

VPixx Technologies
Vision Science Solutions



X-Rite i1Display Pro (VPX-ACC-8010)

User Manual

Version 1.0

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Version History of this document

Version Updated to	Date	Author	Reason
1.0	2014/11/04	P.Kakos	v1.0 release

Document Icons

The use of icons emphasizes helpful, caution or warning notes. Below is a list of the icons available.

Icon	Type	Description
	Helpful Hint	<i>Information to help out during assembly, installation or usage</i>
	Caution Notice	<i>Important Information to prevent misuse and/or damage to equipment</i>
	Warning	<i>Critical information to prevent damage to equipment and/or personnel</i>

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Overview

This manual provides installation, usage and maintenance information for the i1Display Pro colorimeter.

For technical questions or product support information, do not hesitate to contact the VPixx support team by phone or by sending an E-mail at support@vpixx.com



By creating your *MyVPixx* account on the VPixx Technologies website, you will have access to additional product documentation, demos, source code examples and the latest firmware and software drivers.

WARNING - SAFETY INFORMATION & PRECAUTIONS

- Place the ambient diffuser over the optics when not in use. The ambient diffuser will prevent dust or dirt from accumulating on the lens.
- If cleaning is required, first use a lens blower brush to remove loose dust. Then GENTLY wipe the lens with a soft lint-free cloth.
- Always use and store the device between 10° C to 35° C at 20% to 80% relative humidity (non-condensing).



All colorimeters must be protected from prolonged exposure to humidity and direct light. After each use, place the i1Display Pro in its protective case. Failure to do so may result in the colorimeter requiring premature recalibration.



Never use water, solvents or detergents to clean the lens or body of the device as these may cause damage or deformation.

Compliance Information

For European Countries



DECLARATION OF CONFORMITY

Manufacturer's Name: X-Rite, Incorporated

Authorized Representative: X-Rite, Incorporated

Siemensstraße 12b • 63263 Neu-Isenburg • Germany

Phone: +49 (0) 61 02-79 57-0 • Fax: +49 (0) 61 02 -79 57-57

Model Name: i1Display

Directive(s) Conformance: EMC 2004/108/EC and LV 2006/95/EC

To remain CE compliant, only CE compliant parts should be used with this product. Maintaining CE compliance also requires proper cable and cabling techniques. VPixx Technologies will not retest systems or components that have been modified by customers.

The following information is only for EU member states:



The mark shown to the left is in compliance with the Waste Electrical and Electronic Equipment directive 2012/19/EU (WEEE). The mark indicates the requirement NOT to dispose of the equipment as unsorted municipal waste. For more information call VPixx Technologies Inc. or email us at support@vpixx.com

For the United States of America

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Declaration of RoHS Compliance

RoHS This product has been designed and manufactured in compliance with Directive 2002/95/EC of the European Parliament and the Council on restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).

General specifications

The i1Display Pro colorimeter features an advanced, high-end optical system with custom-designed filters. It provides a near perfect match to the color perception of the human visual system, delivering superior color measurement results. i1Display Pro supports all modern display technologies, including LED backlight and wide gamut displays. It is spectrally calibrated, making it fully field upgradeable to support future display technologies.



Figure 1 X-Rite i1Display Pro colorimeter

An innovative Swiss-engineered design makes the i1Display Pro much more affordable than previous generations of colorimeters. The i1Display Pro connects to your computer over a USB interface, allowing your own software to initiate automated measurements and acquire data. Software support includes a low-level ANSI C API as well as MATLAB/Octave and Python libraries for use under Mac OS X, Microsoft Windows and Linux.

- 1: Ambient Diffuser Arm
- 2: Ambient Diffuser

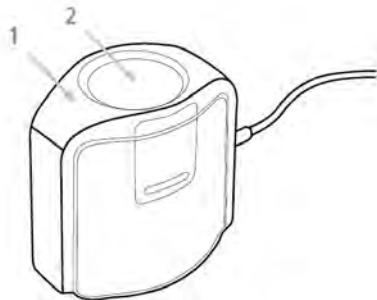


Figure 2 i1Display components

Measuring modes

- Ambient Light Measurement
- Emissive Light Measurement
- Projector Measurement

Specifications

- Color accurate measuring of all modern display types
- Contact or non-contact display measurement modes
- Ability to measure projector screens
- Capability to measure ambient light (color and illuminance)
- Specifically designed for modern LCD display technologies including CCFL, White LED, RGB LED, and Wide Gamut display technologies

Optics specification

- Number of Channels: 3
- Measurement area (in contact): 24 mm diameter circle
- Acceptance angle: ± 5 degrees (at half max)
- Luminance Measurement Range: 0.1 cd/m² to 1,000 cd/m²
- Minimum measurement integration time: 0.1 sec / measurement @ 100 cd/m²
- Maximum measurement integration time: 6 sec / measurement @ 0.10 cd/m²
- Effective Mesurement Primaries: CIE Standard (1931) Observer
- Ambient measurement angle: 160 degrees cosine response
- Ambient illuminance measurement range: 0.5 lm/m² to 5,000 lm/m²

Measurement Performance

- Accuracy: Illuminant A under X-Rite's standard measurement conditions
 - Color = $\pm 0.004 x, y$ @ 100 cd/m²
 - Luminance = $\pm 4.0\%$ @ 100 cd/m²
- Short-term repeatability: Illuminant A under X-Rite's standard measurement conditions
 - Color = $\pm 0.001 x, y$ @ 100 cd/m²
 - Luminance = $\pm 1.0\%$ @ 100 cd/m²

i1Display Pro installation

Cable installation

Connect the USB cable between the X-Rite i1Display Pro and your computer.

Device detection

Your computer should detect the X-Rite i1Display Pro and prompt you for the installation procedure. On a Mac OS X system, no driver is required; under Microsoft Windows, a driver must be installed for the X-Rite i1Display Pro.

Software Installation Instructions for Mac OS X

Insert the CD labeled “**VPixx Technologies Software/Documentation**” in your CD/DVD reader and copy the *Software Tools for MAC* folder into the OS X or Linux user folder.

In the *Software Tools for MAC* folder can be found documentation, drivers, libraries and low level C API. By using the vputil application you can configure and operate your device on a basic level.

	<i>For more information on VPixx software tools, please refer to the VPixx Software Tools user manual.</i>
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	<i>For more information on calibrating with the X-Rite i1Display Pro, please refer to the VPixx Calibration user manual.</i>
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Driver and Software Installation Instructions for Windows

These instructions are for Windows 7. Installation under Windows Vista, XP or Windows 8 is similar, but not necessarily identical.

Insert the CD labeled “**VPixx Technologies Software/Documentation**” in your CD/DVD reader. In *Software Tools for Windows*, run the *setup.exe* application. When the following box appears, click *Next* and follow the instructions.



Figure 3 VPixx Tools Setup Wizard

A shortcut of *vputil.exe* is copied on the *Windows desktop* as well as the *Program Files*, in the *VPixx Technologies* folder; documentation, drivers, libraries and low level C API folders are copied. By using the *vputil* application you can configure and operate your device on a basic level.

Once the installation is complete, the *VPixx Technologies* folder is located under *C:\Program Files*

	<i>For more information on VPixx software tools, please refer to the VPixx Software Tools user manual on MyVPixx.</i>
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	<i>For more information on calibrating with the X-Rite i1Display Pro, please refer to the VPixx Calibration user manual on MyVPixx.</i>
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Software support

VPixx Software Tools include a low-level ANSI C API as well as Psychtoolbox MATLAB / Octave and Python libraries for Mac OS X, Windows XP, Windows 7, Windows 8 and Linux. In addition, the X-Rite i1Pro is directly supported by the VPixx high-level application.

We strongly recommend you create your MyVPixx account by visiting:

<http://vpixx.com/register/>

By registering, you will have access to the latest software versions, demos and user manuals to support all your VPixx products.

Ambient diffuser and arm installation

The ambient diffuser arm snaps into place over the measurement optics. Be sure to lift up on the ambient diffuser arm before attempting to rotate it into different measurement positions.



Figure 4 Ambient diffuser and arm

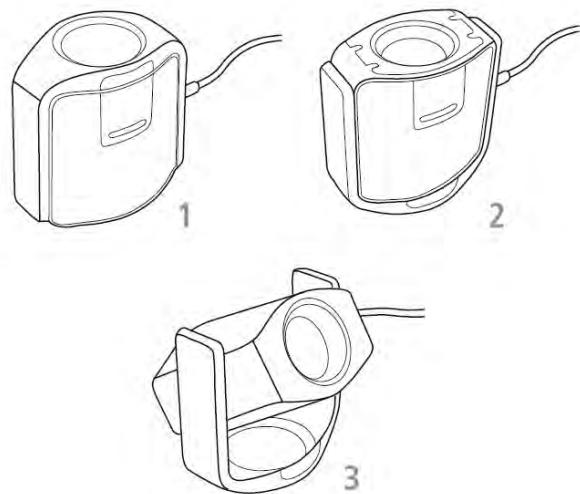


Figure 5 Ambient diffuser arm rotation procedure

Ambient light measurement

For ambient light measurements follow this procedure:

1. Rotate the ambient diffuser arm until the diffuser is positioned over the optics.

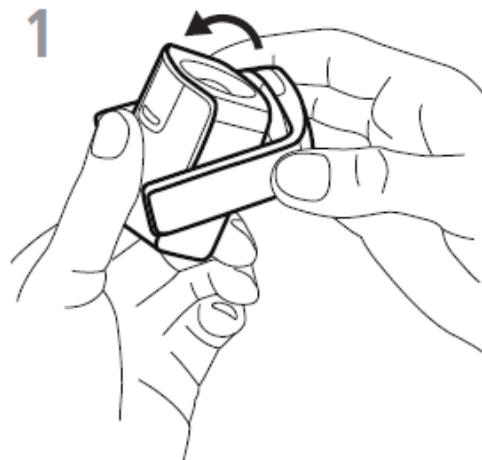


Figure 6 Rotating ambient diffuser arm

2. Press down on the ambient diffuser arm until it snaps into place over the optics.

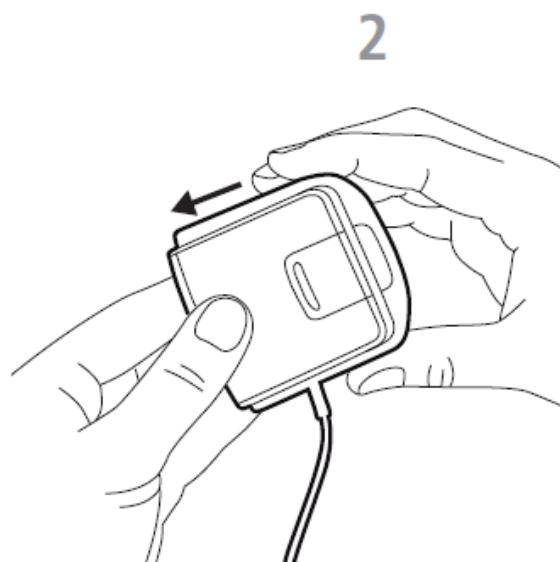


Figure 7 Snapping ambient diffuser arm over optics

3. Position the device on your work surface next to your display with the ambient diffuser pointing upwards.

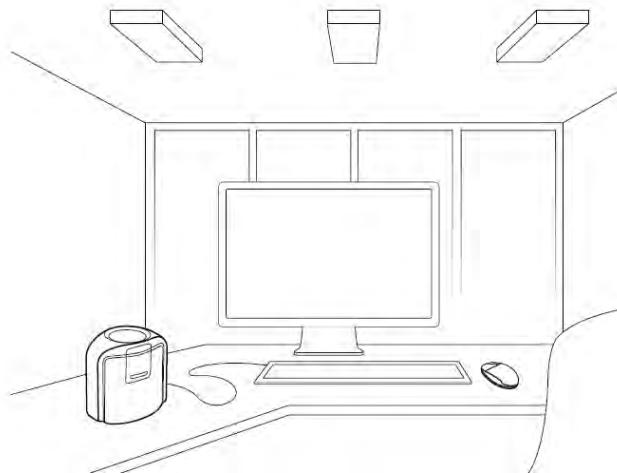


Figure 8 Ambient diffuser pointing upwards

Run the vutil software for display measurement and start the measurement process in the application.

	<p><i>For more information on vutil software tools, please refer to the VPixx Software Tools user manual on MyVPixx.</i></p>
	<p><i>For more information on calibrating with the X-Rite i1Display Pro, please refer to the VPixx Calibration user manual on MyVPixx.</i></p>

Monitor measurement

For display measurements, follow this procedure:

1. Lift up on the ambient diffuser arm.

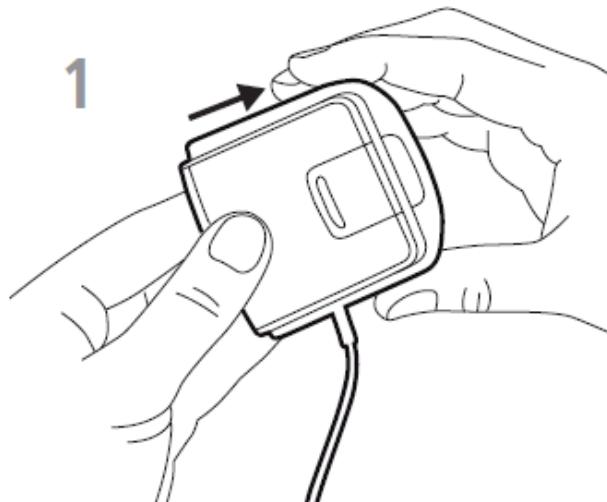


Figure 9 Lifting up on ambient diffuser arm

2. Rotate the ambient diffuser arm to the rear position.

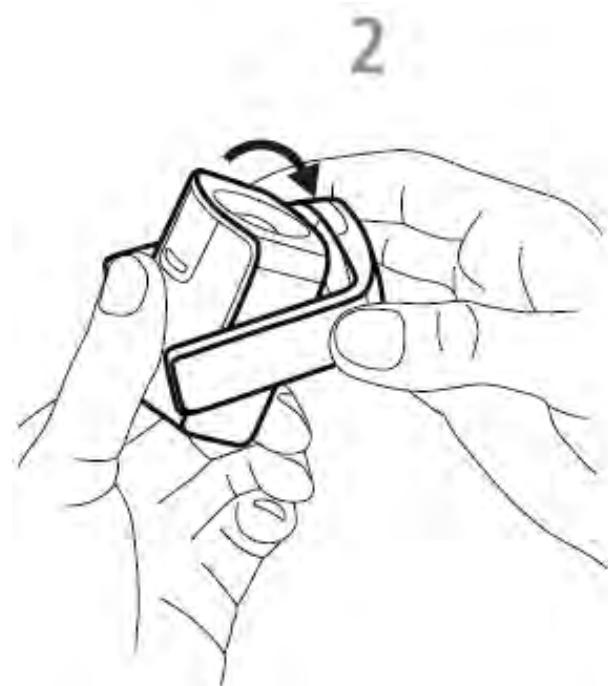


Figure 10 rotating ambient diffuser arm to rear position

3. Ambient diffuser arm will snap into place when located in rear position.



Figure 11 Snapping ambient diffuser arm into place

4. To adjust the position of the counterweight, depress the button on the counterweight while simultaneously sliding down the counterweight to the desired location.

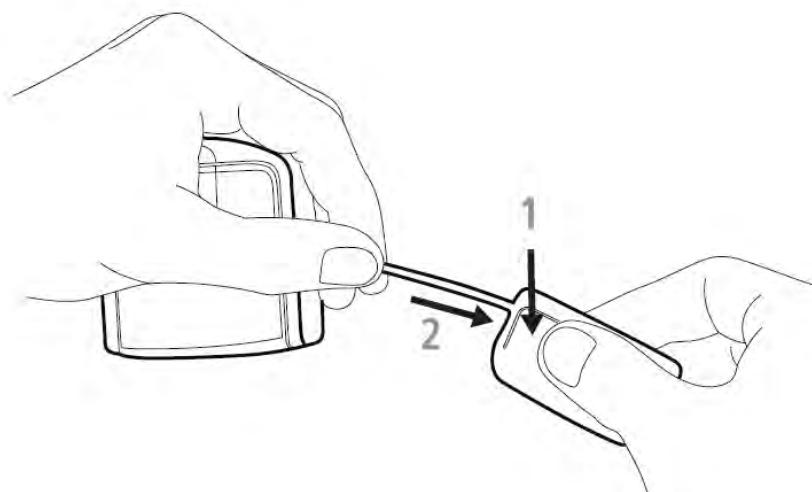


Figure 12 Sliding down the counterweight

5. To mount the device on your display, position the optics in contact with the center of your display. Then position the USB cable and counterweight behind your display.

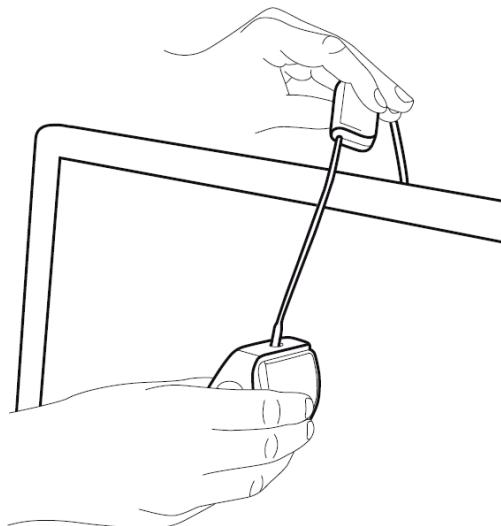


Figure 13 Mounting the device on your display

6. Adjust the position of the counterweight according to the size of your display. Ensure that the foam pad on the front of the device sits flat on your display.

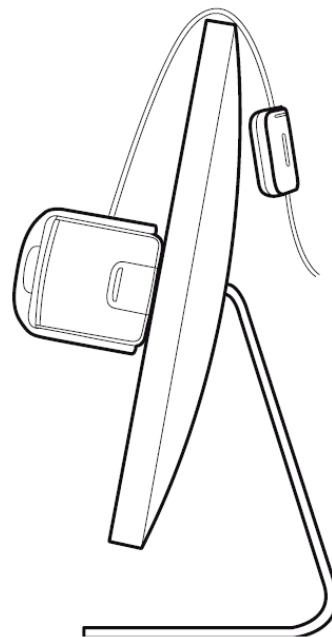


Figure 14 Example of final positioning

Run the vputil software for display measurement and start the measurement process in the application.



*For more information on vputil software tools, please refer to the **VPixx Software Tools user manual** on MyVPixx.*



*For more information on calibrating with the X-Rite i1Display Pro, please refer to the **VPixx Calibration user manual** on MyVPixx.*

Projector measurement

For projector measurements, follow this procedure:

1. Lift up on the ambient diffuser arm.

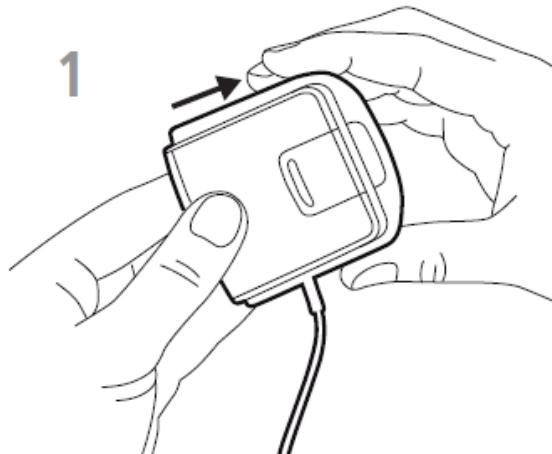


Figure 15 Lifting up the ambient diffuser arm

2. Rotate the ambient diffuser arm halfway towards rear position.

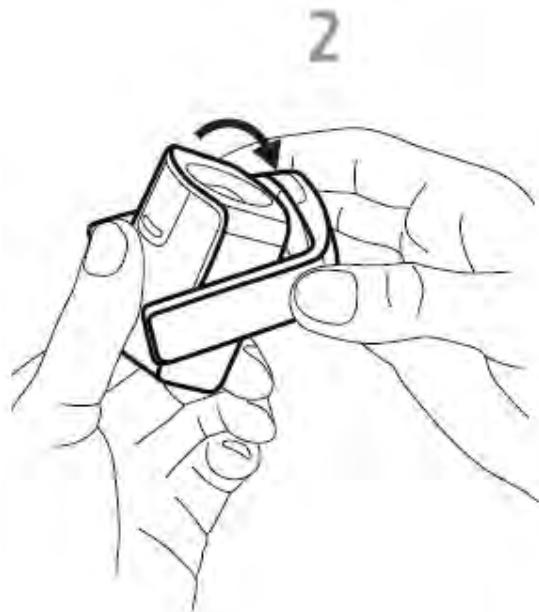


Figure 16 Rotating the ambient diffuser arm halfway towards rear position

3. Use the ambient diffuser arm as a stand and position the device on a table in front of the projector screen.

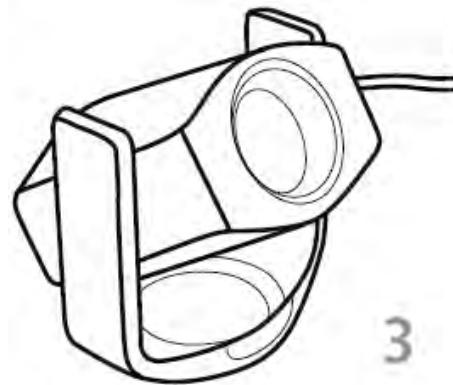


Figure 17 Positioning the device in front of the projector



A threaded tripod mount is also available, on the bottom of the device, for use with a tripod.

4. Rotate the device up or down and pivot left or right until the device optics point towards the center of the projector screen. For best results, position the device as close to the projector screen as possible and set room lighting to the intended viewing conditions.

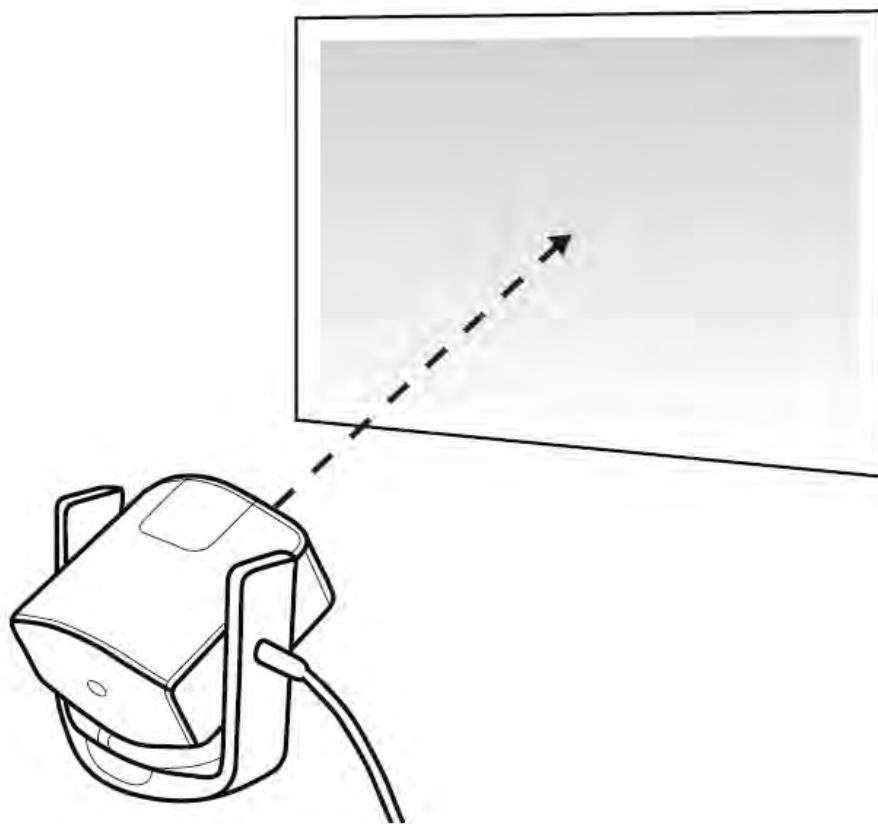


Figure 18 Aligning the device optics with the center of the projector screen

Run the vputil software for display measurement and start the measurement process in the application.

	<p><i>For more information on vputil software tools, please refer to the VPixx Software Tools user manual on MyVPixx.</i></p>
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	<p><i>For more information on calibrating with the X-Rite i1Display Pro, please refer to the VPixx Calibration user manual on MyVPixx.</i></p>
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vputil Software Tool

The vputil tool can be run from the main VPixx Technologies directory under the *Software Tools\vpoutil\bin* folder. This utility allows the user to control some of the VPixx equipment features. It can also be used to generate built-in test patterns from the equipment.

1. Toggle the power switch to the ON position
2. Run the vputil application



Figure 19 vputil application main screen

The vputil tool automatically detects all VPixx Technologies hardware connected to the computer. The main menu of the application can be displayed by using the help command.

	<p>For more information on vputil software tools, please refer to the VPixx Software Tools user manual on MyVPixx.</p>
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	<p>For more information on calibrating with the X-Rite i1Display Pro, please refer to the VPixx Calibration user manual on MyVPixx.</p>
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Warranty

The i1Display Pro is warranted against manufacturing defects in materials and workmanship for one year for parts and labor from the date of purchase.



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