**CURRICULUM VITAE**

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**Current Employment:**

July 2019 – Hypercube Semiconductors / Dilead

**Systems architect**. I commissioned 1gbit symmetric fiber optic link in London. Hands on work include configuring Linux servers for direct Internet facing services. I set up IPTables for high security (drop by default) routers, DHCP, DNS, HAProxy, NGINX, (configured for load balancing and high availability) Apache and MySQL servers. Also worked on the planning and started Python coding for implementing shopping cart using SHA256 block chain, and systems configuration management using block chain.

The other work includes hands on PCB design (KiCAD), design Hypercube mechanical parts, screws and threads in FreeCAD 3D modelling package, outrunner drone motor design + propeller design, gearbox design, chain design, pulley drive design, servo design, 3D packing of STL models into containers for SLS nylon printing. 3D parts mostly parametric (spreadsheet computed models) to reduce redesign time, some created with Python scripts.

Now working on moving all the server technology from gigabit ethernet to motherboards with gigabit SFP fiber interfaces and use of fiber switches and fiber routers.

December 2018 – July 2019: Bboxx Ltd, a solar power + IoT company.

**C Software developer**. Continue development of a 50AH LiPO4 battery management system that took in solar power, and sold it to customers in remote areas with a SIM800 GPRS modem to control the dispensing of power in measured amounts for a fee. The SIM800 sends the power dispensed measurement to payment processing in real time to Amazon servers. The PCB is STM32 based. I worked on creating new graphical user interface for SPI bus 1.5 inch TFT display converting old pixel drawing routines to fast image blitting method. I re-wrote serial Victron MPPT message parser to send commands and read back its registers so as to control Victron MPPT without dropping packets or using blocking code. I wrote software I2C driver to repair issues with radio modem interference locking up I2C controller without using blocking clode. It also involved using Altium to check PCB for errors and track issues – a few of which were identified for future attention. The code used real time RTX OS and Keil compiler but had a lot of problems with blocking code and 9 threads signalling each other and unable to control state of the machine into a precise known state at any one time. I converted most of the code to fast, non-blocking code, state machine, and reduce heap usage to get control of firware lock up problems. All software managed through Github. Also setup Doxygen to document code in html. I also set up wiki to help engineers and management absorb details of the current status of the project. I used Atlassian Jeera to update progress as they got done.

February 2018 – November 2018: Hypercube Semiconductors Ltd.

**Senior electronics engineer** and software developer of own company with an office in Enfield, London, with help from a China investor. The office is equipped with technology to create next generation IoT products. The details are available at web site <https://hellosemi.com/hypercube/pmwiki.php>

I created a set of STM32 ARM based boards to function as replacements for Arduino for IoT projects that the China company will manufacture and sell, sharing a percentage of the profit. They are diversifying from an LED lamp manufacturer with 90,000 sq foot offices into other electronic products. Within office in London, I worked most of the time designing PCBs, testing them and writing the software libraries in C. I wrote software for ARM SoC to recognize QR codes and barcodes from camera using OpenCV, and activate gadgets by taking instructions by settings configured in a website. Web software written in PHP, MySQL and Python. Also a Python server for sorting images. I coordinate work between China and UK through use of Intranet, wiki and ssh file servers for daily uploads and updates.

September 2017-December 2017: Felcana Ltd, a Startup company.

**Embedded C developer**. Hired to repair blocking code of Bluetooth stack of Silabs based IoT product into state machine based multi-tasking non-blocking code, repair other features of the product including SPI flash chip communications, processing accelerometer readings and some aspects of power management. Used Gitlab for daily code updates, and Slack for daily developer updates.

February 2017-August 2017: Working with several investors on a Startup Company. Included travel to China to set up PCB manufacturing operations for IoT security camera system. Disagreements between shareholders first led to split of the company and then led to dissolution of company.

June 2005 – January 2017: Senior Electronics R&D Engineer in Martindale Electric Ltd

**Permanent position as Senior Electronics R&D Engineer** developing ARM embedded hand held safety critical products for direct connection with power electronics to UK mains supplies and measuring voltage, phase, earth resistance, and also safety critical Portable Appliance Testers. Originally started as contract Visual Basic software developer and then moved into embedded electronics for the last 11 years. The high voltage generators built with switch mode power supplies we used spice simulator to model behaviour.

Work is summarized as mainly embedded product research and development, put the R&D into production, resolve technical problems, occasionally lend a hand with office PC problems, networking problems and take the lead in complex IT problems such as virus infections, forensics and Internet security. More details of work activities:

1. Research and repair the company's defective embedded software of PIC based design for Earth Loop measurement system and make is saleable and suggested move to ARM versions where I did all the basic R&D. I pioneered multi-threaded state machine debugging techniques for small embedded CPUs which are used by all of the R&D engineers in the company today.
2. Repairing defective embedded software of a hand held TI MSP420 based PAT by absorbing how the software worked, documenting it with doxygen, creating ATE test machine to locate relay and electronics combinatorial failures, R&D high dV/dt cleaning pulse to added it to the hardware, and repaired the instrument logic software functions to make the product saleable.
3. Create the basic R&D ground work for a new range of voltage indicators.
4. Created R&D ground work for new PAT tester using Microchip PIC. Code written in C in MPLABX. Designed and laid out all the boards using KiCAD. Later I also investigated HC05 Bluetooth modules and ESP8266 WiFi modules to remotely download data. I wrote the 2 point and 3 point calibration software for insulation test and resistance measurement.
5. Repaired Far East (Philippine) produced mains Nuvoton ARM based 700V AC voltage generator software to make it saleable. Code written in C and Coocox IDE. The software was originally written with a lot of if..then statements which could not resolve conflicting information about battery levels, excess current drain, short circuits and high loading conditions. The software was changed to multi-threaded state machine to resolve conflicts in under a millisecond and made saleable.
6. Completed R&D using NXP ARM based Earth Loop tester. Designed most of the development boards and modules in KiCAD. Remaining boards completed in Altium. Wrote the code in C in NXP's Code RED Eclipse IDE. The product applied short circuit directly across real mains for a few microseconds to measure Earth current and so determine Earth resistance. Problems dealt with included high mains dV/dt pulses, high dI/dt pulses, mains noise filtering, and power supply stability. The final R&D test jig could resolve 0.06R Earth loop resistance.
7. Moved to doing R&D into making ST ARM based 700V AC voltage generator at much lower cost than original product. All the PCBs and modular sub systems PCBs were generated in Altium. Code written in C in STM32CubeMX and AC6 Eclipse IDE running in Linux. The ATE for testing the power supply was also built, and it talks to the Linux PC using opto isolator. The ATE is controlled by software written in GAMBAS running under Linux.
8. Helped with mass production by creating numerous high voltage test equipment and custom ATE jigs for production testing PCBs. I own a laser cutter and used that to make all the custom boxes.
9. Helped move PCB production of hand held PAT from Taiwan to China. Built custom ATE with Arduino, OLED display, Lithium chargers, relay banks to test boards rolling off the production line. The ATE helps with automation of a number of tests to locate problems before they reach calibrators which may otherwise get damaged through high voltage and/or high dV/dt signals.
10. Set up Linux Apache Intranet for engineers in China, Philippines and UK to communicate through web and used of rysnc replication of data across Linux servers. I was architect for the Linux based Apache Intranet web servers, traveling to China and Philippines to install the servers, train their engineers to maintain it, and documented the system in HTML. I trained China and Philippine engineers on Linux server maintenance, PCB design, electronics design, and embedded C software design.

In summary, the work is hands on Embedded ARM electronic product design and C coding work, multi-threaded state machine debugging work, electronics digital and analogue design, writing calibration software, switch mode power supply design, PCB design and layout work in Altium or KiCAD, productionizing projects, looking after communications infrastructure from Far East, traveling where necessary to Far East to sort out production problems and communications infrastructure. I help source components from Shenzhen and Guanzhou electronics markets and design and put in the QA and automated test equipment (ATE) jigs for low reject rate production. I set up documentation system essential for problem free production with Intranet so that engineers are sync'd up on all essential details down to the last component. To help with low reject rate production I help train engineers on embedded C software, hardware design essentials, multi-threaded state machine debugging techniques, PCB design, documenting to Intranet and Linux usage.

**Technology Background**

Trained as Electronics Engineer to expand on electronics hobby and got a BSc in Digital Electronics. Started working as field engineer for a City brokerage company for 6 years installing and repairing their stock trading hardware, and then moved into PC developer work. When I left, I moved into contracting, and initially worked as PC applications developer using software such as VC++, VB and SQL, and then moved on working as permanent engineer (in current position) as an embedded electronics product developer designing PIC and ARM based boards with mix of analogue, digital and power electronics. The more powerful embedded gadgets required Linux, so trained in Linux. As a Linux based developer, I worked with Intel and ARM boards at work and hobby and engaged with open source developer projects. During the last 12 years, I have traveled to Shenzhen and Guangzhou, stayed there many times and visited SEG electronics market to source components. I have worked in China sorting out production problems, QA problems and training China engineers with software, firmware, and board level repairs.

As a senior engineer, I have set up Intranet so that stake holders, engineers and production staff obtain up to the minute details of production with 2 to 3 clicks for trouble free production. The Intranet that I set up had SSL security, authentication, training videos, photographs and descriptions of production problems, circuit diagrams, firmware, documentation, manuals, repair instructions, fault diagnosis methods, and all the minute details that are important for problem free production runs. I set up DNS servers using no-ip.com dynamic DNS services with port forwarding on the routers and https for secure Intranet web browsing. I created automation server apps in GAMBAS that interprets scripts to synchronise Intranet data to web site, and uploads from remote Linux servers to central server, and into local intranet web server so that remote engineers' daily software output, test results, diagrams, firmware builds and their own local Intranet is replicated overnight into UK's servers for instant access.

I set up company email backup server that kept bcc copies of all incoming and outgoing email. I installed and set up Courier Mail Server on Ubuntu, installed Roundcube webmail client, and set up regex expressions in the .mailfilter file to filter incoming mail into respective user directories and set up spam filters. Later the machine was upgraded to bigger SSD using dd command and gparted disk tool to replicate the entire system to bigger disk without re-install.

I keep in training daily by reviewing important developments in the field of electronic components, electronic component supply markets, IoT devices, CPUs, memory chips and circuit design. Through that I have an in depth understanding China electronics market directions, new development in electronics, 3D printing, PCB design, production, sourcing, and using computers for higher level applications using programming languages such as C/C++, SQL, Python, PHP and regular use of Apache, bash scripting, Linux, GIT, Arduino, Bluethooth modules, WiFi modules, Micropython modules, I work well in environments where there are every day IT tasks that need attention, where software and firmware progress needs daily summary, documentation and controls, and where electronics production needs attention in an era of startups, crowd funded production, rapid scaling, Internet based Linux Fintech environments, IoT device environments, server optimization, and so on where as a senior engineer I bring all round varied experience to the stake holders to bring production into existence and/or bring costs under control.

Example of participation in open source project – the EOMA68 which has successfully received crowd funding:

The Allwinner Linaro ARM distro I produced for that project is distributed by Cubieboard makers because it uses the same CPU:

<http://dl.cubieboard.org/software/a20-cubieboard/ubuntu/cubie_eoma_ubuntu_13_04_3d.bin.xz>

I cross compiled the Linux to ARM SoC adding in numerous drivers and eliminating drivers that did not work. Debugged with Uboot until SATA capability worked. Also added 3D graphics, Gambas, KiCAD, LibreOffice, vsftpd, apache, MySQL, sqlite, PHP, numerous window managers, and other packages to the distro to make it self contained PC like experience when using it.

I am proficient in 3D printing (I own 4 FDM printers), FreeCAD, OpenSCAD, Wings3D, QCAD for generating models and 3D components for PCB 3D viewing. I also own an 80W laser cutter for making acrylic / plywood / MDF parts, boxes and hobby gadgets.

I build an online “Internet of Seeing Things” product that allows IP webcams to upload 1 picture a second. The system can then be used to find any images captured over the past 14 days for up to 20 cameras with a few clicks.

It uses Ubuntu Linux server, Apache + PHP with user management to control access the web site and select images to view, VSFTPD to upload images, MySQL and two Python daemons to process images. This is available for demo at interview.

I built an online barcode inventory management system that carries thumb photos uploaded of the product and high resolution images with search functions, inventory management functions and user management.

It uses Ubuntu Linux server, Apache + PHP for online access, and MySQL database.

This is available for demo at interview.

**Older Employment:**

August 2002 to June 2004: Working with China based companies TVRetail + Access Asia putting into production hand held personal care electronic products such as muscle massage devices that used PIC microprocessor, electric combs and various toy gadgets that used IC dice bonded to PCB based controllers.

September 1999 to December 2000: PRNewswire developer (VB6 / Delphi / SQL Server, Apache, Java. I repaired PRNewswire quotation system written in VB and SQL server from 7 hours to 30 minutes allowing many more orders to be taken per day by optimizing SQL.)

April 1999 to July 1999: Cone Software – software contract (VB6 / Access developer)

NTDC - 8 months (developer / engineer - VB5, web design, PIC electronics controller board)

Advent Communications Ltd - 7 month contract (VB5 programmer for ship navigation sub system)

Domino Ltd - 5 month contract (VB5 programmer for converting graphics to printer pixel commands)

PSE Ltd - 5 month contract working in Home Office buildings on building their first digital passport handling system (used Win NT, Delphi, C++ 4.2, HTML - designer, writing developer documentation - rapid prototyping work with Oracle database for the document imaging and document work flow system with document security)

ISM Ltd - 3 month contract (Win 95, VB4 Developer - access database based self contained VB class with many properties and methods for EDI stock ordering system)

Qubit Ltd - 4 month contract (Windows NT 32 bit Visual C++ V2.2 - debugging & extending functionality of a navigation and data logging system for ships)

Glaxo plc - 4 month contract to write software to manage their 2000+ printer queues (Windows NT 32 bit Visual C++ V2.1, C++ V1.5 and Visual Basic software development work writing a collection of software utilities which involved socket programming and handling TCP/IP packets)

Signal Computing Ltd - 4 month contract (Windows NT 32 bit Visual C++ V2 software development work writing multi-serial port I/O DLL drivers using RS485 multi-drop packet signaling for 5000 user security door lock system)

Hallmark Cards Ltd - 7 week contract (Visual Basic 3.0 / MS Visual C++ / & SQL software development work building order processing system)

Connectivity Plus Limited - 3 months contract (Visual Basic 3.0 software development work linking Oracle & MS-Access databases and viewing information)

Harlow Butler - 6.5 years (Field Engineer - 2 years, Workshop Supervisor - 2.5 years, Telecom Development - 2 years)

Computer Recognition Systems – 4 Months (Image recognition developer and hardware repairs – using the WISARD image recognition system). Image recognition and their algorithms was hobby and my university thesis subject and I continue to work with it as hobby.

**Skill Levels (out of 10)**

Embedded C 9, C++ 5, Python 7, PHP 7, HTML/CSS 7, Linux 8, Linux Admin 7, IPTables 7, DNS Server 7, DHCP server 7, HAProxy 7, Nginx 5, Load balancing 6, High availability servers 6, Gambas 9, MySQL 8, SQLite 8, SQL Server 5, OpenSCAD 8, KiCAD 9, Altium 9, FreeCAD 5, Linaro ARM porting 8, Cortex M0/1/2/3/4 8, RS232/I2C/SPI 8, Linux kernel cross compiling (ARM) and debugging Linux drivers 7, Setting up Apache/HTTPS on Linux 7, Setting up FTP server on Linux 7, setting up mail server on Linux 7, socket programming 5, Uboot 8, ARM CPU electronics design 8, PIC CPU electronics design 8, High Voltage AC (HVAC) electronics design 9, Arduino 9, STDuino 9.5, BLE 7 (SiLabs), SIM800 7, Victron MPPT 9, LiPO4 battery management 8, TFT displays and graphics menu development work 9.