David King

PERSONAL INFORMATION

MARITAL STATUS:	SINGLE
NATIONALITY:	BRITISH
DATE OF BIRTH:	1/12/68
PLACE OF BIRTH:	CUCKFIELD, WEST SUSSEX.

EDUCATION

Downlands Comprehensive School *Sep 1980 - July 1985*
Hassocks, West Sussex.

Haywards Heath Sixth Form College *Sep 1986 - July 1988*
Haywards Heath, West Sussex.

Birmingham University *Sep 1988 - Dec 1988*
Edgbaston, Birmingham, West Midlands.

SUMMARY OF QUALIFICATIONS

Downlands Comprehensive School

'O' LEVEL IN 8 SUBJECTS:

PHYSICS	GRADE A
TECHNOLOGY	GRADE A
MATHEMATICS	GRADE A
TECHNICAL DRAWING	GRADE A
ENGLISH LANGUAGE	GRADE A
ENGLISH LITERATURE	GRADE A
CHEMISTRY	GRADE B
GEOGRAPHY	GRADE B

'A/O' LEVEL IN 1 SUBJECT:

ENGLISH FOR PROFESSIONAL AND BUSINESS USE	GRADE B

Haywards Heath Sixth Form College

'A' LEVEL IN 3 SUBJECTS:

PHYSICS	GRADE B
TECHNOLOGY	GRADE C
MATHEMATICS	GRADE D

Birmingham University

PHYSICS DEGREE COMMENCED, FROM WHICH I REGRETTABLY HAD TO WITHDRAW DUE TO ILLNESS.

TECHNICAL SUMMARY

My programming experience comprises Programmable Logic Controller (PLC) coding, realtime embedded microprocessor / microcontroller programming, processor level coding, Web development, PC desktop application programming, xBase programming, COBOL programming, and I am familiar with configuration management tools and development environments, and have user interface and graphic design skills.

My language skills comprise IEC1131-3 function block diagrams, statement text and ladder logic, C / C++ / C#, Assembler, ASP.NET, Java / JavaScript, Perl, XML / XSLT, HTML / DHTML, CSS, VB / VBA / Basic, Forth, PLM, dBase / Clipper, and COBOL.

PLC

TRICONEX IEC1131-3 FUNCTION BLOCK DIAGRAMS, STATEMENT TEXT AND LADDER LOGIC

GE LOGICMASTER AND ABB AUGUST TRIGUARD LADDER LOGIC

Realtime embedded

MICROSOFT VISUAL C++ 7.0 FOR X86

C++ compiler for embedded x86.

BORLAND C++ 4.5 WITH PARADIGM EMBEDDED X86 LIBRARIES

C++ compiler for embedded x86.

ALTERA NIOS C COMPILER AND ASSEMBLER

C compiler and assembler for Soft Core CPU.

DIAB C++ 4.1A / OSE RTOS FOR 68K

C++ compiler and RTOS for embedded 68K.

ADSP-2100 FAMILY C COMPILER (G21) AND ASSEMBLER

Development toolset for ADSP21xx DSP.

KEIL ELECTRONIK C51 / PLM51 / A51 / RTX-51 RTOS

C and PLM compiler and assembler and RTOS for 805x microcontroller.

COMSOL POLYFORTH / CHIPFORTH

FORTH-83 implementations for embedded x86 / 8051/32 microcontrollers.

Processor

X86 68K NIOS 805X/32 AT90SX 6502 Z80
ADSP21XX TMS320C2X

Web

C# / ASP.NET JAVA / JAVASCRIPT PERL XML / XSLT
HTML / DHTML CSS

Produced company website, expanded intranet to document industrial battery analysis instrument.

Desktop

MICROSOFT DEVELOPER STUDIO 5.0
MICROSOFT VISUAL C++ 7.0 (32-BIT) / 1.52 (16-BIT)
BORLAND C++ BUILDER (32 / 16-BIT)
Targetting Win32 / 16 and MS-DOS with MFC / C++, and MS-DOS with C.

MICROSOFT VISUAL BASIC 6.0 (32-BIT) / 3.0 (16-BIT)
MICROSOFT VISUAL BASIC FOR APPLICATIONS (VBA)

Developed interactive demonstration of PCS desktop interface.

MICROSOFT QBASIC / GW-BASIC

Basic implementations for MS-DOS.

COMSOL POLYFORTH

FORTH-83 implementation for MS-DOS / x86 microprocessor.

xBase

BORLAND DBASE IV VERSION 2.0 AND CLIPPER 5.0

COBOL

MICRO FOCUS LPI ACUCOBOL FUJITSU DESKWARE COBOL 6.50

Configuration Management / Environments

MICROSOFT VISUAL SOURCESAFE / CONTINUUS CM / MKS RCS / PVCS

CODEWRIGHT 6.0

EMPLOYMENT HISTORY

Invensys Triconex *Contract* — *June 2004 – date*
Crawley, West Sussex. — *May 2002 - May 2004*
SOFTWARE ENGINEER — *Oct 2001 - March 2002*

Bio-Rad Microscience *Contract* — *Feb 2002 - May 2002*
Hemel Hempstead, Hertfordshire.
FIRMWARE ENGINEER

Solartron Analytical *Contract* — *Jan 2001 - Sep 2001*
Farnborough, Hampshire.
DSP ENGINEER

Philips Semiconductors *Contract* — *July 2000 - Jan 2001*
Southampton, Hampshire.
SOFTWARE ENGINEER

ABB August *Permanent* — *July 1991 - April 2000*
Crawley, West Sussex.
SOFTWARE ENGINEER

Silvertech *Permanent* — *June 1989 - July 1991*
Horsham, West Sussex.
DESIGN ENGINEER

Invensys Triconex

My contract work with Invensys Triconex has most recently been Turbomachinery control projects for steam and gas turbines and motor drives, for compressors, pumps and generators. Control comprises speed and steam inlet and extraction pressure, compressor antisurge, and generator Automatic Voltage Regulation (AVR). Prior to this, I worked on Fire & Gas and Emergency Shutdown projects.

Control software is programmed using IEC1131-3 Function Block Diagrams, running on the *Tricon* and *Trident* triplicated fault-tolerant control systems.

Applications comprise power generation, boiler feedwater turbopumps, process gas compression, steam header pressure regulation, process recovery, pipeline pressurization, and LNG liquefaction.

I have also undertaken development of project autobuild, custom sequence of event recording, time synchronization, data capture and analysis, protocol conversion, and HMI development, in C++ and VBA.

Bio-Rad Microscience

My Bio-Rad Microscience contract was to design, code and document embedded C++ firmware for a project codenamed *Eagle Eye*.

The project is the development of a reduced cost laser scanning microscope, alternating settings and mechanisms including motorised emission filters within 30ms between a single laser source and photomultiplier tube.

The project included design of an object request broker, permitting arbitrary location of setting controls on any CANbus node within the microscope, and access to controls from any node. Also, a settings manager, which stores and alternately applies settings at 10Hz to distributed nodes.

For production, the firmware is being ported from an x86-platform to the NIOS configurable Soft Core CPU. Lastly, I ported the microscope scan generator from an x86 / ADSP2181 DSP platform to NIOS.

Solartron Analytical

My Solartron Analytical contract was primarily to write the DSP assembler firmware for an ADSP2181-based multichannel voltage acquisition card, being part of an industrial battery analysis instrument. The firmware performs asynchronous acquisition on dual voltage channels, performing continuous autoranging and on demand self test, including zero offset and calibration.

However, I also wrote DSP assembler for the ADSP2181-based main board and temperature acquisition and control board, and C++ on an OSE RTOS platform for the 68K-based marshalling board.

External to the instrument, I carried out development in Visual C++ on an ActiveX custom control, running on the PC, including a double buffered parser for the instrument data and command stream. I also enhanced the Visual Basic user application and development utilities, running on the PC.

Lastly, I performed some development in C++ on a VXD device driver for an embedded PC-based metal analysis instrument. A metal sample was ionised with an electric arc in argon, analysing the resulting spectrum with a CCD.

Philips Semiconductors

My contract with Philips Semiconductors was a realtime embedded role, providing software support for an IC codenamed *Lizard*, intended for use in Philips' next generation of consumer audio CD recorders. Lizard includes an 805x microcontroller (µC) core.

The contract included writing a Hardware Abstraction Layer (HAL), software automatic gain control, and validation programs, running on the 805x, plus an I^2C data transfer utility, and emulator scripts to assist testing, in C and Basic.

ABB August

ABB August (formerly August Systems) designed and assembled Fire & Gas, Emergency Shutdown, Process Control and Safety Systems, mainly for the Petrochemical Industry. ABB August developed their own Process Control System (PCS) and field interface equipment.

The ABB August PCS is one of only a few similar systems in existence, another being the Triconex system, in which all major components are triplicated. The concept of triplicated redundant components is applied to both hardware and software, and permits a single fault to be tolerated without disruption of operation. The remaining modules sustain operation until the faulty module is replaced.

In addition to providing a backup for faulty components, redundancy facilitates voting of system inputs, outputs and intermediate results. A fault is revealed by absence of a unanimous vote. In comparison, PLCs employed in a dual-redundant configuration cannot majority vote.

The system is known as the *SC300 Triple Modular Redundant (TMR) PCS*. The PCS is a development of the US Space Shuttle landing computers.

My work at ABB August was in two main areas:

My main accomplishment was to design and program the process interface module subsystem of an enhanced SC300 TMR PCS, known as the SC300E, coded in C. This comprised writing firmware running on three embedded microcontrollers on each field I/O module, which effectively implement the TMR PCS in miniature. I also wrote test firmware, and a supporting MS-DOS resource compiler. Lastly, I supervised contract programming staff working on the project.

Prior to that, I was responsible for the TRIDAS Display and Control System, which provided a graphical operator interface to the PCS. I also configured and provided support to engineers configuring TRIDAS applications, and programmed PCS TRIGUARD ladder logic required to interface to TRIDAS.

SC300E TMR PCS

My work on the SC300E TMR PCS comprised three projects, namely field I/O module firmware and test firmware, and a supporting resource compiler:

FIRMWARE

SC300E I/O modules comprise three independent channels, each with its own 805x µC. µC firmware relieves SC300E TMR PCS control computers of routine I/O, by assuming the following functions:

µCs vote inputs, outputs and intermediate results to control their common execution path. Analogue I/O modules perform dynamic linear I/O value scaling and auto-calibration. I/O modules regularly perform latent fault detection, or the detection of faults that would otherwise be undetected due to hardware voting. Field I/O data is processed cyclically, and outputs are continuously monitored. I/O and non-I/O diagnostics are determined.

The firmware is a monolithic, configurable operating system and application combination, with features including own implementation LZSS decompression, inter-µC synchronization and voting, software I/O serialization, linear I/O interpolation, and continuous memory test, comprising ROM checksum and RAM address and data bus and cell test.

TEST FIRMWARE

The test firmware is used during development, for I/O module common interface daughterboard test. The test firmware permits non-verified and verified pattern and internal and external loopback tests to be continuously performed on µC ports, shared RAM, and hardware latches and registers.

RESOURCE COMPILER

The resource compiler is an MS-DOS utility that is required to build the firmware and test firmware. The resource compiler compresses the I/O module initial parameter table resource, using an own implementation LZSS algorithm, and fills unused code space with a repeated code sequence, to trap errant execution.

The resource compiler also places a checksum in a code location, for code test, and places firmware identification text at the end of the generated hex file, as loaded into µC on-chip PROM. The resource compiler includes an own design script file parser, and Intel format hex file parse and generate.

TRIDAS Display and Control System

TRIDAS runs on the PC desktop. A 4-port serial card with onboard 286 offloads PCS communication from the main processor. TRIDAS was written in C and assembler, under Borland C++ 2.0, later Microsoft Visual C++ 1.52.

TRIDAS was based on a third party product, developed by Custom Microelectronics (CME). Many features were added, both to accommodate the PCS, and enhance functionality.

Initially, these enhancements were implemented by CME. Later, ABB August purchased the TRIDAS source code, and most enhancements were implemented in-house.

I was responsible for communication with CME. I also designed and specified the CME and in-house implemented enhancements, and programmed and tested some of the enhancements. The main enhancements were as follows:

Multiple PCS support

Support for multiple SC300 PCS, whether connected directly, or nodes on a Local Area Network. Dual redundant TRIGUARD Peer-to-Peer Protocol communication links were typically used.

Zone Hierarchy

Grouping of field alarms and events in a hierarchy, and indication of any alarm or event in a hierarchal group. This particularly suited the hierarchal zoning of offshore petrochemical production facilities.

Per Point Configuration

Screen / printer text, colour and type configuration for each field condition, including normal, event and alarm, for each field point.

PCS Timestamp

Alarm and event logging, with a timestamp sent with data from the PCS.

I also developed a distribution TRIDAS disc set. This included a TRIDAS demonstration, TRIDAS application templates, a font editor, and font families suitable for field identifier labels.

Lastly, I configured TRIDAS applications for the following PCS systems, and provided support for TRIDAS applications for 10 other PCS systems, including systems for British Nuclear Fuels Limited; Pacific Gas and Electric Company, USA; Abu Dhabi National Oil Company, United Arab Emirates; and Instrumentation Limited, India.

MOBIL ST. FERGUS SAGE GAS PLANT

Dual-redundant TRIDAS systems, single PCS, later expanded to five PCS. User interface combining simulated hardwired matrix panel and conventional UI elements, for operator familiarity.

MOBIL CORYTON CRACKING COMPLEX

Two banks of triple-redundant TRIDAS systems, three PCS. Conventional UI, extensive use of hotlinks for navigating three level page hierarchy.

The projects included work on site at Mobil Oil Company Limited, St. Fergus, Grampian, Scotland, and Coryton, Essex; Instrumentation Limited, Kota, Rajasthan, India; and Yokogawa Electric Corporation, Mitaka, Tokyo, Japan.

Silvertech

Like Invensys Triconex and ABB August, Silvertech designed and assembled Fire & Gas (F&G), Emergency Shutdown (ESD) and Process Control Systems for the Petrochemical, Nuclear and Manufacturing Industries.

However, Silvertech mainly used commercially available GE-Fanuc and Allan-Bradley Programmable Logic Controller (PLC) equipment, and GP-Elliot field interface equipment. PLCs were typically employed in a dual-redundant configuration, in which a hot standby PLC would take over in case of failure of the running PLC.

Silvertech developed a range of microcontroller-based Fire and Gas modules, running chipFORTH.

Silvertech also adapted the GE ASCII / Basic interface module to run polyFORTH / chipFORTH implementations of the FORTH language. The Silvertech GE ASCII / FORTH module was used to interface with other systems.

Lastly, Silvertech programmed GE-Fanuc and Allan-Bradley ladder logic.

I worked on projects in each of these areas:

FIRE MODULE FIRMWARE

Written in chipFORTH and assembler, running on embedded 8032 microcontroller.

SILVERTECH FIRE INTERFACE MODULE

Field signal conditioning, alarm and fault monitoring, self-diagnostics, autotest.

FORTH MODULE APPLICATION SOFTWARE

Written in chipFORTH / polyFORTH, running on GE Series 5 and Series 6 ASCII / FORTH modules.

RADWASTE TREATMENT PLANT, UK ATOMIC ENERGY AUTHORITY, WINFRITH

Operator keypad command interface for waste reprocessing plant, VAX to PLC interface. Implemented Modbus protocol for interface.

SNÖRRE FIRE & GAS SYSTEM, SAGA PETROLEUM, NORWAY

Addressable field detector module to PLC interface.

SKIL CONTROLS AND ARCO PICKERILL F&G AND ESD SYSTEM OPERATOR INTERFACE

Programmable event logging system.

RF & MA F&G AND ESD SYSTEM

Configured operator interface terminal display and control system, including platform mimic design. Developed field signal identifier data compression system, to increase capacity, subsequently used on other systems.

SYSTEM APPLICATION SOFTWARE

Written in G E LogicMaster ladder logic, running on GE-Fanuc Series 5, Series 6 and Series 90 / 70 PLCs.

FAHAHIL GAS STRIPPING PLANT

Electrical load shedding incremental shutdown software, plant mimic driver software. Developed method of programming directly from client Cause & Effect diagrams.

SKIL CONTROLS AND ARCO PICKERILL F&G AND ESD SYSTEM, NORTH SEA PETROCHEMICALS DEHYDROGENATION UNIT, ANTWERP

Field interface module autotest, Distributed Control System interface, I/O fault processing. Developed realtime fault table compacting module, subsequently used on other systems.

RF & MA F&G AND ESD SYSTEM, MOSSEL BAY FA PLATFORM, SOEKOR MOSSGAS PROJECT, SOUTH AFRICA

Coded platform module F&G / ESD software. Developed automatic PLC programming and display and control system configuration from client I/O database.

The projects included work on site at GP-Elliot Limited, Merton, London; UK Atomic Energy Authority, Winfrith, Dorset; and Genwest Industries, Johannesburg, South Africa.

INTERESTS

SAILING, MOUNTAIN BIKING, MOTOR RACING, WATERCOLOUR PAINTING, CONSERVATION WORK WITH THE NATIONAL TRUST.