



Specific Video and Imaging Experience / Expertise

- ◆ FLIR / CMOS / CCD interfaces: Indigo, Photobit, Dalsa, Intevac, Nytech, DRS, Enhanced Tech, Motorola
- ◆ Non-uniformity correction 1, 2, 4 point, scene based
- ◆ Bad pixel replacement (BPR)
- ◆ Symbology overlay, alpha blend
- ◆ tracking
- ◆ Zooming / scaling / decimation
- ◆ Temporal filters / averagers
- ◆ Spatial filters, sharpen
- ◆ open-GL
- ◆ image stabilization
- ◆ microscan
- ◆ Gamma correction
- ◆ Video display control
- ◆ contrast enhancement
- ◆ Medical image processing: image reconstruction, radon transforms, back project, PET scanners, CT scanners, warping, distortion correction, etc.
- ◆ Color interpolation - 3x3 and 5x5 windows (Bayer pattern to RGB or YCrCb)
- ◆ Domain transforms (FFT, IFFT, DCT, IDCT, Radon) back projection
- ◆ Correlation, Image stabilization
- ◆ Subsampling
- ◆ Convolution filters, 3x3, 5x5, 7x7
- ◆ Image enhancement
- ◆ Test pattern generators
- ◆ Color space conversion, 420, 422, etc.
- ◆ Color domains: RGB, YCrCb, YUV
- ◆ bilinear interpolation
- ◆ TRZ (translate/rotate/zoom)
- ◆ windowing / cropping
- ◆ Compression (MPEG I and II, MPEG 4, H.261, H.263, H.264, JPEG, proprietary)
- ◆ Display interfacing, NTSC, PAL, RS-170, DVI, HD-SDI, CCIR-656, CCIR-601
- ◆ Video synchronization / genlock
- ◆ Histogram, thresholding
- ◆ white balance
- ◆ edge detection, sharpening
- ◆ distortion correction
- ◆ fusion
- ◆ autofocus
- ◆ shuttering / illumination
- ◆ picture-in-picture

Military Video and Image Processing

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 up to 120fps and resolutions up to 1280. These are products in the field. This was accomplished with SoCs DDC created from scratch, using much of it's own intellectual property, and developing the rest. The SoCs which DDC completely designed included: analog inputs (RS-170) and digital inputs, frame/field conversions, non-uniformity correction, bad pixel replacement, thresholding, histogramming, contrast enhancement, image stabilization, microscan, tracking, translation, rotation, zoom, picture-in-picture, sharpening, temporal filtering/averaging, median filtering, convolution, symbology overlay, analog (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.

Medical Video and Image Processing

DDC has developed several ASICs and FPGAs for medical imaging applications, for such companies as GE, Toshiba, and Siemens. DDC has worked with angiography, CT scanners, PET scanners, DNA slide analysis, all in the image processing sections of these products. DDC has developed image reconstruction 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 many 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.

Consumer / Commercial Video and Image Processing

Set-top Box: 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.

Digital Camera Chips: DDC has developed several digital camera chips for products for Nikon, Kodak, and Motorola. They are typically high resolution SoC devices with many image processing algorithms.

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 (white balance, contrasting, color, etc.)

Fingerprint Recognition Chip: DDC developed a very high speed hardware-based fingerprint recognition system

Video Air Bag Deployment: very high speed (400+ fps) imaging system for vehicle safety mechanism deployment

HD Studio Image Processing: DDC developed a very complex video/imaging chip for studio editing of HD video

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