Julian P.A. Bonsall  MIET

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| Age | 56  D.O.B.  26/01/63 |
| Marital Status | Married |

**Education**   Secondary school education at St. Theodores High School Burnley

Examinations passed        'O' Levels    8        'A' Levels    4

**Qualifications**          Qualifications obtained at

- Huddersfield University

- Huddersfield Technical College

- A Higher National Diploma In Electrical & Electronic Engineering, with a distinction in Industrial Computer Applications.

- An Industry Training Board E.P.1 Certificate

Prince 2 Project Management Qualified, provided by Datrix Training Ltd.

Other training courses

ASIC design course at MEDL IC design centre, Wembley

CE Marking Association RED certification course.

CE Marking Association DFMEA and PFMEA design course.

IPC 610-A Certified.

Core skills. Strong embedded systems development experience, both in hardware and firmware.

## Current Employment 23-04-2018 to present

Employed at Arc Elevators Ltd. Arc are a lift manufacturer, installer and service based business. I have been upgrading an existing auto dialler product, to operate as a 4 way system, and to improve the GSM connectivity of the product, from 2G to 4G + LTE. The unit is based on a DS PIC 33EP512MU810 in the main unit, and a DS PIC 33EP512MC204 in the other audio nodes on the system. The system transmits compressed  GSM quality audio ( 8KHz, 16 bit ) through a two wire bus, which also provides power from the main unit to the other audio nodes. I have used the PIC XC16 compiler to develop the firmware, which is C code. MPLAB X is the IDE used, with the ICD 4 as the programming and debug tool.

As part of a product upgrade to the unit, I also developed a universal SMPS operating from 110Vac to 250VAC to power the unit, based on the STCH03TR, an ST SMPS PWM controller. This was designed online using STs eDesignSuite.

I have also designed a 400W 24V DC to 200V DC power converter, the purpose of which is to act as a brake release system for the main shaft of  the machine that operates the lift winding mechanism. This was designed with LTSpice XVII, and the design uses LTC3788 dual boost switching ICs to generate the required voltage shift. The power converter is controlled and monitored by a DS PIC 33EP512MC204.

I also build and test the current auto dialler product, the software of which I have upgraded to improve performance, and to upgrade to a Quectel 4G GSM module, the EC21.

As well as carrying out the design roles, I also source and purchase all components for the electronics build of the units, and oversee the sub-contact manufacture of the electronics.

## Previous Employment 03-04-2017 – 20-04-2018


Employed at Rowe Hankins Ltd of Bury. The company develops product for use in the Rail and power switching industries. I have used Altium Circuit Studio to develop a dual trip AC earth leakage unit for train heating systems fault detection using a current transformer as the detector. The circuit was designed initially with LTSpice, and simulations of this proved the design concept. I have also designed a dual hall effect speed sensor to be used in traction and braking system on rail vehicles. Both of these devices are designed to comply with BS EN 50155-2017. I have also carried out a feasibility study for the use of Texas Instrument SimpleLink devices CC3320 WiFi and CC2650 2.4GHZ RF devices to work as a four channel full quadrature wireless speed sensor using The concept design was shelved due to the potential customer not placing an order for development. I have also designed and successfully tested a GNSS receiver, based on a uBlox LEA-6N device.

**Previous Employment 03.01.2017 to 06.02.2017**

Employed at MSP Technologies Ltd as an electronics, firmware and software engineer. The company is a start up business, which is attempting to develop containerised hybrid power systems, and voltage sag control systems. In the brief period in this company I debugged and corrected embedded firmware running on a STM32F415RG Arm 4 core micro controller using Atollic TrueStudio, and developed a Visual Studio 2015 C# Winforms application to control a Crestchic dynamic load controller unit.

**Previous Employment 05.01.2015 to 31.12.2016**

Employed at Unipart-Dorman Ltd in Southport, as an electronics and software engineer. The company designs and manufactures road and rail lighting systems, and has provided around 95% of all rail signal LED modules installed on the Network Rail system. I have upgraded existing designs of signal to improve noise immunity, and was successful in completing the EMC testing process for this upgrade. I am currently developing a signal for the North American market. I visited Canadian Pacific headquarters in Calgary in Aprill 2016 to give a demonstration of a prototype which has lead to an order for a trial system to be installed in September 2016. The design uses modern custom LED controller ICs, combined with power management electronics to allow it to pass stringent signal controlling interface systems testing. This analogue system was designed and simulated using LT Spice IV. I have also developed a prototype vehicle management controller using a PIC24 controller, which interfaced to Bluetooth, WiFi, USB, radar and an MPPT solar power battery charging circuit. I developed the software for this SBC using Microchip XC16 embedded C compiler, and also modified a PC windows application to interface to the hardware, using Visual Studio 2013, programmed in C#. I am currently investigating the use of FPGA devices for use as the control device for stencil and theatre type LED signs for use on rail platforms.

I also provide some project management function, in providing departmental and individual project management documents, using Google docs and Microsoft Project 2013. I also guide and mentor junior engineers in the department.

**Previous Employment 09.12.13 to 02.12.2014**

Employed at Forsberg Services Ltd as the Technical Manager. I was responsible for a team of four software engineers, and two hardware engineers, developing products relating to GPS and GNSS positioning systems. The company develops a wide range of bespoke products for use in navigation systems used by both commercial and military customers.

As well as task assignment, I also develop PCB designs using Altium 10, develop embedded software using the Keil 5.01 IDE, the target of which is an ARM Core NXP1788, and develop PSU SMPS electronics using LT Spice IV, and LTPower CAD II.

I also have input into project planning and costing using Prince2 project management methodology, and assisting the sales department with technical proposals.I have an increasing customer facing role, to ensure project progress is communicated accurately to customer stakeholders.

## Previous Employment 05.10.09 to 06.12.13

Employed at Prestige Medical Ltd, as an electrical, electronics and software engineer. The company designs and manufactures sterilising equipment for use in the medical sector, and I have sole responsibility for electrical, electronic, firmware and software design areas for the entire product range. I am also responsible for design, approval, documentation and testing of the products, to BS EN60601-1, BS EN 61000, and BS EN 62304:2006, which are the required standards to medical equipment. The company was audited in February of 2012 by BSI, and passed the required standards.

I am responsible for generating project plans for electronics and software development, using Microsoft Project.

PCB and schematic hardware is designed using Altium Protel, firmware is generated using AVR Studio, Eclipse IDE, and Rowley Crossworks to generate both C and C++ embedded code, and C# software is generated using Microsoft Visual 2008. Target microcontrollers are ATMega328p, Atmel ARM Core AT91RM9200, and Cortex M3 core NXP LPC1788. I also develop product specific test rigs for automated PCB testing, developed using C#, a Labjack U3-LV, and custom designed interfacing board.

Other responsibilities include monitoring and altering the production test rig software which tests each individual product manufactured, and quality input to the manufacturing process. I also interface with electronics sub contractors to provide design data and support for their manufacturing processes. I am regularly called upon to step in for service engineers when dealing with unusual service/repair issues.

**Previous Employment 08.06.09 to 21.09.09**

Employed at Texecom Ltd, developing embedded products for use as intruder detection systems. Microcontrollers used were MEPS430F2272 as a radio interface controller between wireless PIR detectors and control panel, and PIC18F65J11 for standard wired control panels. Texas Instrument's CCE IDE and Microchip MPLAB were used as development environments. The wireless system used CC1101 RF transceivers and ran a bidirectional mesh protocol. I also organised sub contract PCB development work, and reviewed sub contract firmware development work.

**Previous Employment ( 06.10.08 to 29.05.09 )**

Employed at Protec Fire detection PLC, developing embedded systems for use in fire detection control panels. Hardware is based on the H8SX/1644 MCU, and I use CadStar version 8 is used for schematic and PCB development. I am using the Renesas HEW toolchain for firmware development for which I have sole responsibility. I have also developed firmware for Arm 9 core processors, using the IAR tool suite. I have embedded a National Semiconductor LMX9838 bluetooth interface, in order to connect to a hand held bluetooth printer, and worked on the companies next generation fire detection panels.

**Previous Employment ( 29.10.07 to 01.9.08 )**

Employed at Oxley Developments Ltd, developing hardware, software and firmware solutions for microcontroller based electronics to control elapsed time indicators used on the Eurofighter aircraft. I also developed LED based aircraft external lighting systems for the HERTI project. The micro's used are PIC 16F628, 16F688 and 18F1320 devices. The embedded C compilers used are Hi-Tech PICC, and PIC18. Hardware development is carried out with the Altium Designer suite. PC based software is developed using Visual C#. All the companies micro based products are safety critical, and have to pass stringent approvals. All embedded code is developed to MISRA standards.

**Previous Employment ( 23.10.06 to 26.10.07 )**

Employed at Pactrol Controls Ltd, developing hardware, software and firmware solutions for microcontroller based electronics to control gas and oil fired boilers. The micro's used are PIC 16F628, 16F688 and 18F4520 devices. The embedded C compilers used are Hi-Tech PICC,and PIC18. Hardware development is carried out with the Allegro design entry suite. PC based software is developed using VB and Visual C++. All the companies micro based products are safety critical, and have to pass stringent approvals. All embedded code is developed to MISRA standards, and checked with the Programming Research ProQA tool.

## Previous Employment ( 03.05.05 to 19.10.06 )

Employed by Money Controls Ltd, as a Production Software Engineer. This role involves developing production related software, such as PCB test and final unit test and configuration software. I have worked on software using FTP to upload configuration information to the Money Controls web site. This is developed in Visual Basic ( V6, SP5). I have also modified PIC 12 assembler for a hopper product, to improve payout security.

## Previous Employment ( 24.01.00 to 03.05.05 )

Working for BSB Electronics Ltd, Great Harwood, Lancashire. This firm designs and manufactures access control equipment. I develop firmware for PIC series of microcontrollers, using the PICC C compiler by Hi-Tech Software. I have specified and developed serial communication protocols to allow direct PC to controller communications, to remove an outdated and expensive bus master. As part of this, I developed an Active X control, with Visual Basic ( V6, SP5 ) to abstract the communications layer from the PC database software. I have also spent one year developing the companies software, introducing multi user access and login over TCP/IP. I have added TCP/IP, UDP/IP, PSTN and GPRS interfaces to the equipment range, designing in switch mode power supplies. I have also developed an RFID card reader, and a magnetic stripe card reader. The hardware design tool I used was Altium Protel 2004, (SP 2). With this I produced schematic and PCB designs. I also carried out EMC testing on the products developed, and also developed VB applications to allow production to test and configure the manufactured controllers.

**Previous Employment ( 17.08.98 – 07.01.00 )**

Working for Baxall Ltd of Stockport, developing realtime embedded C for an H8 microcontroller, using the IAR C compiler. The device was used to control a video telephone board to transmit H261 standard video images over a basic rate interface ISDN telephony link. The MMT video board is programmed over a standard RS232 interface, and support the Hayes AT command set. I also developed a CCTV video multiplexer, as part of a team, which had a 16 to 4 video switching capability. A multitasking operating system was used to manage the H8 application code, and I ported the uC/OS realtime operating system to the H8 for this purpose. I also used the Hitachi Workbench, and CIDE V1.87 emulator for debugging.

**Previous Contract ( 14.02.98 – 12.09.98 )**

Working for GEC Alsthom, Preston, developing and testing embedded software on an Intel 80C96 controller, used in braking systems for London Underground trains. The work involves use of the Sun Sparc workstation, is in a Unix environment, and uses the C96 compiler. Cantata is the test tool used, and is configured to allow only 100% code coverage and branch coverage, for test acceptance.

**Previous Contract ( 08.11.97 – 13.02.98 )**

Working for Westinghouse Brakes Ltd, Chippenham, Wiltshire, developing realtime embedded software for train braking systems.

The target processor is the Siemens 80C167, and the Keil C166 C compiler, Keil Datascope, and Hitex emulator are the main development tools. I used the LDRA Testbed tool for both static and dynamic performance analysis. All these tools are PC based. The target software is being developed for a brake control unit, and wheelslide/wheelsip protection unit which will be fit to the Heathrow and Gatwick to London express routes, and Eurostar Channel tunnel trains.

**Previous Contract ( 02.06.97 – 01.08.97 )**

Working for Oxley Developments in Flukeburgh, Cumbria, developing hardware and software for an LED based display system for use in agricultural markets. This design was based on the PIC16C48 microcontroller, and the MetraByte C compiler and emulator were used as the development tools. I also did an amount of work on the Echelon LAN development system ( NodeBuilder ), with its associated C compiler, for use on a military vehicle diagnostics system. All tools were PC based.

## Previous Contract ( 17.03.97 – 17.05.97 )

Working for Telecom Sciences Corporation Ltd, of Airdrie ( formerly Philips Business Communications Ltd ) developing comms software for use in switches, using the Microtec Research C compiler, and SDL compiler language. Specifically, I was incorporating a proprietary protocol, within the standard ISDN protocol, to allow Windows based screenphone digital extensions to appear as standard ISDN extensions. This involved the use of the BTNR 191 volume 3 standard to implement the embedding of one protocol within the other. The target processor was the 68302. An applied Microsystems Corporation emulator, and a Trend Datalink Tekelec ISDN protocol analyser were used to generate test scripts to verify the correct operation of this software.

## Previous Employment ( 06.08.96 – 20.01.97 )

Working for Amber Logic of Shipley, West Yorkshire, developing device drivers for Crystal CS8900 Ethernet interface i.c. Also interfacing this device driver to comms software, specifically Routerware. This is a suite of protocol stacks ( comprising TCP/IP, IPX routing, SNMP, UDP, IP routing, SPX) and was being used to develop an ISDN WAN to Ethernet LAN/router/gateway product. The target processor was an AMD SC300 Elan, to implement a stand alone real time system. The software tools used to do this work were Visual C++ V2.0, and the Watcom 32bit c++ compiler.

## Previous Employment ( 04.12.95 – 01.07.96 )

Working for ACS Data Ltd, of Salford, as s systems design programmer. This company design and develop hand held computing equipment, based on the F8680 micro. This delivers an 80x86 and DOS compatible platform. I have interfaced the hand held computer to a 418MHz radio data transceivers, and was working on the next generation of machine, by upgrading and modifying the operating system to

incorporate an NEC 78054 slave microprocessor to improve overall system performance.

**Previous Contract ( 16.01.95 – 04.12.95 )**

Working for Orbitel Mobile Communications Ltd, of Basingstoke, developing master to slave communications firmware within a CT2 base station mater controller. The target processor was a Motorola 68331, and the Microtec C compiler was used as the development tool, being run on DEC VAX workstations. PC's were also used for Yourdon CASE tool designs and documentation. I also integrated firmware from a team of 14 other engineers, using an Applied Microsystems Corporation XICE debugger/emulations system for the master part, and an Ashling CT68HC11 emulator for the slave part.

**Previous Contract ( 06.12.93 – 03.12.94 )**

Workig for Thorn Security Ltd, Sunbury on Thames, developing an embedded C firmware solution for a Siemens SAB80C535 ( and 8051 derivative ) microcontroller. Software design was implemented using a Select CASE tool, and the DeMarco design method. The keil C compiler and Ashling assembler were the primary coding tools, and the Ashling CTS51 emulator was the main debugging tool. I was also involved in the hardware design, and testing for EMC compatibility. The final product is a building energy management system, which will integrate with contral control systems, via PSTN communications.

Previous Contract

One months work, commencing September 1993, progressing an 8051 based embedded system, using Ashling CTS51 emulation, and embedded C. This work was done for Tunstall Electronics Ltd, based in West Yorkshire. This involved utilising

and existing kernel, and an existing software design, previously developed by Tunstall Electronics.

Previous Contract

Three months experience in development of a stock control system for Smallshaw Precision Plastics using FoxPro 2.5 for Windows 3.1 and Novell Netware 3.11. This is a four workstation system, and fully utilises the multi-user facilities built into the RDBMS.

Previous Employment

Employed at Colebrand Ltd, as an Electronics and Software Engineer. This project I worked on involved the development of active membrane technology, for use in safely containing toxic waste materials. The project was carried out in conjunction with Imperial College, London, which provided scientific evaluation of the proposed design. This project required software development work, which was carried out on Pc's using C++. There was also a requirement for interface control systems to the PC.

Previous Employment

In March 1991, I was appointed Principal Design Engineer at KJ Bentley and Partners, Oldham. This firm designed and manufactured microprocessor based equipment for the security industry. My duties included

Design of single chip micro systems, based on the Intel 8051 family, involving both hardware and firmware solutions, using Ashling CTS51 emulation, and embedded C.

Development of PC based software, to act as a management for the embedded systems outlined above. The two systems communicated using PSTN.

Previous Employment ( 01.01.89- 01.03.91 )

Working for Cobble, Blackburn, developing precision hydraulic positioning system, using state of the art digital closed loop servo controllers. This particular project required a visit to the USA to learn the specific language of the control system, ACCEL. I also developed an interface to an image scanning system to allow carpet designers to generate CAD images of a design, and then feed this image into the machine control software., to enable 2D patterns to be generated automatically. The software used for this was MASM 5.1, extensively using BIOS and ODS calls, and my own assembly language routines. In January of 1991, I spent two weeks commissioning this software.

## Previous Employment ( 01.01.88 – 01.01.89 )

Working for GEC Transportation Projects Ltd, Manchester. At GEC I was involved with the design of electrical systems for Dockland Light Rail vehicles. I also had a position on a British Railways Board/Railways Industries Association/London Underground Ltd Association committee, dealing with protocol and systems definition for a local area network for automatic rail vehicle motion control and diagnostics control.

## Previous Employment ( 02.04.84 – 01.01.88 )

Employed at Triscan Ltd, Blackburn. My initial work at Triscan was in the systems test department, but after a period of three months, was promoted to the development department. The first project I worked on was the hardware and firmware design of an access control system, which was realised using a Z80 based design.

Another project I worked on was the development of an onboard vehicle data collection device, which required the design of an Application Specific Integrated Circuit, and an unconventional infra-red fibre optic data transmission link.