

## Tim Long

**Real-time firmware/software engineer, with particular experience of microcontrollers and device drivers for high-volume low cost consumer products**

### Contact Information

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### Skills Summary

Experienced (~15 years) real-time firmware/software engineer, with particular experience of embedded control firmware and device drivers for high volume consumer products, hardware/software interfacing and microcontrollers (8- and 4-bit); Strong skills in 'C' and assembler language, hardware/software integration and varying experience of other languages such as C, Visual C++, Visual Basic, HTML, scripting and others.

I am comfortable in the hardware lab and able to read and understand circuit schematics and undertake board bring-up and (to a certain extent) hardware debugging.

Through 2002 I have taken a career break and I have used the time to develop my skills in Information Technology, network administration, server applications and programming for the Windows platform. I administer an experimental network based on Microsoft's Small Business Server and have thereby gained experience of networking and administration of enterprise class server applications such as Exchange server, SQL server, ISA server. I am studying for a BA degree in Enterprise, an E-learning course in association with E-Colleges Wales and the University of Glamorgan.

I am motivated, enthusiastic about my work and always try to keep a positive mental attitude. I particularly enjoy small-scale projects where I can actively participate in the entire product life cycle from concept to manufacture. I have an ethic of pitching in wherever my help is needed, never a "that's not my job" attitude, and I enjoy the variety of different tasks.

### Highest Qualification

1981 - 1985

[University of Glamorgan, Wales UK](#)

[Bachelor of Science \(B.Sc.\) Degree in Computer Studies](#)

A broad-based course covering many aspects of computing, from digital hardware interfacing, through compiler writing and computer graphics.

## Professional experience

July 2001 - October 2001

InterTrust Technologies  
Santa Clara

### Senior Software Engineer

Digital rights management (DRM) software and firmware.

- Maintain and build DRM kernel for Nokia 9210 Communicator, using the Symbian SDK and Epoch OS. Tools run on Windows platform and generate code for both the actual target hardware (ARM processor) and an emulation running under Windows.
- Install and maintain Linux build servers (RedHat 7.1 Linux and GNU tool chain), port makefiles from Sun Solaris to Linux. Maintain and build DRM kernel software for various targets on the Linux platform.

Skills: Linux administration; GCC 3.0; GNU Make; CVS (version control)

February 2000 - April 2001

Cisco Systems, inc.  
San Jose

### Senior Software Engineer

Located in the San Jose HQ campus, working in the Wan Edge / Internet Services business unit.

- Developing device driver and interface code for the Catalyst 6000 (WAN Edge/campus) switch/router family
- Real time software running under Cisco's IOS (Internetwork Operating System).
- Code written in C, on MIPS 7000 target using GNU C compiler and Atria ClearCase configuration management tools.

Skills gained: GNU GCC; ClearCase; Cisco IOS; HDLC

October 1997 - February 2000

Nortel Networks, inc.  
Cwmcarn, Wales, UK  
and Santa Clara, California, USA

### Senior Software Engineer (Firmware)

Design, development, documentation & maintenance of embedded firmware for Meridian-1 digital business telephone sets.

- Developing new features for Meridian-1 telephone terminals
- Implementing cost improvements.
- Coordinating contractors on multi-developer projects.
- Problem investigation in lab and at customer sites in collaboration with engineers from Galway, Ottawa and Santa Clara.
- Design and development of a 'Personal Greeting Module' using a DSP-based speech encoder.
- Firmware development on new terminals in Santa Clara, California.
- Introduction of software version control and configuration management tools and procedures.
- Development support tools developed on PC/Windows platform using Visual

C++/Win32.

- Introduction of the use of CASE tools for software design.
- Pioneered the use of high-level language ('C') in the Cwmcarn technology group and proved its worth by delivering the product on-time, fully documented and with no defects.

Languages used: Assembler (Mitsubishi 8-bit), C, Visual C++/MFC/Win32 API

Skills: VxWorks/Tornado; TCP/IP protocols; AllChange; digital telephony

March 1996 - September 1997

Global Telecommunication  
Laboratories Ltd,  
Bristol, UK

#### Senior Software Engineer

Firmware design & development, primarily for consumer telephony products.

- Assembler development on 4-bit controller for Siemens Eurotel 325 telephone.
- Control software for an automated voice announcement system for Stafford Fire Service (based on digital answering machine technology). Software implemented in 'C'.
- Design and implementation of a reference application to accompany and demonstrate the Siemens Answering Machine (SAM) chipset. This project required high quality design, documentation and source code, which would accompany the reference hardware and would be distributed to Siemens' customers. The documentation included a user-interface specification, a functional description and design documents generated using a CASE tool and the Yourdon structured design methodology. The target processor was a Motorola 6809 microcontroller used with Hi-Tech C compiler.
- Provided support for the laboratory's automated test systems, using IEEE instrumentations bus (HP-IB) and controlled by Hewlet Packard PCs running HP-Basic.

Skills: C; Assembler; in-circuit emulator; telephony; version control software; Yourdon design methodology

June 1992 - March 1996

Ascom Telecommunications Ltd,  
Cardiff, Wales, UK

#### Software Engineer

Firmware development for consumer telephony products

- Software development for the 'Berkshire' range of telephones, using innovative power-saving techniques to produce an efficient device to meet the stringent requirements for line-powered operation (no batteries, no power supply).
- Software design for a 'smart call router' for a UK service provider. The unit automatically selected the least cost call route by analyzing dialed digits and substituting appropriate trunk access codes. Software developed in C and assembler initially for Fujitsu and NEC 8-bit microcontrollers. In mid-project, the processor family was switched to NEC chips which required reworking the firmware. This was achieved very quickly thanks to 'defensive programming' techniques.
- I was the evangelist of high-level languages such as C, together with Yourdon design techniques, software version control and configuration management (AllChange)

Skills: C; assembler; ICE; Fujitsu and NEC microcontrollers; Telephony

August 1991 - June 1992,

Vtech Communications Ltd  
Farnborough, UK

#### Software Engineer

- Software development for a 900 MHz digital cordless telephone, for USA market. Working with a highly motivated team of engineers in a start-up company, (RF designers, ASIC designers, hardware and other software engineers) the product was taken from concept to first prototype in just six months. Working in such a talented, highly motivated team with a common vision was one of the most rewarding jobs I have ever undertaken. I learned the fundamentals of the Yourdon structured analysis and design methodology as extended by Ward and Mellor for use in real-time systems. Development target was Hitachi H8-330 series (8/16 bit microcontroller) in C, using the IAR compilers and leading edge in-circuit emulation technology from Pentica Systems (MIME 700)

Skills: Hitachi H8 family; Yourdon design methodology; Pentica ICE; IAR cross compiler tool chain; C language

September 1986 - February 1991,

Tetrel Technology Ltd  
Llantrisant, Wales, UK

#### Software Engineer

- Development of embedded firmware for payphones and other telephony-related devices
- Development of software in C and assembler for a multi-processor architecture TDM synchronous multiplexor
- Supporting the full product life cycle from design through to final production.
- General trouble-shooter for the company's computing and networking requirements.
- Languages and skills used: Hitachi 4-bit assembler. C on Zilog Z80 embedded target. MC68000 assembler.
- Use of in-circuit emulators, oscilloscopes, logic analysers, protocol analysers and other engineering test equipment.
- I joined Tetrel as a startup (as the second employee) and quickly learned the attitude of pitching in at whatever job needed doing, be it fixing company computers, designing the company headed notepaper (an attitude that I have maintained to this day). I gained a good understanding of telephony and the approvals of telephony equipment in the UK.

Skills: 4- and 8-bit assembler; C; ICE; Lab equipment; Circuit schematics

#### References

References available on request

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