TROY CHERASARO

ELECTRICAL AND COMPUTER ENGINEER

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SUMMARY OF WORK EXPERIENCE

I am an expert consultant level FPGA developer and accomplished circuit board designer with a decent embedded software background and 20 years of experience. My experience ranges from commercial products to radiation hardened aerospace & defense applications including software-defined radio, imaging, sonar, DSP and high-speed data interfaces.

TECHNICAL SKILLS

FPGA VHDL / Verilog / SystemVerilog Design and Verification, RTL Design, Synthesis, Place and Route, Timing Analysis

- **Simulation & Verification** – ModelSim / QuestaSim & others, UVM test benches, code coverage, assertions etc.
- **Synthesis** – Synopsys (Synplify Pro & Premier), Leonardo Spectrum and native Altera / Xilinx synthesizers
- **Xilinx Tools** – Vitis / Vivado Suite, IP Integrator & SDK, ISE, ARM MPSoC, MicroBlaze, PowerPC, Chipscope / ILA
- **Xilinx Devices** – Zynq, Artix, Kintex, Virtex (including Ultrascale, Ultrascale+, MPSoCs) & Spartan device families
- **Intel / Altera Tools** – Quartus, SoC Embedded Design Suite (SoCEDS), IP Wizard / MegaWizard and SignalTap
- **Intel / Altera Devices** – Stratix I & II, Cyclone, Flex20k, Max 9000 & Max 10 device families
- **Technologies** – AXI4 Interfaces, MGTs up to 12Gbps, SerDes, LVDS, GigE, DDR, PCIe, PLLs, Hard & Soft CPUs
- **Applications** – System on chip (SoC), software-defined radio (SDR), imaging, sonar, DSP and high-speed data handling

Printed Circuit Board Assembly (PCBA), Design, Development, Manufacturing and Test

- **Mixed Signal Design** – RF, analog, high-speed digital, multi-volt and multi-clock circuit board assemblies
- **Circuit Analysis** – Simulations and creating proto-board, wire wrap and first article PCBA prototypes
- **Schematic Capture** – PADs Logic, Cadence / OrCAD, Altium, Eagle, KiCad and others
- **Advanced PCB Technologies** – PCB layout oversight including 2 mil space & trace, sequential stack lamination, blind & buried vias, micro-vias (4-mil laser drill), multiple controlled impedances, and wafer level chip scale packages (WLCSP)
- **Board Bring-Up** – Using oscilloscopes, digital multi-meters, logic analyzers, spectrum analyzers & waveform generators

Embedded Firmware / Software Development

- Python, JavaScript, C / C++, device drivers, diagnostics and embedded application firmware
- Build systems and regression tests with shell scripts, Tcl scripts & make files
- Agile development & continuous integration (CI) with Atlassian tools (Bitbucket, Jira, Confluence & Bamboo)
- Revision control and configuration management with Git tools / methodologies (Gitflow), GitHub, SVN and CVS

Linux System Administration, Dev Ops and Web App Development

- Virtualization of Debian, Ubuntu and CentOS Linux with Parallels, VirtualBox, VMWare, & Hyper-V
- Jamstack, LAMP stack and CMS Dev Ops using the command line, Bash shell scripts and other languages & tools
- Securing and scaling servers and web apps using IPTables, Modsec, OSSEC, OSSIM and Varnish
- Web app deployment & development of "self-hosted" applications written in Javascript, PHP, Python and CSS

System Engineering, Architecture and System Integration

- Setting, deriving and refining requirements for component and interface specifications
- Specifying high performance PCs, servers and single board computers to meet demanding requirements
- Providing support for system integration and factory acceptance test

Project Management and Leadership

- Scoping engineering effort, skills, milestones, documentation, design reviews, and infrastructure needed for projects
- Using deadlines, metrics, and historical project data to create budgets and schedules
- Tracking earned value management (EVM) with Microsoft Project & Agile development with Jira
- Leading, training and mentoring others to do PCBA and FPGA embedded system development

EDUCATION

Bachelor of Science Electrical Engineering – University of Colorado – Boulder, CO

PROFESSIONAL EXPERIENCE

Senior Engineer – Contractor & Consultant | Cardinal Peak, LLC | 8/2015 – Present

FPGA Based OFDM Software Defined Radio (SDR) – FAANG Company R&D

- Helped design custom low-latency wave form derived from 802.11 operating in Wi-Fi 6E ISM bands (6-7GHz)
- Implemented OFDM TX & RX in FPGA fabric using Verilog & SystemVerilog targeting a Zynq 7035 RFSoM
- Developed radio system Python firmware & performed system integration, test & optimization with 8 prototypes

Fighter Jet Avionics SystemVerilog Simulation – Large DoD Contractor

- Used DO-254 based process to maintain & improve simulation of Xilinx Ultrascale+ MPSoC design
- Also supported efforts to hire a vendor to perform independent 3rd party verification with UVM

CES 2019 Demo: Bluetooth Voice Activated Home Assistant Device – Household Name Audio Company

- 8-layer mixed-signal RF PCBA schematics, layout & enclosure design oversight, proto run, bring-up and HW support

FPGA Radiation Effects Test Development – Local Aerospace Company

- Implemented MGT, SerDes, DSP, CLB, BRAM, IOB and config memory tests for a large Xilinx FPGA
- Logged 21 days of "beam-time" providing on-site support at TAMU & University of California Davis cyclotrons
- Became project manager for 4 months to ramp up expanded FPGA test dev team of 6 people for follow-on tests

16-layer x4 lane PCIe FPGA Board with GigE Dante HC Network Audio Interface – Pro Audio Company

- Schematic capture, layout oversight, proto run, bring-up, test and HW support of complex Artix 7 & Spartan 6 PCBA
- Wrote VHDL targeting Artix 7 FPGA to integrate IP inc. Gen 2 PCIe, GigE, SPI & custom I2S TDM interfaces

Interviewing candidates for senior engineering and management roles

- Specializing in vetting FPGA developer candidate knowledge, skill and experience

Self Employed – Contractor & Web Entrepreneur | Splinter Media Group, LLC | 8/2009 – Present

- Under contract with Cardinal Peak, LLC on over a dozen projects (highlighted projects listed above)
- Launched, maintained and marketed high traffic web sites hosted on customized high-performance LAMP stacks

Senior Computer Systems Architect | Lockheed Martin Corp. | 2/2001 – 2/2010

Mk48 Torpedo Launcher – International Submarine Programs

- Led PCBA & FPGA design and test of Virtex 4 FX PowerPC SoC with real-time Linux to initiate launch sequence via GigE
- Awarded $13M contract with Royal Canadian Navy as result of >99% functional demo with torpedo emulator HW

Digital Video Recorder & Processer – Low Profile Mast

- Integration of M-JPEG cores with custom IP in an Altera Stratix II (EP2S180) on Matrox Odyssey XPro+ vision processor
- Allocated image processing functions to FPGA or ASIC based on analysis of DDR RAM, M-JPEG, H.264, median filter, and color space converter performance & trade-offs

FPGA Compute Accelerator – IR&D

- Design and verification of 3 multi-million gate FPGA designs with a team of 6 other developers
- SVD algorithm MicroBlaze SoC, 2-D sonar spectral beam-former, Scalable line synthesizer and test benches in VHDL
- Designs targeted Xilinx Virtex 4 LX 160, Virtex II-Pro, Altera Stratix I (EP1S40 & EP1S80) devices

Sonar Array Electronics – Domestic Submarine Programs

- Buffer Box – Led development of PCBA, FPGA and CPLD, for a system that buffers data & transmits it over PCI-X bus
- Advanced Inverse Beam Former (AWIX) Module – Seawolf Submarines: Created schematics, oversaw PCB layout, wrote diagnostics (C & assembly) for a module with 2 PCBAs, 2 CPLDs, 1 FPGA and an Analog Devices DSP (2187L)

Other Awards and Achievements

- 3 Patents Granted (co-authored) – FPGA reconfigurable computing framework designs
- **Digital Design Assurance Certification** 16-week digital design course – Lockheed Martin Missiles & Fire Control