

# Electronics Hardware Design Solutions

## Electronics Engineering Design Services

When you need electronics in your product, it's important to approach the design process from all angles. The most innovative hardware designs integrate seamlessly with the software and logic running on them, and DornerWorks understands the nuances and complexities of embedded design.

Our hardware engineering team is endorsed by NXP, Xilinx, and others. The benefits of choosing DornerWorks as your hardware partner extends much further. Our expertise in custom circuit board solutions has led to successful launches for hundreds of products, all the while offering those very clients a comprehensive system view of their project as it progresses and ownership of the resulting design.

Our approach begins from your requirements, and builds incrementally to an optimal solution. We can build from an idea, through rapid prototypes (such as a SOM or development kit), to a fully customized hardware solution, depending on your budget and performance requirements. Not only can we handle your hardware development, but our engineering team also has the experience to assist with your embedded software, custom logic, and test systems engineering needs. Our talented design teams can tackle a very wide variety of electronics engineering challenges.



## Hardware Design Solutions

- **Turnkey Solutions:** Requirements Development, Design, Validation, and Documentation
- **Design Migration:** Migrating designs to the latest technology
- **Prototyping:** Proof of Concept, Feasibility, Concept Creation
- **Validation:** Signal Integrity Analysis, EMC, Testing, Board Bring-up
- **Production Support:** Integration, On-site support available

## Tools

- **Schematic Capture:** OrCAD, Mentor Graphics, Altium
- **PCB Layout:** Allegro, PADS, Expedition, Altium
- **Simulation:** Spice, Signal Integrity Analysis, Thermal Analysis, Power Distribution Network
- **Debug:** Oscilloscopes, Multimeters, Electronic Loads, Power Supplies, Signal Generators

## Key Capabilities

- **Video:** HDMI, HDSMI, NTSC, FPD-Link 3, CSI, CSI2, RGB LCD, LVDS, DVI, DisplayPort
- **Communication:** 1Gb/24Gb Ethernet, CAN, USB, PCIe Gen4
- **Analog:** Precision Instrumentation, Conversion, Active Filtering, High Dynamic Range Signal measurement and generation
- **Devices:** Xilinx Zynq/Zynq US+, Altera Stratix, NXP i.MX6/Kinetis, Microchip
- **Wireless:** Wi-Fi, Bluetooth, GPS
- **Memory Interfaces:** DDR2/3/4, SRAM, Flash, eMMC/SDIO, QSPI
- **Power Management:** SMPS, LDO, Battery Management, Power Distribution Network, Wireless Power
- **PCB Technology:** 32 Layers, Flex and Rigid-Flex, Backplanes, Blind and Buried Vias
- **Mechanical and Industrial Design Partnerships**
- **Environmental Testing Partnerships**



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## HW Solutions Case Studies

### C360 Video Processing Unit

The C360 by Amphenol Borisch Technologies is a full-view situational awareness video system that includes front and rear mounted day/night camera towers and a Smart Touch Control Unit. DornerWorks created the Video Processing Unit (VPU) for the C360 with high-end video processing using FPGA and PCB design.

**Technologies:** Altera Stratix IV FPGA, 64-bit DDR3, 24-layer PCB design, NTSC and HDSOI camera inputs, HD digital video output, BT.656 video encoders



### IoT Industrial Appliance

DornerWorks successfully collaborated with the customer to add features and functionality to their product in order to leap frog their competition. The use of an application level processor along with DDR3 allowed the customer to add cloud connectivity and a rich user interface never before seen in their industry. NXP's robust KE06 series of microcontrollers provided the foundation for reliable controls in an industrial environment.

**Technologies:** NXP i.MX 6SoloX, NXP Kinetics KE06, DDR3, Ethernet, CAN, I2C, RTC, eMMC, SMPS, LVDS to LCD, Industrial Machine Interfaces including, sensors, VFD, relays, analog and discrete I/O

### IoT Consumer Appliance

Added wireless cloud connectivity and control to an existing product line while improving its performance. Optimized the design to balance BOM cost, performance, and world-wide regulatory requirements.

**Technologies:** Espressif ESP32 Wi-Fi and Bluetooth Module, TI CC3200 Wi-Fi, AC Modulation of Fan, DC motor control

### Harrier-F Video Development Kit

DornerWorks Harrier-F Video Development Kit is a multiple camera daughter card solution targeting Advanced Driver Assistance Systems (ADAS) development in the automotive industry. ADAS systems require multiple cameras in a vehicle to assist the driver with safety-related features like lane departure warnings and adaptive cruise control.

**Technologies:** HD Camera Inputs, FPD-Link III SERDES, Power over coax



### Portable Data Acquisition & Analysis Recorder

DornerWorks developed a full product solution for a data acquisition and analysis device, enabling 16 simultaneous 24-bit accelerometer channel acquisition, GPS input, Tachometer input, 24-bit Digital to Analog (DAC) output up to 108 kHz sample rate, Gigabit Ethernet, 802.11 b/g/n WiFi, and an operational battery life of over 6 hours. The platform dornerworks developed with hardware, software, and custom logic allowed the customer to spend their time on the user interface and algorithm development.

**Technologies:** Xilinx Zynq-7000, Gigabit Ethernet, DDR3, MSP430 for Power Management, Tachometer, Analog, GPS Input, High Dynamic Range and Low Noise Signal Filtering and Conditioning, Li-Ion Battery Management, Serial ADC, SD Card, SD Card, WiFi



### Custom SOM Development

Many engineers and product developers struggle with an overload of things to do when they need to get a real-time or application-rich product to market. DornerWorks' System-On-Modules (SOM) are powerful processing platforms that enable you to quickly develop a custom solution so that you can get back to focusing on what you do best. DornerWorks can design a new or customize an existing SOM to meet your requirements. One of DornerWorks' SOM platforms is a feature rich, cost effective system on module solution featuring a highly integrated processor, NXP's iMX 6SoloX.