LASERPOINT

Blink HS Short User Manual 8-Jul-2022 Rev01

P/N BM-W-50W-10-B

P/N BM-W-20W-14-T

P/N BM-A-25W-10-B

P/N BM-A-15W-14-T

P/N BM-A-10W-10-B

P/N BM-A-8W-14-T

P/N BM-A-5W-14-T

P/N BM-A-5W-10-B

(and -ENH versions)

and

P/N HSM-1000

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1. INTRODUCTION

The **Blink HS** line includes a series of instruments for the measurement of laser Energy that combine both the sensor (**Blink HS**) and the readout electronics (**Blink HSM**) connected via microwave cable.
Laser measurement is done by connecting directly the instrument to a PC via Ethernet cable.
The **Blink HS** is supplied with LaserPoint user-friendly Graphics User Interface (GUI) named “GIOTTO”.
The platform is designed to measure the energy of pulsed light sources, from UV to far IR, in the range of 1 kHz to 1 MHz (depending on the model), and from µJ to mJ energy/pulse range.
The following sections describe the basic measurement functionality of **Blink HS sensor head** and **Blink HSM meter**, including the Graphic User Interface.
Before using any product from the **Blink HS** line it is worth considering the following:

1. Laser Source: What specific laser has to be measured? Which sensor is the best suitable for that source, in terms of aperture, full scale, hardness of its absorber? What has to be measured: laser power or laser energy? Are the laser power, energy, and the power/energy densities exceeding the sensor ratings? (Please read carefully Blink HS specs and do not hesitate to contact our local distributor or directly LaserPoint at sales@laserpoint.it)
2. Instrument Settings: What settings have to be configured (for example, statistics, energy threshold, wavelength, and so on)?

2. SAFETY NOTES

Before operating the sensor head and its associated **Blink HS** electronics, carefully read the safety information to avoid both personal injuries and to prevent damage to the instruments.
Measuring a laser’s Energy, as well as the operation of a laser, is potentially dangerous. The instruments object of this manual may operate at high Energies and at wavelengths that may include non-visible laser radiation.

WARNING: never touch the HS sensor head active area (accessible from Laser aperture, Figure 1)

● Proper operating practices, in accordance with laser manufacturer’s recommendations, are crucial; to ensure that the correct operating procedures are followed, consult the laser manufacturer and your laser safety officer
● Eyewear and other personal protective equipment must be used in compliance with applicable laws and safety regulations

1. The user of this instrument must be trained in the use of lasers and their associated risks. LaserPoint is in no way liable for any damage resulting from misuse, carelessness, or use beyond the rated limits for the provided products.

2.Complete all the required safety procedures to work with laser beams and wear suitable appropriate personal protective equipment, such as laser goggles, protection glasses all the time while the laser is powered ON!

3.Before proceeding to measurements, check the cooling devices applied on the head.
● On heads with water cooling: Verify that water is flowing (when applicable) with the specified flux and temperature. Wait for at least 5 minutes to achieve the thermal stabilization of detectors and the maximum stability of electronics.

● On heads with forced air cooling: first connect the fan (when applicable) to the 12V DC power supply and wait for at least 5 minutes, after turn-on, to achieve the thermal stabilization of detectors and the maximum stability of electronics. Even at powers far lower than the head full scale, the fan must be connected and active.

WARNING!

4. **Specular and diffused back reflections**. Always pay attention to the specular and diffused back reflections originating from laser absorbers. The percentage of absorption depends on each coating type and can vary between 30 % up to > 90 %, as a function of wavelength. The amount of radiation that is not absorbed is reflected or scattered following the Lambert Cosine Law. To avoid dangerous back reflections that can be returned to the laser cavity, or are back-focused by lenses, it is recommended to position the head with a small angle relative to the optical axis. The beam path must be fully enclosed using appropriate light blocking enclosures.

WARNING!

5. **CO2 laser reflectivity. The reflectance from the absorber at CO2 laser wavelength could be as much as 75% and the reflected beam can be quite specular, so it is advisable to provide a beam stop for the reflected beam with the highest power lasers**

6. **External Sources**. All thermal sensors, in particular those with broadband coatings that extend into IR, are very sensitive to heat regardless of its source. Extreme care must be taken to ensure that only the measured radiation reaches the sensor active surface.
Air currents, hands touching the detector, sun light, or other forms of heat will easily alter the measured value.

6. **Detector temperature.** Thermal heads, in particular those with convection-cooling, may become hot and cause burns if touched.

7. **Do not operate** the head and its associated meter in critical medical environments, in wet or damp conditions, or in an explosive atmosphere.

8. **Do not operate** the head and its associated meter if damage or potential failures are suspected to occur.
Contact LaserPoint for a qualified service inspection or to repair damaged equipment.

9. **Follow all laser safety procedures**. The laser must be blocked or switched OFF before beginning the measurement procedures described in the following sections**.**
Operate all instruments only within their specified range.

10. **Do not exceed the power/energy density** limits specified for each sensor.

3. BLINK HS OVERVIEW AND CONNECTIONS

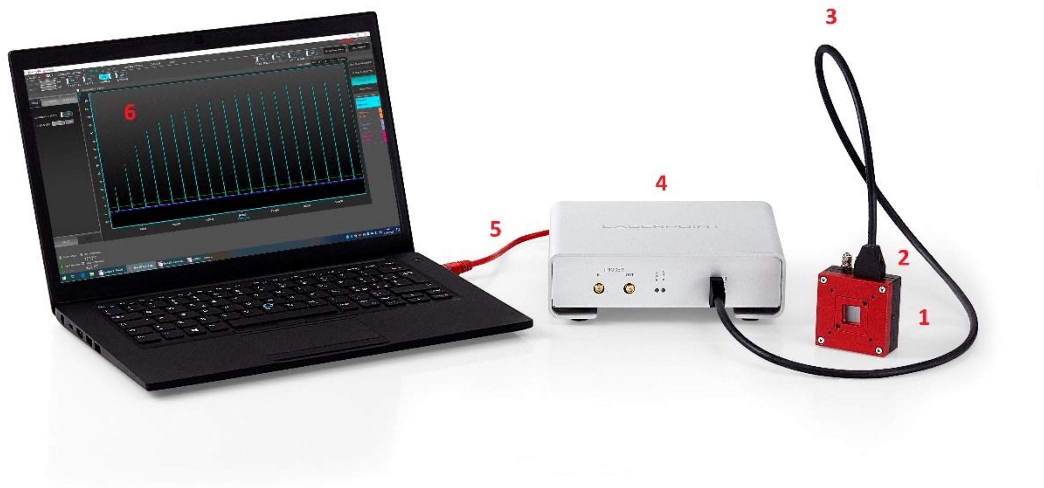


Figure 1: Blink HS system overview

1. **Blink HS sensor head**
2. **Connector**
3. **Microwave cable**
4. **Blink HSM meter**
5. **PC Ethernet cable**
6. **Graphic User Interface**

4. COMPUTER MINIMUM SYSTEM REQUIREMENTS

- **PC Windows 10, 64bit**
- **Display resolution 1400 x 1050**
- **Processor Intel i7 @ 2GHz**
- **SSD disk, free space > 50 GB available**
- **8 GB RAM**
- **Gigabit Ethernet Lan**

5. INSTRUMENT SETUP

In order to setup the instrument ready for measurement please perform the following steps:

In case of Water Cooled sensors:
P/N BM-W-50W-10-B
P/N BM-W-20W-14-T

1. **Connect HS sensor head to water hoses, water flow according to specs (Figure 2)**

In case of Forced Air Cooled sensors:
P/N BM-A-25W-10-B
P/N BM-A-15W-14-T

2. **Connect the P/S to the HS sensor head (Figure 3)**

Then, for all the models:

3. **Connect the microwave cable to the HS sensor head (Figures 2 and 3)**

WARNING: the plug has a wedge, please connect carefully the connector to the HS sensor head (the wedge should be up-left)

WARNING: never touch the HS sensor head active area (accessible from laser aperture, Figures 2 and 3)

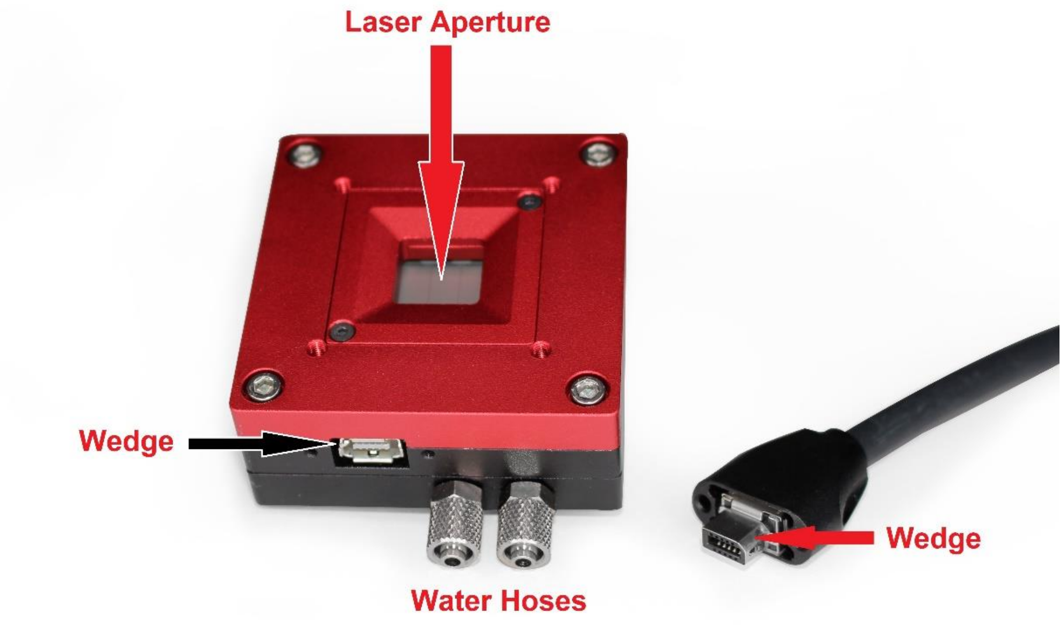


Figure 2: Water Cooled Blink HS sensor head with microwave cable

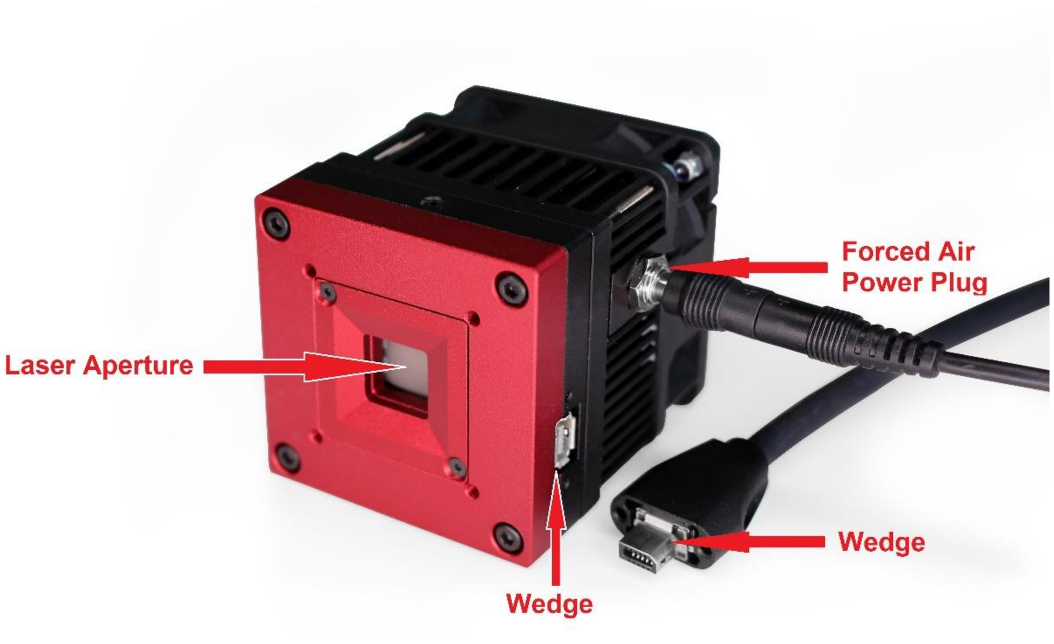


Figure 3: Forced Air Blink HS sensor head with microwave cable

4. **Connect the microvave cable to the HSM meter (Figure 4)**

WARNING: the plug has a wedge, please connect carefully the connector to the HSM meter (<u>the wedge should be down-left</u>)

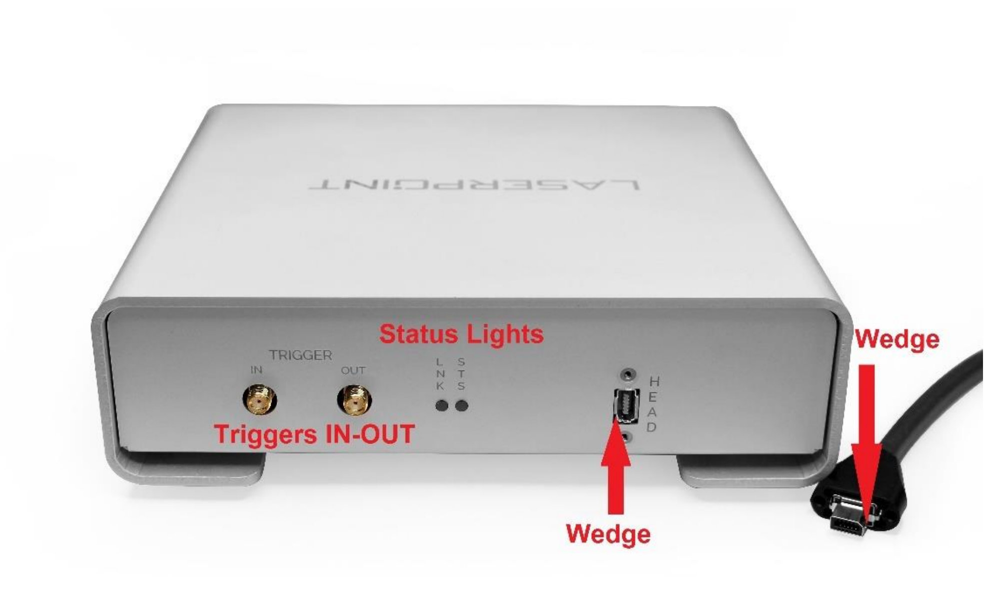


Figure 4: Blink HSM meter front side

5. **Plug the power supply to the HSM meter (Figure 5)**
6. **Connect the Ethernet cable to the HSM meter, PC connection (Figure 5)**
7. **Connect the Ethernet cable to the PC (Figure 1)**
8. **Screw the protection cap both on HS sensor head and HSM meter side**
9. **Power the HSM meter ON (Figure 5)**
10. **Wait until status lights switch from RED to GREEN**

The system is ready to be connected to the "GIOTTO" (next paragraph) for normal operation

Figure 5: Blink HSM meter rear side

LED STATUS

Led LNK (Link)
- Yellow → blinking every transmitted/received a PKT over Ethernet
- Blue → Trigger Active
- Red → Sync Alarm (ADC off-line, the system is unable to measure)

Led STS (Status)
- Red → Alarm (system failure)
- Green → Head Blink HS connected

6. PC SETTINGS AND INSTALLATION OF THE GRAPHIC USER INTERFACE

In order to setup the instrument ready for measurement please perform the following steps:

1. **Install the Blink HS "GIOTTO"**

2. **Set the TCP/IPv4 according to figure 6**

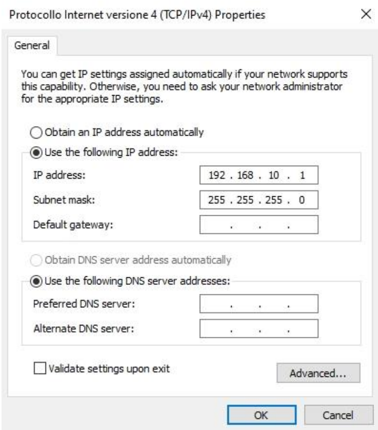


Figure 6: TCP/IPv4 settings

WARNING: it is mandatory to set properly the PC Antivirus and Windows Firewall, either by disabling them
OR
Setting to Trust Zone the Blink HS "GIOTTO"
OR
Opening the 11000 communication port

3. **Example: How to Disable PC Windows Defender Firewall or Setting Blink HS to Trust Zone**

- To turn Microsoft Defender Firewall off:
- Select the Start button > Settings > Update & Security > Windows Security and then Firewall & network protection. Open Windows Security settings
- Select a network profile.
- Under Microsoft Defender Firewall, switch the setting to Off. Turning off Windows Defender Firewall could make your device (and network, if you have one) more vulnerable to unauthorized access. If there's an app you need to use that's being blocked, you can allow it through the firewall, instead of turning the firewall off.
- Select the "**Start**" button, then type "**firewall**".
- Select the "**Windows Defender Firewall**" option.
- Choose the "**Allow an app or feature through Windows Defender Firewall**" option in the left pane

7. GRAPHIC USER INTERFACE OVERVIEW

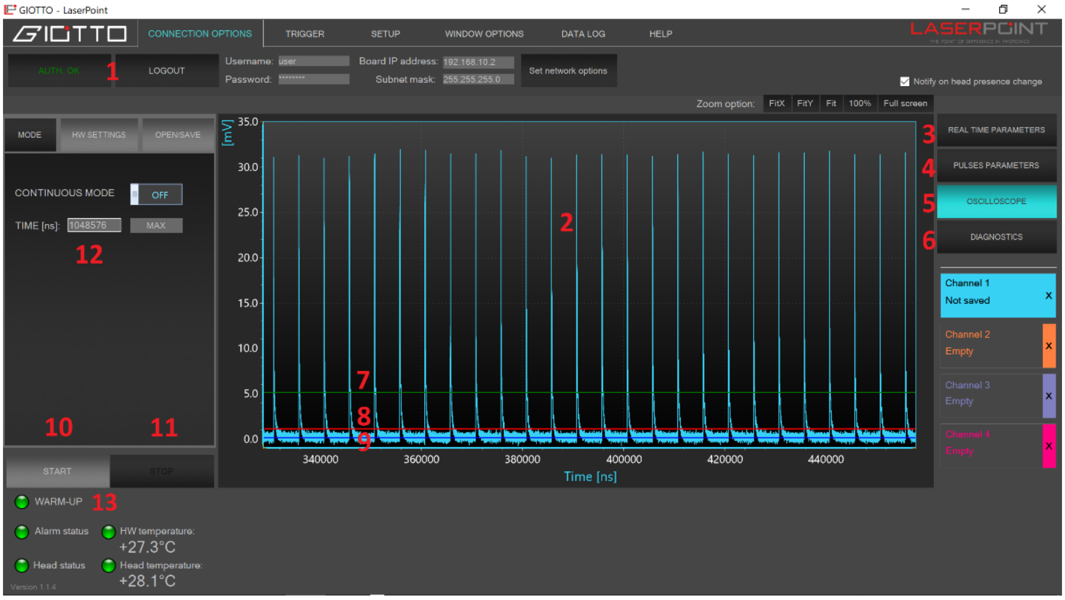


Figure 7: “GIOTTO”overview

1. **Authentication/Logout buttons**
2. **Graph Area**
3. **Real Time parameters**
4. **Pulses parameters**
5. **Oscilloscope**
6. **Diagnostics**
7. **Trigger Start**
8. **Trigger Stop**
9. **Baseline**
10. **Start acquisition**
11. **Stop acquisition**
12. **Setting the acquisition time span (nanoseconds)**
13. **Warmup status**

Oscilloscope mode (5, fig.7)

The time span is defined by the number of samples (set at **12, fig.7**); maximum = 1,048,576 ns, for a faster acquisition user can decrease the time span.

Real Time parameters (3, fig.7)

The samples discretization (the data point displayed) is 1 ms; i.e. the HS system computes every pulse in the pulse train then averages the energy/pulse over 1 ms. Accordingly, the statistical parameters (std deviation) are computed for energy, frequency and peak power, and displayed in the boxes below the graph area.

Pulses parameters (4, fig.7)

In this selected mode, every single pulse energy value is displayed, up to 32,766 point. In other words, e.g. in case of 500 kHz laser the range of single pulse values visualized is greater then 65 ms.

8. QUICK GUIDE TO MEASUREMENT: OSCILLOSCOPE MODE

This section provides a quick guide to perform basic measurements with the **Blink HS** sensor system.

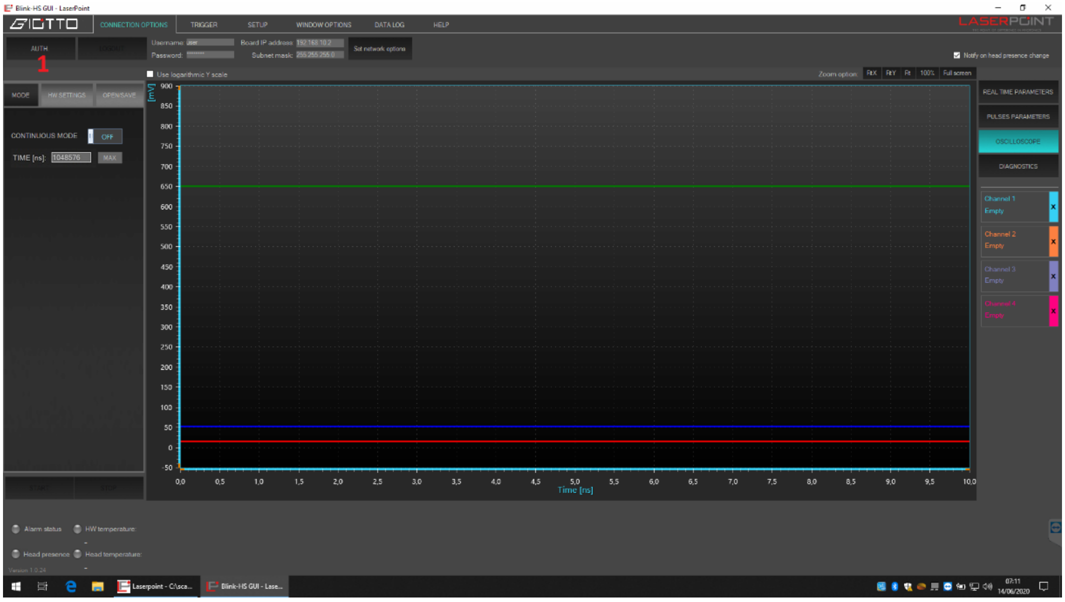


Figure 8

1. Run the Blink HS-“GIOTTO”
2. Then press “AUTH” button (**1, fig.8**)

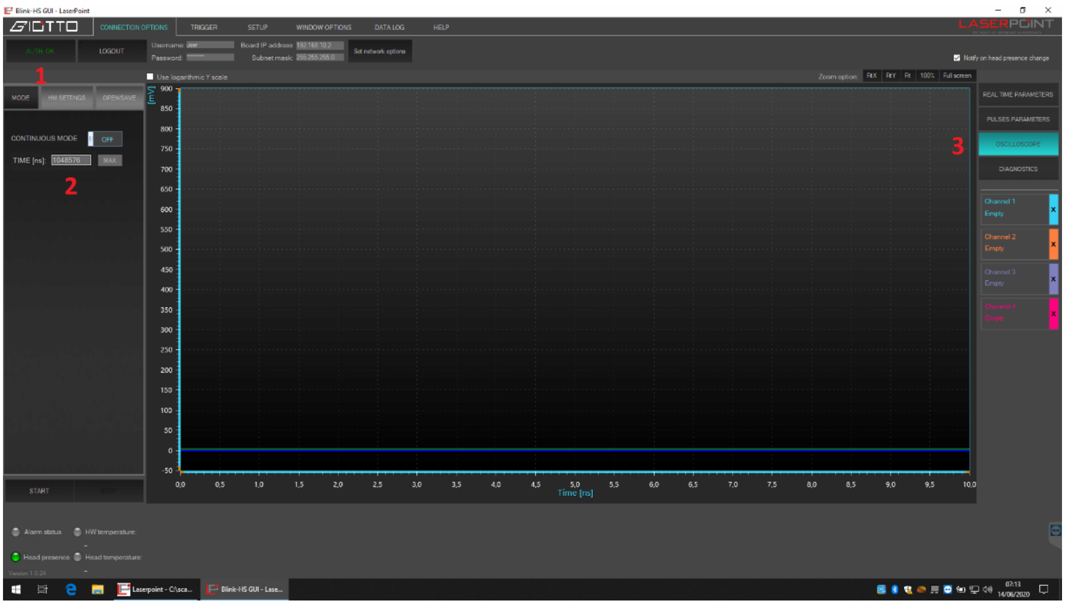


Figure 9

3. The authentication is performed when green label is on (**1, fig.9**)
4. Select the time span (**2, fig.9**) in oscilloscope mode (**3, fig.9**) → max 1.048 ms time slot

9. BASELINE SETTING MODES

There are three modes for setting Baseline and trigger levels:

- Manual mode
- “CALC BASELINE” fully automatic mode
- “AUTO SETUP” semiautomatic mode

Manual mode

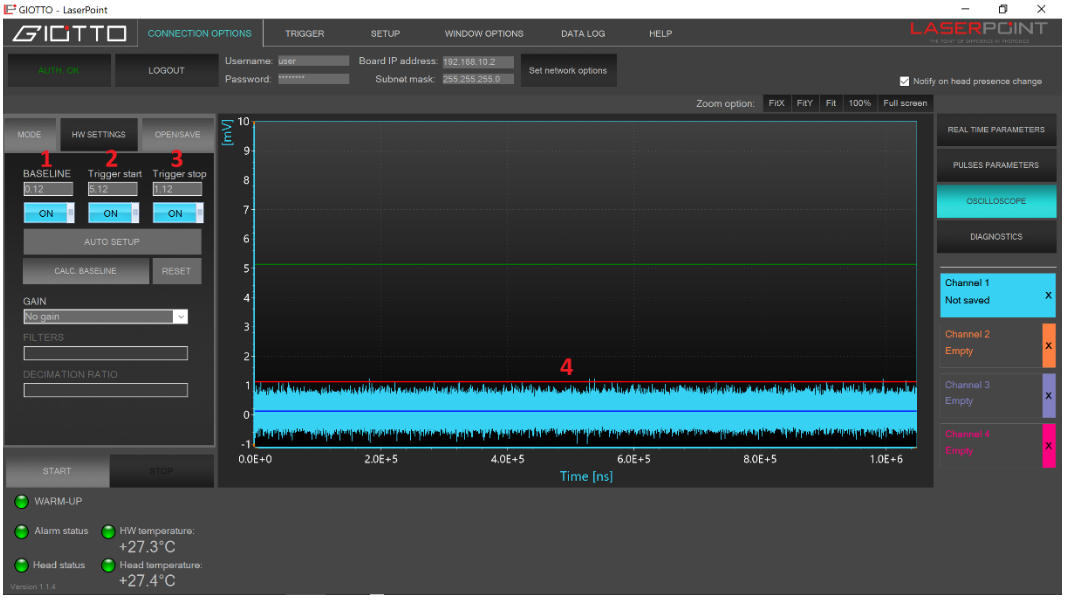


Figure 10

1. Background noise acquisition (**4, fig.10**), no laser impinging on HS sensor
2. Set manually Baseline, Trigger Start and Trigger Stop (**1, 2, 3 fig.10**),

“CALC BASELINE” mode

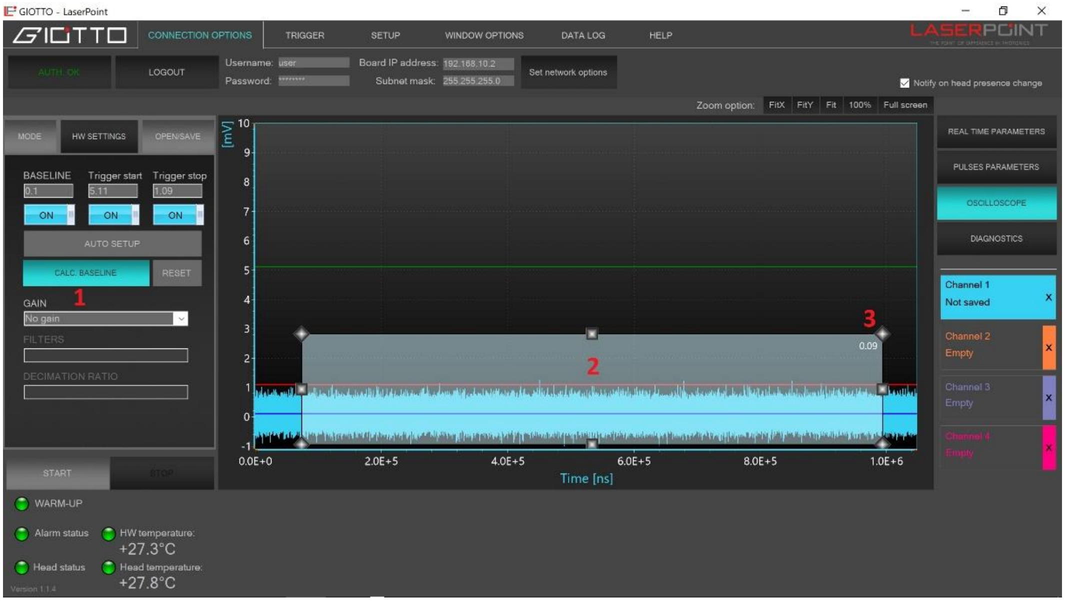


Figure 11

3. Automatic Baseline setting, activated by pressing CALC BASELINE (**1, fig.11**)
4. In the grey rectangular area (**2, fig.11**) the optimized Baseline value is calculated ad displayed (**3, fig.11**)

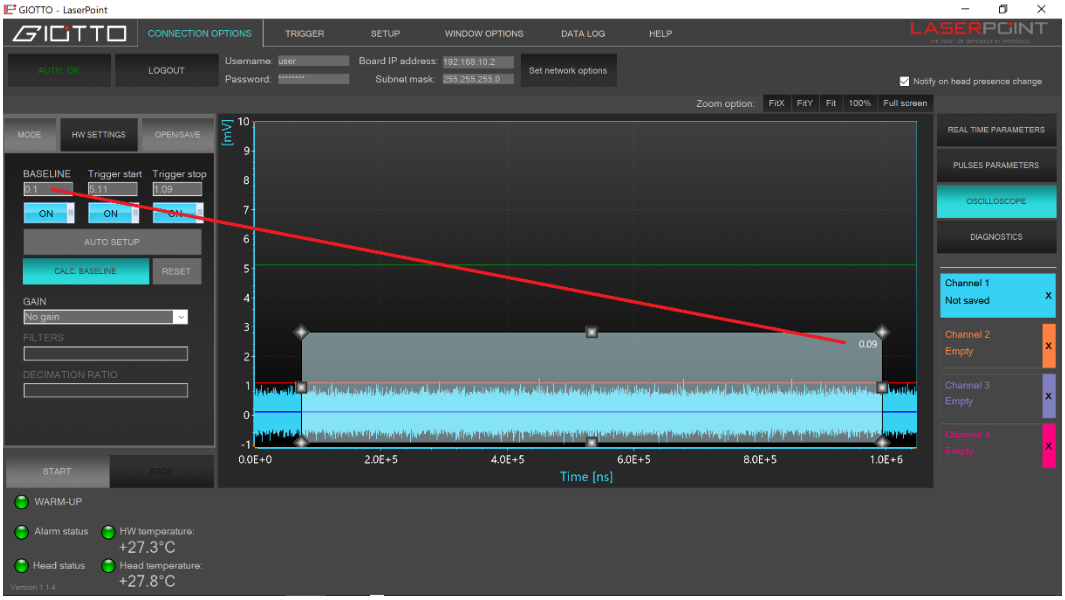


Figure 12

5. The automatic calculated optimal Baseline value is set in the corresponding box at the upper left side (**fig.12**)
6. Set the desired Trigger Start and Trigger Stop values in the relevant boxes

"AUTO SETUP" mode

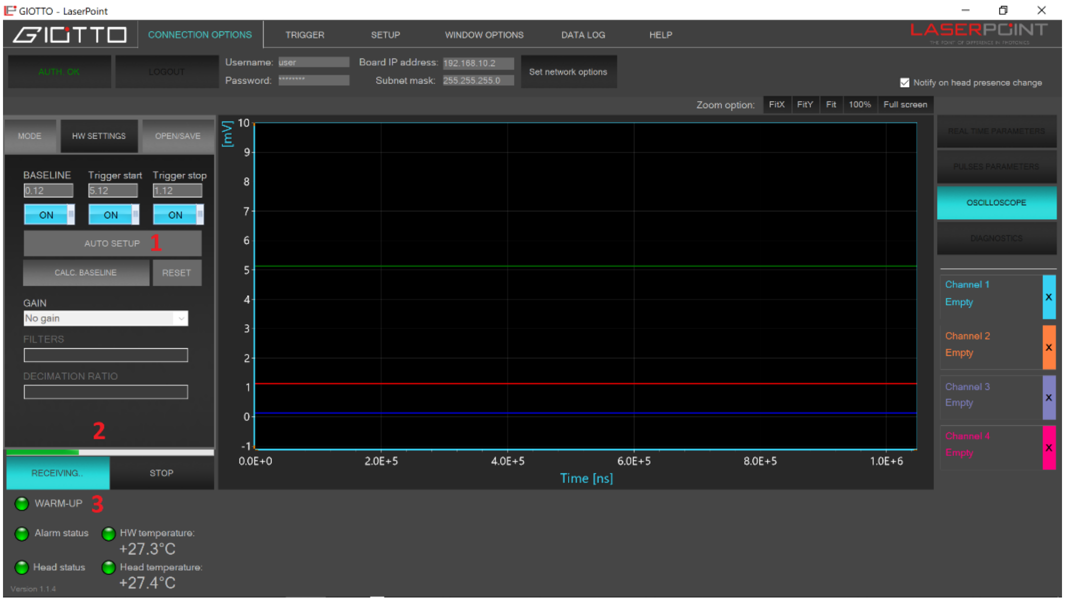


Figure 13

7. Please make sure that no laser is impinging on the sensor, and HSM warmup light on green; light turns from red to green after 20 minutes from HSM switched to ON
8. Then press the "AUTO SETUP" button (**1, fig.13**) a fully automatic process starts (**2, fig.13**) in order to calculate the optimal Baseline and set automatically Baseline, Trigger Start, Trigger Stop
9. The optimal Trigger Start and Trigger Stop (**as delta respect Baseline**) are defined during calibration in LaserPoint and written in sensor eeprom

10.TRIGGER SETTING MODES

AUTO TRIGGER MODE

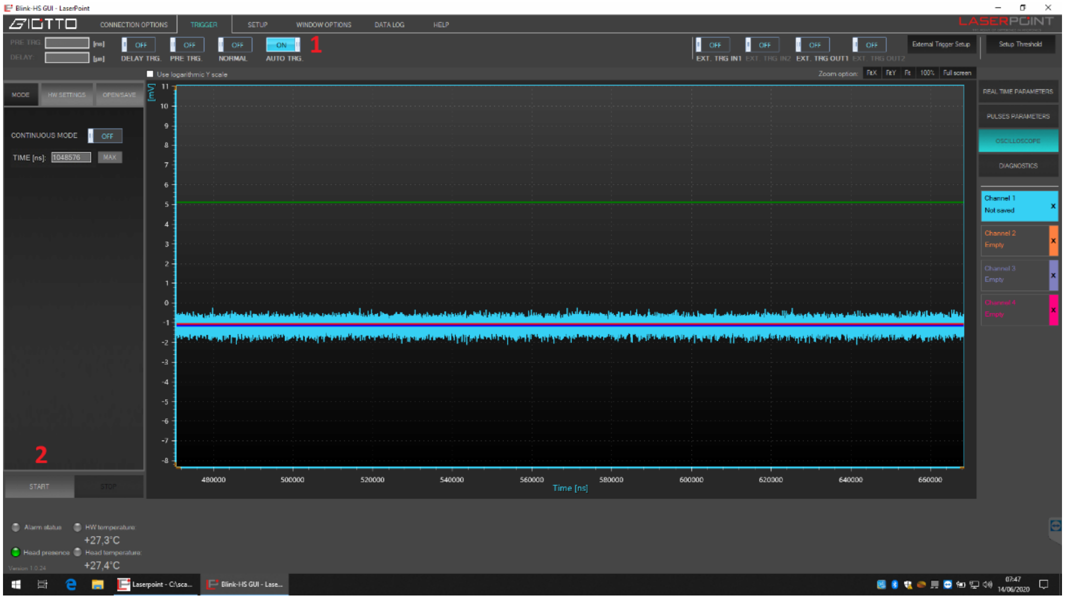


Figure 14

1. In Auto Trigger mode (**1, fig.14**) the HSM meter starts acquisition just after pressing Start button (**2, fig.14**)

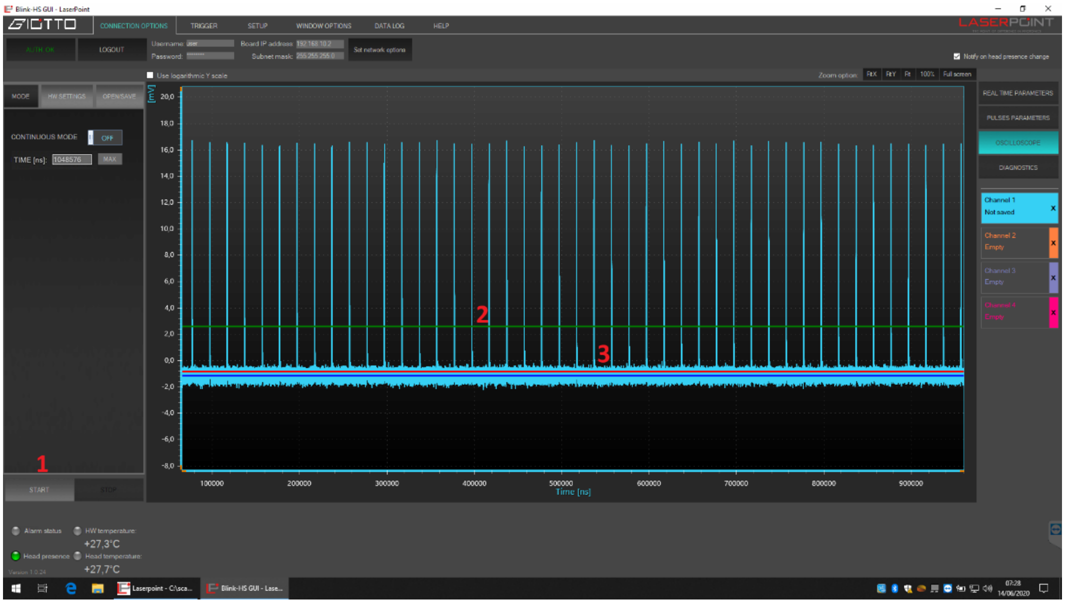


Figure 15

2. Set of Baseline, Trigger Start and Trigger according to one of the three modes described in Chapter 9
3. Laser ON, start acquisition (**1, fig.15**) of laser pulse train
4. Trigger Start (**green line, 2, fig.15**) is shown with value according to the procedure selected
5. Trigger Stop (**red line, 3, fig.15**) **i**s shown with value according to the procedure selected

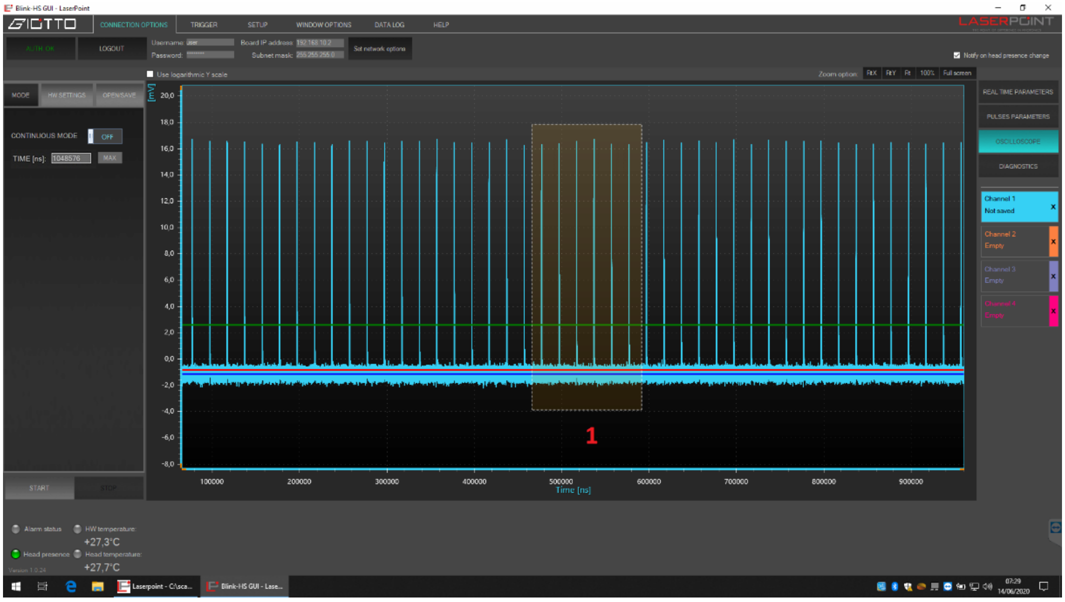


Figure 16

6. In order to magnify a part of the pulse train, click and drag the corresponding area (**1, fig.16**)

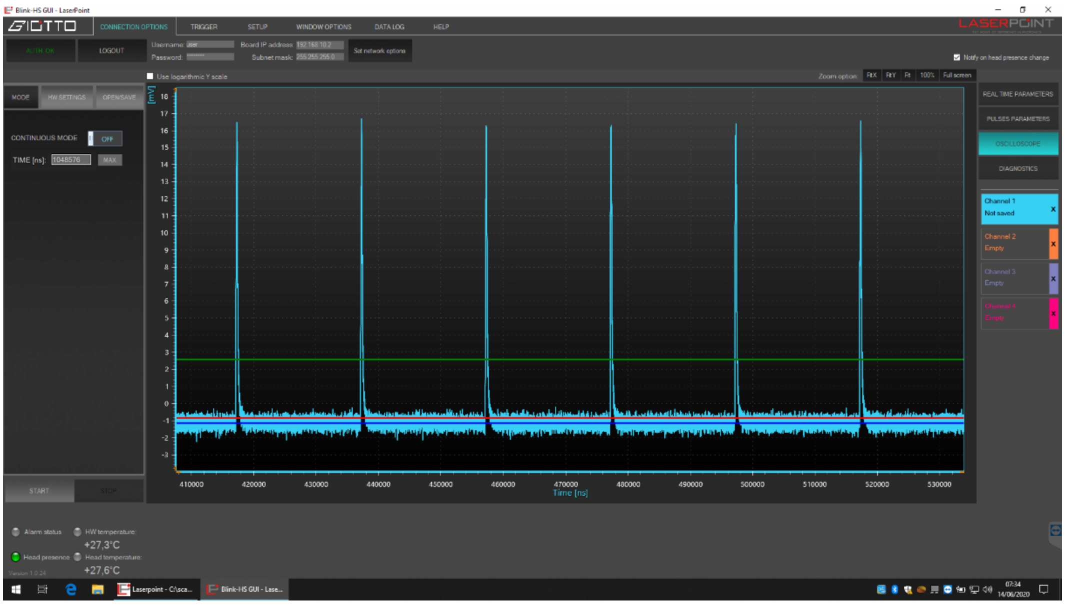


Figure 17

7. Magnified view of the pulse train, after click and drag of the corresponding area (**fig.17**)

NORMAL TRIGGER MODE

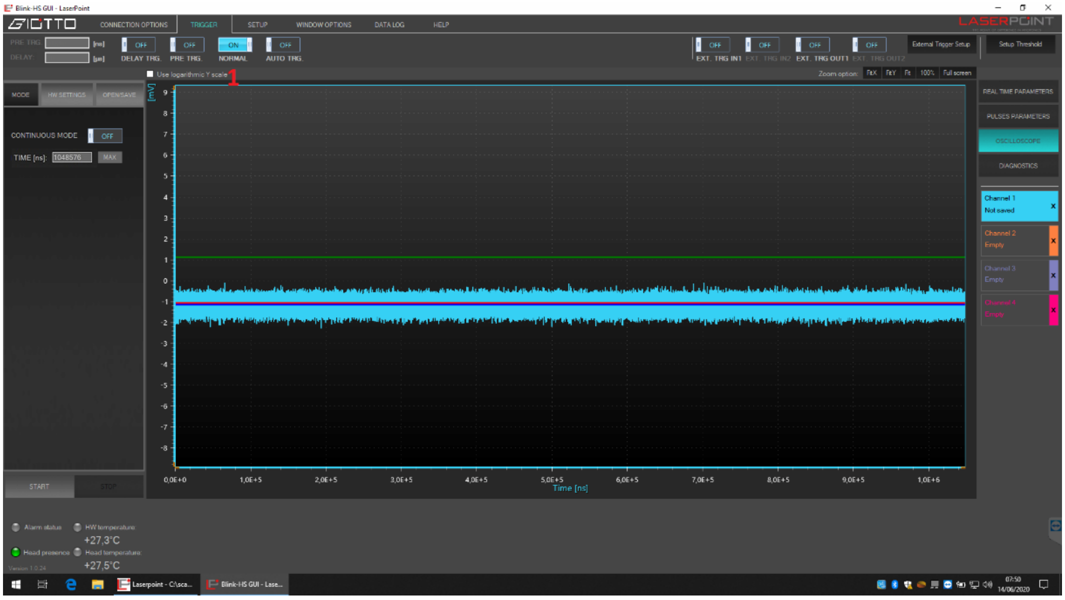


Figure 18

1. In Normal Trigger mode (**1, fig.18**) the HSM meter remains on hold and starts acquisition when pulses are greater than Trigger Start value (in mV)

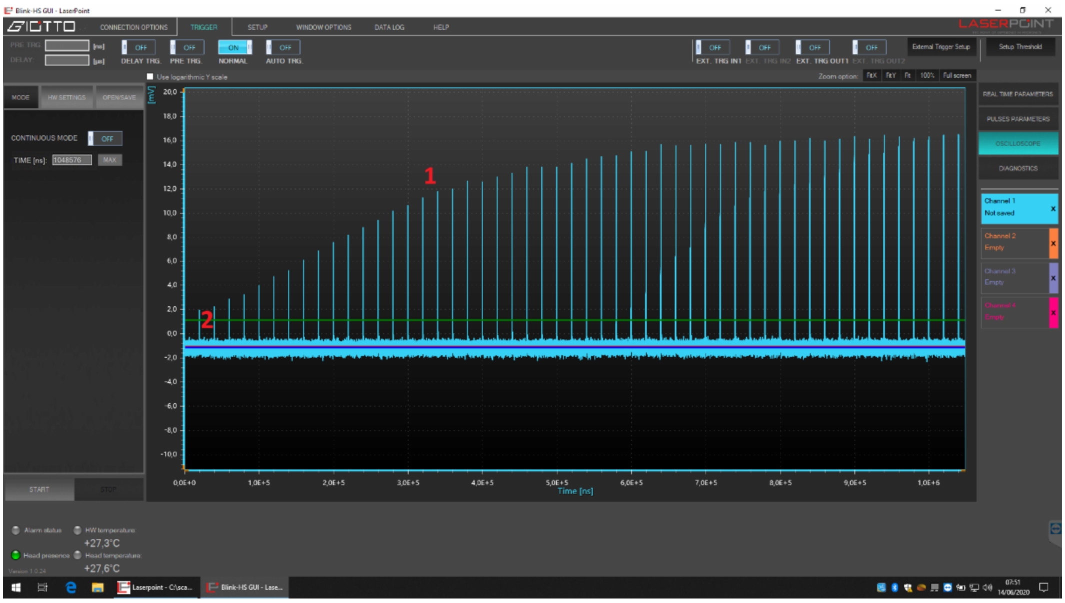


Figure 19

2. As soon as signals are greater then Trigger Start threshold (**2, fig.19**) the HSM meter displays the pulse train (**1, fig.19**); in this example the ramp up of a fiber laser is detected

PRE TIGGER MODE

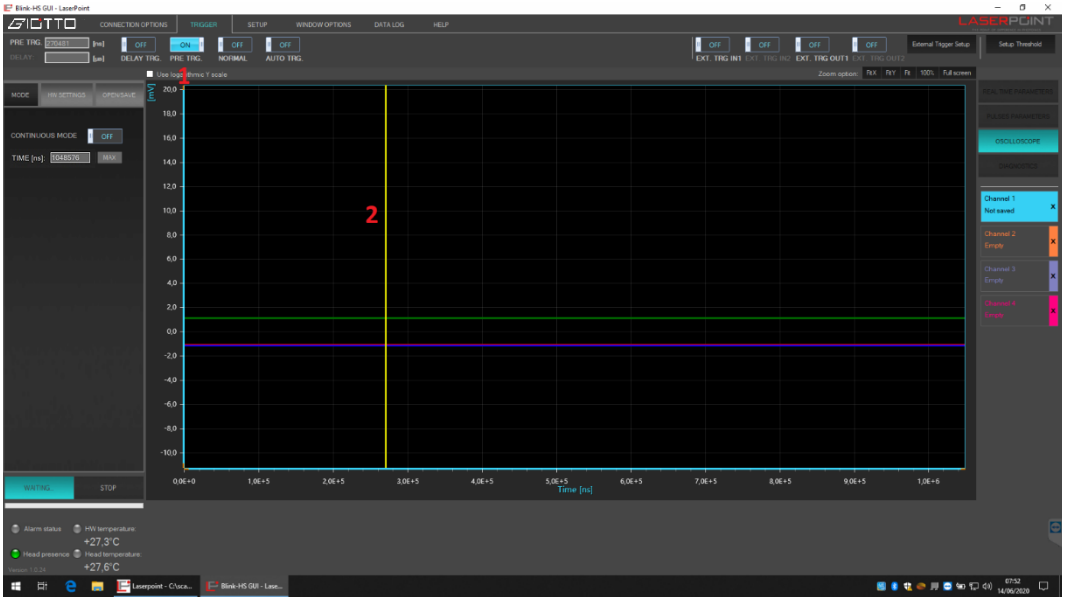


Figure 20

1. In Pre Trigger mode (**1, fig.20**) the HSM meter remains on hold and starts acquisition when pulses are greater than Trigger Start value (in mV), the it will display a pre portion of the spectrum, according from the position of the marker (**2, fig.20**)

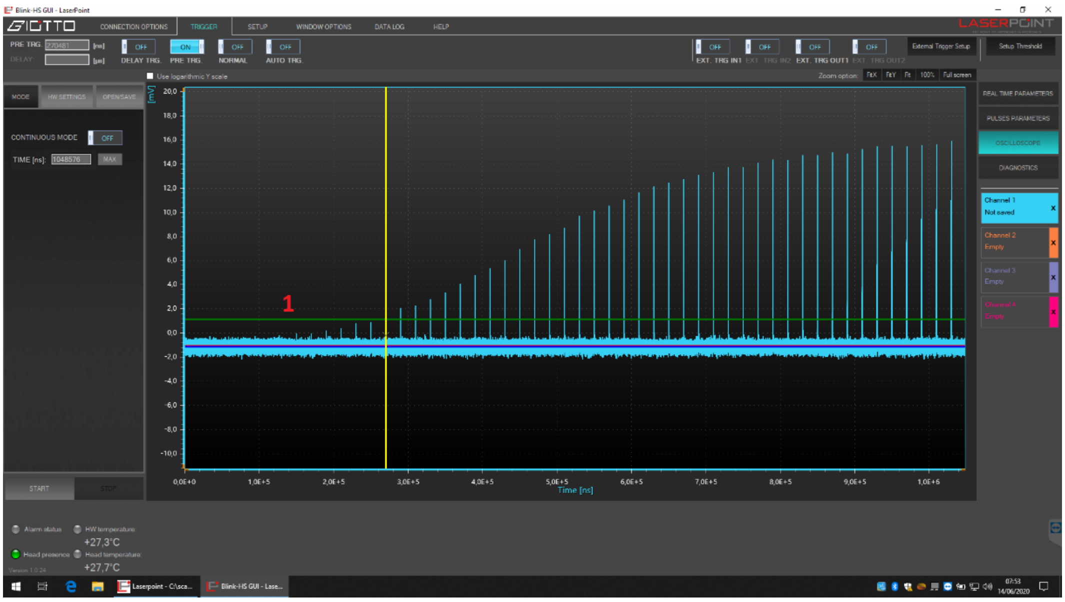


Figure 21

2. As soon as signals are greater then Trigger Start threshold (**1, fig.21**) the HSM meter displays the pulse train, including the portion of the spectrum from origin to the marker; in this example the ramp up of a fiber laser is detected

11.HARDWARE TRIGGER IN AND TRIGGER OUT

The HSM meter has two SMA female connectors on the front side (Figure 4), with function of Trigger IN and Trigger OUT.
For both functions the polarity and thresholds can be defined via dedicate panels.

Figure 22

1. External Trigger Setup button (**1, fig.22**) allows access to setup panel (**2, fig.22**) where polarity of Inputs/Outputs can be defined.

Figure 23

2. Setup Thresholds button (**1, fig.23**) allows access to threshold setup panel (**2, fig.23**) where Peak, Frequency and Energy parameter limits (upper and lower) of the control bands can be defined. In case that measured parameters are outside the control band limits HSM sends a TTL signal at Trigger Out SMA connector. An example of these functions can be found later in this document.

12.HS SENSORS CALIBRATION

The HS sensors are supplied as a standard with calibration of Gain x1 (“no gain” in the drop-down menu), of the customer selection of wavelength at order time (available wavelength calibration list at www.laserpoint.eu).
HS sensor can be calibrated, upon request, as well for Gain x10 (**ENHANCED version, P/N Extension -ENH**), thus allowing a more accurate measurement at the low energy side of the usable range.

Usage suggestion tip: use Gain x10 in the energy range 1 to 20 microJ/pulse, and switch to Gain x1 from 20 microJ/pulse and above.

In the following Figure 24 is shown a sample of the calibration certificate, reporting HS calibration at Gain x1 and Gain x10, and three wavelengths (1064 nm, 532 and 355 nm, respectively).

Cert_HS_rev.2

LASERPOINT

Customer: Final Customer
Date of cal.: 29/06/2022
Certificate N°: 229999
Ref: product order and distributor
Laserpoint PO: order 123-22

CERTIFICATE OF CALIBRATION **N° 229999**

Detector Head: BM-A-15W-14-T
Serial Number: 112233
Date of calibration: 29/06/2022
Laboratory environment: Temperature: 24°C Humidity: 45%

	Energy Measures - AS LEFT					
	Wavelength	*Standard*	*Device under test*	*Measured Error*	*Tolerance*	*Comment*
*	1064	9.38 µJ	9.42 µJ (a)	+ 0.47%	± 5%	Within Tolerance
*	1064	50.94 µJ	50.84 µJ (b)	- 0.19%	± 5%	Within Tolerance
*	1064	221.06 µJ	219.98 µJ (b)	- 0.49%	± 5%	Within Tolerance
**	532	8.25 µJ	8.26 µJ (a)	+ 0.12%	± 7%	Within Tolerance
**	532	19.01 µJ	18.94 µJ (a)	- 0.37%	± 7%	Within Tolerance
***	355	158.39 µJ	158.71 µJ (b)	+ 0.20%	± 7%	Within Tolerance
***	355	366.77 µJ	366.60 µJ (b)	- 0.05%	± 7%	Within Tolerance

* Fiber Laser, 125 kHz rep rate
** Fiber Laser, 100 kHz rep rate
*** UV Laser, 20 kHz rep rate

(a) HSM settings: *Gain = x10* *Baseline = detected using "AUTO" function*
Trigger Start = Baseline + 20 mV *Trigger Stop = Baseline +2 mV*

(b) HSM settings: *Gain = x1* *Baseline = detected using "AUTO" function*
Trigger Start = Baseline + 3.5 mV *Trigger Stop = Baseline + 0.2 mV*

Laserpoint s.r.l. hereby certifies that this instrument has been calibrated using standards whose accuracy is traceable to the National Institute of Standards and Technology (NIST) and to the PTB (Physikalisch-Technische Bundesanstalt) and other standards in accordance with EN 61040.

CALIBRATION STANDARDS TRACEABILITY DATA:				
Manufacturer	**Model**	**Serial N°**	**Certification**	**Cal. Due Date**
FLUKE	8808A	4799023	LAT 019 62413	16/09/2022
LASERPOINT	A-40-D25	142030	NIST 686153, O-1451-20	12/08/2022

Calibrated by: .... *(G. Crapella)*
Certified by: .... *(S. Pellegrino)*

The recommended calibration interval is 12 months.
Date of calibration due: **06-2023**

Figure 24: HS calibration certificate sample

13.HOW TO SET THE HS SYSTEM TO METROLOGICAL MODE

In order to set the instrument ready for metrological measurements according to HS sensor specifications, please perform the following steps:

STEP 1: allow HSM warmup time > 20 min (Figure 25); the warmup light in the Home Page turns to green. Warning: in case the measurement is preformed when warmup light is red the accuracy of measurement might be worse then specified

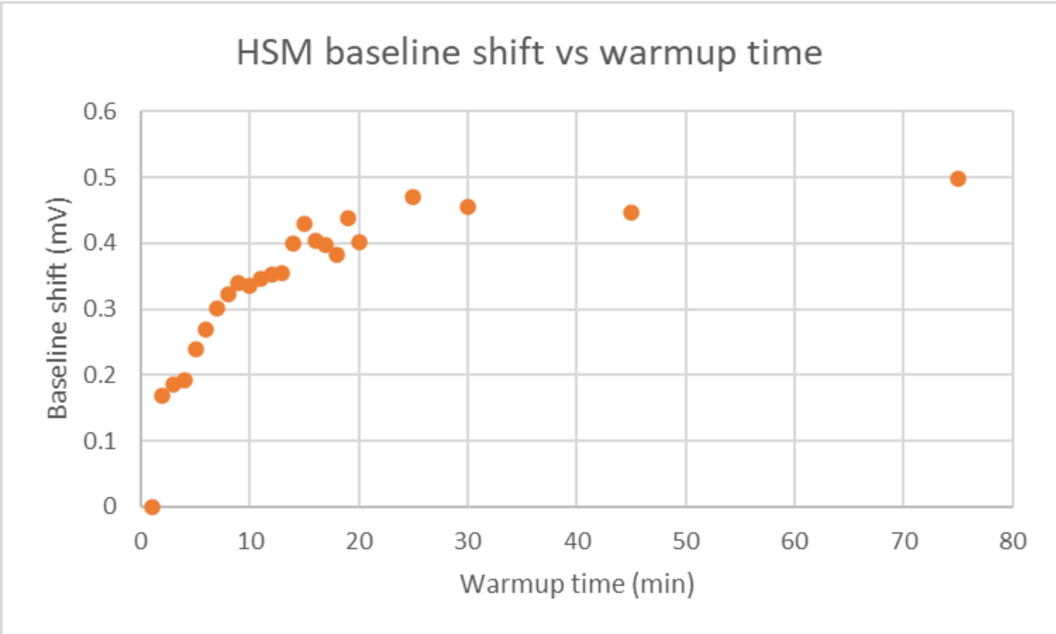


Figure 25: Baseline shift over warmup time

STEP 2: choose the desired automatic “AUTO SETUP” or semiautomatic “CALC BASELINE” mode

In case of selection of the automatic mode the system is ready to perform metrologically.

In case of selection of semiautomatic mode → set Trigger Start = Baseline + xxx mV (according to the value reported in the calibration certificate), then then input the value to the target box

14.METROLOGICAL MODE: REAL TIME PARAMETERS

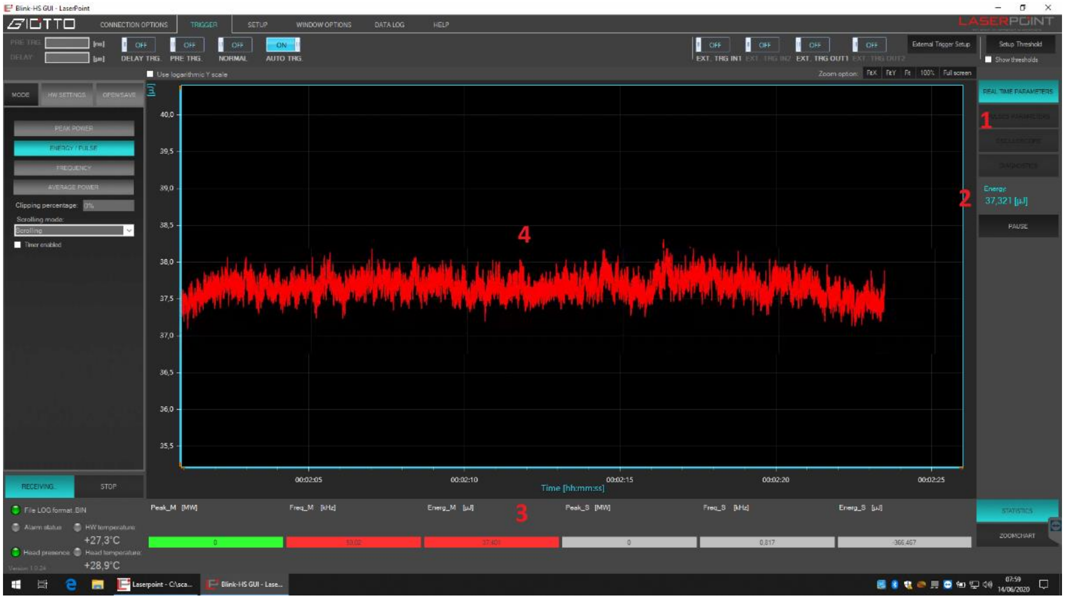


Figure 26: REAL TIME PARAMETERS overview, part 1

1. **Real Time Parameters button**
2. **Real Time display of the selected parameter (Energy/pulse, Frequency, Peak Power, Average Power)**
3. **Statistical values (Peak, Frequency, Energy)**
4. **Graphical display of the selected parameter**

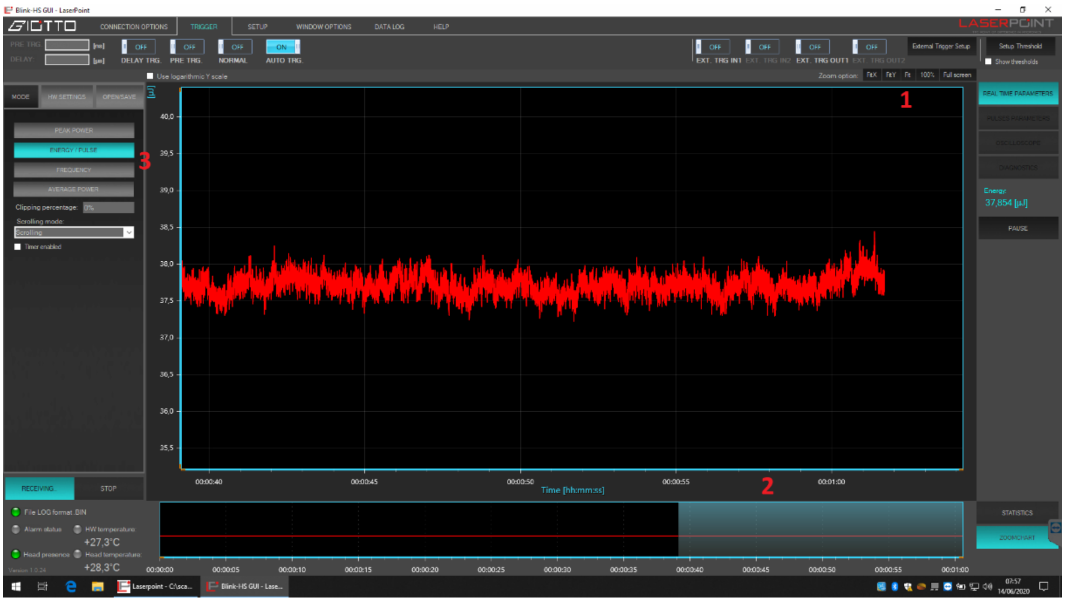


Figure 27: REAL TIME PARAMETERS overview, part 2

1. **Zoomchart**
2. **Fit buttons: Fit X axis, Fit Y axis, Fit to area, Fit to full scale**
3. **Mode selction buttons: Peak Power, Energy/pulse, Frequency, Average Power**

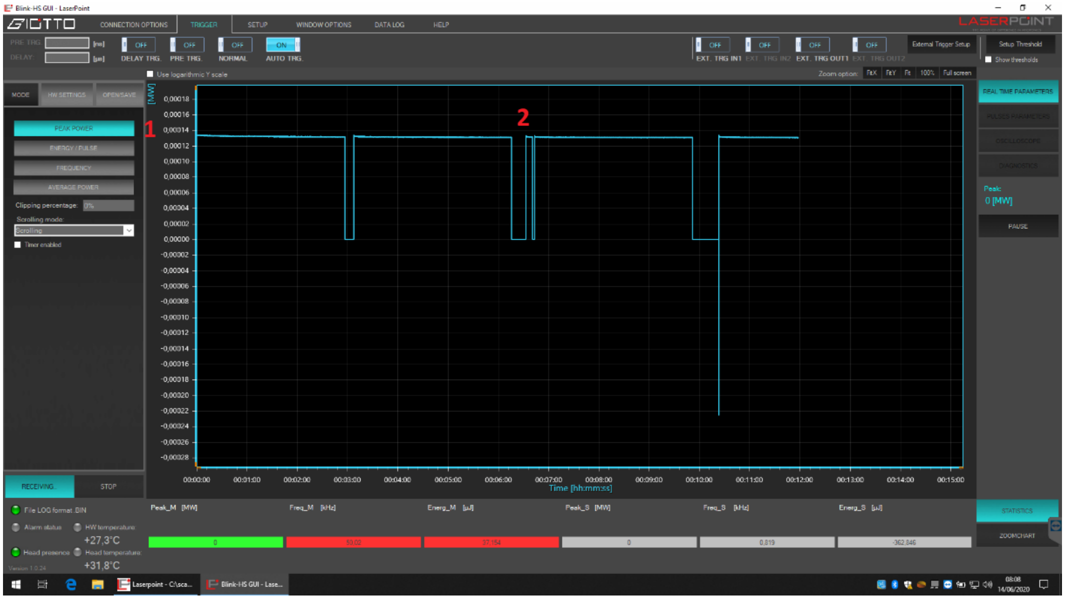


Figure 28

1. Select Peak Power (MW) (**1, fig.28**), the real time average values over 1 ms vs time are displayed, (**2, fig.28**)

Figure 29

2. Select Energy/pulse (microJ) (**1, fig.29**), the real time average values over 1 ms vs time are displayed, (**2, fig.29**)

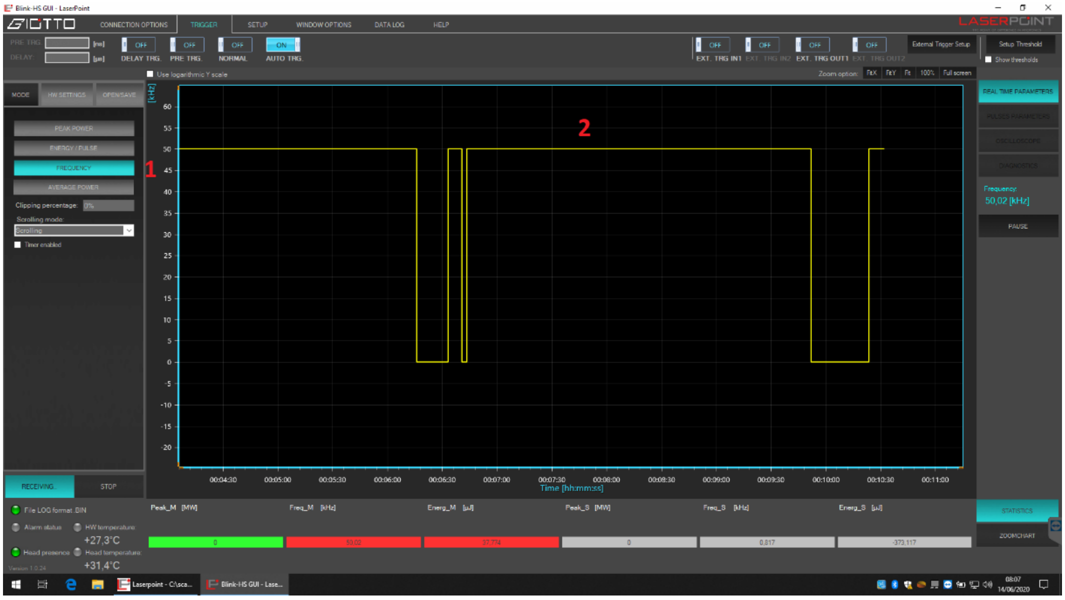


Figure 30

3. Select Frequency (kHz) (**1, fig.30**), the real time average values over 1 ms vs time are displayed, (**2, fig.30**)

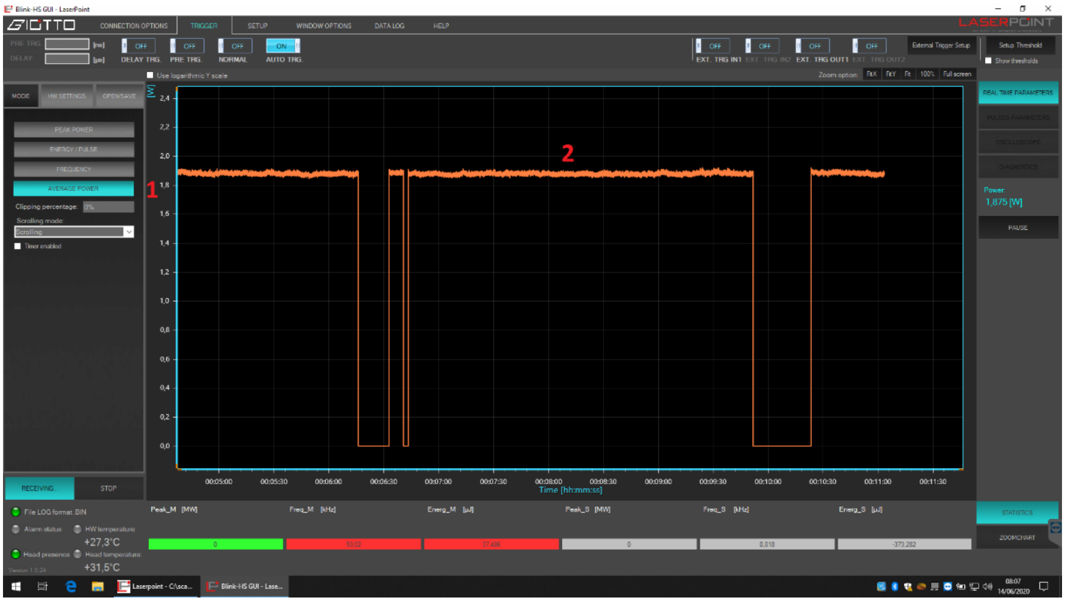


Figure 31

4. Select Average Power (W) (**1, fig.31**), the real time average values over 1 ms vs time are displayed, (**2, fig.31**)

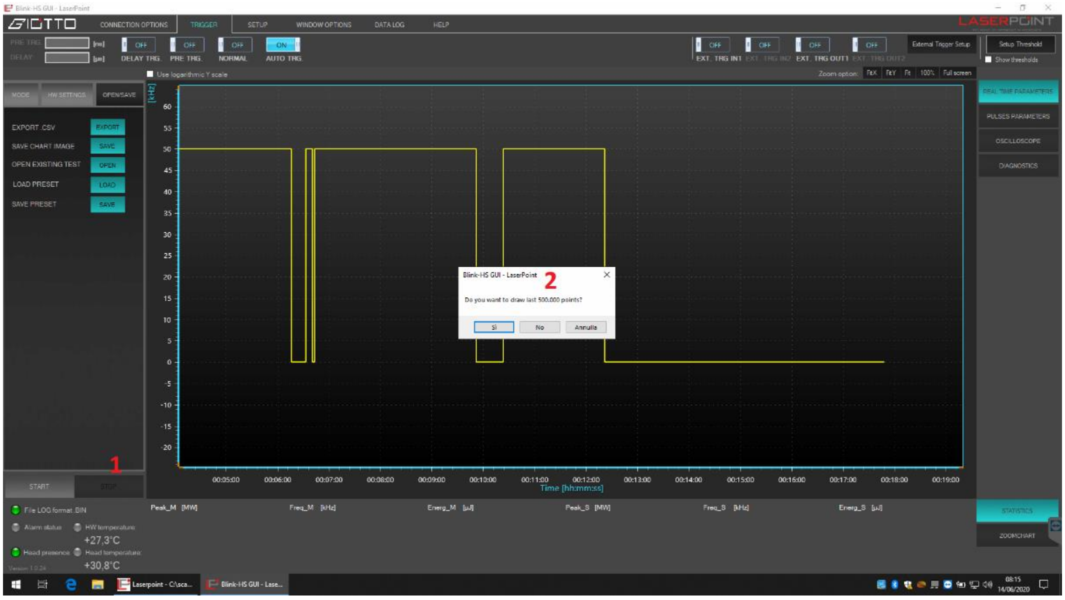


Figure 32

5. Once acquisition is stopped (**1, fig.32**), a selection popup appears, proposing the choice to replot the last 500000 points (**2, fig.32**)

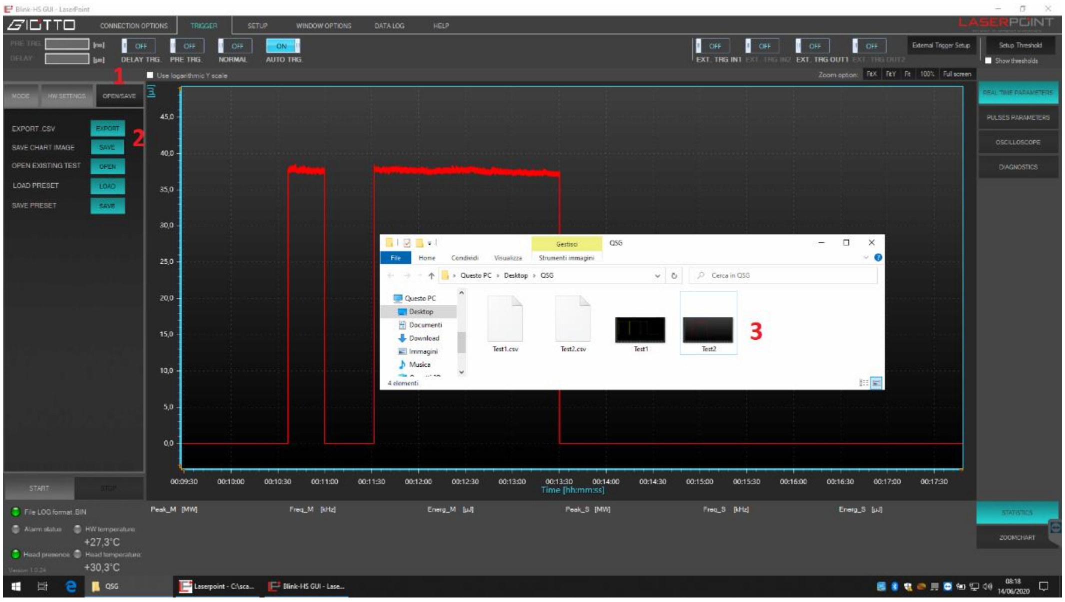


Figure 33

6. Following acquisition stop, the user can save the acquired data (**1, fig.33**), in csv or save chart image in png format (**2, fig.33**), then files position is shown (**3, fig.33**)

15.METROLOGICAL MODE: PULSES PARAMETERS

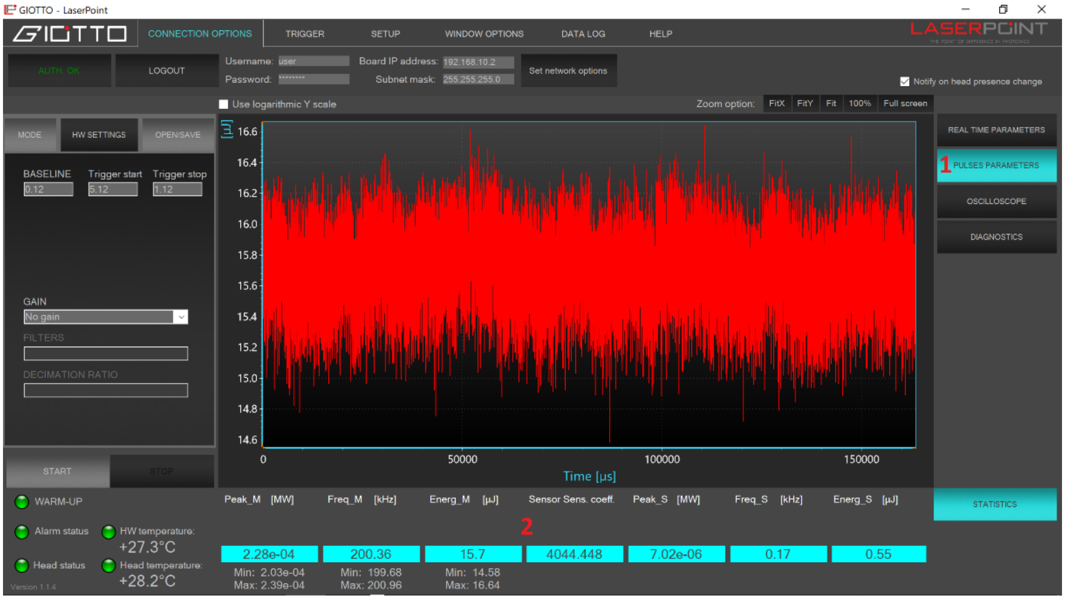


Figure 34

1. When the Metrological Mode Pulses Parameters is selected (**1, fig.34**) and acquisition started. the output to screen show peak, frequency, energy mean and sigma values (**2, fig.34**) within the single pulses displayed up 32,766 single pulse values

16.DATA EXPORT CSV FILES

X	Y
0	1,47857666
2	2,308654785
4	1,971435547
6	2,490234375
8	2,412414551
10	2,256774902
12	2,101135254
14	1,997375488
16	1,686096191
18	2,256774902
20	2,723693848
22	1,893615723
24	2,230834961
26	1,66015625
28	1,84173584
30	2,153015137
32	1,945495605
34	2,412414551
36	2,178955078

A

Progressive	PeakMV	FrequencyMV	EnergyMV	PowerMV
0	0,00047017	20,00320051	74,24559909	1,485149606
1	0,000443221	20	70,51847065	1,410369413
2	0,000465965	20,00640205	73,73779797	1,475228032
3	0,000486989	20	76,24678937	1,524935787
4	0,0004566	20,00320051	71,41084388	1,428445429
5	0,000448381	20,00320051	71,28029434	1,42583402
6	0,000475139	20,00320051	74,2238815	1,484715185
7	0,000444559	20,00320051	69,98187543	1,399861486
8	0,000457555	20,00320051	72,24099256	1,445051059
9	0,000449337	20,00320051	70,93720526	1,418971141
10	0,000450101	20,00320051	71,75417698	1,43531319
11	0,000456409	20,00320051	72,03162526	1,440863043
12	0,000459275	20,00320051	73,39080461	1,46805098
13	0,000445706	20,00320051	70,86277982	1,417482394
14	0,000453542	20,00320051	72,47305352	1,449693021
15	0,000466729	20,00320051	74,90395922	1,498318915
16	0,000457746	20,00320051	71,60508208	1,432330815
17	0,000473992	20,00320051	74,58136763	1,491866051
18	0,000466729	20	73,4727946	1,469455892

B

Progressive	PeakMV	FrequencyMV	EnergyMV	PowerMV	PeakS	EnergyS
0	0,001289071	10,00080006	178,0634324	1,780776786	2,31E-05	12631998478
1	0,001290747	10,00080006	177,9772625	1,779915018	1,53E-05	1,82140498
2	0,001287771	10,00080006	178,3197317	1,783339984	2,28E-05	12936427654
3	0,001291178	10,00080006	178,6222367	1,786365276	2,34E-05	12348097090
4	0,001289192	10,00080006	178,3603358	1,783746058	2,25E-05	12936427654
5	0,001287789	10,00080006	178,0245995	1,780388426	2,54E-05	12936427654
6	0,001286998	10,00080006	178,0449172	1,780591619	2,60E-05	12858261213
7	0,001290758	10,00080006	178,5579046	1,785721904	2,31E-05	12936427654
8	0,001288677	10,00080006	178,2836835	1,782979474	2,28E-05	12936427654
9	0,001288913	10,00080006	178,2471811	1,78261442	2,41E-05	12858261213
10	0,001286948	10,00080006	178,3132615	1,783275277	2,30E-05	12936427654
11	0,001297017	10,00080006	179,6211561	1,79635527	2,56E-05	2,901360102
12	0,001291899	10,00080006	178,8259185	1,788402257	2,48E-05	2,766952814
13	0,001292557	10,00160026	178,688655	1,787172498	2,42E-05	2,954884606
14	0,001295007	10,00080006	178,6452289	1,786595217	2,22E-05	2,672526218
15	0,001295537	10,00080006	179,4142783	1,794286326	1,81E-05	2,197974771
16	0,001281259	10,00160026	177,9644998	1,779929787	2,11E-05	2,490211165
17	0,001292374	10,00080006	178,9184772	1,789327918	2,65E-05	3,053876727
18	0,001295847	10,00080006	179,2455463	1,792598871	1,94E-05	1,85342959

C

Progressive	PeakMV	FrequencyMV	EnergyMV	DurationMV	PeakS	EnergyS	DurationS	HeadtempF	HWtempF	Status	StatCNT	Baseline
1	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
2	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
3	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
4	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
5	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
6	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
7	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
8	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
9	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
10	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
11	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
12	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
13	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
14	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
15	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
16	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
17	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
18	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806
19	0	0	0	0	0	0	0	30,6	27,3	1,0001E+14	1	32806

D

Figure 35

Four examples of CSV files downloaded from open/save menu and Log file (**Figure 33**):

A Oscilloscope data

B and **C** content includes the main parameters values in case of NO selection in Stop popup (**B, fig.35**), and main parameters and statistical values in case of YES selection in Stop popup (**C, fig.35**)

D Log file

17.SETUP MENU AND CROSSHAIR INDICATION

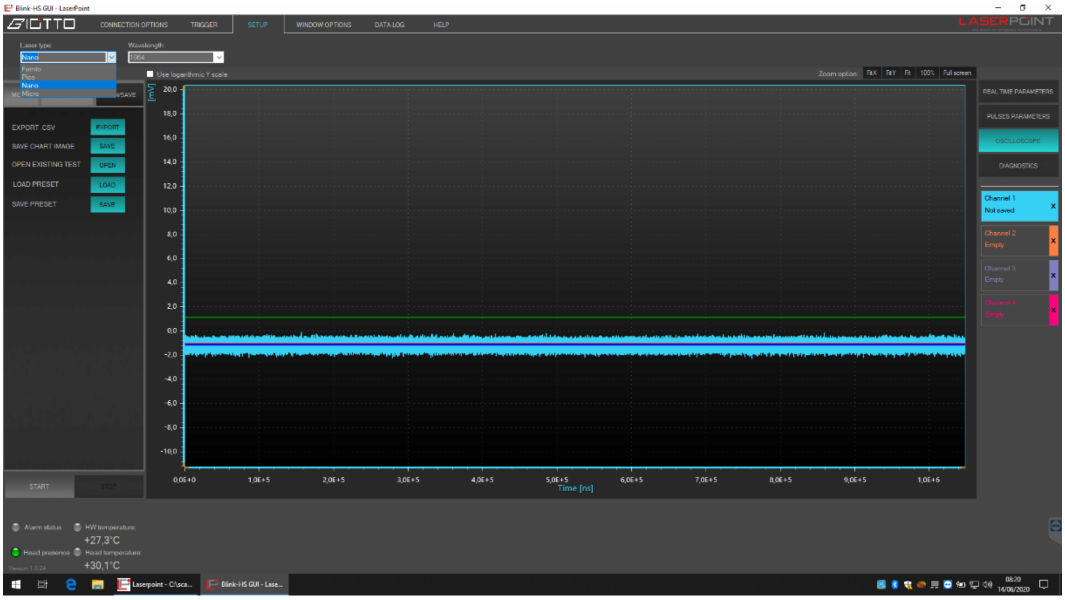


Figure 36

1. User can select upon 4 different pulses duration (Microsecond, nanosecond, Picosecond, Femtosecond), a corresponding correction factor is applied to measurements (**fig.36**)

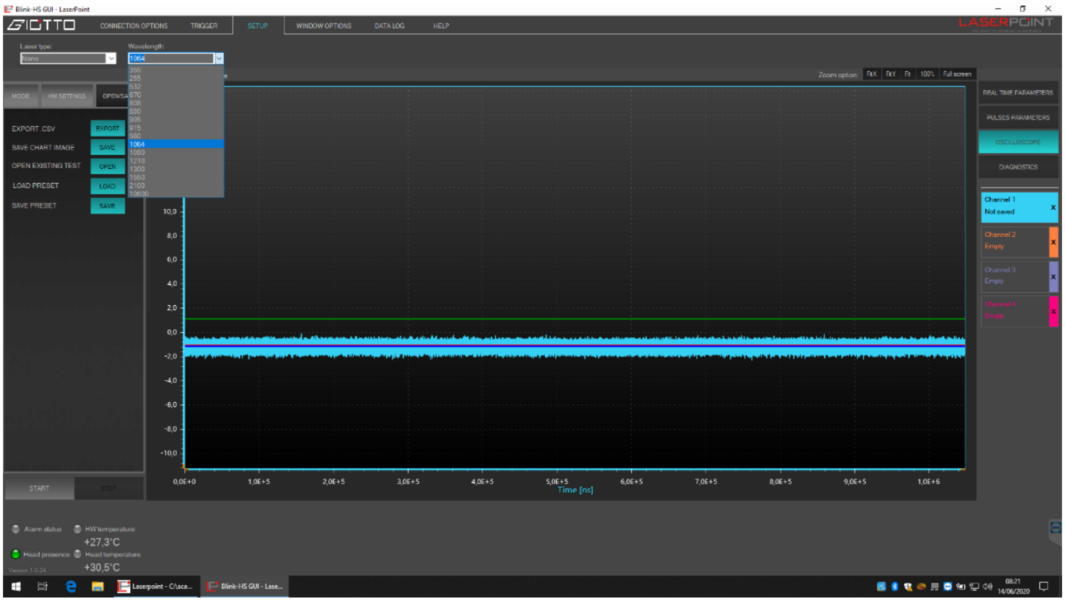


Figure 37

2. User can select up to 16 different wavelength, a corresponding correction factor is applied to measurements (depending on wavelength calibration selection at purchase order) (**fig.37**)

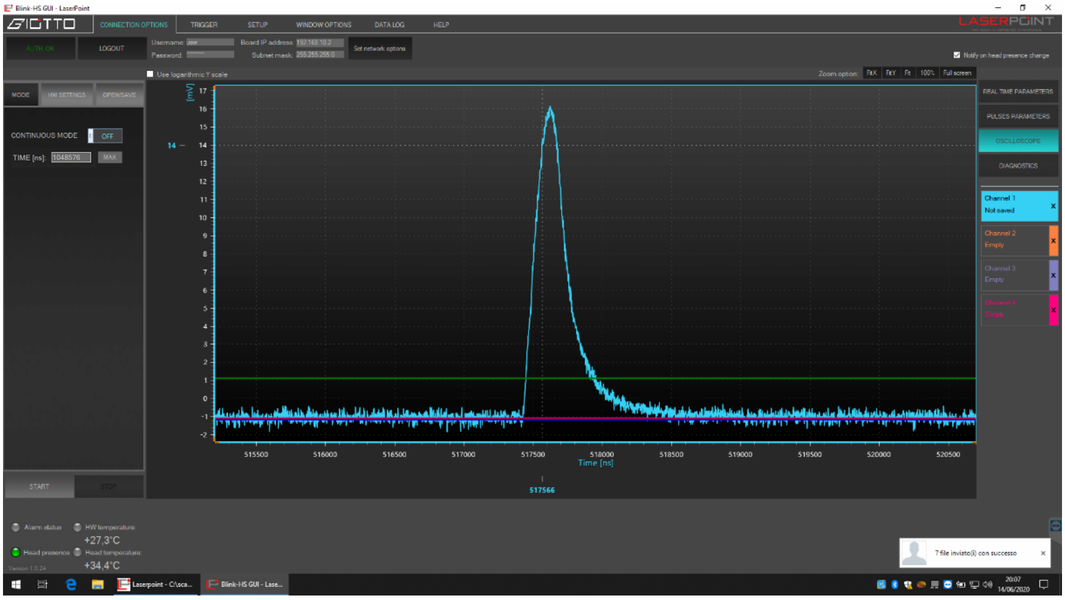


Figure 38

3. By left mouse click pointing over the graph trace, a crosshair appers (X-Y values are displayed); the crosshair is removed be click once more on the graph trace (**fig.38**)

18.EXAMPLES OF UV AND CO2 LASER MEASUREMENT

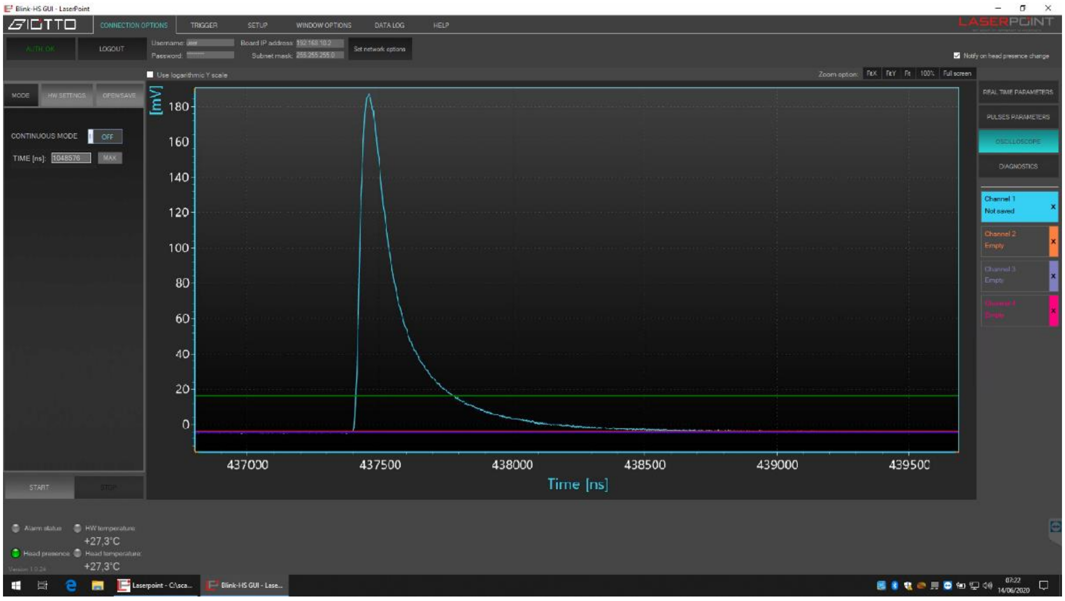


Figure 39

1. Pulse shape of 355 nm laser (**fig.39**)

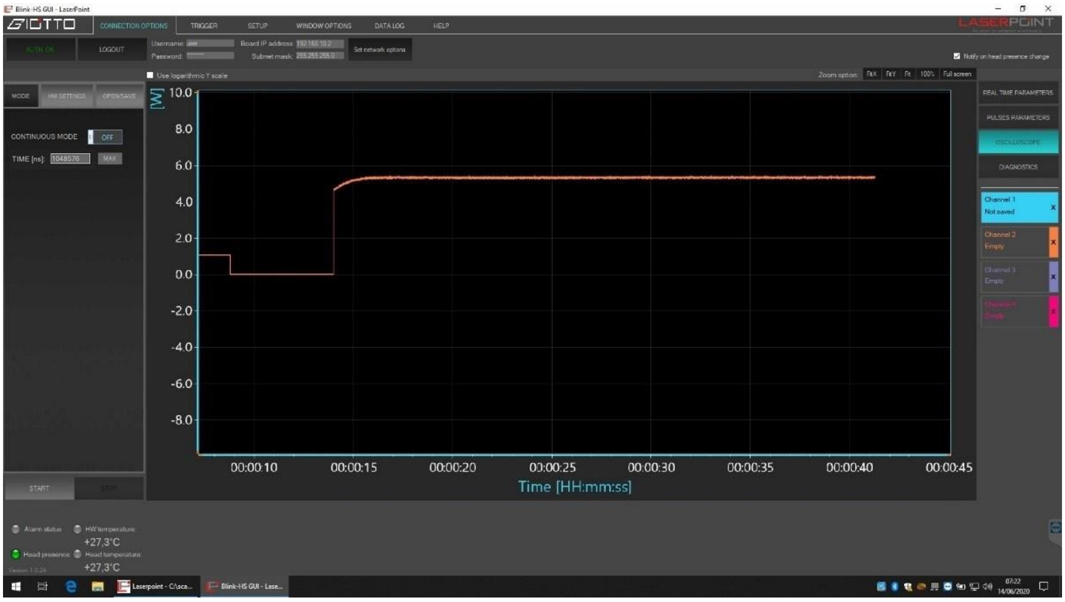


Figure 40

2. Time evolution of average Power of 355 nm laser (**fig.40**)

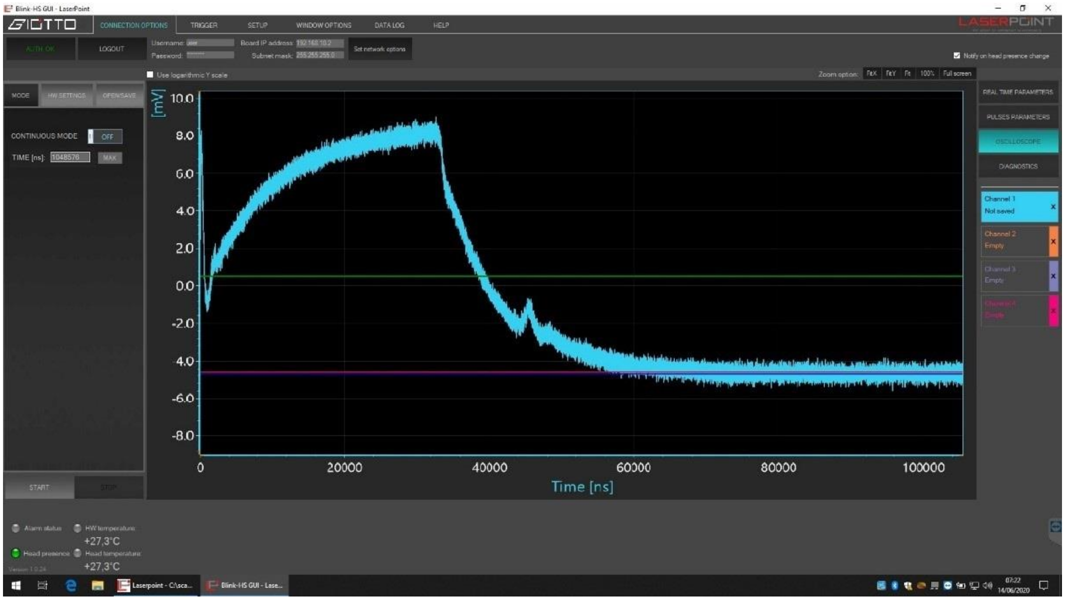


Figure 41

3. Pulse shape of CO2 laser (**fig.41**)

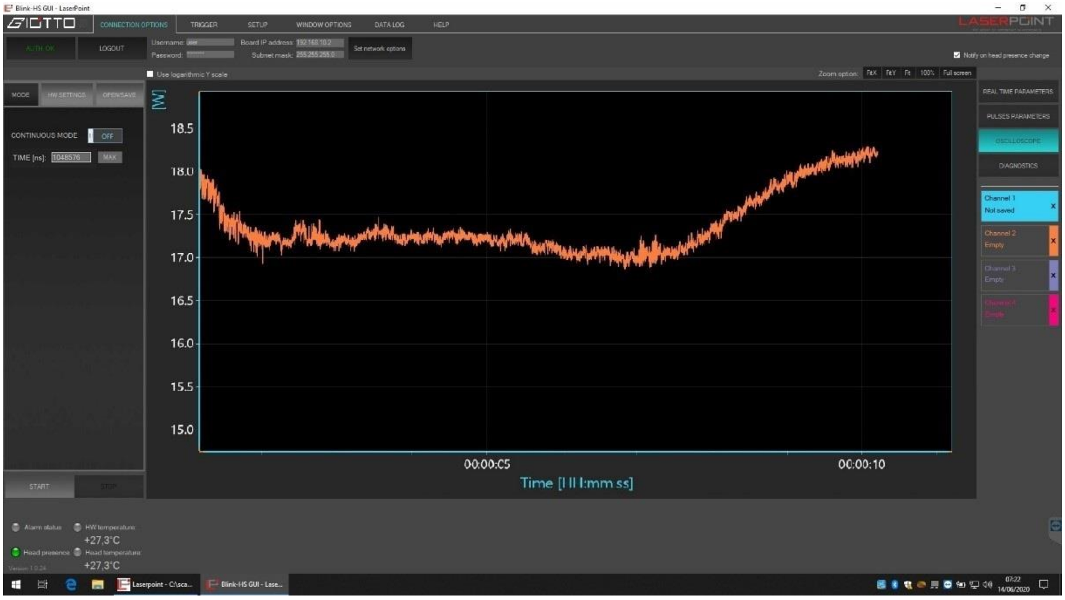


Figure 42

4. Time evolution of average Power of CO2 nm laser (**fig.42**)

19.EXAMPLES OF MHZ FEMTOSECOND PULSES DETECTION

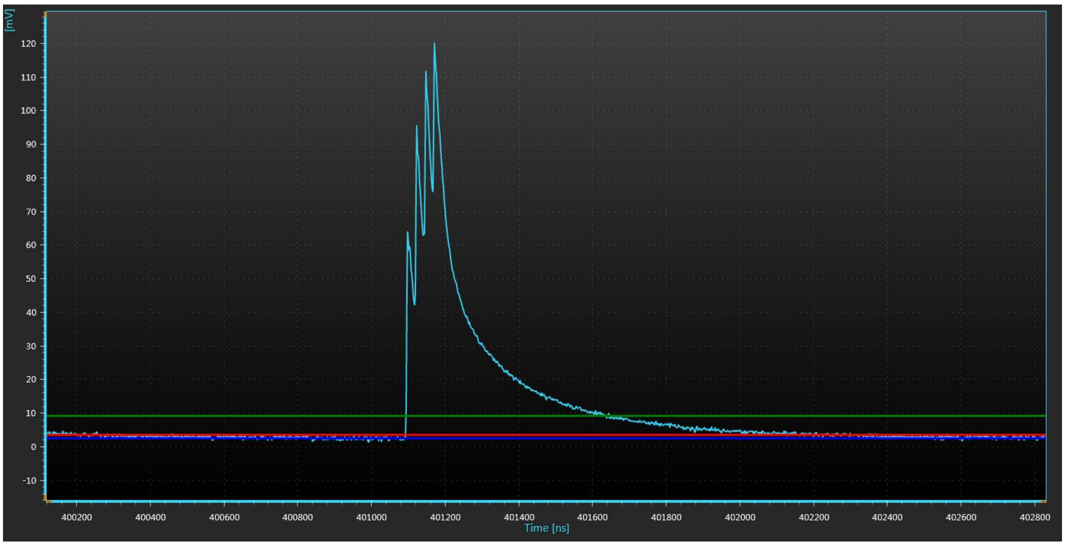


Figure 43

1. Detection of MHz burst (40 MHz, **4 pulses**) of femtosecond laser

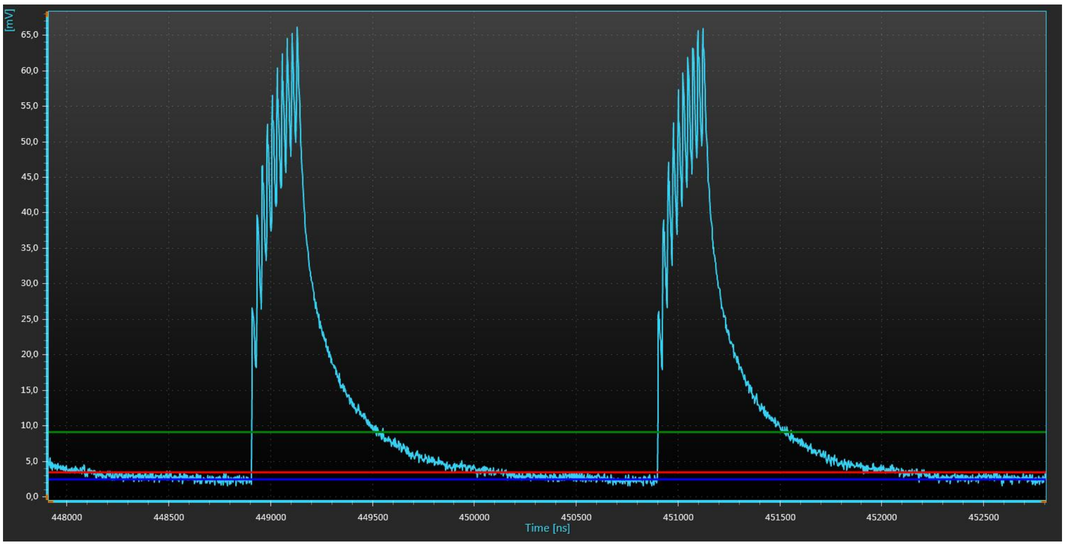


Figure 44

2. Detection of MHz burst (40 MHz, **10 pulses**) of femtosecond laser

20.EXAMPLES OF PULSE TO PULSE REAL TIME TRIGGER OUT HARDWARE ALARM SIGNALS

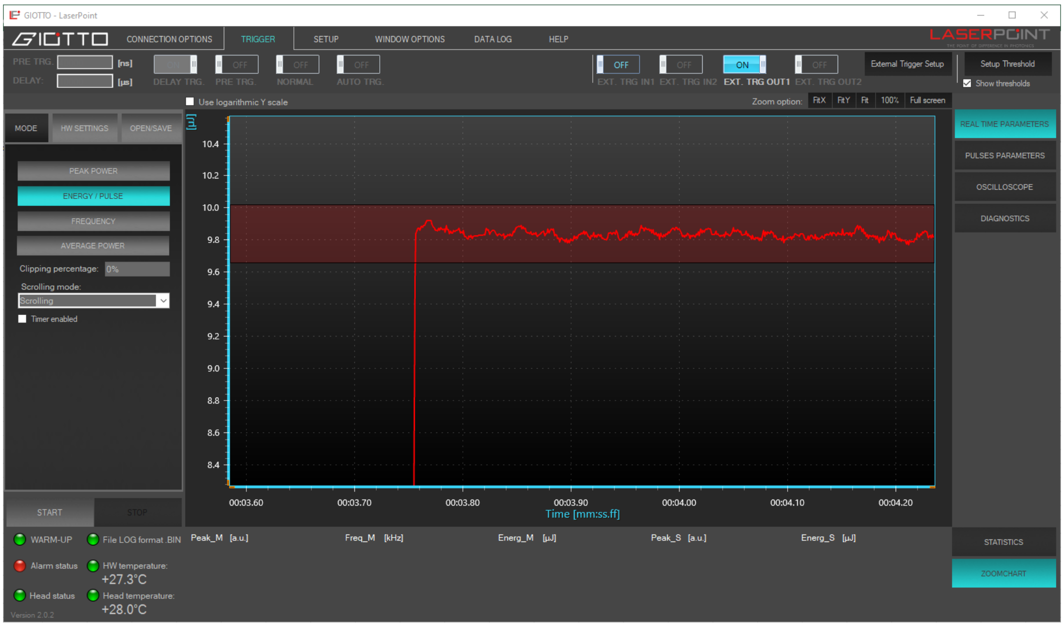


Figure 45

1. Outstanding Blink HS performances coupled to the enabling HSM acquisition electronics can allow the control of each individual laser pulse (emitted as expected, or below lower threshold, or above upper threshold, or missing); graphical visualization of the control band (pale red) is shown at the display window of Giotto GUI

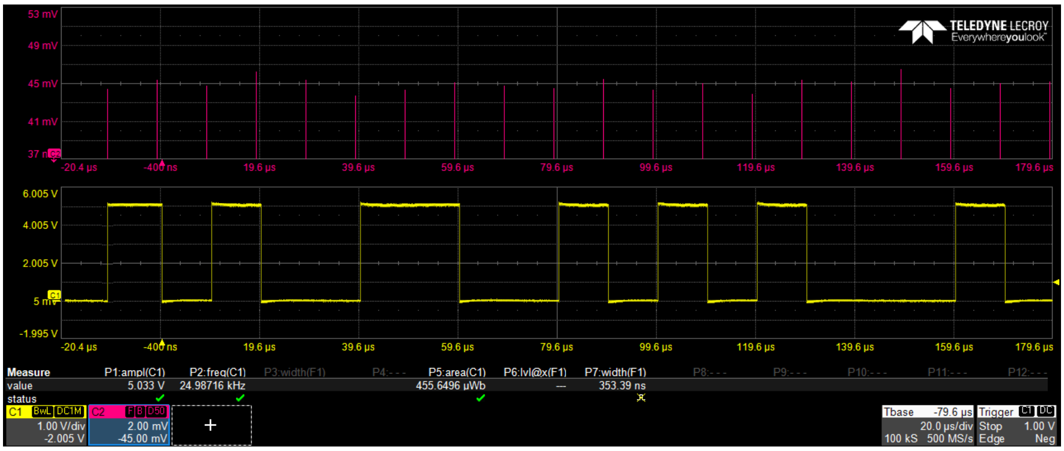


Figure 46

2. Trace of the oscilloscope (cyclamen) of the single pulse train and the TTL alarm trace (yellow) on the Trigger OUT connector (located on the front of the HSM electronics) is shown on the side

21.GRAPHIC USER INTERFACE SHORTCUT MENU

F11 → Enter fullscreen mode
Esc → (in fullscreen mode) Exit fullscreen mode
Ctrl+1 → (in fullscreen mode/parameters/mediated parameters) Show Peak value
Ctrl+2 → (in fullscreen mode/parameters/mediated parameters) Show Energy value
Ctrl+3 → (in fullscreen mode/parameters/mediated parameters) Show Frequency value
Ctrl+4 → (in fullscreen mode/parameters/mediated parameters) Show Power value
Ctrl+F → Chart zoom to fit
Ctrl+L → Enable/disable logarithmic scale
Ctrl+E → Export chart image in default folder (Log folder)
Ctrl+P → (while in time parameters acquisition) Pause/restart scrolling chart

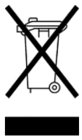
22. COMPLIANCE TO ROHS DIRECTIVE (ROHS 2 DIRECTIVE 2011/65/EU)

The European (RoHS) Directive about Restriction of Hazardous Substances (RoHS 2 Directive 2011/65/EU) requires that certain hazardous substances (heavy metals such as lead, mercury, cadmium, and hexavalent chromium and flame retardants such as polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE)) are substituted by safer alternatives.
LaserPoint **Blink HS** Energy meter is a product compliant to RoHS European Directive.

23. WASTE OF ELECTRICAL & ELECTRONIC EQUIPMENT

Information on Disposal of Electrical & Electronic Equipment (EUROPEAN UNION WEEE DIRECTIVE -WEEE 2012/19/EU)

This product bears the selective sorting symbol for waste electrical and electronic equipment (WEEE). This means that this product must be handled to the local collecting points or given back to retailer when you buy a new product, in a ratio of one to one pursuant to European Directive 2012/19/EU in order to be recycled or dismantled to minimize its impact on the environment.



Very small WEEE (no external dimension more than 25 cm) can be delivered to retailers free of charge to end-users and with no obligation to buy EEE of an equivalent type. For further information, please contact your local or regional authorities. Electronic products not included in the selective sorting process are potentially dangerous for the environment and human health due to the presence of hazardous substances. The unlawful disposal of the product carries a fine according to the legislation currently in force.

************End of Document************