VC0706

Serial port debug
User's manual

Version 1.00

2008.02.29

Notes1: The information is subject to change without notice. Before using this document, please confirm that this is the latest version.
Notes2: Not all products and/or types are available in every country. Please check with a Vimicro sales representative for availability and additional information.

Important Notice

Vimicro and its subsidiaries reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. Customers should contact Vimicro's sales department before purchasing the product described in this document. All products are sold subject to Vimicro's terms and conditions of sale supplied at the time of order acknowledgment.

Vimicro does not warrant or represent that any license, either explicit or implied, is granted under any Vimicro patent right, copyright, mask work right, or other Vimicro intellectual property right relating to any combination, machine, or process in which Vimicro products or services are used. Information published by Vimicro regarding third-party products or services does not constitute a license from Vimicro to use such products or service or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from Vimicro under the patents or other intellectual property of Vimicro.

Vimicro semiconductor devices are intended for standard uses (such as office equipment, computers, industrial/communications/measuring equipment, and personal/home equipment). Customers using semiconductor devices for special applications (including aerospace, nuclear, military and medical applications) in which a failure or malfunction might endanger life or limb and which require extremely high reliability must contact our Sales Department first. If damage is caused by such use of our semiconductor devices without first consulting our Sales Department, Vimicro will not assume any responsibility for the loss.

The contents of this document must not be reprinted or duplicated without written permission of Vimicro. Information and circuit diagrams in this document are only examples of device application. They are not intended to be used in actual equipment. Vimicro accepts no responsibility for infringement of patents or other rights owned by third parties caused by use of the information and circuit diagrams in this document.

Reproduction of information in Vimicro data books or data sheets is permissible only if preproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. Vimicro is not responsible or liable for such altered documentation. Resale of Vimicro products or services with statements different from or beyond the parameters stated by Vimicro for that product or service voids all explicit and any implied warranties for the associated Vimicro product or service and is an unfair and deceptive business practice. Vimicro is not responsible or liable for any such statements.

Table of contents

Document specification

This document will explain how to use the VC0706 serial port debug and how to get the relative technical reference without the VC0706 technical detail introduction.

The **boldfaced font** is used to express important contents.

The ***boldfaced and italic font*** is used to express the reference documents of relative technical.

The blue font is used to express the program buttons and the list words.

The "Notice" is used to express special prompt.

Function introduction

This program is used for communicating with VC706 serial ports. In order to control VC0706 it sends various commands to VC0706 and receives the data from VC0706.

The following functions can be implemented:

- Communication port setting: setup the baud rate for each serial port
- Capture version number
- Read-write register: read-write register for each module
- Serial number setting
- Color control: control auto or manual switch between color and black & white
- Mirror control: control the horizontal Mirror display of sensor
- Power control: control the power saving mode and common mode
- RTC timer control: the time read and modify
- AE control: control the 50Hz/60Hz choosing, indoor or outdoor switch and black light compensation.
- System reset: Reset VC0706.
- Motion control: motion detection and alarm control, motion serial port and sensitivity setting.
- OSD configuration: OSD channel control
- Image property: modify image property parameters such as: brightness, hue, saturation and contrast.
- Gamma control: read and modify gamma parameter.
- Spi flash: check SPI Flash size, erasure operation.
- Up/Down load: Up/Down load the control information.
- Other control:
- FBUF Ctrl: write and read the image from FBUF and control FBUF.
- Zoom Ctrl: the image Zoom and Downsize operations can be achieved.
- External program transfer: transfer other program of VC0706 via menu

Program introduction

This program includes four parts:

- **Comm Setting**: It is used to communication mode of serial port setting and turn off/on serial port.
- **Comm Command**：It is used for various commands testing.
- **Data Show**：It is used to indicate the information from serial port.
- **Menu**: external program transfer and help information support.

The program interface as follows:

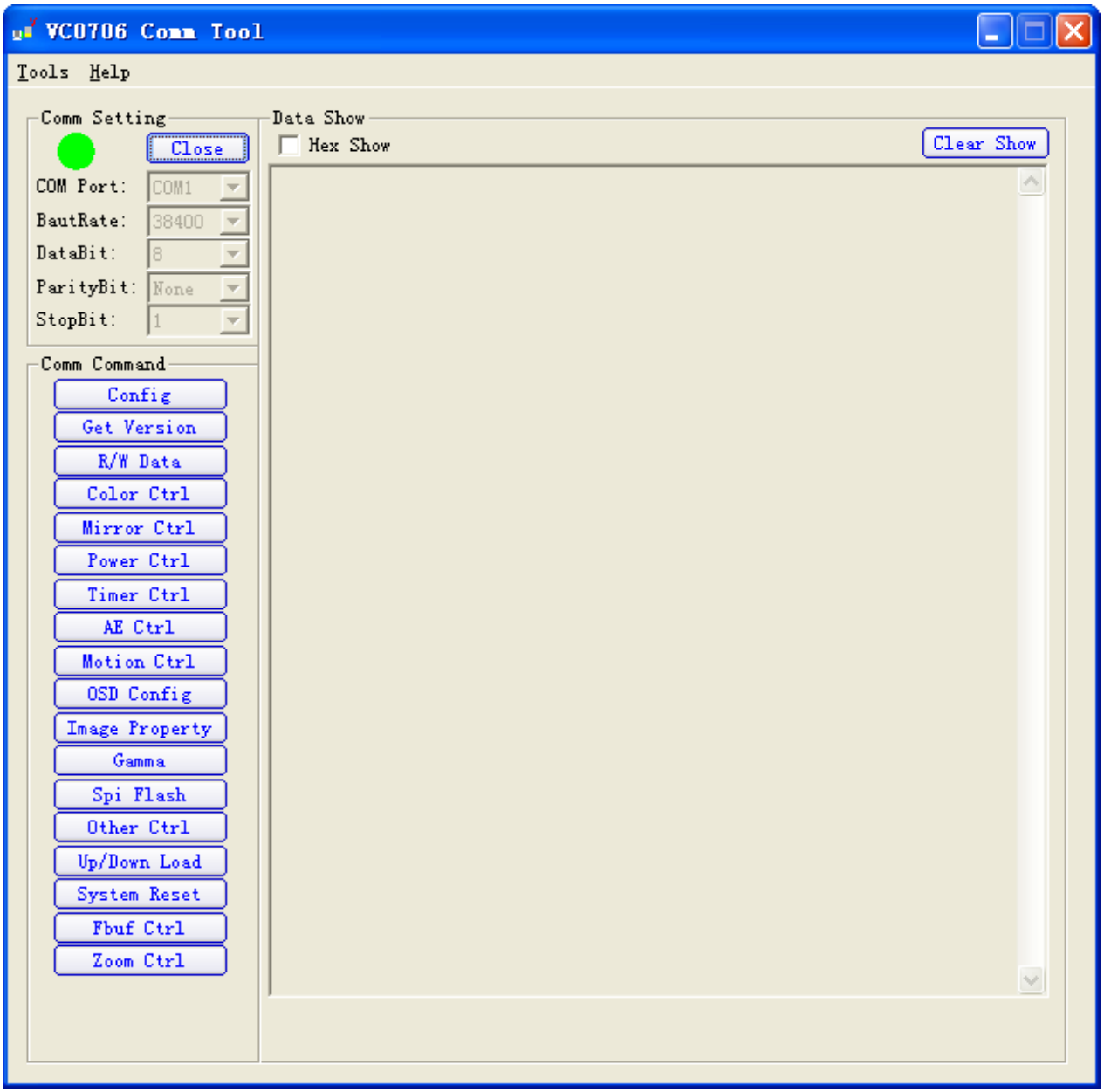

Figure: program interface

Button specification

- “Open/Close”：It is used for open and close port. After close the port the button indicate “Open”, and after open the port the button indicate “Close”.
- “Config”: It is used for program configuration and baud rate setting of communication port.
- “R/W Data”：It is used for data read and writing. Those data include Chip reg, Sensor, I2c E2prom, SPI E2prom, SPI Flash and CCIR656.
- “Serial Number”：It can be used for communication settings.
- “Color Ctrl”: It is used for color display model setting and obtains current color status.
- “Mirror Ctrl”: It is used for Mirror model setting and obtains current Mirror status.
- “Power Ctrl”: It is used for power control model setting and obtains current power control status.
- “Time Ctrl”: It is used for RTC time setting and obtains current RTC time.
- “AE Ctrl”: It is used for various AE model setting and obtains current AE status.
- “System Reset”: It can be used to reset system.
- “Motion Ctrl”: It is used for enable motion control, alarm output control and register operation relative to Motion.
- “OSD Ctrl”: It is used to operate register relative to OSD.
- “Image Property”: It is used for image property page adjustment.
- “Gamma”: It is used for Gamma adjustment.
- “Up/Down Load”: It is used to up/down load control information.
- “Other Ctrl”: It is used for other operation.
- “Fbuf Ctrl”: It is used for the image read-write and control of Fbuf.
- “Zoom Ctrl”: It is used for the operations about Zoom and Downsize.
- “Clear Show”：It is used for clear all the data in the display area which from serial port.
- “Hex Show”：It is used for choosing the data display mode as Hex mode or Character mode in data display area.

Menu specification

- Tools: It is used to open the other tool.
  - Image Convert: It is used to open the tool which can convert the BMP file to JPG format file supported by VC0706.
  - OSD Char List: It is used to indicate the characters which are supported by OSD.
- Help: Help menu

Serial port settings

Serial port settings include:

Baud rate:**38400（alterable）**

Data bit: **8**

Parity bit: none

Stop bit：**1**

“Config” button

Click the “Config” button on the main interface to open the program configuration page which is shown as follows:

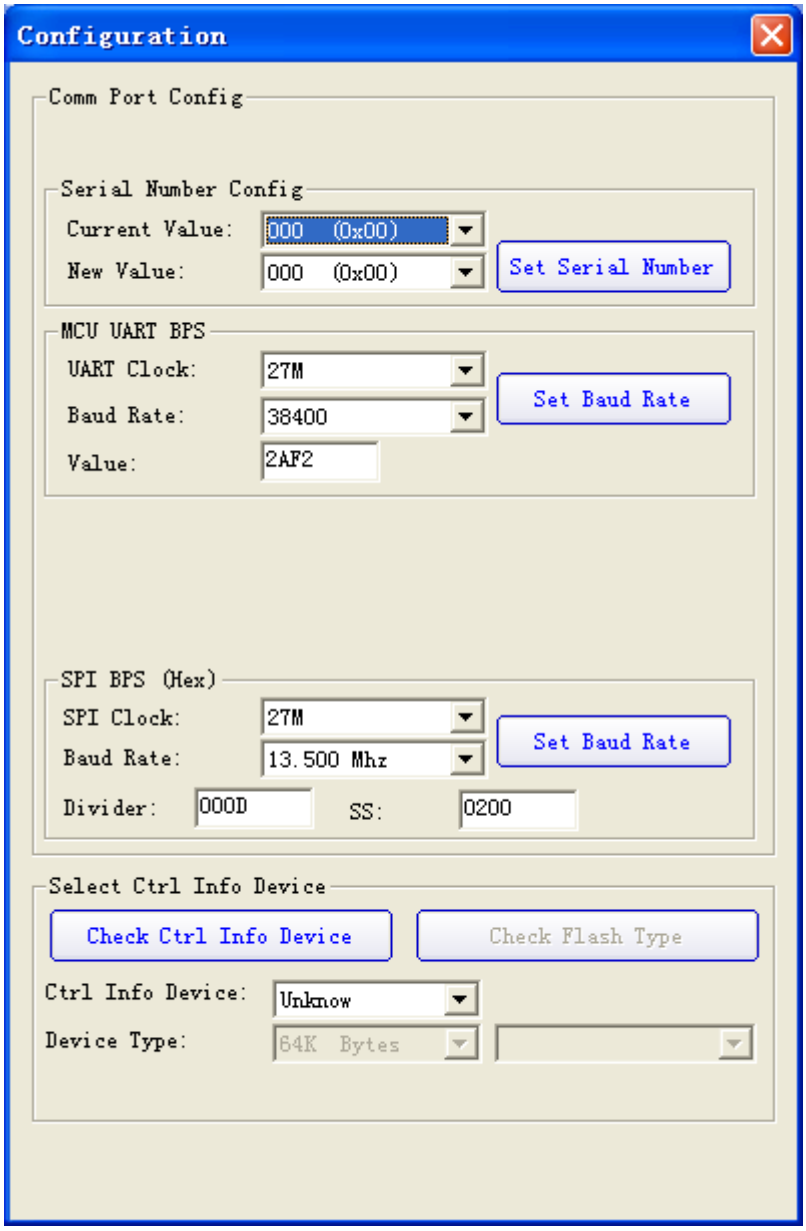

Figure: Program configuration interface

This page is used to set the baud rate of serial port, property of SPI device, position of control information and so on.

- "Comm Port Config": It is used to set the serial number of communication.
  - "Serial Number Config": It is used to choose the serial number of command sending and change the serial number of VC0706.
    - "Current Value": It is used to choose the serial number of command sending. This value can not be enabled except when it is the as the serial number of its connective VC0706.
    - "New Value": It is used to change the serial number of VC0706. If set the value successful, this program will change the "Current Value" as the same as "New Value" automatically and use this value as the command serial number in the future communication.
- "MCU UART BPS": It is used to set the baud rate of MCU serial port.
  - "UART Clock": It is used to choose the MCU time which can be 27M or 36M. This option has to same as the MCU time of its connective VC0706 otherwise the baud rate can not be enabled.
  - "Baud Rate": It is used to choose the baud rate which needs setting.
  - "Value": It is used to display the setting value of baud rate. This value will change to the setting value of current baud rate automatically and it can be changed manual as choosing the baud rate by "Baud Rate" list. When you using the "Set Baud Rate" button to set baud rate, the setting value of baud rate is the same as the value in this option.
  - "Set Baud Rate": It is used to modify the baud rate of MCU serial port about VC0706 via sending the baud rate setting command of MCU serial port. The setting value of baud rate is the same as the value in "Value" option. After baud rate modifying the program baud rate needs change to the same as the setting baud rate.
- "SPI BPS": It is used to set the baud rate of SPI port.
  - "SPI Clock": It is used to choose the SIP time which can be 27M or 36M. This option has to same as the SIP module time of its connective VC0706.
  - "Baud Rate": It is used to choose the baud rate which needs setting.
  - "Divider": It is used to display the Divider parameter of baud rate setting. The value of "Divider" will change to the same as the setting value of current baud rate and it can be changed manual as choosing the baud rate via "Baud Rate" list. When you using the "Set Baud Rate" button to set baud rate the Divider value of current baud rate is the same as the value of "Divider".
  - "SS": It is used to display the SS parameter of baud rate setting. The value of "SS" will change to the same as the setting value of current baud rate and it can be changed manual as choosing the baud rate via "Baud Rate" list. When you using the "Set Baud Rate" button to set baud rate the SS value of current baud rate is the same as the value of "SS".
  - "Set Baud Rate": It is used to modify the baud rate of 706 SPI port by sending setting command of high speed serial port baud rate, the setting value of baud rate in "Divider" and "SS".
- "Select Ctrl Info Device": It is used to configuring the storage device of control information and its type. The control information can be saved in I2C, E2prom, SPI E2prom or SPI Flash. The settings of this device will be saved automatically after modifying. This page will display the current settings when you open it every time.
  - "Check Ctrl Info Device": It is used to check storage devices which are I2C E2prom, SPI E2prom and SPT Flash whether contain control information. The "Ctrl Info Device" will be modified to display the device type of control information if the storage device contains control information. On the other hand the "Ctrl Info Device"

will be modified to display “Unknown” if there is no control information have been checked.

- “Check Flash Type”: It is used to check the type of SPI Flash when the control information saves in SPI Flash. There are four types SPI Flash can be checked by VC0706 as AT25F512A, AT25F1024A and AT25F4096A. if the SPI Flash type has been checked the “Device Type” will be modified, the second list will display SPI Flash type, the first list will display SPI Flash space. If the SPI Flash can not be checked or distinguished the second list of “Device Type” will be modified to display “Unknown”. This button only can be used when the control information saved in SPI Flash, otherwise the option is gray and disabled.
- “Ctrl Info Device”: It is used to display and choose the storage device of control information as I2C E2prom, SPI E2prom or SPI Flash, if there is no storage device “Unknown” will be displayed.
- “Device Type”: It is used to display and choose the type and space of control information storage device. From left side the first list display device space and the second list display device type. When the device type or space is modified the corresponding type or space in this list will be modified automatically. The device type in this list will change along with the control information storage device changing.

“Get Version” button

After click “Get Version” button the program will send the read version number command and display the version number in dialog box.

“R/W Data” button

Click the “R/W Data” on the main interface to open the data window which is shown as follows:

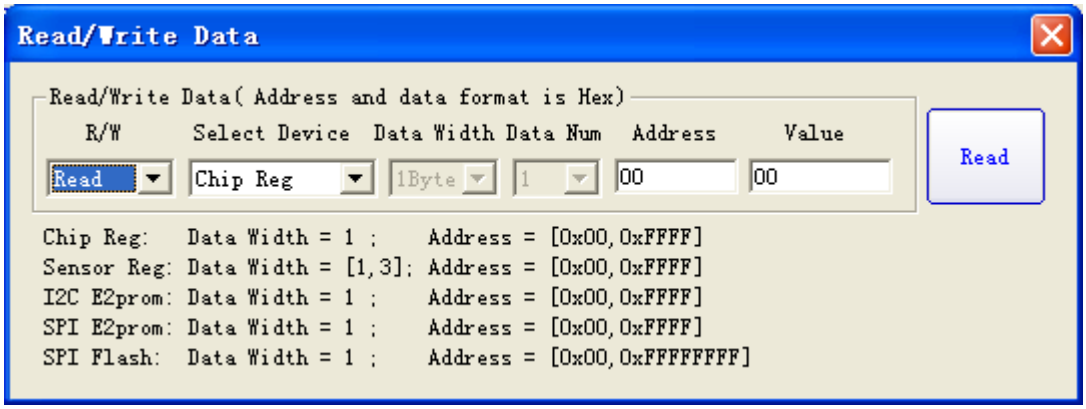

Figure Read-write data window

The data read-write function supports following devices:

- Chip register
- Sensor register
- CCIR656 register
- I2C E2prom
- SPI E2prom
- SPI Flash

Operation specification

- “R/W”: It is used to choose read or write data function. The “Read” button indicate “Read” while selecting “Read” function it means reading operation is currently. Otherwise the “Read” button indicate “Write” while selecting “Write” function it means writing operation is currently.
- “Select Device”: It is used to choose the current device which needs read-write data.
- “Data Width”:It is used to set the data width for current data. The data width for all the devices is 1bit except Senor and CCIP56 which are need data width setting.
- “Address”: It is used to set the start address of current read-write data.
- “Value”: For reading operation it is used to show the read data, for writing operation it is used to fill in the register value.
- “Read/Write”: After completed above settings this button can be used to send commands. The operation of press “enter” on this interface is defaulted as trigger this button.

“Color Control” button

Click the “Color Ctrl” button on the main interface to open the color control interface which is shown as follows:

Figure: Color interface

This interface is used for color control to set the color control mode and color display model.

Interface specification:

- “Ctrl Mode”: It is used to set and display the color control mode is GPIO control or Serial Port control.
  - “GPIO Ctrl”: It is used to set the color display mode control via GPIO.
  - “UART Ctrl”: It is used to set the color display mode control via serial port.
- “Color Mode”: It is used to set and display the current color mode.
  - “Auto Switch”: It is used to set the color display mode as auto switch.
  - “Manual Color”: It is used to set the color display mode as manual.
  - “Manual BW”: It is used to set the color display mode as manual Black & White.
- “Set Config”: It is used to send the color control command according to the current settings of “Ctrl Mode” and “Color Mode”.
- “Get Config”: It is used to obtain the current color control and display mode and display them via “Ctrl Mode” and “Color Mode”.

"Mirror Ctrl" button

Click "Mirror Ctrl" button on the main interface to enter the mirror control interface which is shown as follows:

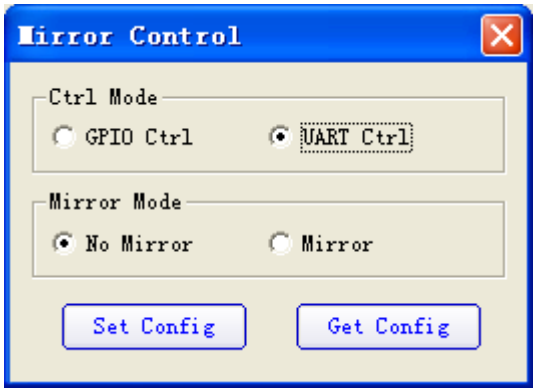

Figure: Mirror control interface

The interface is used to Mirror control operation. It can be used to set the mirror control and display mode.

Interface specification:

- "Ctrl Mode": It is used to set or display mirror control mode is GPIO control or Serial Port control.
  - "GPIO Ctrl": It is used to set mirror control mode as GPIO control.
  - "UART Ctrl": It is used to set mirror control mode as Serial Port control.
- "Mirror Mode": It is used to set and display current mirror mode.
  - "No Mirror": It is used to close mirror display.
  - "Mirror": It is used to set mirror display.
- "Set Config": It is used to send the Mirror control command according to current "Ctrl Mode" and "Mirror Mode" settings.
- "Get Config": It is used to obtain and display the current mirror mode and display them via "Ctrl Mode" and "Mirror Mode".

"Power Ctrl" button

Click the "Power Ctrl" button on the main interface to open the Power control configuration page which is shown as follows:

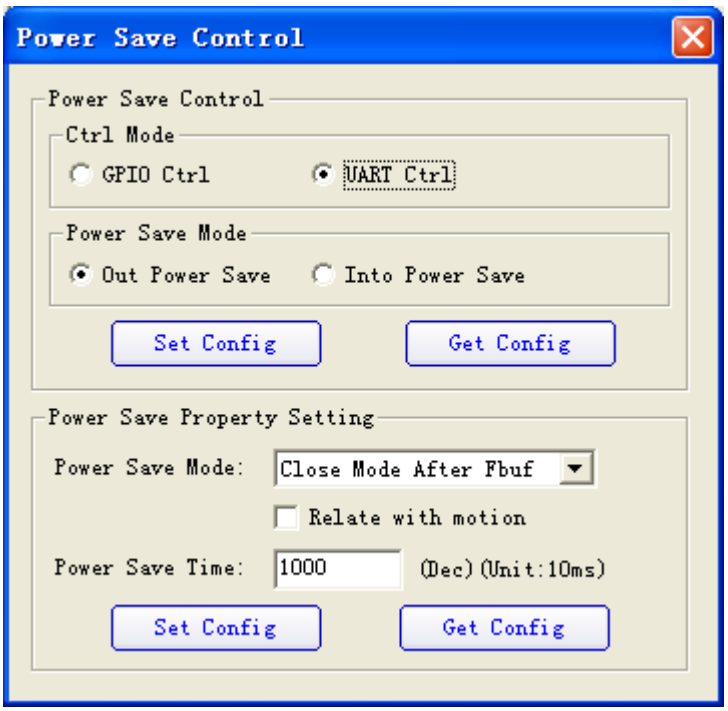

Figure: Power Save Control interface

This interface is used for power save control operation. There some functions can be achieved in this interface such as close/open power save control, power save mode choosing and power save mode setting.

Interface specification:

- "Power Save Control": It is used for power save mode control.
  - "Ctrl Mode": It is used to set and display the control mode of power saving is GPIO control or serial port control.
    - "GPIO Ctrl": It is used to choose GPIO control mode of power saving.
    - "UART Ctrl": It is used to choose serial port control mode of power saving.
  - "Power Save Mode": It is used to set or display current power save mode status.
    - "Out Power Save": It is used to exit power save mode.
    - "Into Power Save": It is used to enter power save mode.
  - "Set Config": It is used to send power control command according to the current settings of "Ctrl Mode" and "Power Save Mode".
  - "Get Config": It is used to obtain the current mode and status of power save control and display them via "Ctrl Mode" and "Power Save Mode".
- "Power Save Property Setting": It is used to set power save mode.
  - "Power Save Mode": It is used to choose power save mode.

- "Relate with motion": It is used to set the power save mode whether relative with motion.
- "Power Save Time": It is used to set the time of enter the power save mode when it working with motion.
- "Power Save Control": It is used for power save mode control.
- "Set Config": It is used to write current data to VC0706
- "Get Config": It is used to obtain the current settings of VC0706 and display it via above control.

"Time Ctrl" button

Click the "Time Ctrl" button on the main interface to enter the RTC time setting page which is shown as follows:

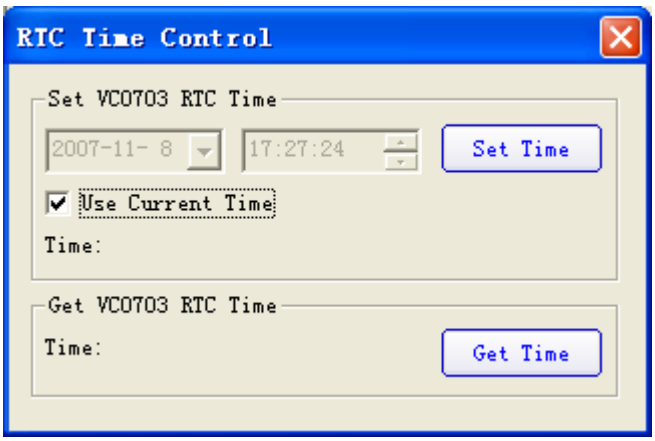

Figure: RTC time configuration

This interface is used to read and set the RTC time of VC0706.

Interface specification;

- "Set VC0706 RTC Time": It is used to set the RTC Time.
  - Date and Time select: It is used to choose the write time without using current time.
  - "Use Current Time": It is used to ensure the write time is current time of system or choosing the time via date and time select frame.
  - "Time": It is used to display the write time.
  - "Set Time": It is used to write the current selective time to VC0706.
- "Get VC0706 RTC Time": It is used to read RTC time.
  - "Time": It is used to display the time read from VC0706.
  - "Get Time": It is used to read the time from VC0706.

"AE Mode" button

Click the "AE Mode" button on the main interface to enter the AE control page which is shown as follows:

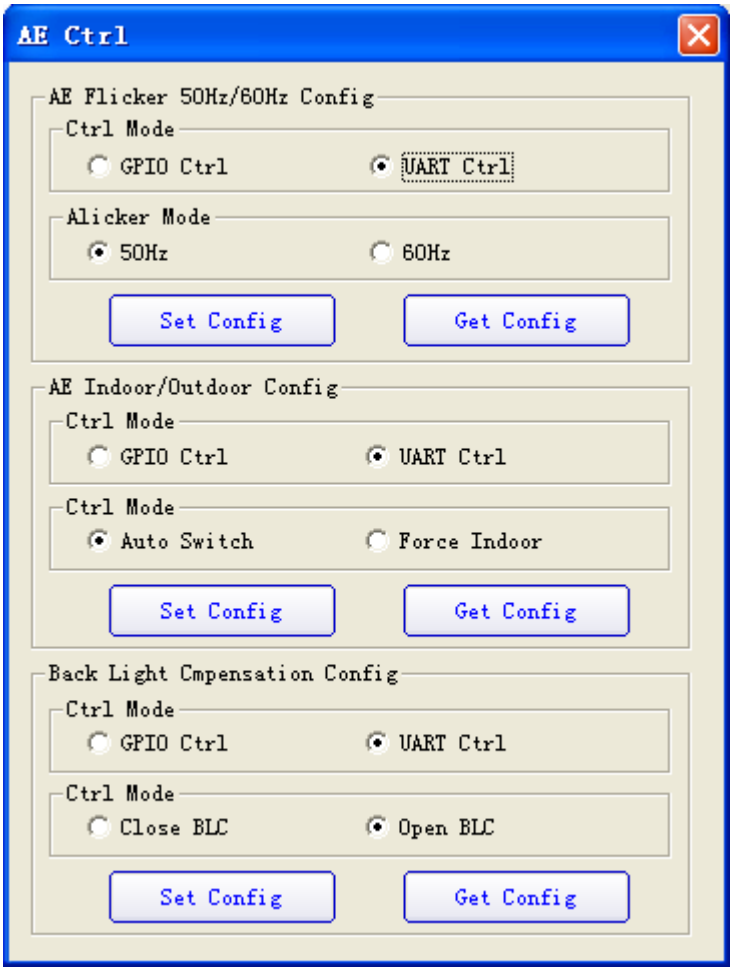

Figure: AE control

The interface is used for some correlative operations of AE such as:

- AE Flicker 50Hz/60Hz select
- Outdoor /indoor Switch
- Back light compensation control

Interface specification:

- "AE Flicker 50Hz/60Hz": AE Flicker 50Hz/60Hz select.
  - "Ctrl Mode": It is used to set or display the Flicker control mode is GPIO control or serial port control.
    - "GPIO Ctrl": It is used to set Flicker control via GPIO.
    - "UART Ctrl": It is used to set Flicker control via serial port.

- "Flicker Mode": It is used to set or display current Flicker.
  - "50Hz": It is used to set 50Hz.
  - "60Hz": It is used to set 60Hz.
- "Set Config": It is used to send the AE Flicker control command according to the current settings of "Ctrl Mode" and "Flicker Mode".
- "Get Config": It is used to obtain the current Flicker control mode and Flicker mode and display them via "Ctrl Mode" and "Flicker Mode".

- "AE Indoor/Outdoor": AE Indoor and Outdoor switch control.
  - "Ctrl Mode": It is used to set or display the control mode of Indoor and Outdoor switch is GPIO control or serial port control.
    - "GPIO Ctrl": It is used to control Indoor and Outdoor switch via GPIO control.
    - "UART Ctrl": It is used to control Indoor and Outdoor switch via serial port control.
  - "Ctrl Mode": It is used to set and display the current Indoor and Outdoor switch mode.
    - "Auto Switch": It is used to set Indoor and Outdoor auto switch.
    - "Force Indoor": It is used to set force indoor.
  - "Set Config": It is used to send the control command of Indoor/Outdoor switch bases on the interface current settings.
  - "Get Config": It is used to obtain the current Indoor/Outdoor control mode and its status and display them.
- "Back Light Compensation": It is used for Back Light Compensation control.
  - "Ctrl Mode": It is used to set and display the Back Light Compensation control mode as GPIO control or serial port control.
    - "GPIO Ctrl": It is used to set control the Back Light Compensation via GPIO.
    - "UART Ctrl": It is used to set control the Back Light Compensation via serial port.
  - "Ctrl Mode": It is used to set the current Back Light Compensation mode and display its status.
    - "Close BLC": It is used to close BLC.
    - "Open BLC": It is used to open BLC.
  - "Set Config": It is used to send the Back Light Compensation control command according to the interface current settings.
  - "Get Config": It is used to obtain the current mode and status of Back Light Compensation and display them.

"System Reset" button

Click "System Reset" button on the main interface to send the reset command for VC0706 reset and the VC0706 reset information will be received.

"Motion Ctrl" button

Click "Motion Ctrl" button on the main interface to enter the Motion configuration interface which is shown as follows:

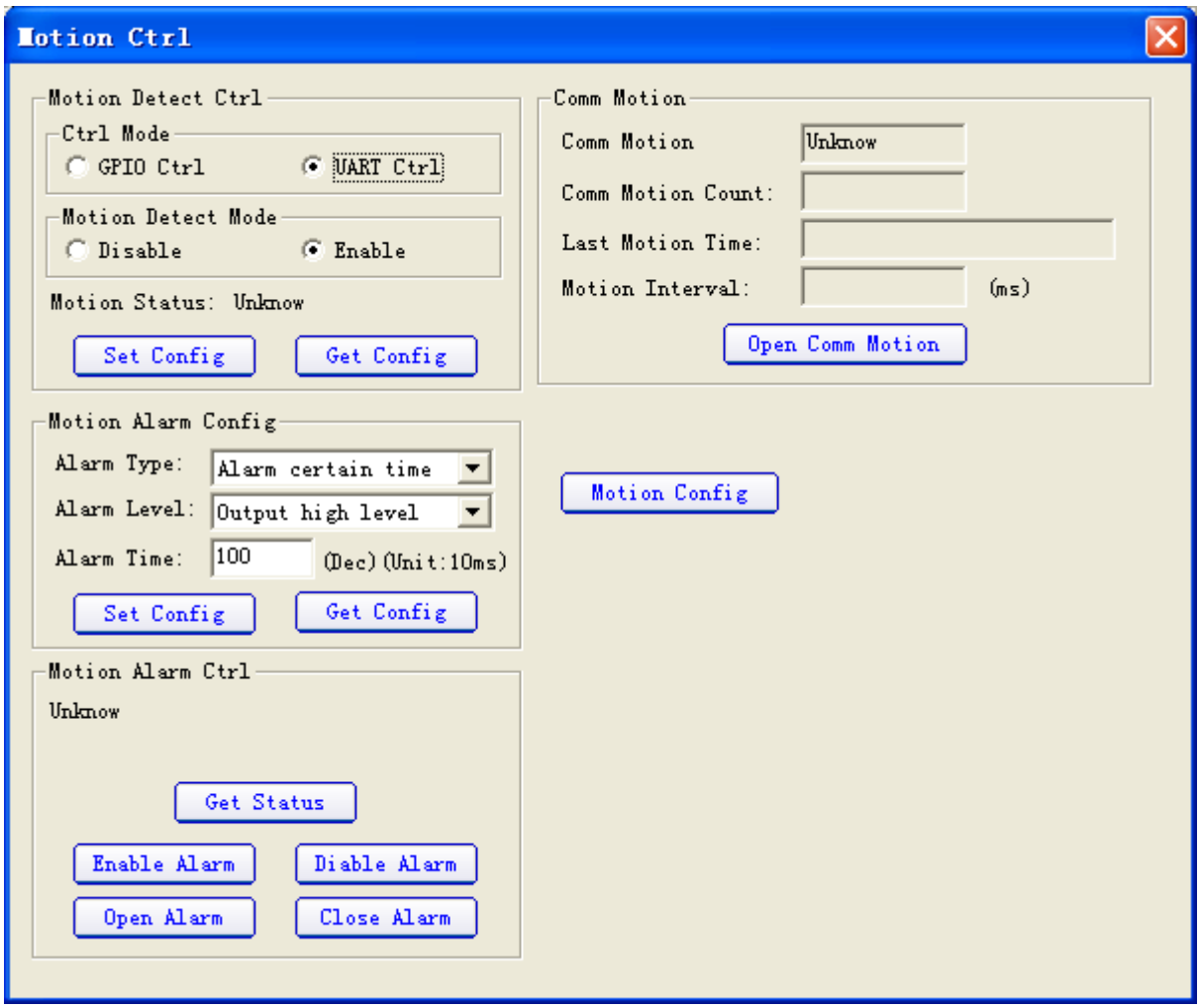

Figure: Motion configuration

This interface is used for Motion relative operation which includes:

- Motion detection enabled control
- Motion alarm property setting
- Motion alarm control
- Serial port Motion detection
- Motion relative operation: sensitivity configuration, Motion window configuration, Motion status surveillance

Interface specification:

- "Motion Detect Ctrl": It is used to set Downsize or display its status.
  - "Ctrl Mode": It is used to set or display Motion control mode is GPIO control or serial port control.

- "GPIO Ctrl": It is used to set the Motion control via GPIO
- "UART Ctrl": It is used to set the Motion control via serial port

- "Motion Detect Mode": It is used to set or display the current Motion mode.
  - "Disable": It is used to close Motion detection
  - "Enable": It is used to open Motion detection
- " Set Config": It is used to send Motion control command according to the current settings of "Ctrl Mode" and "Motion Detect Mode".
- "Get Config": It is used to obtain current Motion control mode and Motion detection mode and display them via "Ctrl Mode" and "Motion Detect Mode".
- "Motion Status": It is used to display whether detected any Motion as getting the Motion current status.

- "Motion Alarm Config": It is used to set the property of Motion alarm.
  - "Alarm Type": It is used to set the alarm type is enable alarm all the time or during the appointed time and disable alarm out of appointed time..
  - "Alarm Level": It is used to set the alarm output is low level or high level.
  - "Alarm Time": It is used to set alarm duration.
  - "Set Config": It is used to write the current property of Motion alarm into VC0706.
  - "Get Config": It is used to read current property of Motion alarm from VC0706.
- "Motion Alarm Ctrl": It is used for Motion alarm control.
  - "Enable Alarm": It is used to enable alarm output. The GPIO port output the alarm signal when there is any motion has detected.
  - "Disable Alarm": It is used to disable alarm output.
  - "Open Alarm": It is used to output alarm signal by GPIO port and alarm enabled as precondition.
  - "Close Alarm": It is used to stop the GPIO port output alarm signal.
  - "Get Status": It is used to obtain the current status of Motion alarm control and display it in above textbox.
- "Comm Motion": It is used for serial port Motion detection.
  - "Comm Motion": It is used to display whether received the command about the serial port has detected Motion from VC0706.
  - "Comm Motion Count": It is used to record the number of commands about serial port has detected motion from VC0706.
  - "Last Motion Time": It is used to display the time of receiving the lasted command about serial port has detested motion from VC0706.
  - "Motion Interval": It is used to display the Interval between the serial two commands about serial port has detected motion from VC0706.
- "Motion Config": It is used to open the other Motion operation interface.

Click the "Motion Config" button on the main interface to enter the Motion configuration page which is shown as follows:

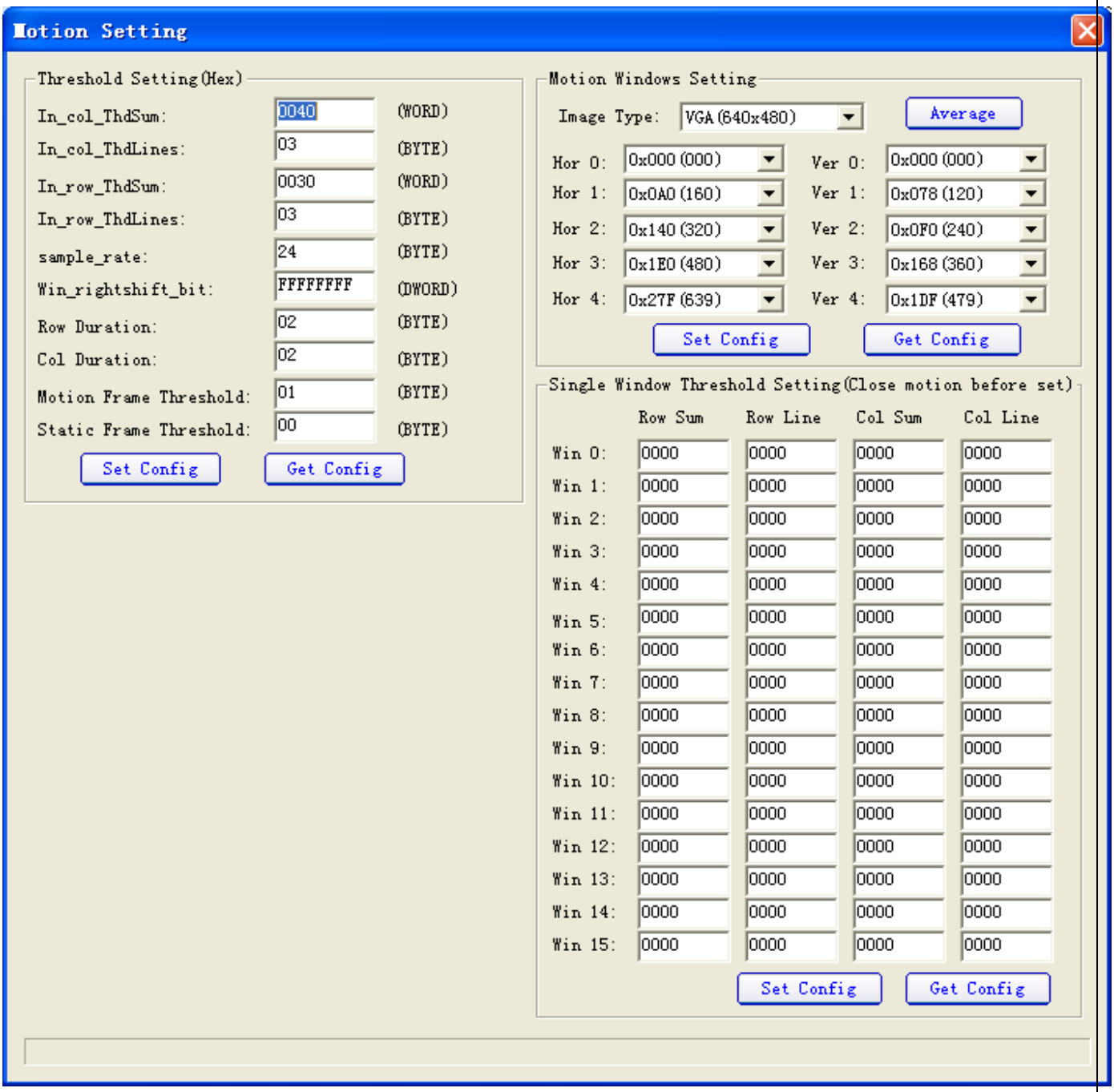

Figure: Motion setting

The interface is used for Motion relative operations which include:

- Motion threshold setting
- The position setting of Motion window
- Single Motion threshold setting
- Motion status monitor

Interface specification:

- "Threshold Setting": It is used to set the correlative parameters of Motion threshold. (not include signal window threshold)
  - Textbox: It is used to set or display the relative Motion threshold settings, its format is hex.
  - "Set Config": It is used to set the Motion threshold.
  - "Get Config": It is used to obtain the Motion threshold and display it.
- "Motion Windows Setting": It is used to set the position of Motion window.
  - "Image Type": It is used to choose the image size and adjust the window size according to the image size.
  - "Hor0"-"Hor4": It is used to partition the 5 level coordinates of window.
  - "Ver0"-"Ver4": It is used to partition the 5 plumb coordinates of window.
  - "Average": It is used to set average assignment of each window.
  - "Set Config": It is used to set the window position according to the current settings.
  - "Get Config": It is used to read the current window position and display it.
- "Single Window Threshold Setting": It is used to set the Motion threshold of single window.
  - "Textbox": It is used to set or display the relative threshold which is hex.
  - "Set Config": It is used to window threshold according to current settings.
  - "Get Config": It is used to read the threshold of current window and display it.

"OSD Ctrl" button

Click the "OSD Ctrl" button on the main interface to enter the OSD configuration page which is shown as follows:

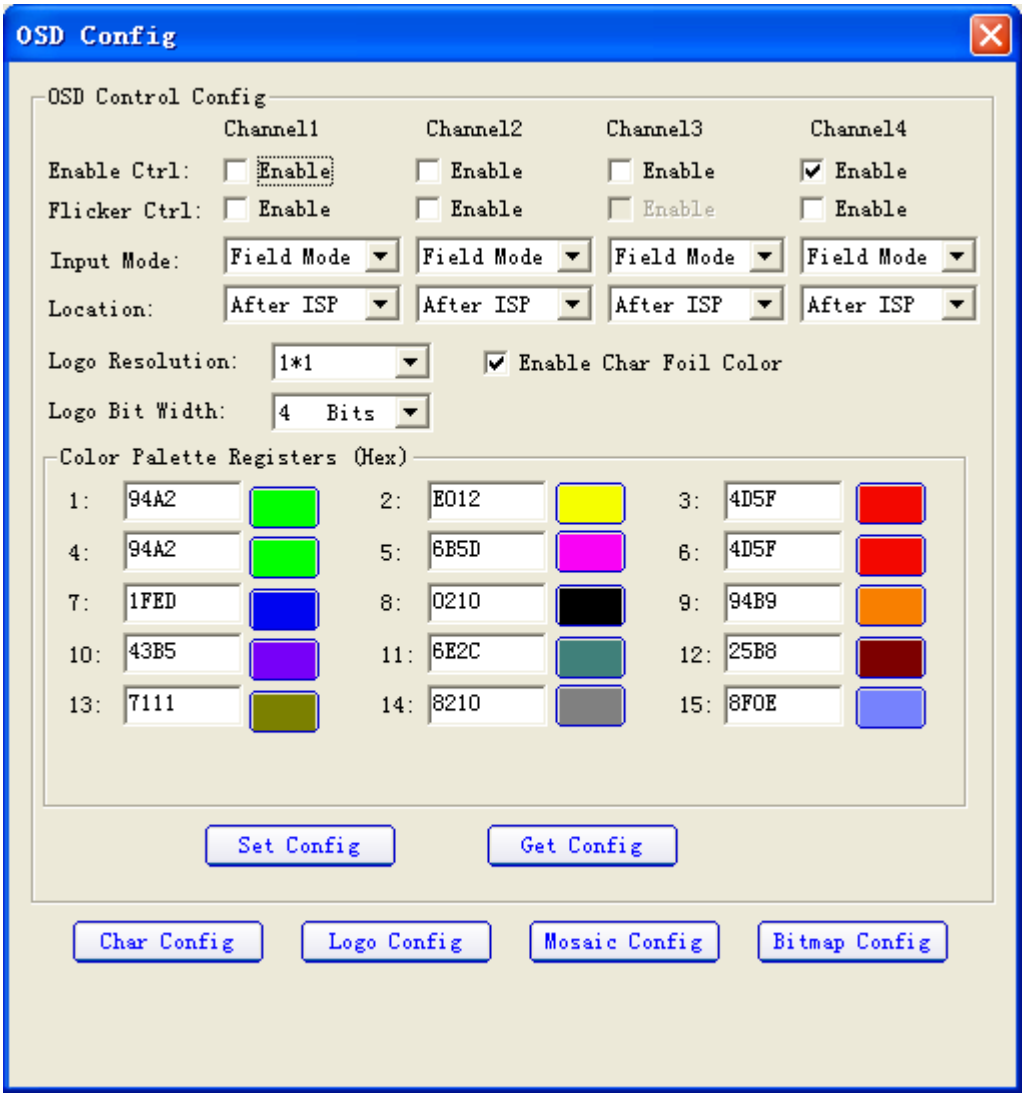

Figure: OSD configuration

The interface is used for the relative operations of OSD module which include character, Logo, mosaic and Bitmap.

Interface specification:

- "OSD Control Config": It is used to read and set the register of general control, the relative setting of VC0706 will be read and displayed automatically when you open this interface.
  - "Enable Ctrl": It is used to enable each channel.
  - "Flicker Ctrl": It is used to set the flicker function for each channel.
  - "Input Mode": It is used to choose the video input format is frame mode or field mode for each channel.
  - "Location": It is used to set the position for each channel.

- "Logo Resolution": It is used to set the Logo resolution.
- "Logo Bit Width": It is used to set the Logo bit width.
- "Color Palette Register (Hex)": It is used to set the color value of 15 groups on the Color palette. Select the corresponding option for each color value to choose color. The textbox display the YUV655 value which will be written into register.
- "Enable Char Foil Color": It is used to set whether display the character frame.
- "Set Config": It is used to write the "OSD Control Config" settings into VC0706.
- "Get Config": It is used to read the register of OSD basic control and display it "OSD Control Config".

- "Char Config": It is used to open the character setting page.
- "Logo Config": It is used to open the Logo setting page.
- "Mosaic Config": It is used to open the mosaic setting page.
- "Bitmap Config": It is used to open the bitmap setting page.

Click the "Char Config" button on the main interface to enter the OSD character setting page which is shown as follows:

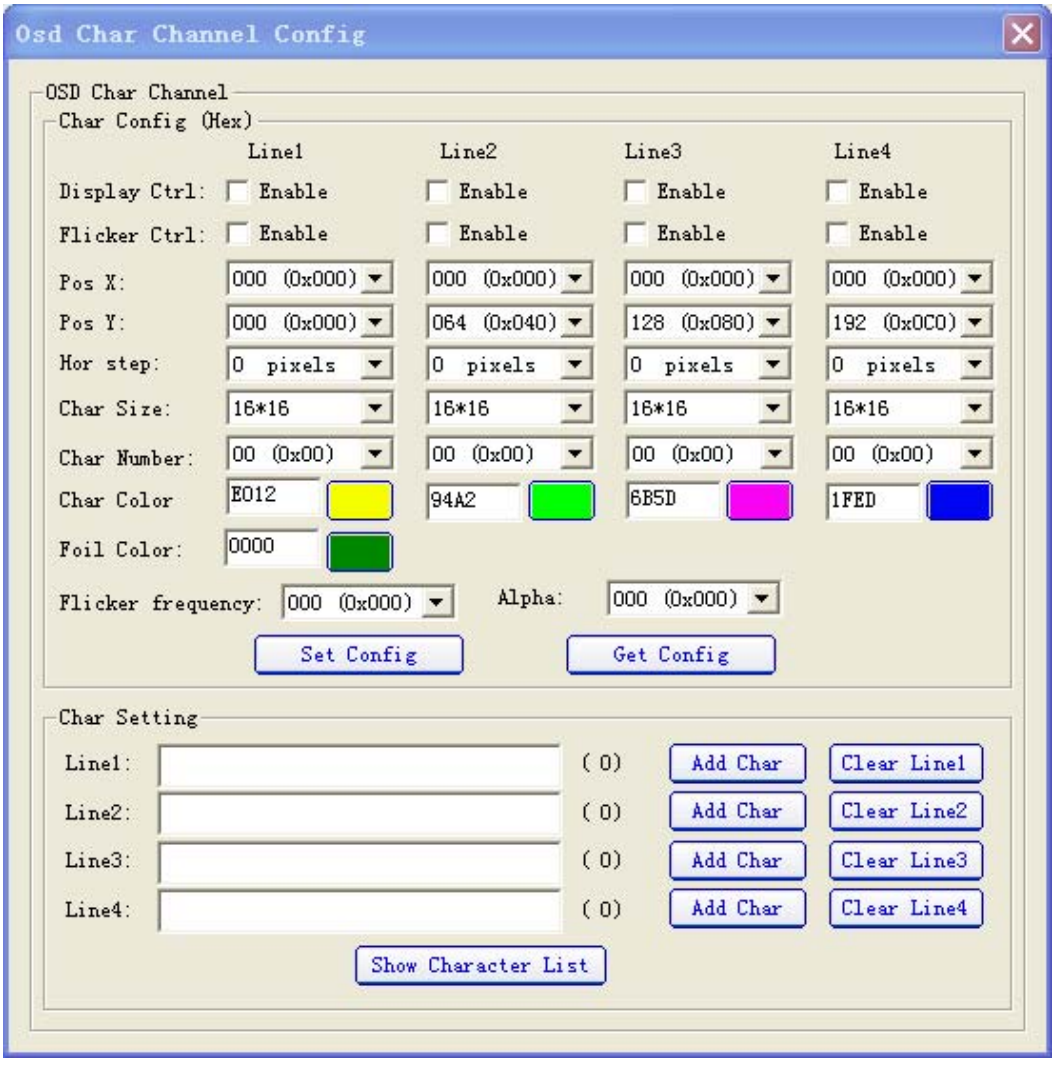

Figure: OSD character configuration

The interface is used for the relative operations of OSD character channel.

Interface specification:

- "OSD Char Channel": It is used to read and set the relative register of OSD module character channel. The relative setting of VC0706 will be read and displayed automatically when you open this interface.
  - "Display Ctrl": It is used to set four lines whether be displayed respectively.
  - "Flick Ctrl": It is used to enable the flicker of four lines respectively.
  - "Pos X": It is used to set the horizontal X coordinate of four lines respectively. Units: 4 pixels
  - "Pos Y": It is used to set the vertical Y coordinate of four lines respectively. Units: 4 pixels
  - "Hor Step": It is used to set the horizontal spacing between four character lines respectively.
  - "Char Size": It is used to set the character size of four display lines respectively.
  - "Char Number": It is used to set the character number of four display lines respectively.
  - "Char Color": It is used to set the character color of four display lines respectively.
  - "Foil Color": It is used to set the foil color of character.
  - "Flicker frequency": It is used to set the character flicker frequency.
  - "Alpha": It is used to set the character alpha respectively.
  - "Set Config": It is used to write the configuration of "OSD Char Channel" into VC0706.
  - "Get Config": It is used to read the control register of OSD character and display it on "OSD Char Channel".
- "Char setting": It is used for some character operations.
  - "Line 1": It is used to enter or display the characters on the first line.
  - "Line 2": It is used to enter or display the characters on the second line.
  - "Line 3": It is used to enter or display the characters on the third line.
  - "Line 4": It is used to enter or display the characters on the fourth line.
  - "Add Char": It is used to write the corresponding characters in the "Line 1"~"Line 4" textbox into VC0706 respectively.
  - "Clear Line 1": It is used to clear the characters on the Line 1.
  - "Clear Line 2": It is used to clear the characters on the Line 2.
  - "Clear Line 3": It is used to clear the characters on the Line 3.
  - "Clear Line 4": It is used to clear the characters on the Line 4.
  - "Get OSD Char": It is used to read current characters and display them on "Line 1"~"Line 4". All of the characters will be read for each time.
  - "Show Character List": It is used to the character list which can be supported by OSD.

Click the "Logo Config" button on the main interface to enter the OSD Logo Channel configuration page which is shown as follows:

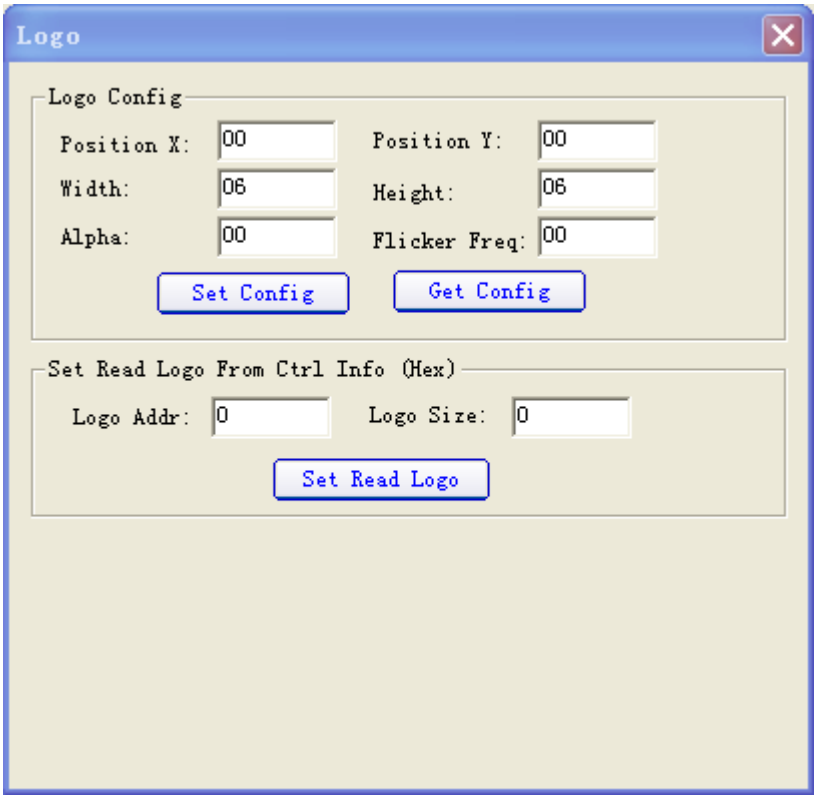

Figure: OSD Logo channel configuration

The interface is used for the relative operation of OSD Logo channel.

Interface specification:

- "Logo Config": It is used to read and set the relative register of OSD Logo channel.
  - "Position X": It is used to set the X coordinate initial value of Logo. Units: 4 pixels.
  - "Position Y": It is used to set the Y coordinate initial value of Logo. Units: 4 pixels.
  - "Width": It is used to set the width of Logo. Units: 4 pixels.
  - "Height": It is used to set the height of Logo. Units: 4 pixels.
  - "Alpha": It is used to set the alpha of Logo.
  - "Flick Freq": It is used to set the flicker frequency of Logo.
  - "Set Config": It is used to write the "Logo Config" settings into VC0706.
  - "Get Config": It is used to read the control register of OSD character and display it on "Logo Config".
- "Set Read Logo from Ctrl Info (Hex)": It is used to read and display Logo from control information.
  - "Logo Addr": It is used to set the data address of current Logo in control information.
  - "Logo Size": It is used to set the Logo size.
  - "Set Read Logo": It is used to send the command of read and display Logo.

Click the "Mosaic Config" button on the main interface to enter the OSD mosaic channel configuration page which is shown as follows:

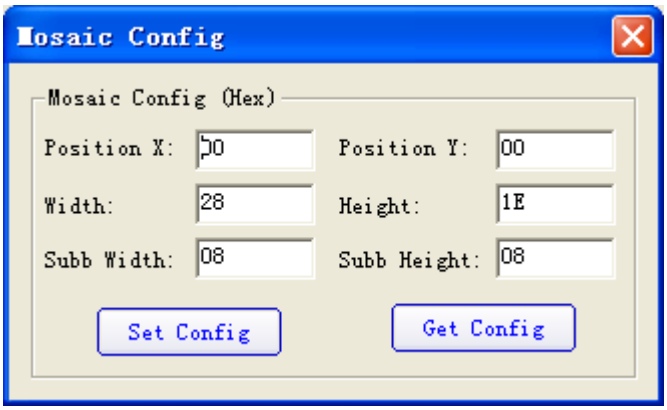

Figure: Mosaic configuration

The interface is used for relative operation of OSD Mosaic channel.

- "Mosaic Config (Hex)": It is used to read and set the relative register of OSD Mosaic channel.
  - "Position X": It is used to set the X coordinate initial value of Mosaic. Units: 4 pixels.
  - "Position Y": It is used to set the Y coordinate initial value of Mosaic. Units: 4 pixels.
  - "Width": It is used to set the width of mosaic. Units: 4 pixels.
  - "Height": It is used to set the height of mosaic. Units: 4 pixels.
  - "Subb Width": It is used to set the width of mosaic subbasis. Units: 4 pixels.
  - "Subb Height": It is used to set the height of mosaic subbasis. Units: 4 pixels.
  - "Set Config": It is used to write the "Mosaic Config (Hex)" configuration into VC0706.
  - "Get Config": It is used to read control register of OSD and display it on "Mosaic Config (Hex)".

Click the "Bitmap Config" button on the main interface to enter the OSD bitmap configuration page which is shown as follows:

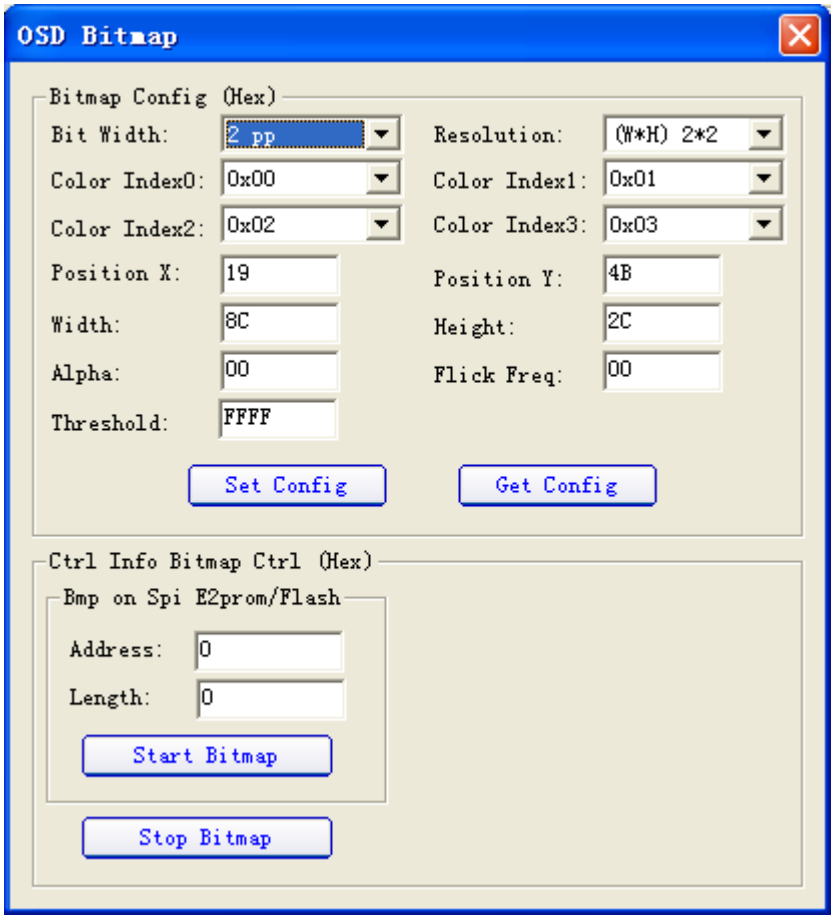

Figure: OSD Bitmap configuration

The interface is used for the relative operation of OSD bitmap channel.

Interface specification:

- "Bitmap Config (Hex)": It is used to read and set the relative register of OSD bitmap channel.
  - "Bit Width": It is used to set the bit width.
  - "Resolution": It is used to set the bit resolution.
  - "Color Index0"~"Color Index3": It is used to set the color index value as the bitmap width is 1~2. Generally it can not be modified.
  - "Position X": It is used to set the X coordinate initial value of BMP. Units: 4pixels.
  - "Position Y": It is used to set the Y coordinate initial value of BMP. Units: 4pixels.
  - "Width": It is used to set the BMP width. Units: 4pixels.
  - "Height": It is used to set the BMP height. Units: 4pixels.
  - "Alpha": It is used to set the BMP alpha.
  - "Flick Freq": It is used to set the flicker frequency of Logo.
  - "Threshold": The value does not need modify.
  - "Set Config": It is used to write the "Bitmap Config (Hex)" configuration into VC0706.
  - "Get Config": It is used to read the control register of OSD character and display it on "Bitmap Config (Hex)".

- "Ctrl Infor Bitmap Ctrl (Hex)": It is used to send the Bitmap control command.
  - "Bitmap in Spi E2prom/Flash (Hex)": It is used to read the Bitmap from SPI E2prom or Flash and display it.
    - "Address": It is used to set address of current bitmap in control information.
    - "Length": It is used to set the length of current bitmap.
    - "Start Bitmap": It is used to send the command of read bitmap from control information.
  - "Stop Bitmap": It is used to send the stop command of bitmap display.

"Image Property Page" button

Click the "Image Property Page" button to enter the image property page which is shown as follows:

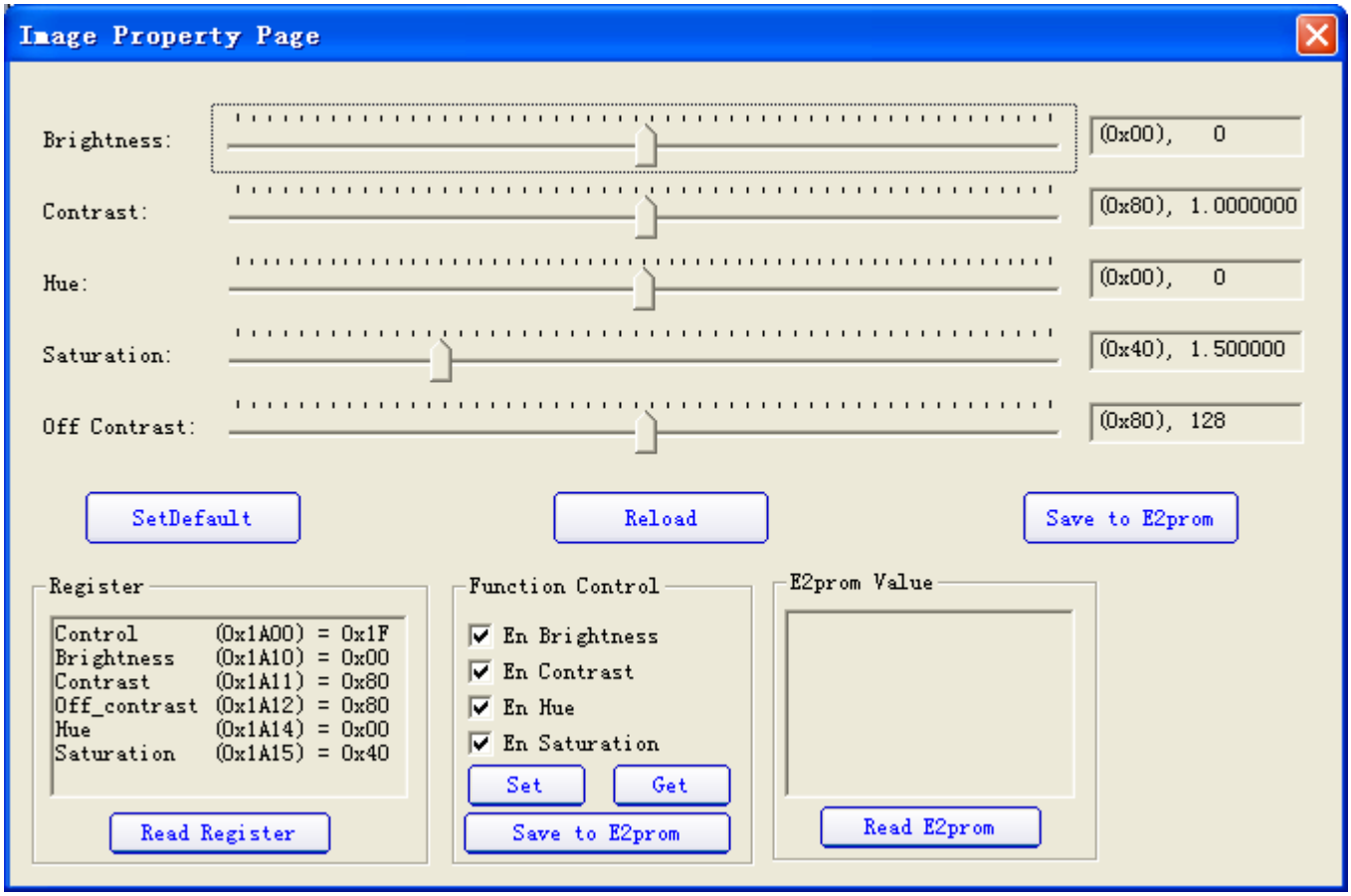

Figure: Image Property page

The interface is used for image property configuration. You can modify the image property at real time and write the current settings into control information.

Interface specification:

- "Drag bar": The five drag bars are used to set the different values for the five image properties. The changing will be effective at once every time.
- "Set Default": It is used to set the property settings of drag bar as default settings and move the drag bar to the default

value.

- "Reload": It is used to reread the relative register of VC0706 and set the new value for drag bar.
- "Save to E2prom": It is used to write the current settings of drag bar into control information which have to include the control information of image property extend page.
- "Read Register": It is used to read the corresponding register value of image property parameters.
- "Function Control": It is used to set ISP control register for each image property function control. Image properties function only can be enabled when it is open and changing the parameter.
  - "Set": It is used to write the current settings into VC0730.
  - "Get": It is used to read the configuration of VC0706 and display it.
  - "Save to E2prom": It is used to write the current settings into the control information of VC0706.
- "Read E2prom": It is used to read the parameter value of image property page from control information.

“Gamma” button

Click the “Gamma” button on the main interface to enter the Gamma setting page which is shown as follows:

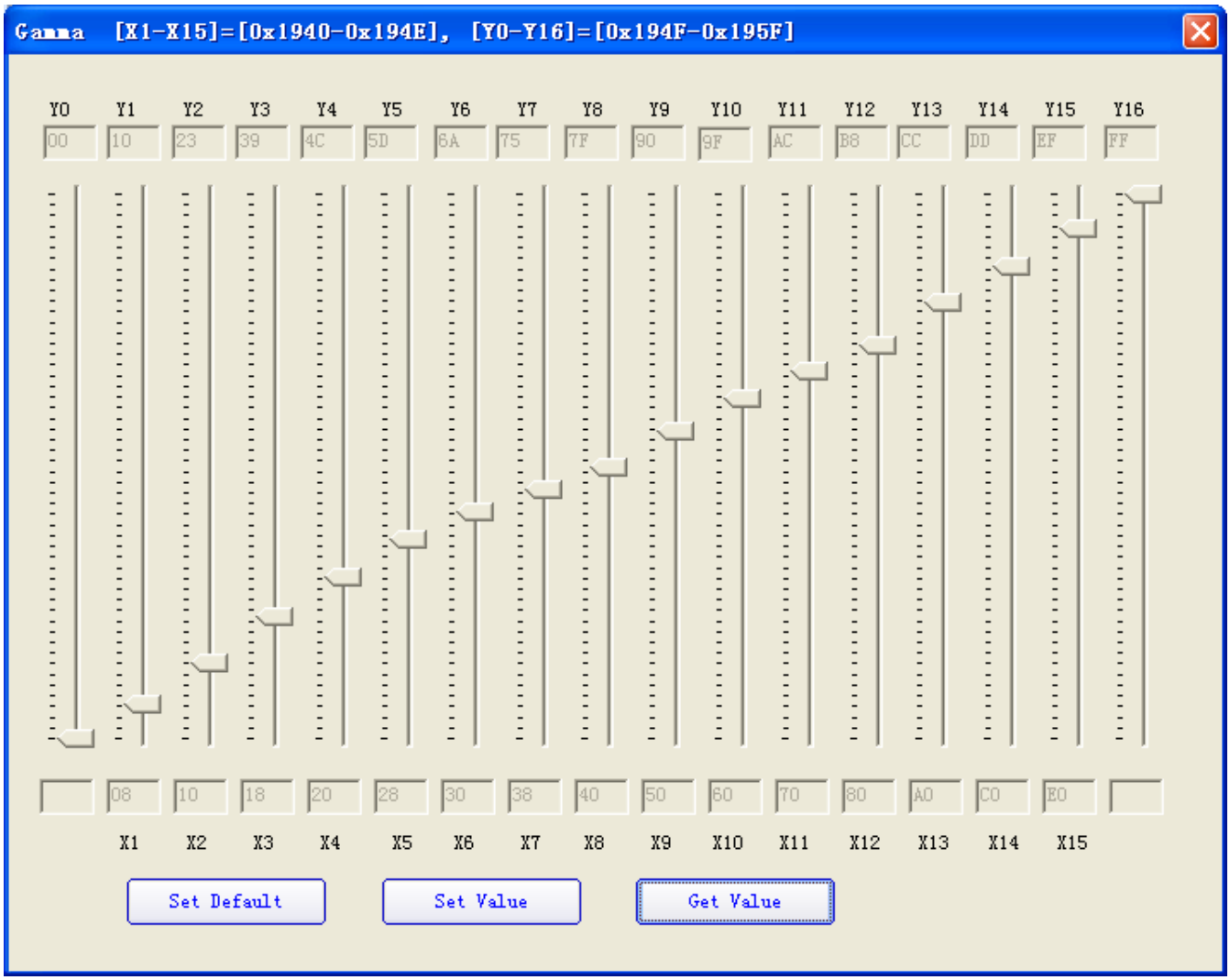

Figure: Gamma configuration

The interface is used to modify the parameter of gamma curve.

Interface specification;

- “X1-X15”,”Y0-Y16”: It is used to set and display the corresponding value of gamma register which is hex. The settings are efficient after click “Set Value”.
- “17 Drag bars”: It is used to set Y0-Y16, and the settings are efficient at real time.
- “Set Default”: It is used to set the gamma parameter as default.
- “Set Value”: It is used to writ the value of “X1-X15” and “Y0-Y16” into gamma registers.
- “Get Value”: It is used to read the value of gamma registers and writes them into “X1-X15” and “Y0-Y16”. The function of this button will be enabled when the interface open.

"Spi Flash" Menu

Click the "Spi Flash Operate" button on the main interface to enter the SPI Flash operation page which is shown as follows:

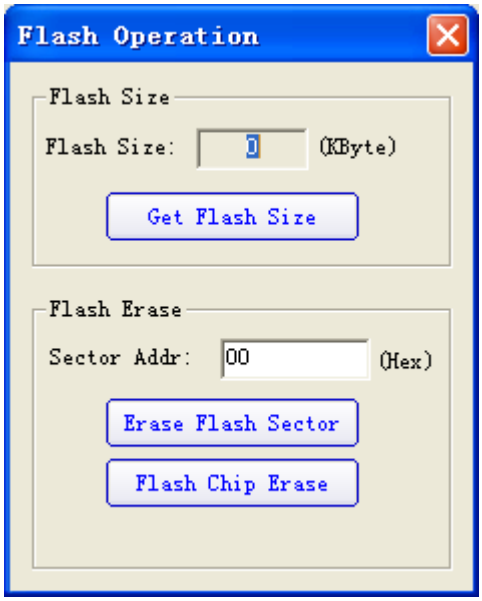

Figure: SPI Flash operation

The interface is used for SPI Flash.

Interface specification:

- "Get Flash Size": It is used to obtain the SPI Flash size.
- "Erase Flash Sector": It is used to erase the start Sector Address (Hex).
- "Erase Flash All": It is used to erase whole flash.

"Up/Down Load" button

Click the "Up/Down Load" button on the main interface to enter the Up/Down Load interface of control information which is shown as follows:

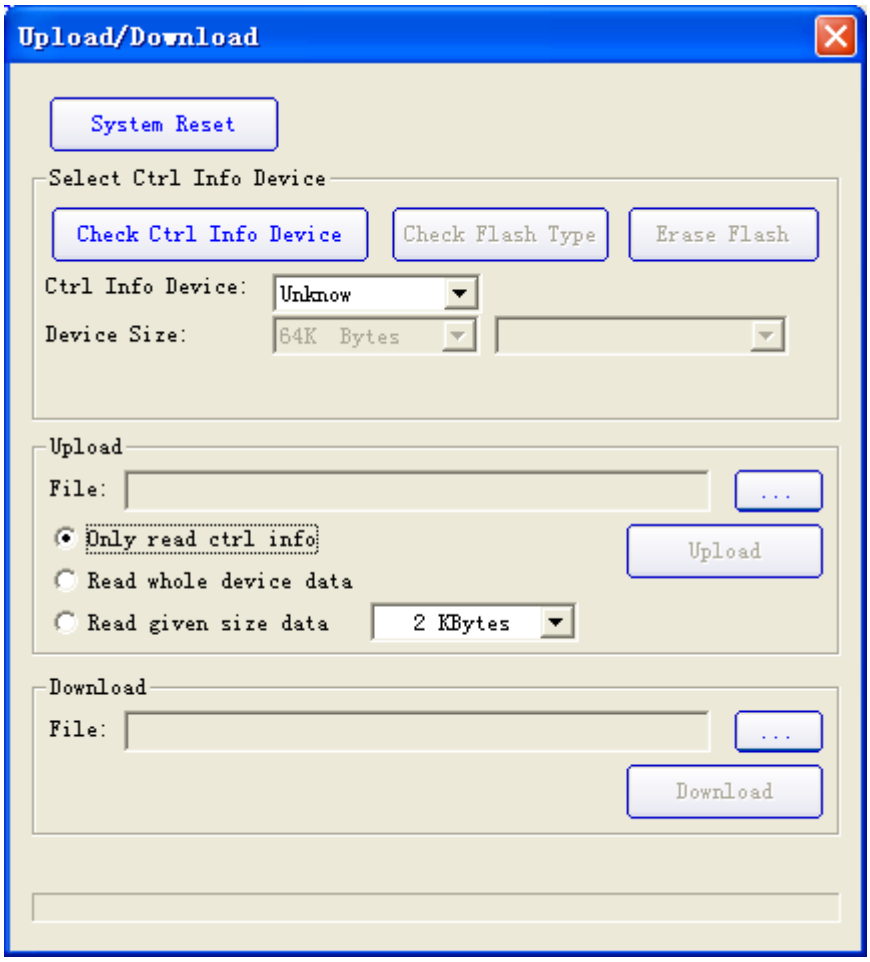

Figure: Up/Down Load

The interface is used to up/down load control information.

- "System Reset": It is used to reset VC0706. In order to bring control information into effect the VC0706 have to reset by using this function after download information.
- "Select Ctrl Info Device": It is used to select control information storage device and its type. The control information storage devices include I2C E2prom, SPI E2prom and SPI Flash. The setting of these devices will save automatically after changing and the current setting will be displayed when the interface is open on each time.
  - "Check Ctrl Info Device": It is used to check the storages devices such as I2C E2prom, SPI E2prom and SPI Flash whether include control information, if them include control information the "Ctrl Info Device" will be changed to display the storage device type which include control information. On the other hand if there is no control information has been detected the "Ctrl Info Device" will be changed to display "Unknown".

- "Check Flash Type": It is used to check the type of SPI Flash when the control information saved to SPD Flash. There are four types SPI Flash can be detected by VC706 are AT25F512A, AT25F1024A, AT25F2038A, AT25F4096A.If there are SPI Flash types have been detected the second list of "Device Type" will be changed to display the SPI Flash type and the first list of "Device Type" will be changed to display the capacity of SPI Flash, otherwise if there is no SPI Flash has been detected or SPI Flash is unknown the second list of "Device type" will be changed to display "Unknown". This button only can be used when the control information saves to SPI Flash otherwise the button is gray and forbidden from use on the other condition.
- "Erase Flash": It is used to erase all of the Flash when the control information saves to SPI Flash otherwise the button is gray and forbidden from use.
- "Ctrl Info Device": It is used to display the storage device type of control information as I2C E2prom, SPI E2prom or SPI Flash otherwise display "Unknown" if there is no storage device.
- "Device Type": It is used to select and display the capacity and type of control information storage devices. Start from left side the first list is used to display device capacity and the second list is used to display device type. The corresponding capacity and type will be changed automatically when the device capacity and type have been changed. The device types which are displayed on this list will change along with the different storage device types of control information.
- "Upload": It is used to read the date from appointed device and save them as file.
- "File": It is used to display the file storage path of read data.
- "…": It is used to choose the storage file of read date.
- "Only read ctrl info": It is used to display the current operation is only upload the control information data from storage. The condition of using this function is the control information has been saved to storage device.
- "Read whole device data": It is used to express read the whole data from storage device when the data uploading.
- "Read given size data": It is used to express read the data number from right side list only when the data uploading.
- "Upload": It is used to startup data upload, after startup the operation process will be displayed on the interface underside and the progress bar will display the data read process.

- "Download": It is used to write the data from the selected file into appointed device.
  - "File": It is used to display the file path.
  - "…": It is used to select the file.
  - "Download": It is used to startup download operation. After startup this operation the process will be displayed on the interface underside and the progress bar will display the data write process. The program will erase whole flash first before write the data into SPI Flash.

“Other Ctrl” button

Click the “Other Ctrl” button on the main interface to enter the other operation setting page which is shown as follows:

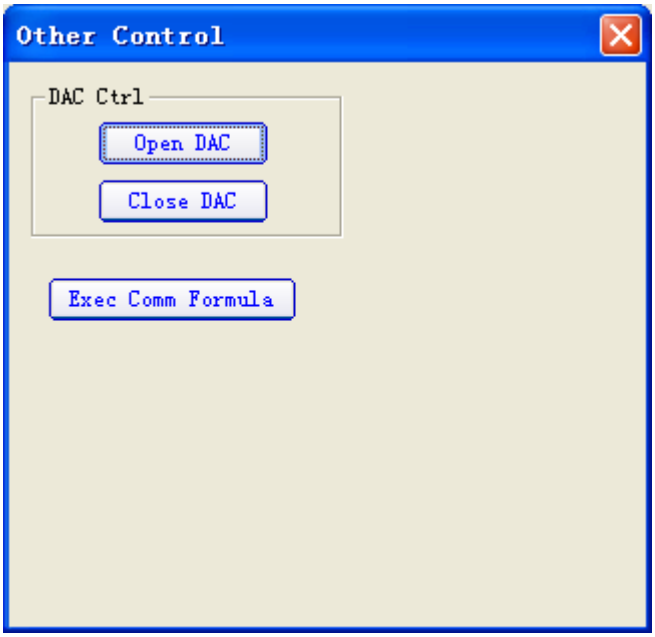

Figure: Other operation configuration

Interface specification:

- “DAC Ctrl”: It is used for DAC operation.
  - “Open DAC”: It is used to send DAC open command.
  - “Close DAC”: It is used to send DAC close command.
- “Exec Comm Formula”: It is used for executing serial port formula.

“FBUF Ctrl” button

Click the “FUBF Ctrl” button to enter the FBUF operation interface which is shown as follows:

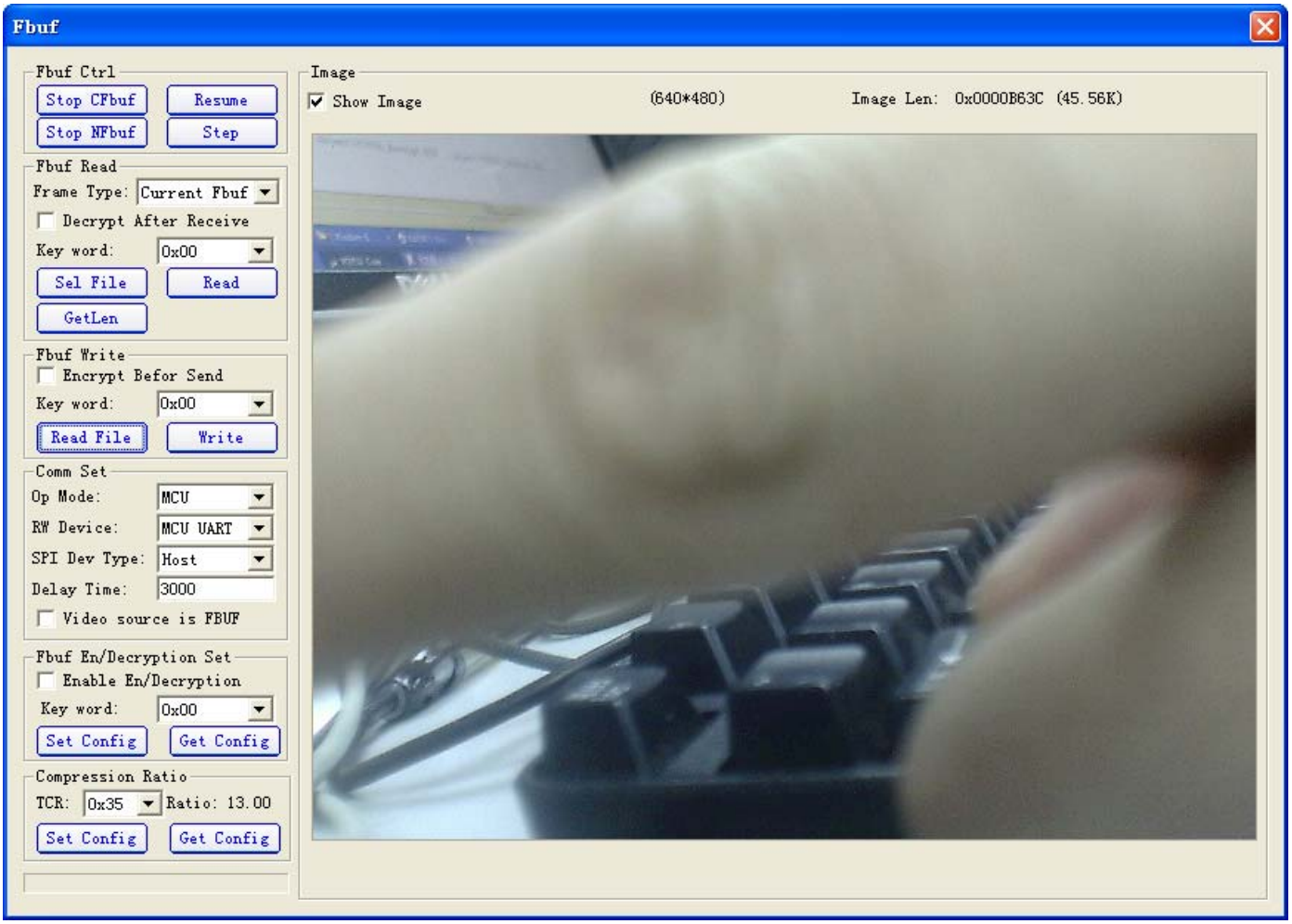

Figure: FBUF operation interface

The interface is used for FBUF operations which include:

- FBUF control: such as stop frame, resume frame, switch frame.
- FBUF read-write operation
- FBUF Encryption
- Compression ratio setting

Interface specification:

- “FBUF”: FBUF control operations such as stop frame, resume frame, switch frame.
  - “Stop CFbuf”: Stop current frame update.
  - “Stop NFbuf”: Stop the next frame update.
  - “Resume”: Resuming frame update.

- "Step": Frame display switching.

- "Fbuf Read": It is used to read the FBUF image. The current frame and next frame can be read by this function.
  - "Frame Type": It is used to choose the frame type as current frame or next frame. The frames which will be read have to stop before read the FBUF.
  - "Decrypt After Receive": This check box is used to decrypt the FBUF image which has encrypted after read it and then save the decryption FBUF image to the appointed file.
  - "Key Word": It is used to choose the key of FBUF decrypting. The key of encryption and decryption are the same.
  - "Sel File" button: It is used to choose the image file which needs to save.
  - "GetLen": It is used to obtain the image length of current appointed frame and display it after the "Image Len".
  - "Read": Start up read operation. There is a progress bar show the read process under the lower left corner and after have read it the dialog box will pop-up to indicate read operation finish.
- "Fbuf Write": It is used to write the image into FBUF with one condition that is image has to write into the next frame buffer and the next frame buffer has to stop before write FBUF.
  - "Encrypt Before send": This button is used to set the data will be encrypted first after read it from unencrypted image file and then write them into FBUF, otherwise the image data write into FBUF will be mistake.
  - "Key Word": It is used to choose the encryption key of the FBUF encryption.
  - "Write": Start up write operation. There is a progress bar show the writing process under the lower left corner and after have written it the dialog box will pop-up to indicate write operation finish.
- "Fbuf En/Decryption Set": It is used for FBUF encryption.
  - "Enable En/Decryption": It is used to enable Encryption and Decryption function.
  - "Key Word": It is used to choose the encryption key for encryption key setting and display the current key for getting encryption key.
  - "Set Config": It is used to write the current settings of "Enable En/Decryption" and "Key Word" into relative register.
  - "Get Config": It is used to read the current encryption status of VC0706 and display is via "Enable En/Decryption" and "Key Word".
- "Compression ratio": It is used for compression ratio operation.
  - "TCR": It is used to choose the value for compression ratio setting and display the current value for read compression ratio.
  - "Set Config": It is used to set compression ratio.
  - "Get Config": It is used to obtain the current value of compression ratio.
- "Image": It is used for the image relative display.
  - "Show Image": It is used to set display the image in the underside frame as read-write FBUF.
  - "Image Len": It is used to display the current image size or display the size of image in the selected frame after click the "Get Len" button.

As reading FBUF you have to stop the frame which needs read first then choose the image save file, finally start up read operation and waiting for image read finish.

As writing FBUF you have to stop next frame first then choose the image file which needs read-in, finally start up write operation and waiting for image writing finish.

Note: After stop current frame you have to resume frame update first if you want to stop next frame and then stop current frame, otherwise it will lead to system mistake.

"Zoom Ctrl" button

Click the "Zoom Ctrl" button on the main interface to enter the control page of Downsize and Zoom which is shown as follows:

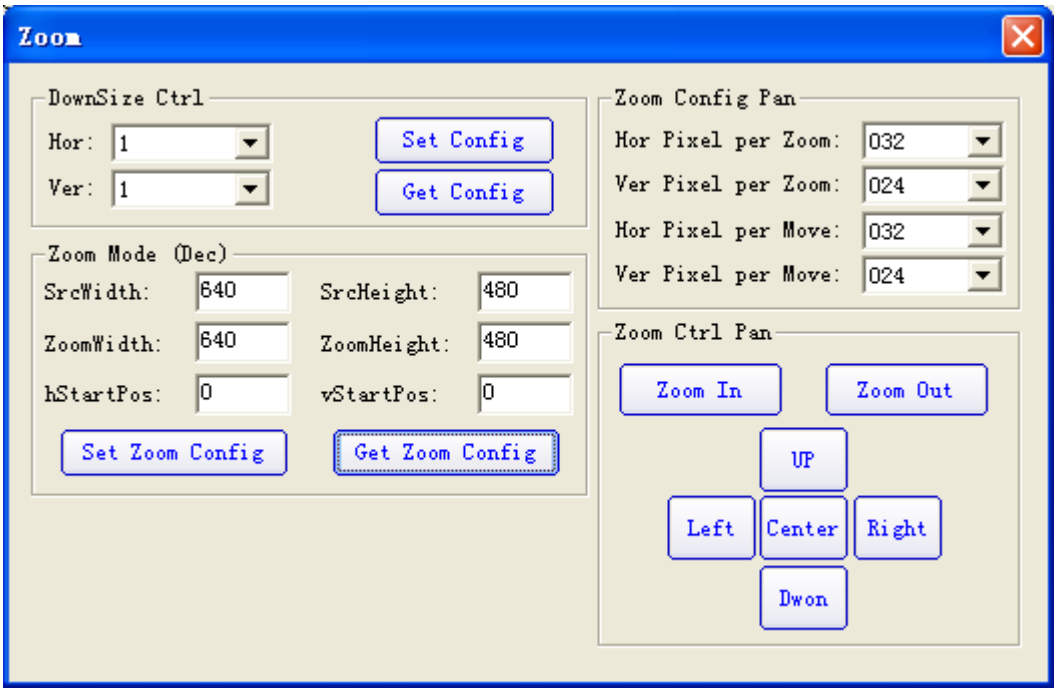

Figure: Zoom control

The interface is used for the operations of Downsize and Zoom.

Interface specification:

- "DownSize Ctrl": It is used to set and display the DownSize status.
  - "Hor": It is used to display the value of Downsize row.
  - "Ver": It is used to display the value of Downsize column.
  - "Set Config": It is used to send the Downsize control command base on the configurations of "Hor" and "Ver".
  - "Get Config": It is used to obtain the Downsize status and display it via "Hor" and "Ver".
- "Zoom Mode (Dec)": It is used to set the Zoom and obtain the current Zoom status. The parameter is decimal.
  - "SrcWidth": It is used to set the width of original image.
  - "SrcHeight": It is used to set the height of original image.
  - "ZoomWidth": It is used to set the width of resized image.
  - "ZoomHeight": It is used to set the height of resized image.

- "hStartPos": It is used to set the start X coordinate of resized image in original image.
- "vStartPos": It is used to set the Y coordinate of resized image in original image.
- "Set Zoom Config": It is used to send the Zoom command base on above textbox settings.
- "Get Zoom Config": It is used to obtain the Zoom status and display them in above textboxes.

- "Zoom Ctrl Pan": It is used to move the Zoom up and down convenient. The operation size for each time can be set by "Zoom Set Pan".
  - "Zoom In": It is used for Zoom In operation.
  - "Zoom Out": It is used for Zoom Out operation.
  - "UP": It is used to move the resized image up in the original image.
  - "Down": It is used to move the resized image down in the original image.
  - "Left": It is used to move the resized image left in the original image.
  - "Center": It is used to move the resized image in the center of original image.
- "Zoom Set Pan": It is used to set the operation size of "Zoom Ctrl Pan" for each time.
  - "Hor Pixel per Zoom": It is used to set the increase or decrease number of horizontal pixel for Zoom operation.
  - "Ver Pixel per Zoom": It is used to set the increase or decrease number of vertical pixel for Zoom operation.
  - "Hor Pixel per Move": It is used to set the pixel number for right and left moving operation.
  - "Ver Pixel per Move": It is used to set the pixel number for up and down moving operation.