John Yaron

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Job Objective

Electronic Design Engineering

Employment History / Designs

5/2007 to : Present — *Principal Design Engineer,* Yashu Systems, Archbald, Pa., www.yashu.com
- Contract Design Engineering -

- Design of economical embedded WiFi heavy-duty military vehicle data logging device:
  - J1939 & J1708/J1587, 802.3 ethernet, 802.11b/g WiFi and FAT16 compliant
  - 2 GByte secure digital memory with holdup power supply for failsafe operation
  - Permanent vehicle installation with low power sleep and autonomous wakeup
  - Internal real-time clock with re-chargeable lithium battery backup
  - 4 analog channels with 3MHz GBW input buffers
- Design of ZigBee wireless sensor interface data logging module for PHM applications:
  - Supports TC, RTD, strain, pressure, proximity, 4-20mA, ICP accel & generic sensors
  - 4 configurable input channels based on Wheatstone bridge architecture
  - Programmable constant current source excitation for each channel
  - Logs sensor data using per-channel user specifiable rates
  - Lithium battery and vehicle powered options

10/1997 to : 5/2007 — *Principal Design Engineer,* EASE Diagnostics, New Milford, Pa., www.obd2.com
- PC Based Automotive Diagnostics -

- Design of economy PC based automotive diagnostic peripheral devices and supporting software applications:
  - 2.4 GHz WiFi & 900 MHz frequency hopped spread-spectrum wireless transceiver family of devices which establishes a diagnostics link between a PC and Vehicle
  - WiFi Vehicle Computer ReProgramming Device .. SAE Standard to allow flashing of onboard vehicle controllers on all 1996 and up ground based commercial vehicles
  - Handheld Data Logger .. PIC18F8720 based, SD Card FAT formatted
  - Vehicle Simulator .. Simulates electronics within a '96 Chevy Lumina automobile

3/1996 to : 10/1997 — *Senior Design Engineer,* GAI-Tronics Inc., Reading, Pa., www.gaitronics.com
- Industrial Communications Equipment -

- Designed/Developed an 8-party line DSP-based Handset Station which operates on a single wire via a proprietary FDM (Frequency Division Multiplex) technique for use in industrial Intercom/Paging communications

4/1994 to : 6/1995 — *Design Engineer,* Ronco Inc., Lake Winola, Pa.
- Contract Engineering Firm -

- Performed system layout and design of a PLC based ultrasonic thickness gauging system for use on a glass polishing/finishing production line
- Responsible for the design and debug of a servo control system for 15 servo motors used on a glass polishing production line

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10/1991 to 1/1994 : *Electrical Engineer*, Audiodyne Co., Scranton, Pa.
- Audio Electronic Products -

- Performed design of an ADSP-2101 based 1/4 inch cartridge digital tape recorder capable of recording 300 hours of speech on one QIC tape
- Designed/Simulated speech compression and processing algorithms using MATLAB
- Wrote and debugged C language software for device control
- Responsible for design and development of a real-time voice compression/expansion unit for use in low bit-rate scrambled/secure communications

7/1982 to 1/1991 : *Electrical Engineer*, Westinghouse Corp., Hunt Valley, Md.
- Radar Test Equipment -

- Lead designer of a team which developed a 3-dimensional digital target simulator for use in pulsed doppler radar system test
- Invented a device to synthesize a dynamic audio spectrum for use in radar testing. The unit was 8086 based running C.
- Responsible for analysis and debug of X-band and L-band RF upconverters used in Westinghouse radar target simulators

Skills and Experience

Hardware: microP (80x86, 68xxx, Z80xx, 29xxx), DSP (TMS320xx, ADSP21xx, DSP32), FPGA (Spartan2/3), CPLD's (XC95xx), microCntrl (PIC, dsPIC, 8051, 68HCxx), coprocessor (80x87, 293xx), memory (ROM, NVRAM,cache), A/D:D/A, Digital/Analog Filter Design, PLC (Allen-Bradley, Honeywell)

Software: C, Delphi, Assembly, VHDL/Verilog, Xilinx Foundation, MATLAB, CAD (PCAD, OrCAD, AutoCAD,Alibre), DSP (DFT, FFT, LPC, xxPCM, FIR/IIR/Adaptive/2D/Kalman Filtering), GPIB, MathCAD, MSWord, Access, Excel, VBasic, Ladder Logic

Protocols: 802.3 TCP/IP, 802.11b/g WiFi, 802.15.4, J2534, J1850 (VPW/PWM), ISO-9141 CAN (ISO15765/J1939), J1708/J1587

Equipment: IBM-PC, digital/analog oscilloscopes, spectrum/vector network/TEF analyzers, signal/function generators, LCR & LFZ analyzers, logic analyzers, constellation analyzer

Education

1/1990 - 1/1991 Johns Hopkins University, Baltimore Md, DSP, 9 credits, GPA: 4.0
1/1983 - 1/1984 Loyola College, Baltimore Md, Digital Systems, 9 credits, GPA: 4.0
8/1978 - 5/1982 New Jersey Institute of Technology, Newark NJ, BSEE, GPA: 3.01
9/1975 - 6/1978 Lackawanna County Vo-Tech, Mayfield Pa, Electronics Technology

Patents

4982196 Radar Target Simulator
5117231 Doppler Spectrum Synthesizer

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=== Current Employment ===

I am currently employed at Yashu Systems, LLC as an independent contractor to BAE Systems located in Johnson City, NY. I was awarded contracts to design & develop:

1) DSP Sensor Interface Module (DSM) : Robust wireless universal sensor interface data logging system for vehicular Prognostics & Health Management (PHM) applications.

2) Embedded Diagnostic Logger (EDGR): Embedded diagnostic data logger for use on heavy-duty military vehicles for Prognostics & Health Management (PHM) and Condition-Based Maintenance (CBM) applications.

The technical details of the DSM device include:

- Battery powered and communicates wirelessly via ZigBee/802.15.4 to a host coordinator
- Each channel of the 4 channel device employs a configurable Wheatstone bridge based front end and allows for attachment of various types of passive and active sensors
- Each channel has a programmable constant current source and PGA under control of a Microchip DSP microcontroller
- Allows for constant current or constant voltage stimulus
- Channel front end is galvanically isolated from the attached sensor through the use of a 'flying capacitor' switching element and offers excellent CMRR and bandwidth
- Supports 2 ICP accelerometers with 4mA stimulus, programmable switched capacitor filter and PGA
- Configurability via USB 2.0 or ZigBee wireless
- Currently supports TC, RTD, Strain, Pressure, Proximity, 4-20mA, ICP Accelerometer & Generic Analog sensors

I designed the entire DSM assembly including schematics, component selection, PCB & enclosure. I wrote all functional and test firmware along with a supporting software application to allow configuration and maintenance of the unit. I coded all polynomial fit functions for the TC and RTD sensors and transfer functions for the constant current based quarter/half/full bridge interface.

The technical details of the EDGR device include:

- 40 MIPs 16-bit DSP (dsPIC) executes J1939 & J1708/J1587, 802.3 ethernet, 802.11b/g WiFi and FAT16 stacks
- Sleep mode allows permanent installation to the target vehicle
- 2GByte rugged embedded Secure Digital Chip (SD-Chip) logs all vehicular diagnostic data
- Internal real-time clock with re-chargeable lithium battery backup
- 4 analog channels with 3MHz GBW input buffers
- SuperCap power holdup circuit combats surprise disconnects from vehicle power and prevents SD-Chip file corruption due to any inadvertent power loss
- Capability to support an optional Universal Sensor Interface Module (DSM) which provides support for additional sensor sampling synchronous with J1939/J1708 traffic

I designed the entire EDGR assembly including schematics, component selection, PCB & enclosure.

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=== Recent Employment ===

Previously, I was employed as a Principal Electrical Design Engineer at EASE Diagnostics in Olyphant, PA. I was the senior hardware/firmware designer there specializing in the product definition, design and manufacturability of economy consumer PC-based automotive diagnostic peripherals. I designed all the hardware devices sold by EASE Diagnostics. This position entailed:

1) Initial product requirements based on customer and/or market requirements.
2) Performing any algorithmic/processing simulation to judge thruput requirements using MATLAB.
3) Conceptual electronic design of the device including mechanical packaging and modeling.
4) Pricing and manufacturability research to meet target price points.
5) Detailed electronic design and schematic/parts creation within a CAD package (PCAD-2002).
6) Design and layout of the PCB(s).
7) Drafting of all drawings, specifications and documentation necessary to manufacture the product either out-of-house or using limited in-house capabilities.
8) Specified/priced all capital equipment necessary to proceed with the development of the product.
9) Creation of the BOM and AML for the design.
10) Responsibility for obtaining the prototype PCB(s) and procuring parts.
11) Either building the prototype personally using a PACE surface mount rework system or delegating/orchestrating the processes necessary to have the prototype built by an out-of-house manufacturing facility.
12) Creation and testing of all embedded firmware and supporting software to breathe functionality into the device.
13) Defining, documenting and performing environmental and life cycle tests necessary for the design.
14) Performed/obtained any necessary government tests/approvals required for product launch.
15) Conducted initial device release to beta sites and performed all necessary engineering support to cure functional and environmental problems which may have occured with the design.
16) Designed and produced the test apparatus and test software/firmware to allow for manufacturing of the device as well as for diagnosing and repairing any faulty devices that return from the field.
17) Subsequent duties included an advisory position to tech support to diagnose installation issues in the field, component engineering to support parts obsolescence, locating long lead items at reasonable price points.

My most formidable task at EASE Diagnostics was the design of an embedded 802.11b wireless ground vehicle interface which allowed for reprogramming vehicle's computer system controllers to fix drivability and emissions issues. The device used multiple embedded microcontrollers from Microchip. Multiple devices can be used in a networked topology to provide diagnostic access to a fleet of automotive vehicles. I wrote the 802.11b WiFi embedded drivers as well as a custom TCP/IP stack to support the requirement for fast, small datagram transfers.

With regards to my WiFi experience, many solutions to embedding the WiFi/TCP stacks were available, but, my shoe-string budget and stringent EASE Diagnostics pricing/performance matrices didn't allow for it. I therefore wrote the majority of embedded drivers for off-the-shelf WiFi radios/cards and ran them on all custom hardware. This afforded me the opportunity to gain experience in the underlying low level ISO OSI

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communication layers and tweak any problems with various COTS access point compatibility. These custom drivers resulted in a more stable and distributable product with less field tech support.

I also completed the design and launch of a galvanically isolated USB vehicle interface utilizing a Xilinx Spartan3 FPGA to perform controller area network (CAN) high speed, multi-node, full duplex diagnostics communication between the vehicle and host PC. All FPGA code was developed in VHDL and simulated under Xilinx ISE Foundation. The prototype was completed, however, it was never adopted into consumer sales.

My last task was the design of a ZigBee CompactFlash card which would operate within my existing devices (in lieu of an 802.11b CF card) and allow for easy field upgrades to this new exciting technology. I also designed an economical Log-periodic planar PCB 2.4GHz antenna using standard FR4 material to be used as the device enclosure top.

My work design tools included PCB CAD (PCAD / OrCAD), Embedded-C (Hi-Tech / IAR) for Microchip uCs, Xilinx CPLD VHDL/Verilog (Foundation), C++ / Delphi and MATLAB. I also designed test apparatus and wrote custom utility applications to support the in/out-of-house manufacturing, test and field support of all my devices.

=== Past Employment ===

I was employed at GAI-Tronics Inc. in Reading, Pa. as a senior design engineer. My task there was the design/development of a T1-telephone interface assembly and a “Smart Handset Telephone Station” to be used for industrial Intercom/Paging communications. The T1-intfc provided 24 telephone channels with HDLC on a single twisted pair wire. The 'Smart' Station employed a fixed point Analog Devices DSP paired with an Intel 8051. This combo performed adaptively equalized frequency division multiplexing of 8 full-duplex voice channels on a single twisted pair wire. The unit implemented a bank of FIR filters and SSB shifters to position the voice channels adjacently within the communication bandwidth. I designed/coded all the DSP routines in C and assembly where necessary.

My work at Audiodyne, a small contract design house, involved extensive research and coding in speech DSP. The projects were a telephone speech scrambler and a voice mass storage unit. Tandem responsibilities included research of various techniques for analog voice scrambling and digital voice coding. Once appropriate algorithms were simulated and tested within MATLAB, I performed the hardware and firmware design of these products as well as packaging and document development for the devices. Both units used an embedded Intel microcontroller paired with an Analog Devices’ DSP.

The voice mass storage unit incorporated a quadrature mirror filter array preceding adaptive PCM compression codecs resulting in very high quality 16 kbit/s recorded speech onto a QIC magnetic tape. I design/coded the speech DSP routines as well as the IDE-based routines to stream the realtime recording to the QIC tape drive.

=== Past History ===

In the past, I was employed by Westinghouse Inc. and worked with a variety of analog/digital/RF circuitry in both commercial and military formats. This included its design and debug as well as documentation. Also, I worked with an extensive amount of test equipment within the laboratory and acquired much experience with its use.

The Westinghouse work with AN/APG-68 (F16) airborne pulsed doppler, AN/APQ-164 (B1-B) airborne phased

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array and MRSR (DIVAD Successor) ground based CW Lewis-Kretschmer coded RADARs provided me with ample DSP experience. This is the field of engineering in which I hold the highest degree of interest.

=== Synopsis ===

I consider myself to be very capable of tackling any electrical design task -or- problem. I am capable of generating system level requirements as well as performing all the design duties. I'm at about 28 years of experience in MicroController/DSP hardware/firmware and software design and will be a good designer candidate for any conceptual products.

My background and ability to work independently as well as communicate effectively should prove to be commensurate with your requirements. Please consider my application and I look forward to hearing from you.

=== Portfolio ===

Please reference my designs at the following websites:

Yashu Systems, LLC. @ http://www.yashu.com

EASE Diagnostics @ http://www.obd2.com

If required, please email me for additional information about any of the above listed products. I can provide a more comprehensive portfolio which will dictate my level of experience.

Regards,
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