

# USB Camera Software

## StCamSWare

### User's Guide

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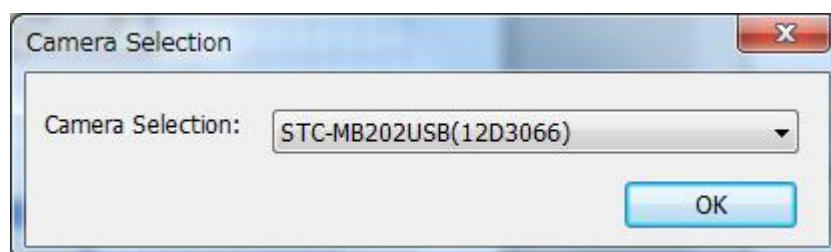
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## 1 Start method

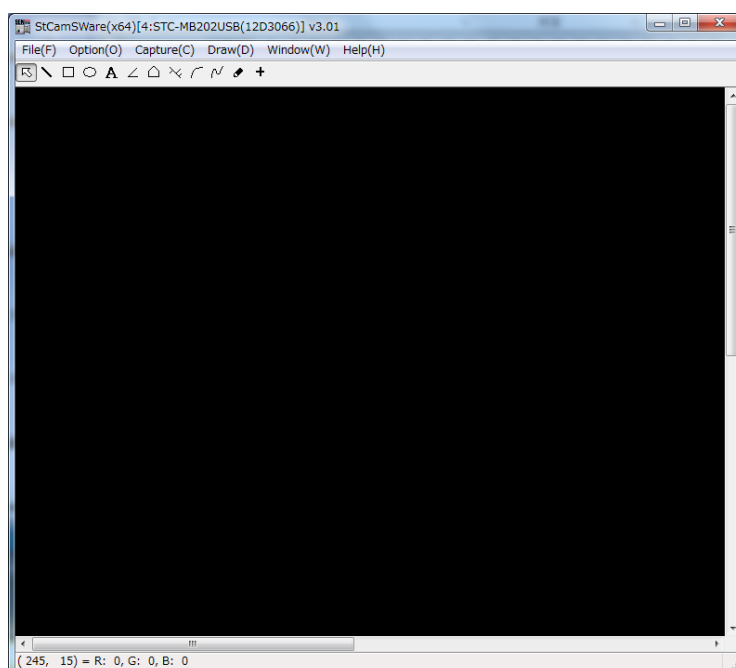
- ① Connect USB camera to USB port of the computer.
- ② After a few seconds, double-click the “StCamSWare” on the desktop and start “StCamSWare.” USB camera may not be recognized if starting StCamSWare software immediately after connecting the USB camera.



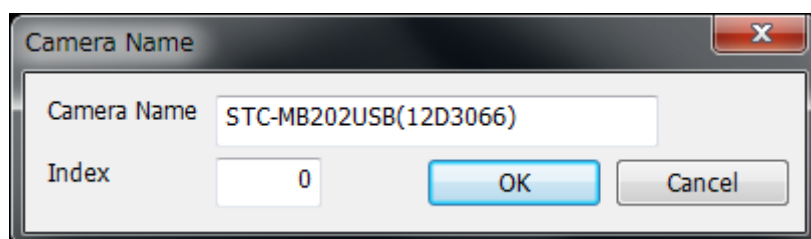
- ③ The message below will appear when several usable cameras are found. Select the camera name (\*1) to be used and click the [OK] button. (\*2)



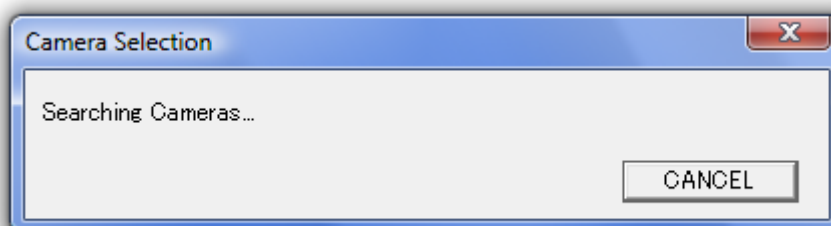
- ④ The preview window will open and preview will start. (\*3)



- \*1 The camera name to be displayed can be changed from the [Option] [Rename Camera] in menu.

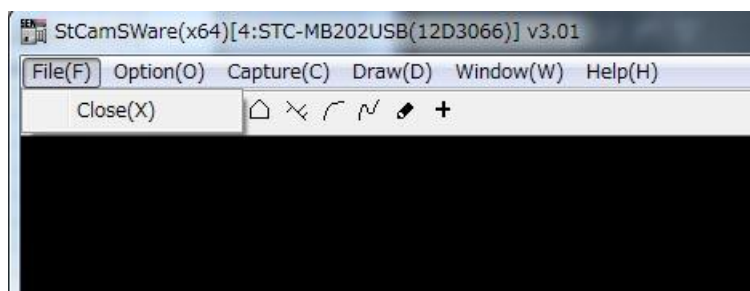


- \*2 When the USB camera is not connected to the PC or when starting up the software immediately after connecting, the "Searching Cameras..." message appears. Either connect the USB camera to the PC or select the [CANCEL] button to close the software, and start the software after connecting the USB camera.



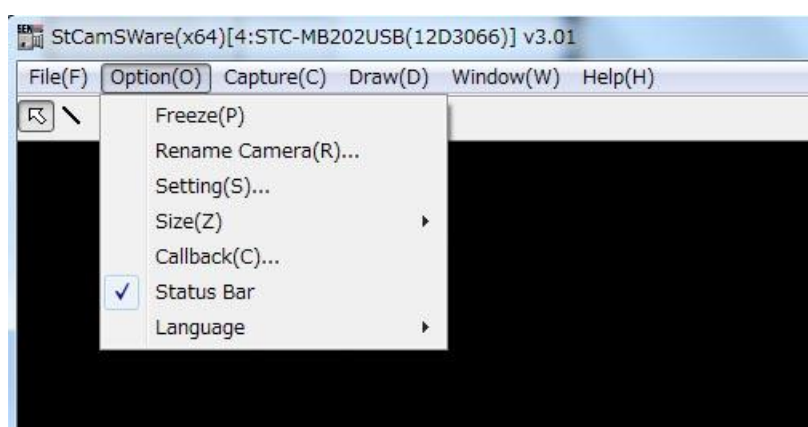
## 2 Operating method (general)

### 2.1 [File] menu



[Close] Closes the StCamSWare software.

### 2.2 [Option] menu



[Freeze] Preview stops and option becomes [LiveVideo]

[LiveVideo] Preview restarts and option becomes [Freeze].

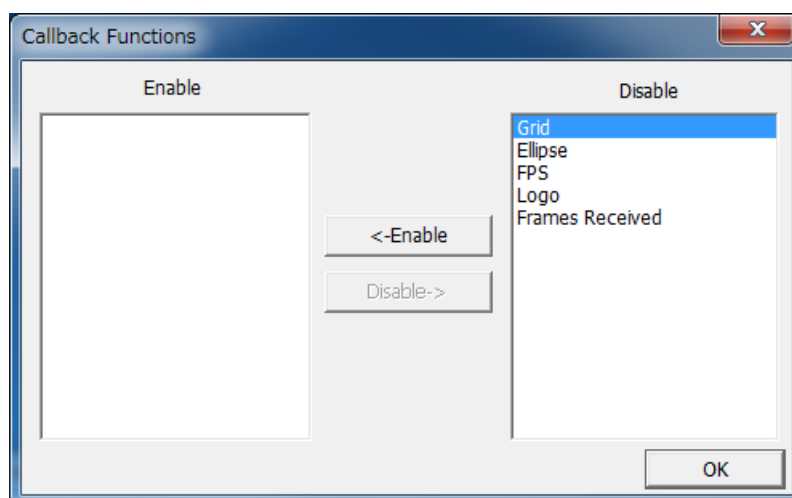
[Rename Camera] Sets camera name (camera identifier of software).

[Setting] Saves, reads in, and makes various changes to camera setting. Please refer to ["3 How to use \(camera setting\)"](#) for details of the camera setting screen.

[Size] Changes display image size. Please select from normal display (original size), double, quadruple, octuplet, half, fourth, one-eighth.

[Callback] When making a software using the camera's SDK, characters, lines, and images can be displayed superimposed on a preview image (the saved image will not change). This software includes functions that display "Grid" "Ellipse" "FPS" "Logo" and "Frames Received" as samples.

- ① The screen below appears when selecting [Option] [Callback] from menu.



- ② To enable Callback, select the Callback to be enabled from the “Disable” list on the right and click the [<-Enable] button. (\*1)

Display name	Description
Grid	Displays grids.
Ellipse	Displays concentric circles.
FPS	Displays FPS, FPS Callback received frame number, camera output frame number and date/time. FPS is calculated from the average time used to receive 100 frames.
Logo	Displays the company logo.
Frames Received	Displays received frame number and non-received frame number.

- ③ To disable Callback, select the Callback to be disabled from the “Enable” list on the left and click the [Disable->] button.

[Status bar] Displays status bar in preview window. Position and pixel value are displayed on the status bar when the mouse is moved. (\*2)

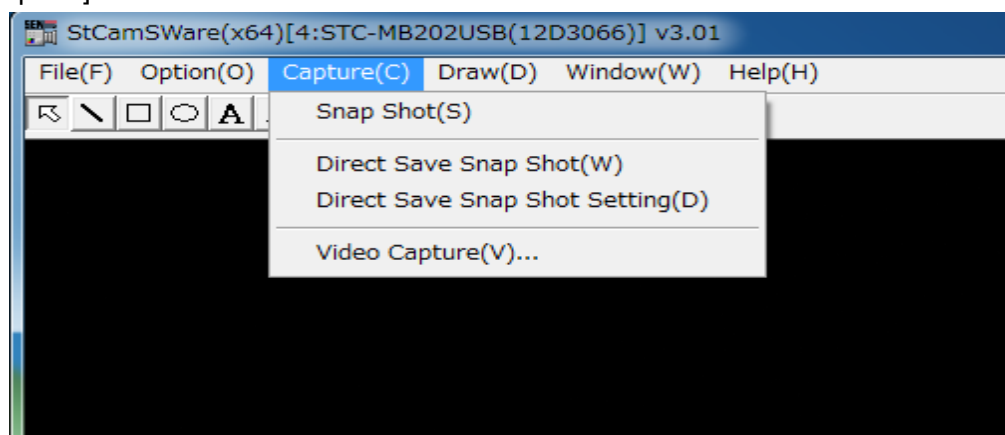
( 294, 243 ) = R:112, G:119, B:117

[Language] StCamSWare display can be changed to English, Japanese, German, Spanish, and Chinese.

\*1 Frame rate may be reduced because processing is done of the computer. If settings are not required, use as “OFF (disable all).”

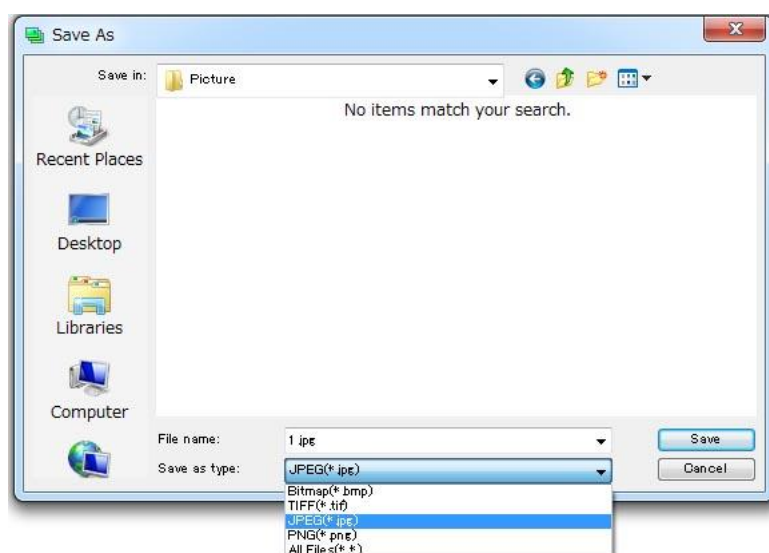
\*2 Position and pixel value are revised when moving the mouse and not when the image is revised.

## 2.3 [Capture] menu



[Snap Shot] Acquires still images, specifies file name, file type, and destination to save, and save.

- ① The still image will be acquired when selecting [Snap Shot] or pressing the [S] key and will be displayed in another window.
- ② To save the acquired still image, right-click on the image to be saved and select [Save] of the displayed menu.
- ③ Input file name, select file type, and save the acquired image. (\*1)

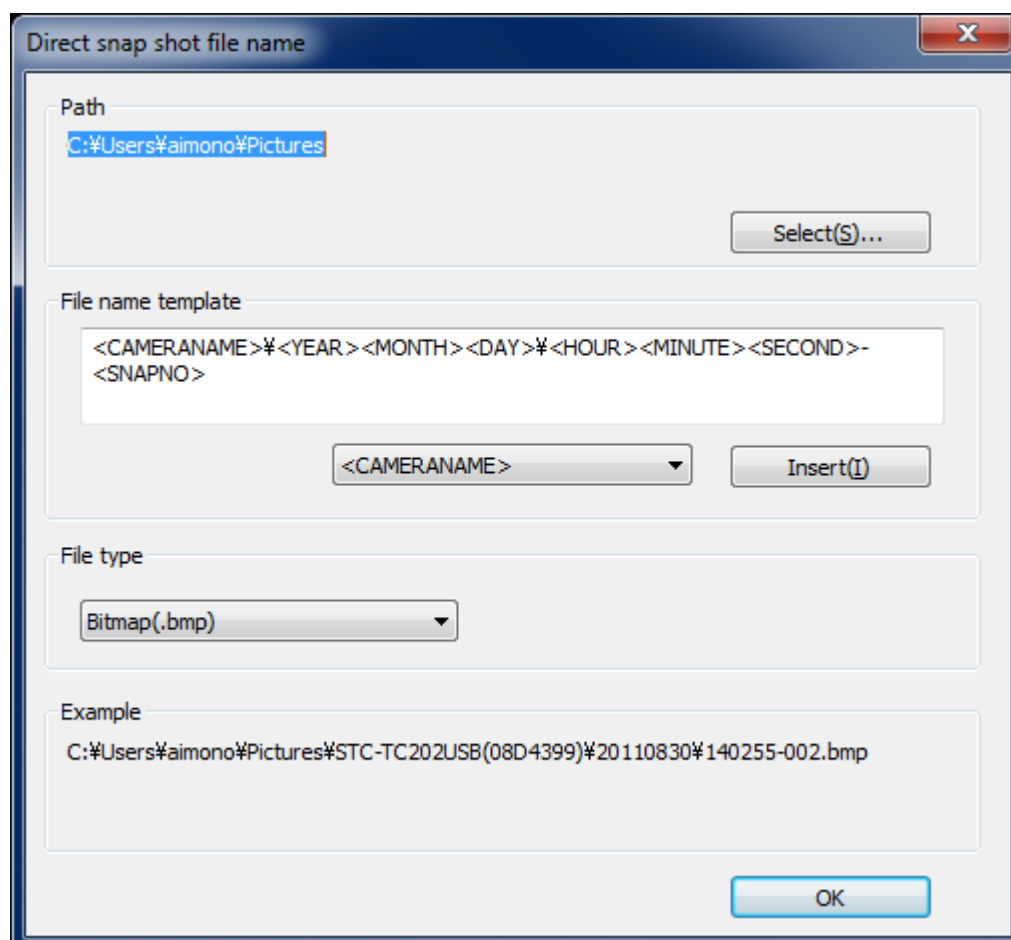


- ④ To display the acquired still image in another window, right-click the image, and select (or double click) [Display] of the displayed menu. (\*1)
- ⑤ To delete the acquired still image without saving, right-click the image and select (or press the [DEL] key) [Delete] of the displayed menu. (\*1)

[Direct Save Snap Shot]      Acquires a still image and immediately saves to a specified destination.

[Direct Save Snap Shot Setting]      Specifies file name and destination.

- ① Select [Direct Save Snap Shot Setting] and open setting screen.



- ② Pressing the [Select] button in the “Path” frame will select the Path to which files are saved.
- ③ Specify a file name template in the “File name template” frame textbox. A subfolder name can be specified by separating with ¥. Character strings enclosed with <> below are replaced when saving. (\*2)

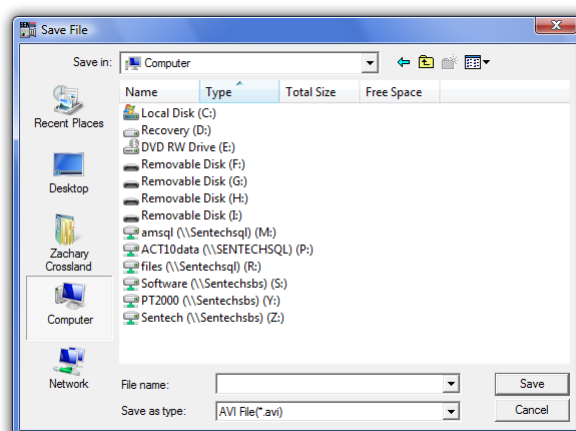


<CAMERANAME>	Camera name
<YEAR>	4-digit one-byte numbers representing Calendar Year
<MONTH>	2-digit one-byte numbers representing Month
<DAY>	2-digit one-byte numbers representing Day
<HOUR>	2-digit one-byte numbers representing Hour
<MINUTE>	2-digit one-byte numbers representing Minute
<SECOND>	2-digit one-byte numbers representing Second
<FRAMENO>	Shortest 4-digit one-byte numbers representing Frame number (exposed image count value after turning on camera*)
<SNAPNO>	Shortest 3-digit one-byte numbers representing Snap number (snap shot count value acquired after starting StCamSWare)

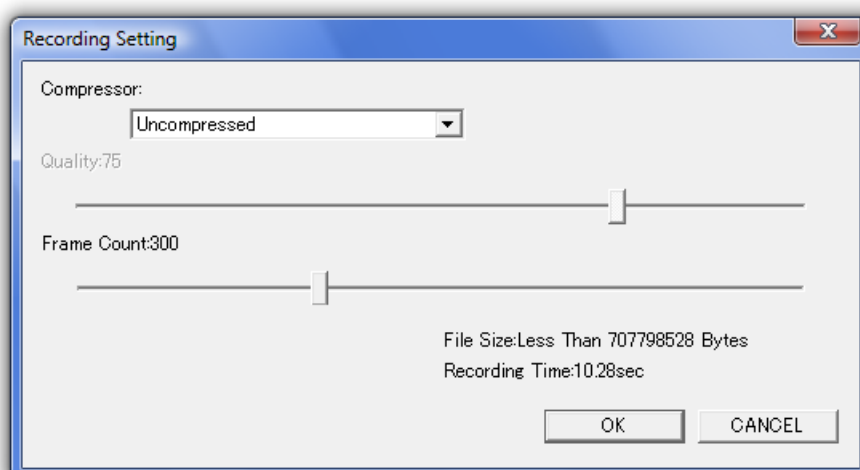
- ④ Select file format (BMP, TIFF, JPEG, PNG) of combo box in [Save as Type] frame.

[Save video] Saves video by specifying file name, compression technology, quality, and frame number. **When saving images, burden on computers increase, and dropping frames are likely to occur. Dropping frames can be reduced by changing clock settings and decreasing frame rates.**

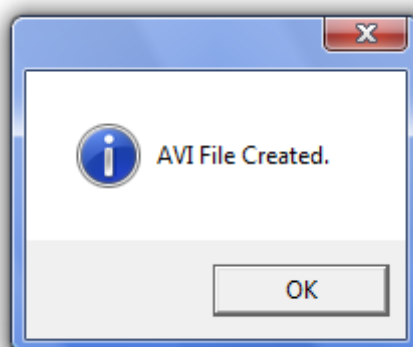
- ① The dialogue box will open when selecting [Save Video], and input AVI file name to be saved.



- ② Set the file format (\*3) and frame number of the video to be saved (quality as well when MotionJPEG) and click the [OK] button.  
 Quality range at MotionJPEG is from 1 through 100 (default is 75), and specifying 100 provides the highest quality.  
 File size when selecting compression format is only a rough indication. File size may change significantly depending on the filmed image.

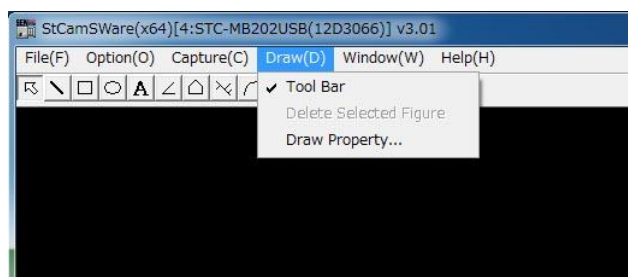


- ③ To cancel while saving, click the [CANCEL] button.
- ④ The message below will appear when saving is completed.

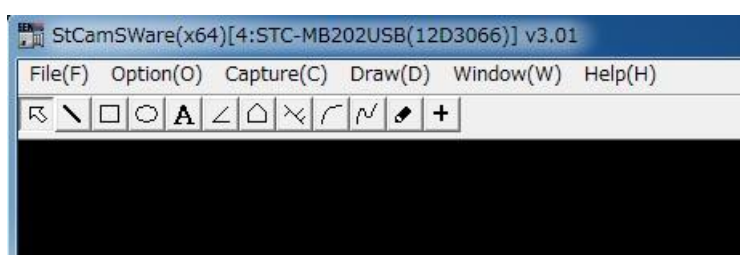


- \*1 Multiple screens can be selected by left-clicking while holding down the [Ctrl] key.
- \*2 Each count value is 32 bits, so it will return to 0 when it exceeds 4294967295. The above character to be replaced can be added to the end of the character string by selecting the combo box and clicking the [Insert] button.
- \*3 MPG4C32.dll is required to save in the compression format (MS-MPEG4v1/MS-MPEG4v2) (not compatible with x64 environment). Not compatible with OS after Windows Vista and x64 version OS.

## 2.4 [Draw] menu



[Tool Bar] The draw tool bar will appear at the top of the screen by selecting the tool bar.



### 2.4.1 Add and edit figures

Instructions on adding and editing figures are given below.

- ① Select the figure to be drawn from the tool bar.



Select the figure already drawn to edit



Draw a line



Draw a rectangle



Draw an oval



Draw a character string



Draw 2 lines to measure angles



Draw polygons



Draw perpendicular lines



Draw an arch



Draw a Bezier curve



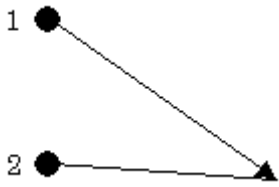
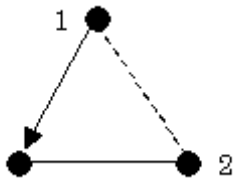
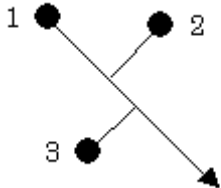
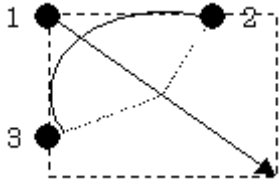
Draw a freehanded curve



Draw a cross

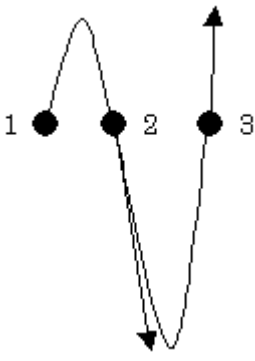

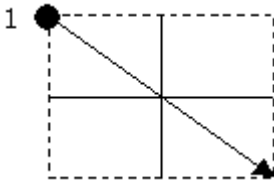
② Use to mouse to add and edit figures.

Line		Add	A line will be drawn from where the left button of the mouse is pressed and where it is released. Moving the mouse while holding down the [SHIFT] key will change the slope of the line by a unit of 45 degrees.
		Edit	Pressing the left button of the mouse on an area around the start or end point will move it until the left button is released. Moving the mouse while holding down the [SHIFT] key will change the slope of the line by a unit of 45 degrees. When pressing the left button of the mouse near the line, it can be moved to where the left button is released.
Rectangle		Add	A rectangle with vertexes at where the left button of the mouse is pressed and released will be drawn. A square will be drawn by moving the mouse while pressing the [SHIFT] key.
		Edit	Pressing the left button of the mouse near the vertex will move it to where the left button is released. A square will be drawn by moving the mouse while pressing the [SHIFT] key. Pressing the left button of the mouse in the rectangle enables to move the position of the rectangle.
Oval		Add	An inscribed oval will be drawn in the rectangle with vertexes at where the left button of the mouse is pressed and released. A circle will be drawn by moving the mouse while pressing the [SHIFT] key.
		Edit	When pressing the left button of the mouse at the vertex of the outer rectangle, the shape of the oval will change so where the left button is released will be the vertex of the outer rectangle. A circle will be drawn by moving the mouse while pressing the [SHIFT] key. Pressing the left button of the mouse in the outer rectangle will move the position of the oval.
Character string		Add	Character strings will be drawn where the left button of the mouse is clicked. Character strings displayed will be change on the Draw property screen.
		Edit	When pressing the left button of the mouse around the characters, the character strings can be moved to where the left button is released.

Angle		Add	Just as with a line, a line will be drawn from where the left button of the mouse is pressed and where it is released. The 2 <sup>nd</sup> line will be drawn to where the left button of the mouse is clicked, and the angle between the 2 lines is displayed.
		Edit	When pressing the left button of the mouse around the line's end point, the end point can be moved to where the left button is released. When pressing the left button of the mouse near the center of the line, the figure can be moved to where the left button is released.
Polygons		Add	Just as with a line, a line will be drawn from where the left button of the mouse is pressed and where it is released. A vertex is added with every left-click. A right-click finishes drawing.
		Edit	When pressing the left button of the mouse around the vertex, the vertex can be moved to where the left button is released. When pressing the left button of the mouse near the center of the line, the polygon can be moved to where the left button is released.
Perpendicular Line		Add	Just as with a line, a line will be drawn from where the left button of the mouse is pressed and where it is released. One perpendicular line is added with every left-click. A right-click finishes drawing.
		Edit	When pressing the left button of the mouse around the line's end point, the end point can be moved to where the left button is released. When pressing the left button of the mouse near the center of the line, the perpendicular line can be moved to where the left button is released.
Arch		Add	Just as with an oval, an inscribed oval will be drawn in the rectangle with vertexes at where the left button of the mouse is pressed and released. The 1 <sup>st</sup> left-click sets the start position of the arch and the 2 <sup>nd</sup> the end position.
		Edit	When pressing the left button of the mouse near the vertex of the outer rectangle, the shape of the oval will change so where the left button is released will be the vertex of the outer rectangle. A circle will be drawn by moving the mouse while pressing the [SHIFT] key. Pressing the left button of the mouse in the outer rectangle will move the position of the arch. When pressing the left button of the mouse near the line's end point from the start position (or end position) of that



			stretches from the center of the arch, the start position (or end position) of the arch can be moved to where the left button is released.
--	--	--	--

Bezier curve		Add	<p>A Bezier curved that passes the position of the left click will be drawn.</p> <p>A right click will finish drawing.</p> <p>Dragging while holding down the left button of the mouse when adding the pass point will set the slope of the angle of the curve (control point) at the pass point.</p> <p>A control point can be set so the curve will become continuous around the pass point by moving the mouse while pressing the [SHIFT] key.</p>
		Edit	<p>When pressing the left button of the mouse near the pass point, the pass point can be moved to where the left button is released.</p> <p>When pressing the left button of the mouse near the tip of the control point stretching from the pass point, the control point can moved to where the left button is released.</p> <p>The control point can be moved so the curve will become continuous around the vertex by dragging the control point while holding down the [SHIFT] button.</p> <p>When pressing the left button of the mouse near the center of the line stretching to the control point from the pass point, the entire curve can be moved to where the left button is released.</p>
Freehand curve		Add	<p>A track of the mouse from the left button of the mouse was pressed to where it was released will be drawn.</p>
		Edit	<p>Freehand curves are generated by multiple lines.</p> <p>When pressing the left button of the mouse near the end point of each line, the end point can be moved to where the left button is released.</p> <p>When pressing the left button of the mouse near the center of each line, the entire curve can be moved to where the left button is released.</p>
Cross		Edit	<p>When pressing the left button of the mouse near the pass point, the pass point can be moved to where the left button is released.</p> <p>When pressing the left button of the mouse near the tip of the control point stretching from the pass point, the control point can be moved to where the left button is released.</p> <p>The control point can be moved so the curve will become continuous around the vertex by dragging the control point while holding down the [SHIFT] button.</p> <p>Pressing the left button of the mouse near the center of the line stretching from the pass point to the control point, the entire curve can be moved to where the left is released.</p>

- \* Burden on the computer increases depending on the number of figures and width of lines.
- \* When multiple figures are selected, they can be moved only in entirety.  
To change shapes of each figure, selected that figure separately.
- \* The display of the drawing can be updated only during preview.


---

Adding, editing, and deleting of figures while the preview is stopped will not be reflected for display.

\*

## 2.4.2 How to delete figures

Instructions on how to delete figures are given below.

- ① Click the  button and set to selection mode.
- ② Left-click the periphery of the figure to be deleted and activate the figure.  
Left-clicking while holding down the [SHIFT] button will enable multiple selections of the figure.  
Dragging while holding down the left button of the mouse will enable selection of multiple figures included in the area dragged.
- ③ Select the [Draw] [Delete selected figure] from the menu to delete a figure.

\* The display of the drawing can be updated only during preview.

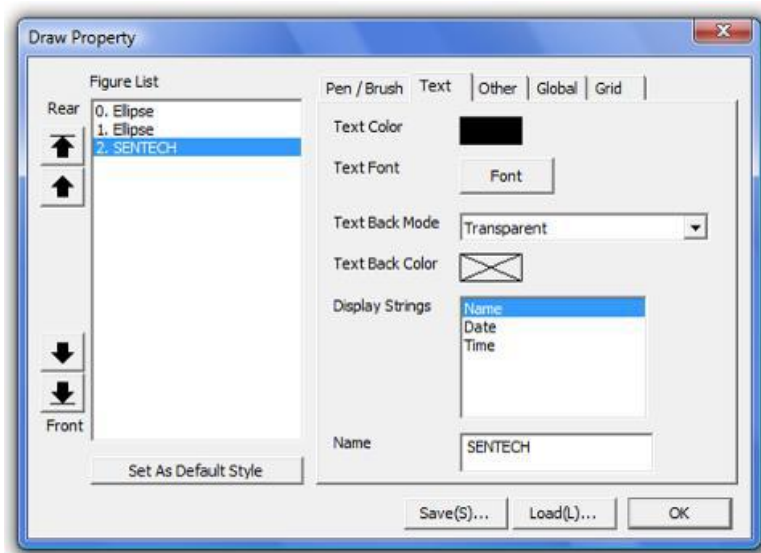
Adding, editing, and deleting of figures while the preview is stopped will not be reflected for display.



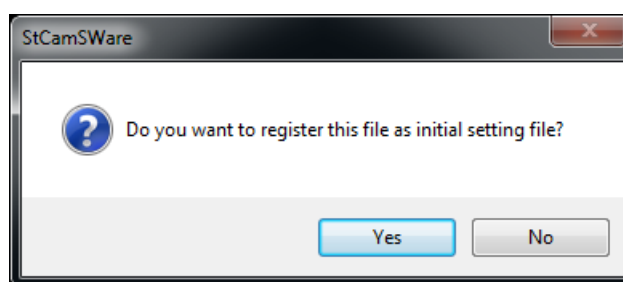
## 2.4.3 Saving and reading of draw data

Instructions now how to save and read draw data are given below.

- ① The below draw property screen will appear when selecting the [Draw][Draw Property] from the menu.



- ② Pressing the [Save] button will enable saving the current draw data to file (\*.drw).  
When responding [Yes] to the message displayed as below, this file will be read automatically the next start-up.

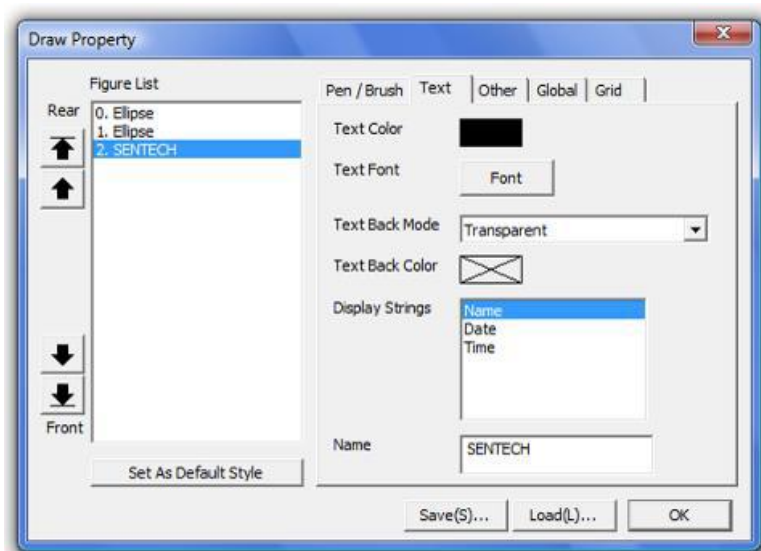


- ③ Pressing the [Load] button will enable to read the draw data to the file (\*.drw).

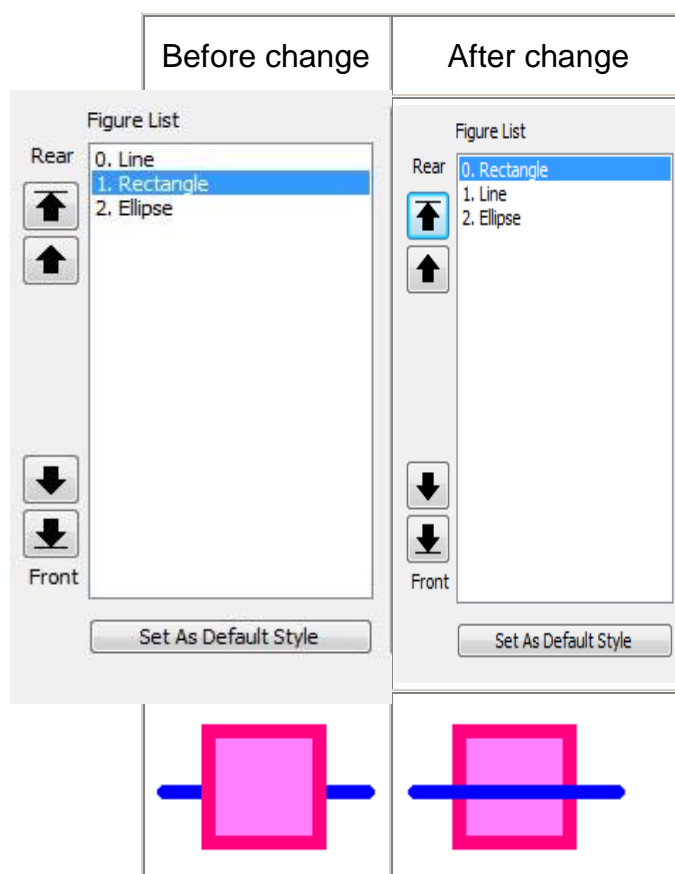
## 2.4.4 Setting the sequence of draw data

Instructions on how to set the sequence of draw data are given below. Moving the sequence to the front will enable display of figures hidden under different figures or will make selection of figures in the back of other figures easier.

- ① The below draw property will appear by selecting [Draw][Draw Property] from the menu.

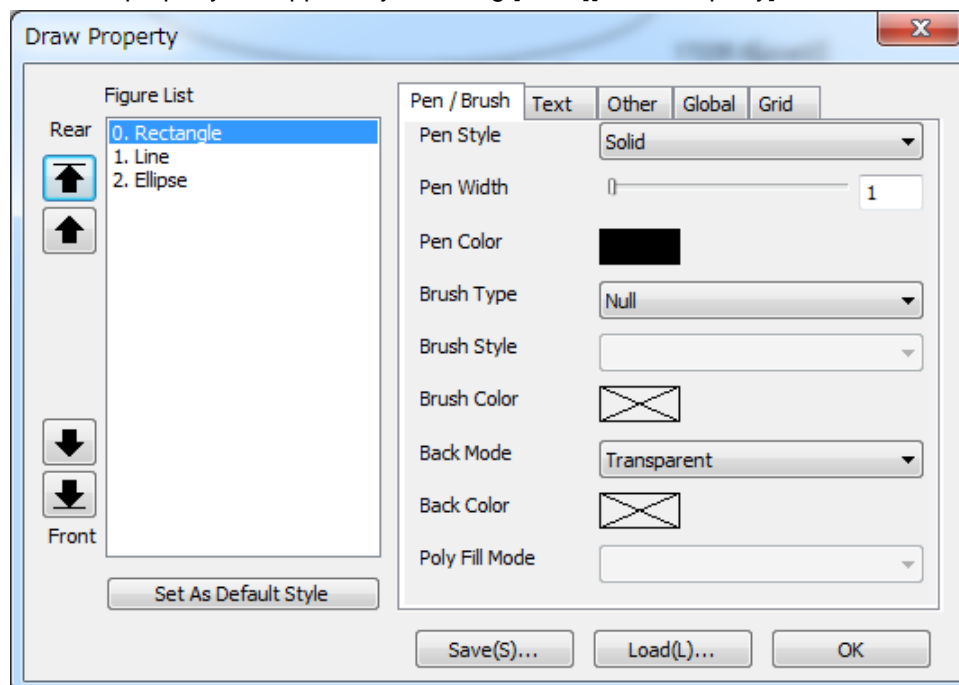


- ② Select the figure to change the sequence from the figure list and click the arrow button.  
In the example below, the [Line] hidden at the back of the [Rectangle] will appear in the front by selecting the [Rectangle] from the figure list and clicking the top button.







































## 2.4.5 Setting figure formats


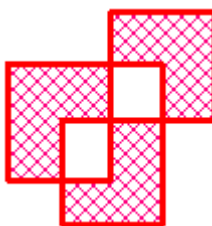

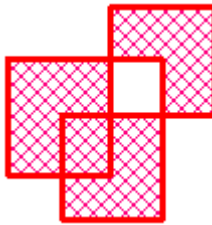
- ① The below draw property will appear by selecting [Draw][Draw Property] from the menu.



- ② Select the figure to change the format from the figure list.

③ Set the format by switching tabs.

Tab name	Item name	Description														
Pen/brush	Pen style	Sets pen style. When pen width is 2 or more, only [Solid][No Line] can be selected (for a cross [Dashed Line][Dotted Line] can be selected).														
		<table><tr><td>Pen style</td><td>Example</td></tr><tr><td>Solid</td><td></td></tr><tr><td>Dashed line</td><td></td></tr><tr><td>Dotted line</td><td></td></tr><tr><td>Chain line</td><td></td></tr><tr><td>Chain double-dashed line</td><td></td></tr><tr><td>No line</td><td></td></tr></table>	Pen style	Example	Solid		Dashed line		Dotted line		Chain line		Chain double-dashed line		No line	
		Pen style	Example													
		Solid														
		Dashed line														
		Dotted line														
		Chain line														
		Chain double-dashed line														
	No line															
	Pen width	Sets pen width.														
Pen color	Sets pen color.															
Brush type	Sets brush type.															
	<table><tr><td>Brush type</td></tr><tr><td>Empty brush</td></tr><tr><td>Pure color brush</td></tr><tr><td>Hash pattern brush</td></tr></table>	Brush type	Empty brush	Pure color brush	Hash pattern brush											
	Brush type															
	Empty brush															
Pure color brush																
Hash pattern brush																
Brush style	Sets brush style. Only valid when brush type is [Hash Pattern Brush].															
	<table><tr><td>Brush style</td><td>Example</td></tr><tr><td>45 degree downward sloping hatch</td><td></td></tr><tr><td>Horizontal and vertical cross hatch</td><td></td></tr><tr><td>45 degree cross hatch</td><td></td></tr><tr><td>45 degree upward sloping hatch</td><td></td></tr><tr><td>Horizontal hatch</td><td></td></tr><tr><td>Vertical hatch</td><td></td></tr></table>	Brush style	Example	45 degree downward sloping hatch		Horizontal and vertical cross hatch		45 degree cross hatch		45 degree upward sloping hatch		Horizontal hatch		Vertical hatch		
	Brush style	Example														
	45 degree downward sloping hatch															
	Horizontal and vertical cross hatch															
	45 degree cross hatch															
	45 degree upward sloping hatch															
	Horizontal hatch															
Vertical hatch																
Background mode	Sets background mode.															
	<table><tr><td>Background mode</td></tr><tr><td>Transparent</td></tr><tr><td>Fill</td></tr></table>	Background mode	Transparent	Fill												
	Background mode															
Transparent																
Fill																
Background color	Sets background color. Valid only when background mode is [Fill].															

Tab name	Item name	Description			
Pen/brush	Polygon fill mode	Sets polygon fill mode. Valid only for polygons. Effective for polygons whose sides cross as below.			
		Polygon fill mode			
		Alternate			
		Entire region			
Text	Character color	Sets character color.			
	Font	Sets fonts. Letter colors may change during font setting. In that case, reset the letter color.			
	Character string background mode	Sets character string background mode. <table><tr><td>Character string background mode</td></tr><tr><td>Transparent</td></tr><tr><td>Fill</td></tr></table>	Character string background mode	Transparent	Fill
	Character string background mode				
	Transparent				
	Fill				
	Character string background color	Sets character string background color. Valid only when character string background mode is [Fill].			
	Display character string	Selects character string to be displayed. Character strings that can be displayed vary depending on the selected figure.			
		Displayed character string	Description		
		Name	Display name of figure		
Width		Displays width of figure			
Height		Displays height of figure			
Length		Displays length of line and circumference of the figure. For arches, values are displayed only for precise circles.			
Area		Displays area of figure			
Angle		Displays angle			
Date		Displays data			
Time	Displays time				

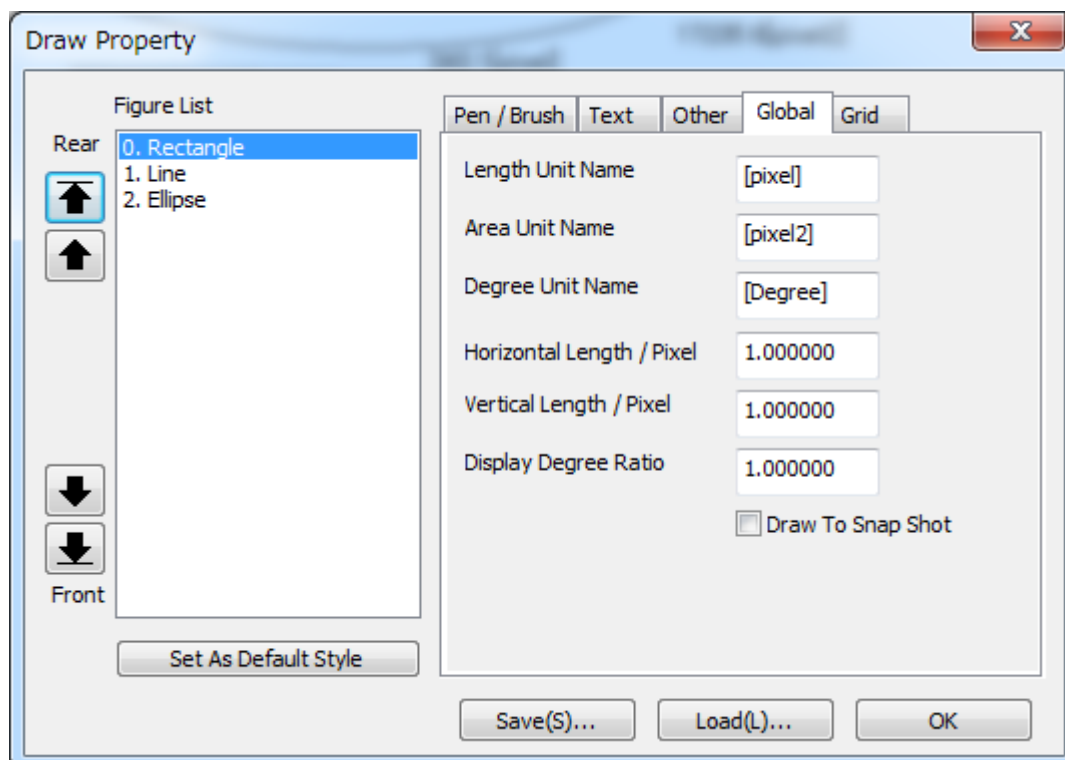
	Name	Sets name. Pressing [Enter] after inputting the new name will change the name.
--	------	---

Tab name	Item name	Description
Others	Lock	Sets to locked state. When locking, selecting and editing with a mouse on the preview screen will be deactivated.
	Non-display	Sets display state. During non-display, the figure can be hidden without deleting it.

- ④ When clicking [Set as Default Style], the setting of the pen, brush, background color, letter color, font, letter background color of the figure that is currently selected will be registered as the default value and reflected on the newly added figure.
- \* When pixel format is set to "GRAY8," draw data will be displayed as black-and-white. To display draw data in color, set to "BGR24" or "BGR32."

## 2.4.6 Draw Global Setting



















- ① The below draw property will appear by selecting [Draw][Draw Property] from the menu



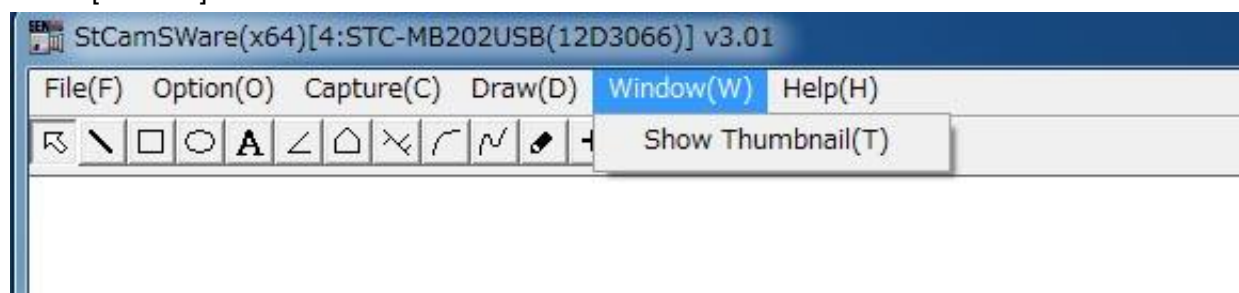
- ② Switch the tab and set each item. Pressing the [Enter] key after changing will fix the input value.

Tab name	Item name	Description
Global	Length unit name	Sets the length unit displayed with the length value.
	Area unit name	Sets the area unit displayed with the area value.
	Angle unit name	Sets the angle unit displayed with the angle value.
	Lateral direction pixel size	Sets multiplier that corrects the lateral direction length. When an 8cm horizontal line in the real world is compatible with a 100 pixel horizontal line in the image, the value should be set to 0.08 and length unit name will be set to [cm].
	Longitudinal direction pixel size	Sets multiplier that corrects the longitudinal direction length. When an 8cm horizontal line in the real world is compatible with a 100 pixel perpendicular line in the image, the value should be set to 0.08 and length unit name will be set to [cm].
	Display degree ratio	Sets multiplier that corrects the displayed degree value. Sets value against degree measure (360 degrees). To display the milli-radian value, this value will be set to 17.453293 and degree unit name will be set to [mrad].
	Draw to snap shot	Placing a checkmark will enable to draw figures on snap shops.

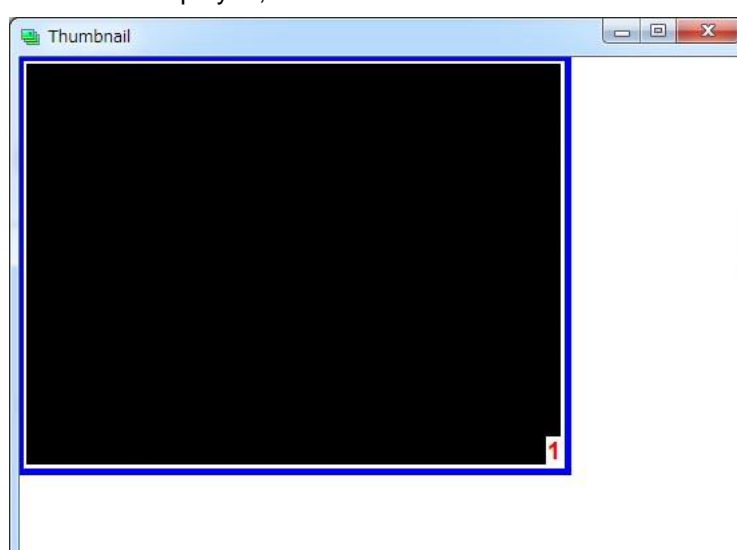


Tab name	Item name	Description														
Grid	Lateral direction grid number	Sets number of grids of the lateral direction.														
	Longitudinal direction grid number	Sets number of grids of the longitudinal direction.														
	Grid pen style	Sets grid pen style. When pen width is over 2, only [Solid][No Line] can be selected. <table><tr><td>Pen style</td><td>Example</td></tr><tr><td>Solid</td><td></td></tr><tr><td>Dashed line</td><td></td></tr><tr><td>Dotted line</td><td></td></tr><tr><td>Chain line</td><td></td></tr><tr><td>Chain double-dashed line</td><td></td></tr><tr><td>No line</td><td></td></tr></table>	Pen style	Example	Solid		Dashed line		Dotted line		Chain line		Chain double-dashed line		No line	
	Pen style	Example														
	Solid															
	Dashed line															
	Dotted line															
	Chain line															
	Chain double-dashed line															
No line																
Grid pen width	Sets grid pen width.															
Grid pen color	Sets grid pen color.															
Grid background mode	Sets grid background mode. <table><tr><td>Background mode</td></tr><tr><td>Transparent</td></tr><tr><td>Fill</td></tr></table>	Background mode	Transparent	Fill												
Background mode																
Transparent																
Fill																
Grid background color	Sets grid background color. Valid only when background mode is [Fill].															

## 2.5 [Window] menu



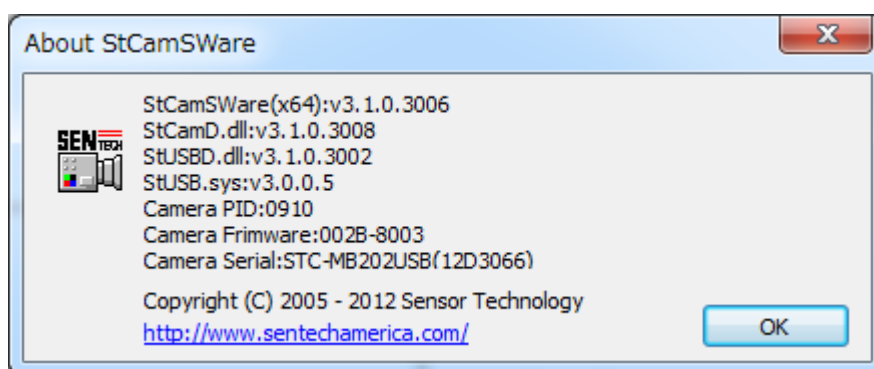
[Show Thumbnail] A thumbnail screen will appear when selecting thumbnail display, the captured image can be displayed, saved and deleted.



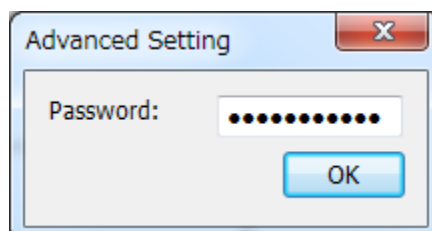
## 2.6 [Help] menu



[Version Information] When selecting version information, software version information and camera information can be acquired.



[Advanced Setting] The password input screen will appear when selecting detail setting.  
To use the trigger function, enter the password and activate the trigger function screen.



Password: triggeruser

\* The trigger function built in StCamSWare is for simple operation check.  
To use the trigger function in the real application, please refer to the sample program StTrgDisplay△△△.exe included in TriggerSDK (△△△ varies depending on the development environment such as VB6 and VC6).

[Help] Help will appear when selecting help.

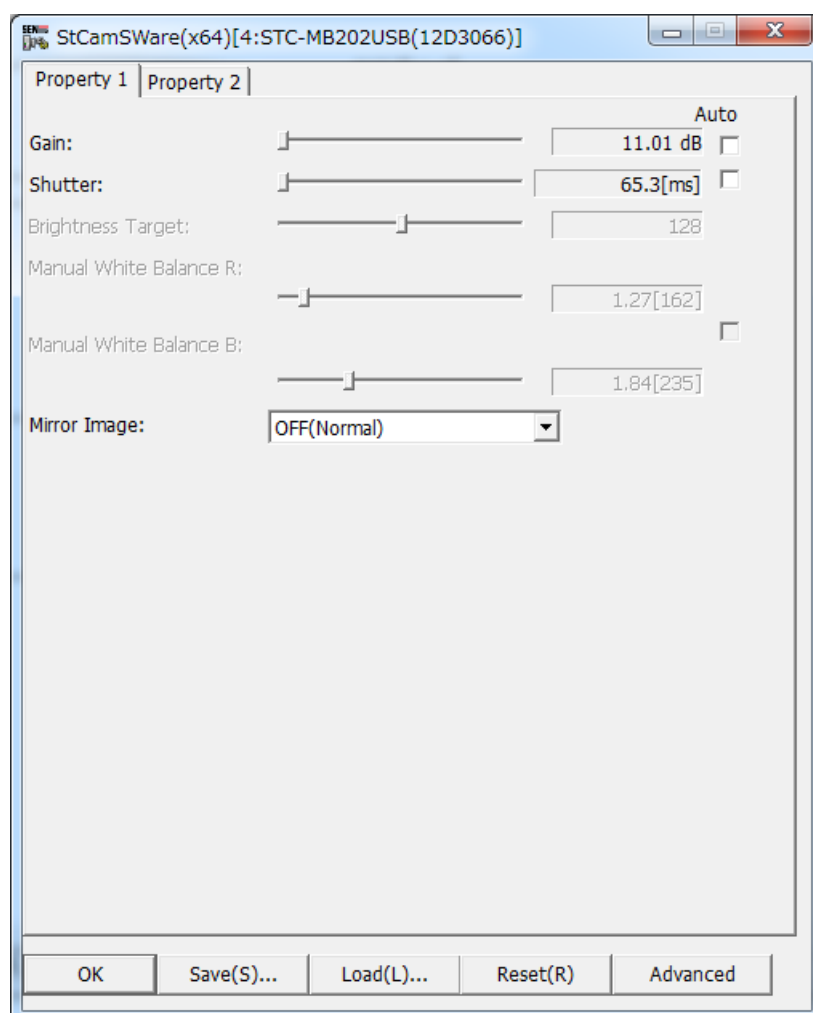
### 3 How to use (camera setting)

#### 3.1 Saving and reading camera settings

Instructions on how to display the setting screen, how to save files to settings, how to read settings from file, and how to reset settings are given.

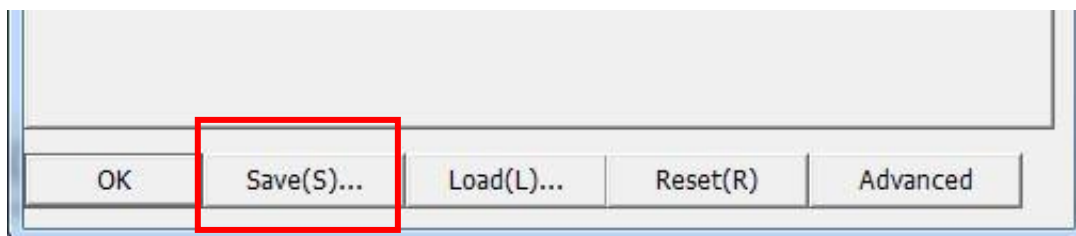
##### 3.1.1 Display method of setting screen

- ① Select [Option][Setting] from menu.
- ② To display the detail setting screen, click the [Advanced] button.
- ③ To return to the normal setting screen, click the [Simple] button.

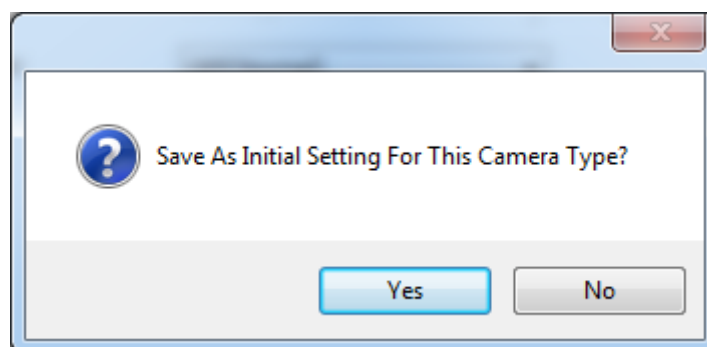


### 3.1.2 How to save settings to files

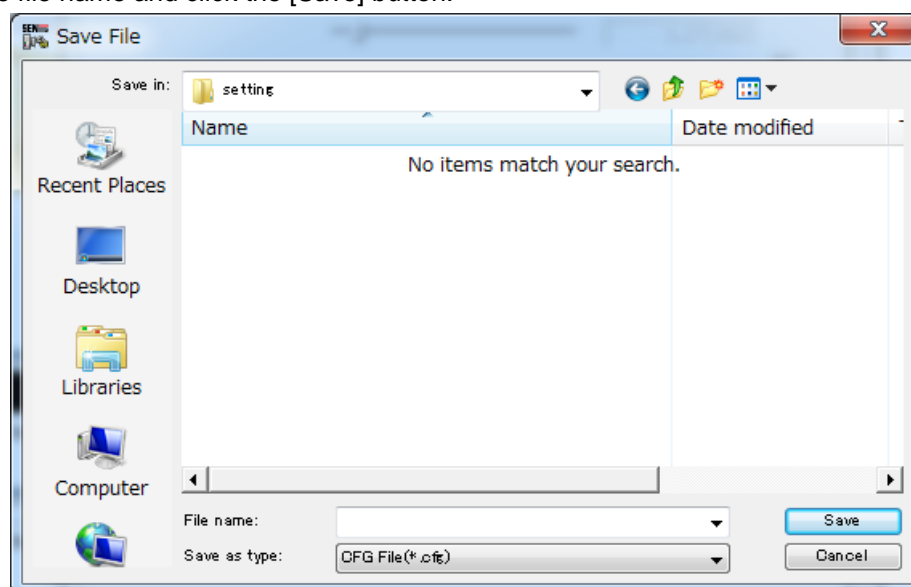
- ① Click the [Save] button in the lower part of the screen.



- ② When selecting [Yes] to the below message, setting file “StCamSWare.cfg” will be created in the same folder as “StCamSWare.exe” (\*:¥ProgramData¥Sentech¥StCamSWare in post-Vista OS), and it will be automatically read from the next start-up. When selecting [No,] the next step is ③.



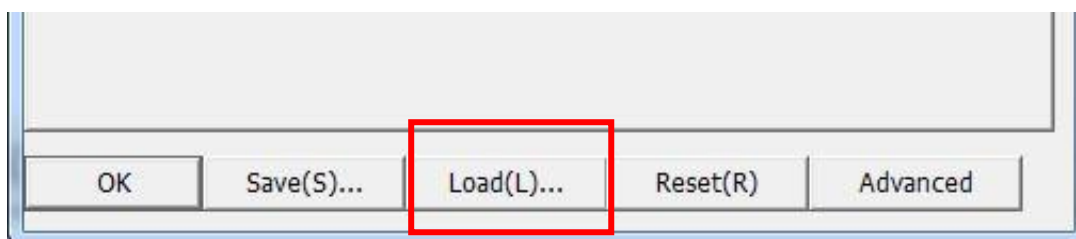
- ③ Enter the file name and click the [Save] button.



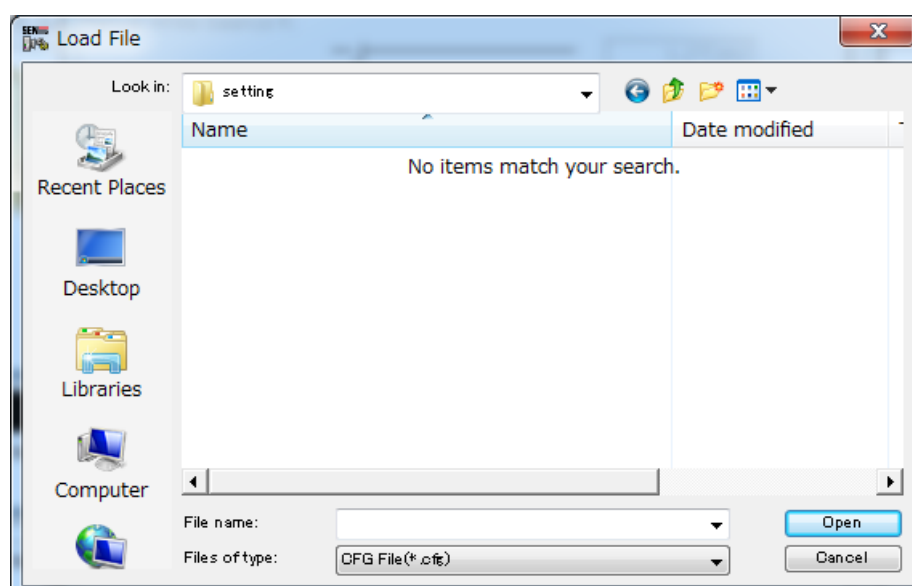
\* “Trigger” and “IO” screen settings of the detail setting screen cannot be saved.

### 3.1.3 How to read settings from files

- ① Click the [Load] button at the lower part of the screen.

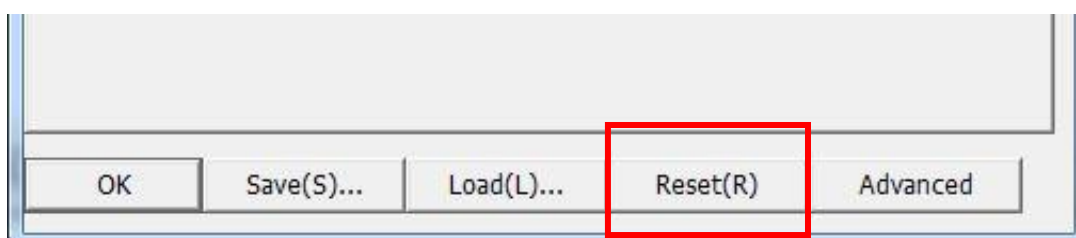


- ② Select the file to be selected and click the [Open] button.



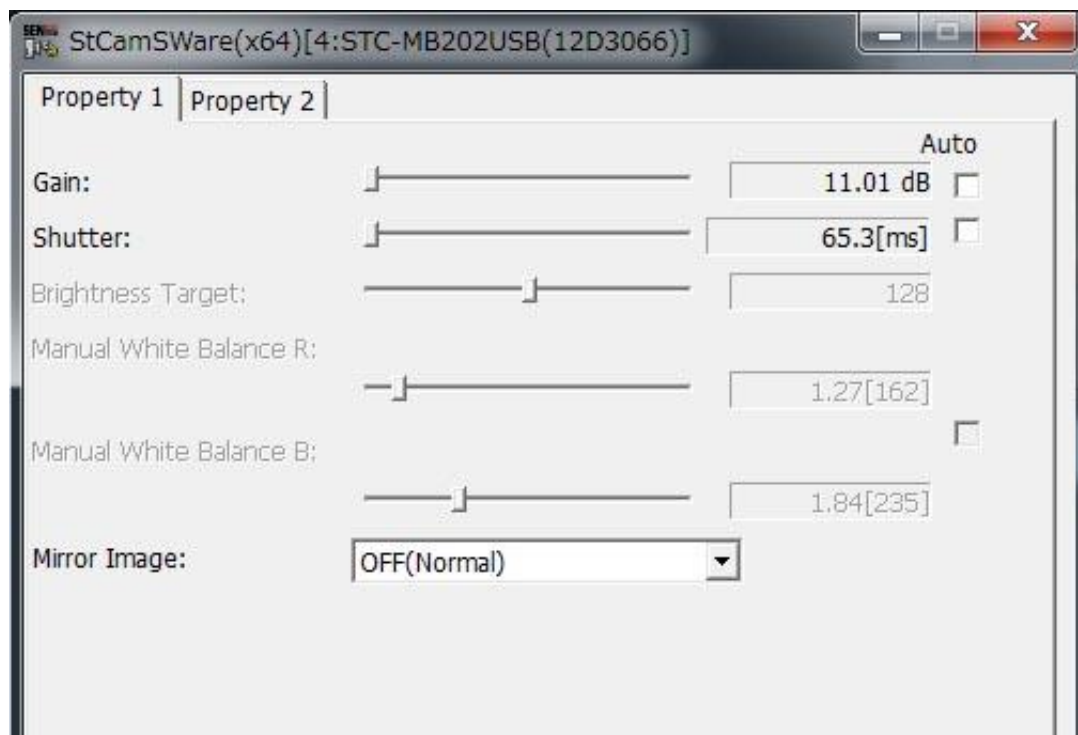
### 3.1.4 How to reset

- ① Click the [Reset] button at the lower part of the screen.



## 3.2 Simple setting screen

### 3.2.1 Property 1 [Gain, Shutter, Mirror Image]



[Gain] Gain settings inside the camera will adjust brightness of the image.  
 “Fixed Gain Mode” and “AGC (Auto Gain Control) mode” can be selected.

#### ■ Fixed gain mode

Setting to this mode fixes the gain to the set value.

- ① Remove the checkmark from the automatic checkbox.
- ② Set the gain value.

#### ■ AGC mode

Setting to this mode will automatically adjust the gain so brightness target will converge to “Brightness Target” value.

- ① Place a checkmark in the automatic checkbox.
- ② Set “Brightness Target” value as necessary.

[Shutter] Electric shutters adjust brightness of images and reduce flickers.  
“Fixed Shutter Mode” and “Auto Shutter Control Mode” can be selected.

■ Fixed shutter mode

Setting to this mode will fix the shutter to the set value.

- ① Remove the checkmark from the automatic checkbox.
- ② Set the shutter value.

■ Auto shutter control mode

Setting to this mode will automatically adjust the shutter so brightness target will converge to “Brightness Target” value.

- ① Place a checkmark in the automatic checkbox.
- ② Set “Brightness Target” value as necessary.

[White balance] The human eye adapts to light source, so white paper under a red light source is seen as white. However, CCD cameras are affected by the light source, and paper photographed under a red light source will be tinted as red. Making adjustments to a white object that is photographed so it will not be tinted is called white balance. This camera has AWB mode which automatically made adjustments and Manual WB mode which fixes the adjustment value.

■ AWB mode

Setting to this mode automatically corrects white balance.

- ① Place a checkmark in the automatic checkbox next to the “Manual White Balance R” (“Manual White Balance B”).

■ Manual WB mode

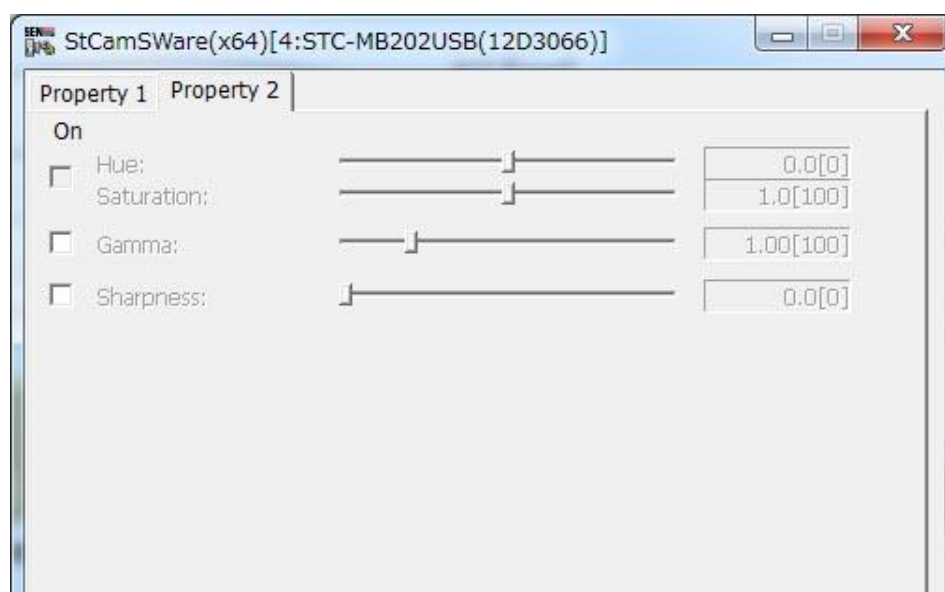
Setting to this mode fixes the adjusted value of white balance to a set value. Used when the light source of the photograph environment is fixed or when AWB mode is insufficient.

- ① Remove the checkmark in the automatic checkbox next to the “Manual White Balance R” (“Manual White Balance B”).
- ② Photograph the white object under the actual light source to be used for the photograph and set the “Manual White Balance R ” and “Manual White Balance B” so it will be displayed as white on the image.

[Mirror image] Images can be displayed in reverse right-left and top-bottom. The frame rate may be reduced when validated (excluding normal image) because processing is done by computers. If unnecessary, please disable (normal image) for use.



## 3.2.2 Property 2 [Hue/Saturation, Gamma, Sharpness]



[Hue/Saturation] Adjusts hue/saturation of the displayed image.

- ① Place a checkmark in the On checkbox.
- ② Sets the hue/saturation value.

\* The frame rate may be reduced when turned on because processing is done by computers. If unnecessary, please turn off (remove the checkmark) for use.

[Gamma] Adjusts gamma of the displayed image.

- ① Place checkmark in the On checkbox.
- ② Sets the gamma value.

\* The frame rate may be reduced when turned on because processing is done by computers. If unnecessary, please turn off (remove the checkmark) for use.

[Sharpness] Adjusts the sharpness of the displayed image.

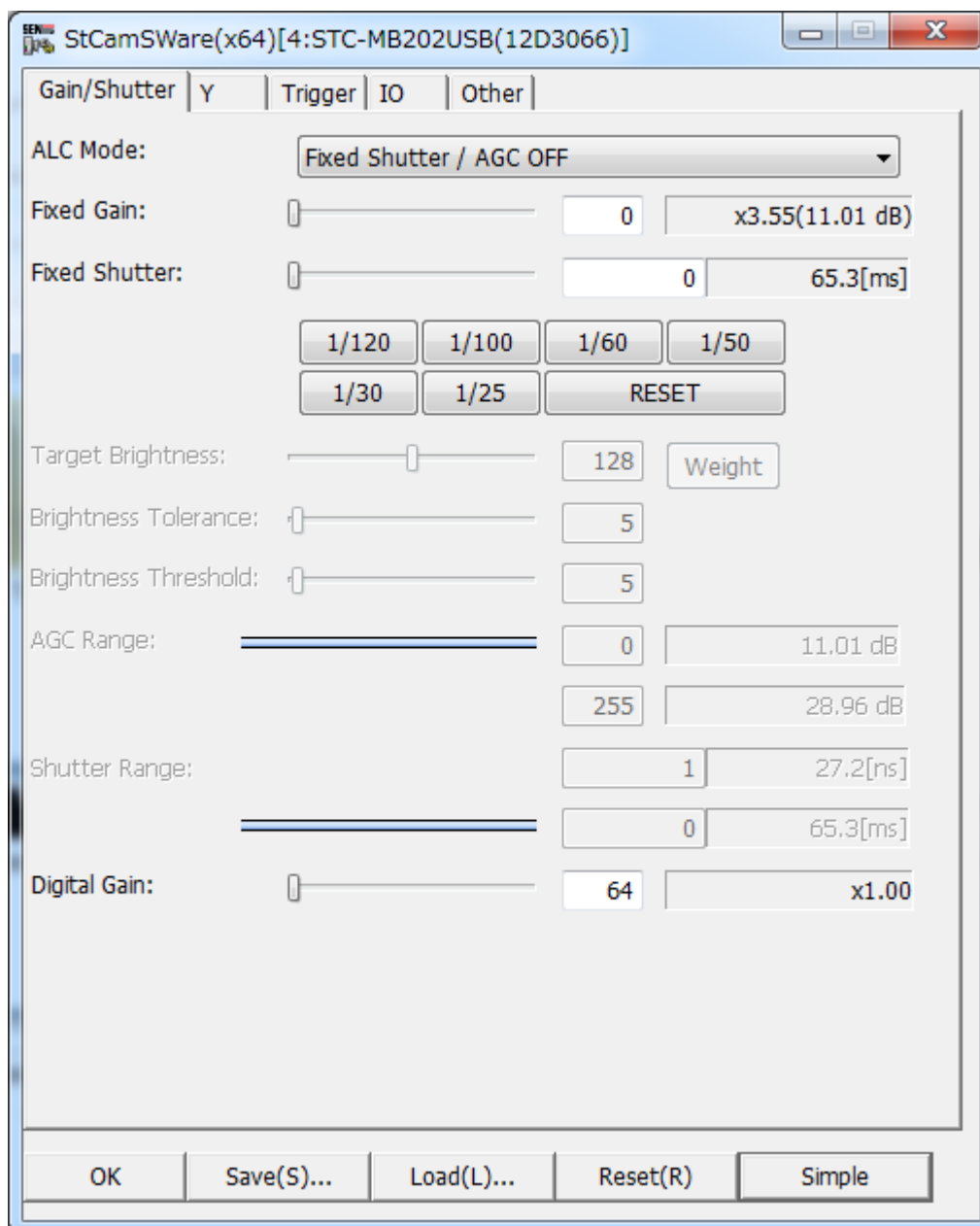
- ① Place checkmark in the On checkbox.
- ② Sets the sharpness value.

\* The frame rate may be reduced when turned on because processing is done by computers. If unnecessary, please turn off (remove the checkmark) for use.

## 3.3 Detail setting screen

### 3.3.1 Gain/Shutter

The outline and Instructions on how to set gain and shutter are given.



## 3.3.1.1 Gain

Setting of the gain inside the camera will adjust brightness of the image. Because the noise component will be amplified along with the image signal, a gain set too large will create a rough image, so attention is required. Fixed gain mode which fixes gain and AGC (Auto Gain Control) mode which automatically adjusts gain can be selected from this camera.

■ Fixed mode

Setting to this mode fixes gain to the set value. Instructions of switching to fixed mode and changing to gain when switching are given below.

- ① Open the [Gain/Shutter] tab and select [Fix Gain] from “ALC Mode.”
- ② Use slider of the “Fixed Gain” to set gain.

■ AGC Mode

Setting to this mode will automatically control gain (Auto Gain Control) and maintain brightness aimed for by the image brightness when the object is dark relative to the aimed brightness. Figure 1 shows the brightness of the object and a change of image when set to AGC mode.

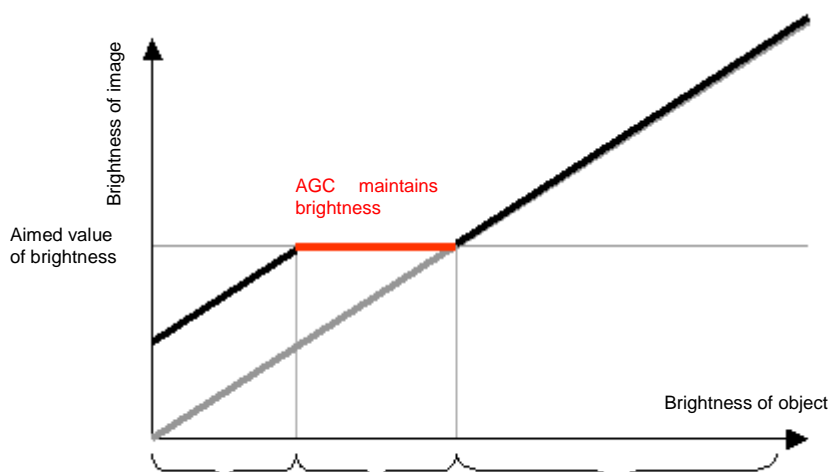


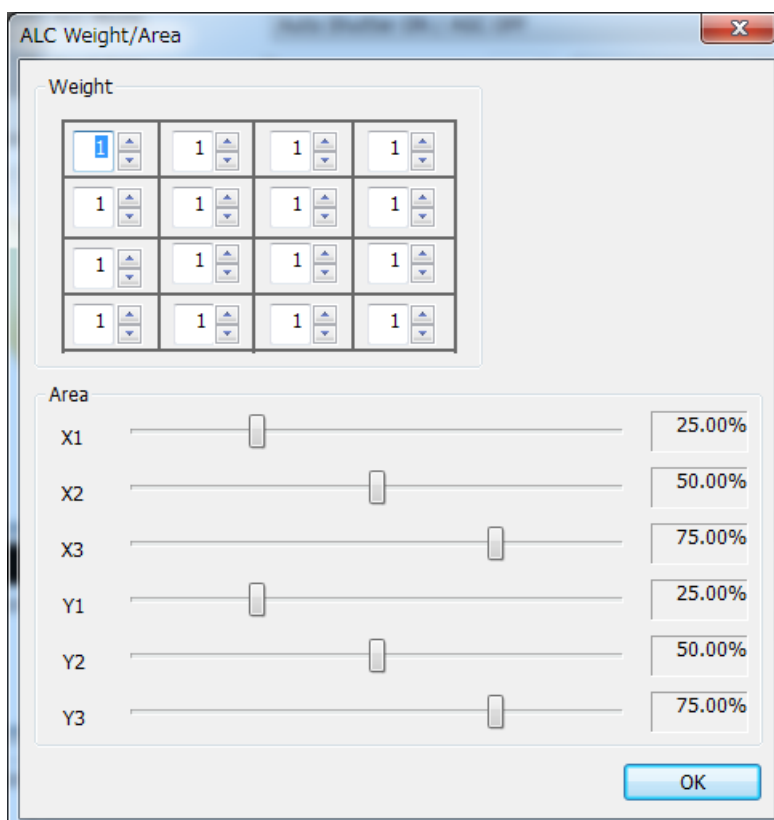
Figure 1 AGC performance outline

AGC functions perform in the red line area, and brightness is maintained to the aimed brightness of the image.

AGC mode settings and aimed value of brightness, and gain control range can be set according to the following steps. Setting the aimed value is the same as the ALC. (Some functions may not be displayed depending on whether the camera has that certain function)

- ① Open [Gain/Shutter] and select [AGC] from “ALC Mode.”  
When selecting [One Shot AGC,] once converged to the aimed brightness, it will switch to “fixed gain.” (display will not change)
- ② Use “Brightness Target” slider to set the aimed value of brightness.
- ③ Use “Brightness Tolerance” slider to set the tolerance of brightness. (\*1)
- ④ Use “Brightness Threshold” slider to set the control start point of brightness. (\*2)

- ⑤ Pressing the [Weight] button will open a screen to enter weight and area positions for brightness data for each position on the image.

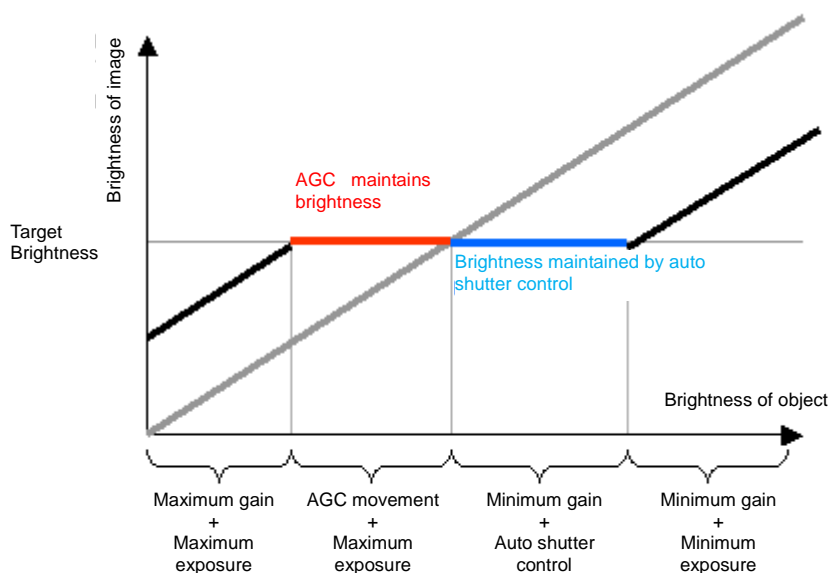


- ⑥ Use “AGC Range” slider to set the gain range at AGC control. (\*3)

- \*1 AGC control finishes when the difference between the “Brightness Target” value and current brightness becomes smaller than this value.  
When this value is reduced, the range of the converged brightness becomes smaller, but the gain becomes variable.  
When this value is enlarged, the range of the converged brightness becomes larger, but the gain becomes more stable.
- \*2 AGC control starts when difference between the current brightness and tolerance range of brightness exceeds this value.
- \*3 Compatible with some cameras only.

■ Combined use with auto shutter control mode

Figure 2 shows the change between the brightness of the object and of the image when auto shutter control mode and AGC mode are used in combination.



**Figure 2 Outline of auto shutter control/AGC movement**

AGC functions are triggered when object is dark (red line area) and auto shutter control functions are triggered when object is bright (blue line area), and brightness is maintained to the aimed brightness of the image.

■ Digital gain (TC, TB series only)

Sets 10 bit of AD output and 8 bit output from camera.

When 64 (x1.00), the top 8 bits out of AD output 10 bits are compatible with 8 bit of output.

When 256 (x2.00), the lower 8 bits out of AD output 10 bits are compatible with 8 bit of output.

## 3.3.1.2

## Shutter

The charge amount of the signal generated by CCD is determined by the brightness of the object (intensity of incident light) and shutter speed (exposure time). When NTSC, normal shutter speed is  $1/60$  [s], and image is output every  $1/60$  [s], the change in signal amount when photographing an object with a constant brightness as in Figure 3 is shown in Figure 4.

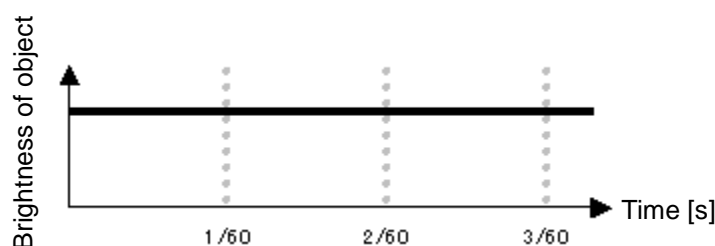
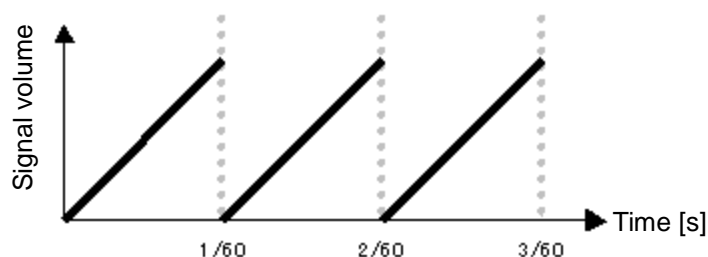
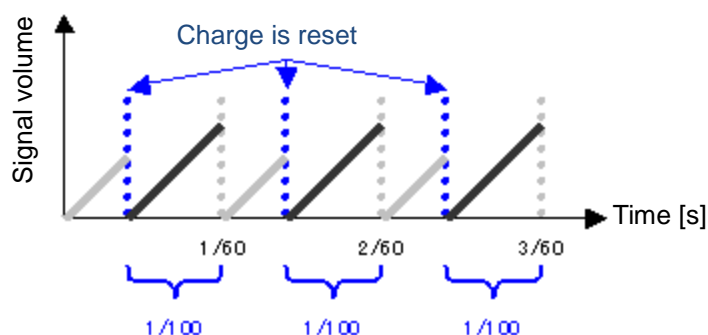


Figure 3 Object with constant brightness

Figure 4 Shutter speed  $1/60$  [s]

Shutter speed can be increased (shorten exposure time) by resetting the accumulated charge before outputting it as an image. Figure 5 shows the change of charge volume when shutter speed is  $1/100$  [s].

Figure 5 Shutter speed  $1/100$  [s]

In comparison Figure 4 and 5, it is obvious that signal volume output every  $1/60$  [s] changes even though the objects are the same. Based on this, shutter speed can be used to adjust brightness of images. In addition, shutter speed for moving objects can be set to high-speed to photograph less blurry images. Fixed mode which fixes shutter speed and auto shutter control mode which automatically controls shutter speed depending on brightness of the image can be selected from the camera.

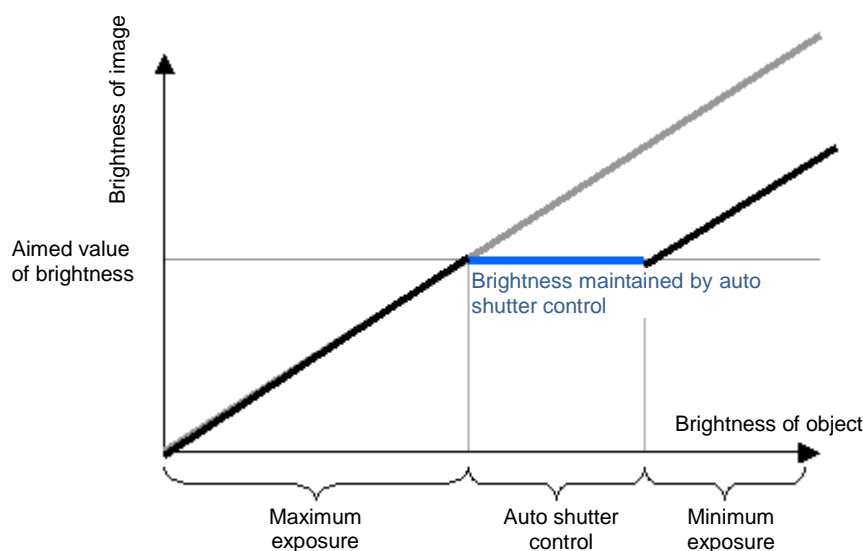
### ■ Fixed mode

Setting to this mode fixes the shutter speed to the set value. Setting shutter speed to 1/100 in 50Hz power supply regions will reduce flickers which are mentioned later.

- ① Open [Gain/Shutter] tab and select [Fixed Shutter] from “ALC Mode.”
- ② Use “Fixed Shutter” slider to set shutter speed.  
Press buttons to set shutter speed to “1/120,” “1/100,” “1/60,” and “1/50.”

### ■ Auto shutter control mode

Setting to this mode will automatically control shutter speed and maintain brightness to the aimed brightness of the image when the object is bright relative to the aimed brightness. Figure 6 shows the change between the brightness of the object and of the image when setting to auto shutter control mode.



**Figure 6 Outline of auto shutter control movement**

Auto shutter control functions will become triggers in the blue area, and brightness will be maintained at the aimed brightness of the image.

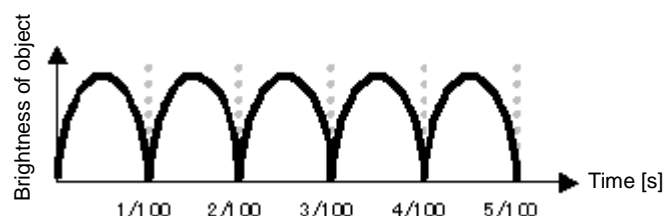
Auto shutter control mode settings and aimed value of brightness can be set according to the following procedures.

- ① Open the “Gain/Shutter” tab and select “auto shutter control (AE ON)” from “ALC Mode.” When selecting “one shot auto shutter control,” once converged to the aimed brightness, it will switch to “Fixed Shutter” (display will not change).
- ② Use “Brightness Target” slider to set the aimed value of brightness.
- ③ Use “Brightness Tolerance” slider to set the tolerance of brightness. (\*1)
- ④ Use “Brightness Threshold” slider to set the control start point of brightness. (\*2)
- ⑤ Pressing the “Weight” button will open a screen to enter weight and area positions for brightness data for each position on the image.
- ⑥ Set the shutter range of the auto shutter control from “Shutter Range.” (\*3)

- \*1 Auto shutter control finishes when the difference between the “Brightness Target” and current brightness becomes smaller than this value.  
When this value is reduced, the range of the converged brightness becomes smaller, but the shutter speed becomes variable.  
When this value is enlarged, the range of the converged brightness becomes larger, but the shutter speed becomes more stable.
- \*2 Auto shutter control starts when difference between the current brightness and tolerance range of brightness exceeds this value.
- \*3 Only compatible with some cameras.

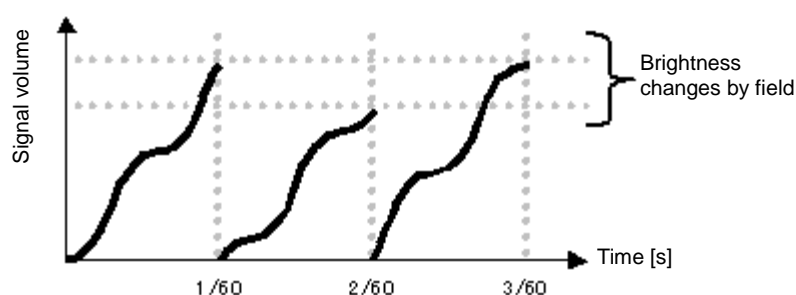
## ■ Flickers

Fluorescent lights blink regularly at 1/100 [s] in the 50Hz power supply region, so the brightness of the object under the fluorescent light changes as in Figure 7.



**Figure 7 Brightness of object under fluorescent light**

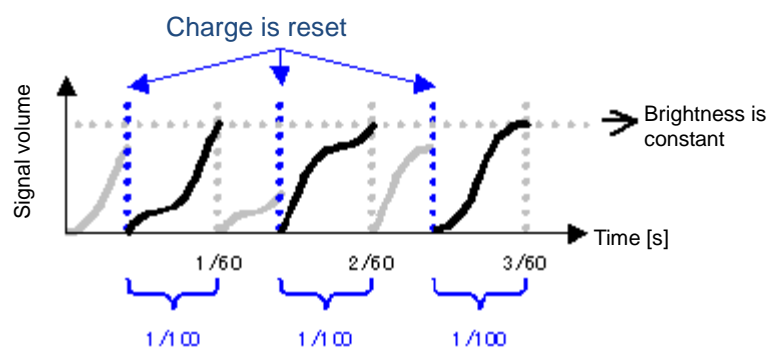
When photographing such an object at shutter speed 1/60[s], the signal volume changes by field as in Figure 8, and the image may blink. This phenomenon is called flicker.



**Figure 8 Shutter speed 1/60 [s]**

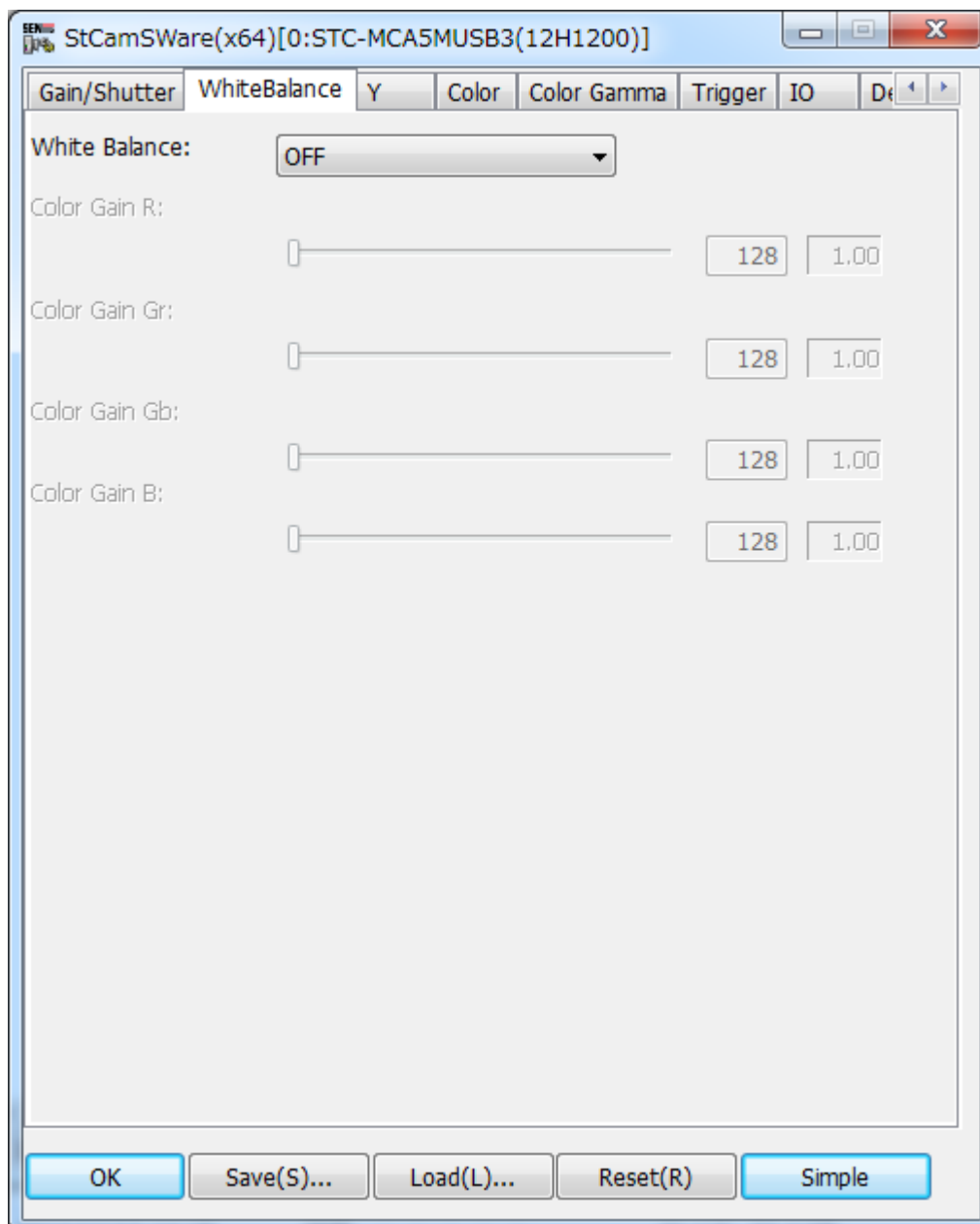
In this case, fixating shutter speed to 1/100 [s] will reduce the flicker. Figure 9 shows the change of signal volume when shutter speed is set to 1/100 [s].



**Figure 9 Shutter speed 1/100 [s]**

## 3.3.2 White Balance

The human eye adapts to light source, so white paper under a red light source is seen as white. However, CCD cameras are affected by the light source, and paper photographed under a red light source will be tinted as red. Making adjustments to a white object that is photographed so it will not be tinted is called white balance. This camera has AWB mode which automatically made adjustments and Manual WB mode which fixes the adjustment value.



---

#### ■ AWB mode

Setting to this mode allows the computer to automatically correct white balance. AWB mode can be set according to the following procedures.

- ① Open the [White Balance] tab and select [AWB] mode of "FullAuto."  
When selecting [One Shot AWB] mode, once converged, it will switch to [Manual] mode (display will not change).
- ② Set "Color Gain Gr" and "Color Gain Gb" as necessary.
- ③ When setting the white balance convergence point to colors other than achromatic colors, set "Auto Target R", "Auto Target B."(\*)

#### ■ Manual WB mode

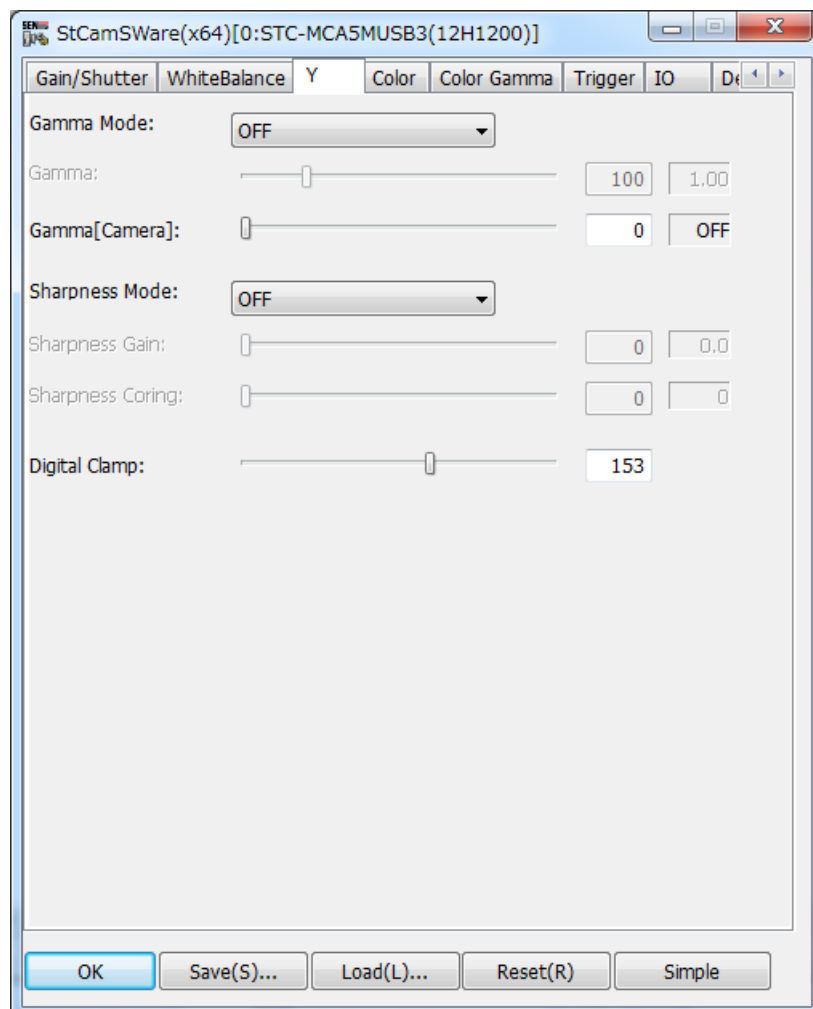
Setting to this mode fixes the adjusted value of white balance to a set value. Used when the light source of the photograph environment is fixed or when AWB mode is insufficient. Manual WB mode can be set according to the following procedures.

- ① Open the [White Balance] tab and select [Manual] mode of "White Balance."
- ② By photographing the white object under the light source actually used, set "Color Gain R", "Color Gain Gr", "Color Gain Gb", and "Color Gain B", so it will appear white in the image.

\* Compatible with some cameras only.

### 3.3.3 Y (gamma, sharpness)

Instructions on how to set gamma and sharpness are given.



---

#### ■ Gamma

Gamma conversion against the accuracy of the object can be performed according to the following procedures. (\*1)

- ① Open the [Y] tab and set “Gamma Mode” to [ON.]  
Accuracy is reversed when “Reverse” is selected.
- ② Change the “Gamma” slider to set the gamma value.

#### ■ Sharpness

Edge reinforcement against the accuracy of the object can be performed according to the following procedures. (\*2)

- ① Open the [Y] tab and set “Sharpness Mode” to [ON.]
- ② Use the “Sharpness Gain” slider to set the level of reinforcement.
- ③ Use the “Sharpness Coring” slider to control reinforcement against small edges.

\*1 Frame rate may be reduced because processing is done on the computer.

If unnecessary, please turn off for use.

A setting item called “Gamma (camera side)” will appear on cameras which support gamma correction on the camera side.

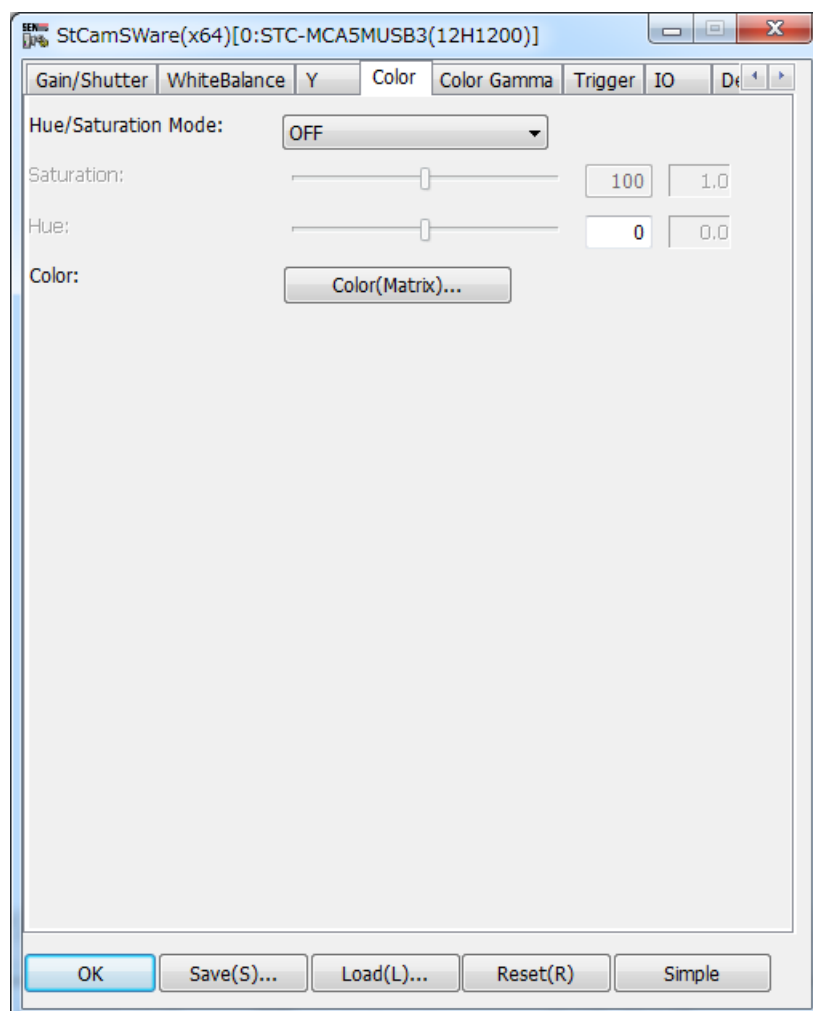
Performing gamma correction will not load the computer even when activated.

\*2 Frame rate may be reduced because processing is done on the computer.

If unnecessary, please turn off for use.

### 3.3.4 Color (Hue/saturation, color correction matrix)

Instructions on how to set hue/saturation and color correction matrix are given.



---

#### ■ Hue/saturation

Hue/saturation can be set according to the following procedures. (\*)

- ① Open the “Color” tab and set “Hue/Saturation Mode” to “ON.”
- ② Change the “Saturation” slider to set saturation.
- ③ Change the “Hue” slider to set hue.

#### ■ Color correction matrix

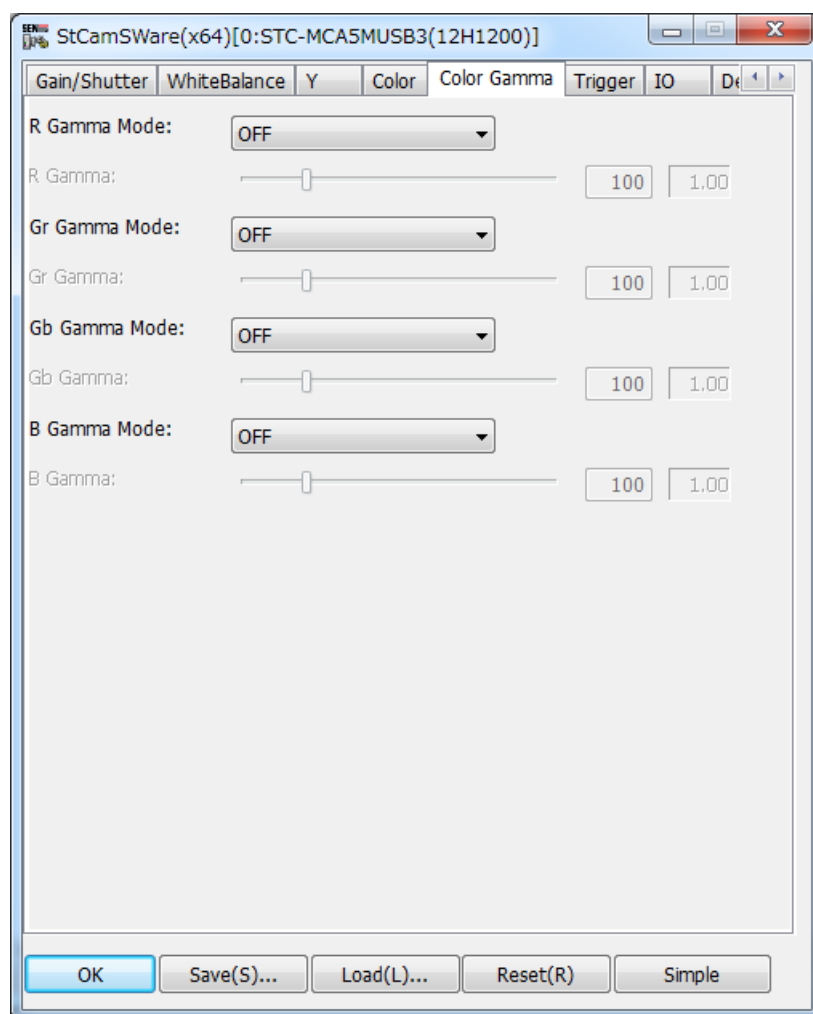
Color correction matrix can be set according to the following procedures. (\*)

- ① Open the “Color” tab and click the “Color (Matrix)” button.
- ② Enter an appropriate value in the Edit box.  
A default value (not corrected) will be set when clicking the “REST” button.  
Clicking the [GRAY] button will set the value for black-and-white.  
Clicking the [REVERSE] button will set a value that reverses each RGB.
- ③ Click the “APPLY” button.

\* Frame rate may be reduced because processing is done on the computer.

If settings are unnecessary, please turn “OFF (reset state)” for use.

## 3.3.5 Color gamma



Gamma conversion against each color component can be performed according the following procedures. (\*)

- ① Open the [Color Gamma] tab and set "R (Gr/Gb/B) Gamma Mode" to [ON.]  
Accuracy is reversed when "Reverse" is selected.
- ② Change the "R (Gr/Gb/B) Gamma" slider to set the gamma value.

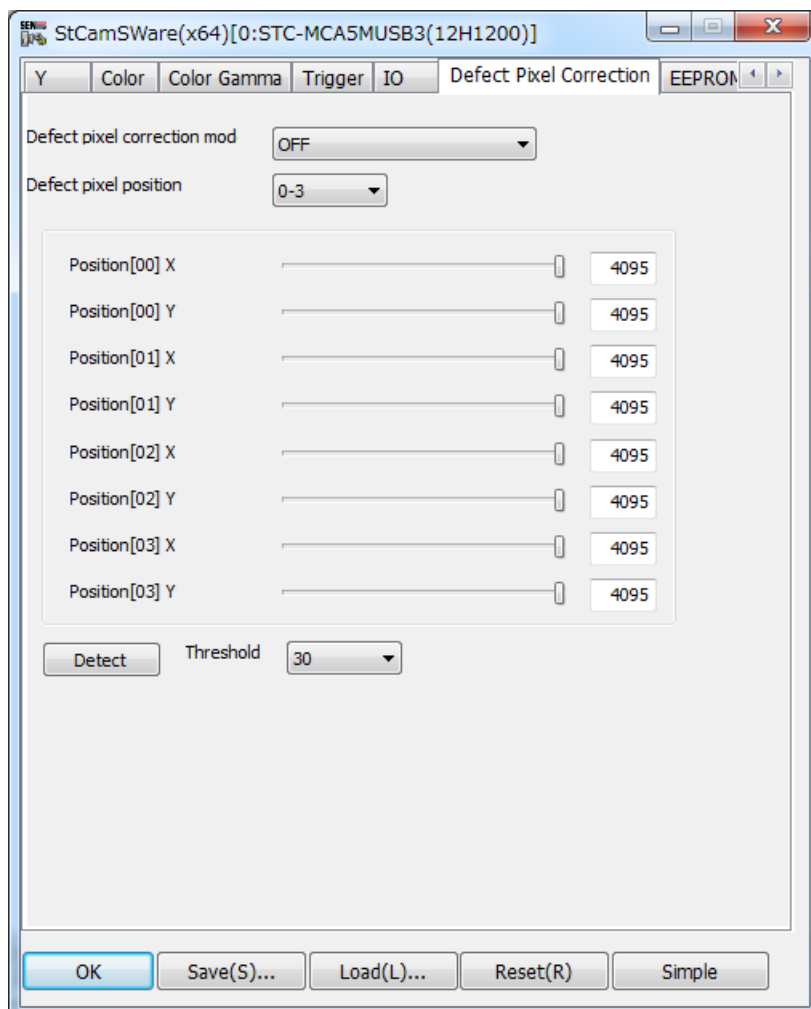
\* Frame rate may be reduced because processing is done on the computer.

If settings are unnecessary, please turn "OFF (reset state)" for use.



### 3.3.6 Defect pixel correction (compatible only with USB.3.0 cameras)

Instructions how to set the sensor's defect pixel correction are given below.



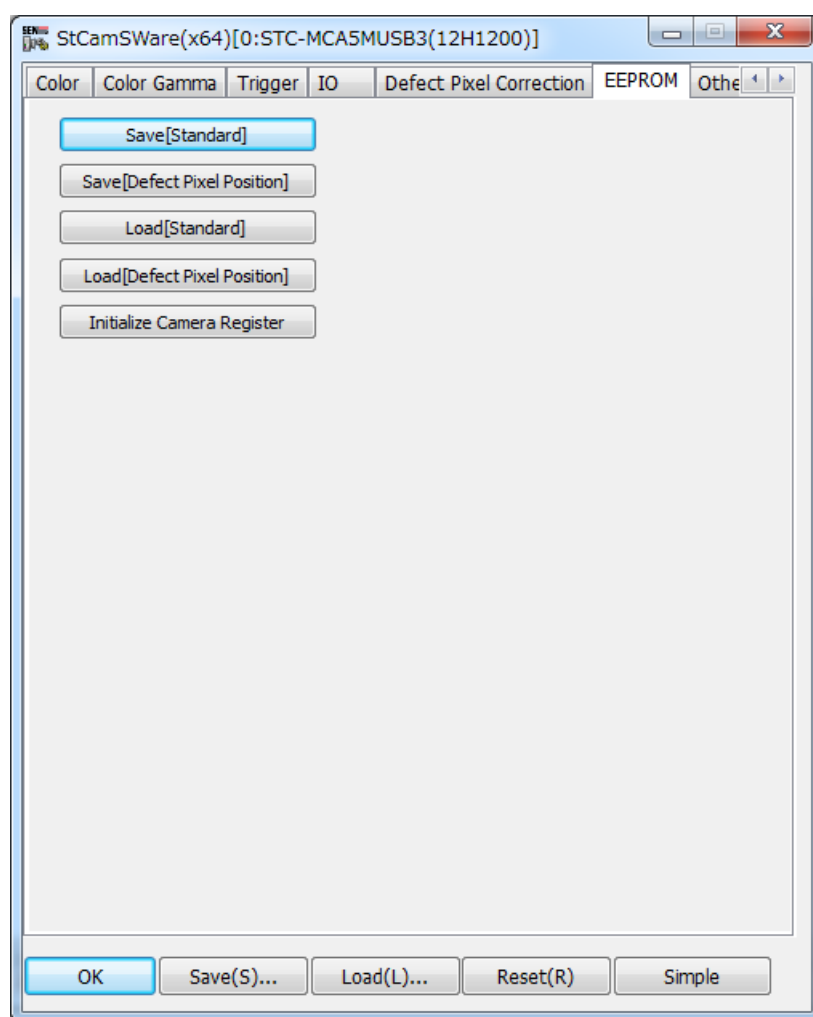
Defect pixel correction can be set according to the following procedures. This function is compatible to some models only.

- ① Open the [Defect Pixel Correction] tab.
- ② Set the threshold and click the [Detect] button to detect defect pixel correction. When a message appears, click the OK button in a backlit state. A pixel with a larger value than the specified threshold will be detected as a defect pixel.
- ③ To manually specify the defect pixel, input the X and Y positions after switching the "Defect pixel correction mod" as necessary.
- ④ When turning "Defect pixel correction mod" to ON, the pixel of the specified position will be corrected.

### 3.3.7 EEPROM (compatible with USB.3.0 cameras only)

Camera settings in some cameras can be saved in EEPROM inside the camera. Settings saved in EEPROM will read when power is turned on or at the specified timing and can be reflected to the camera.

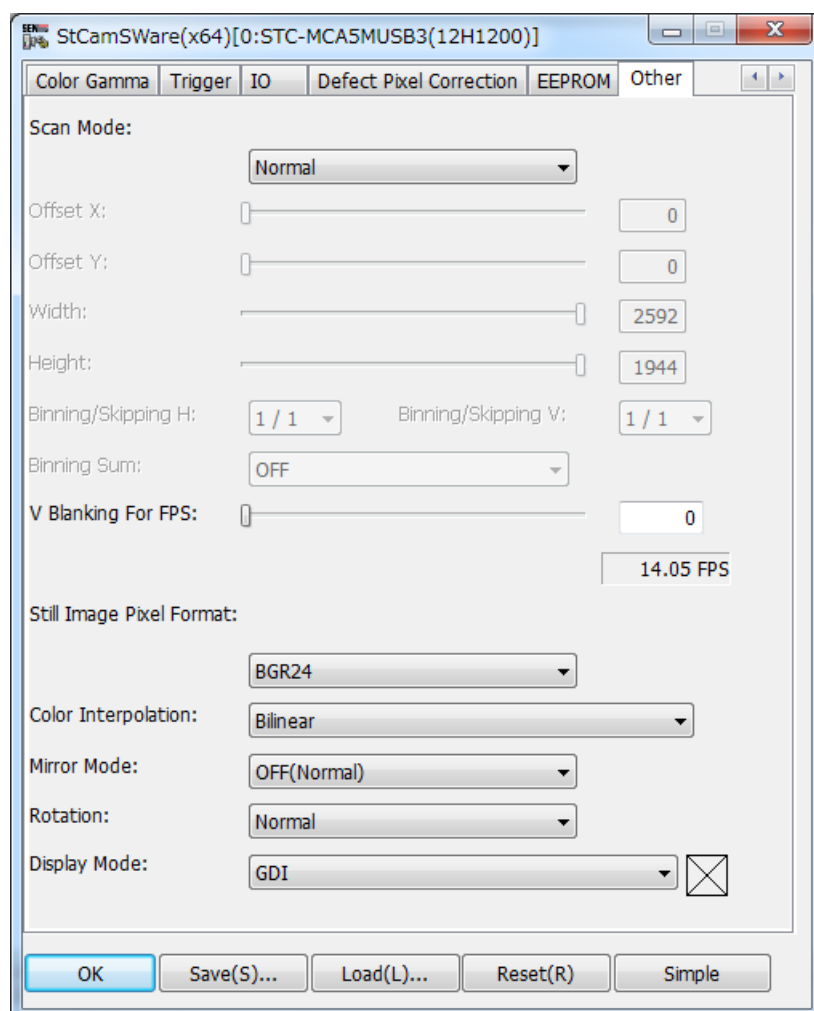
Please be aware that the settings saved are the camera settings only and that the computer's image processing settings will not be saved.



Save [Standard]	Information excluding defect pixel position will be saved to the camera's EEPROM.
Save [Defect Pixel Position]	Information on the defect pixel position will be saved to the camera's EEPROM.
Load [Standard]	Information excluding defect pixel position will read from EEPROM and will be reflected to the camera.
Load [Defect Pixel Position]	Information on the defect pixel position will read from EEPROM and will be reflected to the camera.
Initialize Camera Register	The default value will be reflected to the camera.

## 3.3.8 Other

Instructions on how to set scan mode, clock, pixel format, color interpolation method, mirror image, rotation, and display mode are given.



## 3.3.8.1 Scan mode

Scan mode can be set according to the following procedures. Changing the scan mode will enable high-speed scan of the center of the screen.

- ① Open the [Other] tab and set [Scan Mode.]

Mode	Compatible machines
Normal	Compatible with all machines
1/1 Partial	Cameras compatible with TC, TB series and USB3.0
1/2 Partial	Compatible with all machines
1/4 Partial	Compatible with all machines
Arbitrarily Partial	Cameras compatible with TC, TB series and USB3.0
Binning	Cameras compatible with TB series and USB3.0
Binning1/1 Partial	Cameras compatible with TB series and USB3.0
Binning1/2 Partial	Cameras compatible with TB series and USB3.0
Binning1/4 Partial	Cameras compatible with TB series and USB3.0
Binning arbitrarily partial	Cameras compatible with TB series and USB3.0
AOI	Cameras compatible with USB3.0

- \* When scan mode is changed, brightness may change, and gain or shutter may need to be reset.
- \* Some cameras may allow detailed skipping and binning settings at time of AOI settings on some cameras. When skipping value is increased, a small-sized image can be acquired without changing the angle of view. Reducing the binning value will increase the frame rate, and increasing the binning value will reduce the frame rate but will increase sensitivity. When activating the pixel addition at time of binning, the accumulated value of the added pixel value will be calculated, not the average value.

## 3.3.8.2 Clock

Clock will be set according to the following procedures. Reducing the clock (reducing the camera's output frame rate) will decrease load on the computers. Lengthening exposure time will improve sensitivity.

- ① Open the [Other] tab and set [Clock.]

<b>Normal</b>	<b>Normal</b>
1/2	1/2 Clock
1/4	1/4 Clock

- \* When changing the clock, brightness may change, and gain or shutter may need to be reset.
- \* Some models are not compatible with clock settings.

## 3.3.8.3 V Blanking for FPS

V Blanking is set according to the following procedures. Increasing V Blanking (reducing the camera's output frame rate) will decrease load on the computers.

- ① Open the [Other] tab and set [V Blanking For FPS.] Increasing the value will expand the interval of the output of each image.

- \* Compatible with some models only.

■ Relation between scan mode/clock and maximum frame rate

[Camera compatible with USB2.0]

Model	Scan mode	Image size	Maximum frame rate		
			Normal clock	1/2 clock	1/4 clock
STC-C33USB STC-B33USB	Normal	640 × 480	59.94	29.97	14.99
	1/2 Partial	640 × 224	120.11	60.05	30.03
	1/4 Partial	640 × 80	240.22	120.11	60.05
STC-C83USB STC-B83USB	Normal	1024 × 768	29.18	14.59	7.30
	1/2 Partial	1024 × 344	60.02	30.01	15.01
	1/4 Partial	1024 × 136	120.35	60.18	30.09

Model	Scan mode	Image size	Maximum frame rate		
			Normal clock	1/2 clock	1/4 clock
STC-TC33USB STC-TB33USB	Normal	640 × 480	59.94	29.97	14.99
	1/1 Partial	640 × 480	62.94	31.47	15.73
	1/2 Partial	640 × 224	120.11	60.05	30.03
	1/4 Partial	640 × 80	240.22	120.11	60.05
	Binning	640 × 240	120.11	60.05	30.02
	1/1 Binning partial	640 × 240	121.97	60.99	30.49
	1/2 Binning partial	640 × 112	224.78	112.39	56.19
	1/4 Binning partial	640 × 40	449.55 / 240.22	224.78 / 120.11	112.39 / 60.05
STC-TC83USB STC-TB83USB	Normal	1024 × 768	29.18	14.59	7.30
	1/1 Partial	1024 × 768	29.59	14.80	7.40
	1/2 Partial	1024 × 344	60.02	30.01	15.01
	1/4 Partial	1024 × 136	120.35	60.18	30.09
	Binning	1024 × 384	56.93	28.47	14.23
	1/1 Binning partial	1024 × 384	57.93	28.96	14.48
	1/2 Binning partial	1024 × 172	112.21	56.11	28.05
	1/4 Binning partial	1024 × 68	198.53 / 120.35	99.27 / 60.18	49.63 / 30.09
STC-TC133USB STC-TB133USB	Normal	1280 × 960	22.40	11.20	5.60
	1/1 Partial	1280 × 960	22.63	11.32	5.66
	1/2 Partial	1280 × 440	44.81	22.40	11.20
	1/4 Partial	1280 × 168	89.80	44.90	22.45
	Binning	1280 × 480	44.81	22.40	11.20
	1/1 Binning partial	1280 × 480	44.63	22.31	11.16
	1/2 Binning partial	1280 × 220	79.21	39.61	19.80
	1/4 Binning partial	1280 × 84	89.80	44.90	22.45
STC-TC152USB STC-TB152USB	Normal	1360 × 1024	19.26	9.63	4.81
	1/1 Partial	1360 × 1024	19.78	9.89	4.94
	1/2 Partial	1360 × 472	38.52	19.26	9.63
	1/4 Partial	1360 × 176	77.04	38.52	19.26
	Binning	1360 × 512	38.52	19.26	9.63
	1/1 Binning partial	1360 × 512	38.96	19.48	9.74
	1/2 Binning partial	1360 × 236	69.02	34.51	17.26
	1/4 Binning partial	1360 × 88	77.04	38.52	19.26

Model	Scan mode	Image size	Maximum frame rate		
			Normal clock	1/2 clock	1/4 clock
STC-TC202USB STC-TB202USB	Normal	1600 × 1200	15.32	7.66	3.83
	1/1 Partial	1600 × 1200	15.72	7.86	3.93
	1/2 Partial	1600 × 544	30.63	15.32	7.66
	1/4 Partial	1600 × 208	61.27	30.63	15.32
	Binning	1600 × 600	30.63	15.32	7.66
	1/1 Binning partial	1600 × 600	30.93	15.46	7.73
	1/2 Binning partial	1600 × 272	55.10	27.55	13.78
	1/4 Binning partial	1600 × 104	93.54 / 61.27	46.77 / 30.63	23.39 / 15.32

[Camera compatible with USB3.0]

Model	Scan mode	Image size	Maximum frame rate	
			VBlank=0	VBlank=2035
STC-MCA5MUSB3 STC-MBA5MUSB3	Normal	2592 × 1944	14.1	6.9
	AOI (Skipping/Binning:OFF)	2048 × 1536	21.0	9.1
	AOI (Skipping/Binning:OFF)	1600 × 1200	31.6	11.8
	AOI (Skipping/Binning:OFF)	1280 × 1024	42.4	14.3
	AOI (Skipping/Binning:OFF)	1024 × 768	63.7	17.7
	AOI (Skipping/Binning:OFF)	800 × 600	91.8	21.3
	AOI (Skipping/Binning:OFF)	640 × 680	126.0	24.7

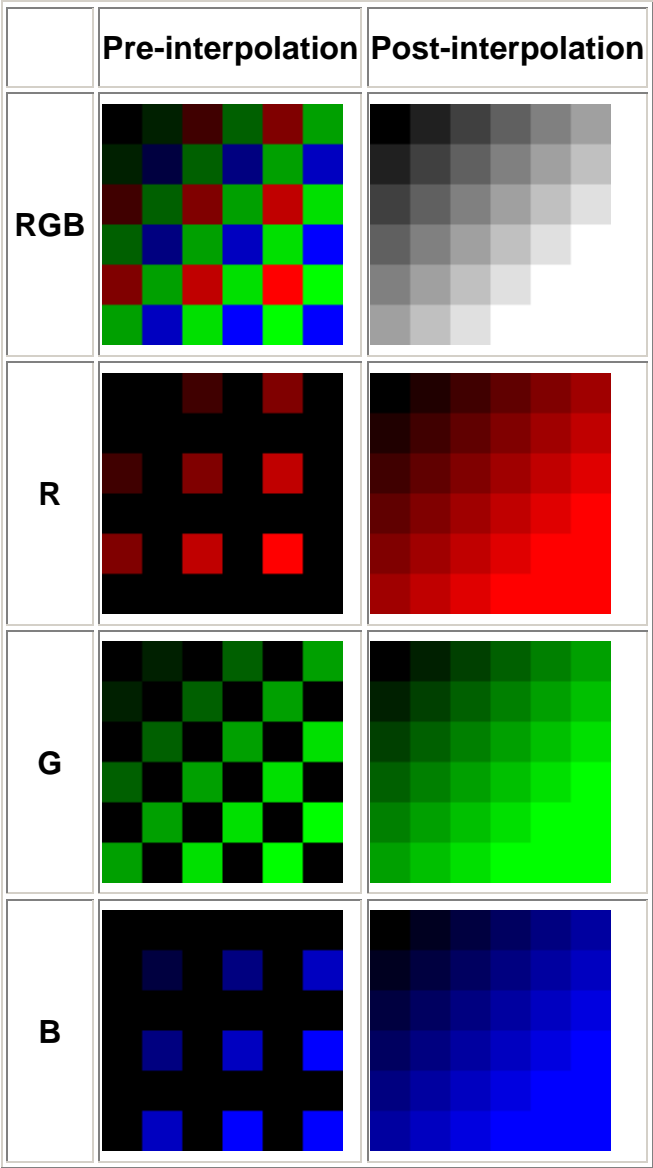
#### 3.3.8.4 Pixel format

Pixel format will be set according to the following procedures. Changing the pixel format will change the file format when still images are saved.

- ① Open the [Other] tab and set [Still Image Pixel format.]

3.3.8.5 Color interpolation method

In each pixel of the image (pre-interpolated image) output from the camera, information on either R, G or B exists. Interpolation processing is performed to acquire information on all RGB for each pixel.





Color interpolation is set according to the following procedures.

- ① Open the [Other] tab and set [Color Interpolation.]

OFF (MONO)	Color interpolation not performed. CCD output value is displayed in black and white.
OFF (COLOR)	Color interpolation not performed. CCD output value is displayed in colors.
Nearest Neighbor	Color interpolation is performed by coping the nearest neighbor's pixel value.
Bilinear	Color interpolation is performed by using 4 pixels surrounding it.
BiCubic	Color interpolation is performed by using 16 pixels surrounding it.
Bilinear false color reduction	Color interpolation is performed by using 4 pixels surrounding it. Compared to the "Bilinear," the false color of the edge area will be reduced, but load on the computer increases.

### 3.3.8.6 Mirror image

Mirror image will be set according to the following procedures.

- ① Open the [Other] tab and set [Mirror Mode.]

Normal
Flip horizontal
Flip vertical
Flip horizontal and vertical
Flip horizontal [Camera side]
Flip vertical [Camera side]
Flip horizontal and vertical [Camera side]

- \* When flip processing is done on the camera side, there is no load on the computer, but flip processing on the camera side is compatible with some models only. Frame rate may be reduced when processing is done of the computer. If settings are unnecessary, use on "Normal."

### 3.3.8.7 Rotation

Mirror image is set according to the following procedures.

- ① Open the [Other] tab and set [Rotation.]

Normal
CLOCKWISE_90
COUNTERCLOCKWISE_90

## 3.3.8.8 Display Mode

Display Mode is set according to the following procedures. Display Mode using DirectDraw is for SDK users, and there is no performance difference among all modes, when limiting use of this software.

- ① Open the “Other” tab and set Display Mode.

Display Mode	Description
GDI	Standard display mode. Stable performance without dependence on computers and video cards.
GDI [HALFTONE]	Interpolation processing is done by CPU at time of expansion. Stable performance without dependence on computers and video cards, but load on CPU increases.
DirectDraw Offscreen / DirectDraw Offscreen HQ	Data of figures and characters drawn by SDK and image data are superimposed by video cards and is displayed. HQ consumes a lot of memory as it maintains the image data in 24 bits.
DirectDraw Overlay / DirectDraw Overlay HQ	Image is displayed on the chromatic key. When using SDK, figures and characters can be drawn on the chromatic key. Chromatic keys may be seen when moving the preview window and resizing, but this is not a defect. Screen shots inclusive of images taken from print screens cannot be acquired on this mode. HQ consumes a lot of memory as it maintains the image data in 24 bits.
DirectX	A drawing using DirectX.
DirectX[V Sync ON] / DirectX[V Sync ON2]	A drawing using DirectX. Tearing may be reduced depending on the video card used. Use [V Sync ON2] when tearing cannot be improved by using [V Sync ON].

- \* When using DirectDraw, DirectX, load on the CPU and image quality may be improved at time of display expansion depending on the environment (video cards or video card drivers).  
On the other hand, the environment (video cards or video card drivers, other applications and OS) may cause a significant decrease in speed or a malfunction in the performance.

**4 Revision History**

Rev.	Revised date	Revisions	Remarks
00	2012/08/31	<ul style="list-style-type: none"> <li>Newly issued</li> </ul>	
01	2012/10/22	<ul style="list-style-type: none"> <li>Revised Compatible with StCamSWare v3.02</li> </ul>	
02	2013/01/22	<ul style="list-style-type: none"> <li>Revised Replaced the screen shot of Windows XP with Windows7.</li> </ul>	
03	2013/05/08	<ul style="list-style-type: none"> <li>Revised Compatible with StCamSWare v3.03</li> </ul>	
07	2017/07/25	<ul style="list-style-type: none"> <li>Revised</li> <li>Company name</li> <li>Removed StCamSWare Revision history to StCamSWare's help information. and software version information</li> </ul>	

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