Summit Soft Consulting

Professional Hardware / Software Co-Design

26895 Aliso Creek Rd. Suite B504   Phone: (877) 839-2543, Fax: (877) 349-1818
Aliso Viejo, CA 92656-5301   E-mail John@summitsoftconsulting.com

John Gulbrandsen

Consultant Profile

Serious, devoted and experienced cross-discipline electronics / software engineer guaranteed to efficiently produce results. Specializing in high-speed board design, FPGA digital design, device drivers, and embedded programming. Also, has many years of professional experience with Windows C#/ C++ application development. Has over twenty years of hands-on professional hardware/software co-design experience, will be an immediate high-performing contributor to any development project.

Skill set	Technologies & tools used
Digital CPLD/FPGA Design and microprocessor-based electronics board design	High-speed board design, SI/PI-Analysis, microcontroller-based design and programming, Altera CPLD/FPGA, Verilog, Logic analyzers, Oscilloscopes, SERDES design, Hyperlynx, Altium Designer etc. Special research interest in FPGA digital design and high-speed board design.
Embedded systems programming	C, Assembly, Windows CE/Mobile, ARM, Keil 8051/Cypress FX2/FX3, Device Drivers, Nucleus and other Real-time OS design and programming, Multithreaded real time programming.
Windows Kernel Mode 8/7/XP/NT/95/98/CE Device Drivers, & Systems Programming	WDK, WDM, WDF, NDIS, Ethernet, USB, PCI, PCI Express, WinDbg, Profilers, Graphics, CE. C/C++, x86 Assembly, Filter Drivers, WinUSB
Data communication	PCI Express and USB protocol expertise, high-speed serial protocol analyzer designer, Ethernet, TCP/IP at socket and higher levels,
Desktop application development	C/C++/C#, VB/VB.NET, WinForms, WIN32 API, COM, DCOM, ATL, IDL, MFC, DirectX, ActiveX, Visual C++, Visual Studio, Visual Basic, .NET.
Database design and development	MS SQL Server, MS Access, ADO, ADO.NET, SQL, Stored procedures, clustering and fail-over etc.

Additional resources available	Details
Extensive technical library	Hundreds of books covering high-speed board design (Johnsson, Bogatin etc), computer science, Windows Internals, Mindshare XXX Architecture, Petzold, Oney, Richter going back 20+ years. Library also covers physics, mathematics, electronics design, signal/power-integrity Analysis, HDLs and much more.
MSDN Universal subscription	All Microsoft's software including all versions of current and older operating systems, all older and new development tools. All language versions are included for complete testing of developed software.
Complete in-house electronics lab	Fully equipped electronics lab. Capabilities to measure signal integrity of USB and PCI Express links and signals. Spectrum Analyzers and Oscilloscopes, Agilent Logic Analyzers, SMT Reflow Oven, BGA PCB rework equipment etc.

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Professional experience   1995 – date

Senior Principal Engineer, International Test Instruments, Irvine, CA   Sep 2014 - date

- o Complete **hardware / software design and prototype development** of a **5 gbps USB 3.0 Protocol Analyzer** (ITIC USB5000A). **10-layer PCB** design in **Altium Designer**, with blind vias and split power planes. Switched/Linear **Power Distribution Network Design**. **SI and PI analysis in Hyperlynx**. The design used an **Altera Cyclone V FPGA**, a **4 GB Micron DDR2 SODIMM**, a 48 MHz **Cypress FX2LP CPU** and external **TI TUSB1310A USB 3.0 PHYs**. A traditional FPGA **data path / controller** design implemented a 32-bit byte ordering and descrambling architecture. Altera's **DDR2 Controller** was used. Also designed PC **GUI using C# / Windows Forms** (currently in implementation). Overall, the same software architecture is used as in the below PCI Express Protocol Analyzer design. Technology: **Digital FPGA Design**, DDR2 Controller, **USB 3.0**. Environment: Quartus II, Altium Designer, **Modelsim**, **Hyperlynx**, Oscilloscope, **Logic Analyzer**, Spectrum Analyzer, **Protocol analyzer**, **Visual Studio 2005** etc.

Senior Principal Engineer, International Test Instruments, Irvine, CA   Feb 2010 – Sep 2014

- o **Complete hardware and software** research and development of a **2.5 gbps x4 lane PCI Express Protocol Analyzer** (ITIC 2500A) described here (http://www.internationaltestinstruments.com/products/100-2500a-pci-express-protocol-analyzer.aspx). **10-layer board design** in **Altium Designer** utilizing **blind vias** and **split power planes**. **Switched and Linear Power Supply** design, **Signal Integrity** and **Power Integrity** analysis using **Hyperlynx**, Altera Arria II GX **Digital FPGA** Design using **Altera Quartus II**. An external active probe makes copies of the upstream and downstream **SERDES** data which is sent to an **Arria II GX FPGA**. The FPGA **byte orders, descrambles and deskews** the data before storing it in an external **DDR2 SODIMM**. The PC software then programs binary **sequence detectors** in the hardware which then automatically detects the location of the **PCI Protocol Items** in SODIMM. The **C#/Windows Forms** PC software then uploads this meta-data and builds an in-memory tree of the **hierarchical protocol item data** as it appears on the bus. Data is uploaded on-demand via Virtual Tree control. Technology: **Digital FPGA Design**, **DDR2 Controller**, **PCI Express 1.1**. Environment: Quartus II, Altium Designer, **Modelsim**, Oscilloscope, **Logic Analyzer**, Spectrum Analyzer, **Protocol analyzer**, **Visual Studio 2005** etc.

Senior Principal Engineer, International Test Instruments, Irvine, CA   April 2005 – Feb 2010

- o **Complete hardware and software** research and development of **480 Mbps LS/FS/HS USB 2.0 Protocol Analyzer** (ITIC 1480A) described here (http://www.internationaltestinstruments.com/products/97-1480a-usb-20-protocol-analyzer.aspx). **FPGA Logic design** in **Altera Quartus II 7.1**. The hardware utilizes an **Altera Cyclone II FPGA** which receives **USB link data** via an **NXP ISP1505 ULPI-compliant USB PHY**. The FPGA encodes the data before it is buffered in an **SDR SDRAM**. The data is then sent to the Host PC via a **Cypress FX2LP USB Controller** for further analysis. **PCB Capture/Layout** using **Altium Designer**. **Signal Integrity, EMC/EMI**, Prototype assembly, board bring-up, manufacturing etc. Technology: **Digital FPGA Design**, **SDRAM Controller**, USB. Environment: **Quartus II**, **Altium Designer**, **Modelsim**, Oscilloscope, Logic Analyzer, Spectrum Analyzer, **Windows Forms**, **Visual Studio 2005** etc.

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Consultant	Summit Soft, Inc.	Dec 1999 – date

- **Consultant, Sorensen Communications, Inc, Salt Lake City, UT**   **February 2016**

  o **Debugged non-stable embedded board** containing an **NVidia Tegra 3** microcontroller. Reviewed schematics, **power and signal integrity** via Allegro and **Altium Designer**. Ran Hyperlynx Power Integrity analysis on all CPU power rails. Found too **high noise levels** (18.5%) on Tegra 3's CORE power rail. Analysis identified the root cause of board instability to be an **insufficient power/ground plane area** on the CORE power rail, resulting in too little **plane capacitance** to meet **Ztarget** for the CPU. Recommended larger plane area and improved decoupling capacitor mounting (**reversed geometry** and **X2Y** capacitors). Technology: **Power Integrity Analysis**. Environment: **Hyperlynx,** Altium Designer, **Cadence Allegro**.

- **Consultant, Incal Technology, Inc, Fremont, CA**   **November 2015**

  o Debugged and brought up **Altera ALTMEMPHY**-based **DDR2 Memory Interface Controller** on **Cyclone IV E FPGA** board. The design used a **64-bit, 1GB, UDIMM**. Reviewed **Signal Integrity**, **SSTL-18 termination** scheme, reference voltages, differential clock pin assignments etc. Verified correct **Modelsim simulation** via **Nativelink**. Suggested improvements. Debugged via **SignalTap** and made run correctly at **maximum 167 MHz** for the platform. Technology: **Verilog**/ Cyclone IV E, DDR2 UDIMM. Environment: **Mentor PADS**, **Altium Designer**, **Quartus II 13.1, Modelsim**.

- **Consultant, JR3, Inc, Woodland, CA**   **April 2015**

  o **Created custom 32/64-bit Windows 8, 7, Vista, XP WDM drivers** for company's line of 1, 2 and 4-channel **PCI-based robotics load sensor cards.** Also developed **INF file** and **co-installer**. Technology: C/C++ Environment: **Windows WDK**.

- **Consultant, Senior Staff Engineer, Western Digital, Irvine, CA**   **June 2004 - Oct 2013**

  o **Windows 7 WDM** driver for a **LSI SAS/SATA 5 Gbps** PCI Express **Host Controller Card**. Involved use or **PCI Express Protocol Analyzer** to maximize throughput of multiple simultaneous DMA Transfers. Technology: C/C++ Environment: **Windows WDK**.

  o **Windows XP/7 Serial Attached SCSI (SAS) Miniport driver** for the **LSI SAS 1064** Controller. Included **installation script** for seamless driver installation. **Technology: C** Environment: **Windows WDK**.

  o Specification, design and development of a **WDM driver** for a custom **PCI I/O card**. The I/O card contained several **D/A converters**, **serial EEPROM** and other components that the card interfaced to via the **I2C** serial interface. A driver installation script was provided for seamless installation. The driver was designed to work on the **Windows 98 / 2000 / XP / 2003** platforms. Technology: WDM, C. Environment: Windows XP DDK, Visual C++ 6.0, WinDbg.

  o **FPGA digital design** of a **64-port serial port** adapter **card for PCI Express**. The plug-in card used an **Altera Cyclone IV GX FPGA** which utilized a hard **PCI Express IP core** to communicate over a **x1 lane, 2.5 Gbps PCI Express** link. Implemented a traditional data-path / controller architecture, **64-channel simultaneous DMA engine**, custom **UART designs** from scratch, custom **I2C controllers** for I/O expansion were developed from scratch, **ADC interface**

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state machine implementation from scratch. Environment: **Quartus II**, **Modelsim**, Oscilloscope, Logic Analyzer, **PCI Express Protocol Analyzer** etc.

o   Designed and implemented a **SAS driver for the LSI SAS 1064 Controller** on the **Nucleus RTOS**. Implemented application-level API that included all standard **SCSI commands**. Supports **dual-port SAS drives**. Implemented **SATA over SAS** on the controller via **STP (SATA Tunneling Protocol)**. Technology: C/C++, **Nucleus RTOS**. Environment: **Mentor Graphics Edge** debugger.

o   Designed and implemented **ATA disk drivers** for the Nucleus embedded RTOS. Supported both ATA and Vendor-specific (WD) commands. Technology: **C/C++**, **Nucleus RTOS**. Environment: Mentor Graphics **Edge debugger.**

o   Specification, design and implementation of a **BSP (Board Support Package)** for a custom CPU board using the **Atmel AT91RM9200 ARM**-based micro-controller. The BSP included **device drivers** for five on-board Oxford Semiconductor **four-channel OX16C954 UARTs** as well as drivers for various on-board peripherals. **Brought up the CPU board** with the use of logic analyzers and oscilloscope. Made various prototype **hardware patches**. Technology: **ARM Assembly**, C/C++, **Nucleus RTOS**. Environment: Mentor Graphics Edge debugger, **Oscilloscopes, logic analyzers.**

o   Specification, design and development of a **WDM driver** for a custom **PCI I/O card**. The I/O card contained several **D/A converters**, **serial EEPROM** and other components that the card interfaced to via the **I2C serial interface**. A driver **installation script** was provided for seamless installation. The driver was designed to work on the **Windows 98 / 2000 / XP / 2003 platforms**. _Technology_: **WDM, C**. _Environment_: Windows **XP DDK**, **Visual Studio 2003**, **WinDbg**.

o   Design and development of a **multithreaded network stack** for simultaneous communication over **USB** between a number of PCs running Windows XP and embedded systems running the Nucleus RTOS. Designed and developed **multiple client and server services** over the network stack that allowed the **embedded Nucleus RTOS** to remotely access files on the PCs over the USB link. _Technology_: USB, **Multithreaded/RTOS programming**. _Environment_: Visual **C++/Visual Studio 2003**, **Mentor Graphics CodeLAB**.

o   **Brought up a custom CPU board** that contained an **Atmel ARM** CPU. Developed **flash bootloaders** and **startup environment** for the **Nucleus RTOS**. Designed and implemented downloading and execution of application images over a parallel link to a master PC. Developed a platform layer and various **Nucleus device drivers** that application developers will use to interface with the hardware. _Technology_: **RTOS programming, Assembly/C**. _Environment_: **Mentor Graphics CodeLAB**.

♦   **Consultant, Densitron Technologies, Santa Fe Springs, CA Feb   2005 – Aug 2005**

o   Reverse-engineered and debugged a **multi-port serial WDM driver** for Windows **2000/XP/2003**. This was for a custom **multi-purpose I/O board**. Fixed major bugs and implemented flow control in the driver. Cleaned up the driver **installation .inf scripts**. Use of **Oscilloscope, logic analyzer,** WinDbg and SoftICE etc. _Technology_: WDM, C. _Environment_: **Windows XP DDK**, _Visual C++ 6.0,_ **WinDbg, SoftICE**.

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- **Summit Soft, Inc**   **May 2005 – Dec 2005**

  - Design and development of the **PCI Explorer Windows application** described at http://www.summitsoftconsulting.com/PciExplorer.htm. The PCI Explorer application enables the user to graphically **view all PCI devices and the buses they reside on** accordingly to the actual hierarchy of the various devices on the buses. The Configuration Space as well as memory and I/O can be edited via the GUI. Technology: **VB7, MFC, C++.** Environment: **Visual Studio .NET** 2003.

  - **Hardware design and implementation** of a **PCI Dump Switch Card** described here: http://www.summitsoftconsulting.com/DumpSwitchCard.htm. **Analog and Digital** circuit design. **State machine implementation** using both discrete gates as well as a 16V8 PLD. Used **WinCUPL** to implement the **PLD state machine** code. **Schematic and layout** work was done in **Protel DXP**. Prototype assembly. *Technology: Analog/Digital design, **PCI-bus**. Environment: Protel DXP, **Oscilloscopes**, WinCUPL.*

- **Consultant, Ubero, Inc. Trabuco Canyon, CA**   **Mar 2004**

  - Created an **Extended Stored Procedure** used for sending email from **SQL Server 2000**. Implemented in **C++** Used a custom **COM object** for the actual sending of the emails. *Technology: SQL Server/C++/**Win32 DLL**. Environment: **Visual Studio 6.0***

- **Consultant, Relsys International, Inc. Irvine, CA**   **Jan 2003 – June 2004**

  - Created custom **ActiveX-controls** for use in **Internet Explorer 6.0**. Automated Microsoft Word on the client-side. Code signed with **AuthentiCode**, creation of cab files etc. *Technology: Windows 2000 load balancer**VC6/VB6.***

  - Identified/corrected **database/web** farm **scalability issues**. Flushed out system instability issues. Load testing in Microsoft **Application Center Test** (ACT). Design and setup of load testing **network, load balancers and switches**. *Technology: **Windows 2000/BigIP** load balancer.**NET/VB6.***

  - Wrote **.NET Windows Services** that monitored system functionality and reset other services in case of failure. Part of the company's **24x7x365** strategy. *Technology: .**NET**. Environment: **Visual Studio .NET**.*

  - Setup of 1-click automated build environment (FinalBuilder). Wrote several Installshield Pro projects. Automatically checks out files, builds components, builds installation packages and produces final CD-images. *Environment: Installshield, Finalbuilder.*

  - Ported **C++** Oracle database access layers from Oracle Objects (**OO40**) to Oracle Call Interface (**OCI**). *Technology: **Oracle 9i**. Environment: **Visual Studio 6.0**.*

- **Consultant, Advanced Trading Research, Inc. Aliso Viejo, CA**   **Nov 2001 – Jan 2004**

  - **Financial** Market's **technical analysis research**. Development of algorithms for determining intraday market dynamics by measuring and analyzing order flow in the **cash, futures and options markets**. *Environment: **SQL server** 2000, **Excel 2003 VBA**, Visual Studio .**NET**.*

  - Complete design and implementation of a real-time electronic **stock monitoring and analysis system**. (Everything on http://www.AdvancedTradingResearch.com including **back-end** systems,

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web site and **client applications**). The system receives real-time order flow from the exchanges in New York and executes proprietary patented algorithms in **stored procedures** running on a 2-node **fail-over SQL server 2000** cluster. Complete **fail-safe** system design of **RAID1 (disk mirroring)** using Compaq RA4000 **fibre channel disk arrays**, Compaq **Fibre channel switches**, Compaq **ServerNet II Gigabit networking/cluster switch** and Multiprocessor AMD Athlon machines. The system analyzes about **2.5 million orders per day** which generates approximately 1.2 GB of data daily. The finished calculations are replicated to a number of front-end read-only databases using **SQL Server transactional replication**. Two independent networks were used together with **fail-over routers/gateways** to provide **fail-safe networking**. *Technology:* ***ASP.NET***, ***C#***, ***JScript/HTML***, ***SQL/T-SQL***/*Stored procedures. Microsoft **clustering and load-balancing**. Environment: SQL server 2000 **Enterprise manager, Profiler and Query analyze. Visual Studio .NET.***

o Design/development of a **raw TCP/IP communication** protocol for the client chart data. Uses **.NET** on the server side (TCPClient and NetworkStream) and **VB6 Winsock** control on the client side. This protocol is about 100 times less verbose than a **XML/SOAP** approach which keeps bandwidth and server machines to a minimum. Implemented a **TCP/IP server** in a **C#/.NET Windows service** that was **load-balanced** on a number of servers. *Technology:* ***C#/.NET/VB6.*** *Environment:* ***Visual Studio 6.0/.NET.***

o Development of various **C#/.NET Windows services**. Uses **.NET web services** to communicate between various data distribution centers and the main web site. This implements redundancy since any of the data centers can handle the request from the client charting tools. *Technology:* ***C#/.NET.*** *Environment:* ***Visual Studio .NET.***

o Design and implementation of **client side VB6** charting application (**ActiveX** technology). Used Microsoft **SOAP toolkit 2.0** and **TCP/IP Socket** communication to communicate with the data centers. *Technology:* ***VB6*** *Environment:* ***Visual Studio 6.0***

♦ **Consultant, Desper Products, Inc. Santa Clara, CA**   **Oct 2000 – Nov 2003**

o Design and development of **DirectX Media Objects** (DMOs) for **Windows Media Player 9**. Uses Spatializer's Audio Alchemy algorithm to filter out cross-channel noise in **5.1 multi-channel sound** in DVD movies. *Technology:* ***MFC/WIN32/ C++.*** *Environment:* ***Visual Studio 6.0.***

o Design and development of a background resident sound processing application. Runs in the background on XP systems and processes all system sounds regardless of what application is used for playback by using **kernel-mode** sound stream hooking. Basically an integration of various features of earlier projects below. *Technology:* ***MFC/WIN32/ C++.*** *Environment:* ***Visual Studio 6.0.***

o Development of a **WinAMP plug-in** that uses the Spatializer proprietary sound processing algorithms ('StreamFX'). Available at http://www.spatializer.com. A UI was created that integrated with the Windows shell (notification tray integration with pop-up menus) through which the sound processing algorithms could be adjusted. *Technology:* ***MFC/WIN32/ C++.*** *Environment:* ***Visual Studio 6.0.***

o Design and development of an application ("*Virtual Sound Processor 11*") used to configure the sound processing device drivers described below. The UI was built using an **MFC** dialog application that hosted several **custom ActiveX** components that were developed in C++/MFC. The **Macromedia Flash** player control was used for effects in the UI. A setup application was also created using **InstallShield**. *Technology:* ***MFC/WIN32/ C++.*** *Environment:* ***Visual Studio 6.0.***

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o   Development of kernel mode **WDM and VxD device drivers** for the Windows 95/98/98SE/2000/XP-Whistler platforms. The drivers intercept all sounds sent via the Wave and **DirectX/DirectSound** APIs, applies various **3D-sound algorithms** to the sound data before sending the sound buffers on to the sound card or USB speakers. Also developed a user mode DLL for hooking Wave out on Windows 9x. _Technology_: WDM & VxD kernel mode development in **C and x86 Assembly**. _Environment_: **95/98/W2K DDKs.** 16 bit compiler for the hook DLL.

♦   **Consultant, Canon Information Systems, Inc. Irvine, CA   Mar 2000 – Jun 2002**

o   Windows **9x and NT/2000 kernel mode development** of **XML/SVG printer drivers**. Generates an XML/SVG file that contains scalable information that describes the printed page. The SVG file can later be viewed using Adobe's SVG viewer or printed to an SVG compatible printer. _Technology_: **C**. _Environment_: **Windows 9x/2000 DDK**, **SoftICE**.

o   Specification and development of a Windows **2000/XP/Whistler printer driver** that generates **SVG/XML**-data. Contains two COM-component plug-ins that handle rendering into the XML/SVG file respectively defines the user settable properties of the printer driver. _Technology_: **COM**, ATL, and **C.** _Environment_: **Windows 2000 DDK**, **Visual C++ 6.0**.

o   Lead design and development of an **ASP-based WEB site** (www.docgo.com). Built on NT4/IIS4 using **Visual Interdev 6.0**. Design/Implementation of various COM components in ATL/C++. Design and implementation of the **SQL server database** for the WEB site. **ADO** was used for the data access. _Technology_: ASP, **COM**, ATL, SQL, and **WIN32**. _Environment_: **Visual Interdev 6.0**, **Visual C++ 6.0**.

o   WIN32 application programming. A **Windows 2000 service** was created that published data retrieved from a 3rd party SDK into a **Microsoft Active Directory** database. _Technology_: **LDAP**, _Active directory, WIN32. Environment_: **Visual C++ 6.0**, Windows 2000.

o   Design and implementation of an **ActiveX object hierarchy in C++/ATL 3.0**. The COM components were used from Visual basic/ASP to search for, retrieve and update information in Microsoft's Active Directory databases. Uses advanced features of ATL3.0 to implement Visual Basic collections etc. _Technology_: **C++/ATL,** ActiveX, **COM,** VB, ASP, _Environment_: Visual InterDev 6.0**, Visual Basic 6.0**, **IE 5.0**, Windows 2000.

o   Creation of various **tools in Visual Basic 6.0** that used the above mentioned ActiveX components. For instance was an explorer-like tool implemented which allowed the user to graphically browse, update and delete information in a Microsoft Active Directory server.

o   Design and implementation of a **Windows 2000 service**. Used for, in a background task, collecting information from Canon printers and copiers (status information etc) and updating a directory server with the retrieved results. Written directly to the **WIN32 API in C++.** _Technology_: C++/WIN32 _Environment_: Visual C++ 6.0, Windows 2000.

♦   **Consultant, SOHO Search, Inc. Laguna Niguel, CA.   May 2000 – August 2000**

o   Development of **a Windows CE application** in VB/C++ which was used for tracking time and expenses on Palm and Handheld PCs. ActiveX components were developed in ATL. **Database programming via ADO** on CE and PC platform. Synchronization of databases between the Windows CE device and the desktop platform. _Technology_: **C++/ATL,** ActiveX, **COM,** VB, Environment_: Visual Basic, Visual C++, **Windows CE 2.0.**

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- o **Hardware and software design** of an **USB-to-telephone converter**. Used for interfacing telephones to standard PCs via USB port. Hardware design, electronics schematics, PCB layout and prototype building. Used DirectSound and DirectInput for low-latency streaming sound and control. Used Microsoft TAPI for call-control in test applications. *Technology:* **USB, Electronics CAD applications (Protel), COM.** Environment*:* Visual C++, **oscilloscopes** and other normal HW development tools.

- ♦ **Consultant, Eureka Broadband, Inc. Newport beach, CA**   **Dec 1999 – Mar 2000**

  - o **ActiveX/ATL.** Design and development of ActiveX-components used for displaying barcodes and some additional information in WEB-pages. *Technology:* ActiveX, **COM,** ASP, *Environment:* **Visual C++ 6.0,** Visual Basic 6.0, **IE 4.0**.

  - o **ASP/VBScript/JavaScript**. Design and development of an advanced **WEB application** used to online print barcode data retrieved from SQL Server 7.0. Use of **Design time controls** and of the above mentioned ActiveX component. Server and client side **scripting**. *Technology:* ActiveX, **COM,** ASP, *Environment:* Visual InterDev 6.0, **Visual Basic 6.0**, **IE 4.0**, Windows NT.

Consultant	Softtronic ObX, Sweden	Sept 1997 – Dec 1999

- ♦ **Consultant, Autodiagnos AB. Stockholm, Sweden / Berlin, Germany.**

  - o **Windows NT Network programming** via **Windows socket**s. Added network support in software that uploads data from automobile computers, generates **XML**-files and sends the XML-files to a central server for storage. Uses standard **TCP/IP** network for communication. Development of a user interface for communication with the server. Development of WEB-based presentation of data using **Visual Interdev 6** and **ASP**. *Technology:* **Delphi** 4, **WIN32 and ASP.** *Environment:* Windows **95/98/NT.**

- ♦ **Consultant, Medtronic Functional Diagnostics. Copenhagen, Denmark.**

  - o **Windows CE WIN32** application development for an embedded medical device. Low-level Windows **CE system programming** of flash memories, Real time clock and other system functions. *Technology:* Microsoft **Windows CE 2.0**. *Environment:* Microsoft Windows CE Embedded Toolkit, **C++.**

  - o Design and development of a **Windows CE printer driver**. Porting of Windows CE **operating system code** to a new hardware platform. Setup of Windows CE build environment on a build server and system integration of Windows CE to the target system. *Technology:* **Microsoft Windows CE 2**.0. *Environment:* Microsoft **Embedded Toolkit, C.**

- ♦ **Consultant, ABB AB. Vasteras, Sweden.**

  - o Design and development of an **ActiveX communication component** for Windows **NT/98**. It was used real time in a Visual Basic application to control an industrial computer via a serial link. Implementation of a serial communication protocol of type Modbus. The component was implemented in **C++** using **ATL 3.0** in Visual Studio. Development of test applications in **Visual Basic 6**. *Technology:* **C++,** Visual Basic, ATL 3.0, **WIN32.** *Environment:* Visual Basic 6.0, **Visual C++ 6.0**.

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♦ **Consultant, Medtronic, Inc. Stockholm, Sweden.**

  o Development of **COM-components** in **C++/ATL** and **Visual Basi**c. Used to in **real-time stream** data into a client/server system that handles real-time analysis and display of streaming clinical data. Uses Microsoft **DirectShow** technology. _Technology_**: DirectShow, COM, ATL, IDL, WIN32**. _Environment_: Visual Studio, C++, VB

  o Development of a **NT4 stream device driver** in **C++.** Used for generating simulated data that implements a virtual USB device. _Technology_: Vireo **Driver::Works** class library**, C++. NT DDK**, C. _Environment_: NT4.

  o Development of an **USB WDM device driver** for Windows98/NT5. Used for collecting real-time data from a medical data acquisition instrument. _Technology_: Microsoft **DDK**. C. _Environment_: Windows 98 and **Windows 2000**.

  o Development of a **Windows DNA 3-tier client server application** that handles real-time analysis and display of streaming medical data retrieved from hardware devices**. IE4 WEB based front end** containing **DHTML** and **ActiveX** components built in **VB and C++/ATL**. Client side Jscript/VBScript. Implementation of client side ActiveX components in VB5 and C++/ATL. Development of middle tier business components in VB and ATL that used **ActiveMovie streaming technology**. The backend was based on a **SQL Server** database wrapped by **MS Repository 1.0.** _Technology_: **IDL, COM**, ActiveX, DHTML, MFC, ATL, and WIN32. _Environment_:_IE4,_ VC5, VB5, Windows 98 and Windows 2000.

  o System and application programming of a **Windows CE** based portable medical data acquisition device. Subprojects included: 1) Specification and development of **Windows CE device drivers** for data acquisition, 2) **Windows sockets** communication over infrared link **(IrD**a), 3) Application programming using **WIN32AP**I, **Visual C++** and **MFC** for Windows CE. _Environment_: Windows CE, C, C++, Embedded toolkit for VC++.

♦ **Consultant, Ericsson Telecom. Stockholm, Sweden.**

  o Specification of **Windows 95/NT device drivers** and system design of an **ISDN Multimedia telephone** for Windows 95/NT. **DirextX** technologies like **DirectShow**, **DirectDraw** and **DirectSound** were used for multimedia presentation. A video for windows **(VFW)** device driver was used for interfacing the hardware with the system. A **NDIS 4.0 miniport** driver handled the network communication. **TAPI** was used for call management. _Technologies_: DirectX, VFW, NDIS miniport, TAPI. _Environment_: Microsoft **DDK**, Windows 95/NT, **C/C++.**

♦ **Consultant, Net Insight AB. Stockholm, Sweden.**

  o Specification and development of a **high performance NT device driver** for a **PCI based fiber network card.** Subprojects included: 1) Specification and development of an **NDIS 4.0** miniport. It used **bus master DMA** for transferring data between main memory and the PCI Network card, 2) A **LAN emulation** software was designed and implemented for interfacing NT's connectionless **TCP/IP** network stack to the connection oriented **DTM network**. _Environment_: Microsoft **NT DDK**. C, Windows NT 4.0.

♦ **Consultant, MMC Electronics. Stockholm, Sweden.**

  o Design and development of an **embedded Micro controller** system. Design and **implementation of a pre-emptive real-time kernel** for it. (Round robin scheduling, pre-emptive time slicing, Semaphores, msg queues, timers and more). Design and development of a

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multithreaded real-time application for the device. <u>HW Technolog</u>y: Flash memories, **USB** controller, UARTs, Hitachi H8 CPU, PLDs, e**mulators and Logic Analyzers**. <u>SW Technolog</u>y: **Operating system implementation**, **realtime programming.**

♦ **Consultant, ITF AB, Stockholm, Sweden**

o Implementation of a **Windows NT stream device driver** used to control a general-purpose parallel ISA interface board. A **user mode DLL** was developed for easier access to the device driver from application programs written in **C, C++, Pascal and Visual Basi**c. Test applications for the targeted programming languages were also developed. <u>Technology</u>: Microsoft NT DDK, C, WIN32 API, Visual C++ and Visual Basic.

o Implementation of a **kernel mode audio driver** for Microsoft Windows **NT**. The audio board was partly **Soundblaster** compatible. User mode support drivers were also developed which enabled plug-into the NT **multimedia** subsystem. <u>Technology</u>: C, Microsoft C Compiler.

♦ **Consultant, Frobozz AB, Stockholm, Sweden**

o Specification and development of a **Windows for Workgroups 3.11 NDIS 3.0 miniport**. The miniport controlled a **NE2000** compatible **ISA network car**d. Installation script was also developed for the network driver. <u>Technology</u>: C, Microsoft C Compiler.

o Development of a **Windows** application used for remotely controlling a **satellite receiver.** Channels could be scanned for, stored and be brought back for later viewing. The position of the satellite dish could be remotely controlled by the Windows application, which enabled the application to automatically search for new satellite channels without user intervention. Stored channels could, after an automatic search, be sequentially previewed for a number a seconds. Printing support was included which enabled lists of channel information, satellite position and other relevant information to be presented on paper. The application was a 16 bits object oriented **C++** application developed with Microsoft Foundation Classes **(MFC)** using **Visual C++**. <u>Technology</u>: MFC, Visual C++, 16-bits application components **(VBX'**s). Context sensitive **On-Line help.** Installation program **(Installshield).**

o Development of a **Logical Analyzer** targeted to run in **MS-DO**S. The application was used as the user interface for a logic analyzer, which sampled data from a **microprocessor syste**m. The communication with the sampling hardware took place via a **parallel ISA** interface board. Functions for **disassembling** sampled data (Motorola 6800 format) and for searching for data pattern as well as **trigging** sampling at predefined data pattern were implemented. <u>Technology</u>: MS-DOS, **Borland Pascal.**

♦ **R&D Engineer, Lorentzen & Wettre AB, Sweden**   **Aug 1995 – Jul 1997**

o Development of a 16-bit application for **Windows 3.1/3.11/95/NT** which is the user interface to On-Line measuring equipment that measures parameters of paper quality in a paper-processing machine. Direct **WIN16 programming in C.** Implementation of an **HTTP-serve**r using **Windows sockets** for communication over TCP/IP-network. Creation of Implementation of **On-Line help using**RTF-files and Microsoft Help Compiler. Creation of an **Installation program** using Installshield. <u>Technologies</u>: **WIN16,** C. <u>Environment</u>: Borland C/C++, InstallShield.

o **Hardware/software development** of a distributed **multiprocessor** system consisting of 15 CPU boards that controlled an automatic paper testing system. This system communicated with a data analysis system implemented in **Delphi 2.0** under **Windows NT**. Measured data was stored

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in a MS SQL-server 6.5 or Borland Paradox. *Technology:* Programming in a **real-time operating system** and direct to the hardware in **C and Assemble**r. **Emulators** and **Logic analyzers**.

o **Microcomputer design and development** of an embedded DC-motor controller. The motor controller was based on a Intel 80196CA CPU which controlled the position and speed of the DC-motor. *Technology:* A mixed environment with a **real-time operating system** and direct programming of the hardware in C and Assembler. (IAR and O´Tool). **Emulators, debuggers** and **logic analyzers**.

Education

B.Sc. EE & CS – Lulea University of Technology, Sweden, 1995