

Gerald B. Lester

Session Control LLC
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SPECIALIZATION

- System Design.
- FPGA design and HDL implementation.
- Embedded Software design and implementation.

QUALIFICATIONS

Over twenty years experience in a wide variety of hardware and software design programs. Experience includes hardware from PCB design to high level HDL coding; and software from driver level to large OO projects. Quick learner, maintains education in leading edge technology. Strong history of on-time and on-budget project completion.

EXPERIENCE

Session Control LLC, Vista, CA, USA

Consultant / Owner (2003-present)

Established Session Control in 2003, supplying Engineering Consulting Services. While specializing in FPGA and Embedded Software design, all facets of electronic product design are covered, from specification through to manufacturing handoff.

The next three companies listed provide examples of consulting work performed while representing Session Control LLC ...

Rockwell Collins Optronics, Carlsbad, CA, USA

<http://www.rockwellcollins.com/optronics/ProductsAndServices/soldier-systems/page813.html>

FPGA and Software Consultant (2004-present, representing Session Control LLC)

Consulted on 18 separate projects over 5 years, primarily with Soldier Systems group. Supplied complete FPGA design and implementation in each case. Also provided software for most projects, from low-level drivers up to full design and implementation.

- Created system of modular, re-usable video processing blocks now in use across all projects.

Consulting Project: Sample #1 (name withheld)

As part of an extensive body-mounted soldier electronics system, integrated helmet attached devices using an FPGA and a USB processor. Helmet sub-systems included image fusion, audio codec's, camera interfaces and controls, USB command interface, USB video, USB audio, and display interface and controls.

- Designed user interface.
- Developed camera synchronization and video processing for two night vision cameras.
- FPGA programmed from external CPU.
- Project completed successfully despite erroneous USB video format documentation requiring reverse engineering to correct.

Consulting Project: Sample #2 (name withheld)

Video switching box prototype for in-vehicle use, with 5 inputs (NTSC, VESA), 4 intelligent display outputs, video processing, communications, and user interface.

- REC 601,656 conversions.
- Frame buffers with custom multi-channel DRAM interface.
- Continuously variable video scaling (50%~200%).
- Gamma correction.
- 175% global clock resource usage (Xilinx Spartan 3A).

Brainstorm Electronics Inc., Los Angeles, CA, USA

Hardware and Software Consultant (2004-2008, representing Session Control LLC)

Consulting Project: DCD-8 Digital Audio Wordclock Generator

Complete design of ultra low jitter Word Clock Generator; multiple I/O formats; generates multiple rates simultaneously; includes audio router. Start-to-finish project, including PCB design, component specification, software design and implementation, UI design, manufacturing test design and handoff. Assisted customer with product specification. (Product web page: <http://www.brainstormtime.com/dcd8.php>.)

Consulting Project: VSG-4 Video Sync Generator

Complete design of 4-channel High Definition (HD) and Standard Definition (SD) analog Video Sync Generator; outputs 26 different Tri-Level HD formats and 5 SD formats including NTSC and PAL; genlocks to video, audio clock or GPS. (Product web page: <http://www.brainstormtime.com/vsg4.php>.)

- o Implemented using single Xilinx Spartan 3E-500 plus 2 PLL's plus output DAC per channel.

Intevac Vision Systems, Carlsbad, CA, USA

<http://www.intevac.com/intevacphotonics>

FPGA and Software Consultant (2006-2008, representing Session Control LLC)

Consulted on 6 head mounted display projects over 3 years.

- o Complete video path designs.
- o LCD display interfaces and column drivers.
- o Created OO software design to model hardware in modular based system, maximizing re-use of hardware, HDL and software modules.

TimeLine Vista Inc., Vista, CA, USA

Vice President of Engineering (1999-2002)

Director of Engineering (1996-1999)

Software Development Manager (1994-1996)

Senior Software Engineer (1991-1994)

As VP of Engineering, led a group of up to 14 engineers through several successful designs in the area of multichannel digital audio recorders and machine control systems for audio and video post production. Introduced Verilog HDL to streamline FPGA development and enable greater design re-use. Introduced embedded 32-bit processing to address combined control and DSP issues. Encouraged the use of C++ and OO design techniques for all PC and embedded RISC applications; C for 8-bit CPU's; assembler only when necessary. Participated actively in product specification.

Inventions and Developments applied to Multiple Projects

- o Invented auto-polling, multi-group, precision synchronization bus ("TL-Bus") for multiple digital audio devices and control surfaces, over up to 100m of cable.
- o Created complete inner audio "engine" for digital audio recorders.
- o Invented and maintained an extensive system-wide software messaging system and serial protocol.
- o Introduced absolute timebase capture/compare systems for the implementation of software PLL's.
- o Invented proprietary Predictive PLL as well as using PID and other methods.
- o Developed Direct Digital Synthesis (DDS) for audio sample clock generation.
- o Created generic OS API object for cross-platform use.
- o Supervised UI Design for most projects, and ultimately executed those designs from high-level software to hardware interface.
- o Simplified hardware/software interface implementation and modification by (a) using virtual software object interfaces, and (b) co-designing HDL and software.
- o Implemented MIPS boot, CPU, cache and other low-level management code, using MIPS assembler.

Project: TL-Sync Advanced Machine Controller and Rate Generator

Created initial specification and base design. Implemented real time software and HDL code containing collectively over several 100,000 lines of code, to control video machines running at a multitude of rates and utilizing a variety of formats.

(This product was subsequently acquired by Session Control LLC and brought to market by G. Lester in Q4, 2003. Details may be found at <http://www.sessioncontrol.com/TLs%20Features.htm>)

Project: MX-2424 Multi-Track Hard Disk Audio Recorder

Chief architect and project leader throughout. Responsible for system design; audio path design; audio bandwidth calculations; initial main unit schematic; audio interconnect design; user interface design; all synchronization and transport motion issues.

- Installed, interfaced and debugged Galileo 64115 (MIPS North Bridge) for dual MIPS CPU's.
 - Implemented digital audio path from disk buffers to I/O and back, including all I/O controls, DMA, DSP, gain controls, timing, buffer addressing and queuing, waveform collection, and metering.
 - Wrote DSP code for audio edit cross fades and off-speed interpolation using MIPS assembler.
- (This product was designed and manufactured for the TEAC Corporation of America, TASCAM Division, and may be viewed at <http://www.tascam.com/products/mx-2424.html>)

Project: MMR-8 Modular Multi-Track Digital Dubber

Authored product specification, and assumed full project leadership in mid-development. Responsible for audio path design; user interface design; all synchronization and transport motion issues; main command dispatchers; software/hardware interfaces and drivers.

- Designed synchronization interface, and implemented software using Pentium and multiple 8051's.
- Implemented DSP audio suite using Motorola DSP56002.
- Interfaced and debugged PLX PCI9060 (PCI peripheral interface).

(This product was designed and manufactured for the TEAC Corporation of America, TASCAM Division, and may be viewed at <http://www.tascam.com/products/mmr-8.html>)

Project: Mediasound Multi-Track Graphical Audio Editor for SGI Workstations

Managed a team of 7 engineers, including several consultants.

- Created very high-speed waveform display using unique tiered file system under UNIX.

ADAMS-SMITH, Hudson, MA, USA

Chief Engineer (1988-1991)

Project Leader (1986-1988)

Software Engineer (1985-1986)

Supervised six other hardware, software and field support engineers. Upgraded all engineering documentation systems from manual to CAD based. Created significant software improvements in the Adam-Smith 2600 modular synchronizer series. Designed new lower cost Zeta-Three Synchronizer.

Tele-Tech Electronics Ltd., Markham, Ontario, CANADA

Manager, Technical Services (1980-1985)

Supervised team of field service technicians. Responsible for recording studio system evaluation, design and installation; customer training (operations and maintenance); technical support for automated consoles, multi-track recorders and ancillary audio equipment. Designed and maintained synchronizer transport interfaces and synchronizer control software.

EDUCATION

B.A. University of Melbourne, Victoria, Australia [Mathematics and Logic].

INDUSTRY INVOLVEMENT and AWARDS

- Received an Academy of Television Arts & Sciences 2000 Prime Time Emmy Award for Outstanding Achievement in Engineering Development for the MMR-8 and MMP-16 Digital Dubbers.
- Led the TimeLine engineering team to an Academy of Motion Picture Arts & Sciences Scientific and Engineering Award for the design and development of the MMR-8 digital audio dubber (2001).
- Author of MIDI Machine Control (MMC) protocol, now in widespread use (reference http://en.wikipedia.org/wiki/MIDI_Machine_Control).
- MX-2424 Product Awards (TimeLine):
 - 2001 Mix Magazine TEC Award (Category "Recording Devices")
 - M.I.P.A. International Press Award, given by the editors of the world's leading audio publications.
 - Electronic Musician Magazine 2001 Editors' Choice Award
 - Pro Audio Review Magazine Par Excellence Award

- Other MMR-8 Product Awards (TimeLine):
 - 8th and 9th Annual Post Awards (Audio Systems and Gear, Multitrack Digital Recorder).
- Zeta~Three Product Award (Adams-Smith)
 - 1990 Mix Magazine TEC Award (Category "Ancillary Equipment")

REFERENCES

Excellent professional references from previous clients available on request.

SKILL SUMMARY

Recent Applications

- AES/EBU audio clock decode
- Audio codec interfaces & software
- Bayer to RGB conversion
- Boot loaders (MIPS, ARM7, Microblaze)
- Camera gain and white balance servos
- Camera synchronization
- Color mixers, color space conversion
- Modular video processing design
- Continuously variable video scaling (50%~200%)
- Cross platform OS interfaces
- DRAM: Arbitration (N-channel)
- DRAM: SDRAM, DDR and Mobile DDR PHY
- FIFO's (block style and streaming)
- Flash and/or EEPROM based file systems
- FPGA programming by external CPU
- Frame buffers
- Gamma correction & contrast controls
- Histograms
- I2C and SPI interface blocks
- Inter-clock-domain handlers
- LCD Column Drivers
- LCD panel & OLED controls
- Look-up tables
- NTSC/PAL Decoder/Encoder interfaces
- On-screen text displays
- Pattern generators
- USB video
- REC 601,656 conversions
- Reticle overlays
- Serialized CPU to FPGA interfaces
- Software PLL's
- USB audio
- USB devices
- Vectored Interrupt Controllers
- Video I/O Formats: NTSC, PAL, VESA, LVDS, DVI, Camera Link
- Video sync generators, genlock

CPU's, PLD's

- ARM7
- Cypress FX2
- Freescale S08
- X-Scale
- Microblaze
- NIOS
- MIPS
- Embedded PC Systems
- Extensive 8-bit experience
- DSP56002
- Xilinx FPGA's and CPLD's
- Altera, Lattice PLD's

Languages

- C++ (15 yrs)
- C (22 yrs)
- Assembler (27 yrs)
- Verilog (11 yrs)

Tools

- Altera
- CodeWarrior
- GNU
- Green Hills MULTI, Integrity
- HyperLynx
- Keil
- ModelSim
- Subversion, Perforce, PVCS
- Visual C++, Visual Studio
- Xilinx
- Microsoft Driver Development Kit (DDK)
- Compuware/NuMega Driver Studio and SoftICE debugger
- Express Logic "ThreadX" OS
- Synplicity Synplify HDL Synthesis
- Orcad
- GC-Prevue (Gerber)
- AutoCAD