

We design and manufacture custom electronics products for professional use. Our goal is to offer from a single source everything our customers need to turn their ideas and requirements into delivered products. Thousands of our devices have been installed around the world. For example, they make measurements and transfer data on icy railroad yards, protect machinery from tropical thunderstorms and help ensure accurate operation in factories from Europe to Asia. Hardly any faulty units have ever been sent back.

## DESIGN

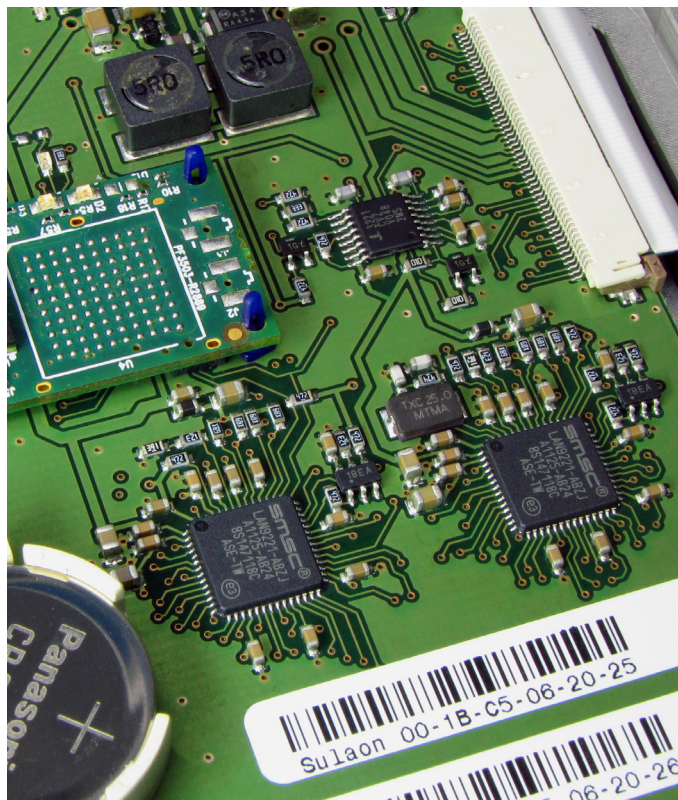
### Electronics

*Circuit boards, sensing, data transfer, RF / RFID, antennas, also difficult cases in analog electronics*

We design electronics from audio and measurement applications to radio frequency equipment. Combining knowledge from different areas is often required e.g. in difficult sensing applications where unusual ways of measurement are used.

One of our strengths is strong knowledge in RF and RFID technologies - when necessary down to transistor and bit level. For example, we have designed RF power amplifiers, protection circuits and antenna switches, and also multiple custom antennas for communication and RFID applications for all frequency bands.

For circuit board design we use Mentor Pads software, which has a broad range of automation and verification tools. All part lists and other documentation can be automatically generated in the right format for our own production.



### Software

*Microcontroller applications for embedded systems, RTOS and Linux applications, user interfaces*

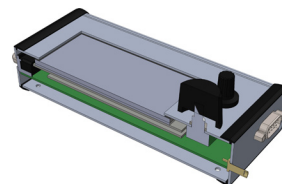
Embedded software is a crucial part of most products that we design. We have done software development on numerous commonly used and also more unusual platforms. In most of the recent projects we have utilized a software platform of our own design. The platform includes a compact RTOS kernel and device drivers for most common peripherals. Power management features are included in the kernel, making it a good match for also battery powered devices.

For more complex software, where using a microcontroller is no more sensible, we use various Linux platforms. These are typically devices with a graphical user interface or ethernet connections. Linux is also widely used in our own servers, automatic measurement systems and test equipment control.

### Mechanics

*3D modeling, sheet metal assemblies, machined and injection molded parts*

For mechanics design we use Dassault Systèmes SolidWorks. 3D models of circuit boards can be combined with other mechanical parts to ensure adequate space for each single component. This is especially useful in designs that have tight limitations on the shape or volume of the final product.



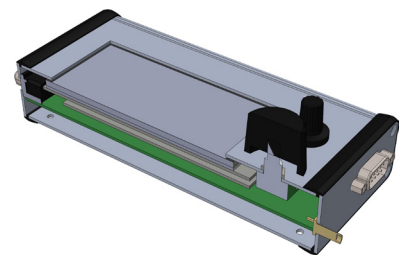
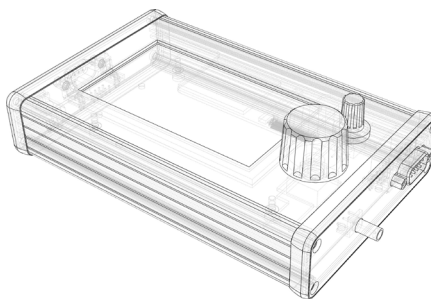
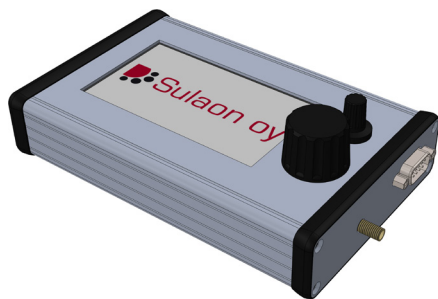
Rapid prototyping techniques are often used to help visualize and verify designs.

## MANUFACTURING

### Electronics

To guarantee a fast response time for our customers, we operate our own surface mount assembly facility. Many modern components come in packages that are difficult or impossible to solder by hand. Hence automated assembly must be used even for the very first prototype units.

Direct feedback from our own production helps us design circuit boards that are easy and efficient to manufacture.



### Device assemblies

We can deliver everything we have designed as fully assembled and tested products.

Electrical and circuit board assemblies come from our own production. For mechanical parts we have an established subcontracting network.

We also design and manufacture jigs and testers used in electronics manufacturing. These can be as simple as manual jigs used to speed up manual assembly steps, or needle beds to establish contact with internal test ports. For more complex requirements we can deliver testing systems complete with test equipment, control software and product specific jigs. Custom measurement circuitry and evaluation software can be designed to customer requirements.

## TEST AND MEASUREMENT

*Conventional electrical measurements, radio frequency measurements, temperature tests, mechanical measurements*

Our range of test and measurement equipment is comprehensive. Getting numerical values from everything we do is important for sustained quality and developing our working methods.

Some examples of the available measurement equipment and possibilities:

- **Voltage measurements 100 nV .. 20 kV**
- **Oscilloscope measurements with 1 GHz bandwidth and 0.4 pF load capacitance**
- **Galvanically isolated and high voltage oscilloscope measurements**
- **RF measurements with a broad range of signal generators, spectrum analyzers and network analyzers**
- **Temperature tests -40 .. +130 °C, for complete devices and single components**
- **Environmental measurements, sound pressure, air movement with a hot wire anemometer, etc.**
- **Antennas (with some limitations)**
- **RF performance measurements and network simulation for wireless devices**
- **Dimensional accuracy of circuit boards, placement accuracy of SMD components and solder paste**



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