

Sentech Power Plus GigE Vision Camera

User configurable FPGA (XILINX) sample code

(Revisions)

Rev	Date	Changes	Note
1.00	2010/05/13	New document	
1.01	2010/08/06	Update Change the camera name	
1.02	2010/09/10	Update Add the frame memory function	
1.03	2010/10/01	Update Change the block diagram of the sample code	
1.04	2010/12/03	Update Change the register information for the sample codes	
1.05	2011/05/19	Update Add the user configurable FPGA enable command	
1.06	2011/09/12	Update Add the information for "Binalize"	
1.07	2012/01/30	Update Change the register information for the sample codes	

Sentech provides following sample codes for the user configurable FPGA (XILINX) of the Sentech Power Plus GigE Vision camera.

Binalize and calculate center of gravity

Edge detection

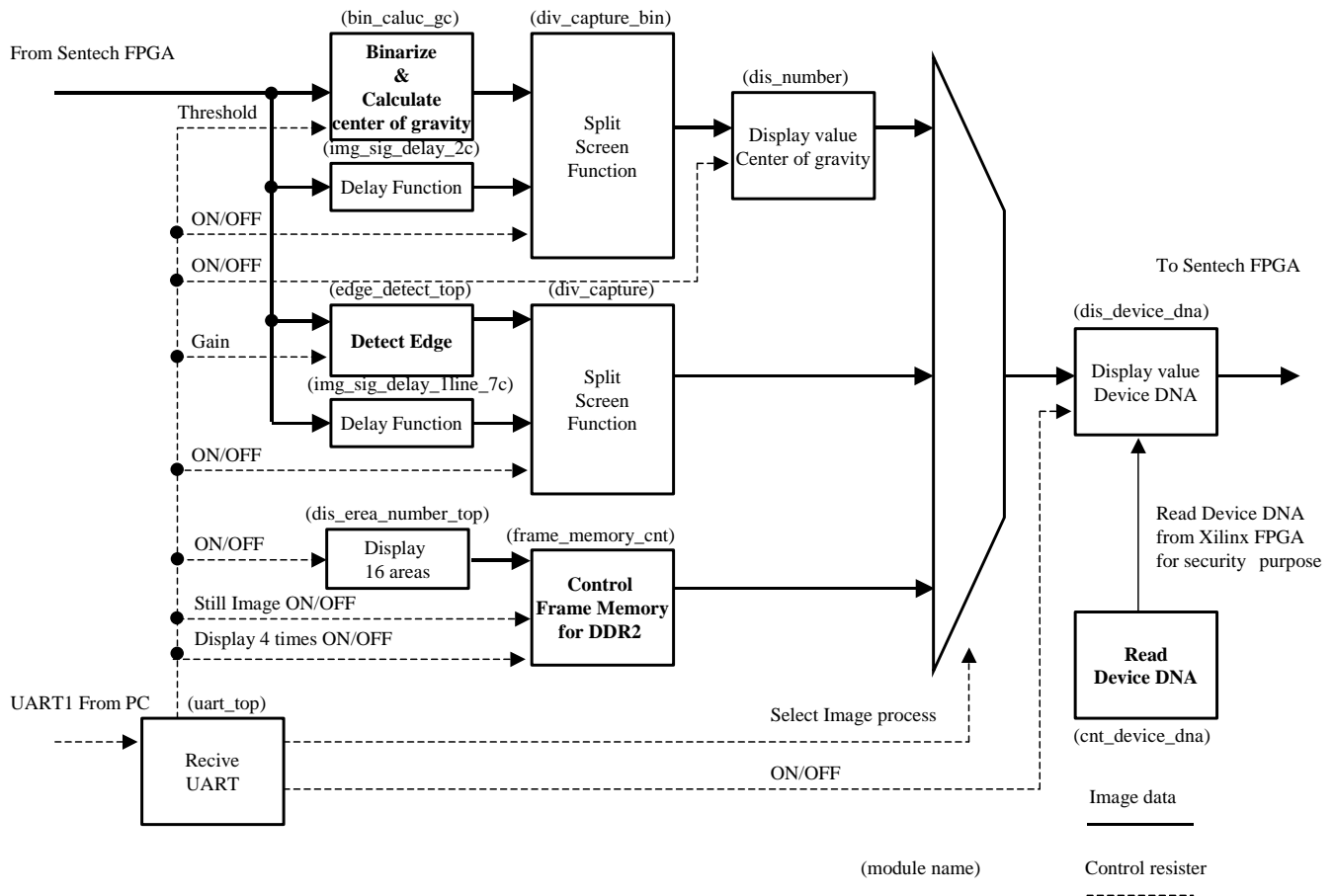
Frame memory function

Please use StCamGigEWare_OpDemo software for check these sample codes for user configurable FPGA (XILINX).

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1. Block diagram of the sample codes



2. Sample codes information

2.1 Binalize and calculate center of gravity

Binalize the image.

Split the four areas for the binalized image. Display the number of the white pixels for each area.

Split the four areas for the binalized image. Calculate and display the center of gravity of the white pixels. for each area.

When Split screen function is on, binalize processes for the left half of the original image.

2.2 Edge detection

Edge detection.

When Split screen function is on, edge detection processes for the left half of the original image.

2.3 Frame memory function

Get the still image, 4x digital zoom for the live and still image and slide show.

Get the still image when select "ON (Still image)" for the "Still image mode".

Wen select "ON" for the "4x zoom and slide show", split sixteen areas, 4x digital zoom for each area and slide show the image.

Change the 4x digital zoom image each two seconds.

3. StCamGigEWare OpDemo software installation and start up

StGigE-Pacakge has to be install before install StCamGigEWare_OpDemo software.

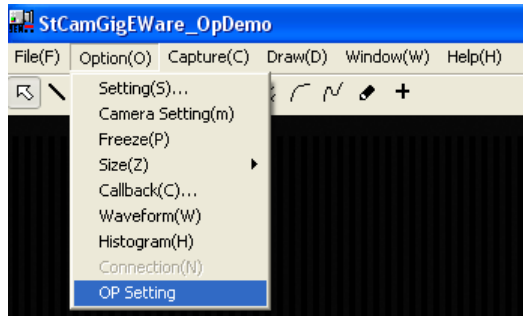
3.1 Install StCamGigEWare_OpDemo software using StCamGigEWare_OpDemo.exe installer.

3.2 Select “Start” (of Windows) – “Sentech” – “StGigE-Package” – “StCamGigEWare_OpDemo” – “StCamGigEWare_OpDemo” to start StCamGigEWare_OpDemo software.

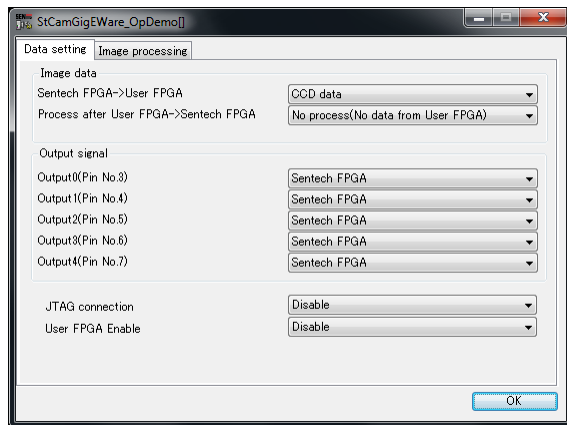
4. Sample codes evaluation with StCamGigEWare OpDemo

4.1 Binalize and calculate center of gravity

- 1) Select "OP Setting" under "Option" in the menu.



- 2) Select the image data and I/O setting in "Data setting" window.



- A) Select which processed image data send from Sentech FPGA to user configurable FPGA at "Sentech FPGA -> User FPGA".

Color camera:

Data selection	Color camera
CCD data	CCD data
White banlance processed data	White banlance processed data
White balance and gamma processed data	White balance and gamma processed data

Monochrome camera:

Data selection	Monochrome camera
CCD data	CCD data
White banlance processed data	CCD data
White balance and gamma processed data	Gamma processed data

B) Select which process is apply to the image data after send back from user configurable FPGA to Sentech FPGA at “User FPGA -> Sentech FPGA”.

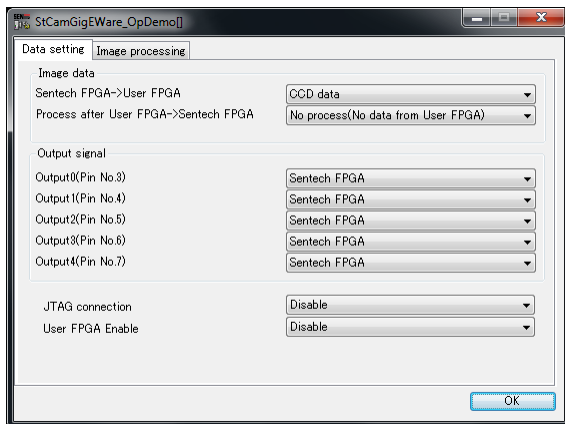
Color camera:

Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	White balance, gamma and color interpolation
Gamma and color interpolation	Gamma and color interpolation
Color interpolation	Color interpolation

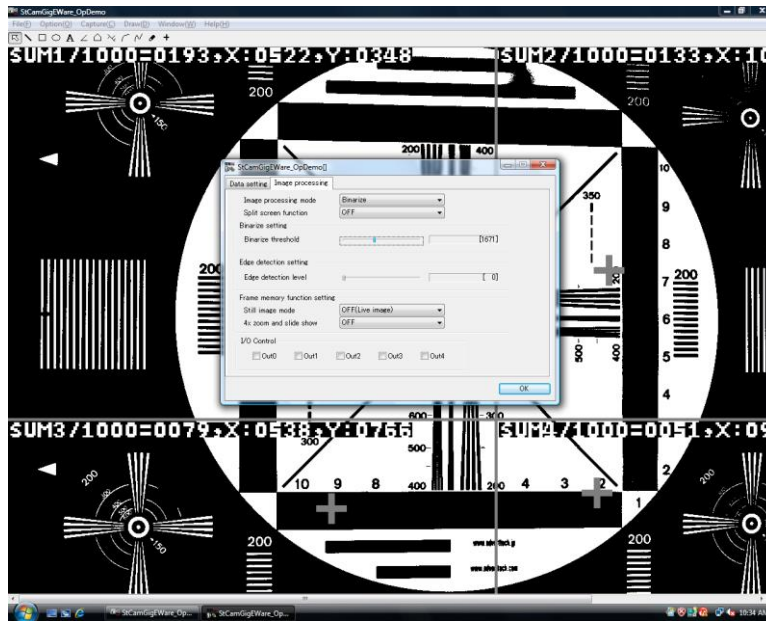
Monochrome camera:

Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	Gamma processing
Gamma and color interpolation	Gamma processing
Color interpolation	No process (Data from User FPGA)

3) Select “Enable” at “User FPGA Enable” in “Data setting” window.



3) Select “Binalize” for “Image processing mode” in “Image processing” window.

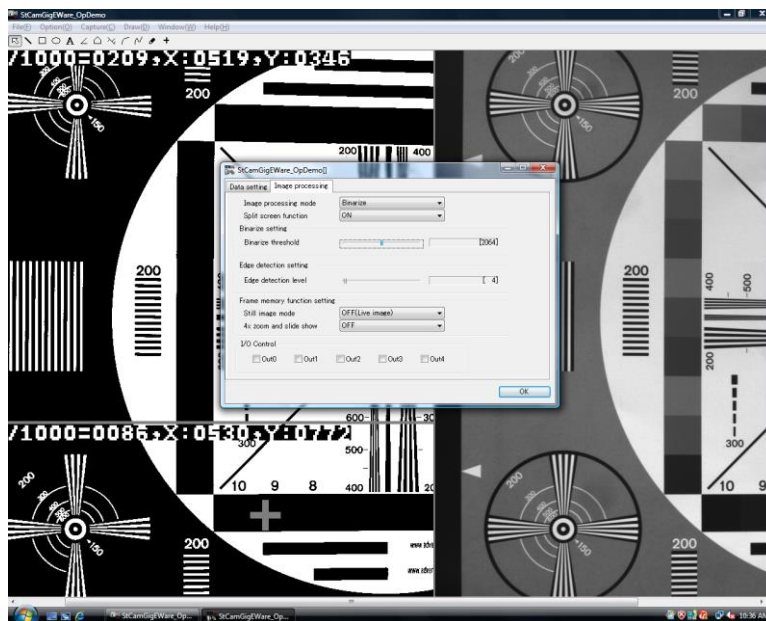


Adjust "Binalize Threshold" for the binalize and calculate center of gravity processing.

Display information:

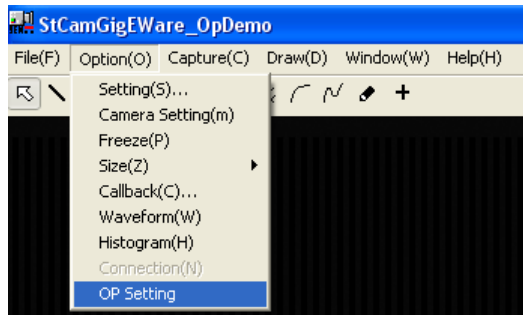
- Total area of the white pixels (white pixels / 1,000),
- X center of the gravity of the white pixel in the image,
- Y center of the gravity of the white pixel in the image

The left half original image, which is before processing binalize and calculate center of gravity, and the binalize and calculate center of gravity processed image are appeared when select “ON” for “Split screen function” in “Image processing” window.

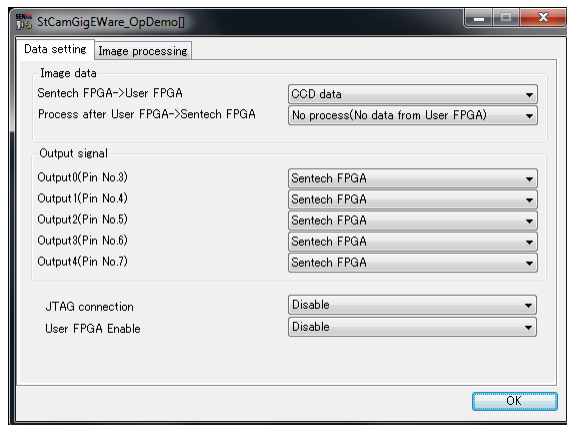


4.2 Edge detection

- 1) Select "OP Setting" under "Option" in the menu.



- 2) Select the image data and I/O setting in "Data setting" window.



- A) Select which processed image data send from Sentech FPGA to user configurable FPGA at "Sentech FPGA -> User FPGA".

Color camera:

Data selection	Color camera
CCD data	CCD data
White banlance processed data	White banlance processed data
White balance and gamma processed data	White balance and gamma processed data

Monochrome camera:

Data selection	Monochrome camera
CCD data	CCD data
White banlance processed data	CCD data
White balance and gamma processed data	Gamma processed data

B) Select which process is apply to the image data after send back from user configurable FPGA to Sentech FPGA at "User FPGA -> Sentech FPGA".

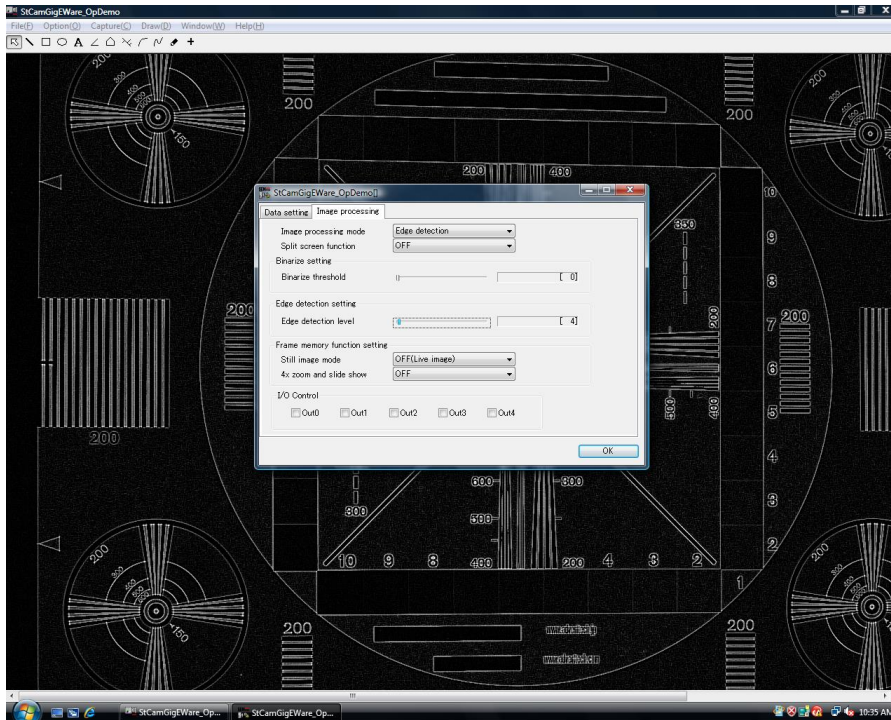
Color camera:

Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	White balance, gamma and color interpolation
Gamma and color interpolation	Gamma and color interpolation
Color interpolation	Color interpolation

Monochrome camera:

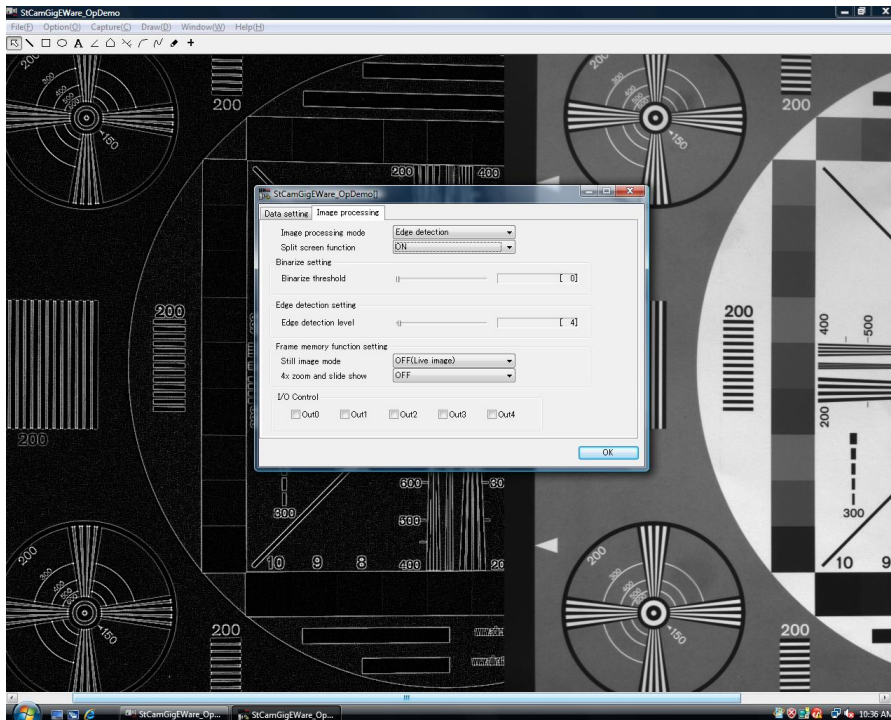
Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	Gamma processing
Gamma and color interpolation	Gamma processing
Color interpolation	No process (Data from User FPGA)

3) Select “Edge detection“ for “Image processing mode” in “Image processing” window.



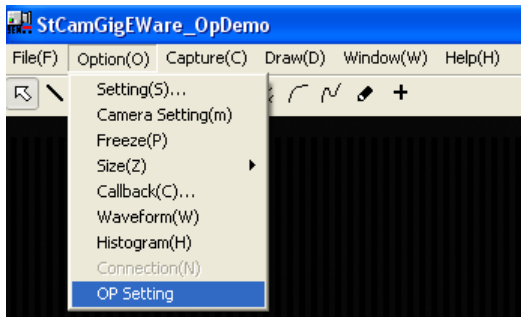
Adjust “Edge detection level” for the edge detection processing.

The left half original image, which is before processing the edge detection, and the edge detection processed image are appeared when select “ON” for “Split screen function” in “Image processing” window.

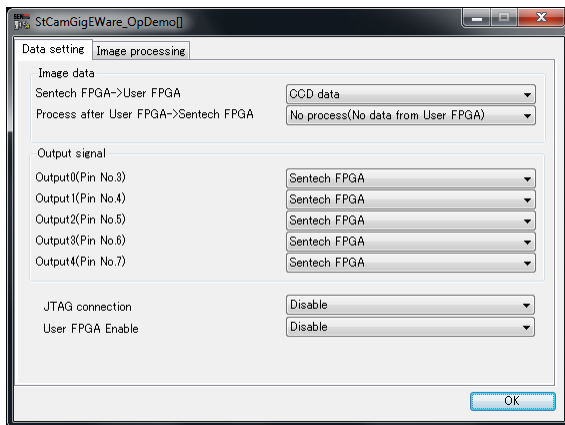


4.3 Frame memory function

- 1) Select "OP Setting" under "Option" in the menu.



- 2) Select the image data and I/O setting in "Data setting" window.



- A) Select which processed image data send from Sentech FPGA to user configurable FPGA at "Sentech FPGA -> User FPGA".

Color camera:

Data selection	Color camera
CCD data	CCD data
White banlance processed data	White banlance processed data
White balance and gamma processed data	White balance and gamma processed data

Monochrome camera:

Data selection	Monochrome camera
CCD data	CCD data
White banlance processed data	CCD data
White balance and gamma processed data	Gamma processed data

B) Select which process is apply to the image data after send back from user configurable FPGA to Sentech FPGA at "User FPGA -> Sentech FPGA".

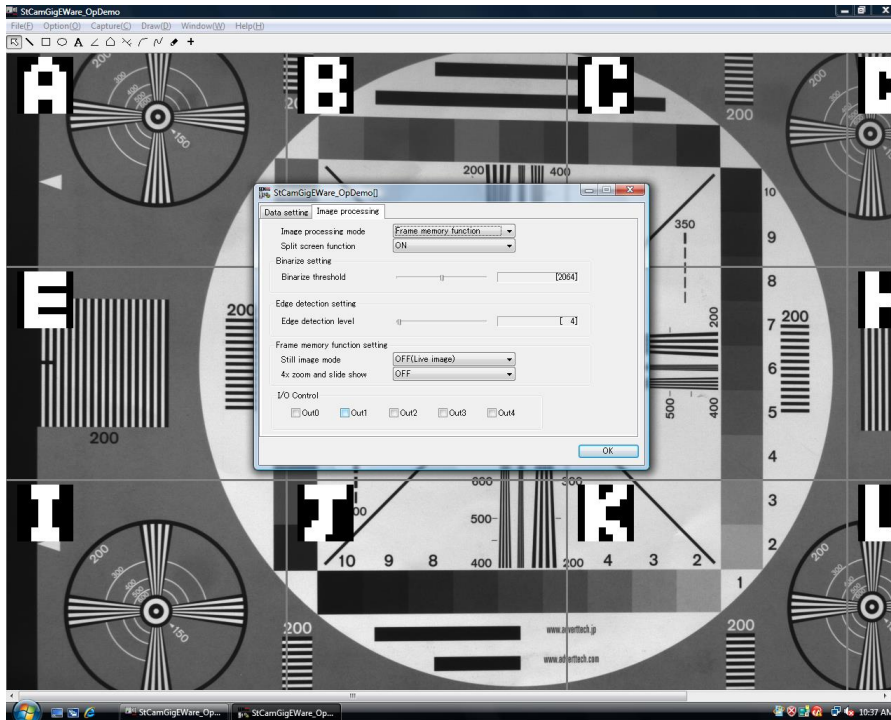
Color camera:

Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	White balance, gamma and color interpolation
Gamma and color interpolation	Gamma and color interpolation
Color interpolation	Color interpolation

Monochrome camera:

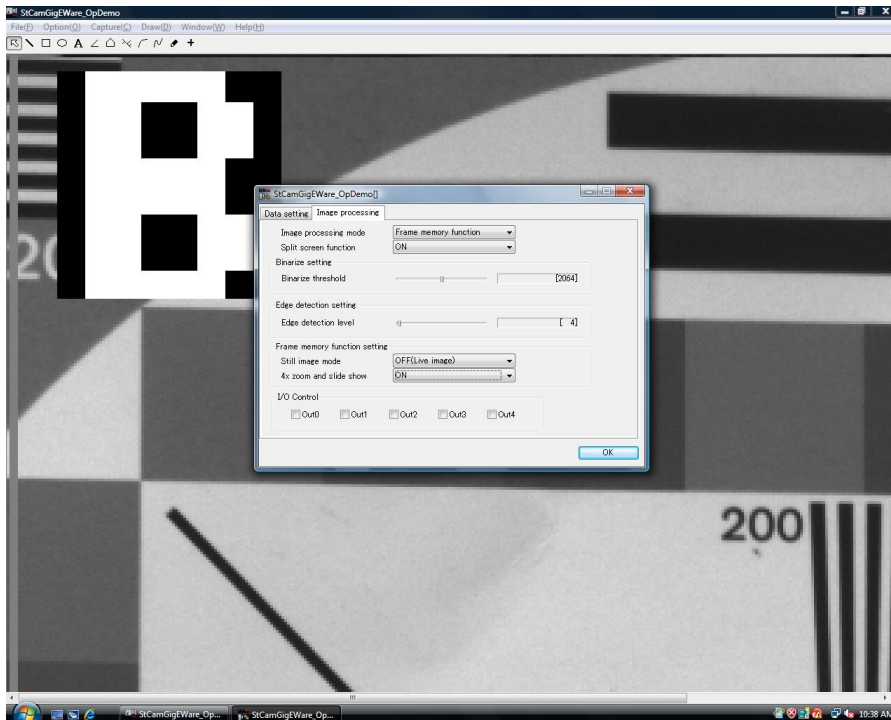
Process selection	Color camera
No process (No data from User FPGA)	No process (No data from User FPGA)
White balance, gamma and color interpolation	Gamma processing
Gamma and color interpolation	Gamma processing
Color interpolation	No process (Data from User FPGA)

3) Select “Frame memory function” for “Image processing mode” in “Image processing” window.



Get the still image when select “ON (Still image)” for the “Still image mode”.

When select “ON” for the “4x zoom and slide show”, split sixteen areas, 4x digital zoom for each area and slide show, which is the image change each two seconds.



5. UART communications and the register information for sample codes

5.1 UART communication setting

Baud rate: 115200bps
 Data bit: 8bit
 Parity: None
 Stop bit: 1bit
 Flow control: None

5.2 Register information for the sample codes

Command No.		Function	Value
DEC	HEX		
0	0H	Image processing mode	0: No image process 1: Binalize and calculate center of gravity 2: Edge detection 3: Frame memory function
1	1H	Split screen function	0: OFF 1: ON
2	2H	Binalize threshold (Lower 8bit)	Range of threshold: 0 to4095
3	3H	Binalize threshold (Upper 4bit)	
4	4H	Gain of detect edge	Range of gain: 0 to 255
5	5H	Resolution and COLOR / BW selection	7 to 4bit: 0: STC-GE/GEC202OX 1: STC-GE/GEC152OX 2: STC-GE/GEC83OX 3: STC-GE/GEC33OX 5: STC-GE/GEC133OX DO NOT use other settings 3 to 1bit: Please set as 000 0bit: 0: B/W 1: COLOR
6	6H	I/O pots output control	7bit: Not using (MSB) 6bit: Not using 5bit: Not using 4bit: OUT5 0: OFF 1: ON 3bit: OUT4 0: OFF 1: ON 2bit: OUT3 0: OFF 1: ON 1bit: OUT2 0: OFF 1: ON 0bit: OUT1 0: OFF 1: ON (LSB)
7	7H	Still image mode	0: OFF (Live image) 1: ON (Still image)
8	8H	4x zoom and slide show	0: OFF 1: ON

7F, Harada center building
9-17, Naka cho 4 chome
Atsugi-city, Kanagawa
243-0018 Japan

Sensor Technology Co., Ltd

TEL 81-46-295-7061 FAX 81-46-295-7066
URL <http://www.sentech.co.jp/>