Henry Macnair-Smith B.Sc(Hons), M.Sc

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Key Skills: Embedded C,C++ programming and C# desktop programming, electronics design, build and test.

- Several major projects completed from start to production using Windows™ PC, .NET, C#.
- Major project completed to production using 32-bit i.MX6 processor with MQX RTOS. [C]
- Major project completed to production using Power-PC with Nucleus-Plus RTOS [C++].
- All the above include Ethernet TCP/UDP/IP networking, interrupt handling for serial RS232, high-speed data capture, image processing, and many other elements.
- Many mini-projects doing complete design, schematic, PCB and C-code using 8-bit microcontrollers.
- Design and implementation of circuits including both Lattice and Altera CPLDs; VHDL code.
- Detailed electronic design, including digital interfacing, analogue buffering, analogue filtering; considerable hardware-firmware-software diagnostics and trouble-shooting.

Recent Experience

Current – Software Engineer (From July 2018).
Development and support of the bespoke machine controller used in every product.
AVX Electronics – Systems Engineer (January 2017 to July 2018).
Work for the operations department within TT/AVX Electronics, (TT Electronics in Harston was acquired by AVX at the end of 2017), was focused on the design, build and commissioning of 'end-of-line' production equipment for the automotive industry. Typically an engine camshaft sensor would require initial programming, then the output response would be measured using high-speed signal capture, the asic would then be programmed to optimize the response and security locked/fused, finally the sensor would be tested against a range of requirements. Electrically the demands were stringent as the measurements of the sensor parameters involves voltages controlled to within 10mV, which means that the equipment was controlling and measuring signal within 1mV; i.e. four-wire supply and sense wiring was standard throughout.
Mechanically, aside from being safe and easy to use, destined for locations in China and Mexico, the placement of the sensor had to be repeatedly better than 10um to ensure that the machine capability, the standard deviation of measured output, of the machine was better than one thirtieth of the sensor tolerance.
Aside from the application itself written in C#, I was also responsible for custom microcontroller hardware used to interface the feedback encoder to the high speed data acquisition solution.
I have been the principle technical support for production sites in Mexico, China, and India.
Rivertrace – Development Engineer (June 2014 to December 2016).
Lead engineer for the 'overboard discharge monitoring equipment' (ODME) (primary product).
Initially I was bought into Rivertrace to resolve long-standing issues with the ODME produce; fortunately, not only was it possible to resolve prior issues, but it was possible to successfully achieve target of bio-fuel certification prior to January 2016. (Certificate available).
In addition, aside from general technical support, there was development of a PLC based monitoring system which introduced novel global monitoring with daily status from on-board the marine vessel.
Plus, I was the lead engineer for the recently introduced 'Smart-PFM' Windows™ based image processing solution; technically, not only was the application using advanced image processing applied through the EMGU-CV libraries, but associated to the image capture I designed and commissioned hardware which controlled the current and duration of the 'lamp-strobe-pulse' to 200nanoseconds, using a combination of microcontroller and CPLD-VHDL technology; this product achieved US Coast Guard approval.

Skills/work summary:

- Proficient at C/(C++)/C# embedded programming, including the following processors:
    1. Production line test equipment in C# running on PC; network communications, fast ADC.
    2. C# image processing application on PC; US-Coast Guard approved.
    3. Freescale ColdFire (i.MX51) 'Code-Warrior' and iSystems tool-chain.
    4. Freescale PowerPC823 (PowerQUICC architecture) using EST & Diab compiler tools.
    5. Microchip PIC 16x and 18x series; using 'C' & assembler (Microchip MPLAB).
    6. ADuC842 (C51).
    7. Atmel AVR series using IAR-EW (& Atmel Studio).
- Strong electronics background:
    1. Schematic design and PCB layout skills; Proteus/ Ultiboard.
    2. Comprehensive debug using hardware tools (oscilloscope, logic analyzers, emulators).
    3. VHDL programming of CPLD using Altera Quartus II or Lattice Diamond.
    4. Analogue signal conditioning and analogue to digital conversion.
- Detailed application support including implementation of the following peripherals:
    1. Interfacing to internal and external non-volatile memory, data & address bus interfacing.
    2. Analogue to digital converters (ADC) usage.
    3. Serial communications (RS232, RS485) and Controller Area Network (CAN bus)
    4. Serial peripheral interface (SPI) and Inter integrated circuit communications (I^2C).
    5. Core and Memory management, Power Modes, and Oscillator configurations.
    6. Universal Serial Bus (USB) enumeration in 'host' and 'device' mode.
    7. Fast Ethernet controller (FEC) including protocol stack (TCP/IP).

Company	From	Activities
TT/AVX Electronics	January'17	Production manager of 20 years has left company, group decision to move operations to Germany.
Rivertrace	June'14	[Marine, Oil & Gas] Contract role; project completion including certification from US Navy.
Eschmann	April'13	[Medical] Contract role; corporate take-over by Steris closed on-going operations.
MBL	July'11	[Laser-Marking] Self-employed
CSR	Aug'10	[Bluetooth] Left to start new business at MBL
Electrox	Aug '06	[Laser-Marking] Development stopped by 600-Group; business later sold to 'Tykma'.
Watkiss	Feb '96	[Paper Handling] Completed milestone GUI project; left for opportunity at Electrox

Education

- MSc. Manufacturing Technology, Cranfield Institute of Technology. Project: Voice control.
- B.Sc. (Hons) Mechanical Engineering, Southampton University. Project: Application of sensors.
- A Levels: Mathematics (A), Further Mathematics (C), Physical Science (C)

Quote, from my job appraisal at Electrox, under '<u>Quality of Work</u>':
"Top, it is difficult to see how it might be bettered."