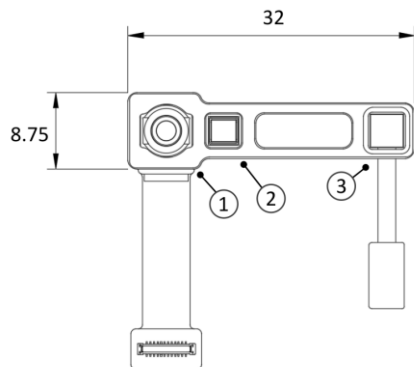


## Behind OLED Face Authentication – A trinamiX solution



Technology demonstrator (user facing)

- 1- IR Camera
- 2- Flood Illumination
- 3- Dot Projector

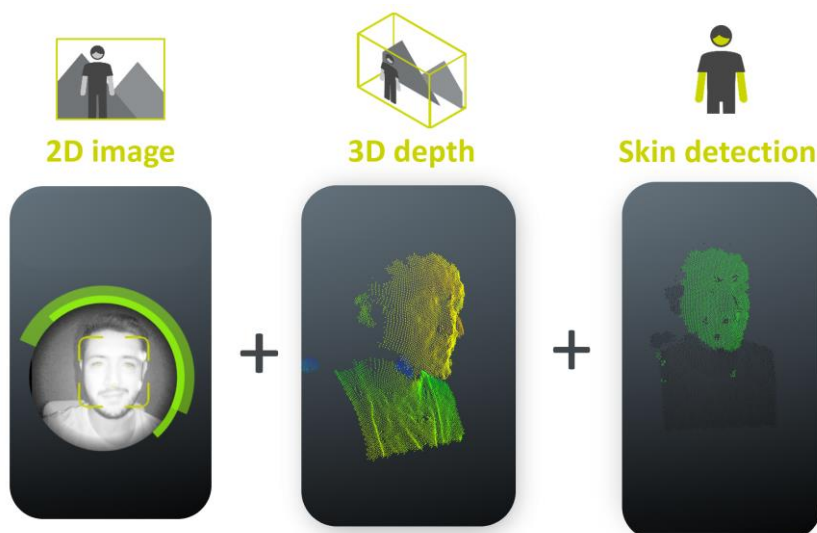
The system enhances a regular 2D IR image using proprietary Beam Profile Analysis technology with a laser dot projector to capture

- Flood illuminated IR 2D image
- 3D depth information
- Skin detection

trinamiX' Beam Profile Analysis technology enables face authentication for Behind OLED integrations. It supports Android 10 and upwards on a Qualcomm secure environment (Qualcomm Trusted Execution Environment, QTEE).

**Security:** Beam Profile Analysis combines depth and skin detection together with machine learning for a secure face authentication solution. This allows not only to recognize an enrolled user but also prevents attacks through printed or 2D digital photographs, videos and even 3D printed masks.

**Privacy** is incredibly important to trinamiX. Face authentication data – including mathematical representations of the face – is encrypted and protected by Qualcomm's Trusted Execution Environment. This data will be refined and updated as the owner uses the face authentication. Face authentication data is only stored on-device (no cloud computing involved) and cannot leave the device as it is protected by Qualcomm's Mobile Security hardware.



Only if all three checks are passed in a single unlock process, the device unlocks, or the app executes the payment request.

## Behind OLED Face Authentication

### Software

Integration	Android 10 upwards
Secure Environment	QTEE with Trusted App (TA) and Secure Processing Unit (SPD)
Runtime	< 200 ms @ Snapdragon 855
	Beam Profile Analysis runs on a single CPU core. Snapdragon's DSP is used to process the machine learning part of the solution, all within QTEE
Memory	< 150 Mbyte
	The facial recognition solution is modular and can be integrated into existing customer's solution
FAR @ FRR Spoof Acceptance Rate (SAR)	FAR: 1/50,000 @ FRR: 1/100 < 1%
Presentation Attack Detection (PAD) (available Q3/2020)	FIDO Level C compliant
Mobile payment (available Q4/2020)	BCTC certified

### Hardware

Camera module	OVT OV9282
Edge emitter laser projector	940 nm with 1591 points
VCSEL laser projector (available in Q4/2020)	940 nm with 509 points
Flood illumination	940 nm LED
Power consumption	0.015 mWh per unlock operation

### Evaluation platforms

Qualcomm Snapdragon 855 (HDK 8150)	ARMv8
Qualcomm Snapdragon 865 (HDK 8250) (available in Q4/2020)	Secure environment execution Trusted App on ARMv8 Secure Processing Unit Hexagon DSP

## Key Figures

### Depth

Working range	0.2 m – 0.8 m
Z-accuracy	2 mm @ 0.5 m Reflectivity 70% For full range, < 1% of the distance
X,Y-resolution	For native resolution, see hardware section Up to 38k points with trinamiX smart interpolation.
Field of view	55° x 38°

### Skin detection

Material	Human skin vs. no skin (including skin-like materials)
X,Y-resolution	Same as depth native X,Y-resolution
Field of view	Same as depth image

### 2D image

X,Y-resolution	1MPixel NIR image
Field of view	64° x 44°

## Contact

Christoph Podes  
Business Development  
E christoph.podes@trinamix.de  
T +49 151 73060172