IFTEST

Iftest inside – highly miniaturized smartwatch and wearables electronics

From elegant to trendy, from integrated telephone functionality to comprehensive fitness tracker. Smartwatches and the entire product category of wearables are increasingly become a day to day routine use element for the lives of many people. Behind the development and manufacturing of increasingly smart functionalities which are integrated into ultra low volume you find a highly specialiced expert know-how and sophisticated production technology.

About 30 million smartwatches werde sold in 2015, 2016 already 50 million were sold. This number is expected to grow further strongly (Gartner Research). Only a few years ago, many of the clever and highly sophisticated functionalities in the field of healthcare were unthinkable (e.g. colored running card in offline mode or fitness trackers). Today those devices have become a reality thanks to highly miniaturized electronics with multiple integrated sensors on them. This development is enabled through innovative partners with qualified personnel and state-of-the-art production equipment to drive the limits of what's possible further and further.

1 What makes a smartwatch even smarter

The continued development of smartwatches and wearable devices requires a number of enablers. People involved in the development and manufacturing of continously smaller and more intelligent devices face the following challenges:

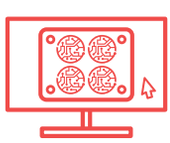
+ How do you integrated more and more functionalities in even smaller volumes?
+ How to secure and guarantee the highest quality level and reliability for all assembled components to end customers?
+ How to produce consumer quantities in a cost effective way?

2 How a smartwatch is built

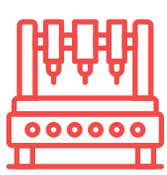
Successful smartwatch manufacturing is enabled if many process steps are being integrated in one site. When the smartwatch electronics company designs the printed circuit board, builds prototypes as well as ramps up volume production, the end result is a mature product that meets the demands of the market. Eventually, consumers benefit by increased functionalities, performance and quality of the end product.

+ Iftest works with smartwatch companies in a partnership model to co-develop and mass produce highly sophisticated smartwatch electronics.

1 Development
Concept and design of smartwatch or wearable electronics is developed together with product management und R+D of customer

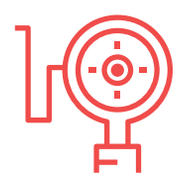


2 Printed Circuit Board (PCB) design
PCB design is being developed using computer aided design (CAD) targetting optimized design for manufacturing, quality and cost



3 Production of printed circuit boards
Manufacturing of boards with state-of-the-art know-how and economy of scale efficiencies

4 SMT assembly of device
Fully automated assembling of der electronic components on printed circuit boards



5 Quality inspection
Fully automated inspection of device using state-of-the-art Automated Optical Inspection (AOI)

6 Milling into single pieces
Singulation of each board through highly precise milling singulation technology

7 Assembly of clock unit
Assembly of all electric and mechanical components to clock unit

8 Final assembly of smartwatch
Final assembly step of complete watch and final QC

3 How to successfully produce smartwatch electronics

+ Four key ingredients and success factors are required for efficient production of miniaturized electronics boards for smartwatches and wearables.

Miniaturization

In order to integrate more functionalities on increasingly smaller surfaces, highly condensed print layouts as well as smaller electronic component sizes are required. State-of-the-art SMT equipment technology as well as the use of ultra thin printed circuit boards (thickness down to 0.3mm) are key.

Precision

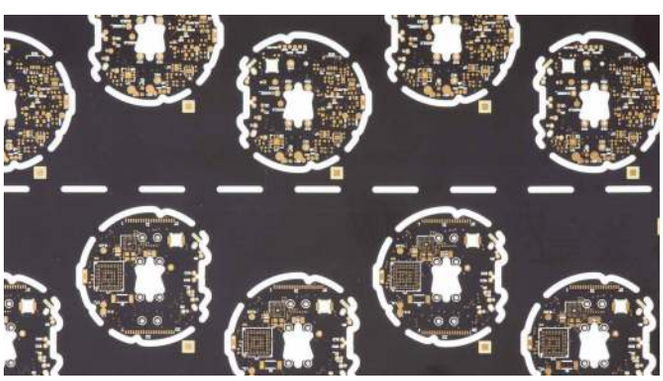
Meeting mechanial target dimensions and tolerances was a limiting factor in the design and concept of smartwatches. Ultra precise milling separation technology with tolerances down to 50 micrometers enabled the required mechanical precision.

Reliability

Thanks to high precision and process stability of the milling separation process, the stress impact on sensitive electronic components is minimized. In addition, a new 3D Automated Optical Inspection (AOI) unit from the latest generation is employed to ensure premium quality and reliability.

High volume manufacturing

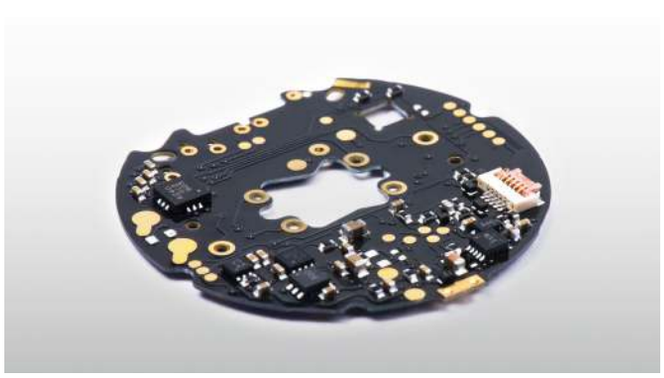
New manufacturing concepts together with an optimized PCB design assure manufacturing capacities of at least 4'000 smartwatch boards per day.



Printed Circuit Board (PCB) – manufacturing of PCB with a thickness down to 0.3 mm

SMT Assembly – Assembly of up to 100 components per single board a lateral precision accuracy < 40 micrometers

Precision milling – milling of singulated boards with a xy mechnanical precision below 50 micrometers



Smartwatch board – high precise electronic board for use in a smartwatch or wearable device

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4 Smartwatch Electronics from Iftest

+ Iftest cooperates with customers as competent partner with a proven track record and know-how in the field of electronics hardware and embedded software development as well as serial production.

As technology leader who is investing continuously into latest manufacturing technology, we support our customers in the development of electronic assemblies and a manufacturing service. During the New Product Introduction (NPI) phase, we optimize the product design towards optimal manufacturability (Design for manufacturing, DfM), ship rapid prototypes for tests and produce subsequently high quality products from 0 series all the way to volume production. Today, already more than ten well know Swiss Smartwatch brands build their market success on Iftest's design and manufacturing expertise for highly integrated and miniaturized smartwatch electronics. High process control and capability matched with superior expertise in quality and regulatory matters make Iftest the ideal partner of choice.

Iftest AG

+ EMS partner for medical and industrial electronics
  – Hardware development
  – Software development
  – Printed circuit board design
  – Prototype manufacturing
  – Test engineering
  – Printed circuit board assembly (SMT and THT)
  – Cable assembly
  – Module and device assembly

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