SVM-03/03U Utility Software

[SVMCtl]

Software Manual

Rev. 8.2

NetVision Co., Ltd

Revision History

Edition	Date	Detail	Charge
1st	2014/06/25	The first edition	N. Kashiwagi
2nd	2015/05/12	Change「【Figure 4】Setting Window of SVMCtl」	N. Kashiwagi
3rd	2015/05/27	Integrate SVM-03 / SVM-03U	H. Yamada
4th	2015/06/16	Change UI placement	H. Yamada
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6th	2015/10/07	Add function explanation	H. Yamada
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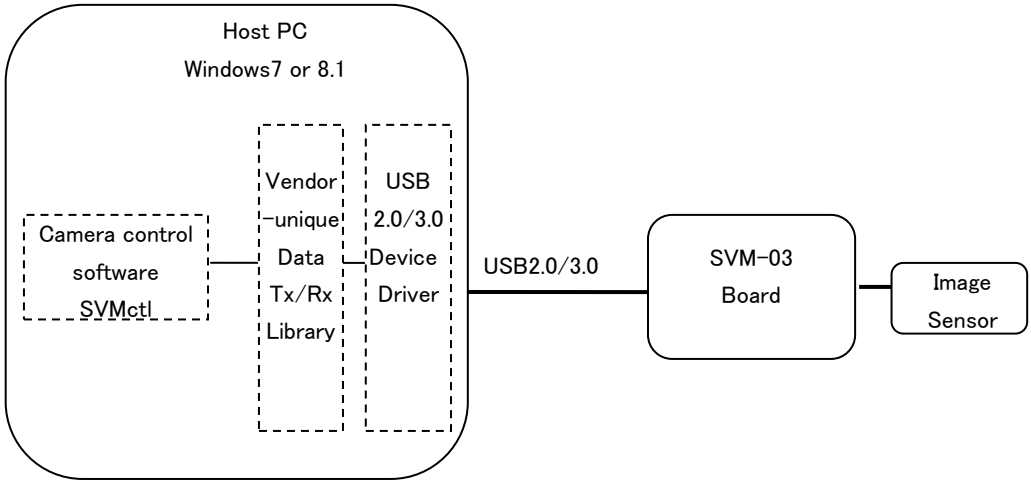
1. Outline

This document is a manual of SVM-03 utility software "SVMCtl". SVM-03 is an image converter / capture board from parallel digital interface to HDMI or USB3.0. "SVMCtl" is a utility software to configure SVM-03 and to send setting into the image sensor. When you use SVM-03 board at the first time, you need to congirure initialization by "SVMCtl" software.

For hardware details about SVM-03, please refer to the hardware specification sheet.

【Figure1】 System Configuration



※Win7, Win8 is 32bit, 64bit both supported.

【Table 1】 SVM System Constitution Table

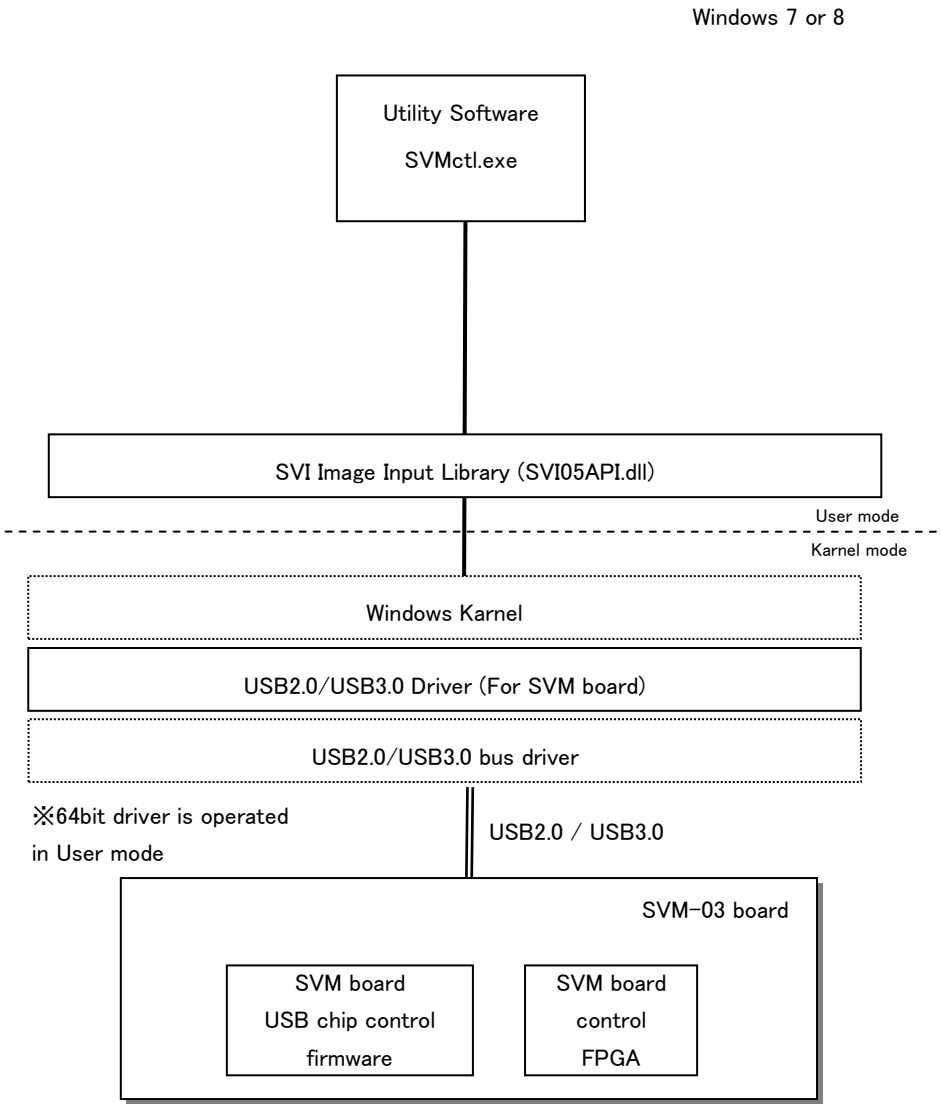
Application	Utility Software	SVMCtl (SVMCtl.exe)
Driver	32bit driver	SVM-03 USB3.0 Driver (SVIUSB30.sys, .inf)
	64bit driver	SVM-03 USB3.0 Driver (SviU3drv.dll etc)
Firmware	Board controller	SVM-03 board USB chip control FW (SVM-03_vxx.img)
Hardware	SVM board	SVM-03 board
	FPGA configuration	FPGA configuration data (s6fpgaxxx.bin)

- xxx shows the version number.
- Applications and libraries are available in 32bit and 64bit, so please use them to your environment.

2. SVM-03 Software Configuration

Software configuration of SVMCtl is described in【Figure2】.

【Figure 2】 Software Configuration



3. SVM-03/03U Board/Camera control software SVMCtl (SVMctl.exe)

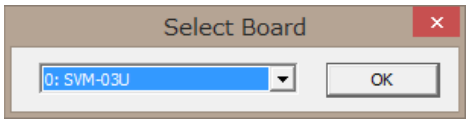
SVMCtl controls the I2C interface of the SVM board, sets the camera, obtains information, and configures the SVM board. You can also set the resolution of the SVM-03U board, and update the firmware and FPGA configurations.

3.1. Top Window

When you start the software, you will immediately see the top screen if one of the SVM boards is connected. If more than one SVM board is connected, the Select Board dialog screen appears, as shown in Figure 3, select the SVM board you want to work with and press the OK button to display the top screen.

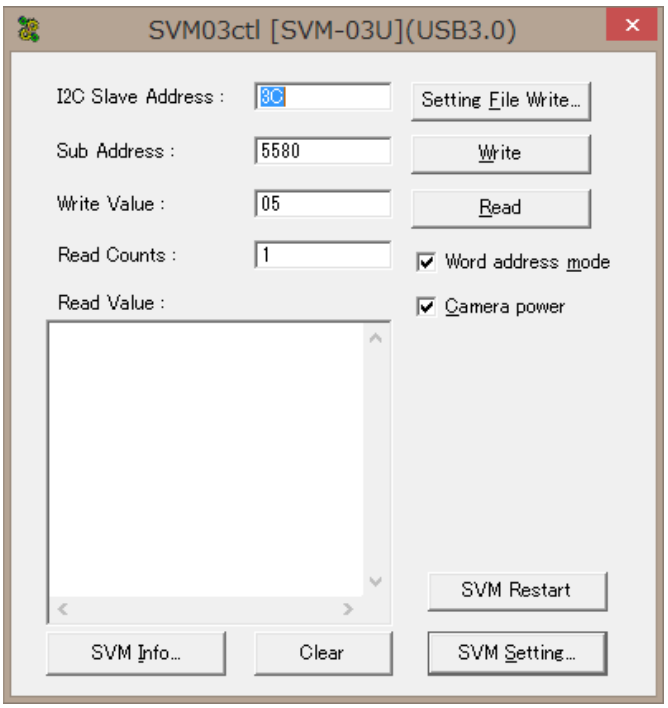
"ID =" Displays the "UVC Board ID" set in "SVM Setting screen" below.

【Figure 3】Select Board Dialog



This software provides menu items depending on a model number of automatically recognized like SVM-03 or SVM-03U. Recognized board identifier and version of USB (USB2.0 / USB3.0) are displayed on title bar, as shown in [Fig.4]. USB3.0 connection becomes indispensable to high-resolution non-compression image transfer concerning a transfer speed. Please confirm that it is displayed as "USB3.0" on the title bar of top window when you use camera of resolution more than 720p with SVM-03U.

【Figure 4】Top Window of SVMCtl



Lists of Menu on top window of SVMCtl are showed on Table2.

【Table 2】SVMCtl Top Window Menu Chart

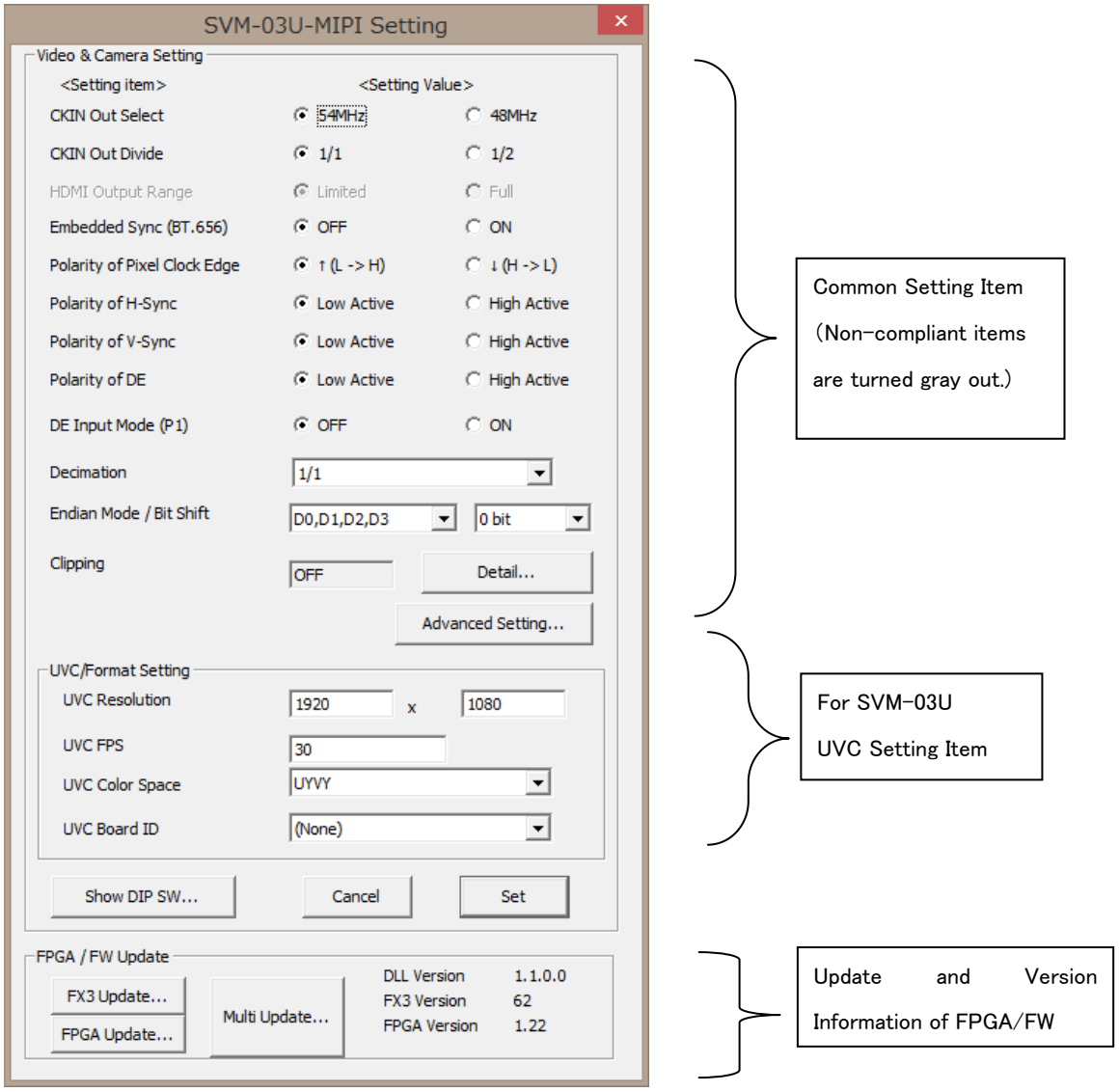
I2C Slave Address	Specifies the slave address (7bit) of camera by hexadecimal.
Sub Address	Set register address in hexadecimal representation (8 bit). If "Word address mode" is checked, SVM-03 transmits the length of the address in word long (16bit).
Write Value	Set value to transmit in hexadecimal representation. If it is blank, SVM-03 doesn't transmit. And SVM-03 can transmit plural bytes by delimited comma.
Read Counts	Set the number of bytes to read from Sub Address.
Read Value	Display comma delimited values read by pushing "Read".
Write	Write "Write Value" to "Sub Address" of "I2C Slave Address".
Read	Read I2C Data and display to "Read Value". Read "Read Counts byte" size from "Sub address" of "I2C Slave address".
Word address mode	When checked, the length of the sub-address is sent and received by the word length (16bit). The setting also applies to the Setting File Write.
Restart Condition	Sets the format for I2C Read.
Camera Reset	Set the reset signal to the camera. (Output L when Check)
Setting File Write...	Read the comma-delimited configuration file and transmit to camera. Please confirm "Format of Setting File for I2C Connecting" about I2C confirm.
SVM Info...	Display SVM Info window. This function is used for our remote support, not need to use in normal operation.
Clear	Clear "Read Value" edit box.
SVM Restart	Restart SVM board. It is used for reflecting the setting of SVM Setting Window.
SVM Setting...	Display SVM Setting Window and change such as settings of SVM board.

3.2. SVM Setting Window

The following dialog shows how to change the configuration of the SVM board. This dialog is displayed by pressing the "SVM Setting..." button on the top screen.

In the setting window, displayed setting items vary according to the kind of a recognized board. The following figures are setting windows connected with SVM-03U mode. The model number of a recognized board is shown on the window title of the setting window.

【Figure 5】Setting Window of SVMCtl



Menu lists on setting window of SVMCtl are shown on【Table3】and explanation lists of update and version information are shown on【Table4】.

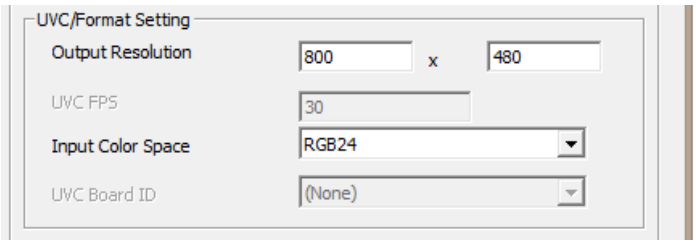
【Table3】Menu List of Setting Window of SVMCtl

Entry	Explanation
CKIN Out Select	Configure frequency of driving clock to supply to target.
CKIN Out Divide	Configure dividing rate of driving clock to supply to target.
ITU BT.656 Mode (SAV/EAV)	Set correspondence mode to ITU BT.656.
Polarity of Pixel Clock Edge	Set edge polarity about the data captured by DCK (pixel clock). ↑(L->H):Capture by rising edge of clock. ↓(H->L):Capture by falling edge of clock.
Polarity of H-Sync	Set polarity of the sync period of HS (Horizontal Synchronization) signal input from target. (See below)
Polarity of V-Sync	Set polarity of the sync period of VS (Vertical Synchronization) signal input from target. (Sww below)
Polarity of DE	Set polarity of the sync period of DE (Data Enable) signal input from target. "Valid when DE=H": Valid data during the DE = H period "Valid when DE=L": Valid data during the DE = L period
DE Input Mode (P1)	ON: Use P1 pin as external DE signal. OFF: Don't use DE signal. (default)
Decimation	Configure magnification of frame decimation rate. (Default 1/1)
CS Swap Mode (Only SVM-03)	Set method of the swap of byte alignment of data signal from target.
Endian Mode (Only SVM-03U)	Set byte order from camera.
Bit Shift	Sets the Bit Shift width, which is valid when the input is 8bit. For example, if you set bit Shift: 2 bits, you capture the 8bit data in Pixel_data [9:2].
Clipping	Configure clipping by pushing "Detail..." button. The current clipping ON/OFF setting is displayed on this dialog.
Advanced Setting...	Displays a dialog for changing advanced settings.
UVC Resolution	Set resolution of UVC. (in Pixel) "Width" must be a multiple of 4.
UVC FPS	Set frame rate of UVC. (in Frame per second)
UVC Color Space	Set color space of UVC.
UVC Board ID	Specifies the ID to use when connecting multiple SVM. (Some operating systems require driver updates.)
Show DIP SW...	Display setting item of DIPSW of connecting board
Cancel	Cancel without applying settings.
Set	Apply setting to SVM-03.

【Table 4】Information of update and version

Entry	Explanation
FX3 Update...	Update FX3 firmware of SVM board. Note contents that are updated aren't applied until restarting SVM board. You need to restart SVM board after finishing update.
FPGA Update...	Update FPGA configuration of SVM board. Note you need to restart SVM board after finishing update.
Multi Update...	Update both FX3 firmware and FPGA configuration of SVM board at once. Please follow the manual of update file at the time of updating.
DLL Version FX3 Version FPGA Version	Display used DLL, FX3 FW and FPGA version of SVM-03. If board is not connected to PC definitely, FX3 and FPGA version are not displayed definitely.

When you start in SVM-03 mode, some configuration items are displayed as follows:

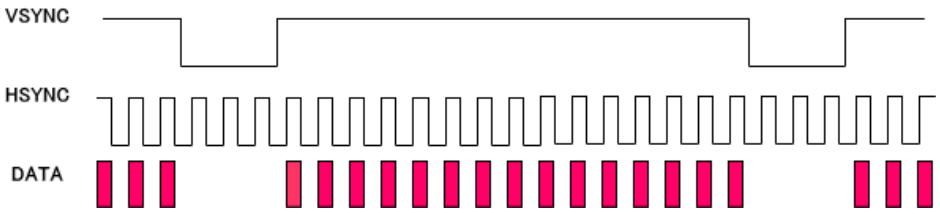


Entry	Explanation
Output Resolution	The resolution output to HDMI can output a custom resolution in addition to 1080p and 720p. The output Resolution item set a resolution that outputs in "custom resolution". (800x480, 800x600, 1024x768) This item is common with UVC Output Resolution.
Input Color Space	Select the input color space (YUV/RGB). This item is common with UVC Color Space.

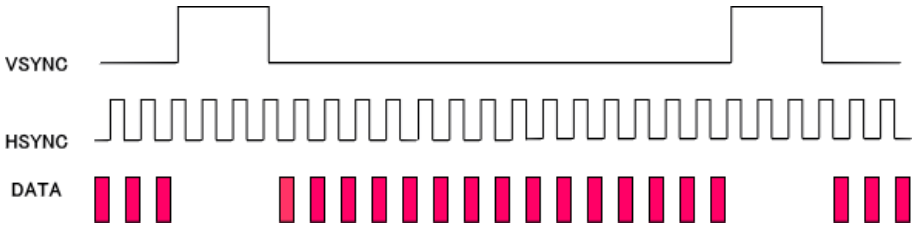
- About setting of "Polarity of H-Sync" and "Polarity of V-Sync"

You can select "Low Active" or "High Active" in setting of "Polarity of H-Sync" and "Polarity of V-Sync".

For example, setting of "Polarity of H-Sync" and "Polarity of V-Sync" are set to "Low Active", VSYNC and HSYNC both low at blanking period. So, SVM-03 captures in data as active data that VSYNC and HSYNC both high (Red frame part of DATA of the chart below).

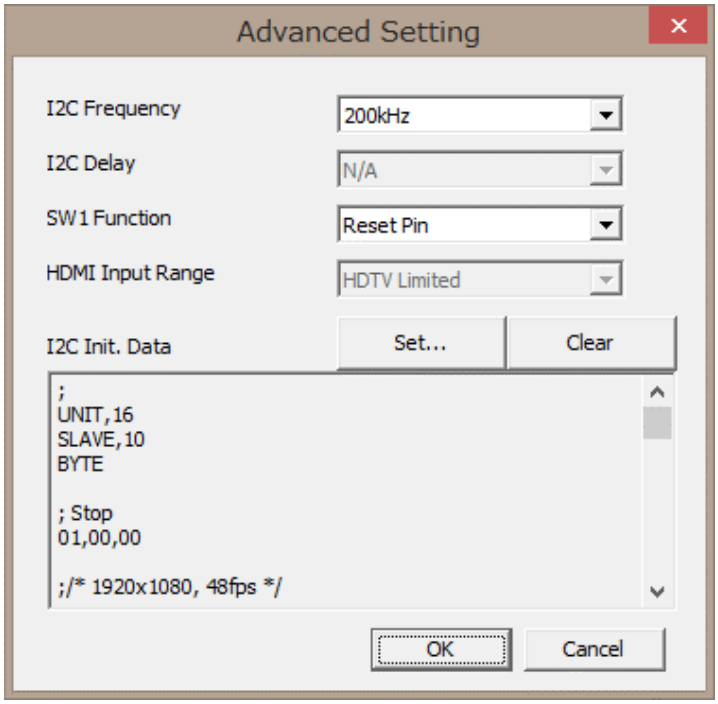


Note setting of "Polarity of H-Sync and DE" and "Polarity of V-Sync" are set to "High Active", VSYNC and HSYNC both high at blanking period. So, SVM-03 captures in data as active data that VSYNC and HSYNC both low (Red frame part of DATA of the chart below).



3.3. Advanced Setting Display

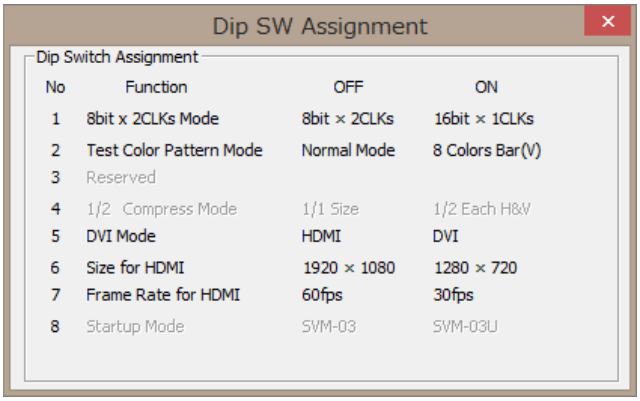
This is a display that makes advanced settings.



Entry	Explanation
I2C Frequency	Sets the communication speed of the I2C bus. (100kHz/200kHz/400kHz)
SW1 Function	Set the function of the switch SW1 on the board. Reset Pin: Camera reset operation in SW1 Disabled: SW1 function disabled Reset -> Init: SW1 Press to reset Release the SW1 to release the reset and then send the I2C initialization data.
HDMI Input Range	(SVM-03) Set the video input range. The current version only affects color conversion during RGB input. YUV inputs are treated as HDTV YCbCr Limited.
I2C Init. Data	Set the I2C initialization data to be sent when the SVM board is launched. Press "set..." To display the file selection display and specify the configuration file The setting is written to the SPI-ROM on the board, and the default setting is will be sent. The configuration file is the same format as the top screen Setting file Write. If you press clear, the configuration file that is written to the board is cleared. The edit box below displays the current initialization data that is loaded from the board.

3.4. Dip SW Assignment Window

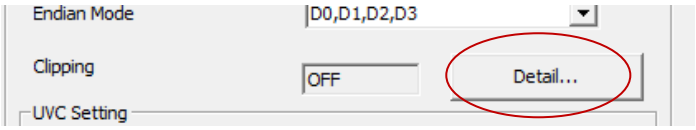
【Figure 6】 Dip SW Assignment Window



Displaying lists of setting items of DIP SW implemented on a connected board now.

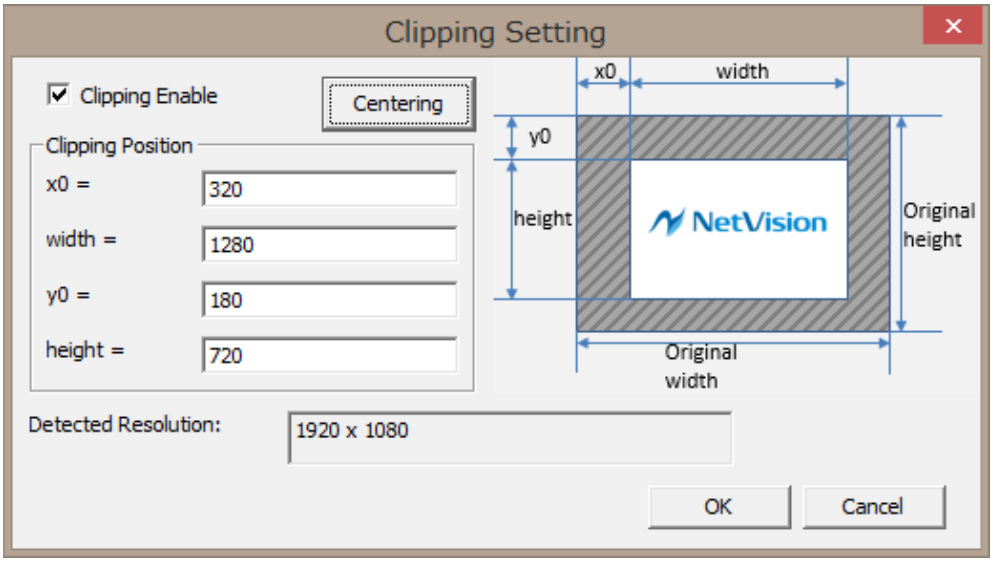
For more information about each function, please refer to hardware specification.

3.5. Clipping Setting Window



Clipping Setting window is opened when you click “Detail...” on “Clipping”.

【Figure 7】Clipping Setting Window



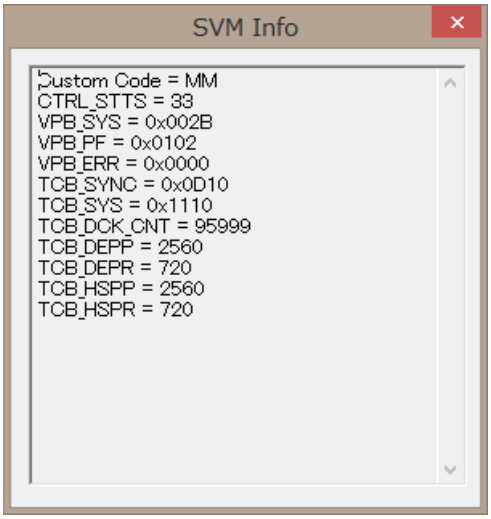
You can configure setting of clipping for input image. The setting contents are common throughout SVM-03/SVM-03U, and saved on SPI-ROM by “Set” button on “SVM Setting” window as other settings. Note it is necessary that the setting of UVC resolution equals to the resolution after clipping.

【Figure 5】Setting Items of Clipping Setting Window

Entry	Explanation
Clipping Enable	If it is checked, clipping function becomes active.
Centering	Automatically set x0 and y0 based on automatically detected resolution and value of “width” and “height” to cut from center of the window.
x0, y0	Set the coordinate of the start position.
width, height	Set width and height of clipping. “Width” must be a multiple of 4.
Detected Resolution	Display resolution of image data that detected by SVM board. Detect of resolution is done at the timing of displaying Clipping Setting window.
OK	Apply change and return to original window.
Cancel	Cancel change and return to original window.

3.6. SVM Info Window

【Figure 6】SVM Info Window



■Meaning of the main register values

TCB_DCK_CNT: Pixel clock frequency [kHz]

TCB_DEPP: Horizontal resolution after DE-signal processing [CKs]

If the DE signal is not used, the same as TCB_HSPP

TCB_DEPR: Vertical resolution after DE-signal processing [Lines]

If the DE signal is not used, the same as TCB_HSPR

TCB_HSPP: HSync Horizontal resolution [CKs]

TCB_HSPR: VSync Vertical resolution [Lines]

Left example is 1280x720/UYVY/8bit input

Window used for debugging used for our support. SVM Info window is displayed when you push "SVM Info..." button on main window. Internal status of SVM-03 board is displayed on this dialog. It is not used for normal operation.

3.7. SVM-03 Connecting Procedure

The procedure of connecting SVM-03 with PC is shown below.

1. Switch on the PC and start Windows.
2. Connect SVM-03 board with USB port on PC.
3. Set atacched CD-ROM in the drive and install the driver if you are required to install driver.

Note, for more information about install drivers, please refer to "Readme.txt" in CD-ROM.

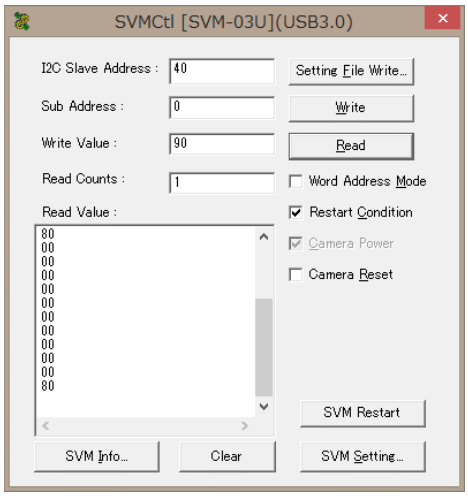
3.8. Install of Application

There are no installer applications. Copy Appl folder in the CD-ROM to any folder of PC.

3.9. Launch camera in camera control application

1. Start an application called "SVMCtl.exe" in the above folders.

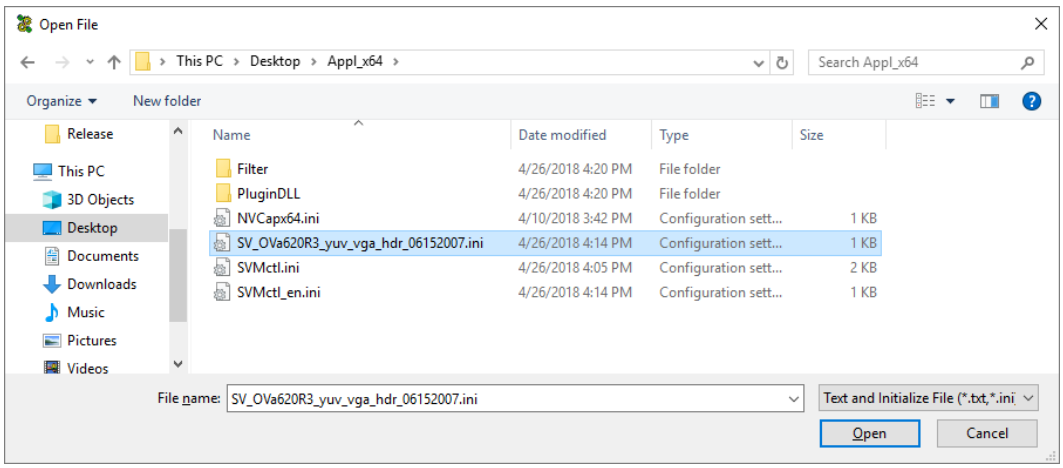
2. A dialog below will be shown.



3. Input slave address of camera (7bit) at "I2C Slave Address" in hexadecimal.

4. Click "Setting File Write" button, select I2C configuration file of camera to be sent.

In the figure below, the contents of the configuration file are sent to the camera by selecting the initial configuration file named "SV_OVa620R3_yuv_vga_hdr_06152007.ini" and clicking the "Open" button.



-Files placed in a path that contains double-byte characters, such as Japanese, may not be loaded correctly.

If you receive an error message, please confirm the connection of the camera, the connection of the SVM-03 board, etc., and send the initial configuration file again.

5. If the initial configuration file is successfully sent, the LED 9 of the SVM-03 board will blink.

(If the frame rate is fast, it may look like a thin light condition.)

3.10. Format of I2C Configuration File

Text file for writing command to camera module register by I2C communication is described following forms.

UNIT, (Radix)
SLAVE, (Slave Address)
(Sub Address), (Writing Value 0), (Writing Value 1), …
wt, (Wait Value)
BYTE
WORD

- Appoint radix for Slave address, sub address and writing value on UNIT command. You can appoint “10” or “16” for radix. “10” appoints the later numerical value in decimal digit. “16” appoints the later numerical value as hexadecimal number.
- Appoint slave address by SLAVE command.
- You write to register by command beginning with sub address. Sub address is sub address in the device and appointed in 8bit or 16bit. The sub-address length is set by the ″BYTE″ command (8bit) or ″WORD″ command (16bit) (SVMCtl ver. 1.3.1 or later). If “Word address mode” is checked, you write sub address in word long (16bit). Contrarily, if “Word address mode” is not checked, only lower 8bit of the address level of the word head becomes effective. Appoint the value to write to register by 8bit in writing value.
- “wt” command appoints value of waiting time. You can appoint waiting time by msec unit up to 32767 in decimal.
- Commands beginning with “#” are considered as comment until line break and skip to next line. Empty line (Only line break, not include such as space) also is skipped.
- You can use comma or space for the end of the item.

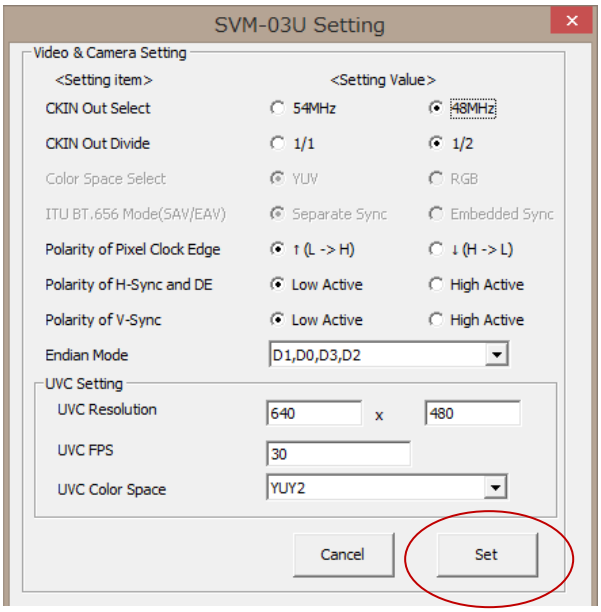
An example of configuration file is shown on the following page.

(Example of setting file)

```
# SVM-SDK Setting file sample
# date: 2008.03.24
#
BYTE
# Assuming in hexadecimal representation
UNIT,16
# Appointing slave address
SLAVE,2A
# Setting device 1
00,00
01,00,02
02,3A
03,6B
8B,00
# Waiting 100msec
wt,100
# Assuming in decimal digit
UNIT,10
# Appointing slave address
SLAVE,44
# Setting device 2
00,00
01,90
02,130
03,110
100,20
#
# END OF FILE
#
```

3.11. Configuring of SVM-03 Board Setting

Configuring of SVM board (Such as pixel format, resolution, etc.) is achieved by both this application and DIP SW (SW2) on the SVM-03 board. When you change the settings on the SVM Setting display and apply the changes with the Set button, the settings are preserved in the ROM on the SVM-03 board. In SVM-03 mode (DIP SW 8 is off), setting is applied immediately and output image will be updated. In SVM-03U mode (DIP SW 8 is on), you need to restart SVM-03 board to apply setting. To restart SVM-03 board, apply setting by pushing "Set" button and then push "SVM Restart" button on the main window.



When you open the setting window with SVM-03 board connected to PC, the application acquires current setting value and display these settings on the dialog.

In addition, the setting values held in the SPI-ROM are loaded at the SVM-03 board startup, and the board is configured on the firmware side. Therefore, if you set the application once, you do not need to do this in the future.

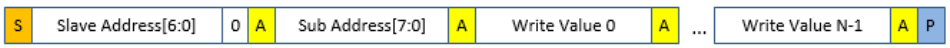
When using the SVM-03 board, restart the SVM-03 board if the setting value is not reflected after the configuration change.

4. I2C Communication Format

explanatory notes

4.1. I2C Write

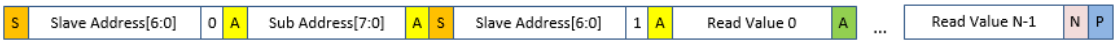
Word Address: Unchecked



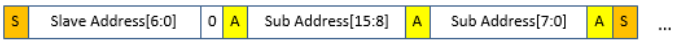
Word Address: Checked

4.2. I2C Read (Restart Condition : checked)

Word Address: Unchecked



Word Address: Checked



4.3. I2C Read (Restart Condition : unchecked)

Word Address: Unchecked

Word Address: Checked

5. Update of FX3/FPGA

You can update FPGA configuration and FX3 firmware of SVM-03 board by SVMCtl software.

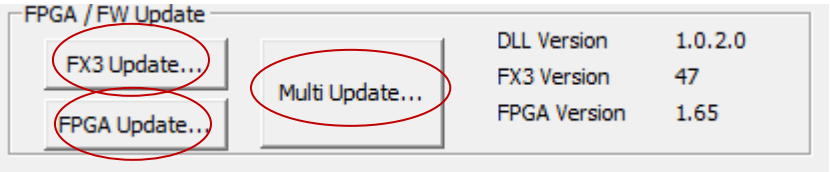
Update procedure is described below.

- If "FX3 version" number in SVM-03U mode is less than 45, update failure may be occured, so we strongly recommend to update in SVM-03 mode.

1. Confirm that PC doesn't process much load, connect SVM-03 board with PC, and start SVMCtl application.
2. Push "SVM Setting" button.

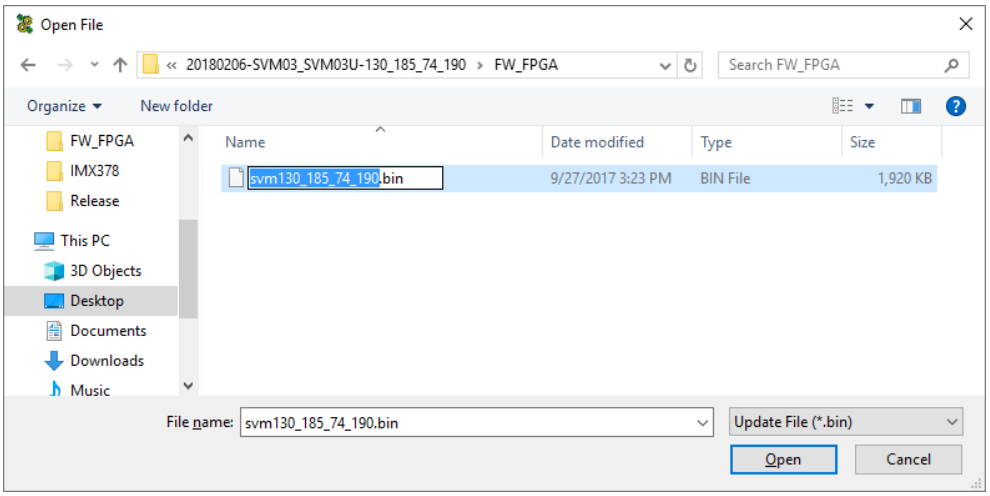
3. SVM Setting window will be shown.

   For normal update process, push "Multi Update..." button then updating of firmware and FPGA configuration starts at the same time. If you try to update FX3 firmware or FPGA configuration separately, push "FX3 Update..." button or "FPGA Update..." button, respectively.



4. After window for selecting file to update is displayed, select the file. The extension of file is as follows.

Target for update	File extension
FX3 Update	.img
FPGA Update / Multi Update	.bin



5. Dialog for the last confirmation of update is displayed, press "OK" if you want to execute updating.

6. Updating process begins. The following dialog is displayed during updating. Note that the updating process takes for around 5 min. for SVM-03U, about 3 min. for SVM-03.

- Be careful not to switch off the PC or pull out USB cable until this dialog is closed. SVM-03 will be unable to start up in such condition.

7. Dialog is displayed when updating is finished.

[In case of success]

When updating is finished normally, pull out USB cable and restart SVM-03 board. Updated firmware and FPGA is applied after restarting.

[In case of failure]

If updating is failed, a dialog informing failure is displayed. In this case, please update again.

- If updating is failed, please update again without pulling out USB cable. If you pull out USB cable in the state of failing to update, SVM-03 will be unable to start up.

6. SVMCtl Recommended Operating Environment

PC	: PC/AT Compatible machine
CPU	: Pentium4 1GHz or higher recommended
MEMORY	: 512MB or higher recommended
USB	: With USB interface
OS	: Windows7 32/64bit or Windows8.1 32/64bit

7. Applicable version

Mode	FX3 Version	FPGA Version
SVM-03/ UVC	70 or later	1.87 or later
SVM-03-MIPI/ UVC		1.20 or later
SVM-03/ HDMI	123 or later	1.85 or later
SVM-03-MIPI/ HDMI		1.20 or later
SVO-03U&P/ UVC	91 or later	0.92 or later
SVM-03U&P/ HDMI		0.93 or later

- SVMCtl: Ver. 1.3.0.0 or later