

## Technical Details

### VISION MODULE

Optics FOV	12 mm, 31.8° horizontal
Focus operation	Autofocus
Sensor resolution	2064 x 1544 pixels (mono or color)
Motion-to-photon analysis	Up to 120 Hz
Tristimulus sensor	Point-type, CIE1931, 100 kHz
Support for sequential AR colour displays	Up to 540 Hz
Image acquisition and preprocessing	Onboard STM32F4 for realtime display refresh analysis, trigger event control and AF lens control
Interpupillary adjustment	Manual, 55–75 mm
Camera distance to HMD	Manual, 40 mm
Camera/lens position	Readable with absolute encoders
Camera triggering	Selectable for global, rolling or scanning display / projector type

### ROBOTICS SPECIFICATION

Gimbal reach, max speed and acceleration, roll	180°, 600°/s, 2000°/s <sup>2</sup>
Gimbal reach, max speed and acceleration, pitch	180°, 430°/s, 840°/s <sup>2</sup>
Gimbal reach, max speed and acceleration, yaw	360° (increased reach on request), 600°/s, 3000°/s <sup>2</sup>
Repeatability per axis	36 arc seconds (0.1°)
Drift and motion tracking accuracy, max error	<2.2 mrad
Drift and motion tracking accuracy, mean error	<1.0 mrad
Jitter measurement sensitivity threshold	1.0 mrad
Motor encoder	Built-in for position tracking (before the 1:100 gear)
Measurement encoder	Follows the actual axis position without backlash (after the 1:100 gear ratio)

*More technical info inside*

## About OptoFidelity

*At OptoFidelity we thrive for the ultimate user experience by simulating and testing user interactions for smart devices.*

We work with the World's largest device manufacturers. We are globally recognized pioneers in test solutions, and our humanlike robot assisted technology platforms are widely used in product development, production and quality assurance. Our products are all equipped with easy-to-use software tools for test configuration, results analysis and reporting.



### LOCATIONS

FINLAND: Tampere (Global HQ), Oulu and Espoo  
USA: Cupertino (CA) and Redmond (WA)  
SOUTH KOREA: Seoul  
GREATER CHINA: Zhuhai (China HQ and manufacturing center), Suzhou, Shenzhen and Hong Kong

### HEADQUARTER

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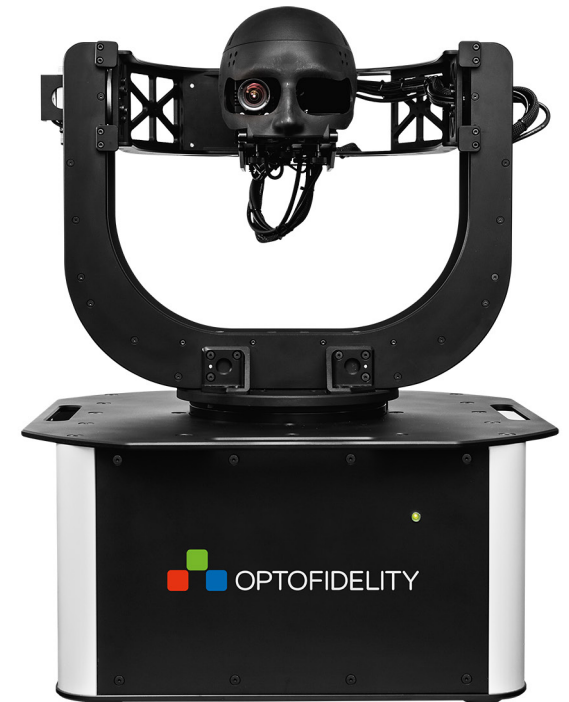
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## OptoFidelity™ BUDDY

Performance tester  
with 3 degrees of freedom  
for any AR/VR/XR  
head-mounted display



## OptoFidelity™ BUDDY

*Performance tester with 3 degrees of freedom for any head-mounted display*

OptoFidelity™ BUDDY is a comprehensive solution for virtual, augmented and extended reality (VR, AR, XR) head-mounted display (HMD) performance testing and calibration in both RnD and in manufacturing lines.

With its integrated vision module and 3 degrees of freedom, you are able to ensure the best HMD performance including Motion-to-Photon (M2P) jerkiness, spatial jitter and pose drifting between real world and virtual world.

The system is based on non-intrusive measurement comparing the changes in the virtual world pose to the robotics pose. Measurement performance comes from OptoFidelity's proprietary vision module and robotics platform, which enables unbeatable repeatability, time synchronization, and position based triggering.

Main components

- 1 HMD mounting
- 2 Vision module
- 3 Roll axis
- 4 Pitch axis
- 5 Yaw axis
- 6 Controller



## Test Case Examples

### DISPLAY TEMPORAL CHARACTERISTICS

- Pixel persistence
- Refresh rate

### MOTION TRACKING ACCURACY

- Spatial jitter
- Drifting
- Prediction overshoot/undershoot
- Tracking repeatability

### MOTION-TO-PHOTON (M2P) LATENCIES

- M2P latency w/o motion prediction
- M2P latency w/ motion prediction: predictable movements
- M2P latency w/ motion prediction: unpredictable movements
- Initial latency

### AR WORLD-LOCKING PERFORMANCE

- Hologram-locking accuracy to real-world features
- Hologram stability
- SLAM (simultaneous localization and mapping) verification



### ROBOT CELL

Form factor	Table top fixture
Dimensions W x H x L	580 x 720 x 580 mm
Weight	65 kg

### INTERFACES

Operating voltage	110–240 VAC, 50/60 Hz
E-Stop	Manual Press Button
Safety Switch	Light Curtains (mandatory)
External Device Sync	External I/O can be input and triggered via Sensor 1 & Sensor 2 ports
HMD charging	Feed-through channel, cable path to HMD
HMD data link	Feed-through channel, cable path to HMD
HMD test content	Unity-based constellation app
Control Link	Additional stages/axis can be added for synchronized movements
Data processing PC	Provides the GUI for Control & Reporting
Back-up storage	8 TB storage for measurement backup
Meas. data capture	1TB M.2 fast storage for measurement images
Measurement Camera Connection	4 channel USB3 card with 5 GBit for each

### PATENTS

US Patents	US 9,729,868 US 9,787,978 US 9,807,384 US 9,990,874
CN Patent	ZL 201711456931.2