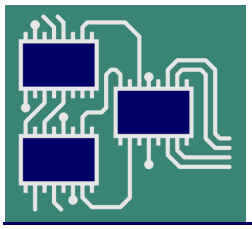

# Gary Stringham

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## Professional Summary

Thought leader in the design and testing of software, firmware, and hardware. Over 30 total years of professional engineering experience including 15 years with Hewlett-Packard's LaserJet printer design lab. Holder of 13 patents. Author of key text in hardware/firmware interface design. Experienced expert witness. Significant public speaking experience.

## Experience

### Cubby Paperless, LLC

Founder and CEO
Boise, Idaho, 2019 – Present

#### Online Document Storage Service

Developed and patented an online document storage service which aggregates and presents paperless bills and statements for end consumers.

- Started this company to monetize this patented process.
- Used third-party companies and freelancers to develop the website, create a name and brand, write blogs, develop marketing materials, carry out marketing activities, and other related functions.

### Gary Stringham & Associates, LLC

President and Founder
Boise, Idaho, 2004 – Present

#### Contract Software, Firmware, and Hardware Engineering

Provided contract engineering services in design and firmware programming. Sample projects include the following:

- Law firm for intellectual property matters: Reviewed over 700 patents for valuation purposes. Produced about 40 claim charts showing potential presence of claims in products.
- Startup in green technologies: Designed and wrote a communication protocol specification, solved several design issues, and wrote firmware in C for universal power supplies.
- Various clients and projects: Analyzed and compared different programming languages to determine characteristics and to compare software written in the different languages.
- Engineering consulting firm: Performed and wrote analysis of two competing tools and analyzed product designs and generated solutions.

- Municipal utility equipment companies: Solved intermittent Linux hangs and examined software code for defects.
- Prototyping firm: Wrote assembly language for a Microchip PIC processor connected to hardware components for a keypad prototype.
- Large consumer electronics firm: Diagnosed several difficult and intermittent hardware and firmware problems and developed firmware solutions and workarounds for those problems. Provided consultation, training, and other work to port a device driver to new hardware.

### Consultant/Training

Adjunct Professor at Boise State University spring semester of 2019 teaching a 400-level computer architecture course.

Provided consulting, training, and authoring to the embedded systems industry to promote good hardware/firmware/software design practices. Delivered training in person, at conferences, and via webinars.

Took PLI's (Practicing Law Institute) Patent Office Exam Course, a.k.a., "Patent Bar Review."

### Litigation Support

Provided litigation (including pre-litigation) support in cases involving software, firmware, and hardware.

- Allegations addressed include infringement of patents, copyrights, trade secrets, and intellectual property; unauthorized use of software source code; product reliability and liability; breach of contract; and substandard work and products.
- Typical tasks performed include software source code analysis and comparison, hardware design analysis, reverse engineering, data analysis, and patent analysis.
- Industries include printers, video games, social media, server software, and commercial equipment.
- Served as both a consulting and testifying expert witness.
- Have authored expert reports and declarations. Have testified at depositions and trial.

## Hewlett-Packard Co.

### Firmware Engineer Expert in LaserJet Printer Lab

Boise, Idaho, 1998 – 2005

- Fully responsible for eight LynxOS device drivers written in C for those blocks as implemented across seven ASICs and SoCs and used in 25 different LaserJet printers.
- Diagnosed several ASIC and SoC defects and then designed and developed firmware workarounds, saving $500,000 and three months for each re-spin averted.
- Championed over twenty low-impact design changes in ASICs and SoCs, which reduced firmware complexity, improved the quality and reliability of LaserJet printers, and reduced driver development time from 12 months to three days.

- Established and promoted driver development standards among the 20+ engineers resulting in more reliable and maintainable drivers. As the resident driver expert, provided advice and guidance to the engineers.
- Awarded 12 US patents. Authored 15 defensive publications.

### Firmware Test Development Engineer in LaserJet Printer Lab

Boise, Idaho, 1992 – 1998

- Designed and built three generations of LaserJet printer emulators that saved HP over $10 million and significantly improved the quality of products under development. Responsible for most of the FPGA design, board design, firmware programming, and host computer libraries.
- Designed and implemented various printer test tools, applications, and suites, with some interfacing to hardware tools, to automate test execution and results processing. Developed primarily in C and Korn shell. In one instance, reduced a 40-hour manual test to a 35-minute automated test.

### Test Development Engineer for HP-UX Workstation Manufacturing

Colorado, New Hampshire, and Germany, 1989 – 1992

- Designed a standardized test architecture to run on HP-UX computers to test other HP-UX computers being assembled in manufacturing. Led a team of 10 engineers to develop the architecture.
- Developed a customizable, X-window interface for the standardized test architecture. The customizable capabilities allowed configuring the X Window without doing any C programming, a necessary feature when deployed at five HP-UX manufacturing sites world-wide.

### Manufacturing Development Engineer for HP-UX Workstation Manufacturing

Fort Collins, Colorado, 1984 – 1989

- Developed and supported a QIC (3M data cartridge) tape duplication system used to make copies of HP-UX software for distribution. Delivered to the Department of Defense for copying their Top Secret tapes in a secure environment.
- Diagnosed and solved firmware defects in a new QIC tape drive. Worked with vendor to identify and analyze manufacturing flaws in the QIC tapes.
- Provided engineering support for HP-UX component and workstation manufacturing. Updated manufacturing processes for new products. Trained and supported engineers responsible for similar manufacturing lines at four other domestic and international sites.

## Related Employment during College Years

- September 1983 – July 1984: Assistantship at Utah State University, researched, designed, and built an embedded water level sensor.
- May 1983 – August 1983: Internship at Hewlett-Packard in Fort Collins, CO, testing for static electricity susceptibility of ICs.

- January 1983 – April 1983: Taught electrical engineering class for non-majors at Brigham Young University.
- May 1982 – August 1982: Internship at Hewlett-Packard in Fort Collins, CO, developed automated reports.
- June 1981 – August 1981: Internship at IBM in Boca Raton, FL, developed memory board for test fixture.

# Publications

## Books

1. Stringham, Gary. *Hardware/Firmware Interface Design: Best Practices for Improving Embedded Systems Development*, Elsevier/Newnes, 2010, 376pp, ISBN 978-1-85617-605-7.
2. Stringham, Gary. *Hardware/Firmware Interface Design: Best Practices for Improving Embedded Systems Development*, (Simplified Chinese edition), Elsevier/Newnes, 2011, 274pp, ISBN 978-7-302-26701-0.
3. Oshana, Robert, and Kraelin, Mark, editors. *Software Engineering for Embedded Systems: Methods, Practical Techniques, and Applications*, Newnes, 2013, 850pp, ISBN 978-0124159174. Chapter 6 by Stringham, Gary.

## Articles/Papers

1. Online Article: *Hardware/firmware interface design – Principles, part 1-2*, and *Design, parts 1-4*, January-February 2014, published by EDN,
    a. http://www.edn.com/design/systems-design/4426729/Hardware-firmware-interface-design---Principles--part-1
    b. http://www.edn.com/design/systems-design/4427075/Hardware-firmware-interface-design---Principles--part-2
    c. http://www.edn.com/design/systems-design/4427358/Hardware-firmware-interface-design---Design--part-1
    d. http://www.edn.com/design/systems-design/4427550/Hardware-firmware-interface-design---Design--part-2
    e. http://www.edn.com/design/systems-design/4427922/Hardware-firmware-interface-design---Design--part-3
    f. http://www.edn.com/design/systems-design/4428214/Hardware-firmware-interface-design---Design--part-4
2. Printed Article: *Engineers and Management*, published in The Software Practitioner, November-December 2013, Volume 23, No. 6, page 9.
3. Printed Article: *Hardware/Firmware Interface Design: Best Practices for Improving Embedded Systems Development*, published in Embedded Intel Solutions, Spring 2010, pages 28-29, online at www.embeddedintel.com/special_features.php?article=1498 or print at http://www.extensionmedia.com/basecamp/14199/embeddedintelsolutionsmagazinespring2010/FEATURE_BOOKEXCERPT_v1.pdf.
4. Online Article: *Firmware-Friendly FPGA (and ASIC) Design Tips*, February 2009, published by Netrino (now Barr Group), www.barrgroup.com/Embedded-Systems/How-To/Firmware-Friendly-FPGA-ASIC-Design.

5. Online Article: *Firmware-Friendly DMA Module Design Tips*, February 2009, published by Netrino (now Barr Group), www.barrgroup.com/Embedded-Systems/How-To/Firmware-Friendly-DMA-Module-Design.
6. Paper: *Overview of Hardware/Firmware Interface Design*, July 2006, www.garystringham.com/downloads/HFID-White-Paper.pdf.

### Newsletters/Blogs

1. Blog: 2006-present. (Includes newsletter articles.) www.garystringham.com/blog.
2. Newsletter: *The Embedded Bridge*, monthly during 2006-2011, discussing hardware/firmware interface design practices. Had over 400 subscribers. www.garystringham.com/newsletter.
3. Blog: *Embedded Bridge*, hosted by EmbeddedGurus, 2010-2011, www.embeddedgurus.com/embedded-bridge.
4. Blog: *Hardware/Firmware Interfacings*, hosted by EECatalog.com, 2010-2011, www.eecatalog.com/stringham.

## Presentations

### Conferences

1. *Worldwide patent perspectives: software, SEPs, and the future of patent litigation* (panel member) – Global IP Confex, San Francisco, California, February 2017.
2. *Writing Reusable Firmware for Embedded Devices* – EELive! Embedded Systems Conference, San Jose, California, April 2014.
3. *Principles and Practices of Hardware/Firmware Interface Design* – Design West Conference, San Jose, California, April 2013.
4. *Principles and Practices of Hardware/Firmware Interface Design* – Embedded Systems Conference, Bengaluru, India, July 2012.
5. *Using Register Design Tools to Sync Hardware/Firmware Designs* – Embedded Systems Conference, Bengaluru, India, July 2012.
6. *System-Level Testing and Debugging* – Embedded Systems Conference, Bengaluru, India, July 2012.
7. *HW/SW Interface Management – The Path to smoother HW/SW integration?* – Panelist, Design Automation Conference, San Francisco, California, June 2012.
8. *Principles and Practices of Hardware/Firmware Interface Design* – Embedded Systems Conference, San Jose, California, May 2011.
9. *Intelligent Hardware/Software Interface Design* – DesignCon, Santa Clara, California, January 2011.
10. *Strategic Software-Dictated Hardware Design* – CDNLive, Alternate speaker, San Jose, California, October 2010.
11. *Principles and Practices of Hardware/Firmware Interface Design* – Embedded Systems Conference, Boston, Massachusetts, September 2010.
12. *Best Practices in Hardware/Firmware Interface Design* – Embedded Systems Conference, Bangalore, India, July 2010.
13. *How to Write Reusable Device Drivers* – Embedded Systems Conference, Bangalore, India, July 2010.

14. *Conquering Hardware/Firmware Integration Challenges* – Design Automation Conference, Anaheim, California, June 2010.
15. *Keeping Hardware, Firmware, and Documentation Files in Sync* – Design Automation Conference, Anaheim, California, June 2010.
16. *Lessons Learned in Hardware/Firmware Interface Design* – Embedded Systems Conference, Boston, Massachusetts, September 2009.
17. *How to Write Reusable Device Drivers* – Embedded Systems Conference, Boston, Massachusetts, September 2009.
18. *Twenty Lessons Learned in Hardware/Firmware Interface Design* and – Embedded Systems Conference, San Jose, California, April 2009.
19. *Best Practices in Hardware/Firmware Interface Design* – Embedded Systems Conference, San Jose, California, April 2009.
20. *Best Practices in Hardware/Firmware Interface Design* – Embedded Systems Conference, Boston, Massachusetts, October 2008.
21. *Twenty-five Lessons Learned in Hardware/Firmware Interface Design* – Embedded Systems Conference, San Jose, California, April 2008.
22. *Best Practices in Hardware/Firmware Interface Design* – Embedded Systems Conference, San Jose, California, April 2008.
23. *Twenty-five Lessons Learned in Hardware/Firmware Interface Design* – Embedded Systems Conference, Boston, Massachusetts, September 2007.
24. *Twenty-five Lessons Learned in Hardware/Firmware Interface Design* – Embedded Systems Conference, San Jose, California, April 2007.
25. *RTL Design Practices that Improve Firmware Development* – Real-Time Automotive Seminar, Dearborn, Michigan, November 2005.
26. *RTL Design Practices that Improve Firmware Development* – Embedded Systems Conference, San Francisco, California, March 2005.
27. *ASIC Design Practices from a Firmware Perspective* – Embedded Systems Conference, San Francisco, California, April 2004.

## Webinars

1. *Writing Reusable C Code for Embedded Systems* – DesignNews Continuing Education webinar, November 2012.
2. *Principles of Interface Design* – DesignNews Continuing Education webinar, May 2012.
3. *System-Level Testing & Debugging* – DesignNews Continuing Education webinar, March 2012.

## Business Presentations

1. *Seven Principles of Hardware/Firmware Interface Design* – India Semiconductor Association meeting, Bangalore, India, July 2010.
2. *Principles of Hardware/Firmware Design* – IEEE Boise Chapter Meeting, Boise, Idaho, April 2008.
3. *RTL Design Practices that Will Improve Firmware Development* – IEEE Boise Chapter Meeting, Boise, Idaho, August 2004.
4. *ASIC Design Practices from a Firmware Perspective* – Hewlett-Packard LaserJet Design Lab, Boise, Idaho, February 2004.

# Inventions

## U.S. Patents

1. **11,522,944** – *Systems and Methods for Distributing Electronic Documents*. Gary Stringham. Issued 06-Dec-2022.
2. **11,140,213** – *Systems and Methods for Distributing Electronic Documents*. Gary Stringham. Issued 05-Oct-2021.
3. **7,394,558** – *Modifying Printing Based on Print Job Clues*. Gary Stringham. Issued 01-Jul-2008.
4. **7,152,107** – *Information Sharing Device*. Bert Newell, Gary Stringham. Issued 19-Dec-2006.
5. **7,107,368** – *Systems and methods for printing*. Todd Lutz, Gary Stringham. Issued 12-Sep-2006.
6. **7,095,513** – *Method and Apparatus for Language Translation of Production Job Output*. Gary Stringham. Issued 22-Aug-2006.
7. **7,086,055** – *Computer System and Method for Increased Processing Power by Communicating with Non-computer Devices*. Gary Stringham. Issued 01-Aug-2006.
8. **7,054,021** – *System and Method for Printing Multiple Different Jobs in a Single Action*. Robert Sesek, Gary Stringham. Issued 30-May-2006.
9. **6,856,860** – *Systems For and Methods of Distributing Mail*. Bert Newell, Gary Stringham. Issued 15-Feb-2005.
10. **6,801,730** – *Printer Power Management*. Warren Johnson, Gary Stringham. Issued 05-Oct-2004.
11. **6,671,487** – *Fuser Assembly Including First and Second Fusers. Gary Stringham*. Issued 30-Dec-2003.
12. **6,609,172** – *Breaking Up a Bus to Determine the Connection Topology and Dynamic Addressing*. Gary Stringham. Issued 19-Aug-2003.
13. **6,268,745** – *A Wired-AND Bus Interface Circuit for Galvanically Isolating Nodes*. Gary Stringham. Issued 19-Jun-2001.
14. **6,249,666** – *Print Path Identifiers to Identify Print Medium Paths*. Bert Newell, Ricardo Osuna, Carlos Becerra, Gary Stringham. Issued 31-Jul-2001.

## Abandoned U.S. Patent Applications

1. **10/418,542** – *System For and Method of Distributing Mail*. April 17, 2003.
2. **10/352,565** – *Customizing Print Job Clues*. January 28, 2003.
3. **10/352,818** – *Print Job Clues*. January 28, 2003.
4. **10/284,099** – *Selectively Printing Document Pages*. October 31, 2002.
5. **10/247,884** – *Method to Edit a Document on a Peripheral Device*. September 20, 2002.
6. **10/227,330** – *Obtaining Pieces of Operating Code for a Network Device from Multiple Sources*. August 23, 2002.
7. **10/146,626** – *Task Scheduling and Automated Task Performance in Printers*. May14, 2002.
8. **10/106,713** – *System and Method for Supporting Network Devices*. March 26, 2002.

9. **10/095,251** – *Method and Device for Specifying Initialization Tasks for a Peripheral Device*. March 12, 2002.
10. **09/973,108** – *A Printer Having a Thesaurus Feature*. October 9, 2001.
11. **09/870,972** – *Apparatus for Selectively Distributing Document Production Job Output*. May 31, 2001.
12. **09/877,913** – *A Method and Apparatus that Enables Language Translation of an Electronic Mail Message*. June 8, 2001.
13. **09/874,728** – *Methods and Arrangements for Compressing Raster Data*. June 4, 2001.
14. Application number unknown – *A Method to Determine the Connection Topology and Dynamic Addressing of a Bus System*. About April 20, 2000.

## Defensive Publications

Published to disclose inventions without applying for a patent.

1. *Maser Large Jobs By Getting Host To Send Job Multiple Times.* Gary Stringham. Research Disclosure, pg. 933, doc #472045, August 2003.
2. *Method and Use of an Instant Email Address Verification Service.* Gary Stringham. Research Disclosure, doc #465032, January 2003.
3. *Method and Use of Preventing User from Copying Unauthorized Documents.* Gary Stringham. Research Disclosure, pg. 963, doc #458031, June 2002.
4. *Method to Install Localization File onto Printer Via Paper.* Gary Stringham. Research Disclosure, pg. 968, doc #458036, June 2002.
5. *Method for Displaying Document Images.* Gary Stringham. Research Disclosure, pg. 952, doc #458019, June 2002.
6. *Method and Use of Sending Photos from Camera Memory via Email.* Gary Stringham. Research Disclosure, pg. 963, doc #458030, June 2002.
7. *An Output Paper Handling Device to Cut Edges for Tiled Printouts.* Gary Stringham. Research Disclosure, pg. 959, doc #458028, June 2002.
8. *Attach a Removable-media Drive to a Printer for Direct Printing.* Gary Stringham. Research Disclosure, pg. 711, doc #457001, May 2002.
9. *Print Job Reformatter Driver.* Gary Stringham. Research Disclosure, pg. 543, doc #456001, April 2002.
10. *Method and Use of Swiping Credit Card on Printer to Print Statement.* Gary Stringham and Todd Lutz. Research Disclosure, pg. 2016, doc #452036, December 2001.
11. *Method to Use PDA to Download Localization File to Printer.* Warren Johnson and Gary Stringham. Research Disclosure, pg. 2014, doc #452034, December 2001.
12. *An External Output Device for a Printer that Shreds Paper When Desired.* Gary Stringham and Bert Newell. Research Disclosure, pg. 1163, doc #447077, July 2001.
13. *An External Output Device for a Printer that Embosses Printed Media.* Gary Stringham. Research Disclosure, pg. 1159, doc #447073, July 2001.
14. *Devices External to the Printer that Allow Printing on a Pad of PostIt-brand Notes.* Gary Stringham. Research Disclosure, pg. 1152, doc #447064, July 2001.

15. *Structuring Source Code Data in One File to Be Used in Multiple Files.* Gary Stringham. Research Disclosure, pg. 718, doc #432102, April 2000.

## Skills/Keywords

The following is a partial list of skills, abilities, and experience.

3D printers, 3M Data Cartridge, 6502, 65c816, 68000, ADC, AHDL, All-in-one printers, Android, Apple II, ARM, ASIC, Assembly language, AT command set, Awk, AWS, Banking, bash, BASIC, BasicStamp, Bourne Again Shell, Bourne Shell, C, C++, C#, CAN, Claim charting, ClearCase, CodeSuite, Coldfire, Collaboration, Combinatorial logic, Concurrent Versions System, Consumer electronics, Copyrights, Cost savings, CS80, CSRSpec, CSS, CVS, Cygwin, DAC, Data analysis, Data compression decompression, Debugging, Delta compression, Design analysis, Design issues, Design, Development standards, Device drivers, Diagnostics, DMA, Electrical devices, Electrical engineering, Electronic devices, Electrostatic discharge, Embedded C Coding Standard, Embedded software, Embedded systems, Emulators, Engineering, Excel, Facsimile, Fax, Financial, Firmware, Fluid management, Forensics, Fortran, FPGA, Front-end chip design, G-code, GDB, Git, GPIB, Grafit, Green technologies, Greentalk, Greenwire, Hardware, Hardware turn on, Hardware/software products, Hewlett-Packard, HP, HPGL, HP-IB, HP-UX, HSC08, HTML, I2C, i96, IAR, IBM PC, IEEE-488, Innovation, Integration, Inventions, JavaScript, Kepner Tregoe, Kernels, Korn shell, ksh, Laser printers, LaserJet printers, LaTeX, Linus Tapes, Linux, Logic analyzers, LynxOS, Manufacturing, Micrium, Microprocessor, MIPs, MISRA, Modems, MPE, MPEP, MSP430, Multifunction printers, Municipal utilities, .NET, Networking, Oscilloscopes, Page Description Language (PDL), PALASM, Pascal, Patent claim charting, Patent prosecution, Patents, PCS Cortex, PCS “The Brain”, PIC, PCL, PHP, PJL, Plotters, PostgreSQL, PostScript, PowerPoint, PowerShell, Presentations, Printer MIB, Printer technology, Printers, Processor, Product development, Programmable calculators, Programmers, Programming, PsPad, Public speaking, Published author, Punch cards, QIC Quarter Inch Cartridge, Real-time operating systems (RTOS), Research and design, Reusable software, Reverse engineering, Rocky Mountain BASIC, RS-232, Scanners, Security devices, sh, Shell scripts, Simulators, SoC, Social media, Software, Software duplication, Software engineering, Software forensics, Software revision control, Source code, Source code comparison, Source code control, Statistics, STL, Subversion, SVN, Tape duplication, Test harness, Testing, TIFF, Trade secrets, Transact, Troubleshooting, TTL, TypeScript, UART, Ultrasonic distance measurements, UML, Unix, VAX, VBA, Verilog, VHDL, Vi, Video games, Visio, Visual Studio, VMS, VSCode, VueJS, VxWorks, Windows 3.1/9x/CE/XP/7/8, Word, X11, x86, Z80.

## Education

### Utah State University

Master of Science, Engineering, 1983 – 1985, Logan, Utah.

- Masters project was an embedded water level sensor.

### Brigham Young University

Bachelor of Science, Electrical Engineering, 1977 – 1983, Provo, Utah.

- Senior project was an embedded player piano.
- Taught an Electrical Engineering class to non-majors.
- 1979 – 1980: Took two years off from school to serve as a missionary in Central America.

## Professional Associations

- **IEEE (Institute of Electrical and Electronics Engineers):** Senior Member. 2005 – Present.
- **CNSV (Consultants' Network of Silicon Valley):** 2013 – Present.
- **FEWA (Forensic Expert Witness Association):** Professional Member. 2013 – 2019.
- **Phi Kappa Phi:** Academic honor society. 1984 – Present.
- **Toastmasters International:** Public Speaking club, earned Competent Toastmaster and Competent Leader awards, contest winner, club president and treasurer. 2000 – 2007.