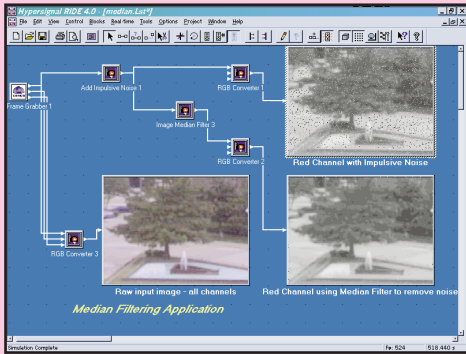




# Examples

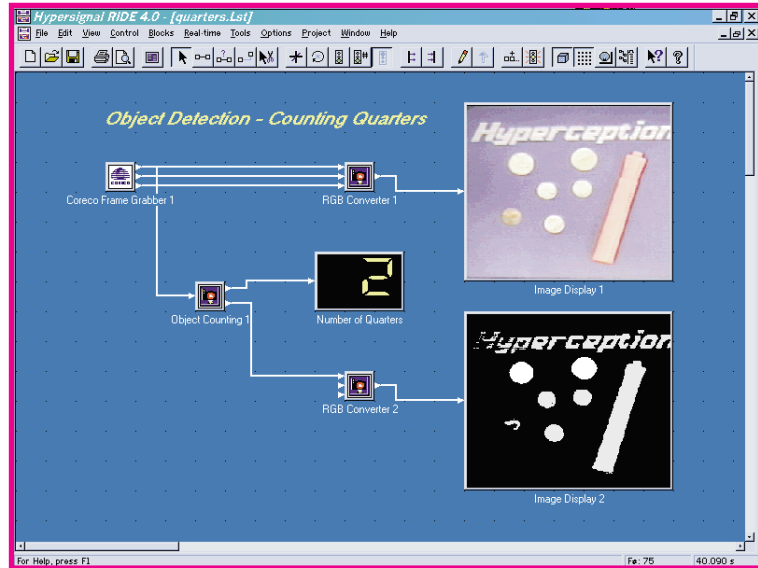
# Advanced Image Processing Library

*Optional Digital Image Processing Function Library for Hypersignal® Graphical Design Environments*



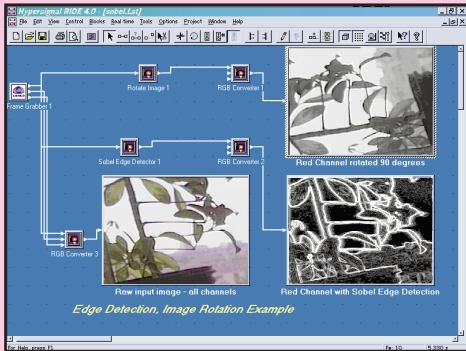
## Median Filtering Example

*This worksheet provides an example of working with an image by splitting the image into its component color channels, RGB, and then adding impulsive noise to the image, and using a median filter to remove the noise from that channel.*



*Object Detection example using Image Processing Library*

*Image processing applications may be created and proof-of-concept research and development may be performed with this digital image processing library.*



## Edge Detection and Image Rotation

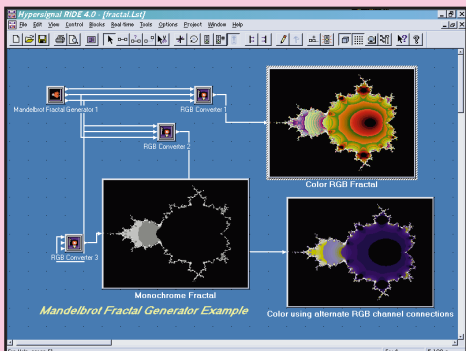
*This example worksheet shows an image which has its red channel rotated 90 degrees and also sent through a Sobel Edge Detector. Note the ease at mixing and working with the RGB color planes.*

## Overview

The Advanced Image Processing Library available for Hypersignal graphical design environments provides a specific set of image-related simulation blocks for image processing research and development. Adding these specialized image functions to Hypersignal is a great way to get the image processing engineer up and running in no time at all!

## Capabilities and Color!

The Advanced Image Processing Library uses a plane-based format to allow for monochrome and color processing of images using Red, Green, and Blue (RGB) planes of data; this format also has the additional advantage of allowing image data to be treated as matrix data with corresponding matrix operations possible on the image. Conversion routines between one-dimensional data and two dimensional data are included for performing a wide variety of image processing algorithms, using a mix of image processing specific functions and conventional one-dimensional functions.



## Mandelbrot Fractal Example

*The Digital Image Processing Library supports fractal generation directly. A Mandelbrot Generator and a Chaos-based Fractal Generator are included in this library for a variety of fractal-based experiments.*

Getting images into and out of the design environment may be accomplished through reading and writing image files in a variety of formats, including raw pixel data formats, and standard Windows BITMAP and AVI formats. A recent addition to the Image Library is the Frame Grabber function for direct capture of images from standard video cameras and capture cards. With the open software architecture of Hypersignal, custom and proprietary image capture, or frame grabber hardware, may be supported easily by creating a new block function for the hardware.

# Advanced Image Processing Library

## Partial List of Functions

### Add Constant

Add a constant to an image

### Clip Image

Clips an image by comparing with two specified threshold levels

### Flip Image

Flips an image

### Image Negative

Creates a negative image

### Image Square

Produces the square of an image

### Image Square Root

Calculates the square root of an image

### Threshold

Examines an image and outputs zero if the image element is not greater than the specified threshold

### Zoom Image

Zooms an image based on the specified parameters

### Multiply by Constant

Multiplies an image by a constant

### Multiply Image

Multiplies two input images

### Add Image

Adds two input images

### Subtract Image

Subtracts two input images

### Rotate Image

Rotates an image

### RGB Display

Displays an image in RGB format

### Isotropic Edge Detector

Detects the edges of an image using the Isotropic method

### Laplace Edge Detector

Detects the edges of an image using the Laplace method

### Prewitt Edge Detector

Detects the edges of an image using the Prewitt method

### Roberts Edge Detector

Detects the edges of an image using the Roberts method

### Sobel Edge Detector

Detects the edges of an image using the Sobel method

### 2-D FFT

Performs a 2-dimensional FFT on input

### 2-D Inverse FFT

Performs a 2-dimensional Inverse FFT

### Point Detector

Detects the isolated points on an image

### Horizontal Line Detector

Detects the horizontal lines on an image

### 45 Degree Line Detector

Detects the 45 degree lines on an image

### Vertical Line Detector

Detects the vertical lines on an image

### 135 Degree Line Detector

Detects the 135 degree lines on an image

### AVI Read

Reads an AVI file

### AVI Write

Writes an AVI file

### Bitmap Read

Reads a Windows Bitmap file

### Bitmap Write

Writes a Bitmap to a disk file

### Maximum Filter

Performs a maximum filter on an image

### Median Filter

Performs a median filter on an image

### Minimum Filter

Performs a minimum filter on an image

### Moving Average Filter

Performs a moving average filter on an image

### Order Statistical Filter

Performs an order statistical filter on an image

### Exponential Transform Histogram

Performs the exponential transform histogram on an image

### Histogram

Calculates the histogram of an image

### Histogram Equalization

Performs a uniform histogram on an image

### Log Transform Histogram

Performs the log transform histogram on an image

### Brightness

Measures the average intensity of an image

### Contrast

Measures the variance of an image

### AND Two Images

Performs the logical AND function on two input images

### OR Two Images

Performs the logical OR function on two input images

### XOR Two Images

Performs the logical XOR function on two input images

### AND Constant

Performs the logical AND function on an image with a constant

### OR Constant

Performs the logical OR function on an image with a constant

### XOR Constant

Performs the logical XOR function on an image with a constant

### Add Gaussian Noise

Adds noise with a Gaussian distribution to an image

### Add Impulsive Noise

Adds impulsive noise to an image

### Add Laplacian Noise

Adds noise with Laplacian distribution to an image

### Add Uniform Noise

Adds noise with a uniform distribution to an image

### Object Counting

Detects and counts objects

### Object Tracker

Tracks an object(s) in an image

### Sharpening Filter

Performs a sharpening filter on the input image

### Mandelbrot Fractal Generator

Generates a Mandelbrot Fractal with specified parameters

### Chaos Game Generator

Generates a fractal based on the chaos game

### RGB Converter

Convert an RGB signal to the specified format

### Image Delay

Delay a specified number of images

### Sprite

Generates a Sprite image

### Standard Video Frame Grabber

Allows standard PC-based video cameras to acquire/process real-time images

## Ordering Information

Part Number:

HSWN2515 - Advanced Image Processing Library

**Optional Image Processing Function Library for  
Hypersignal Graphical Design Environments**

**Hyperception**

**The Leader in DSP**

Hyperception, Inc.  
9550 Skillman LB 125 \* Dallas, Texas 75243  
(214) 343-8525 \* FAX (214) 343-2457  
Internet: info@hyperception.com  
World Wide Web: www.hyperception.com

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