1200nm
- /1100 → 1200-2200nm
- /2200 → 2200-3400nm

## SLOW SCAN OPERATION

There are two modes of operation for the delay generating // mirrors of the **FR-103MC**:

1. Uniform rotation ( with a refresh rate typically >2Hz)
2. Controlled movement such that the // mirrors slow down greatly (4 selectable speeds ) over a period when the pulses on the two arms of the Michelson Interferometer set up are overlapping. The // mirror assembly speeds up beyond this range, to return quickly, for a repetition of the cycle.

Whereas the uniformly rotating // mirrors mode is suitable for typically > 100kHz rep rate lasers, the latter mode renders the **FR-103MC** suitable for 'real-time' autocorrelation for any rep rate > 500Hz. This is particularly useful for kHz amplified lasers.



Fringe resolved trace of a 450fs pulse at 1552nm, w/FR-103MC operated in the SS/SP3 mode.

## FIBER ADAPTER OPTION (/FA)

An optional gimbal mount with a collimator can be installed over the variable input aperture of the **FR-103MC**, for easy connection of fiber-coupled beams. Factory aligned, repeated connections without a need for realignment is facilitated. The /FA is easily removable for a free-space input beam. Its standard adapter is FC [FC/PC or FC/APC]. For operation at 1550nm, a PM-DSF patchcord can be attached to the /FA. The collimator of the /FA is focus adjustable to obtain good collimation if its use at greatly different wavelengths is needed. A  $\lambda/2$  plate holder is also provided within the /FA assembly, for the user to install one for his wavelength of operation, if needed for polarization control.

## COMPUTER DATA ACQUISITION (/CDA)

A data acquisition board installed in the **FR-103MC/CDA** provides a USB interface with a Windows PC. Its associated software allows traces to be displayed, analyzed [averaged and/or fit with typical pulseshapes (Gaussian and Sech<sup>2</sup>)] or saved.

## SPECIFICATIONS:

- \* Resolution: ~ 1fs
  - \* Scan Range: > 50ps
  - \* Sensitivity:  $[P_{av}P_{pk}]_{min}=10^{-4}W^2$
  - \* Wavelength Range: 420-3400nm
  - \* Interferometric
  - \* Polarization insensitive\*
  - \* Any rep rate > 4Hz (w/CDA)
  - \* Free space/ Fiber coupled (/FA)
  - \* Computer Interface (/CDA)
- \* Vertical polarization yields higher signal due to better R/T ratio for pellicle beamsplitters



2123 4<sup>th</sup> Street, Berkeley, CA 94710 Ph#: 510-644-1869, Fx#: 510-644-0118  
e-mail: sales@femtochrome.com; http: [www.femtochrome.com](http://www.femtochrome.com)