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3D Polarizer (VPX-ACC-8060)

User Manual

Version 1.1



Vision Science Solutions

www.vpixx.com

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1.0	2014/11/03	P.Kakos	v1.0 release
1.1	2016/12/28	P.Kakos	Light path modification

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, maintenance and troubleshooting information for VPixx Technologies Inc.'s DepthQ 3D Polarizer.

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



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

- Protect the polarizer from direct sunlight, heat or water.
- Do not modify the electrical or mechanical components of your 3D system.
- Do not apply force to the lens of the polarizer.
- Use a clean soft cloth when cleaning the polarizer to avoid scratching, especially on the lens surface.
- Always transport the polarizer in a rigid case to avoid scratching the lens.
- Do not expose the polarizer to water.



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

3D Polarizer Overview

The DepthQ circular polarizer is driven directly by the PROPixx projector. Our custom driver ensures symmetric 50-microsecond switching times and minimal crosstalk at up to 400 FPS. Polarizer placement is straightforward; simply place it in front of the projection lens. Passive 3D glasses are widely available in a variety of form factors, and most are made of 100% plastic, rendering them suitable for MRI environments. This solution is much simpler to implement than trying to align superimposed left/right eye images, as is required when using dual projector setups.



Figure 1 DepthQ 3D Polarizer

Specifications

- Polarization type: Circular L/R symmetrical, neutral color
- Maximum number of frames per second: 400 FPS (400Hz)
- Switching time: 50 μ sec
- Open transmittance: 32%
- Polarized glasses: Glasses are circular and use a standard 0/0 orientation.
- Includes 4 pairs of passive glasses
- Aperture size: 9.84 x 6.11 cm (3.875 x 2.41 in)
- Operating temperature: +5 to 52 deg C (40 to 125 deg F)

3D Polarizer advantages

- Single-projector solution eliminates possibility of geometric asymmetry between eyes
- No vertical or horizontal parallax problems
- Simple Modulator placement - just set it in front of the projector
- No time consuming alignment of superimposed images
- No moving parts
- Less hardware than two-projector solutions
- Does not require the use of high power Infra-Red emitter
- Passive eyewear is inexpensive

Optical characteristics

The DepthQ 3D Polarizer offers complete symmetric operation between the left and right eye, along with high extinction, at all wavelengths, for dark states.

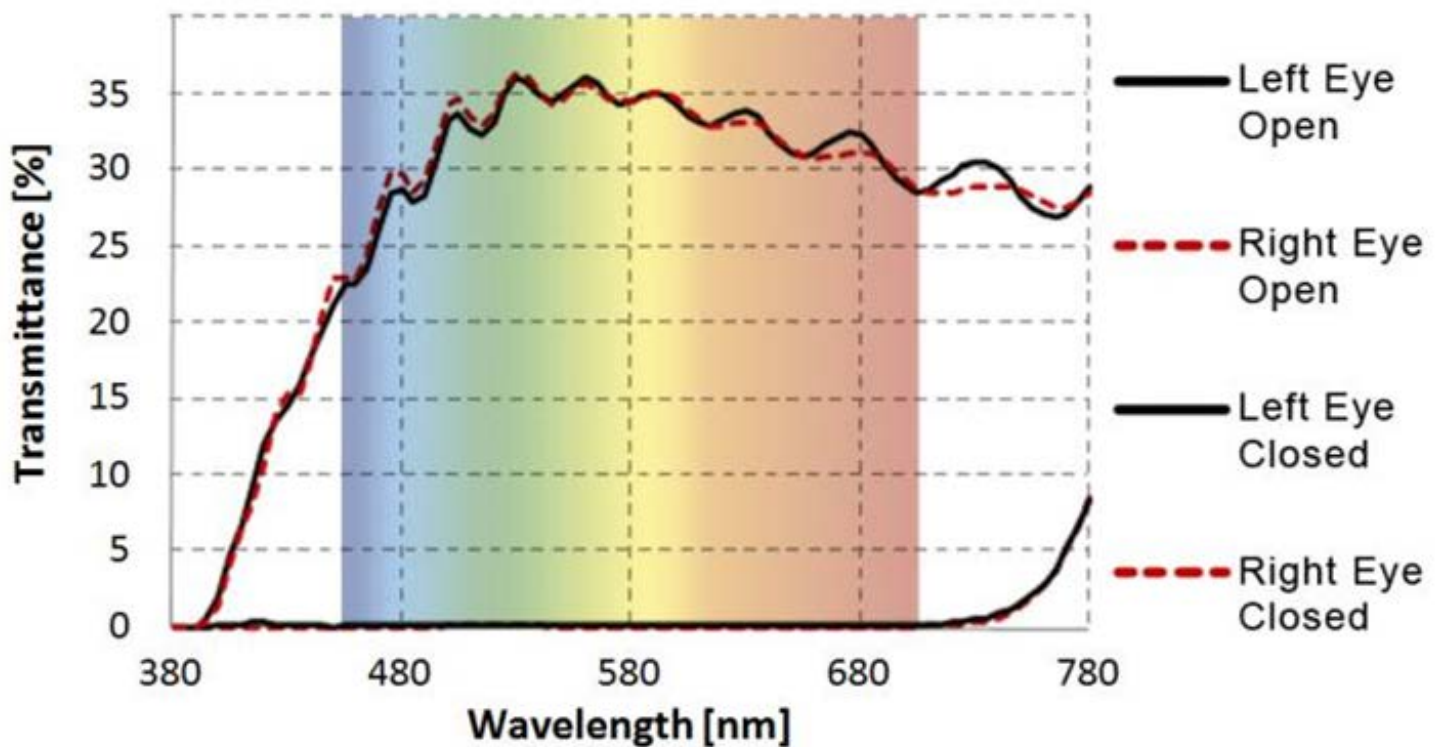


Figure 2 DepthQ optical characteristics

Switching characteristics

The DepthQ polarization modulator allows for ultra-fast switching between two polarization states.

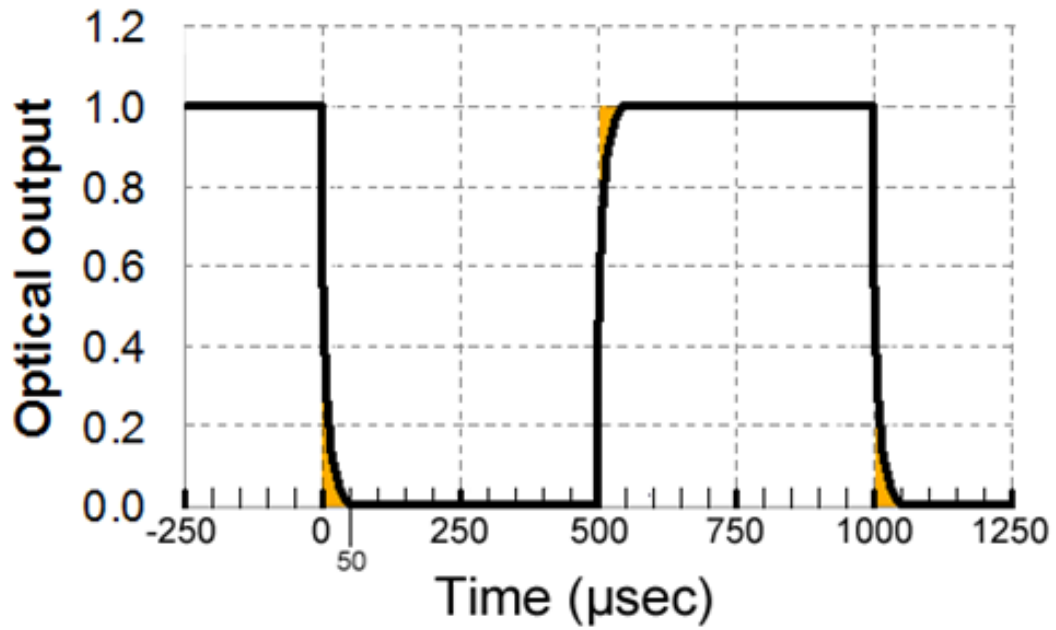


Figure 3 DepthQ switching characteristics

3D Polarizer installation

Requirements

In order to enjoy the best quality 3D images, you need a polarization-preserving silver screen designed for 3D projection. If your screen was not manufactured specifically for 3D use, you might experience uncomfortable and blurry 3D images with a high level of cross talk.

3D Polarizer placement

The 3D Polarizer should be placed directly in front of the projector lens at a distance maximizing the projector image's surface area on the polarization window. This optimal placement is meant to minimize thermal heating effects. A distance between **20 mm and 50 mm** is normally recommended for this purpose.



Figure 4 DepthQ Polarizer placement

Cable installation

Connect the cable provided with the polarizer kit to the PROPixx projector. Ensure that the yellow arrow on top of the polarizer follows the light path from the projector as shown by following figure.



Figure 5 DepthQ cable orientation

Connect the other end of the cable to the PROPixx projector interface labeled “3D” as shown below.



Figure 6 PROPixx 3D interface

Height adjustment

To center the PROPixx projector lens with the center of the 3D polarizer filter, unscrew the screws on each arm of the polarizer and adjust its height until the alignment is perfect.



Figure 7 DepthQ height adjustment

Software support

Your 3DPolarizer can be accessed through the DATAPixx toolbox in our VPixx Software Tools libraries.

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 VIEWPixx /3D is directly supported by the VPixx high-level application.

With the VPixx Software Tools, you can:

- Acquire data on analog IO;
- Acquire an analog signal and convert it to digital;
- Set up audio playback, feedback and stream;
- Set up voltage outputs, synchronize and generate audio using digital to analog convertors;
- Record, monitor and synchronize with a RESPONSEPixx or any digital signal;
- Set up a Gaze Contingent display using a DATAPixx;
- Show 3D Stimuli with perfect synchronization;
- Display stimuli using high-bit precision;
- Record a microphone input;
- Display stimuli at 440 and 1440 Hz using a PROPIxx;
- Set up a touchscreen using a TOUCHPixx;
- And much more !

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.

Psychtoolbox

The DATAPixx hardware toolbox is fully supported by the Psychophysics Toolbox (PTB) using Matlab or GNU/Octave under OS X, Windows and Linux.

Once the PTB has been installed, there are several paths to getting information on using the DATAPixx within the PTB. From Mario Kleiner: "All special graphics display functions (stereo, multi-display, mirroring, high precision color and luminance display) are supported via PsychImaging, e.g., demonstrated in BitsPlusCSFDemo, AdditiveBlendingForLinearSuperpositionTutorial and ImagingStereoDemo. The Timestamping functionality and other convenience functions, as well as audio capture and voice keys are available via PsychDataPixx, DatapixxAudioKey and PsychPortAudioDatapixxTimingTest. Refer to the *Help* section of the DatapixxToolbox for more information.

All low-level features are supported via the Datapixx mex file driver". In addition, the DatapixxDemos folder contains a collection of low-level DATAPixx functional starting points for all of the basic functionalities.

DatapixxToolbox questions may be emailed to support@vpixx.com. General questions whose answers may be useful to other VIEWPixx /3D or DATAPixx users should be posted on the PTB forum.





*For more information on Psychtoolbox, please refer to the **DATAPixx Toolbox for MATLAB user manual** on MyVPixx.*

Python

pypixxlib uses the object-oriented approach and strengths of Python. With pypixxlib, you can get information to and from your devices while using your preferred python packages for stimulus generation. pypixxlib converts your physical device into python objects with attributes matching the subsystems included in VPixx devices. This guarantees everything you attempt is executed on the subsystem you intended. We also offer a functional approach with the versatility of Python; pypixxlib includes a wrapper for our ANSI C API.

Complete with full documentation and demos, pypixxlib is therefore very easy to use.



*For more information on Python, please refer to the **DATAPixx Toolbox for Python user manual** on MyVPixx.*

Low-level ANSI C API

Insert the CD labeled “**VPixx Technologies Software/Documentation**” in your CD/DVD reader and browse it. The “**Low Level C API\libdpx\src**” folder in the **Software** folder contains the ANSI C APIs, which are compatible with Windows, MAC OS X and Linux.



*For more information on low level ANSI C API, please refer to the **DATAPixx Toolbox low level ANSI C API user manual** on MyVPixx.*

3D Demo

This demo is made for the VPixx Technologies 3DPolarizer.

You can try some 3D demo pictures for testing the ultimate 3D experience with your PROPixx / 3DPolarizer by using the vputil application.

1. In the command line type the following command;

 Tp 19 1 (for 3D picture #1)

 Tp 19 2 (for 3D picture #2)

 ...

 Tp 19 6 (for 3D picture #6)

2. Enjoy your 3D experience!



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

Warranty

The 3D Polarizer is warranted against manufacturing defects in materials and workmanship for two years for parts and labor from the date of purchase.



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