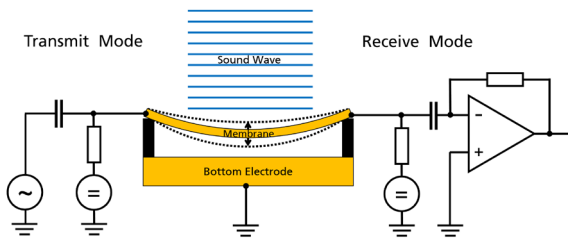




# Evaluation kit for CMUTs



CMUT in transmit and receive mode

We offer an Evaluation kit for CMUTs for a sensor test designed to save you time and effort, ready to revolutionize your sensor integration.

### Scope of Delivery

The evaluation kit is specifically designed for capacitive micromachined ultrasonic transducers (CMUT) and supports CMUTs, PMUTs (piezoelectric micromachined ultrasonic transducer), and bulk piezos. Order an option with one or four CMUTs for air or water applications. A pulse generation package is also available.

- Basic package (2 channels)
- Standard package (4 channels)

Always included:

- Analogue front end
- Red Pitaya® board
- Power supply unit
- Control software
- On request: Consulting hours and software development kit (SDK)

### Key Features

- Plug-and-play compatibility with both capacitive and piezoelectric MUTs
- User-friendly interface for easy configuration and data analysis
- Extensive documentation and support for a seamless integration process
- Consulting hours on request

### Applications

The evaluation kit is capable of addressing all applications that utilize ultrasound. For example:

- Improving healthcare devices and wearables
- Improving industrial automation processes
- Optimize environmental monitoring systems

## Components

The evaluation kit is specifically designed for CMUTs and includes an analogue front end that supports CMUTs, PMUTs and bulk piezos. It enables the generation of transmitter signals within the frequency and voltage ranges typical of these sensors. The front-end ensures exceptional sensitivity, resolution and ESD protection for the MUTs.

The kit includes a commercially available microcontroller board for analogue-to-digital conversion and front-end control. The entire system can be easily managed via a web application accessible via Ethernet or optional WIFI connection.

## Principle of CMUTs

In transmit mode, the flexible top membrane of the CMUT is deflected by an electrostatic force generated between two electrodes. This deflection causes the membrane to vibrate at its resonance frequency, resulting in the emission of an ultrasonic wave.

In receive mode, the acoustic wave from the environment causes the membrane to deform, resulting in a change in capacitance between the electrodes. This continuous change in capacitance, combined with a DC bias voltage, produces an alternating current (AC). This AC current can be converted into a measurable voltage using a transimpedance amplifier.

## Introducing Fraunhofer IPMS: Your Solution for custom CMUTs

We offer custom small batch and pilot production of CMUTs tailored to your specific application and equipment.

- **Design freedom:** Achieve any 2D shape for single element transducers or arrays.
- **High sensitivity:** Experience exceptional sensitivity even at low voltages.
- **Seamless integration:** Our CMUTs are fully integrable into CMOS technology.
- **Optimum performance:** Enjoy good impedance matching in fluids.
- **Environmentally friendly:** Our CMUTs are free from toxic materials and are ROHS II compliant.
- **Cost effective:** Benefit from our cost-effective manufacturing process for high volume orders.

Parameter	Min.	Typ.	Max.	Unit
<b>Airborne CMUT</b>				
- Resonance Frequency	1.6		2.2	MHz
- Aperture		Ø 1		mm
- Bias Voltage (DC)	20		50	V
- Coating		none		
<b>Waterborne CMUT</b>				
- Resonance Frequency	3		7	MHz
- Aperture		0.5 x 1		mm <sup>2</sup>
- Bias Voltage (DC)	50		70	V
- Coating		Silicone		

Contact Fraunhofer IPMS today to explore the possibility for your specific devices!

### Contact

Björn Betz  
+49 351 8823-4656  
bjoern.betz@ipms.fraunhofer.de

Fraunhofer Institute for  
Photonic Microsystems IPMS  
Maria-Reiche-Str. 2  
01109 Dresden, Germany  
Germany

[www.ipms.fraunhofer.de](http://www.ipms.fraunhofer.de)

