



MESH LDC PLUGIN GUIDE

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Mailing Address: Texas Instruments
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1 Overview

1.1 Description:

The Mesh Lens Distortion Correction (LDC) module deals with lens geometric distortion issues, chromatic aberration, and affine transformation for camera images.

Most digital cameras suffer from some degree of nonlinear geometric distortion. A spatial transformation is required to correct the distortion. In automotive applications, cameras use wide angle lenses, including fisheye lenses to provide 180°+ field of view. To visually present the scene to the user in an easy-to-consume representation, these distortions need to be corrected.

1.2 XML:

The exported .xml file name is *sensor_name_mesh_ldc_dcc.xml*

1.3 Input files:

- Input image (distorted) in YCbCr4:2:2/YCbCr4:2:0 format (8 bit or 12 bit).
- LDC LUT file

1.4 Tuning prerequisites:

Independent of all other plugins.

2 Tuning Process

1. Select Mesh LDC plugin from Plugin Menu.
2. In the “Advanced params” tab enable or disable Mesh LDC.
3. In the “Input image” tab enter input YUV file and load the YUV image using Load button.
4. Select the “LDC LUT file” tab and load your corresponding LUT file.
5. Select the appropriate parameter values in the “Advanced params” tab. See table 1 below for more details.
6. Process the plugin. The output image will be stored as output_image.yuv (and output_image.bmp) in the save directory for the plugin.
7. Select “Export DCC profile binary” to generate XML and bin files for Mesh LDC.

Table 1 – Advanced Parameters

Parameter	Range	Comment
Tuning Method	Manual/Semi-Automatic	Semi-Automatic: tuning method will calculate the optimal output block width (OBW) and height (OBH) to reduce overall memory bandwidth. Manual: the user will enter the output block width and height.
Enable	ON / OFF	Enables or disables Mesh LDC
Mode	YCbCR420 / YCbCR422	Input image format.
Output frame width (even: 2x)	0 - 8192	Output frame width should be an even integer multiple of Output block width.
Output frame height (even: 2x)	0 - 8192	Output frame height should be an even integer multiple of Output block height.
Output starting x coordinate (even: 2x)	0 - 8192	The x starting coordinate of the lens distortion processing (starting from the left of the image).
Output starting y coordinate (even: 2x)	0 - 8192	The y starting coordinate of the lens distortion processing (starting from the top of the image).
Interpolation type for Y data	Bicubic / bilinear	Interpolation mode for Y. Cb/Cr images use bilinear.
Pixel pad	0 - 15	Amount of padding in input pixels.
Output block width (even: 8x)	0 - 255	OBW must be a multiple of 8
Output block height (even: 2x)	0 - 255	OBH should be even.
Affine transform warp, A S14Q12	S16Q12	14 bits with 2 bits for integer and 12 bits of fraction
Affine transform warp, B S14Q12	S16Q12	14 bits with 2 bits for integer and 12 bits of fraction
Affine transform warp, C S16Q3	S16Q3	16 bits with 13 bits for integer and 3 bits of fraction
Affine transform warp, D S14Q12	S16Q12	14 bits with 2 bits for integer and 12 bits of fraction
Affine transform warp, E S14Q12	S16Q12	14 bits with 2 bits for integer and 12 bits of fraction
Affine transform warp, F S16Q3	S16Q3	16 bits with 13 bits for integer and 3 bits of fraction
Affine transform warp, G S16Q23	S16Q23	perspective warp transform

Affine transform warp, H S16Q23	S16Q23	perspective warp transform
Input frame width (even: 2x)	0 - 8192	Input image width
Input frame height (even: 2x)	0 - 8192	Input image height
Table subsampling factor (M)	0 - 7	Mesh table down-sampling factor. down-sampling = 2^M
Mesh frame width	0 - 8192	The width of the mesh frame (before down-sampling).
Mesh frame height	0 - 8192	The height of the mesh frame (before down-sampling).

3 XML fields

This section describes the correspondences between user input parameters and the XML fields. The table describes all fields in the XML. Fields in *italics* cannot be changed through the plugin.

Table 2 – XML fields

ldc_ctrl	LDC Enable, 0: Disable, 1: Enable
ldc_ctrl	LD Mapping enable, 0: disable, 1: enable
ldc_ctrl	Input data mode, 0: YUV422, 1: Y only, 2: YUV420, 3: YUV420 UV
ldc_ctrl	Output data mode, 0: keep UYVY; 1: convert to 420
ldc_ctrl	Input pixel format, 0: 8b, 1: 12b packed, 2: 12b unpacked
ldc_ctrl	0: Disable perspective warp. 1: Enable perspective warp
ldc_cfg	Interpolation type for Y data. 0: Bicubic, 1: Bilinear
ldc_cfg	Region mode, 0: disable, 1: enable
ldc_meshtable_cfg	Mesh table subsampling factor (0-7)
ldc_mesh_frsz	Mesh frame width (0-8192)
ldc_mesh_frsz	Mesh frame height (0-8192)
ldc_compute_frsz	Compute width (0-8192)
ldc_compute_frsz	Compute height (0-8192)
ldc_initxy	Output starting horizontal coordinate (0-8192)
ldc_initxy	Output starting vertical coordinate (0-8192)
ldc_input_frsz	Input frame width
ldc_input_frsz	Input frame height

ldc_block_size	Output block width (0-255)
ldc_block_size	Output block height (0-255)
ldc_block_size	Pixel pad (0-15)
ldc_ab	Affine Transform warp, A S16Q12
ldc_ab	Affine Transform warp, B S16Q12
ldc_cd	Affine Transform warp, C S16Q3
ldc_cd	Affine Transform warp, D S16Q12
ldc_ef	Affine Transform warp, E S16Q12
ldc_ef	Affine Transform warp, F S16Q3
ldc_gh	Affine Transform warp, G S16Q23
ldc_gh	Affine Transform warp, H S16Q23
ldc_sf_w1	Width 1 (0-8191)
ldc_sf_w2	Width 2 (0-8191)
ldc_sf_w3	Width 3 (0-8191)
ldc_sf_h1	Height 1 (0-8191)
ldc_sf_h2	Height 2 (0-8191)
ldc_sf_h3	Height 3 (0-8191)
ldc_sf_en0	Enable
ldc_block_size0	Output block width (0-255)
ldc_block_size0	Output block height (0-255)
ldc_block_size0	Pixel pad (0-15)
ldc_sf_en1	Enable
ldc_block_size1	Output block width (0-255)
ldc_block_size1	Output block height (0-255)
ldc_block_size1	Pixel pad (0-15)
ldc_sf_en2	Enable
ldc_block_size2	Output block width (0-255)
ldc_block_size2	Output block height (0-255)
ldc_block_size2	Pixel pad (0-15)
ldc_sf_en3	Enable
ldc_block_size3	Output block width (0-255)
ldc_block_size3	Output block height (0-255)
ldc_block_size3	Pixel pad (0-15)

ldc_sf_en4	Enable
ldc_block_size4	Output block width (0-255)
ldc_block_size4	Output block height (0-255)
ldc_block_size4	Pixel pad (0-15)
ldc_sf_en5	Enable
ldc_block_size5	Output block width (0-255)
ldc_block_size5	Output block height (0-255)
ldc_block_size5	Pixel pad (0-15)
ldc_sf_en6	Enable
ldc_block_size6	Output block width (0-255)
ldc_block_size6	Output block height (0-255)
ldc_block_size6	Pixel pad (0-15)
ldc_sf_en7	Enable
ldc_block_size7	Output block width (0-255)
ldc_block_size7	Output block height (0-255)
ldc_block_size7	Pixel pad (0-15)
ldc_sf_en8	Enable
ldc_block_size8	Output block width (0-255)
ldc_block_size8	Output block height (0-255)
ldc_block_size8	Pixel pad (0-15)
ldc_dualout_cfg	Luma LUT enable (0-1)
ldc_dualout_cfg	Luma input bit depth (8-12)
ldc_dualout_cfg	Luma output bit depth (8-12)
ldc_dualout_cfg	Chroma LUT enable (0-1)
ldc_dualout_cfg	Chroma input bit depth (8-12)
ldc_dualout_cfg	Chroma output bit depth (8-12)
mesh_table_size	Number of bytes in Mesh Lookup Table
Mesh_lut	Lookup table

4 Restore from DCC

Not Implemented