



GDD400 Digital Image/Video Processing and Graphics Library for TMS320C6000.

GDD400 is a set of Digital Image/Video Processing and Graphics primitives functions optimized algorithmically and on the assembly level for TMS320C6000 VLIW architecture.

The library provides with a wide range of still image operations such as arithmetic, logical and bitwise operations, image formats conversions, 2D and 3D transforms, filtering and histograms, video stream manipulation.

Library functions are operating system independent and can be used in any run-time environment with TI Code Generation Tools.

Target applications: medical and industrial image processing, video editing, control and automation, robotics, surveillance, machine vision, spectral analysis, image analysis, military, target guidance identification and control, TV, test and measurement, diagnostic, telecomm.

Target hardware: TMS320C62xx, TMS320C64xx, TMS320DM64xx, TMS320C67xx DSPs.

The library would include following sections/operations (the list of functions is not complete and will be defined and described in more details soon)

Image/Vector Management

- Copy/Move
- Fill with a constant
- Segmentation
- Subimage (window) extraction/copy/merge
- Conversions to/from integer/floating point

Vector Numerical Operations

- Vector add, sub, mpy, div
- Vector scale
- Vector/constant MAC
- Vector/Vector MAC
- Vector Min/Max, absolute Min/Max
- Vector Threshold/Limits/Clipping
- Elementary functions (sqrt, log, exp, sin, cos)

Image Arithmetic Operations

- Basic arithmetic operations (add/sub/mpy)
- Scaling
- Constant add/sub

Image Clipping/Limits (pixel values)

- Min/Max
- Thresholds
- Binarization

Image Logical Operations

- and/or/xor
- Constant and/or/xor

Image Bitwise Operations

- Image and/or/xor
- Mask/Constant and/or/xor
- Bitwise arithmetic/logical Shift/Rotate

2D/3D TRANSFORMS (fixed/integer/floating point)

- Complex Forward/Inverse FFT
- Real Forward/Inverse FFT
- Fast Forward/Inverse Discrete Cosine Transform DCT
- Haar Transform
- Hadamard Transform
- Hough transform
- Karunen-Loehve Transform

Image Correlations/Convolutions

- Autocorrelation
- Crosscorrelation
- Convolution

Geometric Transformations

- 2D/3D Vector Translations/Rotations
- Polar to Rect conversion
- Image Interpolation/Decimation
- Bilinear interpolation
- Spline/bicubic spline interpolation
- Image Resizing
- Zoom in/out
- Image rotation
- Flip Vertical/Horizontal
- Image Transpose

Histograms

- Histogram accumulation
- Histogram equalization
- Gamma correction
- LUT

Edge Detection

- Sobel, Prewitt, Laplace, Roberts operators
- Gradients

Image Filtering

- Degauss
- Blur/deblur
- Smoothing
- Sharpening
- Despeckling
- FIR/IIR
- Median
- Linear/Nonlinear filters

Color Coordinates Transforms

- Transformations between different color spaces
- Color depth conversions

Image/Lens Distortions Corrections

- Geometric distortions corrections
- Spherical aberrations corrections
- Chromatic aberrations corrections

Image Morphology

- Dilate/Erode

Motion Detection/Estimation

Image/Video Codecs and Data Formats Conversions

- BMP/RLE/GIF/TIFF
- PNG/MNG
- JPEG/JPEG2000
- H.261/H.263
- Motion JPEG/MPEG/2/4
- AVI

Graphics Primitives

- Draw point, line, rectangle
- ellipses, triangle, circle
- Flood fill