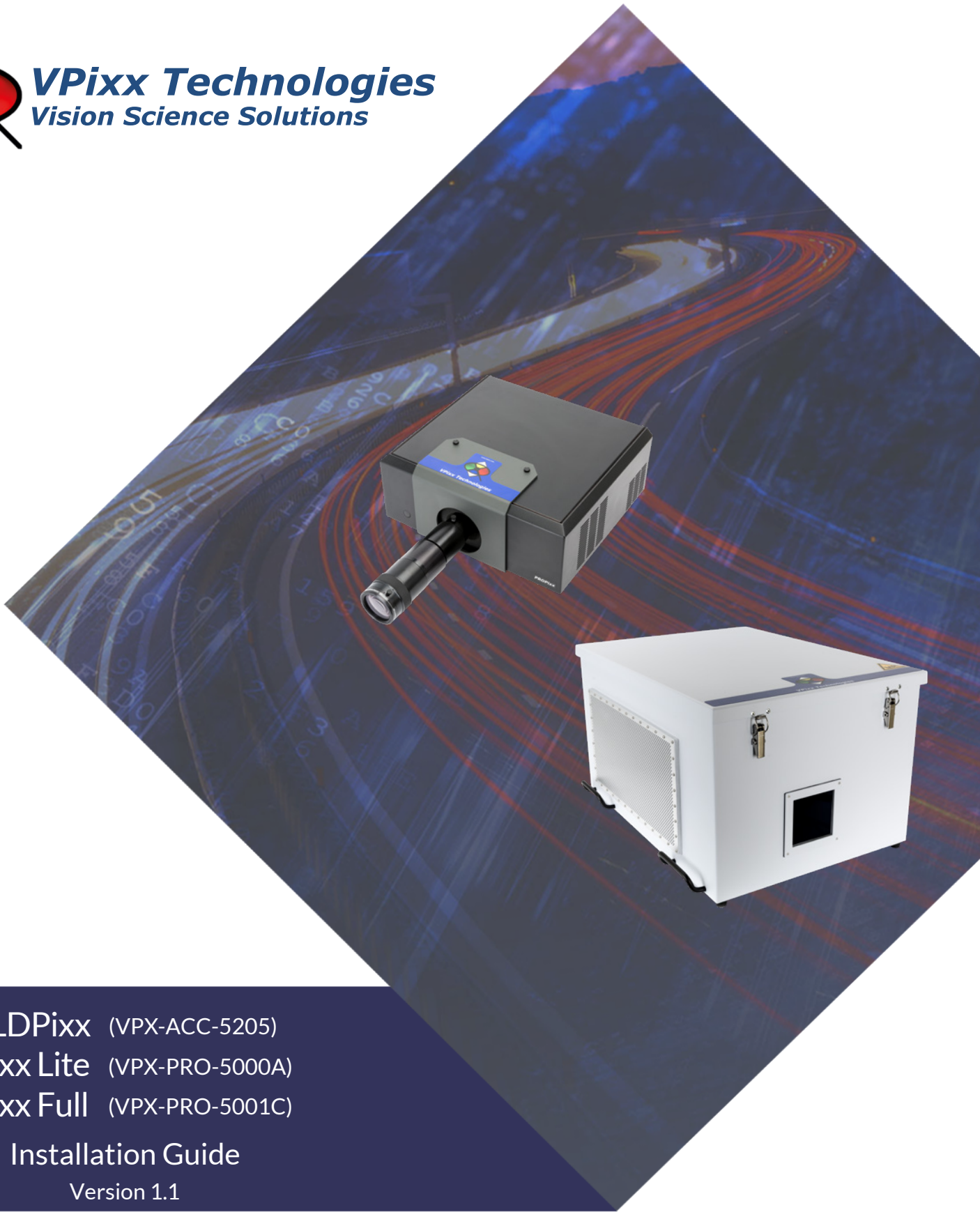




VPiXX Technologies
Vision Science Solutions



SHIELDPiXX (VPX-ACC-5205)
PROPiXX Lite (VPX-PRO-5000A)
PROPiXX Full (VPX-PRO-5001C)

Installation Guide

Version 1.1

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IMPORTANT

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For more information about our company and products, visit our Web site at www.vpixx.com

For information, comments or suggestions, please contact us by e-mail at support@vpixx.com

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Version History of this document

Version Updated to	Date	Author	Reason
1.0	2019/07/25	P.Kakos	v1.0 release
1.1	2024/01/26	JFH	SHIELDPixx dimensions

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 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 and cabling information for VPixx Technologies Inc.'s SHIELDPixx and PROPixx systems. For technical questions or product support information, do not hesitate to contact the VPixx support team by phone or by sending an E-mail to 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.



WARNINGS AND MARKINGS MUST BE OBSERVED!

Before installing and using your SHIELDPixx and PROPixx in an MR room, familiarize yourself with the MR room safety symbols found on each component of your system. These are explained in the following table






UNPACKING SHOULD BE MADE OUTSIDE OF THE MR Room.

Never unpack and/or assemble your products in the MR Room.

Immediately after receiving your SHIELDPixx and PROPixx, verify that no components are missing by consulting the Read This First document provided with each product.

Table 1 MR room safety symbols

<i>Symbol</i>	<i>Name</i>	<i>Description</i>
	MR safe	Objects and components that are marked with the green MR safe icon present no danger for staff and equipment when operating in the MR room.
	Conditionally MR safe	The yellow Conditionally MR safe icon indicates objects and components that are only MR safe in a limited fashion. There are specified safety distances that limit how close the object or component in question may be from the magnet.
	MR unsafe	The red MR unsafe icon marks objects or components which are strictly prohibited from entering the MR room.

Compliance Information

For European Countries



DECLARATION OF CONFORMITY

Manufacturer's Name: VPixx Technologies Inc.

Manufacturer's Address: 630 Clairevue West suite 301
Saint-Bruno, Qc
Canada, J3V 6B4

Product Name: PROPixx and PROPixx Lite

Part Numbers: VPX-PRO-5001C, VPX-PRO-5000A

Product Options: All

Application of Council Directive:

2014/30/EU	-Electromagnetic Compatibility directive
2015/863/EU	-RoHS directive
2012/19/EU	-Waste Electrical and Electronic Equipment directive

The following harmonised standards have been used:

EN 61326-1:2013	-Electrical equipment for measurement, control and laboratory use.
• IEC CISPR 11	-Radio frequency disturbance characteristics (Class A)
• IEC 61000-3-2	-Limits for harmonic current emissions (Class D)
• IEC 61000-3-3	-Limitation of voltage changes, voltage flicker ($\leq 16A$ per phase)
• IEC 61000-4-2	-Electrostatic discharge immunity test (Level 2 contact, air) (Perf Criteria B)
• IEC 61000-4-3	-Radiated, radiofrequency, electromagnetic field immunity test (Level 2, Perf Criteria A)
• IEC 61000-4-4	-Electrical fast transient/burst immunity test (Level 2, Perf Criteria B)
• IEC 61000-4-5	-Surge immunity test (Level 2, Perf Criteria B)
• IEC 61000-4-6	-Immunity to conducted disturbances, induced by radio-frequency fields (Level 2, Perf Criteria A)
• IEC 61000-4-8	-Power frequency magnetic field immunity test (Level 2, Perf Criteria A)
• IEC 61000-4-11	-Voltage dips, short interruptions and voltage variations immunity tests (Perf Criteria B and C)

Supplementary Information:

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.

Signature: 

Printed name: Jean-François Hamelin, Eng

Title: Vice President

DECLARATION OF CONFORMITY**Manufacturer's Name:** VPixx Technologies Inc.**Manufacturer's Address:** 630 Clairevue West suite 301
Saint-Bruno, Qc
Canada, J3V 6B4**Product Name:** SHIELDPixx**Part Numbers:** VPX-ACC-5205**Product Options:** All**Application of Council Directive:**

2014/30/EU	-Electromagnetic Compatibility directive
2014/35/EU	-Low Voltage Directive
2015/863/EU	-RoHS directive
2012/19/EU	-Waste Electrical and Electronic Equipment directive

The following harmonised standards have been used:

Safety :

- UL/cUL 60601-1 3.1rd Edition
- TUV EN60601-1 3.1rd Edition
- CB IEC60601-1 3.1rd Edition
- UL/c-UL UL60950-1
- UL/cUL 62368-1
- TUV EN60950-1
- TUV EN62368-1
- CB IEC 60950-1
- CB IEC 62368-1
- CCC (Class I)
- PSE (Class I)

EMC standards :

- EN60601-1-2 Ed4:2015
- IEC60601-1-2 Ed4:2014
- EN 55011 Class B
- EN 55032 Class B
- EN 55024 Class B
- FCC Part 15 Class B
- FCC Part 18 Class B
- CE

Signature: Printed name: Jean-François Hamelin, EngTitle: Vice President

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 device complies with part 15 subpart B of FCC rules. Its operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 subpart B of the FCC rules.

For Canada

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

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).

SHIELDPixx product overview

The SHIELDPixx is a complete shielding enclosure in which you can install multiple electronic devices so that they may be used safely in an MR room. The SHIELDPixx is optimized for reduced EMI at the frequency operation of a 1.5T, 3T or 7T scanner.

PROPixx product overview

The PROPixx is a unique DLP LED projector designed to be the most flexible display possible for vision research. It features a native resolution of 1920 x 1080 and can be driven with refresh rates up to 500 Hz (RGB mode) or 1440 Hz (Greyscale mode) with deterministic timing.



*The PROPixx projector with MRI kit is **Conditionally MR safe** and is overwhelmingly made of aluminium and stainless steel 316, both materials not being ferromagnetic. Less than 2% of the total weight is ferromagnetic.*

Front view of projector and controller

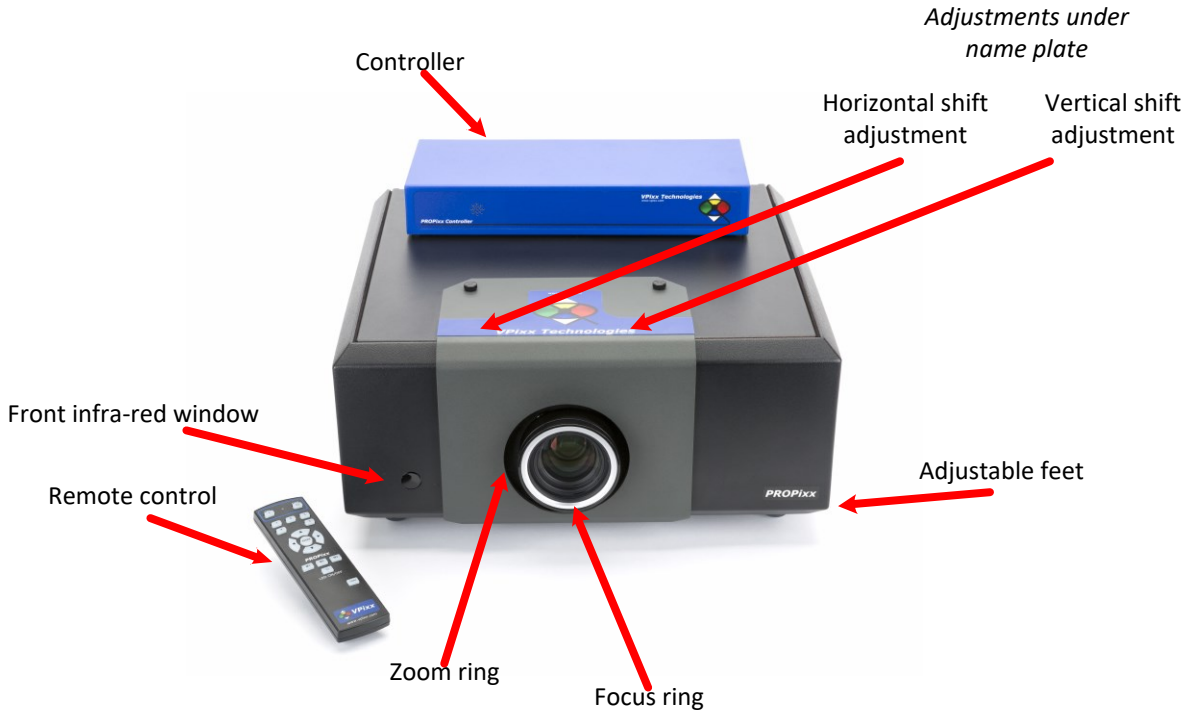


Figure 1 Front view of PROPixx controller and projector

Rear view of projector

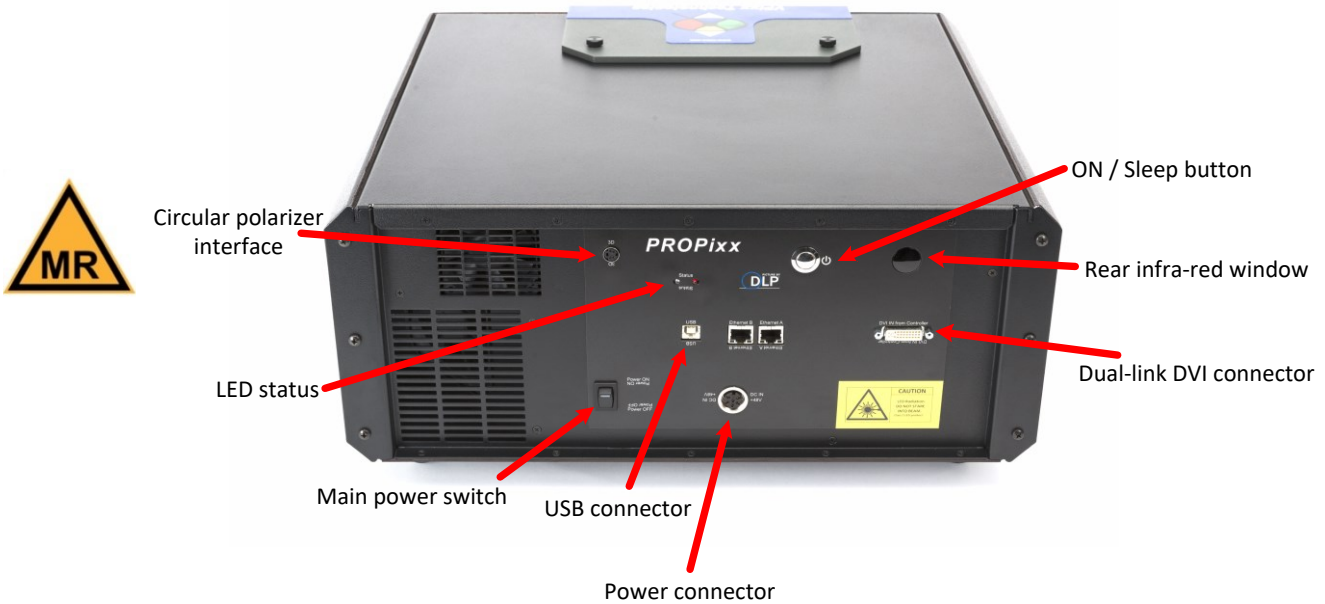


Figure 2 rear view of PROPixx projector

Rear view of controller

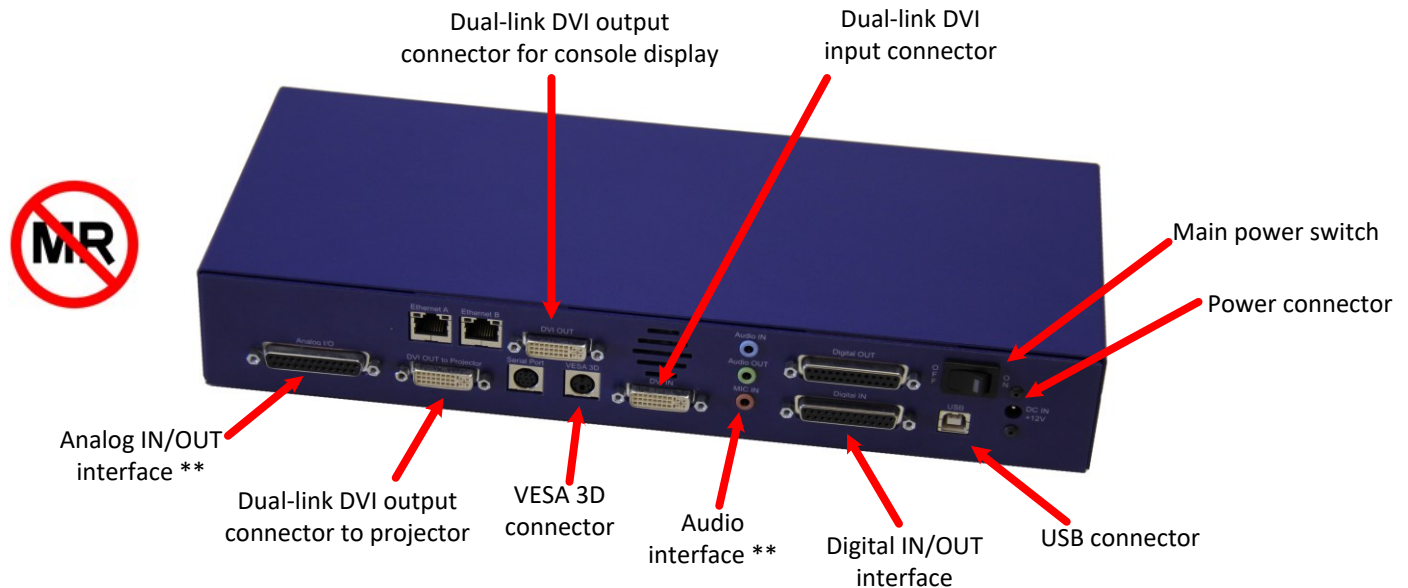


Figure 3 Rear view of PROPixx controller

**Analog I/O and audio functionalities are available only with PROPixx full version (VPX-PRO-5001C)

VPixx Bridge product overview

The two VPixx Bridge modules (**VPixx Bridge Receiver** and **VPixx Bridge Sender**) supplied with your SHIELDPixx/PROPixx package allow for video and USB signal transmission between the control room computer and the PROPixx projector situated in the MR room's SHIELDPixx by way of fiber optic cabling. They allow for seamless transmission of a DVI video stream with no compression or dropped frames while high-speed peripherals can function with no latency.

Each VPixx Bridge connects either to the control room computer or MR room projector through standard USB and DVI cables over fiber-optic.

PROPixx Hardware and software requirements

Graphics Card

The graphics card should have dual-link DVI outputs, or DisplayPort/Thunderbolt outputs (which can be converted to dual-link DVI through an active dongle).



All DisplayPort adaptors are not created equal. The limitation is the 320 MHz video bandwidth which your graphics board can transmit over a dual-link DVI video cable. This is enough bandwidth to generate a full 1920x1200 (or 1080) image at 120 Hz.

We strongly recommend using the following adaptor, which can be obtained from VPixx Technologies or Startech:

<https://www.startech.com/en-us/audio-video-products/dp2dvid2>

USB 2.0

The host computer requires at least one USB 2.0 interface.

Operating System

The PROPixx is compatible with the following OS: MAC OS X, Windows 7 (32bit, 64bit), Windows 8 (32bit, 64bit) and Linux.

PROPixx installation general guidelines

You will need a flat, stable area to install your PROPixx. Also, familiarize yourself with the following simple guidelines concerning the installation of your PROPixx system.

- The projector should be installed as close to the power outlet as possible.
- The power connection should be easily accessible, so that it can be disconnected during an emergency.
- Ensure that there is at least 30 cm (12 in) of space between the ventilation outlets and any wall, and 10 cm (4 in) of space for all other sides.
- Do not install the projector close to anything that might be affected by its operational heat (polystyrene ceiling tiles, curtains, etc.)
- Do not drop or knock the projector.



Never cover the lens while the projector is switched on. This could pose a fire hazard.

Screen size vs throw distance

The *Throw distance* is the distance measured from the front of the projector to the screen. This is an important consideration when it comes to projector installation as it determines if you have enough room to install your projector with the desired screen size, and if your image will be the right size for your screen.

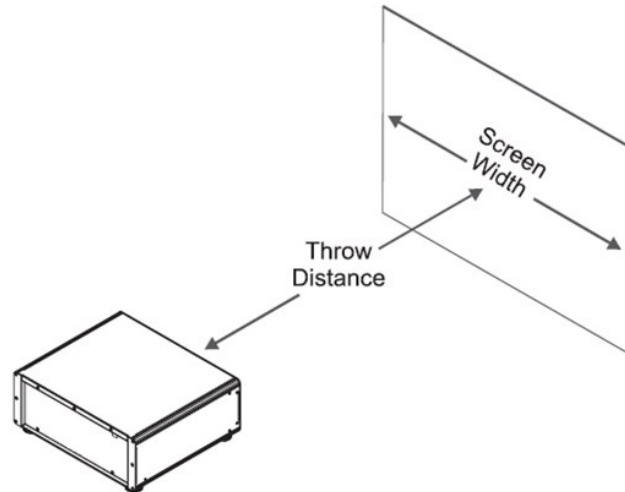


Figure 4 Screen size VS throw distance

Calculating screen width and throw distance

Throw Distance = *Screen Width* * *Lens Throw Ratio*

Screen Width = $\frac{\text{Throw Distance}}{\text{Lens Throw Ratio}}$

The available lenses for the projector have the following optical specifications:

Part Number	Lens Type	Throw Ratio	Focus Range (Metric)	Focus Range (Imperial)
VPX-ACC-6501	Super short-throw lens	0.73 : 1	0.97 - 1.3 m	3.18 - 4.27 ft
VPX-ACC-6502	Short-throw lens	1.56 – 1.86 : 1	1.22 - 7 m	4.0 – 23 ft
VPX-ACC-6503	Long-throw lens	1.85 – 2.40 : 1	1.22 - 10 m	4.0 - 32.0 ft
VPX-ACC-6504	Super long-throw lens	2.4 – 4.0 : 1	1.22 - 12 m	4.0 - 39.0 ft
VPX-ACC-6506	Super short-throw lens	0.84 – 1.03 : 1	0.9 – 5.11 m	2.98 – 16.78 ft
VPX-ACC-6507	Super long-throw lens	8.9 – 14.8 : 1	1.52 - 12.19 m	5.0 – 40.0 ft
VPX-ACC-6508	Super long-throw lens	3.3 – 5.94 : 1	1.22 - 12.19 m	4.0 – 40.0 ft
VPX-ACC-6509	Super long-throw lens	6.3 – 11.0 : 1	1.22 - 12.19 m	4.0 – 40.0 ft
VPX-ACC-6510	Super long-throw lens	4.0 – 7.0 : 1	1.22 - 12.19 m	4.0 – 40.0 ft

- The focus range is the distance over which the image can be focused using the focus ring.
- The zoom range is the range over which the throw ratio can be changed using the zoom ring.

Mounting the PROPixx projector

The four adjustable feet under the chassis allow the projector to be lowered onto a flat surface without any danger of hands being trapped between the chassis and the surface.



Figure 5 Adjustable feet

Shifting the image

Ideally, the projector should be positioned perpendicular to the screen. The normal position for the projector is at the center of the screen. However, you can set the projector above or below the center, or to one side, and adjust the image using the Lens shift controls on the top of the projector to maintain a geometrically correct image.

Remove the front cover of the PROPixx.



Figure 6 Front cover

With the name plate removed, use the MRI safe 5 mm Allen wrench to adjust the horizontal and vertical position of the image.

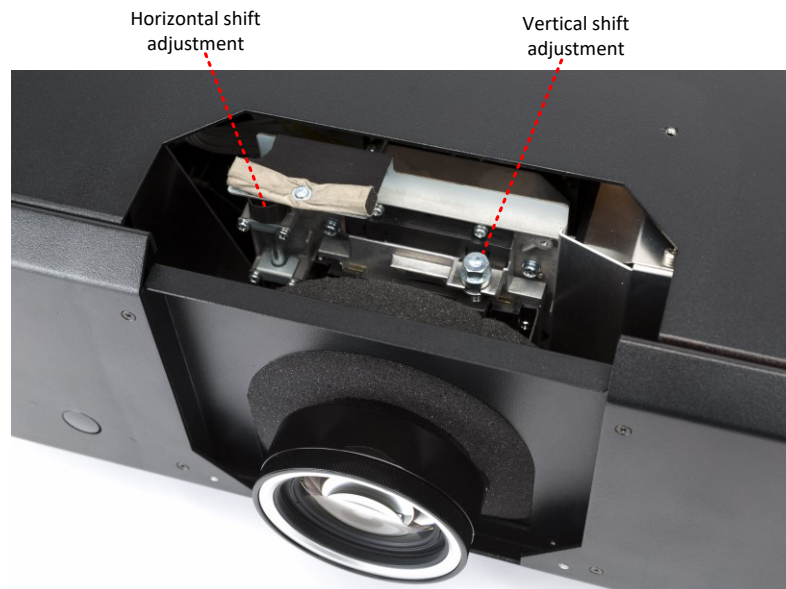


Figure 7 Horizontal and vertical adjustment controls

The image can be shifted by up to:

- ± 0.6 times the height of a full screen image (known as 120% shift)
- ± 0.15 times the width of a full screen image (known as 30% shift)

It is physically possible to shift the lens further than these limits, but this will result in some distortion of the image.

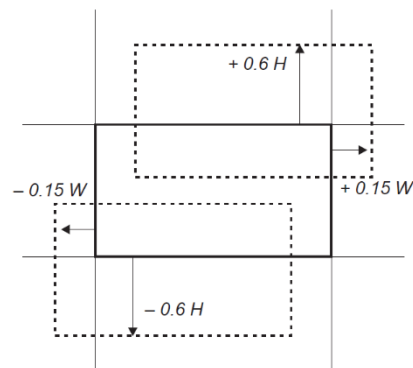


Figure 8 Image shift limits

Adjusting the lens (short throw lens)

Zoom

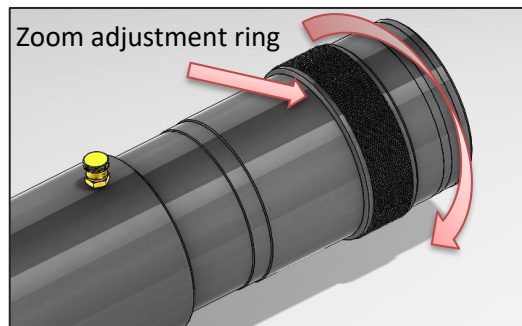
Turn the smooth ring on the lens, closest to the case, to adjust the zoom so that the image fills the screen.

Focus

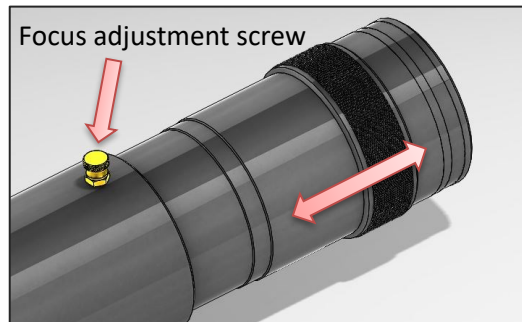
Turn the knurled ring at the outer end of the lens to adjust the focus until the image is sharp.

Adjusting the lens (long throw lens)

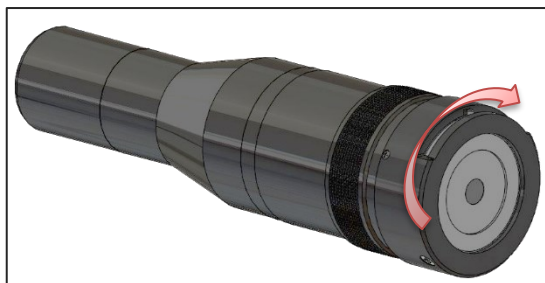
TO ADJUST THE ZOOM: after setting up your PROPixx and the target screen according to your experimental requirements, locate the zoom adjustment ring on the PROPixx lens and rotate it to adjust the zoom according to your needs.



TO ADJUST THE FOCUS: after setting the zoom to the desired value, you can now adjust the focus by first lightly unscrewing the Focus Adjustment screw, then pulling in or pulling out the lens shaft so that your image is clear and sharp. Once this is done, tighten the adjustment screw.



TO ADJUST THE IRIS: adjust the iris at the end of the lens according to the light levels required by your experiment.



Remote controller

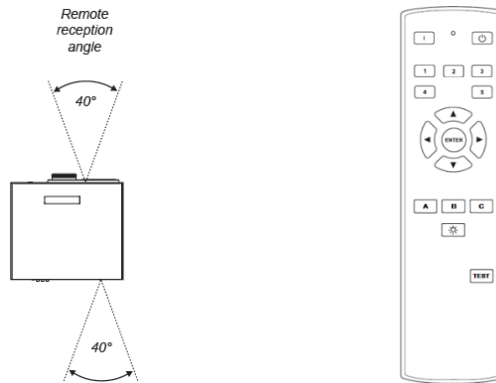


Figure 9 Remote controller

Table 2 Remote controller buttons

Button symbol	Function	Description
	Power ON	Press POWER ON on the remote control to switch the projector ON
	Power OFF	Press POWER OFF on the remote control to switch the projector to SLEEP mode
	LED ON/OFF	Turn ON/OFF LED light source
Other		User defined (through software)

Inserting batteries into the remote control

Open the battery compartment and insert two AA batteries, ensuring that they are inserted with the orientation shown below.

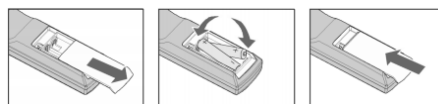


Figure 10 Remote controller battery installation

Installation test pattern

For a perfect installation and screen geometry, use your PROPixx projector in *Test mode*. To enter Test mode, simply press the **TEST** button followed by the **A** button on the remote control. You can do this same sequence for tests B and C.

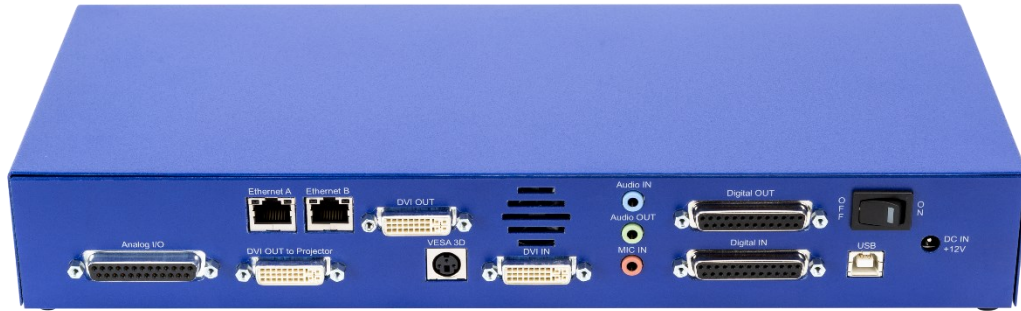
When in Test mode, press the **TEST** button to return to Normal mode.

Software Installation

For software and driver installation information, please refer to the **Application Guide for VPixx Products**.



Controller I/O connector descriptions



Analog I/O connector

The following table shows the analog I/O pin assignment. If you use the analog breakout cable, refer to the associated user manual interconnections.

*Analog I/O functionalities are available only with PROPixx full version (VPX-PRO-5001C)

Table 3 Analog I/O

Pin	Description	Pin	Description
1	ADC0	14	ADC1
2	ADC2	15	ADC3
3	ADC4	16	ADC5
4	ADC6	17	ADC7
5	ADC8	18	ADC9
6	ADC10	19	ADC11
7	ADC12	20	ADC13
8	ADC14	21	ADC15
9	REF0	22	REF1
10	GND	23	+5 VDC **
11	DAC0	24	DAC1
12	DAC2	25	DAC3
13	GND		Shield *

Connector type: D-SUB, 25 pins

Gender: Female



* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

** Current limited (400 mA).

VESA 3D connector

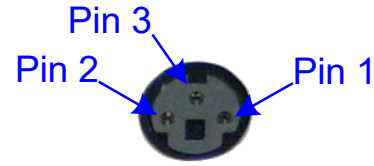
Use this interface to connect your VESA 3D glasses. The following table shows the VESA 3D pin assignment.

Table 4 VESA 3D

Pin	Description
1	+5 VDC **
2	GND
3	VESA_LR (+5 VDC)
Shield *	

Connector type: Mini-DIN, 3 pins

Gender: Female



* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

** Current limited (400 mA).

Digital output connector

The following table shows the digital output pin assignment.

Table 5 Digital Output

Pin	Description	Pin	Description
1	Digital Out 0	14	Digital Out 1
2	Digital Out 2	15	Digital Out 3
3	Digital Out 4	16	Digital Out 5
4	Digital Out 6	17	Digital Out 7
5	Digital Out 8	18	Digital Out 9
6	Digital Out 10	19	Digital Out 11
7	Digital Out 12	20	Digital Out 13
8	Digital Out 14	21	Digital Out 15
9	Digital Out 16	22	Digital Out 17
10	Digital Out 18	23	Digital Out 19
11	Digital Out 20	24	Digital Out 21
12	Digital Out 22	25	Digital Out 23
13	GND	Shield *	

Connector type: D-SUB, 25 pins

Gender: Female



* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

Digital input connector

The following table shows the digital input pin assignment.

Table 6 Digital Input

Pin	Description	Pin	Description
1	Digital In 0	14	Digital In 1
2	Digital In 2	15	Digital In 3
3	Digital In 4	16	Digital In 5
4	Digital In 6	17	Digital In 7
5	Digital In 8	18	Digital In 9
6	Digital In 10	19	Digital In 11
7	Digital In 12	20	Digital In 13
8	Digital In 14	21	Digital In 15
9	Digital In 16	22	Digital In 17
10	Digital In 18	23	Digital In 19
11	Digital In 20	24	Digital In 21
12	Digital In 22	25	Digital In 23
13	GND	Shield *	

* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

Connector type: D-SUB, 25 pins

Gender: Female



Audio In / MIC In / Audio Out

Audio equipment may be connected through these jacks with standard 1/8" (3.5 mm) stereo plugs. The following table shows the audio pin assignment for each jack.

*Audio IN, MIC In and Audio functionalities are available only with PROPixx full version (VPX-PRO-5001C)

Audio In

Table 7 Audio In

Pin	Description
TIP	Audio In left
Ring	Audio In Right
Sleeve	GND
Shield *	

Connector type: Stereo 1/8" (3.5 mm)

Gender: Jack (female)

* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

Audio Out

Table 8 Audio Out

Pin	Description
TIP	Audio Out left
Ring	Audio Out Right
Sleeve	GND
Shield *	

* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

MIC In

Table 9 MIC In

Pin	Description
TIP	MIC In left
Ring	MIC In Right
Sleeve	GND
Shield *	

* Shield is tied to the GND by a 0 Ohm resistor inside the PROPixx controller.

Installation

Follow these instructions to install your SHIELDPixx and PROPixx and perform the necessary cabling operations both in the MR room and the control room. This example supposes an MR room whose available space does not allow the SHIELDPixx to be installed directly behind the MRI (due to size constraints or other reasons). The example therefore uses a mirror allowing you to place your SHIELDPixx (containing the PROPixx projector) at an angle to the MRI according to your experimentation needs.



The installation for MR rooms having enough space simply removes the requirement for a mirror, with the SHIELDPixx placed directly to the back of the MRI outside the 100 Gauss line.



Remember to verify MR warning labels on each component you intend to bring into the MR room. Failure to do so may result in severe injury or damage to equipment. The PROPixx controller and the VPixx Bridge Sender are not MR compatible.



Figure 11 SHIELDPixx & Mirror setup

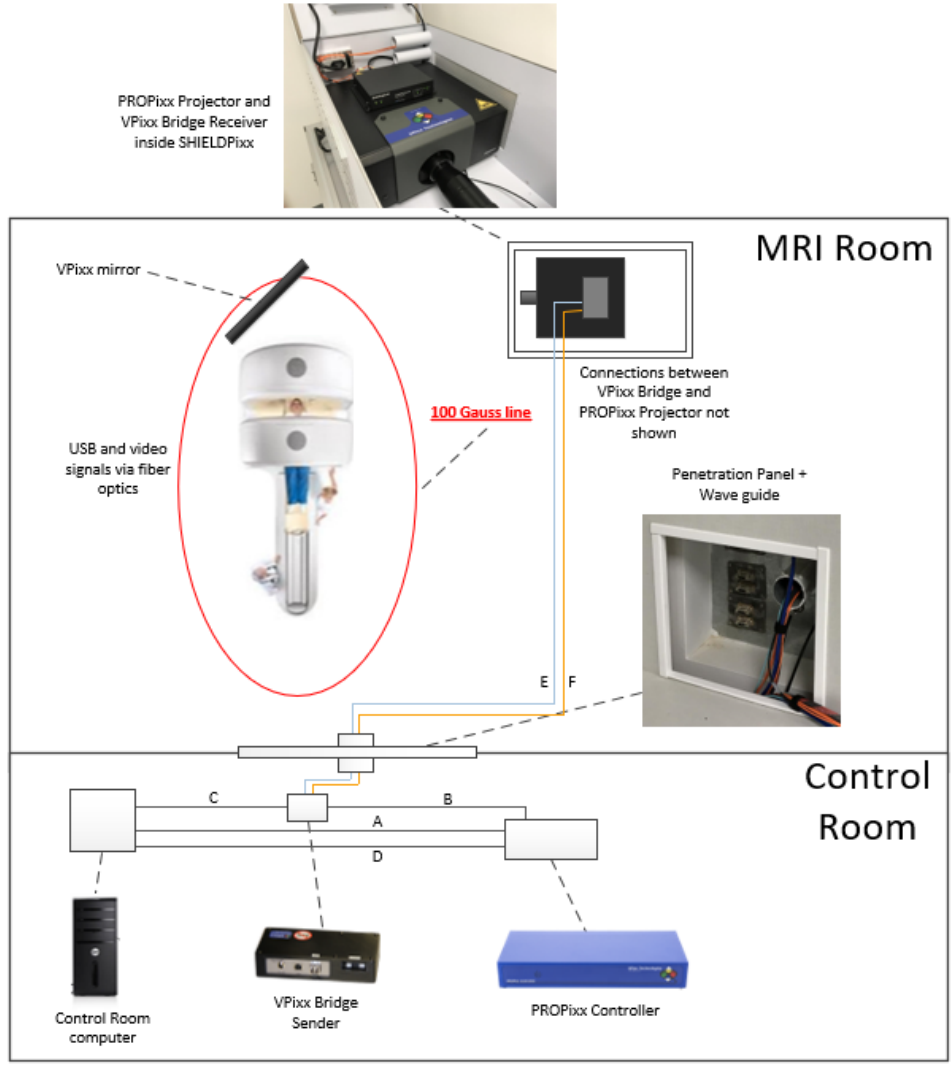


Figure 12 Typical MRI setup using PROPixx Projector and VPixx mirror in MR Room

Table 10 MRI Setup Connection Descriptions (including PROPixx controller)

Connection	Description
A	Dual-Link DVI cable from computer to PROPixx Controller (DVI IN connector)
B	Dual-Link DVI cable from PROPixx Controller (DVI Out to projector connector) to VPixx Bridge Sender
C	USB cable from computer to VPixx Bridge Sender
D	USB cable from computer to PROPixx Controller
E	Fiber optic cable from VPixx Bridge Sender USB interface to VPixx Bridge Receiver USB interface
F	Fiber optic cable from VPixx Bridge Sender VIDEO interface to VPixx Bridge Receiver VIDEO interface

Installation Steps

Refer to the following steps for information concerning the installation of your SHIELDPixx and PROPixx for an MRI application.



THE INSTALLATION SHOULD BE MADE OUTSIDE OF THE MR Room

Never perform the installation in the MR Room. First assemble your products in a safe location and then transport the stand, SHIELDPixx and PROPixx inside the MR Room using two people.

Connection references (connection A, connection B, etc.)

The SHIELDPixx drastically reduces electromagnetic noise emanating from the electronic equipment placed within it, making it so that equipment that would normally not be allowed inside an MR room can be operated safely.



It is of crucial importance to ensure that the SHIELDPixx's closing clamps are in their proper closed position. Failure to do so may result in electromagnetic contamination spilling out beyond the confines of the SHIELDPixx.

1. Install the PROPixx projector (**NOT the controller, which is MR unsafe**) inside the SHIELDPixx enclosure.
2. Secure the VPixx Bridge Receiver on the PROPixx cover plate using Velcro tape. ENSURE that you take the VPixx Bridge Receiver and NOT the VPixx Bridge Sender, which is MR UNSAFE.
3. Connect the DVI cable from the PROPixx projector to the VPixx Bridge Receiver.
4. Connect the USB cable from the PROPixx projector to the VPixx Bridge Receiver.
5. Connect the 5 V power cable between the PROPixx projector and the VPixx Bridge Receiver.

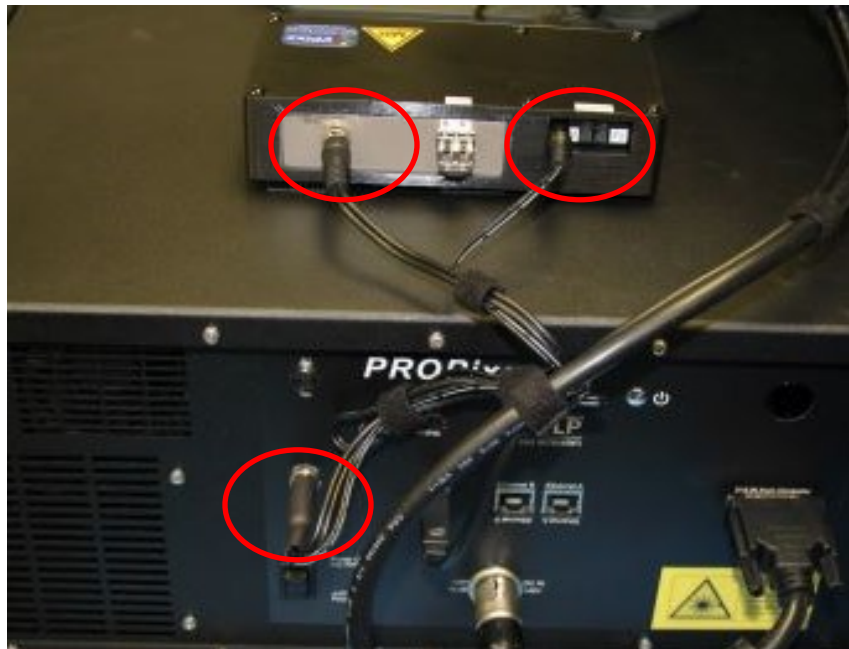


Figure 13 5V power connections

6. Connect a Dual-Link DVI cable from the PROPixx Controller (**DVI Out to projector** connector) to the VPixx Bridge Sender (connection **B**)
7. Connect a USB cable from the computer to the VPixx Bridge Sender (connection **C**)
8. Connect a USB cable from the computer to the PROPixx Controller (connection **D**)
9. Connect the fiber optic cables to the VPixx Bridge Receiver (VIDEO / USB) interfaces (BLUE fiber optics into the fiber optic interface labeled **USB** and ORANGE fiber optics into the fiber optic interface labeled **VIDEO**) and pass them through the SHIELDPixx wave guide.



Remember when manipulating or connecting fiber optic cables not to kink or otherwise bend them with a bending radius of less than 2" (5 cm). Doing so may damage the cable.

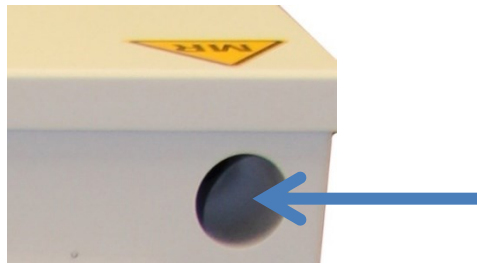


Figure 14 SHIELDPixx wave guide

10. Connect the fiber optics leading out from the SHIELDPixx to the VPixx Bridge Sender (VIDEO / USB) interfaces (BLUE fiber optics into the fiber optic interface labeled **USB** and ORANGE fiber optics into the fiber optic interface labeled **VIDEO**) by passing them through the penetration panel's wave guide (connections **E** and **F**)

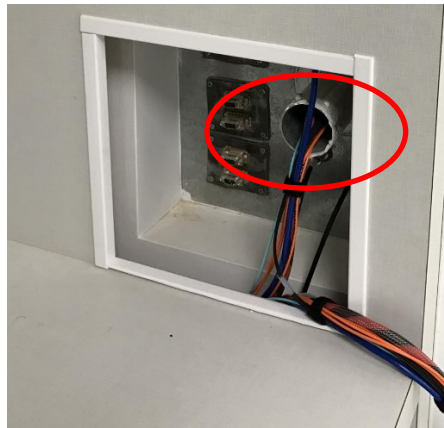


Figure 15 Penetration Panel with wave guide

11. Connect a Dual-Link DVI cable from the control room's computer to the PROPixx Controller's *DVI IN* connector.
(connection **A**)



Figure 16 PROPixx Controller DVI IN connector

12. Connect a Dual-Link DVI cable from the PROPixx Controller to the VPixx Bridge Sender.



Figure 17 PROPixx Controller DVI OUT to Projector connector

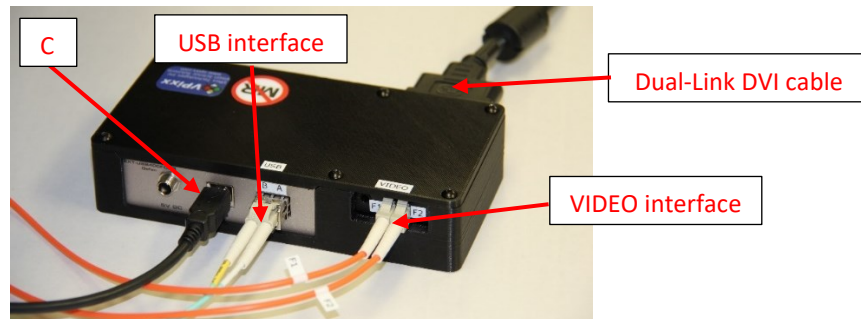


Figure 18 VPixx Bridge Sender connections

13. Connect the SHIELDPIxx AC Power Interface (located to the side of the unit) to the MR room power outlet.

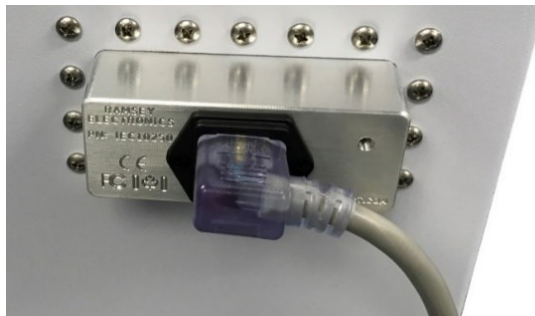


Figure 19 AC power interface

Finalizing the setup

It is of crucial importance to ensure that the SHIELDPixx's closing clamps are in their proper closed position PRIOR to using the system. Failure to do so may result in electromagnetic contamination spilling out beyond the confines of the SHIELDPixx. The following graphic is an example of the typical electromagnetic emissions of a fully functional PROPixx projector placed inside the SHIELDPixx enclosure with its clamps in their proper closed position.

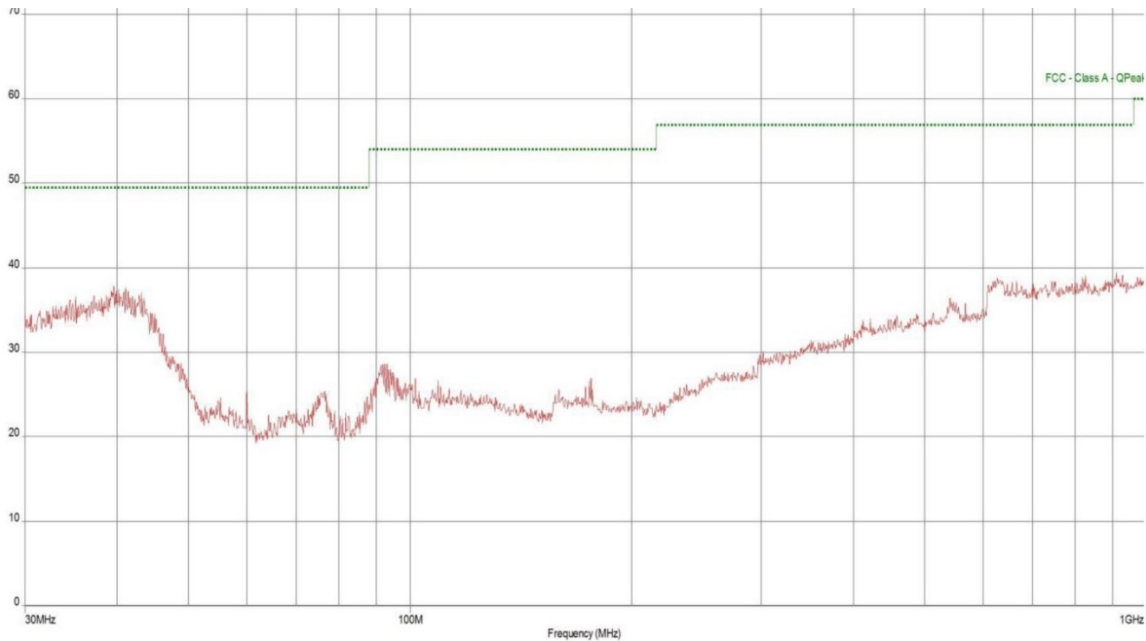


Figure 20 Electromagnetic emissions (typical) of a PROPixx inside a SHIELDPixx

Since the precise positioning of most VPixx instruments (including the VPixx trolley, MRI screen and MRI mirror) is critical to the proper running of your experiment, VPixx Technologies supplies a set of *Foot Locators*.

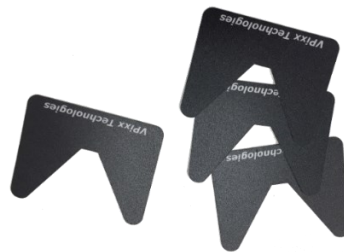
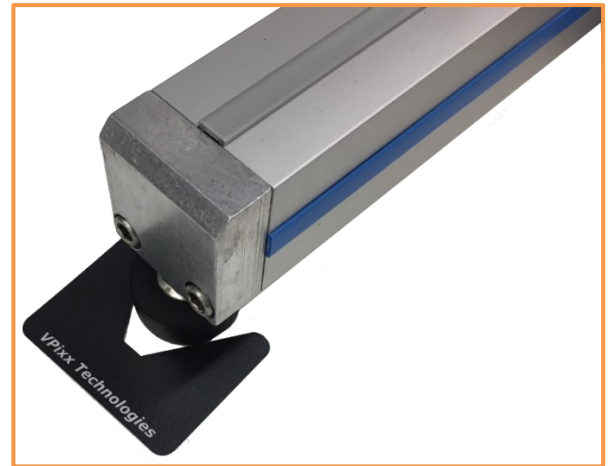


Figure 21 VPixx Foot Locators

When the exact and final position of these instruments is determined, place the foot locators at their feet to ensure that if ever they are later displaced, they can be placed back in exactly the same configuration as before.

To apply the foot locators, follow this procedure:

1. Ensure that the location of the VPixx instrument is final and is in line with the requirements of your experiment.
2. Remove the adhesive tape under one of the foot locators and set it as shown in this figure.
3. Repeat step 2 for the remaining legs of the instrument.



Power up sequence

1. Ensure that all the installation steps have been properly completed.
2. Power up the PROPixx Controller (or the DATAPixx3 if you are not using a PROPixx Controller).
3. Toggle the SHIELDPixx **Master Power switch**, located inside the top cover of the system, to its ON position. This switch controls the internal power supply of the SHIELDPixx. By toggling the Master Power switch to its ON/OFF positions, the equipment located inside the SHIELDPixx may be powered ON or OFF without the need to plug/unplug the AC power interface.



Figure 22 SHIELDPixx Master power switch

4. On the projector, press the  button once to switch the projector ON.



Pressing the projector's  button continually for 3 seconds or more will put it in SLEEP mode.



Power up and power down can be performed using PyPixx software. Please refer to the Application Guide for VPixx Products.

- Close the SHIELDPixx cover and ensure that the closing clamps are in their proper closed position.



Figure 23 SHIELDPixx Closing Clamps in closed position

Device detection

After powering up the PROPixx, your computer should detect the projector and controller and perform the necessary installation. On a Mac OS X system, no driver is required; however, under Microsoft Windows, a driver must be installed.

Status LED

Your PROPixx is equipped with two status LEDs that supply information on the energy or power status of your system. The information relayed by each LED, one blue and one red, is summarized in the table below.

Table 11 Status LEDs

	ON	Blinking
BLUE LED	Awake Mode	LED Off mode
RED LED	Sleep Mode	Thermal Shutdown

VPixx Bridge LED information

The following image describes the LEDs of both VPixx Bridges (Sender and Receiver).

Table 12 VPixx Bridge LED description

LED	Description
PWR	LED turns bright blue when power is supplied.
LNK	This LED turns bright green when a valid link is established between the VPixx Bridge Sender and the VPixx bridge Receiver.
HST	This LED turns bright green when the VPixx Bridge (USB 400 FO from Gefen) system is properly enumerated on the host PC. The LED blinks when in <i>Suspend Mode</i> .
ACT	This LED turns bright amber, indicating that data transmission is active between the VPixx Bridge Sender and the VPixx bridge Receiver. The LED blinks intermittently with or without a USB device plugged in. When the VPixx Bridge Sender and the VPixx bridge Receiver are in a Suspend Mode, the LED is off.

Warranty

The SHIELDPixx and PROPixx are warranted against manufacturing defects in materials and workmanship for two years for parts and labor from the date of purchase.

SHIELDPixx specifications

SHIELDPixx Enclosure

- Aluminium casing
- Width: 50.24 cm (19.780 inches)
- Depth: 92.46 cm (36.040 inches)
- Height: 35.80 cm (14.094 inches)
- Shielding glass window 101.6mm x 101.6mm (4.0 x 4.0 inches)
- One wave guide

VPixx Bridge Receiver

- USB 2.0 compliant
- Allows connection of 4 USB 2.0 devices to the SHIELDPixx
- DVI dual Link interface
- Video resolution: 3840 x 2400@ 60 Hz or 1920 x 1200 @ 120 Hz
- **Conditionally MRI Safe**

VPixx Bridge Sender

- USB 2.0 compliant
- Allows connection of 4 USB 2.0 devices to the SHIELDPixx
- DVI dual Link interface
- Video resolution: 3840 x 2400@ 60 Hz or 1920 x 1200 @ 120 Hz
- **MRI Unsafe**

PROPixx specifications

General specifications

- Display resolution: 1920(H) x 1080(V) pixels
- Display type: Texas Instruments DMD 0.95"
- Aspect ratio: 16x9
- Illumination system: RGB LED
- Contrast: 10 000:1
- Brightness: 600 lumens
- Lamp life: 60 000 hours via solid state illumination
- Up to 12 bits of resolution on each of the RGB channels
- Up to 500 Hz refresh rate (RGB color)
- Up to 1440 Hz refresh rate (Greyscale)
- IR remote control

Video processing

- Video input: 1920 x 1080 pixels, 24 bits (Dual link DVI)
- Deterministic timing between reception of video signal and update of display pixels
- Completely bypasses all image processing “enhancements” prevalent in standard consumer projectors
- Multiple projectors can be synchronized, showing copies or subsets of original video

Analog to digital converter

- Number of channels: 16 (or 8 differential), on DB-25 connector
- Converter resolution: 16 bits
- Maximum sampling rate: 200 kSPS per channel
- Frequency programming modes:
 - Samples per second
 - Samples per video frame
 - Nanoseconds per sample
- Simultaneous sampling across all channels
- Input range: ± 10 V
- Input impedance: $1.6 \cdot 10^8 \Omega // 3$ pF
- Absolute maximum input tolerance: ± 12 V

*ADC functionalities are available only with PROPixx full version (VPX-PRO-5001C)

Digital to analog converter

- Number of channels: 4 on DB-25 connector
- Converter resolution: 16 bits
- Maximum sampling rate: 1 MSPS per channel
- Frequency programming modes:
 - Samples per second
 - Samples per video frame
 - Nanoseconds per sample
- Simultaneous output updates
- Output range: ± 10 V
- Drive capability: ± 25 mA, 250 mW per channel

*DAC functionalities are available only with PROPixx full version (VPX-PRO-5001C)

Audio CODEC

- Audio line in, microphone in, speaker out, on 3.5 mm jacks
- Stereo microphone input amplifier resistance: 20 k Ω
- Microphone sampling rate: 96 kHz
- Programmable microphone bias voltage range: 2.0 V to 3.1 V
- Stereo DAC sampling rate 96 kHz

*Audio CODEC functionalities are available only with PROPixx full version (VPX-PRO-5001C)

Digital input

- Number of digital inputs: 24 on db-25 connector
- Input termination: >20 k Ω pullup to 3.3 V
- Input tolerance: 5 V

Digital output

- Number of digital outputs: 24 on db-25 connector
- Output drive stage: 5 V through 25 Ω series resistor
- Maximum output current:
 - Source: 15 mA
 - Sink: 12 mA

Power (projector unit)

- Power consumption: 300 W
- Input voltage: 48 VDC – 6.25 A
- International AC adaptor input: 90 VAC – 264 VAC (47 Hz – 63 Hz)

Power (controller unit)

- Power consumption: 30 W
- Input voltage: 12 VDC – 2.5 A
- International AC adaptor input: 90 VAC – 264 VAC (47 Hz – 63 Hz)

Software

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



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