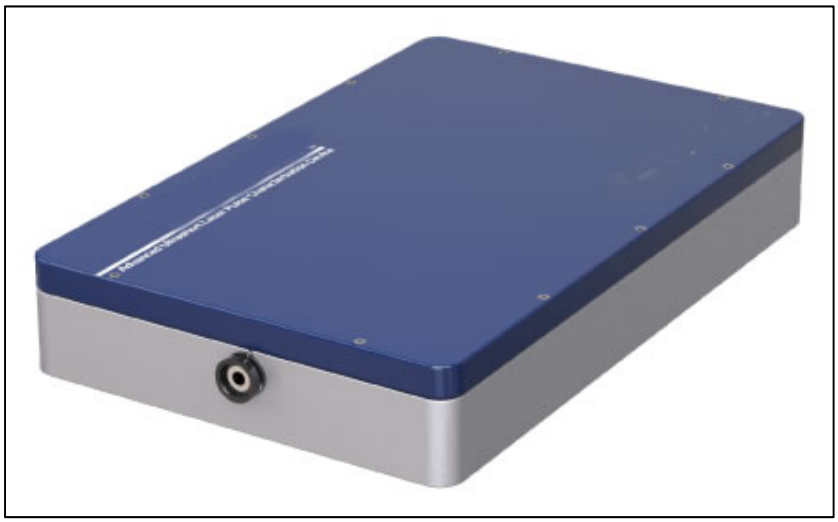
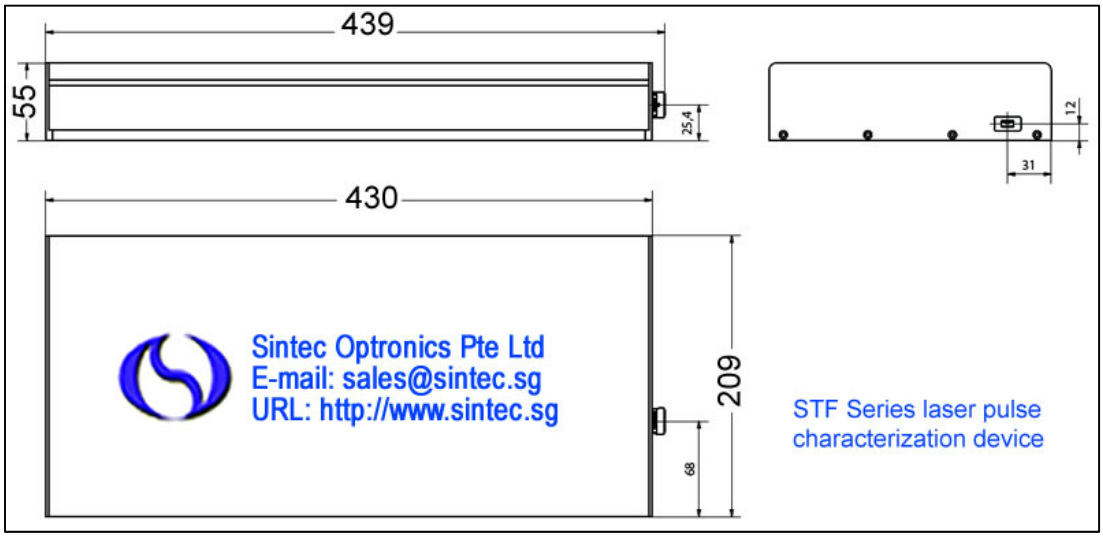
Sintec Optronics

Advanced Ultrashort Laser Pulse Characterization Device

STF series advanced ultrashort laser pulse characterization device is a real-time ultrashort laser pulse characterization device specifically engineered to provide a high-resolution measurement for ultrafast oscillators and amplifiers. It is an essential piece of equipment for everyone who depends on accurate information about properties of their ultra-short pulses. With the device you get more than just a single result. You can watch your pulse evolving in real time.



Part number	STF
Fourier transform-limited pulse duration	60 - 400 fs
Input central wavelength	1010 - 1070 nm (other on request)
Maximum chirped pulse duration	4 ps
Maximum dispersion	<80000 fs^2
Repetition rate	1 kHz — 200 MHz
Sensitivity	>0.5nJ at 80MHz; >100nJ at 1kHz
Input polarization	Linear, vertical
Integrated high-resolution spectrometer (USB 2.0)	Included
User-friendly software and manual	Included
Automated tuning	Optional
Electrical: Manual version Automated version	USB powered (5V, 500mA) 100-240VAC, 50/60Hz, <70W
Operating temperature	15-25°C
Operating humidity	Non-condensing
Size (including spectrometer) (LxWxH)	430x200x55mm



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Sintec Optronics

STFE Series Ultrafast Instrumentation (No Alignment!)

We are a company specialized in ultrafast metrology. We have a strong expertise in the production and characterization of high energy ultrashort pulses and we provide robust and reliable measurement devices for ultrafast lasers, already in use in several state of the art laboratories.

Our current product-line includes all the useful instruments to characterize and manage ultrafast lasers. We provide innovative devices for temporal measurement (ROC and FROG), spectral measurement (MISS spectrometer) and spatial measurement (BeamPro). They are suitable for a broad wavelength range (from UV to mid-IR) and a large pulse duration range, from 5 fs to 80 ps. Our latest addition to our range of products is an innovative, ultra compact, frequency converter for harmonic generation directly coupled to your ultrafast laser.

Beside their intrinsic technical performances, our products are very easy to use, compact, portable and versatile, which make them the ideal tools for customer services. The products are associated with a high quality user-friendly software which contributes to making them easy and pleasant to use. We also make custom products upon request and provide our expertise on ultrafast metrology.

VERY EASY TO USE
Our 2 major products can be installed in only 2 minutes with no necessary calibration. It comes in an ultra compact (55x56x195mm) package for the long pulse model and a 55x56x265mm package for the fs one.

ACCURATE AND ALIGNMENT FREE
Our products are designed to provide accurate and reliable measurements, whatever the experimental conditions. They can yield proper measurements without caring about the accuracy of the alignment.

INTUITIVE, POWERFUL SOFTWARE
Our software can run either on Linux or Windows. It is highly optimized and specifically designed from the ground up to provide accurate control and readings of our products.

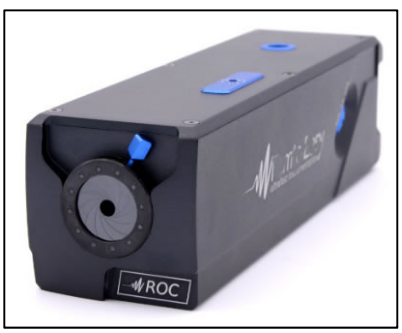
1. STFE Series Autocorrelators

Autocorrelators are used to measure pulse duration. The basic principle is to create two copies of the incoming beam, with a beam splitter. Those copies are superimposed in a nonlinear medium, where they interact generating a third beam. As the overlap of the two copies depends on the pulse duration, analysing the third beam allows to calculate the pulse duration.

We supply different types of autocorrelators. The ROC autocorrelator is a single-shot autocorrelator, thus it needs one single pulse to measure the duration. It is very compact and extremely easy to use. Only two minutes are necessary to get the measurement. The MS-ROC autocorrelator is a multi-shot autocorrelator. It uses an optical delay line to scan the delay, and each pulse allows to know the intensity for a particular delay. It can measure pulses with energy as low as 50 pJ.

1.1 STFE-ROC Series Ultra Compact Single-shot Autocorrelator (Alignment-free!)

ROC stands for Row Optical Correlator. Based on an ultra compact and robust inline setup, the ROC allows the measurement of single-shot autocorrelation traces. Specifically designed to offer the easiest user experience, they cannot be misaligned and no calibration or tweaking is needed. Also, they are easily transportable. And yes, they are rock-solid! Besides those advantages, the ROC autocorrelators provide excellent technical performances and highly accurate measurements. The ROC autocorrelators are available for different wavelength ranges and several pulse durations.



Features:
- Ultra compact
- Installation and measurement in less than 2 minutes! No calibration necessary
- Suitable for any repetition rate
- Single-pulse extraction possible up to 150 kHz laser repetition

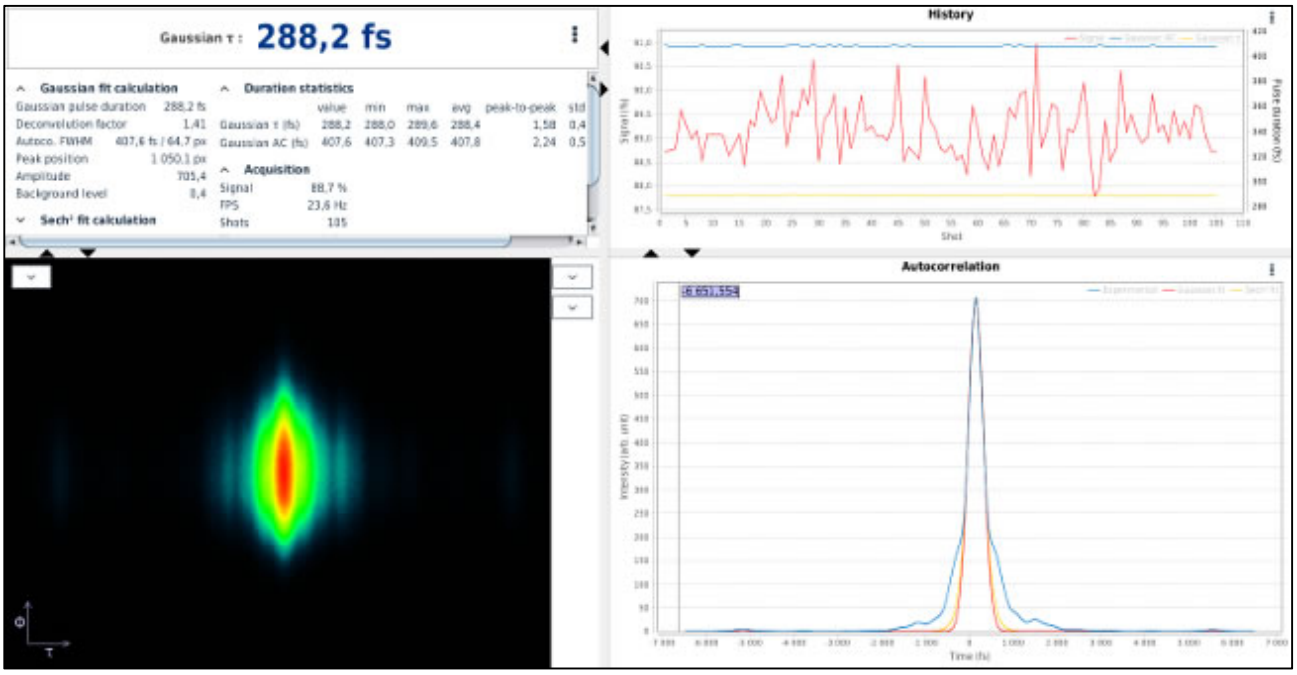
rate (with Enhanced detection option)
- User-friendly and powerful software (STAR : Software Technology for Acquisition and Retrieval)
- Input pulse energy from few pJ to few mJ
- Acceptable average power up to 3.5 W
- Pulse measurement from 5 fs to 10 ps
- Broad available spectral range

Models		STFE-ROC-FC	STFE-ROC-FS	STFE-ROC-PS1	STFE-ROC-PS3	STFE-ROC-PS5	STFE-ROC-PS10
Pulse duration range	min	5 fs	20 fs	50 fs	70 fs	100 fs	300 fs
	max	150 fs	500 fs	1 ps	3 ps	5 ps	10 ps
Accessible spectral range (nm)		480 - 2100[1]					800 - 2100[1]
Input pulse repetition rate		single-shot to GHz[2]					
Single-pulse measurement		up to 150 kHz laser repetition rate (with Enhanced detection option, or 40 kHz without)					
Min input pulse energy[3]	Single-shot	1 µJ (10 nJ with low-energy option)					
	1 MHz	10 nJ (500 pJ with low-energy option)					
	1 GHz	50 pJ (low-energy option required)					
Input polarization		linear horizontal or vertical					
Detection		CMOS 12 Bits - 3 Mpx - 72 dB					
PC Interface		USB 3.1 (or GigE as an option)					
Beam height (mm)		adjustable from 30 mm					
Dimensions (mm)		55 x 56 x 265		55 x 56 x 195			

1. Effective spectral bandwidth to be defined within the accessible spectral range according to customer's requirements
2. The measurements are averaged over several pulses for laser with repetition rate higher than 150 kHz. Custom versions available on request. For lower power and wider pulse duration ranges, Multi-Shot scanning versions are available (STFE-MS-ROC).
3. Those values give an order of magnitude. The exact sensitivity depends on many parameters (pulse duration, beam profile, wavelength…)

Options
- Enhanced detection: Replacement of the default camera embedded in the ROC by a higher performance one to increase the specifications of the system (better temporal resolution, single-shot extraction up to 150 kHz)
- Fiber input connector: Plug & play collimation module with fiber connector. Can be mounted on the ROC to easily switch the input from free-space to fiber. No alignment required.
- High dynamic range: Software mode to increase the dynamic of the ROC signal acquisition from 12 to 16 bits. Not compatible with pure single-shot measurement as 2 images are necessary to build one autocorrelation trace
- Low energy: Internal or external module (depending on ROC model) to increase the sensitivity of the device when the laser power is too weak
- Phase matching: Default ROC configuration works for a given central wavelength. Phase matching allows tuning the SHG crystal to measure different central wavelengths with the best SNR
- Small beam: Internal or external module (depending on ROC model) to increase the input beam diameter when it is too small (necessary for beams typically in the range of few mm or less)
- Trigger: Synchronization of the ROC detection to an external signal for accurate laser single pulse extraction up to 80 kHz (150 kHz with the Enhanced detection option)

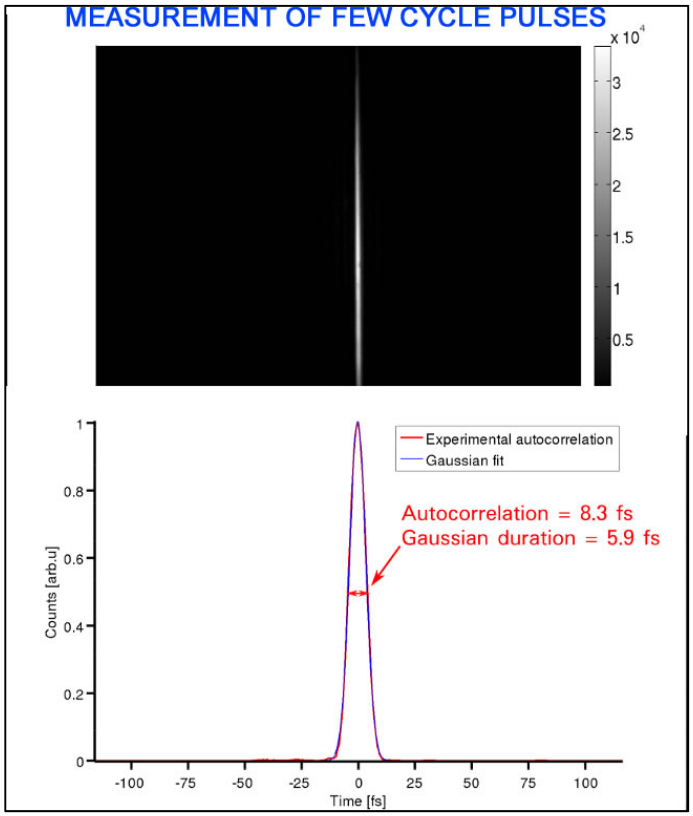
Software:
Our software has been designed to be user friendly and intuitive. This is a modern software compatible with touchscreen that can run either under Linux or Windows. It allows distant control of the devices via PC, tablet or smartphone. We can also provide custom software developments upon request.

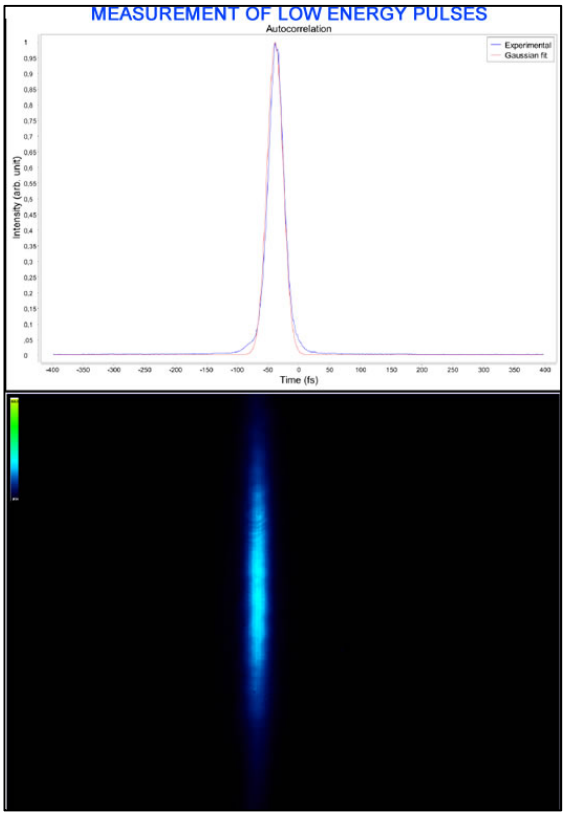


- Live extraction of shot to shot pulse duration
- Different calculation methods available for proper pulse estimation (Raw data FWHM, Gaussian fit, sech2…)
- Enhanced background & hot pixels treatment, for optimum dynamic and signal to noise ratio
- Client / Server interface, allowing remote control through network
- All data exportable into most common formats

Measurement of few cycle pulses:
This is an autocorrelation measurement sample of ultrashort pulse that has been performed in Politecnico di Milano with our short pulse model autocorrelator. On the top, the raw image of the spatially resolved autocorrelation trace. At the bottom, the analysed autocorrelation trace integrated over the spatial coordinate. The experimental data (in red) are fitted by a Gaussian function (in blue). The full width at half maximum of the autocorrelation trace is 8.3 fs. The corresponding Gaussian pulse duration is 5.9 fs.

Measurement of low energy pulses:
This measurement has been performed on a femtosecond Ti:Sapphire oscillator at LCAR with our autocorrelator. The average power used for the measurement was with only 20 mW at 62 MHz repetition rate. It means that in this conditions 0.3 nJ per pulse was enough to get a clean measurement. At the bottom, the raw image of the spatially resolved autocorrelation trace. On the top, the analysed autocorrelation trace integrated over the spatial coordinate. The experimental data (in blue) are fitted by a Gaussian function (in red). The full width at half maximum of the autocorrelation trace is 30.4 fs for a Gaussian pulse duration of 21.5 fs.





1.2 STFE-MS-ROC Series Multi-shot Autocorrelators

MS-ROC stands for Multi-Shot Row Optical Correlator. The MS-ROC allows the measurement of autocorrelation traces. It is based on second harmonic generation, making it reliable and compact. It has been specially developed for sources with sub-nJ energy per pulse. It allows the measurement of pulses from 50 fs to 40 ps in the standard version. With its high scan speed, real-time operations is possible for measurement and optimization. The MS-ROC-LP can perform scan at 130 ps/s, making it the fastest scanning autocorrelator on the market. Also, the MS-ROC-SP allows the measurement of both ultra-short and long pulses thanks to its dual-mode (standard mode for pulse duration > 50 fs and fine-scan mode for pulse < 50 fs). Like every products, the MS-ROC is easy to install and use.

FEATURES

- Ultra simple alignment (2 min to setup)
- Large pulse duration measurement range (from 5 fs to 80 ps)
- High sensitivity (sub-nJ pulse)
- User-friendly and powerful software (STAR : Software Technology for Acquisition and retrieval)
- Broad available spectral range
- Fiber connector available (FC/APC, FC/PC)

Models		STFE-MS-ROC	STFE-MS-ROC-LP	STFE-MS-ROC-SP	STFE-MS-ROC-SLP
Pulse duration range	min	50 fs	100 fs	5 fs	25 fs
	max	40 ps	80 ps	40 ps	80 ps
Fine scan mode range		not applicable	not applicable	5 – 50 fs	25 – 500 fs
Accessible spectral range (nm)		480 - 2000 [1]			
Minimum temporal resolution		6.7 fs	13.4 fs	standard : 6.7 fs fine scan : 0.1 fs	standard : 13.4 fs fine scan : 0.2 fs
Scan speed		> 65 ps/s	> 130 ps/s	standard : > 65 ps/s fine scan : > 50 fs/s	standard : > 130 ps/s fine scan : > 500 fs/s
Input pulse repetition rate		100 Hz to GHz [2]			

Min input pulse energy[3]	1 MHz	100 pJ	100 pJ	5 nJ	500 pJ
	100 MHz	5 pJ	5 pJ	500 pJ	50 pJ
Input polarization		linear vertical			
Detection		CMOS 12 Bits – 3 Mpx – 72 dB			
PC Interface		USB 3.1			
Beam height (mm)		69 - 148			
Dimensions (mm)		222 x 194 x 129		326 x 194 x 129	

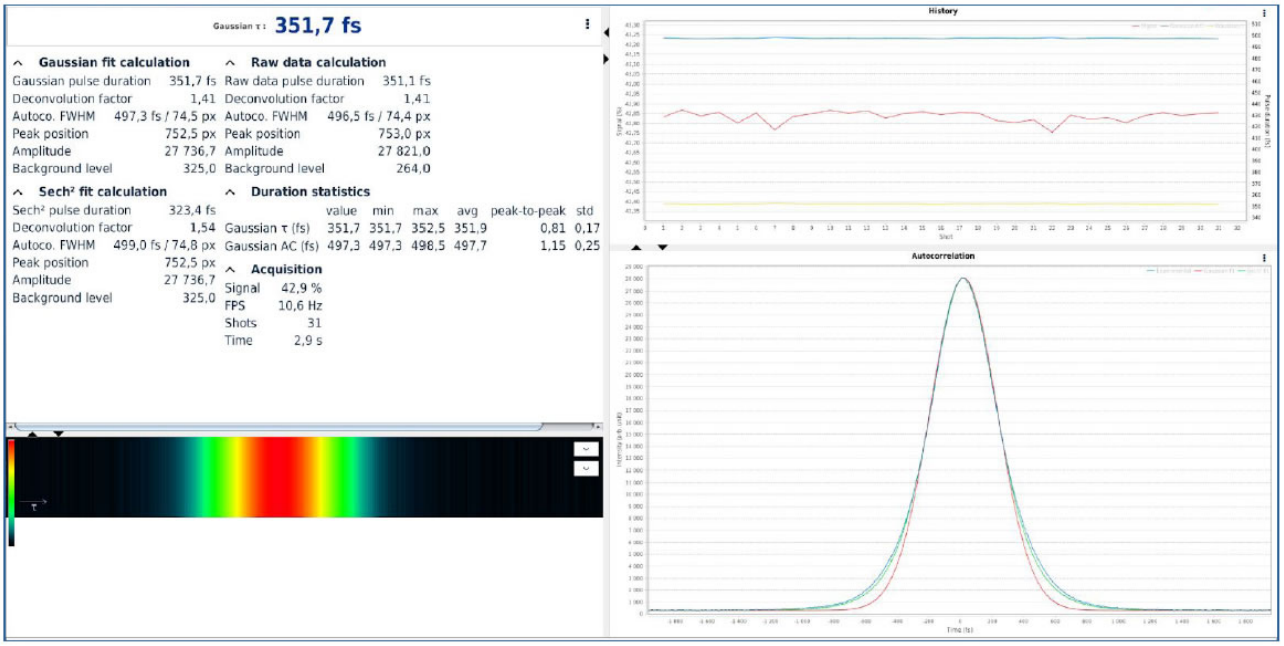
1 Effective spectral bandwidth to be defined within the accessible spectral range according to customer's requirements.
2 Low repetition rate available as an option.
3 Those values give an order of magnitude. The exact sensitivity depends on many parameters (pulse duration, beam profile, wavelength…)

OPTIONS:

- Additional crystals: The default MS-ROC configuration includes one crystal. To extend the wavelength range of the device, additional plug & play crystals can be ordered and swapped within the system in seconds
- Fiber input connector: Plug play collimation module with fiber connector. Can be mounted on the MS-ROC to easily switch the input from free-space to fiber. No alignment required.
- Low energy: Internal module to increase the sensitivity of the MS-ROC when the laser power is too weak
- Low repetition rate: Synchronization mode to be used when the laser repetition rate is low. Mandatory for 100 Hz and lower, recommended from below 500 Hz
- Phase matching: Default MS-ROC configuration works for a given central wavelength. Phase matching allows tuning the SHG crystal to measure different central wavelengths with the best SNR

SOFTWARE

Our software has been designed to be user friendly and intuitive. This is a modern software compatible with touchscreen that can run either under Linux or Windows. It allows distant control of the devices via PC, tablet or smartphone. We can also provide custom software developments upon request.



- Different calculation methods available for proper pulse estimation (Raw data FWHM, Gaussian fit, sech2…)
- Enhanced treatment for real time simultaneous data extraction
- Client / Server interface, allowing remote control through network
- All data exportable into most common formats

2. STFE-FROG Series Characterization of Ultrashort Pulses

FROG stands for Frequency-resolved Optical Gating. It is a technique for a complete characterization of ultrashort pulses, thus it can retrieve the full time-dependant electric field, and the equivalent optical spectrum with spectral phase. In other words, FROG allow you to know the duration of your pulses, but also how to deal with spectral phase to reach the shortest possible duration.

We supply two types of FROG. The Fast FROG is a single-shot FROG, thus it needs one single pulse to measure the duration. Its innovative algorithm allow a real-time pulse retrieval. The MS-FROG is a multi-shot FROG. It uses an optical delay line to scan the delay, and each pulse allows to know the intensity for a particular delay. It can measure pulses with energy as low as 50 pJ. The same device can measure very short pulses and longn pulses, from 5 fs to 80 ps !

2.1 Fast FROG Series Single-shot Measurement

FROG stands for Frequency Resolved Optical Gating. Based on Second Harmonic Generation, Fast FROG is reliable and compact. Key design features, such as the wavefront division technique and the use of our mini imaging spectrometer MISS, make the Fast FROG very easy to use and versatile while leading to accurate measurements. Six models are available, covering different pulse duration ranges from sub-5 fs to 10 ps, over a broad spectral range. Two designs are available: one for long pulses mainly relying on transmission optics, and one for ultrashort pulses which is fully achromatic.

Key features

- Easy to use: no calibration and no tweaking necessary
- User-friendly and powerful software
- Can access Spatio-Temporal couplings (Spatial Chirp, Pulse Front Tilt)
- Versatile: instant-swap of spectrometer for different wavelength ranges
- Single-pulse extraction possible up to 150 kHz laser repetition rate (with Enhanced detection option)
- Achromatic and non-dispersive (FC and FS models)
- Sub-5 fs can be measured

Models		STFE-FROG-FC	STFE-FROG-FS	STFE-FROG-PS1	STFE-FROG-PS3	STFE-FROG-PS5	STFE-FROG-PS10
Pulse duration range	min	4 fs	10 fs	50 fs	100 fs	150 fs	300 fs
	max	150 fs	250 fs	1 ps	3.5 ps	5 ps	10 ps
Accessible spectral range (nm)		480 - 2100[1]					800 - 2100[1]
Spectral Window Δλ (nm)		580 [1]	420 [1]	300 [1]			
Input pulse repetition rate		single-shot to GHz[2]					
Single-pulse measurement		Up to 150 kHz laser repetition rate (with Enhanced detection option, or 40 kHz without)					
Min input pulse energy [3]	Single-shot	250 µJ	1 µJ	1 µJ			
	1 kHz	10 µJ	100 nJ	50 nJ			
	50 MHz	20 nJ	1 nJ	200 pJ			
	1 GHz	n/a	50 pJ	25 pJ			
Input polarization		linear horizontal or vertical					
Detection		CMOS 12 Bits - 3 Mpx - 72 dB					
PC Interface		USB 3.1 (or GigE as an option)					
Beam height (mm)		69 - 148					
Dimensions (mm)		326 x 194 x 129					

1. Effective spectral bandwidth to be defined within the accessible spectral range according to customer's requirements. Additional spectrometers can be provided to address different spectral windows.
2. The measurements are averaged over several pulses for laser with repetition rate higher than 150 kHz.
3. Those values give an order of magnitude, with "low energy" option when applicable. The exact sensitivity depends on many parameters (pulse duration, beam profile, wavelength...)

Options:

- Additional crystals: The default Fast FROG configuration includes one crystal. To extend the wavelength range of the device, additional plug & play crystals can be ordered and swapped within the system in seconds
- Additional MISS spectrometer: The default Fast FROG configuration includes one imaging spectrometer MISS. To extend the wavelength range of the device, additional plug & play MISS spectrometers can be ordered and swapped within the system in seconds
- Enhanced detection: Replacement of the default camera embedded in the Fast FROG by a higher performance one to increase the specifications of the system (better temporal resolution and spectral resolution, single pulse extraction up to 150 kHz)
- Fiber input connector: Plug & play collimation module with fiber connector. Can be mounted on the Fast FROG to easily switch the input from free-space to fiber. No alignment required.
- High dynamic range: Software mode to increase the dynamic of the Fast FROG signal acquisition from 12 to 16 bits. Not compatible with pure single-shot measurement as 2 images are necessary to build one FROG trace
- Low energy: Internal module to increase the sensitivity of the Fast FROG when the laser power is too weak
- Phase loop: Software mode to use the Fast FROG to perform spectral phase feedback loop with a pulse shaper (contact use to check pulse shaper compatibility)
- Phase matching: Default Fast FROG configuration works for a given central wavelength. Phase matching allows tuning the SHG crystal to measure different central wavelengths with the best SNR
- Pulse Front Tilt / Spatial Chirp measurement: Measurement of spatio-temporal couplings in the software. Correction of FROG trace accordingly for better accuracy of the retrieval
- Small beam: Internal module to increase the input beam diameter when it is too small for the Fast FROG (necessary for beams typically in the range of few mm or less)
- Trigger: Synchronization of the Fast FROG detection to an external signal for accurate laser single pulse extraction up to 80 kHz (150 kHz with the Enhanced detection option)

2.2 MS-FROG Series Multi-shot Measurements

MS-FROG stands for Multi-Shot Frequency Resolved Optical Gating. The MS-FROG is based on second harmonic generation, making it reliable and compact. It has been specially developed for sources with energy per pulse of less than 1 nJ. It allows the measurement of pulses from 50 fs to 40 ps in the standard version. The scan speed is so high that it allows real-time operations for measurement and optimization. The MS-FROG-LP can perform scan at 130 ps/s, making it the fastest scanning FROG on the market. Also, the MS-FROG-SP allows the measurement of both ultra-short and long pulses thanks to its dual-mode (standard mode for pulse duration > 50 fs and fine-scan mode for pulse < 50 fs). On top of that, our recently developed algorithm allows to extract information from each recorded spectra instantaneously, leading to real time reconstruction of your pulses! Like every products, the MS-FROG is easy to install and use.

Key features

◆ User-friendly: no calibration and no tweaking necessary
◆ Versatile: instant-swap of spectrometer for different wavelength ranges
◆ Large pulse duration measurement range (from 5 fs to 80 ps)
◆ User-friendly and powerful software
◆ High sensitivity (sub-nJ pulse)
◆ Broad available spectral range

Models		STFE-MS-FROG	STFE-MS-FROG-SP	STFE-MS-FROG-LP	STFE-MS-FROG-SLP
Pulse duration range	min	50 fs	5 fs	100 fs	25 fs
	max	40 ps	40 ps	80 ps	80 ps
Fine scan mode range		not applicable	5 - 50 fs	not applicable	25 - 500 fs
Accessible spectral range (nm)		500 - 2000[1]			
Spectral Window Δλ (nm)		From 200 to 700 [1]			
Minimum temporal resolution		6.7 fs	standard : 6.7 fs	13.4 fs	standard : 13.4 fs

			fine scan : 0.1 fs		fine scan : 0.2 fs
Scan speed		> 65 ps/s	standard : > 65 ps/s fine scan : > 50 fs/s	> 130 ps/s	standard : > 130 ps/s fine scan : > 500 fs/s
Input pulse repetition rate		100 Hz to GHz [2]			
Min input pulse energy [3]	1 MHz	500 pJ	10 nJ	500 pJ	1 nJ
	100 MHz	50 pJ	1 nJ	50 pJ	100 pJ
Input polarization		linear vertical			
Detection		CMOS 12 Bits - 3 Mpx - 72 dB			
PC Interface		USB 3.1			
Beam height (mm)		69 - 148			
Dimensions (mm)		326 x 194 x 129			

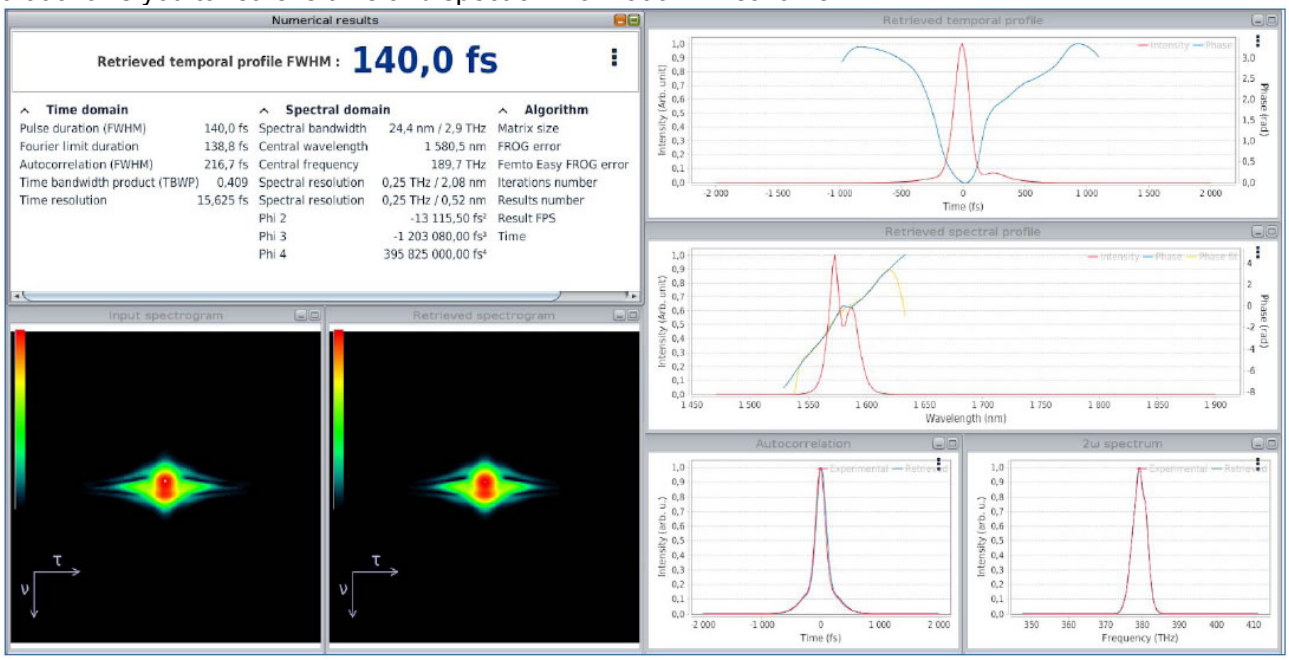
1. Effective spectral bandwidth to be defined within the accessible spectral range according to customer's requirements. Additional spectrometers can be provided to address different spectral windows.
2. Low repetition rate available as an option
3. Those values give an order of magnitude. The exact sensitivity depends on many parameters (pulse duration, beam profile, wavelength...)

Options:

- Additional crystals: The default MS-FROG configuration includes one crystal. To extend the wavelength range of the device, additional plug & play crystals can be ordered and swapped within the system in seconds
- Additional MISS spectrometer: The default MS-FROG configuration includes one imaging spectrometer MISS. To extend the wavelength range of the device, additional plug & play MISS spectrometers can be ordered and swapped within the system in seconds
- Fiber input connector: Plug & play collimation module with fiber connector. Can be mounted on the MS-FROG to easily switch the input from free-space to fiber. No alignment required.
- Low energy: Internal module to increase the sensitivity of the MS-FROG when the laser power is too weak
- Low repetition rate: Synchronization mode to be used when the laser repetition rate is low. Mandatory for 100 Hz and lower, recommended from below 500 Hz
- Phase matching: Default MS-FROG configuration works for a given central wavelength. Phase matching allows tuning the SHG crystal to measure different central wavelengths with the best SNR

2.3 Software

Furthermore it is very user friendly, the FROG software comes with an optimized retrieval algorithm, that allows you to retrieve time and spectral information in real time.



- Live extraction of shot to shot pulse properties: temporal profile intensity and phase, fundamental spectrum and phase, Chirp, Third-order dispersion...
- Several algorithms (including the Ptychographic Iterative Engine) are combined to enhance the reconstruction speed and quality
- Enhanced background & hot pixels treatment, for optimum dynamic and signal to noise ratio
- Client / Server interface, allowing remote control through network
- All data exportable into most common formats

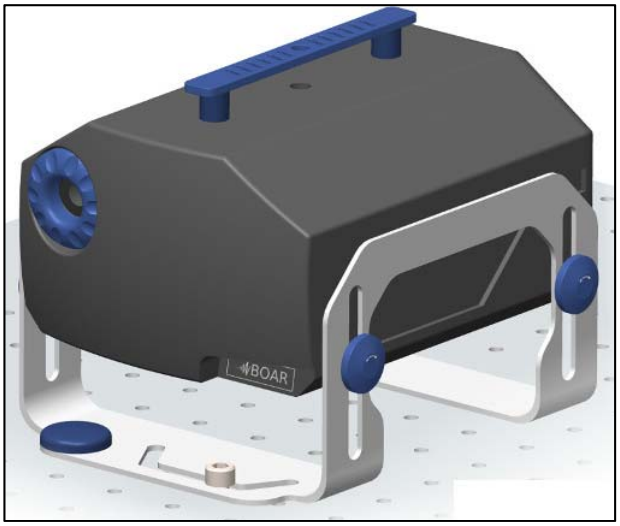
STFE-BOAR Series Autocorrelator Phase Retreival

BOAR stands for Biprism based Optical Autocorrelation with Retrieval. This is a new technique of ultrashort pulses characterization relies on interferometric single shot autocorrelation and two photon absorption. The time delay is encoded into a spatial interferogram which is used to evaluate the pulse duration, the 2ω spectrum and the chirp. There is no non-linear crystal and no phase matching issues, the spectral working range is therefore very broad (1200 - 2400 nm).

The BOAR is actually combining all the advantages : simple, extremely robust, accurate and reliable measurements, spatially resolved, suitable for rather chirped pulses and the retrieval is done in real time directly by Fourier transformation. Two models are available for two different temporal windows.

Features:

- Very easy to use
- Temporal and spectral measurement
- Real time chirp measurement
- No phase matching issues
- Broad spectral range
- Nonsensitive to polarization
- Suitable for any rep rate
- Single shot up to 150 kHz
- Sub-10 fs in the NIR
- Achromatic and non-dispersive



Software interface:
Like every product, the BOAR comes with a powerful and very user friendly software, especially designed for touch screens, in order to give you the best user experience.

Models	STFE-BOAR-FS	STFE-BOAR-PS
Pulse duration range [fs]	Sub-10 to 750 fs	Sub-10 to 1350 fs
Temporal window Δτ	3 ps	5.5 ps
Spectral range (nm)	1200- 2400 nm[1]	
Shot to shot measurement capacity	150 kHz with synchronisation 75 kHz without [1]	30 kHz with synchronisation 15 kHz without [1]
Input pulse repetition rate	From Hz to GHz	
Input pulse energy and average power (for 100 fs pulses)	Standard models Single shot: 100nJ 1 MHz: 5nJ / 5 mW 100MHz: 200 pJ / 20 mW	
	With low energy option Single shot: 5nJ 1 MHz : 100 pJ / 100 µW 100 MHz : 10pJ / 1 mW 1 GHz : 1 pJ / 1 mW	
Input polarization	Any	
Detection	CMOS 12 bit – 6 Mpx – 72 dB – USB 3.1	CMOS 12 bit – 18 Mpx – 72 dB – USB 3.1
Dimensions [mm]	125 x 150 x 80	

1. with a single optics set. The spectral range is directly accessible and there is no need for any manipulations.
2. Over 80 kHz, the measurements are average over several shots. The number of shots depends on the laser rep rate (ex: 4 shots for 200 kHz). Devices with higher shot to shot measurement capacity can be made upon request.

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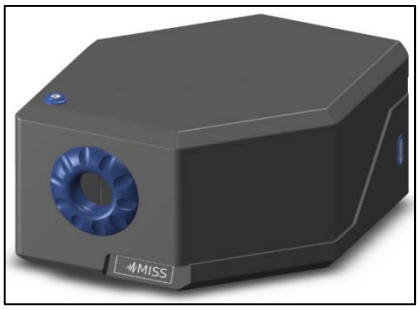
STFE Series Compact Imaging Spectrometer

STFE series imaging spectrometer is a Mini Imaging Spatial Spectrometer (MISS). This innovative spectrometer provides the same information as a spectrograph in a tiny footprint. The measured spectrum is spatially resolved along the incident beam diameter. The acquisition can be single shot up to 40 kHz. Thanks to its compact design, the MISS is easily integrable at different stages of amplified laser systems. It can be used in free space mode to take benefit of the spatial resolution, or with a fiber input, like a regular spectrometer.

Specifications:

- Powerful and user friendly software
- Compact design
- From 190 to 1100 nm models available
- High spatial and spectral resolution
- Input beam diameter up to 12.7 mm
- Fiber input compatible



Software Interface:
The MISS comes with a powerful and very user friendly software, especially designed for touch screens, in order to give you the best user experience.

Specifications:

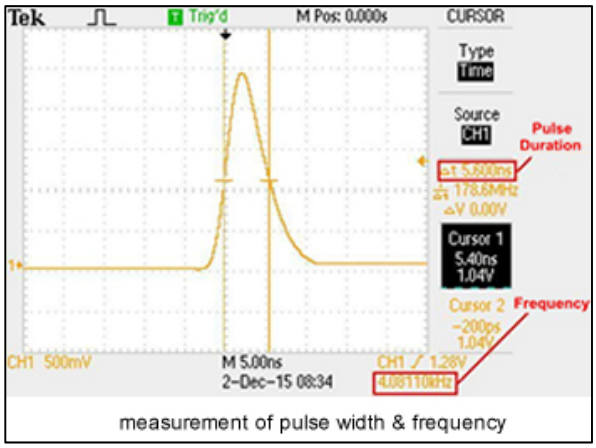
Models	STFE-UV-VIS1	STFE-UV-VIS2	STFE-IR1	STFE-IR2	STFE-Yb
Spectral range [nm]	190-865	190-635	655-1000	635-1100	960-1090
Resolution	2456x2054, 5Mpx				
Spectral resolution [nm]	0.28	0.22	0.14	0.23	0.06
Optical spectral resolution for 15µm slit [nm]	0.96	0.63	0.49	0.66	0.19
Input beam size [nm]	8.8	12.7	8.8	12.7	8.8
Max spatial resolution [µm]	4.3	5.2	4.3	5.2	4.3
Exposure time min–max [ms]	0.027 – 999				
Sensor type	CMOS 12 bits with 72 dB dynamic				
PC interface	USB 3, 36 frames per second				
Synchronisation	Yes				
Dimensions	130x77x53	155x77x53	130x77x53	155x77x53	130x77x53

Laser Pulse Parameter Measurement (High-speed Photodetector)

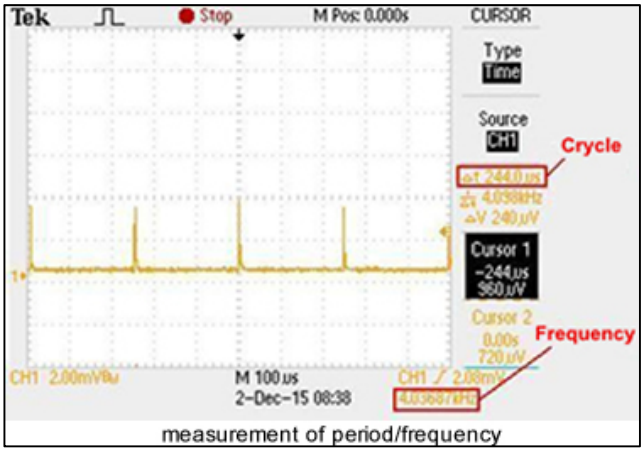
Laser pulse duration, usually refers to the interval between the time when the laser power maintains at a certain value. The pulse duration of different lasers can vary greatly.

High-speed photodetector combined with oscilloscope can monitor ultra-fast pulsed laser and measure pulse duration, frequency, period and other parameters of lasers.

Part number	STC-PD
Product name	High-speed photodetector
Wavelength	200-1100nm
Rise time	1ns, 5ns (optional)
Dimensions	Ultra-thin body [3/4 inch (19.1 mm)] can measure in narrow space
Battery	Internal A23 bias battery (accessory)



measurement of pulse width & frequency



measurement of period/frequency