



CUSTOMER SPECIFIC ELECTRONICS DEVELOPMENT

In 7 steps from your idea to series production

INDIVIDUAL

Personal consulting & development of your unique, specific solution

DESIGN FOR MANUFACTURING

Focus on the production viability of your products & long-term component availability

MADE IN GERMANY

German engineering performance with uncompromising quality standards

IN-HOUSE EMV-LAB

Development & accompanying EMC testing according to industry standards for your certifiable product

SYS TEC
ELECTRONIC



1. Konzept



2. HW-Design



3. SW-Design



4. Mechanik



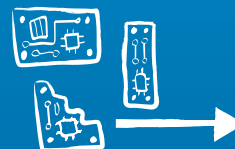
5. Prototyp



6. Serie



7. EMS



SYS TEC
ELECTRONIC



CONCEPTION

Precise understanding of your requirements right from the start

The conception and specification of devices and systems are two of the most important components of our range of services. A correct understanding of the project is essential to achieve your goals. This Step is the decisive bridge between the consultation and the later realization of your project.



OUR SERVICES:

- ▶ Analysis of your objectives
- ▶ Requirements Engineering - Capturing and tracking of requirements
- ▶ Specification documents
- ▶ Preparation of precise requirements and specifications
- ▶ Consulting, on-site trainings and workshops - also on your company
- ▶ FMEA (Failure Mode and Effects Analysis) and RAMS (Reliability, Availability, Maintainability, Safety)
- ▶ Conception and specification under the aspects of functional safety and security

OUR MOST IMPORTANT SAEFTY STANDARDS

for our work in the field of saefty and security are:

- ▶ DIN EN 61508
- ▶ DIN EN ISO-13849
- ▶ DIN EN 50128 und DIN EN 50129

In addition, we comply with other important norms that that emphasize the high quality standards of our work:

- ▶ **Industry:** DIN EN 61131-2, DIN EN 61131-3
- ▶ **Railway:** DIN EN 50155
- ▶ **Medical:** DIN EN 60601-1

HARDWARE DEVELOPMENT

Holistic, efficient electronics design

From platform research and circuit simulation to schematic design, component placement and ultimately PCB layout, we are your competent and experienced partner. We develop a holistic, efficient electrical design for you.



OUR SERVICES:

- ▶ Creation of system, implementation and test specifications
- ▶ Circuit diagram creation & circuit diagram simulation
- ▶ Placement of components and routing of printed circuit boards (layout) (PCBA?)
- ▶ Creation of 3D models of the printed circuit boards for space analysis
- ▶ Prototyping
- ▶ Comprehensive tests (design verification, black box and whitebox tests, integration tests)
- ▶ In-house laboratory for testing of electromagnetic compatibility (EMC) during development
- ▶ Verification of the product in inhouse test facilities (EMC, temperature, climate, shock/vibration)

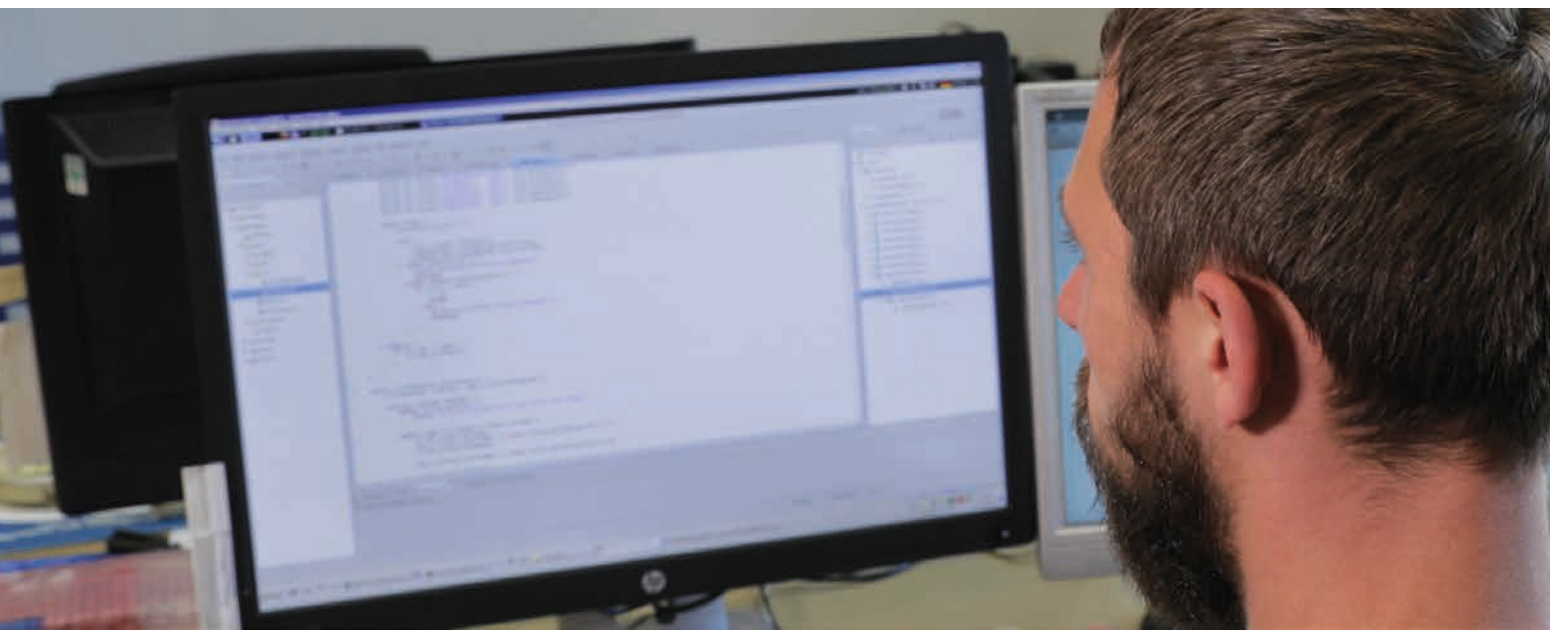
WE FOCUS ESPECIALLY ON:

- ▶ Design to Cost
- ▶ Design for EMC
- ▶ Design for Test
- ▶ Design for Manufacturing
- ▶ Design for Lifecycle

SOFTWARE DEVELOPMENT

Flexible solutions for your software requirements

Our team work together on your integrated solution. Our goal is to provide you with your system based on the the latest technologies and with minimal integration effort.



OUR SERVICES:

- ▶ Application development for customized devices
- ▶ Adaptation of operating systems to customer-specific hardware
- ▶ Porting of operating systems: Linux, microcontroller, real-time operating systems (RTOS)
- ▶ driver programming (Bae-Metal, Linux, RTOS)
- ▶ Software development by programming in C/C++, C#, Java, JavaScripted, Phyton, Node-Red and IEC 61131-3
- ▶ Integration of communication protocols and stacks: MQTT, OPC UA, CAN/CANopen, Modbus-RTU/ TCP, Profinet, Wirepas Mesh, Bluetooth, Industrial Ethernet: Industrial Powerlink
- ▶ Realization of visualization projects using Qt, HTML/JavaScript, .NetWindowsForms
- ▶ Use of encryption protocols TLS/SSL
- ▶ Development of controllers that can be programmed by the user according to IEC 61131-3 (CoDeSys, OpenPCS)
- ▶ Provision of Board Support Packages (BSP) as required
- ▶ Support of various build systems for Linux (YoctoTM, PTXdist, Debian)
- ▶ Support of User Management Systems for Linux
- ▶ Development of programmable logic (z.B. FPGAs, CPLDs)

MECHANICS

3D modeling of PCBs and devices via CAD software

Your ideas take on the best shape: We find the right housing for your requirements. We can provide you with a 3D model for of connections and housing for integration into your overall system.



OUR SERVICES:

- ▶ Planning and compilation of mechanical requirements
- ▶ Use of SolidWorks CAD software for design, visualization, and simulation
- ▶ Use of 3D data from hardware design tools for installation space analysis
- ▶ Design of mechanical assemblies for terminal testing
- ▶ Quick and easy provision of mechanical prototypes by experienced partners

PROTOTYPING & VERIFICATION

Significant highlight in the development of your new product

The production of prototypes and subsequent verification form the basis for tests and improvements, which in turn form the basis for a product ready for series production.



OUR SERVICES:

- ▶ Production viability of the suitability for manufacturing of possible designs
- ▶ Close cooperation between development team and feedback on technological design improvements
- ▶ Inhouse assembly of prototypes
- ▶ Extensive functional testing
- ▶ EMC measurements during development in our own EMC laboratory
- ▶ Accompaniment of the assessment / certification in accredited offices
- ▶ Verification of functional design- and application-related requirements under different environmental influences
 - Shock and vibration testing
 - Temperature and climate testing in our inhouse climate chamber
 - Verification of IP protection classes (durability in relation to environmental influences)

SERIES LAUNCH

Planning and implementation of industrial series production

Once development has been completed, we will also carry out the industrial series introduction of your components and devices for you and take care of all related tasks that would arise for you.



OUR SERVICES:

- ▶ Tests of the assemblies via automated circuit board and device testing procedures:
 - automated optical inspection
 - IC Test (In-Circuit-Test)
 - Boundary Scan
 - High Voltage-Test (HV-Test)
 - Isolations test
 - Visual inspection (manual optical inspection - MOI)
 - burn-in test
 - Function test (based on LabVIEW)
- ▶ Test station development from standard IO devices and power supply units such as:
 - Calibrators
 - Programmable power supplies and measuring devices
 - interface converter (e.g. USB CAN/RS232/RS485, CAN-Ethernet)
- ▶ Development of test software:
 - Encapsulation of the complex tests in a simple graphical user interface
 - Visualization of all test steps
 - Execution of automated tests for reproducibility
 - Data storage on the databases and in log files
- ▶ Supplying the test results as reports

ELECTRONIC MANUFACTURING SERVICES

Flexible, high-quality production of complex assemblies

We take over the development and production of your product from material procurement and logistics to device assembly and sales packaging.



CHARACTERISTICS OF OUR PRODUCTION:

- ▶ Production of safety devices, also from own development according to IPC-A-610 Class 3
- ▶ Certification according to DIN EN ISO 9001:2015
- ▶ Consistent ESD protection, full service from component procurement to device delivery
- ▶ 2 SMD lines each with 430 intelligent feeder stations for high flexibility
- ▶ Printed circuit board size of 50 x 50mm ... 400 x 350mm
- ▶ Component size up to and including 0201 µBGA
- ▶ FinePitch from 0,3mm
- ▶ Accuracy 0,035mm
- ▶ Solder paste printing with optical position control and automatic stencil cleaning
- ▶ Flexible production from quantity 1 (prototypes)
- ▶ Automatic selective soldering (THT) for reproducible solder joints on THT components
- ▶ Soldering processes under nitrogen
- ▶ Automatic optical inspection (AOI) of each circuit board
- ▶ Automatic varnishing machine
- ▶ Functional testing of every module, also with calibration, Burn-In (temperature test chamber),
- ▶ Boundary scan and software installation, high-voltage test as well as in-circuit test possible