



CUSTOMER
SUCCESS STORY
MODULAR
SMARTWATCH
OV TECH

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

WORLD'S FIRST MODULAR OPEN-SOURCE SMARTWATCH

OV Tech GmbH is developing the world's first modular open-source smartwatch. Unlike traditional closed wearables, this project makes **all design data publicly available** – from printed circuit boards and firmware to mechanical components.

Motivation and Business Model

The open design provides the foundation for **collaboration and innovation**. Many startups and developers across Europe are looking for a **generic wearable platform** on which they can build their own products or services – without having to invest in costly, specialized technologies from scratch.

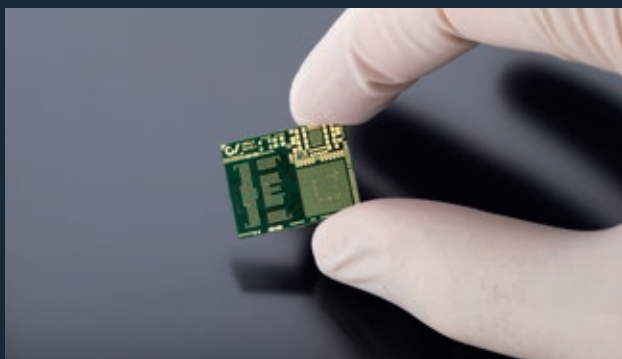


Benefits

- **Startups** benefit from a cost-efficient base platform for wearable development
- **Companies** can launch their own products faster
- **End users** gain a repairable, customizable smartwatch with the freedom to create their own applications

The open-source smartwatch from Open Vision represents a true **paradigm shift** in wearable electronics – moving away from proprietary, closed systems toward an **open, transparent, and community-driven platform**.

REQUIREMENTS



Smartwatch Requirements

- **Modular architecture:** flexible expansion and customization of hardware and software
- **Linux as operating system** (later also Android Wear): simple app and widget development without deep embedded expertise
- **Community-driven approach:** developers and companies alike can contribute, fork, and implement their own use cases
- **Ruggedized design:** IP68 protection rating – dustproof, waterproof (suitable for permanent submersion), and mechanically robust



SiP Module Requirements

- Compact functional module featuring:
 - a powerful **System-on-Chip (SoC)** from the i.MX8 ULP series
 - an intelligent **Power Management IC (PMIC)** for optimal energy efficiency
 - modern **LPDDR4x RAM** for high performance
 - reliable **eMMC mass storage** for data and applications
 - **2 GB RAM and 16 GB storage** – ideal for energy-efficient embedded solutions with a compact footprint
- Fully tested and specified module, easily mountable as an **SMD component** for reflow soldering
- Accessible through the use of **advanced PCB technology**
- **Easily adaptable base design** using commercially available components across different chip and packaging technologies

IMPLEMENTATION



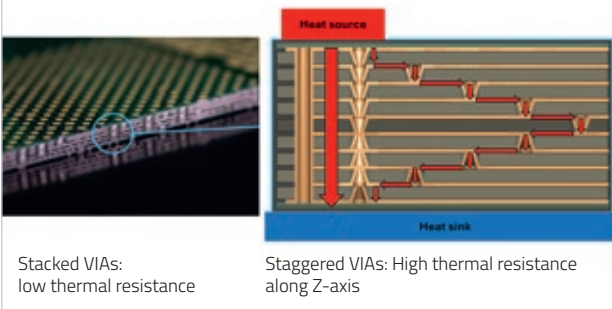
ADVANCED.hdi – The Ideal PCB Technology for SiP
 ADVANCED.hdi is Würth Elektronik’s any-layer microvia-technology, designed without mechanically drilled through-holes. It is based on a temperature-cycle-resistant base material with exceptionally low thermal expansion, which significantly reduces warpage and deformation.
 Thanks to the ultra-thin material layers, even smaller microvias can be realized – enabling maximum packing density and greater design freedom.

The Advantages Are Clear:

- The smallest microvias can be integrated even into very small component pads
- High miniaturization potential thanks to extremely high wiring density
- Stacked microvias save significant space on the inner layers
- Stacked microvias create a continuous copper column, providing excellent thermal dissipation
- Stacked microvias improve signal integrity and EMC by maintaining undisturbed ground planes

The combination of high-quality substrate materials, ultra-thin layers, and very small copper-filled microvias results in highly reliable and robust PCBs. This has been impressively demonstrated in the lab: dozens of reflow processes and hundreds of thermal shock tests at $-55\text{ }^{\circ}\text{C}$ to $+155\text{ }^{\circ}\text{C}$ caused no significant damage to the ADVANCED.hdi PCBs!

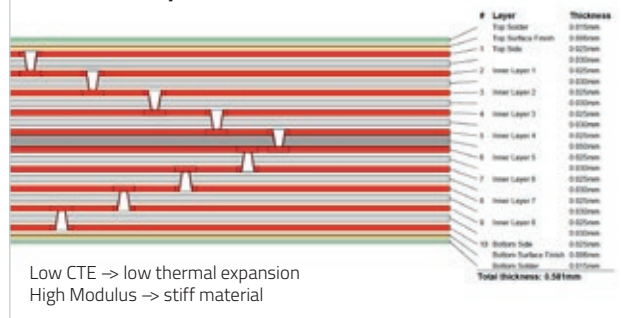
Thermal benefits – ADVANCED.hdi



Stacked VIAs:
low thermal resistance

Staggered VIAs: High thermal resistance
along Z-axis

VIA reliability – ADVANCED.hdi



Low CTE → low thermal expansion
High Modulus → stiff material

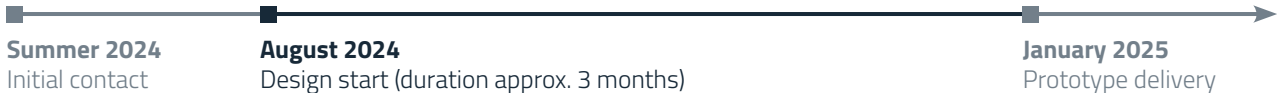


Find out more about ADVANCED.hdi on our website:
<https://www.we-online.com/advancedhdi-en>

TIMETABLE

First Time Right!

The key to success was early, interdisciplinary collaboration with the direct involvement of the PCB manufacturer. With open access to all documents and stack-ups, along with customer-specific adjustments through personal consultation, the project was set on the right track from the very beginning. This was further supported by excellent and transparent communication with the technical project management – a combination that ensured a smooth process and outstanding results.



MODULAR OPEN-SOURCE SMARTWATCH

Three modules offering maximum flexibility:

- individually customizable
- easily interchangeable
- sustainably repairable



QUOTES FROM THE PROJECT TEAM

"ADVANCED.hdi technology makes the developer's life a little easier when it comes to EMC and signal integrity!"

Lukas Henkel, CEO OV Tech GmbH

"Würth Elektronik was not only an excellent partner in terms of consulting and communication, but ultimately the only manufacturer in Europe that implemented the requirements for our project quickly and reliably – while alternative suppliers, such as those from Taiwan, have not responded even after more than a year."

From the customer interview with **Lukas Henkel (CEO)**, **Thomas Ludemann** und **Paul Budich**, OV Tech GmbH



About OV Tech GmbH

At OV Tech GmbH, innovation is more than a principle – it is our driving force. Founded by visionary engineers with a passion for pushing technological boundaries, we have quickly emerged as pioneers in both digital and analog electronics design.

Our greatest strength is our dynamic and dedicated team, committed to redefining technology across industrial and consumer sectors.

With deep expertise in advanced PCB design, digital and analog circuit engineering, and high-precision simulations, we deliver solutions that consistently exceed modern expectations.

Our mission is clear: to tackle complex challenges with scalable solutions and transform ambitious ideas into tangible reality.

INTERESTED?

For more information about ADVANCED.hdi, please visit www.we-online.com/advancedhdi-en or contact our flex solutions experts directly at advancedhdi@we-online.com

Würth Elektronik GmbH & Co. KG **Circuit Board Technology**

Salzstr. 21
74676 Niedernhall · Deutschland
Phone: +49 7940 946-0
cbt@we-online.com
www.we-online.com