

VISO SYSTEMS Labarazzi

User Manual

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Congratulations on purchasing your new Viso Systems product. Before using this product, please read our Safety Information.

This manual contains all operating information and troubleshooting tips necessary to install and operate your new Viso Systems product. Please review this manual thoroughly to ensure proper installation and operation.

For news, Q&A and support at Viso Systems, visit our website at www.visosystems.com

Other manuals and updated versions in this series can be downloaded from <https://www.visosystems.com/user-manuals/>

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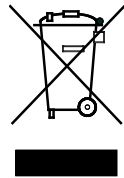
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Safety Information

Warning! This product is not for household use.

Read this manual before installing and operating the Labarazzi. Follow the safety warnings listed below and study all the cautions in the manual. If the device is in any way damaged, defective, wet, or show signs of overheating, disconnect from the mains and PC and contact Viso Systems Service for assistance. Do not install or use the device outdoors. Do not spray with or immerse in water or any other liquid. Do not remove any covers or attempt to repair the controller or the power supply. Refer any service to Viso Systems.

Disposing of this Product



Viso Systems products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable. Help preserve the environment! Ensure that this product is recycled at the end of its lifetime. Your supplier can give details of local arrangements for the disposal of Viso Systems products.

Introduction

About Labarazzi

The special Viso accessory “Labarazzi” is a light source with selectable modulated light waveforms of different modulation levels and shapes to emulate flicker and stroboscopic effects having various visibility and perception properties. Labarazzi can be used for demonstrations and test purposes of TLAs (temporary light artifacts).

Labarazzi works both as a stand-alone unit and connection with Viso Light Inspector software, that can be downloaded from www.visosystems.com.

The Labarazzi light source has several applications:

- In research projects investigating TLA and human responses
- For TLA tester calibration
- For demonstration of flickering light – in education and sales
- For test of (video-) cameras and compatibility with flickering light sources, e.g., in TV recordings.

About this Document

These guidelines describe the installation process of the Labarazzi and how to use it.

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Product Specifications

Dimensions, L*W*H

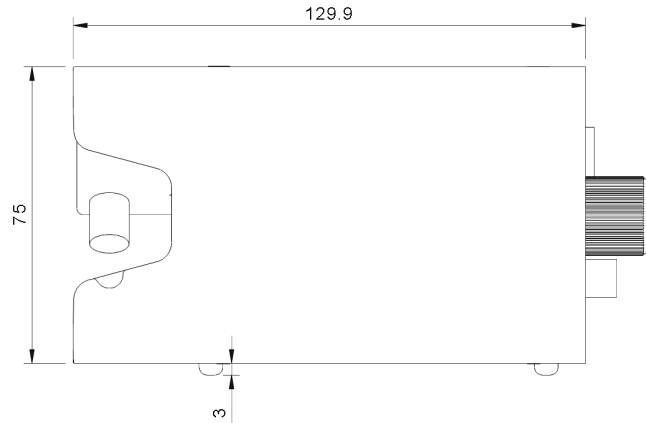
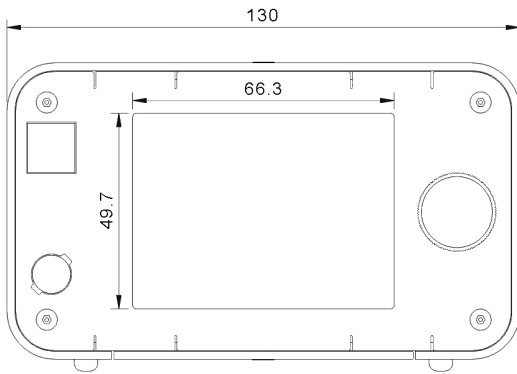
130 mm * 130 mm * 75 mm

Materials

Powder coated steel housing

Weight

Device 1.3 kg + cables



All dimensions in millimeter

Packages and Weight

Shipping Packages	Shipping Dimensions	Shipping Volume	Weight
1. Labarazzi	220 x 155 x 130 mm	0,0044 m ³	1,6 kg

Total shipping weight: 1,6 kg.

The shipment is done in a total of 1 package

Labarazzi Package Content

- 1 Labarazzi Unit
- 2 m angled power cable (Schuco)
- 2 m USB 2.0 cable



Labarazzi Installation Procedure

- Connect the power cable to the Labarazzi and mains power (85-264 VAC, 40 W).
- Turn on the Labarazzi with on/off switch next to the power plug.

For integration with Viso software (and for firmware updates):

- Connection to PC with USB cable, and install Light Inspector software from <https://www.visosystems.com/download-light-inspector/>

When using the Labarazzi to feed a control signal to other devices

- Connect to other devices with Sync BNC port (cable not included).

Position the Labarazzi

- on the desk lying down – light source facing backwards e.g., on a wall.



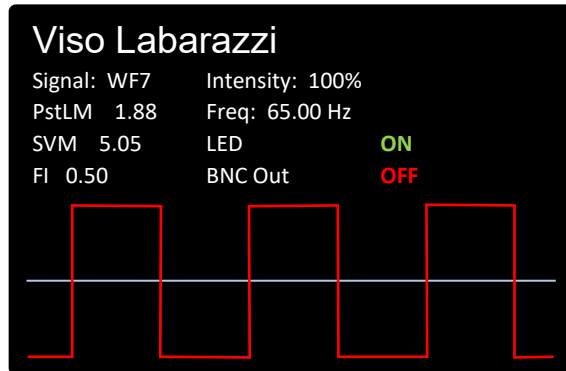
- on the desk standing up – light source facing downwards on the table.



Using Labarazzi in Stand-alone Mode

When turning on the Labarazzi, the built-in display briefly indicates the firmware and bootloader version.

As the unit per default starts in preset Waveform no. 7, and light source at full load, the display initially shows:



Interpretation:

Signal:	Waveform (flat = DC/sine/square/triangle/saw/PWM)
PstLM:	Flicker metric, short term light modulation*
SVM:	Stroboscopic visibility measure*
FI:	Flicker Index*
Freq:	Frequency – all Labarazzi signal are periodic with a defined frequency*
LED:	Indicates whether the built-in LED is currently ON or OFF
BNC:	Indicates whether the built-in external signal output is currently ON or OFF
Bottom red line:	Three cycles of the selected signal (in image: flat/no signal chosen)
Bottom blue line:	Average intensity indicator

* See more details in section “Flicker Metrics”

Flicker Metrics

Flickering light is a visible problem at low frequencies. It can trigger headaches, fatigue, and migraine attacks at higher frequencies - even if the effect is not visible. There are huge differences in how much people are affected by flickering light.

Flicker and stroboscopic effects are only found to a negligible degree in incandescent bulbs, as the filament does not get cold between each 50 Hz pulse from the power supply. Many LED solutions, however, are unsatisfactory in this regard - not because of the LEDs, but because of poor drivers/power supply electronics. Particularly dimmed LED luminaires and some screw-base LED light sources can be very flickering.

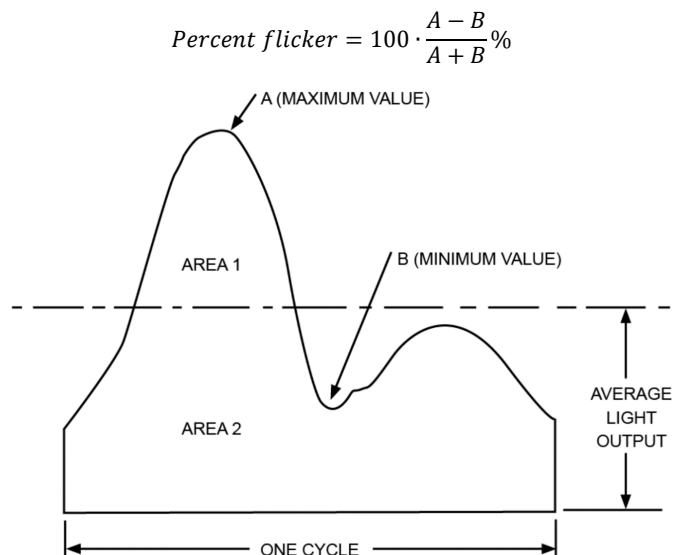
CIE Technical note CIE TN 012:2021 (“Guidance on the Measurement of Temporal Light Modulation of Light Sources and Lighting Systems”) provides a lot of valuable information on the topic and is free to download.

Flicker Frequency

Flicker Frequency is the dominant flicker frequency of lamp typically caused by the driver and supplied AC current.

Flicker Percentage (PF) ≈ Modulation Depth (MD)

Flicker percent is a relative measure of the cyclic variation in the output of a light source (i.e., percent modulation). Sometimes this is also referred to as the “modulation index” (as a fraction between 0 and 1, not percent). From the figure¹ below:



Flicker Index (FI)

According to CIE S 017:2020, 17-22-094 (CIE 2020) the flicker index (symbol I_f) is the quotient of the above-average luminous energy to the total luminous energy over a period of time.

¹ The IESNA Lighting Handbook, 9th Edition, Mark S. Rea, 2000

Hence, the Flicker Index is a “relative measure of the cyclic variation in the output of various sources at a given power frequency. It considers the waveform of the light output as well as its amplitude”¹. The flicker index assumes values from 0 to 1.0, with 0 for steady light output. Higher values indicate an increased possibility of noticeable lamp flicker, as well as stroboscopic effects. Again, from the figure above:

$$Flicker\ Index = \frac{Area\ 1}{Area\ 1 + Area\ 2}$$

New Flicker Metrics

Flicker Index and Flicker Percent are not suitable to describe the effect of light modulations of human perception. E.g., 100% flicker at 1,000 Hz flicker frequency will result in a very high flicker index but at 1,000 Hz humans will generally not be affected by flicker, so ‘Percent Flicker’ and ‘Flicker Index’ will not describe human perception of stroboscopic effects. The latest research in what is collectively referred to as ‘**Temporal Light Artifacts**’ (TLA) distinguishes between three different effects: **flicker** (static light sources+static observer), **stroboscopic effects** (moving light sources+static observer) and **phantom array effects** (Static light source+moving observer eyes). For the first two, good metrics for the effect on people has been established: the two indices P_{st}^{LM} and SVM.

SVM - ‘Stroboscopic Visibility Measure’

Invisible flicker / stroboscopic effects typically occur in the frequency range from 80 Hz to 2,000 Hz and are measured by the SVM measurement method (the abbreviation stands for “Stroboscopic Visibility Measure”). SVM quantifies the strobe effect that may occur in connection with moving objects and a light modulation. Above 2000 Hz there is usually no risk of strobe effects. SVM is based on several parameters like: Intensity, flicker Index, frequency etc.

The SVM value can be read as:

- SVM < 1 Not Visible
- SVM = 1 Just Visible
- SVM > 1 Visible

P_{st}^{LM}

Visible flicker typically occurs when the frequency is from 0.3-80 Hz. In this area the metric P_{st}^{LM} is used (the abbreviation comes from “short term light modulation”). The details are described in IEC / TR 61547-1 and IEC 61000-4-15.

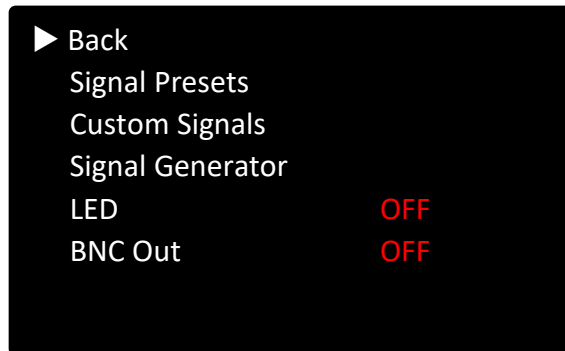
The P_{st}^{LM} values in general can be read as:

- $P_{st}^{LM} \leq 1$ Good
- $P_{st}^{LM} = 1$ 50% detection level
- $P_{st}^{LM} > 1$ Bad

Using the Labarazzi Menus

Main menu

Press the multifunction button/dial once to enter the main menu:



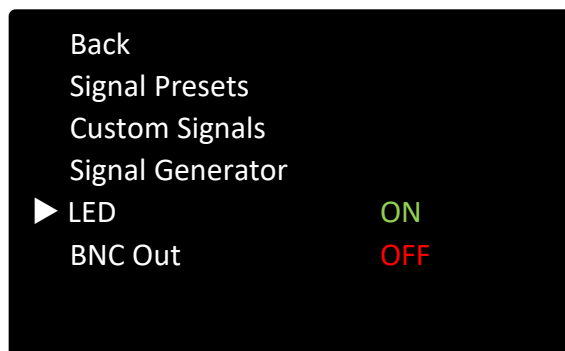
Press once again to go back

Turn button right to scroll down/left to scroll up and to move the arrow to other menu point, the press the button once to choose a particular menu point:

- **Signal Presets** – allows you to choose between 26 preset signals
- **Custom Signals** – allows you to work with custom signals designed in Viso Light Inspector, see page 13.
- **Signal Generator** – allows you to make a custom signal directly on the unit (stand-alone)
- **LED** – turns the built LED on/off
- **BNC Out** – turns the external signal to the SYNC port ON/OFF

LED On/off

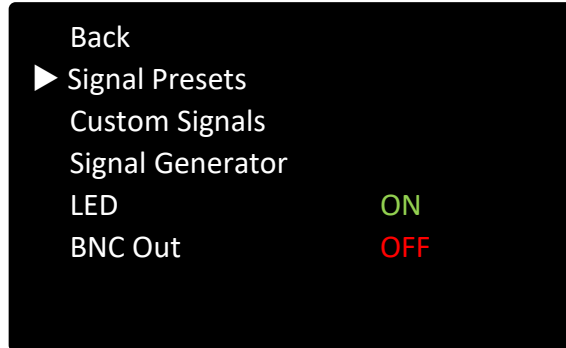
Turn button and press once to enter the 'LED' menu:



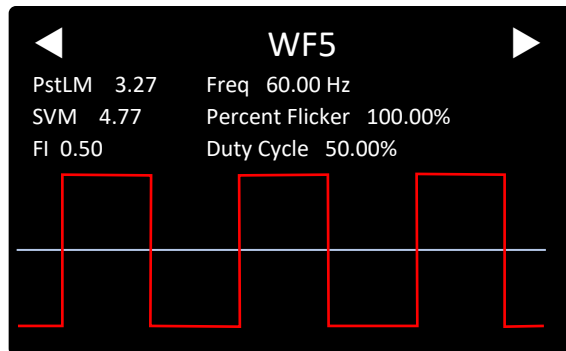
Press button once to turn LED on. Press button once to turn LED off.

Signal Presets

Turn button right and press once to enter the 'Signal Presets' menu:



- The Labarazzi includes 26 signal presets. These preset waveforms cannot be altered.
- Turn button right and left to pick signal – upper line shows waveform names, WF1 through WF26.
- Press selector to select waveform and start. You will now see the Labarazzi demonstrating the selected signal (provided that the LED is set to 'ON'). The bottom of the display shows three cycles of the selected signal.
- Press selector again to go back to the menu.



List of selectable signals:

	Waveform	Frequency <i>Hz</i>	Percent Flicker <i>%</i>	Flicker Index	Duty Cycle <i>%</i>	PstLM	SVM
WF1	Square	56,69	28,4	0,09	100	1	1
WF2	Square	100	50	0,25	50	0,36	2,48
WF3	Square	15	5	0,30	50	11,83	0,06
WF4	Square	50	5	0,03	50	0,53	0,19
WF5	Square	60	100	0,50	50	3,27	4,77
WF6	Square	60	15	0,07	50	0,49	0,72
WF7	Square	65	100	0,50	50	1,88	5,05
WF8	DC (flat)	None	0	0,00	None	0,00	0,00
WF9	Saw	50	100	0,25	50	5,27	1,97
WF10	Sine	50	5	0,25	50	0,41	0,15
WF11	Square	50	100	0,70	30	14,35	5,48

	Waveform	Frequency Hz	Percent Flicker %	Flicker Index	Duty Cycle %	PstLM	SVM
WF12	Square	50	100	0,05	95	0,90	0,50
WF13	Square	100	100	0,50	50	0,72	4,96
WF14	Square	400	100	0,50	50	0,00	2,06
WF15	Square	100	25	0,13	50	0,18	1,24
WF16	Square	10	0,33	0,00	50	0,99	0,00
WF17	Rect. sine	100	100	0,21	50	0,00	1,83
WF18	Sine	100	100	0,32	50	0,08	3,89
WF19	Square	100	100	0,70	30	2,50	6,75
WF20	Square	100	100	0,05	95	0,89	0,44
WF21	Sine	100	35	0,11	50	0,03	1,36
WF22	Sine	100	10	0,03	50	0,01	0,39
WF23	Square	8,8	0,3	0,00	50	0,88	0,00
WF24	Square	33,3	1	0,01	50	1,00	0,02
WF25	Square	0,3	1,3	0,01	50	1,01	0,00
WF26	Square	30	50	0,25	50	63,21	0,91

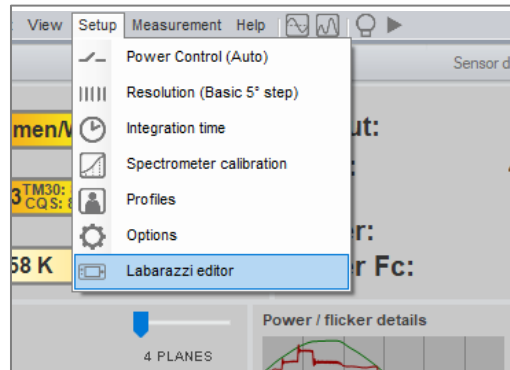
Custom Signals and Software Setup

The Labarazzi editor software allows for creation of custom signals which can be saved to the Labarazzi.

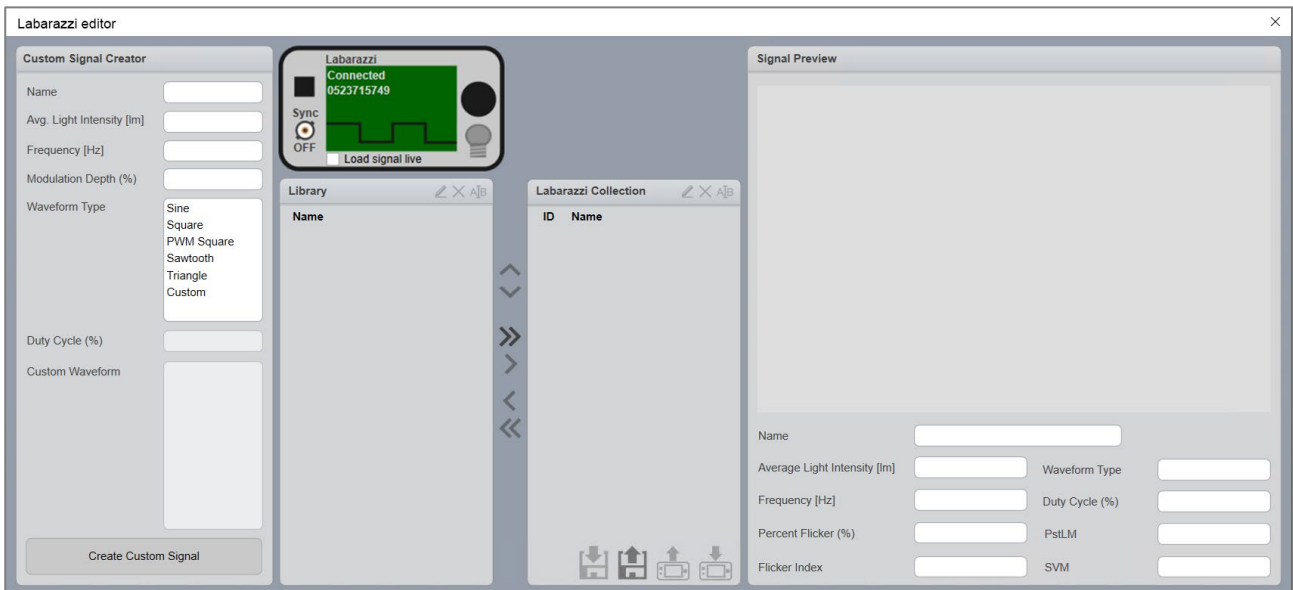
Connect the Labarazzi to your PC with the included 2 m USB 2.0 cable.

Download and install the free Light Inspector Software from <https://www.visosystems.com/download-light-inspector/> (version 6.42 or higher).

Open the Labarazzi Editor in by clicking *Setup* → *Labarazzi Editor*.

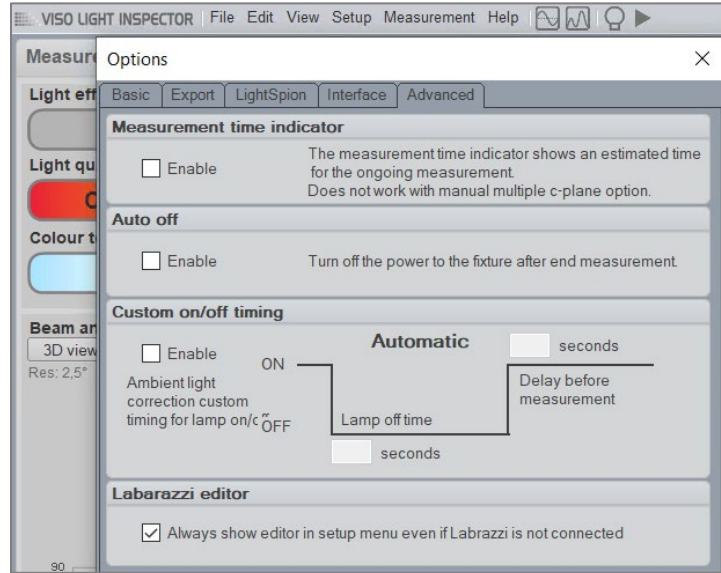


The Labarazzi Editor window opens:

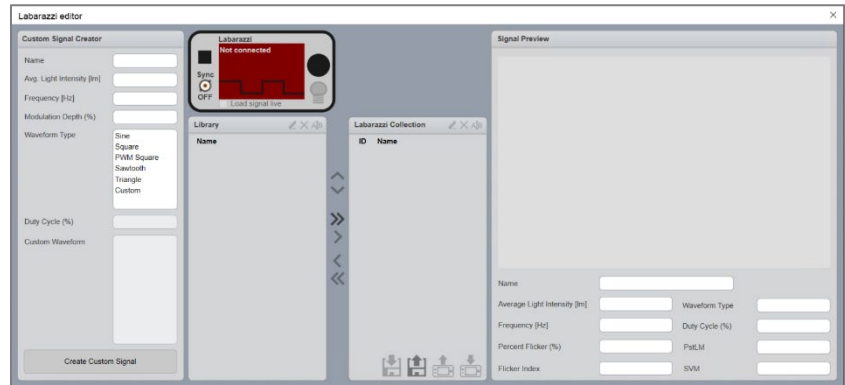


Working with Custom Signals without Connecting Labarazzi.

The menu point “Labarazzi Editor” will not be visible unless the Labarazzi unit is connected to your PC. To change this, go to *Setup* → *Options* → *Tab: Advanced* and tick off the “Always show Editor....” box:



In this case, the Labarazzi Editor window will look like this:



Tool tips

Hovering over the headlines in the menu will give you useful information about the options and limitations.

Creating Custom Signals

With the custom signal creator in the editor, the user can create custom signals using the built-in waveform types or their own CSV waveforms. This means that the user can display their own waveforms of TLA's or any other signal on the Labarazzi easily and conveniently.

Custom Signal Creator contents

1. Name: The name of the Custom Signal being created.

Custom Signal Creator

Name **1**

Avg. Light Intensity [lm] **2**

Frequency [Hz] **3**

Modulation Depth (%) **4**

Waveform Type **5**

Duty Cycle (%) **6**

Custom Waveform **7**

Create Custom Signal

2. Average Light output: The resulting average light output of the Labarazzi. Maximum is 1100 lumen.
Note: This maximum lumen output may not be achievable for PWM Square signals with low duty cycle settings, as peak values will exceed the current limit of the LED. The program will automatically limit the luminous output with these out-of-range waveform settings.
3. Frequency: The frequency of the signal. Note that this will not represent the fundamental flicker frequency if a custom waveform contains more than one cycle of a periodic signal is used.
4. Modulation Depth: The relative amplitude of the modulation of the DC signal. This is approximately equal to the resulting percent flicker of the light output.
5. Waveform Type: The type of waveform which will be generated. If “Custom” is selected, the “Custom Waveform” (7) field will be enabled.
6. Duty Cycle: Note that this is only applicable for the “PWM Square” waveform type.
7. Custom Waveform: Field for inputting custom signals as CSV (comma or semi-colon separated) or newline (return) separated. The input waveform may be of any amplitude, offset and length, as it will be rescaled, normalized and up-/down-sampled to 4096 samples in the software.

Fill in fields 1 through 5 to create your own signal. To make a PWM signal, also fill in field number 6. To make a Custom Waveform, also fill in field number 7.

Then, press the “Create Custom Signal”:

- The new signal is now listed in the library
- Two cycles of the chosen custom signal is shown in the “Signal preview” window
- Various flicker metrics are calculated and are shown in the lower right-hand corner.

Labarazzi editor

Custom Signal Creator

Name: Custom signal 1

Avg. Light Intensity [lm]: 1000

Frequency [Hz]: 80

Modulation Depth (%): 50

Waveform Type:

Duty Cycle (%):

Custom Waveform:

Create Custom Signal

Labarazzi
Connected
0523715749

Sync
 OFF

Load signal live

Library

Name
Custom signal 1

Labarazzi Collection

ID	Name

Signal Preview

(Two cycles)

Signal Metrics

Name: Custom signal 1

Average Light Intensity [lm]: 1000,0

Frequency [Hz]: 80,00

Percent Flicker (%): 50,00

Flicker Index: 0,16

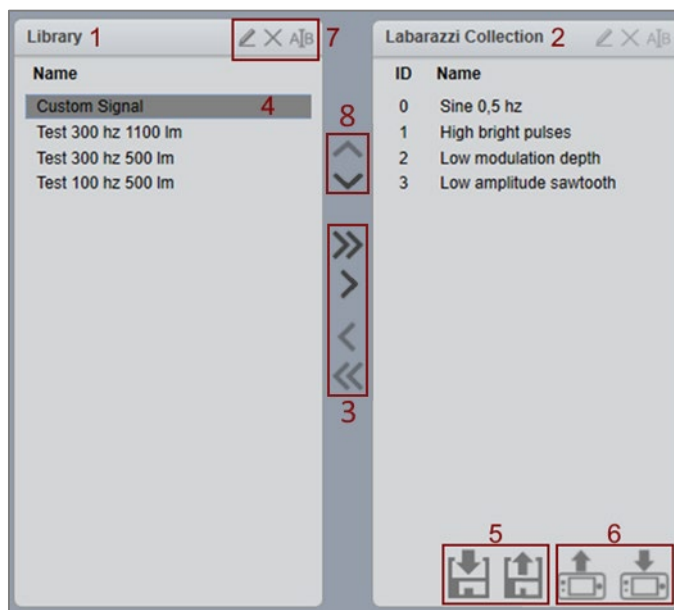
Waveform Type: Sine

Duty Cycle (%): NaN

PstLM: 0,1677

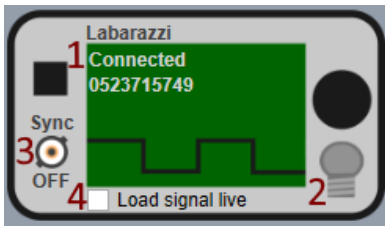
SVM: 2,06

Collection and Library



1. **Library:** The library may contain an unlimited number of Custom Signals. This is where a newly created signal goes. From here the user can move signals to a Labarazzi Collection. The library is saved to the computer (Documents\Viso Systems\Light Inspector\Settings) when the program is exited, so that the list is not lost when the program is restarted.
2. **Labarazzi Collection:** The Labarazzi Collection is a list of up to 15 custom signals which can be loaded onto the Labarazzi. Collections can also be saved to and loaded from the computer. See point 5. This enables the user to conveniently load the same set of custom signals onto multiple Labarazzis.
3. **Move arrows:** Allows user to move Custom Signals from the library to the collection and back again. Single arrows move the selected signal, and double arrows move all signals.
4. **Selected signal:** The selected signal is highlighted with dark grey. Signals can be right-clicked for options to rename, delete, or to copy to generator. These options are also available in field 7 for the selected signal.
5. **Save/load Labarazzi Collection:** These two buttons enable the user to save or load Labarazzi Collections to/from the computer.
6. **Save to or import from Labarazzi:** Allows the user to save the current Labarazzi Collection to the Labarazzi's memory or load previously saved custom signals from the Labarazzi to the Collection.
7. **Copy to Custom Signal Creator, delete, and rename:** Allows the user to copy the selected custom signal to the creator, delete the selected signal, and rename the selected signal.
8. **Move Custom Signal up/down:** Move the selected Custom Signal up or down in the Library or Collection.

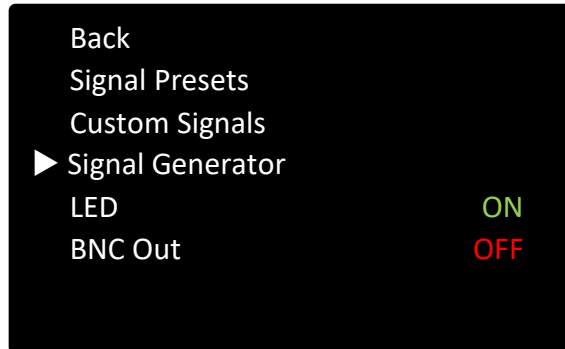
Labarazzi Control



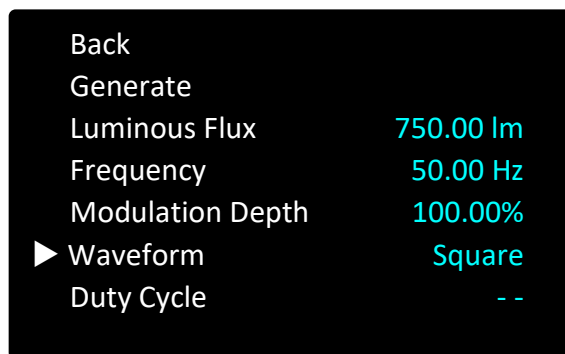
1. Connection screen: Reads "Connected", shows serial number and has a green background when a Labarazzi is connected. Reads "Not Connected" and has a red background when a Labarazzi is not connected.
2. LED toggle: Click the bulb icon to turn on/off the LED on the connected Labarazzi. Appears illuminated when the LED is on.
3. BNC on/off toggle: Allows the user to turn the sync BNC plug on/off.
4. Load signal live checkbox: When checked, custom signals are automatically sent to the connected Labarazzi when selected.

Built-in Signal Generator

Turn button and press once to enter the 'Signal Generator' menu:



In this menu, you can set your own custom signal. Please note: On the standalone unit, you can just set a single custom signal. The Labarazzi will not be able to read out metrics as PstLM and SVM unless the signal is provided as a custom signal (from software).



- Set each parameter to the desired value:
 - Average luminous flux (maximum average 1100 lumen) settings: 100 / 200 / 300 / 500 / 750 (default) / 1100 / Other
Please note: The output peak maximum is set to 2200 lumen to protect the LED. Some settings (e.g., PWM with very short duty cycles) will not run on a 1100 lumen average. The Labarazzi will reduce the average to protect the LED automatically.
 - Frequency settings: 0.5/2/10/20/50/100/200/other (min. 0/max. is 10,000 Hz)
 - Modulation Depth: 100% / 50% / 25% / 10% / 5% / 2% / Other
 - Waveform settings: Sine / Square / Triangle / Saw / Cosine / PWM / Flat (other waveforms through software solution 'Custom signals')
 - Duty Cycle settings (only open for settings if waveform is PWM): 20% / 40% / 50% / 60% / 80% / Other (min. 0, max. 100%)
- Activate the new settings by selecting "Generate" and pressing once (make sure that the LED is on).
- Return to the menu by pressing once again
- Return to the main window by pressing once again

BNC connector output

the Labarazzi is capable of sending a live flicker signal to an external device via the built-in BNC plug. The output is a control signal - thus needing a receptive device or software that can use the signal to drive another light source. Thus, the internal Labarazzi drive cannot drive an external LED directly.

The BNC output of the labarazzi is 0-3.3V representation of the light signal. It is mainly used to trigger other sensors and is therefore a low power output that cannot drive an LED on its own. Thus, the BNC as a signal generator you can control through the interface or our software.

Specifications

Physical dimensions

Dimensions (L x W x H)	130 x 130 x 78 mm
Weight	1300 g
Shipping Dimensions (L x W x H)	220 x 155 x 130 mm
Shipping weight	1600 g

Signals

Signal types	flat = DC / sine / square / triangle / saw / cosine / PWM
Modulation depth	0-100%
Frequency bandwidth limitation	0 Hz to 10,000 Hz

Photometric

Light source, output	0 to 1100 lumen (@300 mA)
Light source type:	Bridgelux BXRC-30E1000-D-73
Light quality	CRI 80, CCT 3000 K

Electric

Connection	Schuco mains cable
Power	85-264 VAC, 40 W

Warranty

Warranty period	2 years from delivery date
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Ordering information

Labarazzi product number	P/N LABARAZ
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At Viso Systems, we design, develop and manufacture OEM- and customer-specific goniophotometer solutions. Our mission is to support customers with powerful, yet easy-to-use control and measurement solutions. Products are developed and manufactured in Copenhagen, Denmark.



Light measurement made easy
