

CONSULTANT PROFILE



#713

Embedded Electronics Development. Year of birth 1960
Speciality: FPGA, ASIC, digital design and embedded software

Work experience

2010 - Prevas A/S
Prevas Freelance Consultant

2006 - StanDigi
Freelance Consultant, Hardware and Software

1996 – 2005 ProTeleVision Technologies
Digital product development, system, software and hardware

1984 – 1996 Philips TV Test Equipment
Digital and processor circuit development. Hardware and software.

Competencies

Hardware Tools and Languages

- Xilinx, Altera, Lattice
- VHDL, Verilog
- Modelsim, Cygwin
- Tcl and perl scripts
- Synplify, Lenardo spectrum
- CVS, ClearCase

Software Tools and Languages

- Keil, Tasking, Borland
- C, assembler, Modula-2, Pascal
- Makefiles

Technologies

- FPGA, ASIC, CPLD
- Signal Processing
- Processors. Control (CPU) or signal processors (DSP)
- Soft processors (Inside FPGA or ASIC)
- Real Time Software (RTOS)
- Signal Integrity

Systems

- Embedded System analysis and design
- Project requirement specifications
- Mixed systems, analog, RF, digital, software
- Safety critical systems

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Education

1979 – 1984 Aalborg Universitets Center
M.Sc.EE.

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Project references

Customer in medico industry

2009-2010 ASIC development consultant
Responsible for ASIC redesign based on test and analyses of first ASIC. Implementation and test was equally split between two developers. The project included requirement specification, design and test before delivery of a complete RTL package to a subcontractor.
Test redesigned to run in different environments:
Several test cases could run in simulation environments, FPGA prototyping environment or in final ASIC test environment.
Tools and technology: Source code in VHDL, simulation in Modelsim, prototyping in Xilinx FPGA based board, final ASIC test in a FPGA controlled test board.
All testing controlled by TCL script in Cygwin environment

Customer in telecom industry

2009 Embedded hardware and software consultant
Responsible for adding features to existing product.
Specification of features including frontpanel and remote control access to features.
Part of the project was to (re)create the development environments. FPGA toplevel was modified to VHDL (From obsolete schematic format).
Created commandline scripts for FPGA and software compile.
The added features was implemented in FPGA, low level control software was updated in a local microcontroller and the external control interfaces was implemented in a instrument controller.
FPGA programming in VHDL, microcontroller software in C with RTOS.

Customer in network industry

2008 FPGA design consultant
Responsible for designing the FPGA part of a multiport Gbit Ethernet interface to existing product.
Design FPGA pinout and review PCB layout with focus on signal integrity.
Design and implement multiport interface including some on-board RGMII interfaces and some of board interfaces through a board-to-board link.
Main challenges was to handle all packets sizes, cycle accurate timestamping and to interface 8 receive ports without blocking (8 Gbit/s).
FPGA code in Verilog, testbenches in verilog, test cases in tcl scripts.

Customer in medico industry

2006-2008 ASIC development consultant
Responsible for ASIC digital design (Mixed signal ASIC)
During the project the resources was increased with an additional digital designer and a designer with focus on testing in hardware.
Responsible for digital system design including some CPU cores and safety related logic. Design of radio protocol logic and interface.
Participated in development of test environments. Testing was done in simulation environments, in ASIC prototype hardware with FPGA and in a final test platform controlled by a FPGA.
Responsible for all FPGA related development.
Digital design in VHDL, testing based on tcl scripts in Cygwin.

Customer in sonar industry

2006 FPGA development consultant

Responsible for FPGA module testing.

A project was in progress with FPGA code implemented but not tested in hardware or simulations.

Responsible for creating module detail specifications and test specifications. Implementation of test cases in verilog and related corrections and optimisations to verilog modules.

Customer in network industry

2005-2007 FPGA design consultant

Responsible for designing an IP core for PCI Express.

The core was portable to several FPGAs and was designed to be a low cost 1 lane with internal or external PHY.

Design in VHDL, simulated in Modelsim by tcl scripts and testbenches in VHDL.

Test in hardware in several platforms with Xilinx and Altera FPGAs.

ProTelevision Technologies A/S

2004 - 2005 3rd generation digital television modulator

Participated in system design and key component specification.

Analyses of FPGA and ASIC components.

Participated in Product requirement specification.

2003 - 2005 Adaptive non-linear and linear corrector.

Responsible for hardware and software design of a module (PCB) doing real time analyses of a feedback signal from a TV transmitter antenna.

The hardware included A/D converter to digitise a modulated TV IF signal (Carrier frequency 37 MHz, bandwidth 20 MHz) and FPGA with internal processors.

2001 - 2004 Feature upgrading in existing DVB-T modulator.

Responsible for modifying product DVB-T modulator to support DVB-H specification. Participated in DVB-H meetings (DVB workgroup writing the actual DVB-H specification)

Added SFN (Single Frequency Network) functionality to FPGA designs.

Advanced non-linear complex signal processing including soft clipping, predistortion and filtering.

Real time software redesign to achieve acceptable response time.

1999 - 2001 DVB-T modulator, 2nd generation.

Participated in system design of a single board DVB-T modulator.

Responsible for input and channel coding in Xilinx FPGA. Requirement specification to IFFT module. Testbenches and bit-accurate models in C to ASIC design (ASIC RTL code was designed by subcontractor). FPGA prototyping of ASIC.

1996 - 1998 DVB-T modulator, 1st generation.

Participated in system design of a DVB-T modulator.

Responsible for project management.

Responsible for part of the digital encoding (Framing structure, pilot insertion, carrier modulation, IFFT processing and guard interval insertion).

The design was partly in FPGAs partly in high performance Digital Signal Processors.

Philips TV Test Equipment

1995 NICAM Demodulator

Participated in system design and key component specification.
Responsible for hardware and software for basic digital NICAM decoding.
The hardware was based on the Motorola DSP 56004 processor, all decoding was software written in 5600x assembly language.

1993 NICAM Soft Switcher

Responsible for hardware and software to a module required in the TV2 broadcast network. Included analyses and requirement specification.
Hardware based on Motorola DSP 56001, main functionality in software written in Assembly language.

1991-1994 TV Measurement receiver

Responsible for all instrument control hardware and software.
The control was based on local microcontrollers, one for each functional module. These controllers were 8031 style programmed in assembly.
A main instrument controller board was programmed in C, and was connected to the functional module controllers using I2C bus with ASCII protocol. The main controller included a remote control interface RS232 or IEEE488.
The user interface was programmed in a separate processor linked to the main controller by RS232 interface. This software was programmed in C and included menu based operations on a graphical display.

1989-1990 TV Monitor Color analyser

Participated in system design.
Responsible for designing the hardware and software (including optical filters) to measure a CRT monitor absolute color.
The design included designing filters to CIE standard coordinates and color coordinate conversion and calibration in software.

1988 NICAM Measurement demodulator

Participated in system design.
Responsible for instrument control hardware and software.
Hardware and software for displaying critical parameters for NICAM system integrators.

1987 TV system identification / line counting

Responsible for FPGA design to identify TV system and separate line and field synchronisation. The design entry was Orcad schematic entry, synthesis by Xilinx tool chain.

1986-1987 NICAM Modulator

Participated in system design.
Responsible for digital NICAM encoding and instrument control hardware/software. NICAM encoding was designed using a combination of a 68000 processor and digital logic.

1984-1986 TV Multichannel converter

Responsible for instrument control hardware and software including frontpanel with displays, keys and rotary encoder.
The control was based on a 8031 controller programmed in assembly. Interface to hardware was several SPI and I2C busses. The instrument included a IEEE488 control interface and system for factory calibration was part of project.

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Competencies (continued)

Processors

- 8031 style, XA, 68000, Stm7, Z80
- Motorola DSP 5600x, 5630x
- NIOSII

Interfaces

- I2C, PCI express, PCI, TCP/IP, SNMP, RGMII, RS232, SCPI, IEEE488, ASI, SPI

Signal processing

- FIR filter, Cordic, COFDM modulation, FFT/IFFT, PAPR reduction, TS restamping, Complex filtering, Non-linear processing.

Applications

- SFN processing, Gbit network, DVB-T, DVB-H, 2.4 GHz wireless, NICAM
- Safety critical designs in medico industry

Languages

- Danish (mother tongue)
- English (Natural language in documentation and work)

Education (continued)

Signal Integrity and High Speed System Design, 3 days, Speeding Edge(2007)
VHDL, 5 days , Hardi (2000)
Structured software analyses and design, 5 days (1995)
Project management, 5 days, Mikkelsen (1990)
EMC-rigtig apparatkonstruktion, 3 days ElektronikCentralen(1990)
Digital Semi-Custom Design, 5 days ElektronikCentralen(1988)