

Applications DDC Has Expert Knowledge In **P.1**

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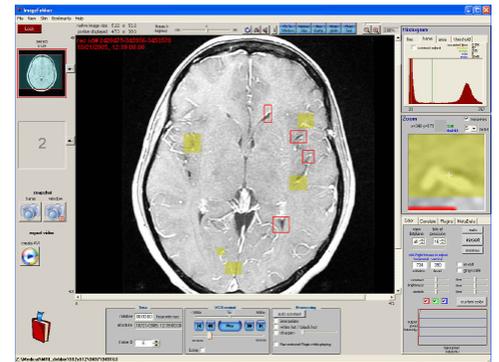
Why DDC is Uniquely Qualified To Work With You **P.3**

Applications DDC Has Expert Knowledge In

DDC has a wide breadth of medical equipment experience. DDC tends to be on the high end in terms of complexity and algorithmic sophistication, and we ultimately culminate our experience in the most advanced applications and highest levels of integration, using the latest FPGA technologies. Our medical applications expertise loosely falls into 4 general categories, as outlined below.

Medical Imaging

DDC has researched, architected, then developed, implemented, and tested the actual hardware and software, for medical imaging applications, for such companies as GE, Toshiba, Siemens, and Loral. Specifically, DDC has worked with angiography lineups, CT scanners, PET scanners, MRI, coincidence detectors, all in the image capture, processing, and display sections of these products. DDC has developed very high speed portions of image reconstruction and back projection systems, including such functions as very high speed frequency domain filtering (FFT, IFFT, etc.), lossless compression, distortion correction, various weighting and extrapolation functions, warp, zoom, image reconstructions, etc. In most of these systems, DDC has developed the hardware and also developed the driver and application software, both in image reconstruction, image processing, and in control. DDC has also developed and implemented a sophisticated imaging system for DNA slide analysis, including all of the camera control. We have also co-developed a high speed finger-print recognition system.



Instrumentation Control

DDC has developed several FPGAs and software for medical control applications for angiography lineups, fitness machines (heart rate monitor), ECG equipment (16 analog channel control, with remote video switching, optical data transfer, etc.), EEG equipment, audiometric brainwave analyzers, eye motion equipment, camera controllers, etc. DDC has extensive experience in developing GUIs to control such equipment as well, both for test and product uses. As an example, DDC has developed a 2 board product (with FPGAs and software) for Toshiba which interfaced and controlled: a CT data acquisition board (DAS) to accept the actual scan information, motor control board for control of the gantry including rotation, the X-Ray source for configuration of X-ray power level (eV) and implementing safety controls, the slip ring to send the high speed formatted scan data to the non-rotating side (stator) using up to four 2 Gbps links, the housing FAN for thermal management, etc.

Biometrics

DDC has extensive experience in developing audio stimulus and retinal stimulus for EEG correlation of external stimulus. This involved developing FPGAs and software to provide AM and FM modulated tones with very high precision and sampling rates on 12 different channels, providing lightbar stimulus, and writing the Windows XP WDM drivers which controlled the system. We also developed for GE a board and FPGAs for a hear-rate monitor which included the optical data flow from the apparatus, and subsequent control.

Applications DDC Has Expert Knowledge In (Continued)

Imaging In General

DDC has much experience in video and imaging electronics, as outlined below. There are many more. The following is a high level summary of the some of the product categories DDC has expertise in.

- **Set-top boxes:** DDC has developed several different compression chips including an MPEG set-top box lineup. This was an SoC which performed full MPEG I and II audio and video digital decompression and image reconstruction for digital TV applications. So, DDC has significant experience in compression, NTSC, PAL, CCIR656, CCIR601, RS-170, etc. DDC has created several tools for working with these types of systems, and performed these various tasks for Cadence, Motorola, Sarnoff, and ST Microelectronics.
- **Digital Camera chips.** DDC has developed several digital camera chips for companies such as Nikon, Kodak, and Motorola. They are typically high resolution SoC devices with many image processing algorithms, such as compression, color processing, zoom, etc. and with many peripherals (SmartMedia, CompactFlash, etc.)
- **Videophone:** DDC has developed significant portions of the image processing line-up in the Motorola video cellular phone. DDC has also written much of the image processing software which interacted with the image processing functions, and was also responsible for the image quality (with performing things such as white balance, contrasting, etc.). DDC has worked extensively with video conferencing equipment as well.
- **Military:** DDC has researched, architected, then developed, implemented, and tested the actual hardware, for all video/image processing elements between several different CCD and FLIRs, to the display (both analog and digital) at frame rates of 60fps and resolutions up to 1280. This was accomplished with FPGAs DDC created from scratch, using some of it's own intellectual property, and developing the rest. The FPGAs which DDC designed included: analog video decoder (RS-170) and digital inputs, frame/field conversions, non-uniformity correction, bad pixel replacement, thresholding, histogramming, contrast enhancement/expansion, translation, rotation, zoom, picture-in-picture, sharpening, temporal filtering/averaging, median filtering, convolution, symbology overlay, analog video encoders (RS-170) and digital outputs, and all of the associated control, such as genlock, bandwidth management, SDRAM interfaces, processor interfaces, etc. Literally, DDC has done everything required to do this type of video and image processing



DDC Medical / Biometric Customers

DDC has developed projects for the following customers:

- **Toshiba** (CT imaging systems, CT data acquisition systems, back projection, RAID, etc.)
- **Siemens Medical** (Angiography imaging systems)
- **Lockheed Martin Medical** (medical image compression, storage and control)
- **General Electric** (PET scanners, ECG machines, MRI acquisition and imaging, etc.)
- **Loral Medical Imaging** (medical image compression, storage and control)
- **Biolmaging Research** (CT imaging systems, image reconstruction, back projection, etc.)
- **Nanosphere** (DNA slide analysis)
- **ICS Medical** (EEG, hi precision AM/FM tone modulation)
- **GN Otometrics** (several EEG-related retinal and audiometric acquisition systems)
- **Apogen** (Gamma knife, based on high speed DLP projection)
- **Progeny Dental** (Digital dental x-ray equipment)



Why DDC is uniquely qualified to work with you!

- **We have extensive experience in medical video and image processing:** We have implemented several video and imaging systems, and in many cases has solved the same problems through several means. We have built a substantial infrastructure of tools, intellectual property, experience, and talent.
- **We have extensive chip design experience:** Having designed complex systems and chips for over 15 years, we have a breadth of experience from which to draw from. We are world-class experts on all main technologies: ASIC, FPGA, and SoC. Our experience in these technologies is unparalleled. We are typically at the cutting edge of technology, using the latest technologies and techniques to achieve high quality in completing the most complex designs.
- **We have extensive experience in system design:** We have designed whole systems, boards, chips, and software for a range of complex video and image processing products. Although most of the really high-end complexity ends up in the chips, we have a proven track record in everything between requirements definition of the overall system, to testing the final product. We have an experienced staff that has expert knowledge in system design, board design, chip design, and software design, and the documentation and testing of such products.
- **We are efficient and cost effective:** In addition to being excellent designers, we are accurate estimators and schedulers. Having done this for so long, we are very predictable and reliable. This makes us efficient and cost effective, time and time again.
- **Every one of our previous customers is a reference:** We have been designing chips and systems for 15 years, and doing so independently for 9 years. In that time, we have proven our abilities over and over again. We use all of our previous customers as a reference, and we will be looking to add each new customer to that list.
- **We have a world-class talent pool:** We have advanced degrees in DSP, communications, and video. Most employees are 10-20 year veterans, and have been with us a long time. We have countless working customer products in the field.
- **We have good relationships with chip and tool vendors:** Relationships take time to develop. Having done this for so long and working with so many processes, chip vendors, and EDA tools, we have nurtured and maintained solid relationships, which allow us to provide the highest quality services and products to our customers.
- **We use the latest tools, software, and equipment:** We keep up to date to provide the fastest and highest quality design cycles.



Digital Design Corporation

Craftsmen Design Consulting and Intellectual Property

- **Who we are**

Digital Design Corporation is a craftsman organization committed to providing best-in-class craftsman digital design services and products for the digital industry. We architect, design, and implement chips, associated circuits and software, and the systems which encompass them.

- **What we do**

Consulting - We will bid whole projects, whole chips, or will just be members of a project team. Our team specializes in medical, video image processing, communications (datacom, telecom, cellular, satcom, etc.), DSP, audio, interfaces, etc., especially as they apply to digital implementations.

Products – We design and develop custom electronic products in the fields of Audio Processing, Video/Image Processing, Telemetry, Solid State Recorders, Video and Telemetry Recorders. We also offer a wide variety of intellectual properties in these fields which can be incorporated into and enhance our customers' product designs.



- **Experience**

We have expert knowledge in implementing the technologies listed above and also in SOCs, ASICs, FPGAs, PLDs, driver software, microcode, and embedded processors, etc., and in SOC/ASIC/FPGA/board design flows, EDA tools and in dealing with ASIC foundries and back end processes.

With average experience in chip and board design for over 20 years, and over 10 years of operation, we are committed to the creation of high quality digital circuits, products, and software.

Digital Design Corporation

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