

# IC and system design

*OLED microdisplay with a resolution of 1440 x 1080 pixels and the world's smallest pixels of 2.5 micrometres.*

The design of integrated circuits is one of the core competences of Fraunhofer IPMS. Many years of experience in the design of analog, mixed-signal and digital circuits provide the basis for customized solutions from the first idea to the final device. The typical applications follow the rule More-Than-Moore, i. e. the integration of additional functions. Therefore, a customization of the standard CMOS process or a post-processing can be applied (e. g. deposition of organic light emitting diodes or photodiodes). For post-processing a 200 mm cleanroom with various possibilities is available in-house.

## Our offer

- State-of-the-art design of analog, digital and mixed-signal circuits
- Typical CMOS processes:  
0.02  $\mu\text{m}$ /0.028  $\mu\text{m}$ /0.11  $\mu\text{m}$
- Coordination of the external CMOS wafer manufacturing as interface between customer and foundry
- Test, start-up, implementation, lifetime investigation
- Wide portfolio of silicon-proven IP cells
- Design steps:
  - Conception
  - Modelling
  - System design
  - Circuit design
  - Simulation
  - Layout
  - Verification

## Kontakt

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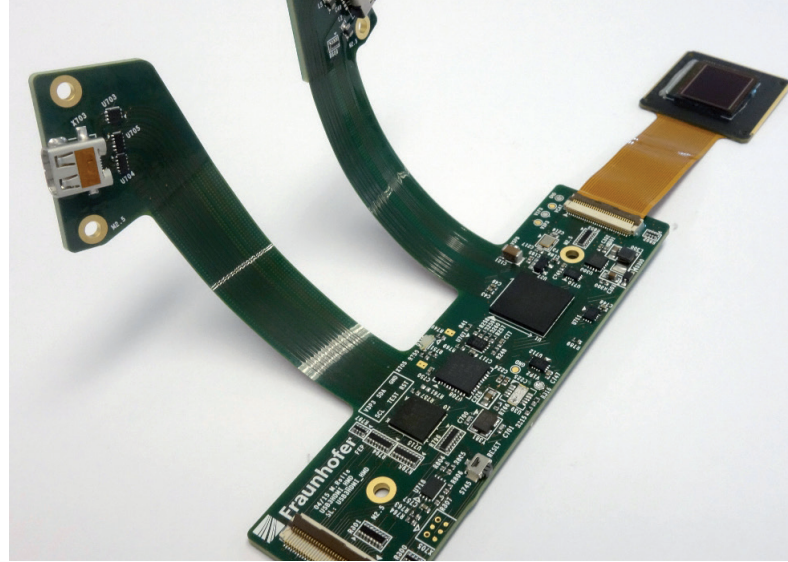
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*Ultra low power microdisplay*



*Example of flex-rigid system electronics*

## Idea

Due to its long lasting experience in the design of integrated circuits, Fraunhofer IPMS can offer its customers the entire workflow from the idea to the product.

## Schematic

After the concept phase the modelling of the single components will take place. That is the basis for the further implementation steps.

## Layout

At the end of the process a database will be available, which enables the fabrication of the integrated circuit by a foundry.

## Test and start-up

Preparations for testing and start-up are carried out in parallel with development and subsequent manufacturing. This also includes setting up the overall system, e.g. an evaluation platform including hardware and software.

## Concept

The focus is on the customer's ideas, which are summarised in a specification sheet. We develop a concept for realising the requirements collaboration with the customer.

## Simulation

During the implementation phase a cycle consisting of circuit design, simulation, layout and verification will be completed several times if required.

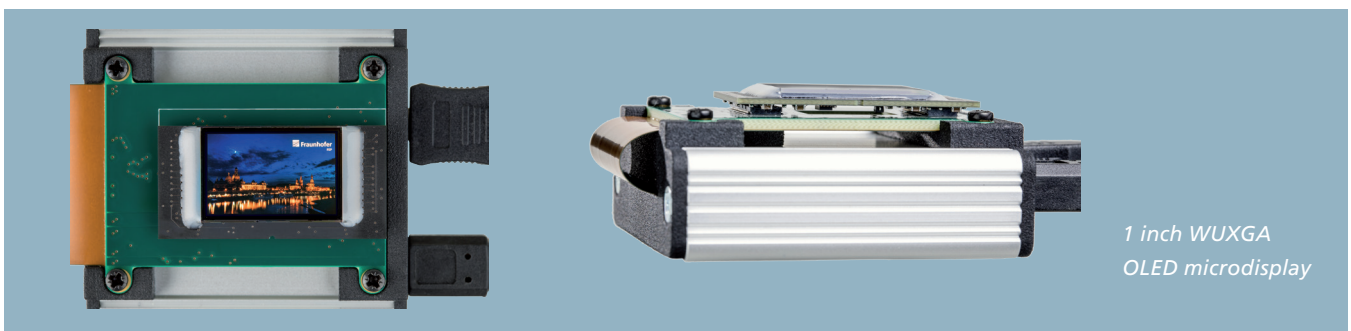
## Manufacturing

Fraunhofer IPMS provides all tools (state-of-the-art hardware and software), know-how and long lasting experience for the manufacturing of CMOS in all various foundry processes.

## System/Packaging and Assembly

Silicon proven examples:

- Hall sensor effect line
- Display controller for passive OLED displays
- Radiation detectors
- Sensor signal processing
- Unidirectional OLED microdisplays (OLED-on-silicon)
- Bidirectional microdisplays with embedded image sensors



*1 inch WUXGA  
OLED microdisplay*