

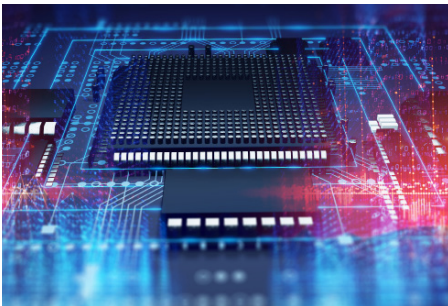


# High Speed, High Complexity Software

## Fidus – First Time Right

With more than 20 years of experience, we have learned how to transform ideas, visions and concepts into exceptional products. That's because we are experienced at taking complex problems and delivering solutions against dynamic environments and tight deadlines.

We apply our industry experience, and leverage the expertise of our people to make sure your product performs to your expectations before it goes out the door. No exceptions.



## HOW WE HELP

With more than 20 years of experience, we have perfected the art of transforming your idea into the product you've imagined.

Fidus' Embedded Software designers have advanced tools and broad expertise to select the most appropriate microcontroller, microprocessor and operating system to solve client challenges. From architecture to implementation and testing, our experts deliver efficiently designed and well documented software solutions that turn your idea into a completed solution. No matter the design challenge, we will work with you to get it done right and on time.

Our software design team's skills are readily complemented by Fidus' Hardware, Wireless, PCB Layout, Signal Integrity, FPGA/DSP, and Mechanical design expertise to deliver a well-rounded and reliable solution.

## DESIGN EXPERTISE

- Embedded systems architecture design, partitioning, coding, profiling, validation, debugging, documentation
- Bootloaders and board support packages (BSPs)
- Kernel space device drivers for hardware peripherals
- Integration of communications and networking protocol stacks
- Design and implementation of functional test GUIs

- Real time operating systems and highly deterministic design
- Software porting, web applications and GUIs
- Security protocols, secure boot, authentication, encryption
- Expertise in creating base level designs in the telecom, video, storage, high speed computing, test/measurement, software defined radio and automotive markets
- Heterogenous computing architectures

## TECHNOLOGIES

- Bare-metal and embedded operating systems (Linux, QNX, RTOS, ThreadX, Android, FreeRTOS, and many others)
- Core languages include embedded C/C++, Java, C#
- Test and automation scripting in Python, Tcl, Bash, Perl
- Platforms:  $\mu$ Controllers,  $\mu$ Processors, Xilinx MPSoC and Microblaze, Intel FPGA SoC and Nios, Microchip PolarFire/SmarFusion SoC, ARM, RISC-V, Lattice Mico8 and Mico32
- Embedded graphics libraries, Drivers, Gstreamer, OpenGL, OpenCL, Hardware Accelerated AI/ML
- Jenkins, Bitbucket, GIT, Microsoft Visual Studio, Static code analysis, LabVIEW, MATLAB/Simulink, Custom application specific lab environments, Yocto

## CLIENT EXAMPLE

A recent request had Fidus integrate a client's proprietary technology to create a unique product. Fidus' tasks included electronic hardware design, FPGA design and coding, mechanical and thermal design, as well as embedded software architecture and development. Based on a Xilinx Zynq Ultrascale+ MPSoC, the design involved signal conditioning, clock recovery, FMC interface, signal conversion, optical QSFP communications, and PRBS-based error detection.

The embedded application ran within Linux hosted on the quad-core Arm Cortex-A53. Customer deliverables included bootloader/BSP, IP over PPP, various USB peripherals support, and a connection to a Cortex-M4 to gather ADC data, as well as sensor information.

As with most projects, in the end, Fidus provided a Yocto build environment and Jenkins build automation for future builds and maintenance. The project concluded on-time, within budget and resulting in the embedded software solution tying the entire system together.

## ADDITIONAL EXAMPLES OF OUR WORK

- Video capture and distribution system. Custom designed circuit cards, FPGA code, and Windows driver and application. Hosted and supervised by both an ARM® embedded system and a PC.

Technologies: Xilinx® Virtex®-7, Xilinx® Vivado®, PCIe Gen3, MIPI, FMC, Image Sensor Pipeline (ISP), FMC, scaling, overlay, PIP, transceivers, GTX/GTH, gbps, Microsoft® Windows Embedded Compact 7 (CE), ARM®, drivers

- Spectrum analyzer Linux board support package. Fidus redesigned a spectrum analyzer including the Linux BSP to reflect numerous hardware changes. The updated Linux kernel image allowed all legacy user-space application software to remain independent of the underlying hardware platform.

Technologies: Linux, BSP

- Xilinx® Zynq® OpenAMP. Fidus designed a demonstration system, based on Zynq. This project involved designing a GUI that allows the user to execute AES, SHA2 and SHA3 algorithms. The algorithms were run on both bare metal as well as the FPGA fabric. This project demonstrated Fidus' software expertise with Asymmetric Multi Processing (CPU0: Linux, CPU1: Bare Metal), High-Level Synthesis, Isolation Design Flow, and Partial Reconfiguration.

Technologies: Xilinx® Zynq®, Avnet® Zedboard, AMP, HLS, IDF, PR

**20+**

**years experience**

Collaborating with smart teams is what fuels us every day.

**3,000+**  
**successful projects**

Your unique challenges are our obsession.

**400+**  
**customers**

Extending your team with our expertise brings designs to market faster.

**82%**  
**repeat customers**

Customers love to work with us, again and again.

## ABOUT FIDUS

Fidus Systems, founded in 2001, specializes in leading-edge electronic product development with offices in Ottawa and Waterloo, Ontario, and San Jose, California. Our hardware, software, FPGA, verification, wireless, mechanical and signal integrity teams work to innovate, design and deliver next-generation products for customers in emerging technology markets. Fueled by 20+ years' experience and creativity, along with our collaborative and process driven approach, we turn complex challenges into well-designed solutions. And with over 400 customers and 3000+ completed projects, we have the expertise to be a seamless extension of your team, providing a clear focus and commitment to getting designs and prototypes to market faster. Once you start working with us, you'll trust us like one of your own. Our hallmark is transparency. Our guiding principle is first time right.

**fidus**  
innovate • design • deliver

**fidus.com**

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