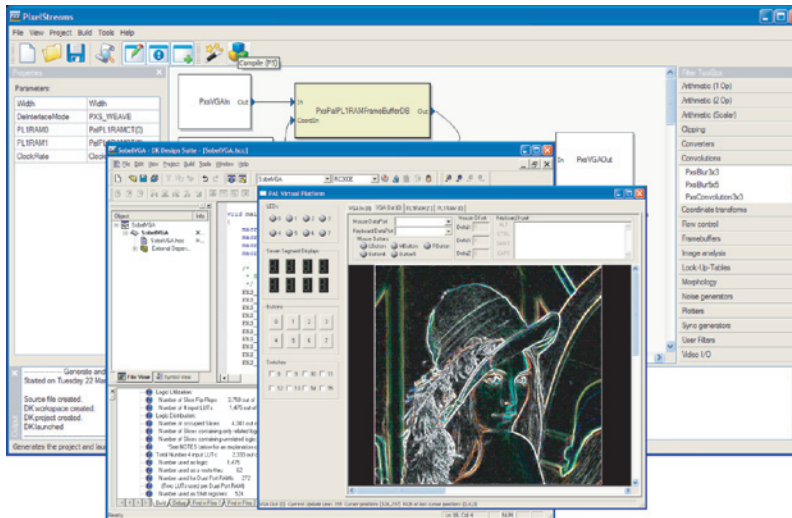


PIXELSTREAMS

COMPLETE SOLUTION FOR VIDEO SYSTEM DEVELOPMENT

Used in conjunction with Agility's DK Design suite and RC series platforms, PixelStreams delivers a complete solution for imaging algorithm development. PixelStreams is an extensive library of parameterized C-based video and imaging functions and is integrated with an easy to use graphical development environment inside Agility's DK Design Suite to make development and modification of video and imaging algorithms easy. Add on one of the variety of RC series platforms and you have a desktop environment that can take you from algorithm to prototype automatically.



Graphical Stream Editor and C-based IDE

EASY TO USE VIDEO AND IMAGING SYSTEM DEVELOPMENT

Systems can either be developed by incorporating library functions directly from the user's C-based code or automatically created using the PixelStreams interactive Graphical Stream Editor. Common source code for simulation and implementation ensures rapid and robust systems development.

FASTEST ROUTE FOR DIFFERENTIATED ALGORITHM DEVELOPMENT

The PixelStreams library delivers source code to all standard filters and over 140 functions providing the user an enormous database of examples from which to develop new video and imaging algorithms. Open and extensible with a layered architecture and consistent Application Programming Interface (API), developers can add new functions to the PixelStreams library and focus on their core unique algorithm content and value.

SCALABLE HIGH PERFORMANCE

PixelStreams produces parallel hardware implementations. By using streams and pipelining the throughput remains constant even with increasing algorithm complexity to maintain real-time video performance.

BENEFITS

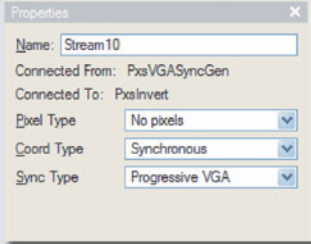
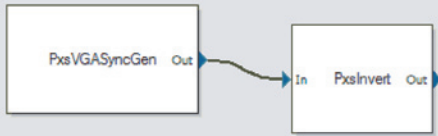
- Rapid prototyping of streaming video and imaging applications
- Run real-time video and images through your application
- Saves design time with rich library of imaging functions
- Fast implementation exploration to finalize your imaging application

KEY FEATURES

- Automatic FPGA implementation of design via DK Design Suite
- Scalable implementation directly to FPGA from block-based description
- Polymorphic streams automatically adapt to build the correct filter interface
- Seamless programming to RC series development and prototyping boards
- Fast and easy-to-use graphical development environment for real-time imaging applications
- Parameterized library functions are open and extensible



Pixels and Streams



Pixel types: Binary, 8-bit monochrome (unsigned), 16-bit monochrome (signed), 24-bit RGB, 24-bit YCbCr
Coordinate types: Synchronous, Asynchronous
Sync types: Interlaced (including TV compatible), Progressive (including VGA compatible)

BROAD APPLICATION SUPPORT

The PixelStreams design framework and template library components are applicable to many video and imaging projects with key elements for rapid prototyping and integration of broadcast and display equipment and machine vision systems.

EXTENSIVE VIDEO MANIPULATION LIBRARY

PixelStreams provides the user with a broad range of library functions to gather, manipulate and output streams of image pixel data. Code using these functions can either be written by the user or automatically created using the PixelStreams Graphical Stream Editor. In either case Agility's DK Design Suite is used to synthesize the resulting code to optimized hardware.

OPEN AND EXTENSIBLE

Full source code and documentation is provided for the library functions, API and data structures enabling designers to develop new library functions and add them to the PixelStreams environment.

PARAMETERIZABLE AND ADAPTABLE

Written in ANSI-C with Handel-C hardware constructs, the filters are highly parameterizable and polymorphic adapting automatically to the type of video data they are configured to process.

SIMULATION

Underpinned by the simulation and debug features of the DK Design Suite and associated Platform Developer Kit libraries and examples, designers have access to functional and cycle accurate simulations of complete video system models.

IMPLEMENTATION

PixelStreams can be used on any hardware platform supported by the DK Design Suite provided the platform has suitable video data sources and sinks. Complete board support is provided for Celoxica's RC series platforms. Further platforms can be added by the OEM or designer.

EXAMPLE LIBRARY FUNCTIONS

Flow control: Delay, FIFO, Line buffers, Muxes, Valves, Splitters, Synchronizer, Cross-domain

Frame buffers: PL1RAM reader, PL1RAM single/double buffered

Video I/O: TV & VGA

Conversion: Color space conversion of any-to-any (1/8/16-bit mono, RGB, YCrCb), Ordered dither, Bit slice, Component extraction,

Threshold

Look-up-tables (LUTs): Fixed & dynamic, Histogram equalization

Video generators: Constant, Test card, Checkerboard, XOR pattern

Video overlays: Cursor, Console, Grid, Bouncing ball, Rectangle, Histogram, Generic

Noise sources: White noise, Perlin noise, Salt & pepper noise, Gaussian noise, Fixed pattern & dynamic

Image arithmetic: Scalar ops (+, -, *, /, <<, >>), Unary ops (~, ..),

Binary ops (+, -, *, &, |, ^, min, max, average, blend)

Convolutions: Arbitrary 3x3/5x5, Gaussian blur, Sharpen, Edge detection, Laplacian, Median filter

Grayscale & binary morphology: Dilate, Erode, Open and Close

Image analysis: Blob (connected component) labeling, Blob counting & measurement, Image min, max, sum, mode, Histogram & cumulative histogram

Plotting: General purpose line/rectangle engine

Region-of-interest: Clip to rectangle, Clip to circle, Remove border, Clip to binary stream

Coordinate sources: VGA sync generator, TV sync generator

Coordinate transforms: Scale, Rotate, Translate, Displace with stream, Affine transform

Clipping (region of interest): rectangle, circle, stream