

Augmented Reality Module (AR module)

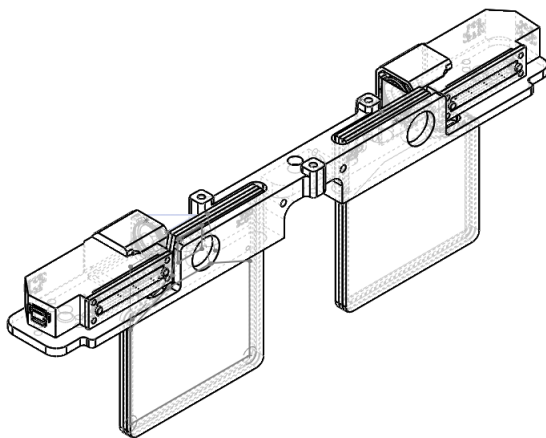
Using WaveOptics Phlox waveguide technology this module is for use in full colour, head mounted, see-through Augmented Reality (AR) products, Virtual Reality (VR) and Mixed Reality (MR) products.

The module consists of two main components.

- a) WaveOptics Phlox waveguides providing a virtual image to the eye.
- b) WaveOptics Light Engines providing light and forming an image which is projected into the wave guides.

The binocular module is supplied pre-aligned.

- Waveguides are aligned to Light Engines.
- Left and right assemblies are aligned.



FEATURES

- Resolution : 1280 x 720
- RGB full colour
- MTF: 18 cycles/degree (30%)
- 40 degree Field of View per eye
- Large eye-box.
- Large eye relief if required.
- High transparency, typ. 80%

- 2D pupil expansion.
- Unobscured peripheral vision.
- Virtual image at 5m to infinity.
- Pre –aligned, binocular
- 100% field overlap
- IPD 63mm. Wide eye-box allowing user variation.
- DMD version.
- LCOS version.

An AR module allows the user to see computer-generated images overlaid onto the outside world. The user views the outside world through the waveguide, which is held in place near the user's eye, similar to a spectacle lens.

A miniature projector or *light engine* generates images which are coupled into a small *input region* of the waveguide, outside the user's field of view. The light propagates along the waveguide via total internal reflection toward an output region.

At the output region light is coupled out of the waveguide, toward the user's eye. The user sees the outside world with overlaid virtual images.

Binocular Component list

- 2x Phlox waveguide assemblies. One left, one right.
- 2x WaveOptics light engines. One left, one right.
- 1x chassis assembly connecting left to right.
- 1x Driver board / electronics

Binocular Alignment

- Supplied with the focal plane of the virtual image set to infinity.
- Convergence between left and right eye will be set to 4 meters.

Monocular

Designed to enable use as a monocular module, details can be provided for specific applications.

Use Without supplied electronics

Module can be integrated into new or existing systems by connecting directly to the light engine modules. WaveOptics can supply information necessary to facilitate this.

Large Eye-box

Allows a large variation in the viewing position without vignetting (cropping).

- Tolerant of wide variations in human head/eye geometry.
- Allows large eye relief and designs that can fit over conventional spectacles.
- Does not require cumbersome “per-user” calibration.

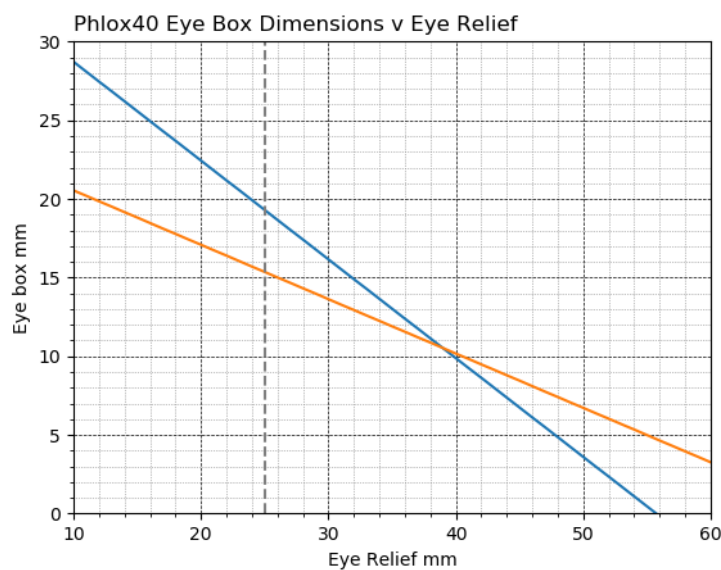


Figure 1 - eye motion box vs eye relief

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Comment
Field of View, diagonal			40	degrees	
Aspect ratio		16:9			
Eye Relief		25 -30		mm	
Eye motion box (eye-box)		19 x 15		mm	at 25mm eye relief. See .

Optical Characteristics

Typical at 25mm eye relief

Parameter	Value	Unit	Comment
Brightness	1000-2000	nits	averaged over FoV
MTF	18	cycles/degree	>=30% contrast
Transmittance	80%		photopically weighted
Contrast	50:1		ANSI white checkerboard measured with a source of at least 200:1 contrast

Phlox Waveguide Mechanical Properties

Parameter	Value	Unit	Comment
Waveguide Overall dimensions	39.0 x 44.0	mm	
Waveguide Thickness	3.2	mm	
Weight	12	g	

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
T _{STG}	Storage Temperature Range (non-condensing)	-40 to +70	°C
T _{OP}	Operating Temperature Range (non-condensing)	-20 to +40	°C

Absolute maximum ratings are those values beyond which damage to the device may occur. Functional Operation under these conditions is not implied.

Module Dimensions

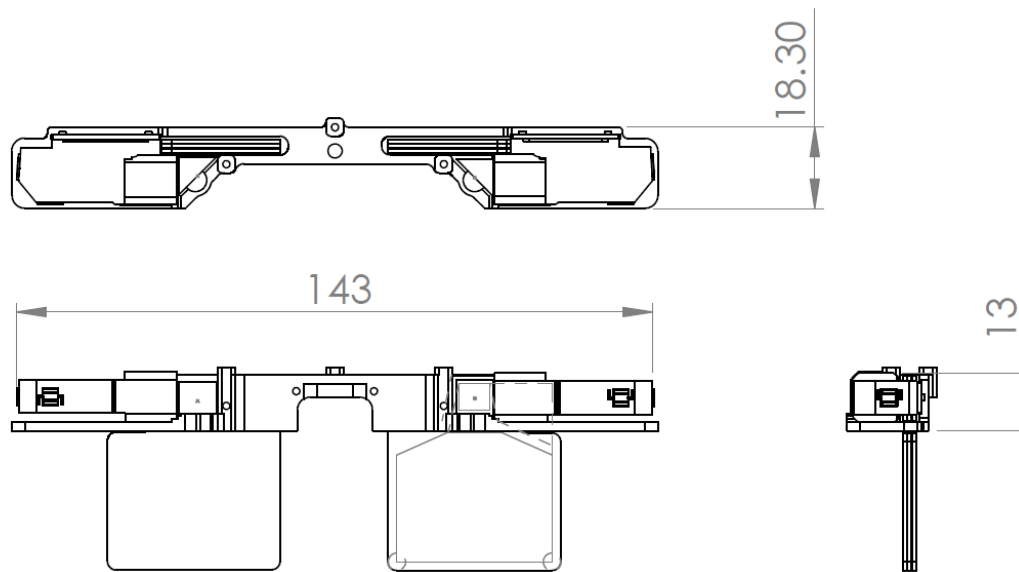


Figure 2 - DMD Module

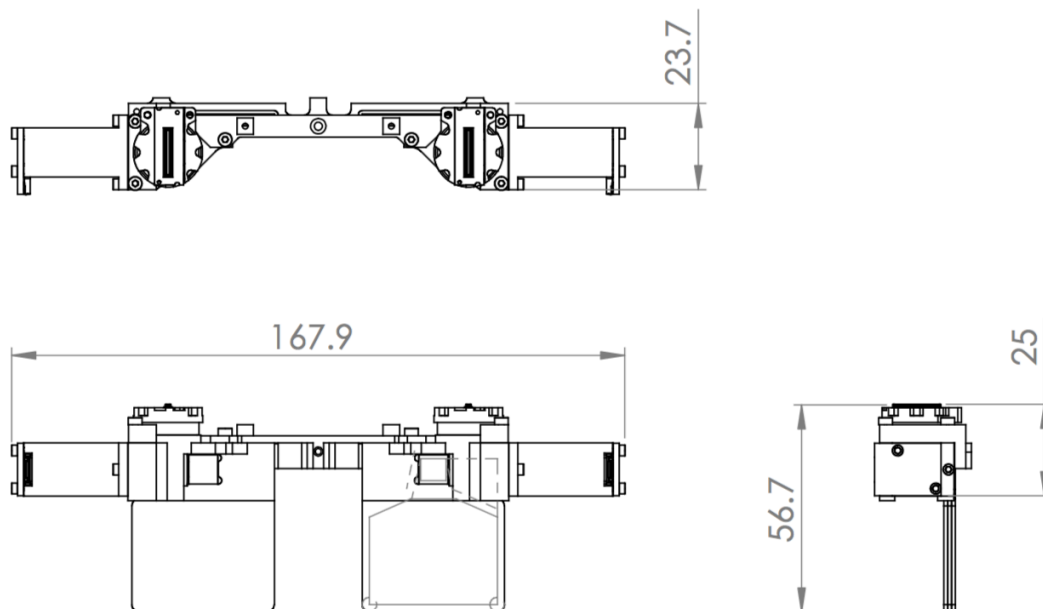
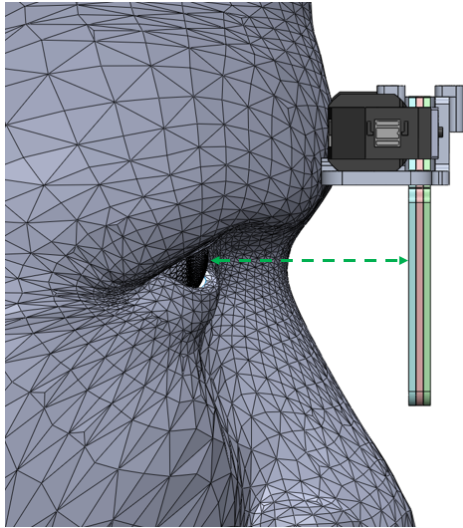


Figure 3 - LCOS Proto Module

Eye Relief definition



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