

## Technical Specification

### INTERFACES

- 2x USB B female reserved for measurement instruments
- 1x RJ45 female reserved for robot control
- 1x USB B female free for headset connection
- 1x M12 8-pin female safety input for external sensor (e.g. light curtain)
- Operating voltage: 110–240 VAC
- Other features: E-Stop, power outlet & button

### HMD INTERFACES

- Toolless mounting for any HMD (AR/VR/MR).
- USB2 link available for HMD connection, max 480 Mbit/s.

### HMD TEST CONTENT

- Test content applications: Unity/Steam, Android, iOS applications for Absolute tracking markers.
- Extensions (customized): optical flow pattern, QR-codes, colors, synchronized audio etc.
- Options to create own test content or request this from OptoFidelity.

### CONTROL AND REPORTING

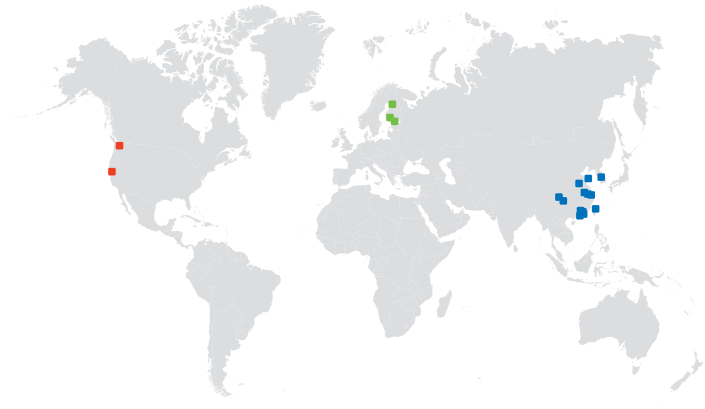
- Graphical user interface for robot movement control and running scripts.
- Python based movement API for automation.
- Access to timestamped robot location data.
- Access to timestamped processed vision analysis data, including HMD position.
- System-wide synchronization accuracy: 100  $\mu$ s covering all sensors
- Visualization reports, data for creating custom reports.
- Windows or Linux control PC

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

USA: Cupertino, Redmond  
FINLAND: Helsinki, Oulu, Tampere  
SOUTH KOREA: Seoul  
CHINA: Chengdu, Chongqing, Dongguan, Kunshan, Nanjing, Shanghai, Shenzhen, Yantai, Zhengzhou, Zhuhai  
Hong Kong, Taipei

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## OptoFidelity™ BUDDY-3

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



## OptoFidelity™ BUDDY-3

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

OptoFidelity™ BUDDY-3 is a comprehensive solution for Virtual, Augmented and Mixed Reality (VR, AR, MR) Head Mounted Display (HMD) performance testing and calibration in both R&D and in manufacturing lines.

With its integrated vision module and three degrees of freedom, you are able to ensure the optimal performance of your HMD device 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, timesynchronization, and position based triggering.

Main components

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



## Test Cases

### DISPLAY TEMPORAL CHARACTERISTICS

- Display pixel persistence
- Display refresh rate

### MOTION TRACKING ACCURACY

- Spatial jitter
- Drifting
- Prediction overshoot/undershoot

### 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

### OPTION1: ADDITIONAL STAND-ALONE EQUIPMENT OR INTEGRATED INTO BUDDY-3

- FPS Jerkiness during movement: average frame rate, dropped frames
- FPS Jitter during movement: std deviation of frame rate
- See through latency: Camera viewfinder latency

### OPTION2: MECHANICAL BUDDY-3 ADAPTATION TO TEST A HANDHELD CONTROLLER

- Controller Motion-to-Photon latencies

With its integrated vision module and three degrees of freedom, you are able to ensure the optimal performance of your HMD device.

The system is based on non-intrusive measurement comparing the changes in the virtual world pose to the robotics pose.

### VISION MODULE (THE EYE)

- Optics: 20° Field of View with autofocus
- Imaging sensor: 240x240 pixels
- Motion to photon analysis up to 120Hz
- Tristimulus sensor: Point type, CIE1931, 100kHz
- Selectable color channel triggering up to 540Hz
- Image processing and acquisition: onboard STM32F4 microcontroller

### ROBOTICS SPECIFICATION

- Gimbal reach, max speed and acceleration:
- Roll: 180°, 600°/s, 2000°/s<sup>2</sup>
  - Pitch: 180°, 430°/s, 840°/s<sup>2</sup>
  - Yaw: unlimited, 600°/s, 3000°/s<sup>2</sup>
- Repeatability per axis: 36 arc seconds/0.1°  
Accuracy: absolute position calibration per request

### ROBOT CELL

- Form factor: Table top fixture
- Test Cell dimensions (W/H/L): 500 / 670 / 500mm
- Weight: 50kg
- Option: safety enclosure