ALAIN VINCENT V. ABITRIA

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PROFESSIONAL SUMMARY

Embedded systems professional with an R&D career spanning around fifteen (15) years, supported by extensive experience in embedded software and hardware systems design and development, and with proven track record in accomplishing his deliverable.

Proactive team-player with very good project management skills, and possesses superb oral and written communication skills, as well as very good interpersonal skills. Self-motivated, adaptable, resourceful, fast-learner, and someone who enjoys the technical and intellectual challenge provided by the embedded systems field.

SUMMARY OF PROFESSIONAL QUALIFICATION

- Experienced in several processor families and architectures: Intel x86/x86-64, ARC, ARM Cortex-A9/Cortex-M3/M4, ARM Cortex-A53, PIC18/PIC16, ESP32
- Understanding and experience with embedded architectures and blocks – memory management, interrupt controllers, cache coherency, inter-processor communication, symmetric multiprocessing (SMP)
- Programming Languages Proficiency: C (extensive experience), C++, Assembly (x86/x86-64/ARMv7 architectures)
- Experienced in Linux Driver Development and Embedded Linux porting
- Experienced in Firmware Development using ASIC, FPGA, microprocessor or microcontrollers
- Experienced in synchronization and shared memory programming of multiple threads in kernel or bare-metal firmware environment
- Strong working knowledge of U-boot operation and experience in porting it for bare-metal and embedded Linux-based platform
- Exposure in embedded OS platforms such as Embedded Linux, Android, and FreeRTOS Real-time OS
- Strong working experience of debugging tools: JTAG, trace debugging, serial, oscilloscopes, etc.
- Source code management and repositories - CVS, git, Perforce
- Experience in electronics hardware development for both digital and analog systems like motor drivers
- Experience in various communication protocols: Small Computer Systems Interface (SCSI), Non-volatile Memory Express (NVMe), USB 1.0/1.1/2.0, UART, RS-232, I^2C, SPI, CAN, MODBUS RTU, MQTT
- Well-versed in both Windows and Linux operating system environments
- Software development tools – Eclipse, Visual Studio, MPLAB, MATLAB/Simulink

PROFESSIONAL HISTORY

TECHNOLOGY ENABLER DESIGNERS PHILS. INC., Makati City, Philippines (May 2020 – Present)
Position Held: Senior Firmware Engineer

- Project: Intelligent Vehicle Gateway, 2020
    - System-level developer for an automotive fleet management device with LTE, WIFI, Bluetooth, GPS capabilities that runs on Android OS platform and NXP i.MX6 processor
    - Delivered custom Android features such as over-the-air (OTA) update, reboot, drivers for monitoring battery level, Windows CE-to-Android field conversion, custom U-Boot changes, among others.
    - Fixed customer OS technical issues involving excessive flash writes, native library tombstones, WiFi functionalities, among others.
    - Optimized boot time for this Android device
    - Provided technical support to Test Engineers and fellow developers.
    - Tools used: Perforce (for code repository), NXP Android 7 Board Support Package (BSP), Android NDK and SDK, Android Studio, Android Debugger (adb), JIRA/Atlassian

- Project: Telematics Platform 1, 2020 -
    - System-level developer for an Embedded Linux-powered telematics device for fleet management that runs on NXP i.MX6 processor.
    - Maintained the Yocto package consisting of U-Boot boot loader, Linux kernel, and application software
    - Provided technical support to customers and production engineers.
    - Tools used: NXP Yocto BSP, git

- Project: Remote Control for Hospital Beds, 2020 -
    - Developed firmware for a bluetooth-enabled remote control device powered by a Cortex-M4 ATSAMD51N20 microcontroller to enable a safe and convenient hospital bed operation. The firmware consists of power management, user input, and several tasks using FreeRTOS real-time OS.
    - Tools used: Microchip MPLAB, SEGGER J-Link JTAG Probe

BiTMICRO NETWORKS INTERNATIONAL, INC., Pasig City, Philippines (September 2011 – March 2020)
Position Held: Firmware Engineer

- Project: System Firmware for Military-grade NVMe SSD Products, 2018 - 2019
    - System-level firmware developer for ARM Cortex-A53 powered NVMe SSD.
    - Delivered critical system blocks within schedule - boot-up, memory management unit, memory allocation, cooperative scheduler, timer wheel, message-based and physical interrupts via Generic Interrupt Controller v3 (GICv3), multi-core cache coherency and other peripherals like system-level DMA and GPIO. These blocks serve as backbone that enables application-level firmware to accomplish its functionality.
    - U-boot porting and customization as well as bringing-up of board hardware.
    - Utilized onboard cryptographic HW accelerators to implement algorithms such as HMAC-SHA256, Elliptic-curve cryptographic algorithms like ECDH and ECDSA, key-pair generation, etc.
    - Proposed and implemented software development process improvement such as using device tree and hardware architecture-agnostic code modules to increase code re-usability in the future.
    - Tools used: NXP CodeWarrior, GNU ARM Toolchain

- Project: Embedded Linux-based NVMe SSD with Security features and Ethernet interface, 2019 – 2020
    - Delivered and ported working embedded Linux to an NVMe SSD in order to implement NVMe and TCP/IP functionalities within a tight two months deadline.
    - Delivered the Linux driver that implements encryption and decryption of data to/from the SSD using AES-XTS libraries as well as communication with a host software. Ensured data integrity is intact.
    - Delivered key and data protection by implementing cryptography algorithms (encryption, decryption, hashing, PBKDF2) over NXP CAAM security engine.
    - Ensured that the driver is SMP-safe and re-entrant even if called from multiple threads or contexts.
    - U-boot porting and customization and product board bring-up as well as DRAM tuning.

- Project: Embedded Linux platform for SSD development, 2017
    - Delivered an SSD platform based on Altera Arria10 and runs embedded Linux. A side project, this served to enable device driver developers to migrate SSD functionalities to an embedded Linux platform and to explore its system functionality and performance.
    - Provided technical support to developers using the platform.

- Project: System Firmware for NVMe SSD Products, 2015 - 2017
    - Developer for the low-level firmware powered by ARM Cortex-A9 MPCore in an Altera® Arria10 FPGA that communicates with host servers via Non-volatile Memory Express (NVMe) interface.
    - Owner of system blocks - memory management unit, interrupt controllers (via ARM GIC), CPU cache, inter-processor communication, and other peripherals (timer, QSPI, etc.) - and leveraged these to develop device codes that served as backbone to enable SSD modules like NVMe protocol, flash translation layer, data management, etc. and to enable SSD performance
    - Board bring-up and interface with Hardware/ASIC team to debug board problems like failing SDRAM functionality, incorrect clocking, etc.
    - Developed diagnostic codes for SDRAM and QSPI modules for early hardware functionality verification
    - Delivered firmware boot loader by modifying U-boot and by exploiting its scripting capabilities
    - Tools used: ARM DS-5 Studio, GNU ARM toolchain

- Project: Linux Device Driver for PCI Express (PCIe) SSD Products, 2012, 2013 - 2015
    - Main developer and maintainer of Linux device driver for BiTMICRO PCIe solid-state drive products
    - Utilized knowledge of kernel block layer, SCSI stack, and kernel APIs to design low-level driver for Enterprise application, primarily on x86-64 based servers.
    - Ensured driver compatibility for multiple Linux flavors with kernel versions ranging from 2.6.32 to 3.19.
    - Ensured that the driver is SMP-safe and re-entrant even if called from multiple threads or contexts.
    - Increased overall system performance from initially 120,000 to 330,000 I/Os per second (IOPS).
    - Debugged and tested driver with tools like gdb, strace, ftrace, crash, lockdep, etc.
    - Deployed driver installers in RPM (Red Hat Package Manager) as well as DEB (Debian) types.
    - Enabled the software team's user-level programs to communicate with the SSD device through the driver.
    - Assisted Engineering Test team during regression and testing of the Linux driver.
    - Used GNU toolchain for development and other tools (strace, ftrace, gdb, crash, console, etc.) for debugging

- Project: Windows Device Driver for PCIe SSD Products, 2012 - 2014
    - Developer of Windows device driver for PCIe SSD products.
    - Implemented command coalescing to merge together read/write commands with the goal of reducing instances of read-modify-write in flash chips, and optimized other algorithms to meet desired I/O throughput and latency.
    - Implemented features like write-back caching and specialized handling of some SCSI commands (Inquiry, Request Sense, Write Same, Sync Cache, Write Buffer).
    - Ensured commonality of the lower-level driver layer between the Linux and Windows platforms for code re-usability, maintainability, and ease of debugging.
    - Assisted Engineering Test team during regression and testing of the Windows driver.
    - Tools used: WinDDK with Visual Studio '12 for development and accompanying WinDebug for debugging

- Project: I/O Firmware Development for PCIe SSD Device, 2011 - 2013
    - Developed interface firmware for SSD to be compliant with Small Computer Systems Interface (SCSI) protocol, particularly SBC-3, SPC-4, SAM-5.
    - Firmware implemented handling of SCSI Block and Primary commands over a proprietary transport layer for PCIe access.
    - Involved in the design and handling of type 2 data protection feature.
    - Development of firmware for Fiber-channel SCSI-based SSD products.
    - Used Green Hills MULTI for firmware development and debugging.

LEXMARK RESEARCH AND DEVELOPMENT CORPORATION, Cebu City, Philippines (Sept. 2005 – Sept. 2011)
Positions Held: Electrical Hardware Engineer II

- Project: Test Tools System Development and Maintenance, 2009 - 2011
    - Developed and maintained LabVIEW-based code and instrumentation to automate mechanical tests.
    - Ported and maintained LabVIEW code of gap tool for Pro4000/5000 series. This tool uses NI DAQ-connected optical sensor placed in carrier to measure gap between printhead and paper in print zone across the entire paper width.
    - Maintained and modified LabVIEW code for Coefficient of Friction tester for use of mechanical engineers.
    - Developed feedrate and dot placement measuring tool, using LabVIEW and NI Vision acquisition DAQ hardware. This tool measures carrier and feed index movement granularity and error.
    - Developed LabVIEW-based motor profiling tool. This tool captures motion data from DC motors like speed, direction, rotational displacement and graphs them against time. This is used in printer motors and throughput verification.
    - Developed a stepper motor motion controller system using PIC microcontroller with Visual Basic interface

Positions Held: Hardware Engineer II

- Project: Lexmark OfficeEdge Pro4000/Pro5000 Series, 2009 - 2011
    - Owner of the electronics board that drives the motor and sensors for the options tray.
    - Developed, designed, and tested the performance of the options tray card, as well as the DC motor and stepper motor drive subsystems in printer engine.

- Led the five-people design team of a wireless gap tool system - for speeding up of test process in manufacturing. The complete system – made up of optical sensor, battery, bluetooth module and main PCB with onboard microcontroller that manages sensor acquisition, data buffering, and data connection with host PC via bluetooth – is to be put in carrier in place of actual printhead.
- Actively involved in the design, review, and release of product documentations like schematics, bill of materials, PCB layout, technical specification, test reports and plans.
- Performed verification of printhead signals and power, NAND flash lines, motor currents, power supply etc.
- Actively participated in project cross-functional team and coordinated with different teams (Firmware, Hardware, and Product Assurance) on the status and timely resolution of issues.
- Actively participated in the drive to innovate products and to reduce product costs.
- Interfaced with off-shore counterparts and OEM partners from different nationalities to accomplish the program development of printers from design to production.
- Traveled to China to support printer design verification builds by helping resolve technical issues.

Positions Held: Hardware Engineer I, Hardware Engineer II

- Project: Prototypes for duplex automatic document feed scanner system and for paper pre-coat system, 2008
  - As a member of the advanced technology team that researches for advanced features to be included in future products, I was tasked to develop the firmware and electronics for these prototypes.
  - Actively participated in the discussion and design with mechanical engineers on how to recirculate paper via motor movement sequences and sensor flags in prototype duplex ADF.
  - Ported existing FW for an ARM ASIC to manage motion control, sensor data and image processing.
  - Produced the necessary electronics setup (motors, sensors, board) and ported firmware to provide motion control for prototype.
  - Successfully presented both projects to Lexington VP executives. Additional prototypes were requested and produced to be turned over to Lexington.

Positions Held: Jr. Hardware Engineer, Hardware Engineer I

- Project: Lexmark X9300 Series and X9500 Series All-in-One Office Printer, 2005 - 2007
  - Involved in the creation, review, and release of schematics, BOM, PCB layout for high-end printer design.
  - Performed tests and hardware verification of printer electronics – op-panel bus signal quality, analog subsystem, power measurements, ESD verification for the entire printer.
  - Delivered fixes for development issues with consideration to manufacturability, reliability, and cost
  - Was sent for technical training to corporate headquarters in Lexington, KY and to China to support early printer design verification builds by helping to resolve technical issues.
  - Coordinated the setup of Electrical HW Lab with the purchase of supplies, test and measurement tools.

PATENTS

US Patent Application 14/690,371 - *Exchange message protocol message transmission between two devices.* Co-inventor, filed April 17, 2015 under BiTMICRO Networks Inc. Patent pending.

US Patent Application 14/688,748 - *Method for transferring and receiving frames across PCI Express bus for SSD device.* Co-inventor, filed April 17, 2015 under BiTMICRO Networks Inc. Patent pending.

EDUCATION

DE LA SALLE UNIVERSITY – MANILA, 2000 – 2004
Bachelor of Science in Electronics and Communications Engineering

- Graduated Cum Laude, CGPA: 3.561/4.0
- Awarded Gold Medal Award for Outstanding Thesis
- Consistent Dean's Lister, 2000-2004
- Consistent university scholar and Dept. of Science & Technology scholar, 2000-2004
- Placed 19th overall in April 2005 E.C.E. Licensee Examination

PERSONAL DETAILS

Name:	ALAIN VINCENT V. ABITRIA
Birth Date:	January 2, 1984
Birth Place:	Manila, Philippines
Current Address:	2513 Callejon 8 cor. Del Pilar Sts., Sta. Ana, Manila
Citizenship:	Filipino
Height:	5'6
Weight:	158 lbs.
Interests:	Mountain biking, swimming, traveling, video games, embedded Linux with Raspberry Pi
Reference:	Available upon request