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DIGITAL DESIGN FROM CONCEPTION TO PRODUCTION

Over 20 years of experience in the development and design of video games, consumer electronics, and computers & peripherals.

I specialize in designing hardware and software for embedded digital systems. My years in the video game business have given me exceptional skills in the art of high performance, low power, minimum cost engineering. I am completely comfortable with all major logic families, memories, MCUs, PLDs, FPGAs, & ASICs, and their utilization in real-time environments. My experience includes the assembly language programming of over a dozen different microcontrollers, the design of PCI cards, and the optimization of DRAM arbitrators/controllers.

WHY USE A CONSULTANT? -- By using a consultant to meet your engineering needs, you maximize flexibility while minimizing overhead, capital expenditures, and long-term commitments. I bring the specific skills and tools needed to complete your task quickly, competently, and professionally. My modern lab is immediately available for your project. Should your needs or plans change, our relationship can easily change too. When the design is completed, and successfully released to manufacturing, we can call the job "Done!" You are not burdened with continuing commitments to an employee, an office, or a piece of equipment.

AMONG THE SERVICES I CAN PROVIDE TO YOU ARE:

* Product definition
* Firmware development
* Prototype - wirewrap or PCB
* ASIC design
* System design
* Circuit design
* FPGA implementation
* Cost reduction

PREVIOUS DESIGNS HAVE INCLUDED:

* Embedded controllers
* Complex state machines
* Graphic LCDs & VFDs
* SDRAMs, SGRAMs, & VRAMs
* Video engines - 2D, 3D, JPEG
* PC plug-in cards - ISA & PCI
* Gate array, standard cell, and full custom ICs
* Multiple FPGAs, some requiring hand partitioning, placing, & routing
* Optimum bandwidth memory controllers/arbitrators
* Numerous MPUs & MCUs, including 4, 8, 16, & 32 bit

SOME OF MY PREVIOUS PRODUCTS:

* Coin Operated Video Games
    - Midway Games, Inc., "MagicBus" USB I/O card for HydroThunder, 1999
    - Bally Sente, The SAC I Programmable Arcade System, 1984
    - Sente, Inc., Snake Pit, 1983
    - Videa, Inc., Gridlee, 1982
    - Atari Inc., Superbug, 1977; Lunar Lander, 1978; Asteroids, 1979
* Other Products
    - Metrotel Corp., "MT FH3-1", telco lineman test set, 2001
    - Smart Matter, Inc., "Smart Plane", intelligent toy airplane, 2000

    - Secure Computing, "Thincard" credit card sized password token, 1999
    - Videomedia Inc., "M2X" JPEG Digital Video Editor, 1997
    - PF Magic, "The Digital Joypad", 1995
    - PF Magic, "Edge 16" Peripheral For Sega Genesis Game Player, 1994
    - Apple Computer, Prototype Computer, ("Fast Eddie"), 1991
    - ByVideo Inc., Point of Purchase Merchandiser, 1983
* Research & Development (Non-production oriented)
    - Time Warner Interactive, Prototype of 3D Image Generator, 1996
    - The 3DO Company, Breadboard of ASIC for 3DO Multimedia Player, 1991
    - Apple Computer, Study of Custom RISC CPU & Memory Interface, 1990
    - Epyx Inc., Breadboard of ASIC for "Lynx" Consumer Video Game, 1988

I BRING TO YOUR PROJECT OVER 20 YEARS OF EXPERIENCE:

June 1988 -- Present
Consultant

Among my recent designs is a key-fob size device for generating one-time use computer passwords. This battery operated product, developed for Secure Computing Corporation, utilizes data encryption techniques within an off-the-shelf ultra-low cost MCU. Due to the limited resources within the MCU, and the use of a non-replaceable battery, I wrote all of the firmware in assembly language, paying obsessive attention to memory utilization and power consumption.

Another interesting project of which I was the principal designer is a coin operated photo booth for FacePlace Photo. My client wanted a product significantly more reliable than existing photo booths. Basing the design on an Intel 386SX processor, I developed an embedded controller with extensive I/O capability, as well as a custom ruggedized camera. The resulting photo booth delivers pictures to customers in only 16 seconds. Having neither a hard drive nor an operating system results in a robust, low cost system, well suited to harsh commercial environments.

October 1981 -- May 1987
Videa, Inc. -- Founder, Chief Financial Officer, Vice President of Engineering
Sente Technologies, Inc.; Bally Sente, Inc. -- Vice President of Engineering

Videa, an electronic entertainment consulting firm, developed product for the coin-operated and consumer video game markets, as well as the first laser disc based point-of-purchase merchandiser. Besides my corporate role, I designed the hardware for the above mentioned products. Videa, with eight employees, was acquired by Pizza Time Theater to become their new Sente Technologies division. I personally designed the Sente "SAC I" convertible video game system - the first cartridge based arcade machine. I also supervised a staff of four engineers and three technicians, as well as sharing responsibility for the day to day operation of the division. Sente Technologies was acquired by Bally Manufacturing in 1984, and renamed Bally Sente. I continued in same roles, developing games and managing the department.

July 1976 -- October 1981
Atari, Inc. -- Engineer; Supervisor, electrical engineering

While at Atari, I developed the vector generator display system used in Lunar Lander and Asteroids, the most successful arcade video game ever developed in the United States. This system, and subsequent enhancements, were used by Atari in nine different games. I also programmed and developed hardware for four other video arcade games (Superbug, Canyon Bomber, Firetruck, & Smokey Joe).

EDUCATION:

Bachelor Of Science, Chemistry -- Rensselaer Polytechnic Institute 1973
Master Of Science, Scientific Instrumentation -- UC Santa Barbara 1976