

# SVO System Software Manual

Rev.1.00

NetVision Co., Ltd.

Update History

Rev	Date	Note	
1.00	2018/07/09	• New File (Equivalent to Japanese version 3.30)	S. Usuba

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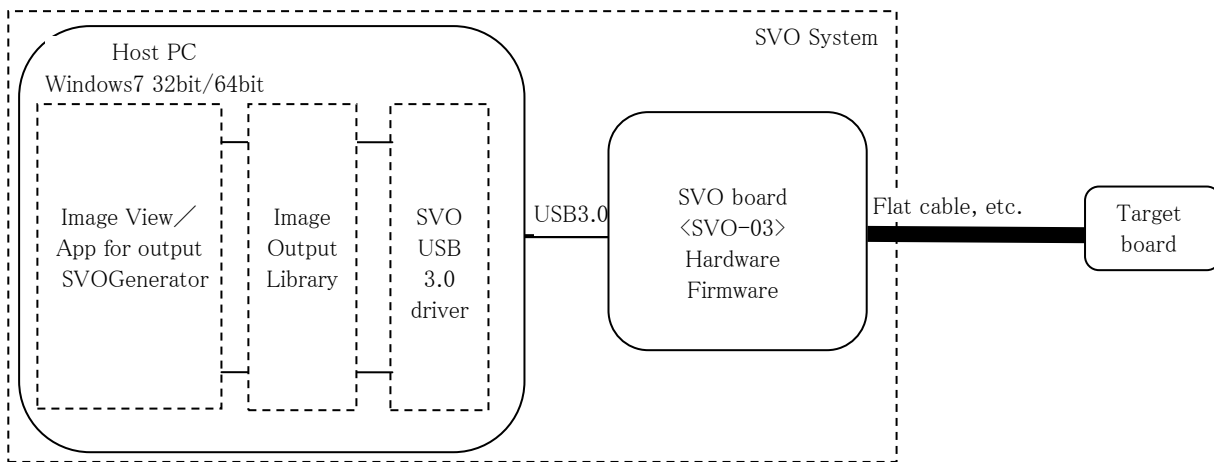
## 1. System Overview

SVO is an image generator system that outputs digital data such as image data. SVO consists of software and hardware and firmware on Windows.

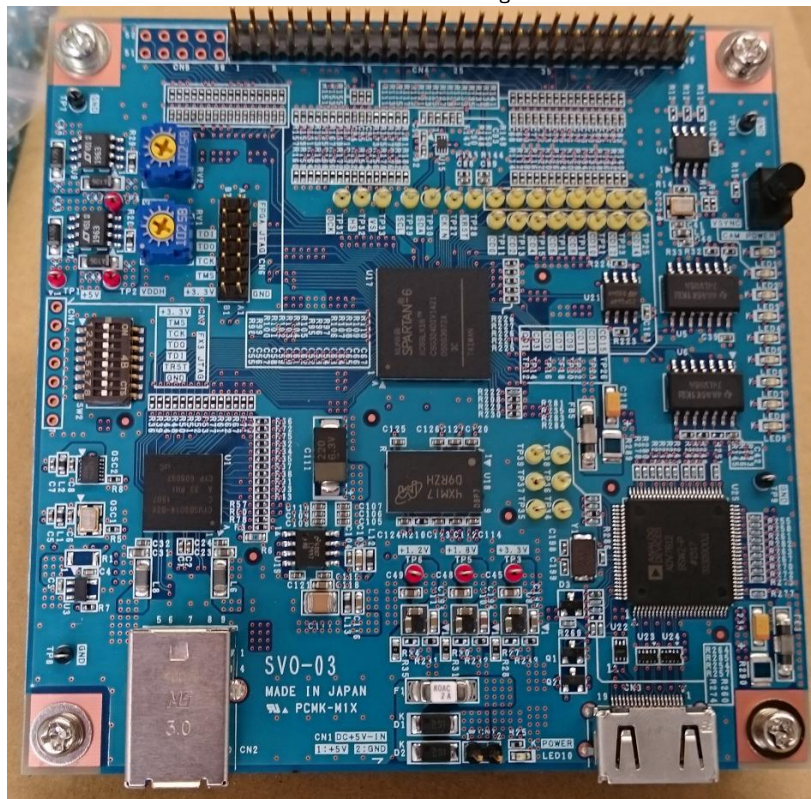
By using this system, it is possible to evaluate the receiving processing of image data, image processing, etc. without the device such as the camera.

The following figure shows the system configuration and the SVO hardware image.

System Configuration Diagram



SVO Hardware Image



## 2. Operating Environment

### ○ Hardware

PC : Windows7/8.1 Environment that works fine  
     CPU                      Core i5 GHz above  
                                 or equivalent CPU  
     Memory                  4GB above  
     Hard disk space        10GB above  
     USB Specifications     3.0 must ※Asmedia-made chips cannot guarantee

Monitor : Full color viewable

他 : USB3.0 cable etc.

※Windows10 is currently under evaluation. We will inform you on the website as soon as the evaluation ends.

### ○ Software

OS : Windows7/8.1 64bit/32bit

他 : Our applications、Library、  
     Device driver (8.1:64bit only)

## 3. Software required

The following software is provided for the operation of the SV0 system.

- SV0Generator.exe

This is an application that allows you to read and display the image data files of our own, and to output this image data at the specified timing to the target board.

- SV0USB30.dll

The SV0 image output library using the USB 3.0 device driver dedicated to the SV0 system. You can also incorporate the library into your system without using the above application.

- SV0USB30.sys、SV0USB30.inf

32bit version of the SV0 system dedicated USB 3.0 device driver file.

- SvoU3drv.dll、SvoUdrv.inf、...

64bit version of the SV0 system dedicated USB 3.0 device driver file.

※After SV0Generator is finished, the following files are generated.

- SV0Generator.ini

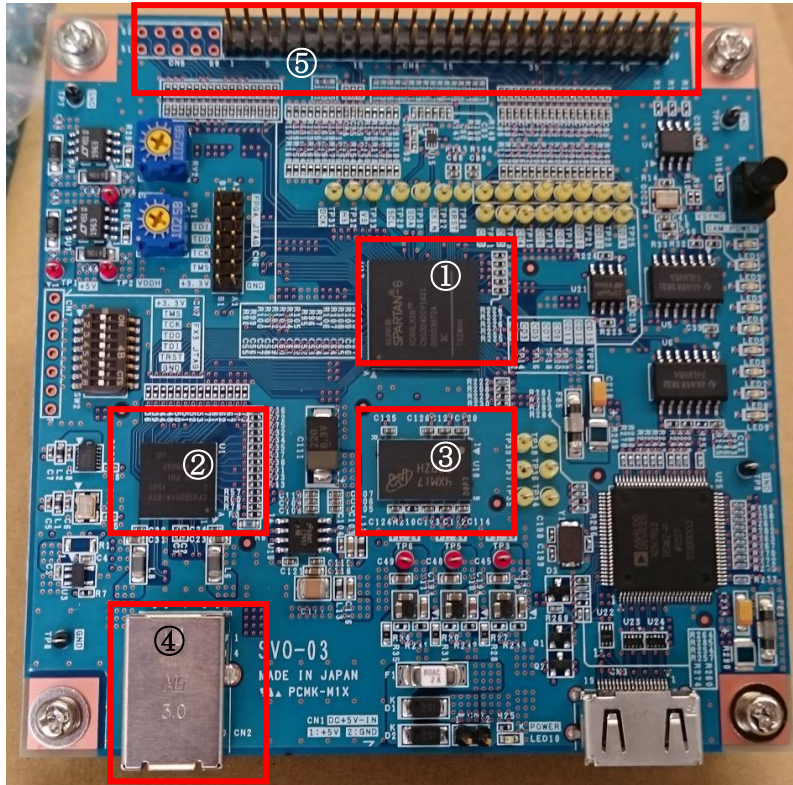
Save the information of the File-option dialog mainly.

- SV0Generator.svo

Save the information of the Device-Setting dialog mainly.

#### 4. SVO Hardware Overview

The SVO hardware (SVO-03) ① Xilinx FPGA (Spartan6-LX16), ② Cypress EZ-USB/FX3, and ③ SDRAM (128MB) are implemented to achieve the image generator.



The host PC is connected to the ④ USB 3.0 port. The ⑤ 50-pin header is used to connect the target board to which the SVO is to be output.

- ① Xilinx FPGA (Spartan6-LX16) provides SDRAM control, image Generator processing, and bus management.
- ② The USB 3.0-Cypress Controller (EZ-USB/FX3) provides a control over the USB interface.
- ③ SDRAM (128MB) stores the output image data.



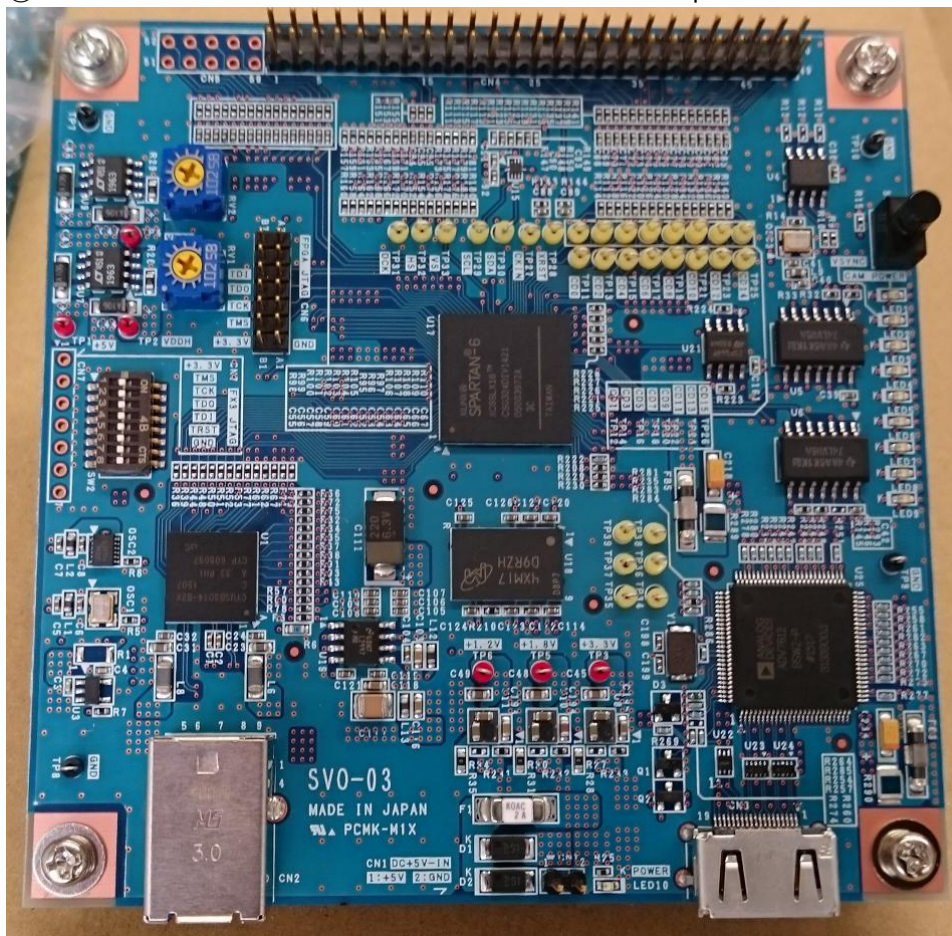
## 5. Install

Contains the software required for the software CD-ROM that is included with the SVO hardware. The contents of this CD-ROM are shown in the table below.

Folder	Content
¥	This folder contains the readme.txt, version.txt
¥SVO-AP_x86	This folder contains applications and library associations.
¥SVO-AP_x64	This folder contains the 64-bit version of the above.
¥Driver_x86	This folder contains the SVO-only USB 3.0 Device Driver Association
¥Driver_x64	This folder contains the 64-bit version of the above.
¥DOC	This folder contains a variety of documents.
¥Image_Output_Library	This folder contains the image output library files.
¥Tool	This folder contains the Frame file converter utility.

### 5.1. Installing the SVO-only USB 3.0 device driver

①Connect the SVO board and PC USB 3.0 interface port with the USB 3.0 cable.

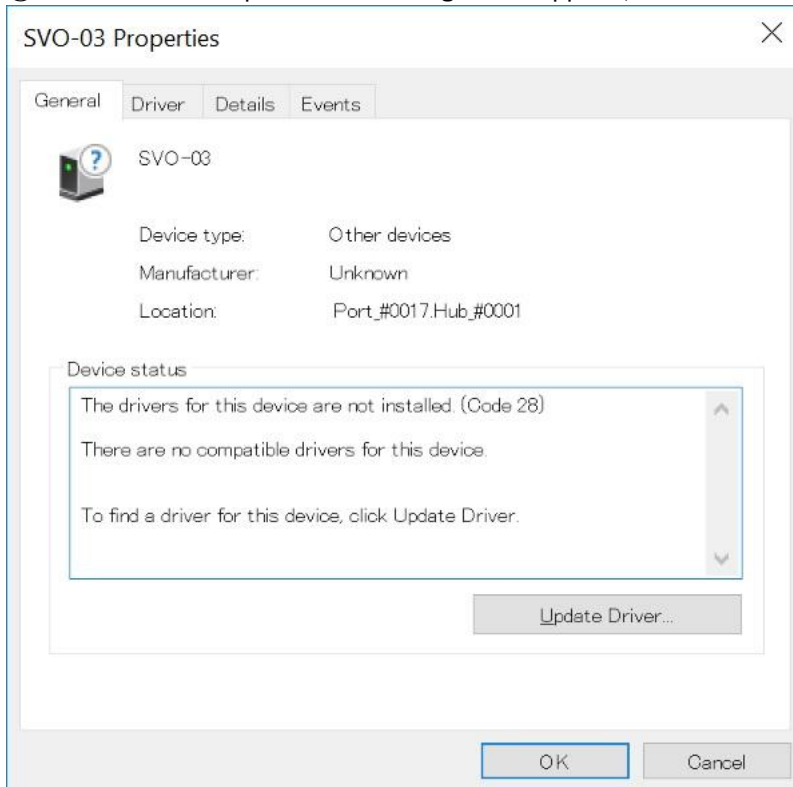




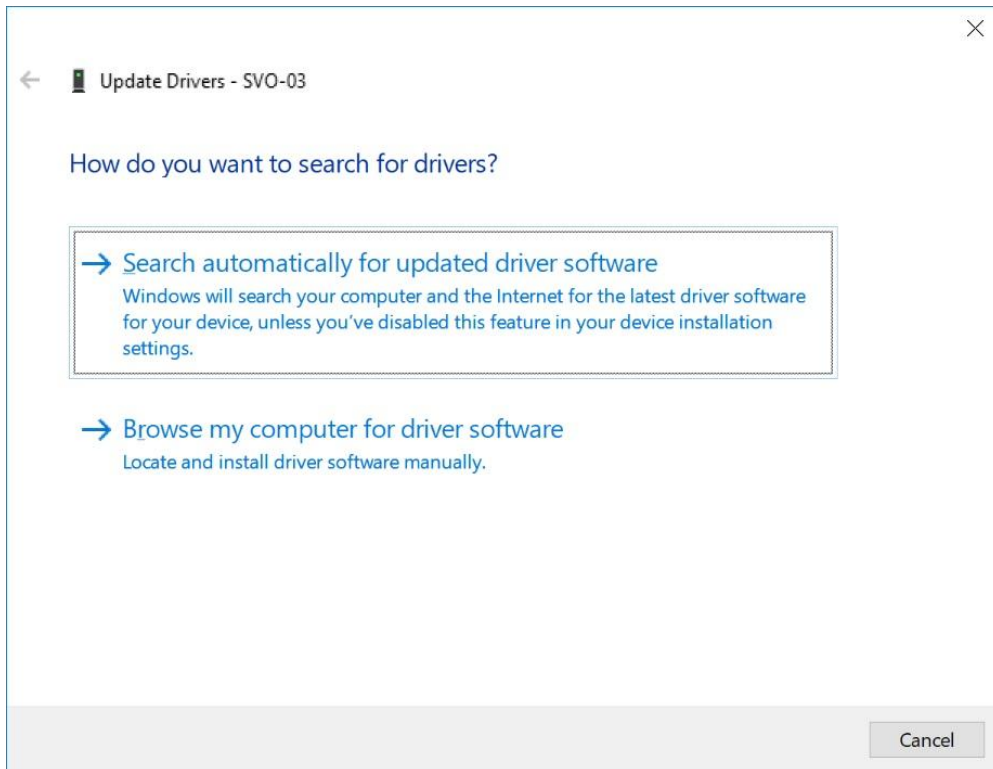
②Start Device Manager, and then double-click SVO-03. SVO-03 is registered with "Other devices" as shown below.

- > Network adapters
- ▼ Other devices
  - SVO-03
- > Ports (COM & LPT)

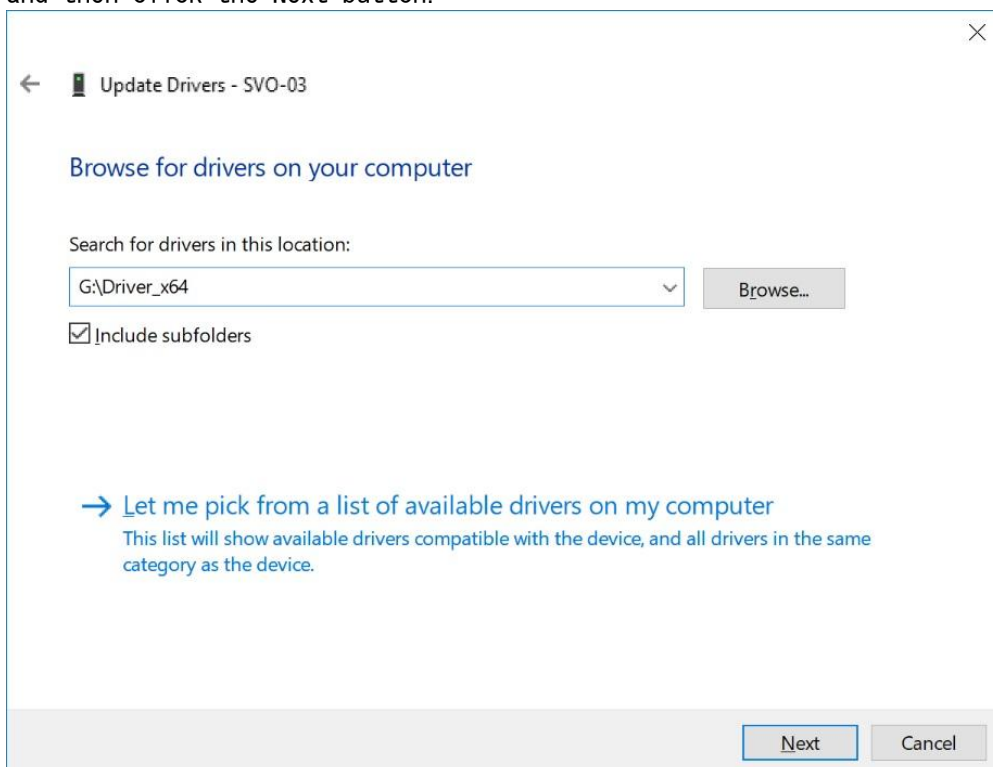
③The "SVO-03 Properties" dialog will appear, so click the "Update Driver" button.



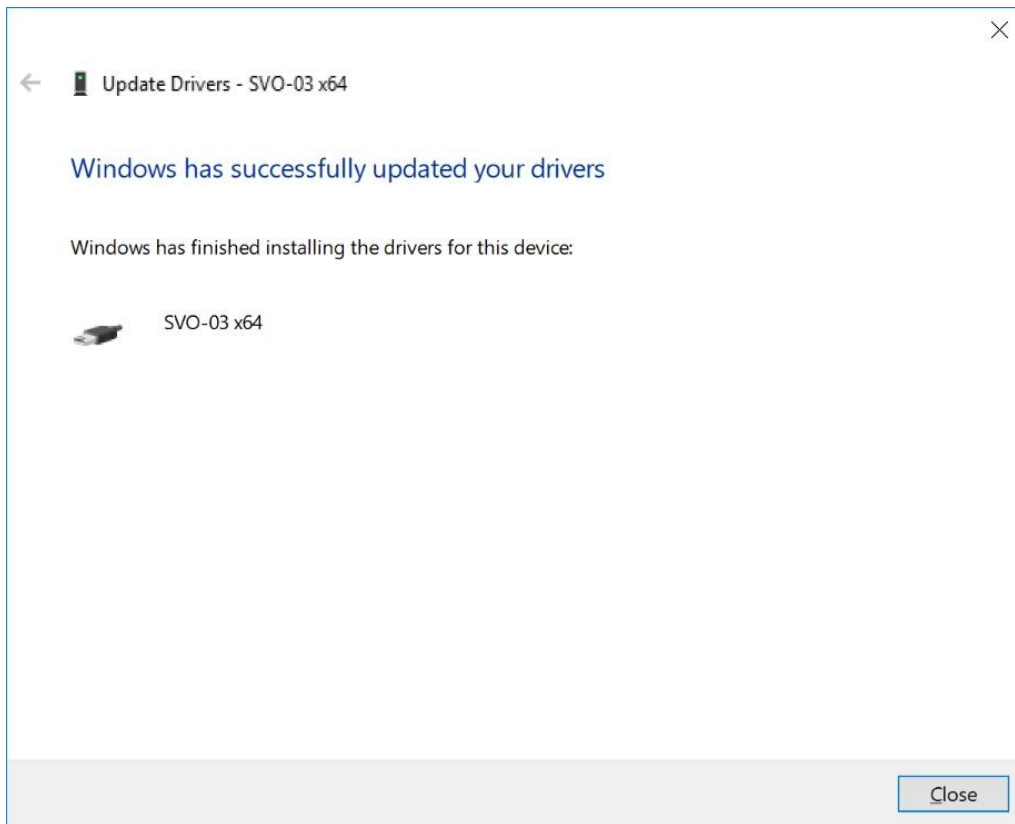
④“Update Drivers – SVO-03” dialog will appear, so click “Browse my computer for driver software”.



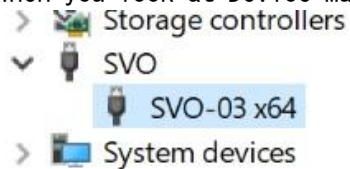
⑤Insert the CD-ROM into the CD drive, select the driver folder with the Browse button, and then click the Next button.



⑥The installation starts and after a while, the installation ends as shown below.



⑦When you look at Device Manager again, SVO-03 has been registered in the SVO class.



※To install the driver to Windows7 32bit, use the device driver stored in the CD-ROM driver\_x86.

※If you have previously installed a device driver for the SVI board, you may see "SVO-03" under "SVI", but there is no operational problem.

## 5.2. Application and library-related installations

Copy the SVO-AP\_x64 folder in the CD-ROM to any location on your hard disk.  
Make sure that the attributes of the destination SVO-AP\_x64 folder are read/write.

※The Windows7 32bit version is stored in the SVO-AP\_x86 folder on the CD-ROM. The usage is identical.

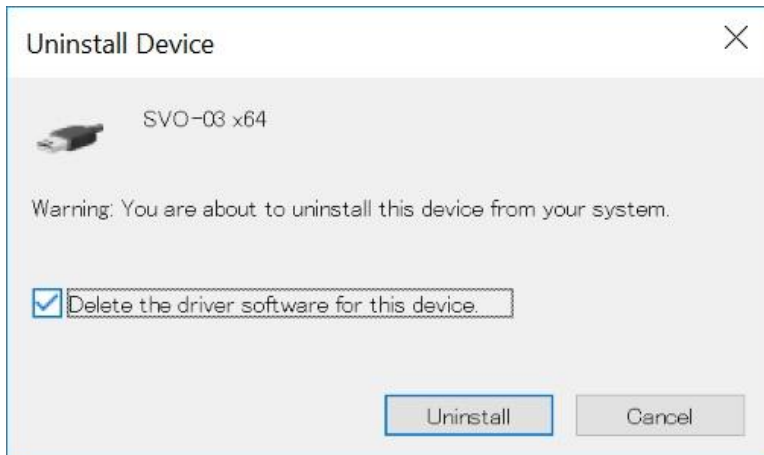
## 6. Uninstall

Provides instructions for removing an application and applications for the SVO-only USB 3.0 device driver.

The removal of SVO is usually only 6.2 "application, library-related uninstall". If you want to completely uninstall SVO from the PC, please do the "uninstall the SVO only USB 3.0 device driver".

### 6.1. Uninstalling the SVO dedicated USB 3.0 device driver

To uninstall a dedicated device driver for SVO, remove SVO-03 in Device Manager. Check "Delete the driver software for this device" as shown below.



### 6.2. Uninstalling Applications and libraries

Delete the copied SVO-AP\_x64 folder. Applications in the SVO-AP\_x64 folder do not write to the registry. Therefore, deleting the folder will complete the application and library-related uninstallation.

## 7. SVO Board DIP switch setting

The software in the SVO system assumes that multiple SVO boards are connected to a single PC. The current software allows you to select and use only one of the different SVO boards.

In the future, we will be able to use more than one SVO board at the same time.

You can then number the dip switch "S2" on the SVO board to identify each of the SVO boards when multiple SVO boards are connected. The number is from 00 to 07 and is set in the table below. (S2-use from number 6 to number 4)

Num	S2-8	S2-7	S2-6	S2-5	S2-4	S2-3	S2-2	S2-1	Device-Select	About Dialog
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0000	0000xxxx
1	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	0001	0001xxxx
2	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	0002	0002xxxx
3	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	0003	0003xxxx
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	0004	0004xxxx
5	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	0005	0005xxxx
6	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	0006	0006xxxx
7	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	0007	0007xxxx

The "xxxx" will be given a number that Windows recognizes and allocate in the range 0 to F.

If you set the following settings, it can be started automatically in the HDMI version. With S2-7 off, start Svogenerator, set the HDMI tab, and write the settings in "Write Rom" to Spi-rom.

By turning S2-7 on, it will switch to the mode of loading the setting from Spi-rom and launching. Therefore, it is possible to output data without having to do the setting from the PC again.

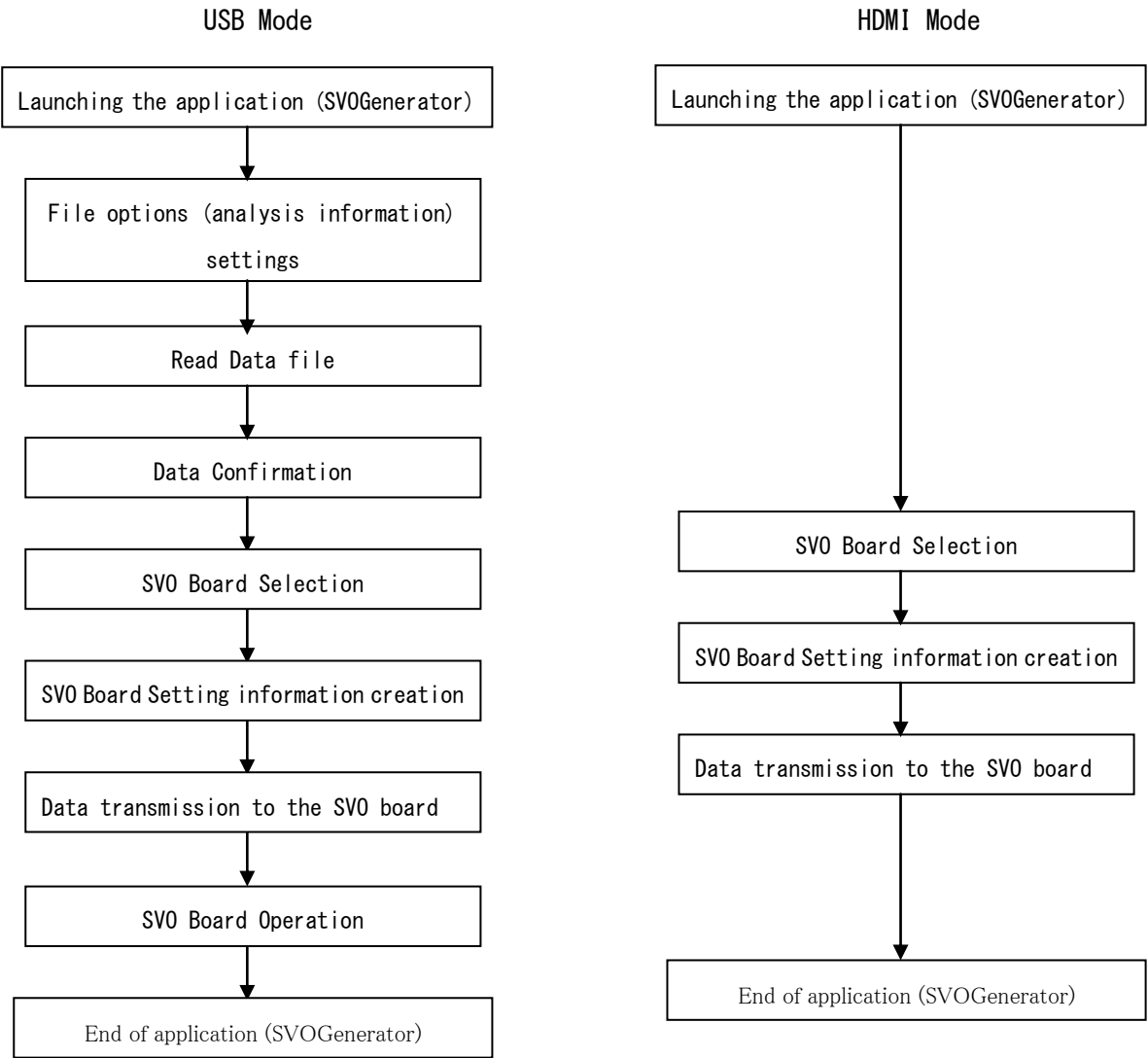
The details of the setting are described in Chapter 13.

8. How to operate the application

Describes that the flow of basic application operations using svogenerator and how to do it individually. See also application Help for more information on application items.

8.1. Application Operation Flow

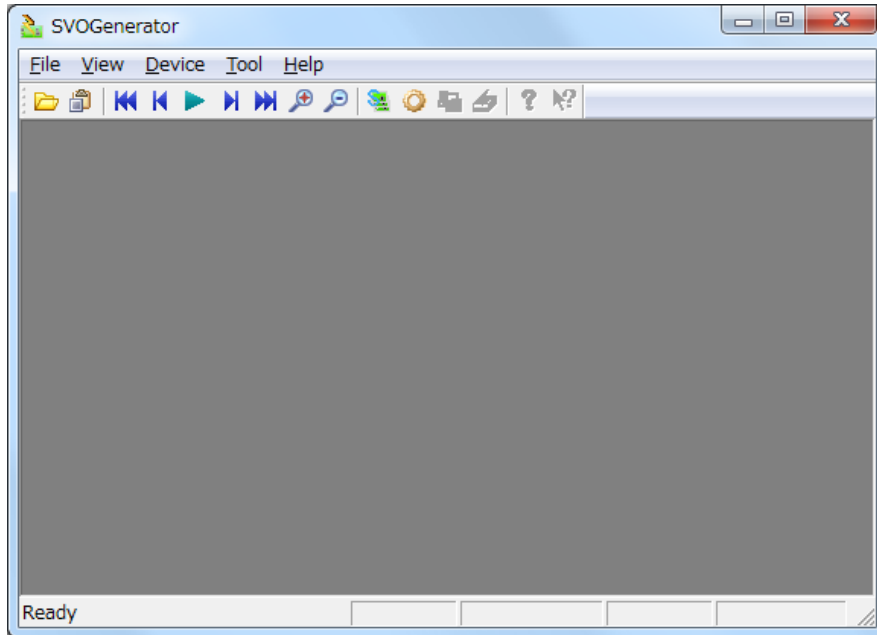
The basic flow of data output from the SV0 device is shown below. You can output data from the SV0 device by performing this procedure. For each item, refer to the following sections.





## 8.2. Launching the application (SVOGenerator)

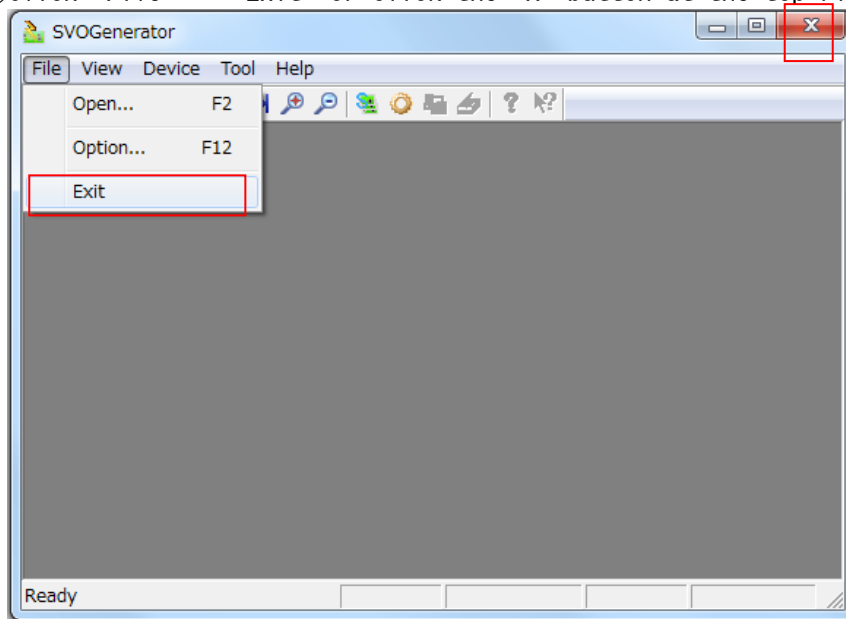
- ① 5.2 Run "SVOGenerator.exe" in the SVO-AP\_x?? folder that you copied in "Applications, library-related installation"
- ② You will see the SVOGenerator screen shown below. Verify that "Ready" appears in the SVOGenerator status bar.



This is the end of the boot.


## 8.3. End of application (SVOGenerator)

- ① Click "File" → "Exit" or click the "X" button at the top right of the screen.

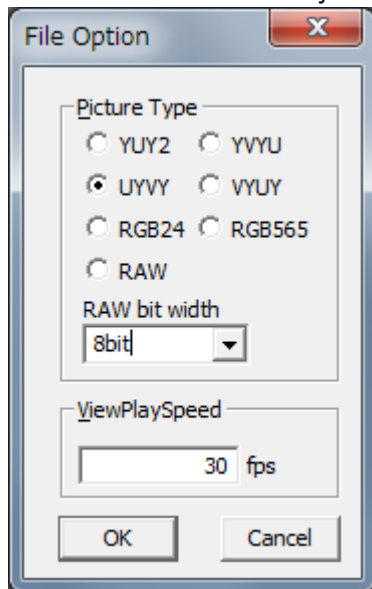


This is the end of the application.

## 8.4. File options (analysis information) settings

①Click "File" → "Option" or click the  icon on the toolbar.

②The "File Option" dialog is displayed so that you can make the settings that were in the data file that you are reading.



- PictureType : Specifies the color format of the image data.


- 1 Color bit width : Select the bit width to generate one color from 8, 10, 12, 16. YUV, RGB565, RGB24 Select 8bit, Raw is set according to the data.

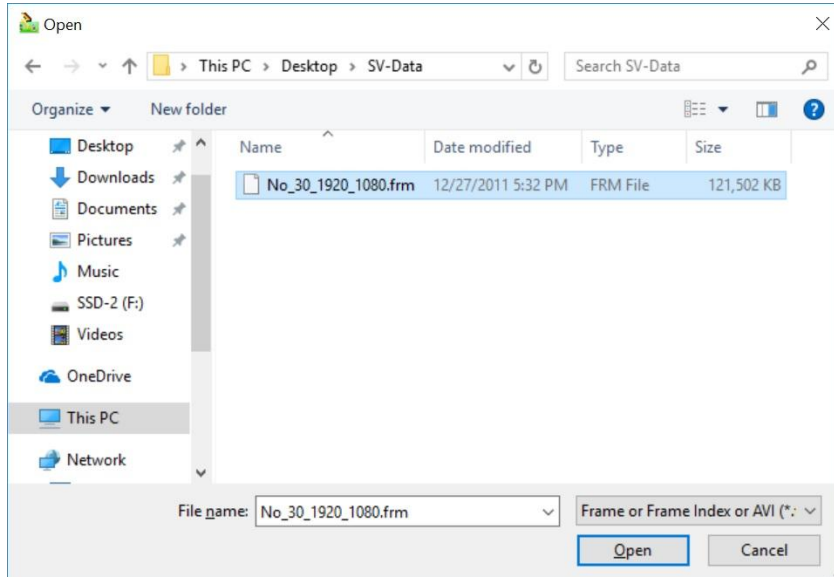
- The viewplayspeed is an integer that specifies the FPS value. At 30fps, specify 30.

③When you're done, click the OK button.

※You can change the file options even after loading the data file. In that case, click the "OK" button and then perform a re-analysis of the image data based on the file option setting.

## 8.5. Read Data file

- ① Click "File" → "Open" or click the  icon on the toolbar.
- ② The Open File dialog box appears, and then select the appropriate file.

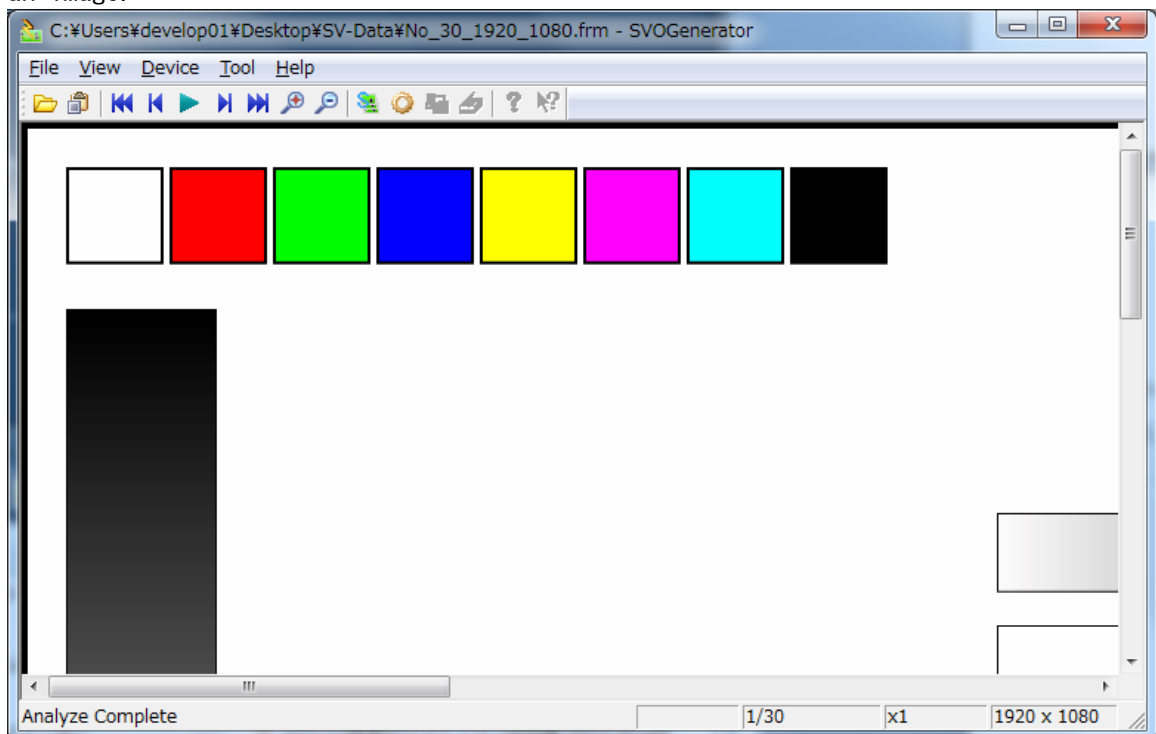


※If you open a file other than the file created in SVI, your application may behave erratically.

In that case, close the application again and start again. Open the file with the extension ".frm", ".frm", and ".avi".


※For AVI files, the supported color spaces are "YUY2", "UYVY", "DIB ". There is no compression only support.

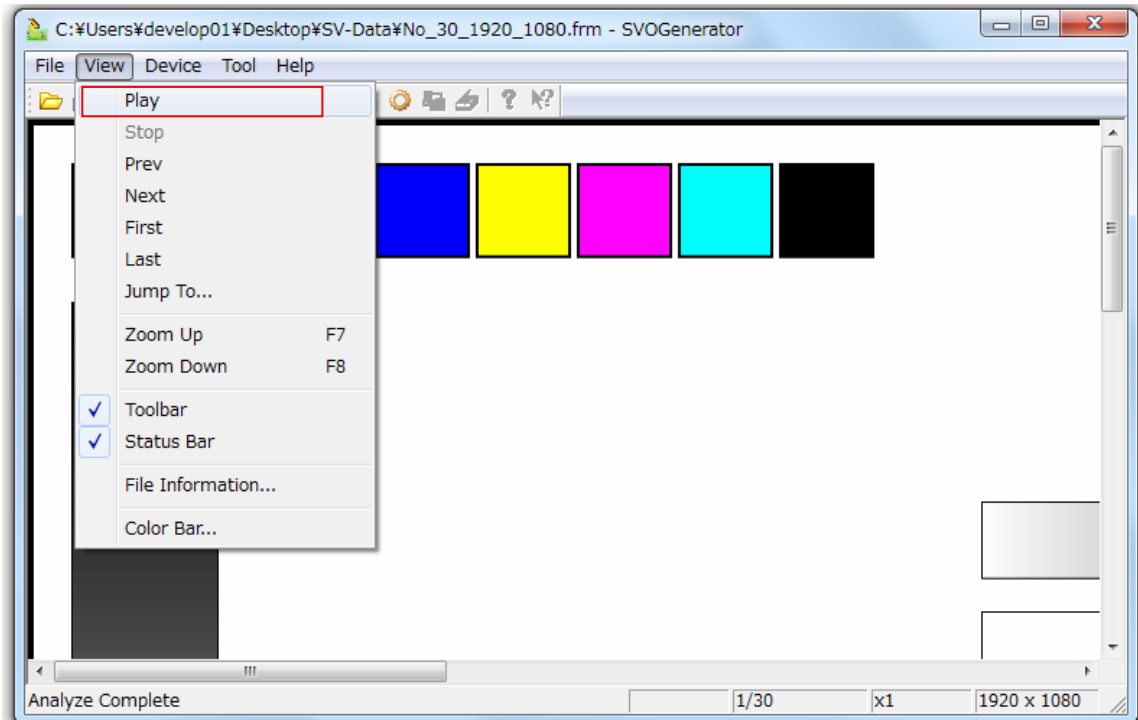
- ③ Analyze the data based on the File option setting. When you're finished, you'll see an image.



- ※If the analysis completes successfully, the status bar displays "Analyze Complete."  
If the analysis is prematurely terminated, the status bar will display "Analyze Incomplete"
- ※If the color is incorrect in YUV system, please try to change the order in File-option.


## 8.6. Data Confirmation

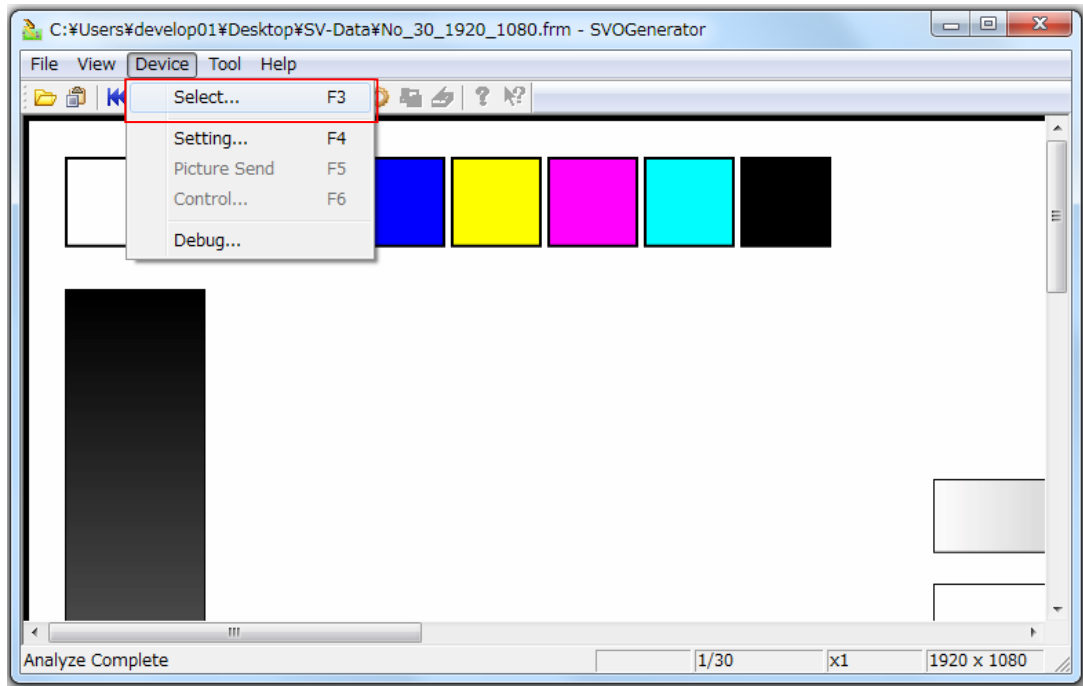
- ① Select "View" → "Play" or the  icon on the toolbar to check the data one frame at a time.



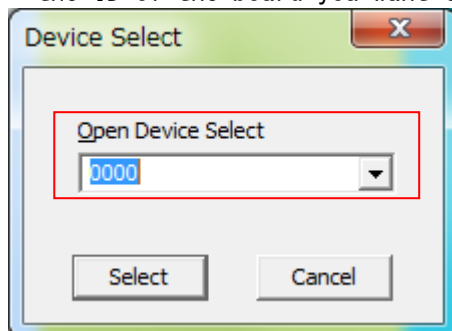
- ② The status bar shows the current frame number and image size, so please refer to it as appropriate during playback.
- ② If you want to check the frame of the image data while skipping "View" → "Jump to" If you want to check the color of the image data, see "View" → "Color Bar" If you want to see the header information for a file, check "view" → "file info". For more information on the status bar and dialogs, see SVOGenerator Help.

## 8.7. SVO Board Selection

①Click "Device" → "Select" or press the "F3" on the keyboard, or the  icon on the toolbar.

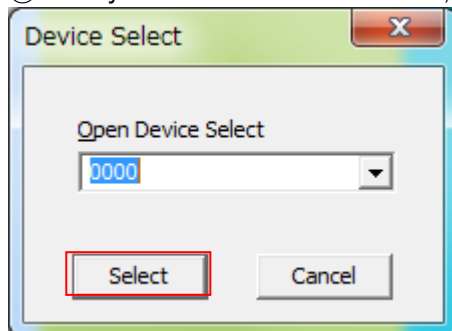


②The "Device Select" dialog will appear. The identification ID of the SVO board that is currently connected to the USB port is displayed in the drop-down list, so select the ID of the board you want to control.



※The ID that is displayed depends on the SVO board connected to the USB port.


③Once you have selected the ID, press the "select" button.

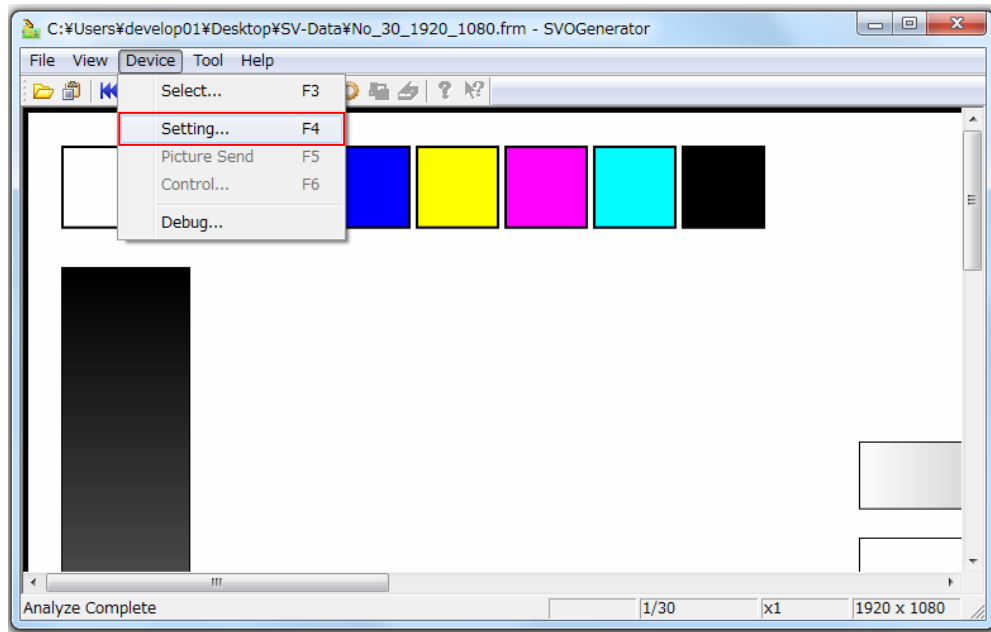


This is the end of the device selection.

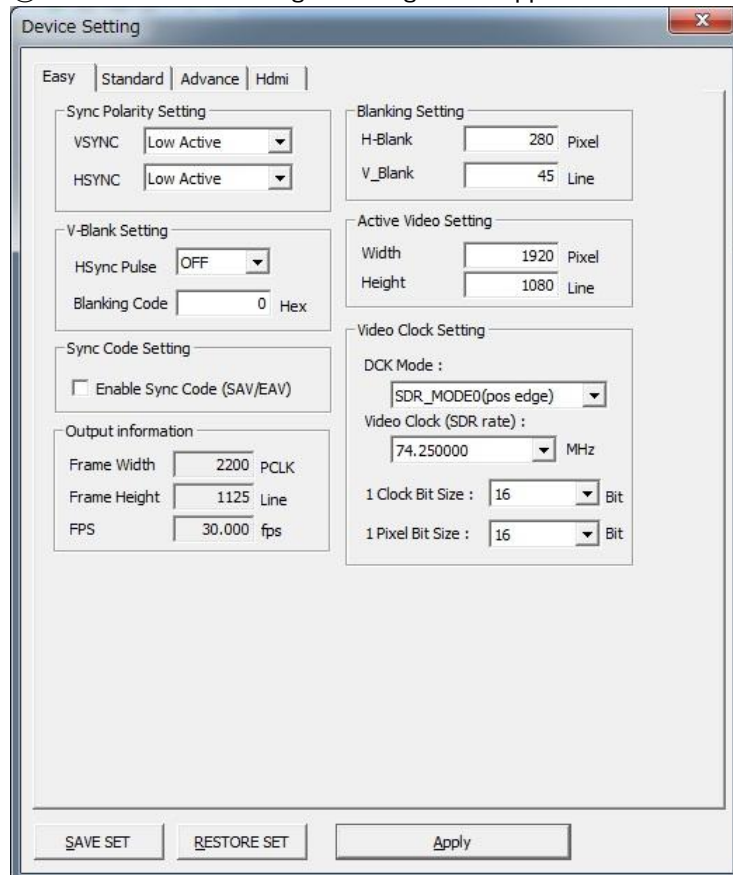


## 8.8. SVO Board Setting information creation

①Click "Device" → "setting" or "F4" on the keyboard or click the  icon on the toolbar.



②The "Device Setting" dialog will appear. Set each setting item.

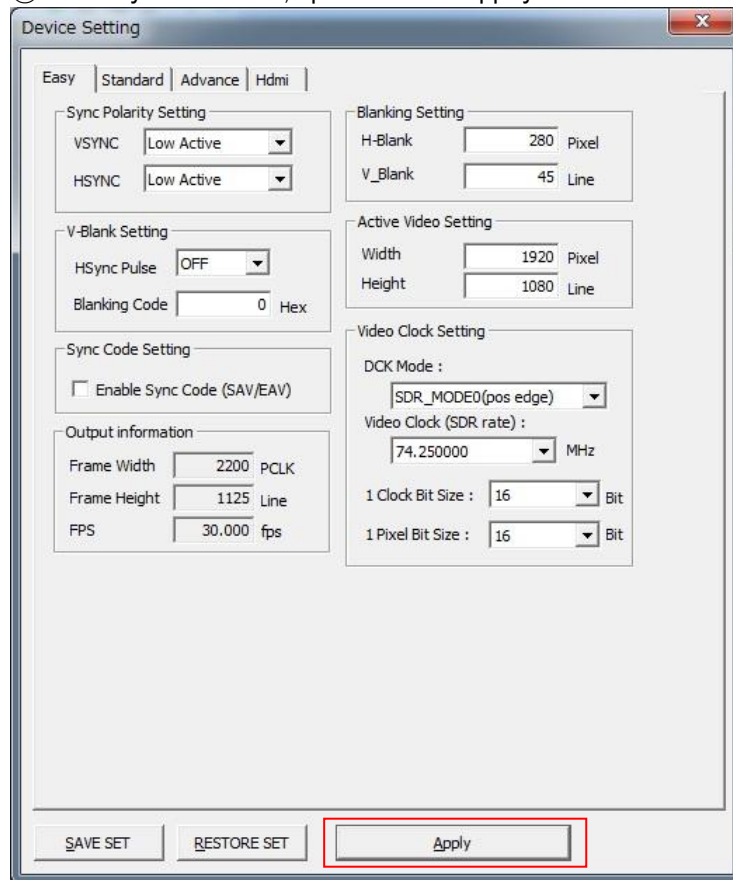


※For the above settings, see "13.device setting Details".

※The "SAVE SET" button allows you to save the current device setting contents to any file.


※The "RESTORE SET" button can read any device setting file.

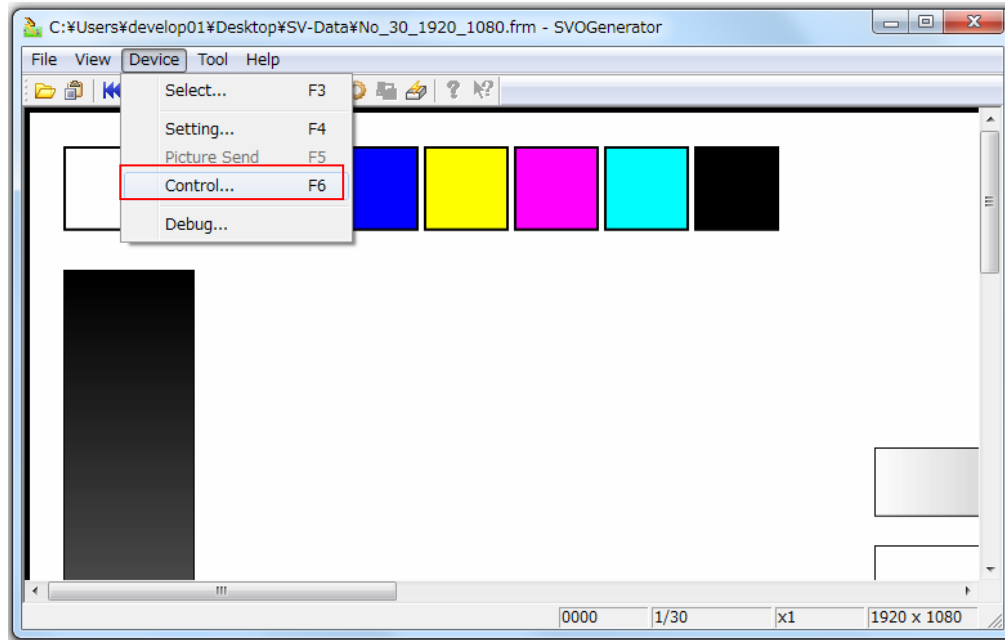
④ When you're done, press the "Apply" button.



This is the end of the setup.

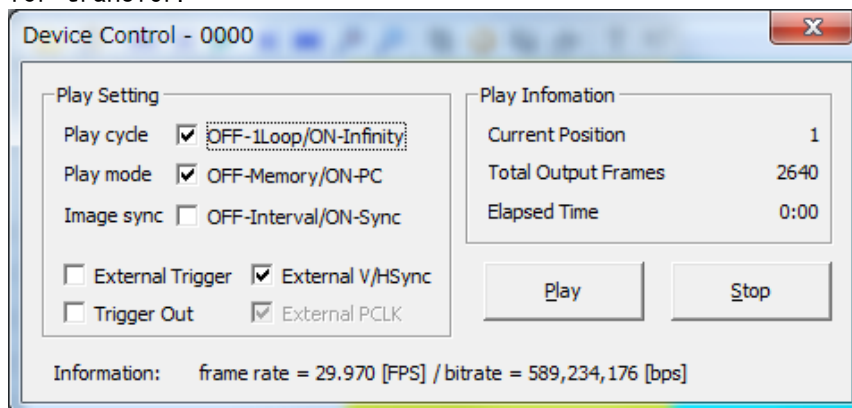
## 8.9. SVO Board Operation

①Click "Device" → "Control", or press F6 on the keyboard, or the  icon on the toolbar.

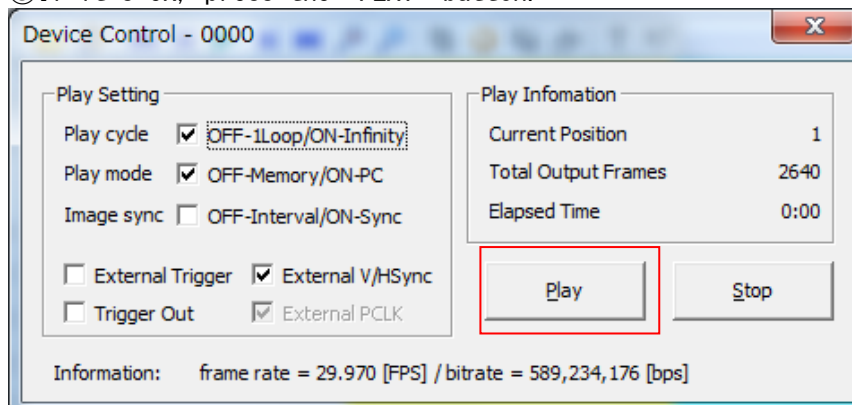


When the Device-control dialog appears, it forwards the frame of the minute that enters the SDRAM first.

②When the "Device Control" dialog opens and the play button is enabled, it is ready for transfer.



③If it's OK, press the "PLAY" button.



- ④When the transfer begins, the Play button is disabled and the Current position is counted up to totaloutputframes. You can exit by pressing the "STOP" button during the transfer. Once all the files have been transferred, the "Play" button is turned on again.

#### 8.10. Device Control – Play Setting

- Play cycle : Set to output only one cycle or output in an infinite cycle.

Output only one cycle at off, infinite cycle at on

- Play mode : Sets whether to output only the memory in the board, or to transfer the image from the PC.

Memory output in the off board, sequential output from PC in the on

- Image sync : The image of the PC side screen is updated every second at the same time as the output.

It does not update it when it is off, and updates it on.

- External Trigger : Image output start trigger input is enabled.

- External V/Hsync : The output is done using the V/Hsync signal of the external input when the image is output.

- External PCLK : The output is done using the PCLK signal of the external input when the image is output.

- Trigger Out : The image output trigger signal can be output from the SVO board, which is the master of multiple ch simultaneous output.

- Information fps / bps : Calculates and displays the frame rate and the bitrate from the settings.

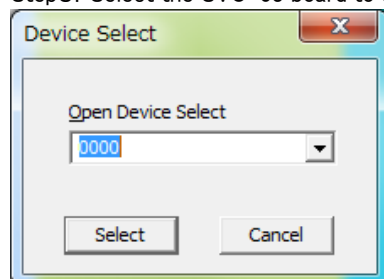
#### 8.11. SVO-03 Board Firmware Update method

Update the firmware on the SVO-03 board.

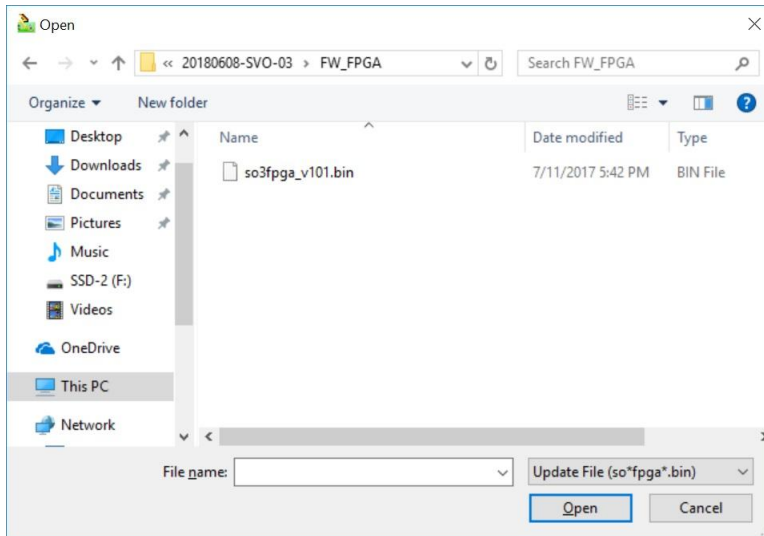
Step 1. Connect the SVO-03 board to the PC and turn on the SVO-03 board.

Step2. Start SVOGenerator.exe.

Step3. Select the SVO-03 board to update by clicking Select on the Device menu.

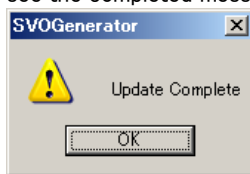


Step4. Click on firmware Update on the tool menu.



Step5. The file selection dialog is displayed, so select the so3fpga\_v101.bin and click the Open button.

Step6. The mouse cursor changes to an hourglass. After a while, the Hourglass will return to the arrow and you will see the completed message below.



Step7. Click the OK button to exit SVOGenerator.

Step8. Disconnect the SVO-03 board from the PC and turn it off.

**注意：Firmware updates and FPGA updates cannot be run consecutively.**

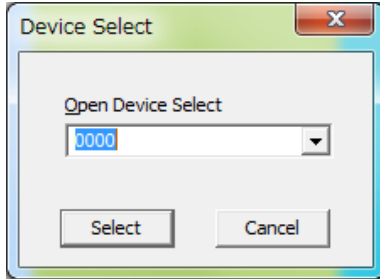
## 8.12. SVO-03 Board FPGA Update method

SVO-03 Board FPGA update.

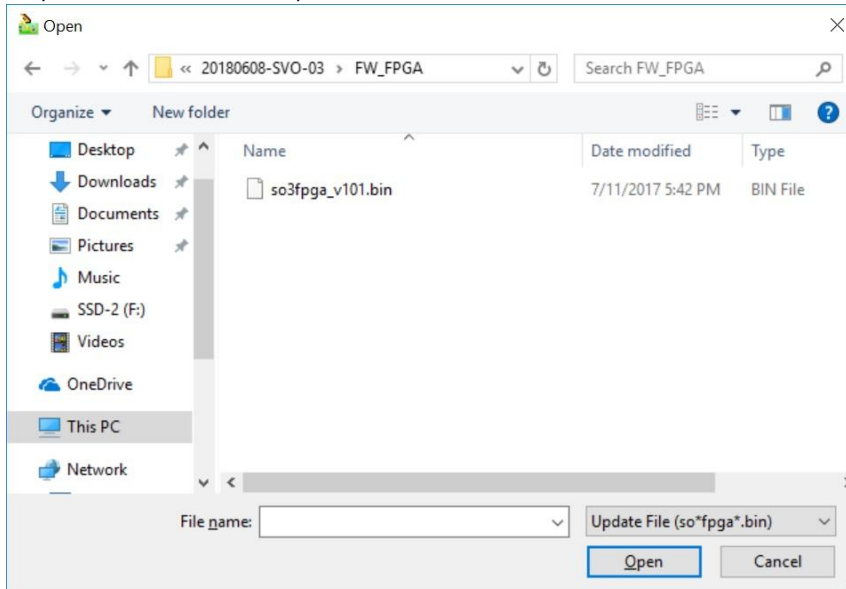
Step 1. Connect the SVO-03 board to the PC and turn on the SVO-03 board.

Step2. Start SVOGenerator.exe.

Step3. Select the SVO-03 board to update by clicking Select on the Device menu.

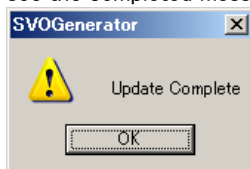


Step4. Click on the FPGA Update on the tool menu.



Step5. The file selection dialog is displayed, so select the so0fpgaxxx.bin and click the Open button.

Step6. The mouse cursor changes to an hourglass. After a while, the Hourglass will return to the arrow and you will see the completed message below.



Step7. Click the OK button to exit SVOGenerator.

Step8. Disconnect the SVO-03 board from the PC and turn it off.

**注意：Firmware updates and FPGA updates cannot be run consecutively.**



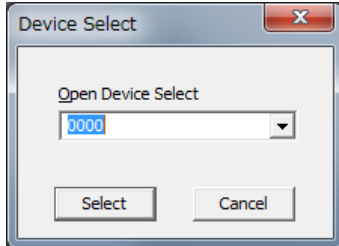
## 8.13. SVO-03 Board Multi-Update method

The SVO-03HDMI board updates the board with a multi-update.

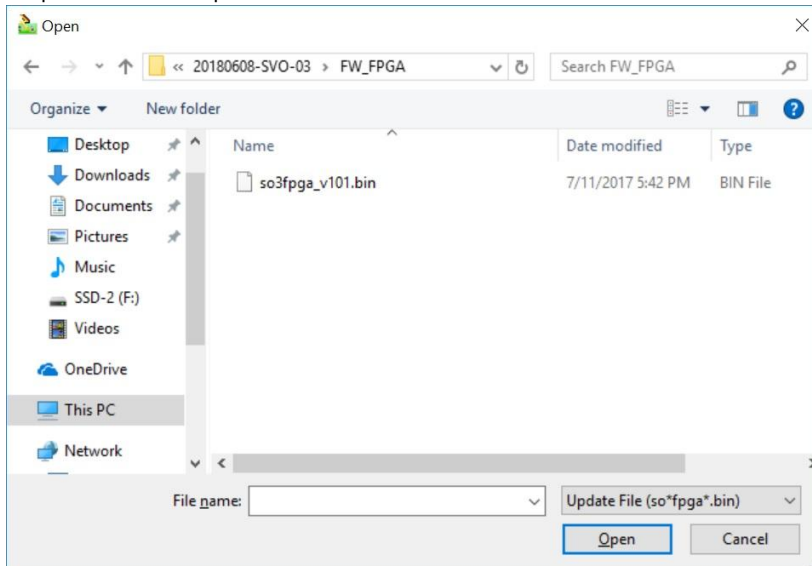
Step1. Connect the SVO-03 board to the PC and turn on the SVO-03 board. **DSW7 turn it off.**

Step2. Start SVOGenerator.exe.

Step3. Select the SVO-03 board to update by clicking Select on the Device menu.

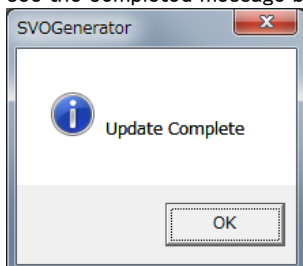


Step4. Click Multi Update on the tool menu.



Step5. The file selection dialog appears, click the Open button to select so3mxxx.bin.

Step6. The mouse cursor changes to an hourglass. After a while, the Hourglass will return to the arrow and you will see the completed message below.



Step7. Click the OK button to exit SVOGenerator.

Step8. Disconnect the SVO-03 board from the PC and turn it off.

## 9. SVO board LED lighting status

See SVO-03 hardware specifications.

## 10. Application Error Message list

Errors may occur during image output or other processing. The application displays a message box if an error occurs and notifies the user of an error. After the error occurs, the process is terminated according to the processing. The following table lists error messages, error factors, and workarounds.

## 10.1. Application Error

Item number	1
Error messages	Device UnOpened
Error content	SVO Board Open process failed
Causes of error	<ul style="list-style-type: none"> <li>• The SVO board is turned off.</li> <li>• SVO Board Anomaly</li> <li>• The application is not aware of the board.</li> </ul>
The solution	1. Exit the application once and turn the SVO board off 2. Turn on the board and re-launch the application

Item number	2
Error messages	Play Failure (The second line of the dialog also shows the SVOAPI error)
Error content	Failed to send data from the SVO device
Causes of error	<ul style="list-style-type: none"> <li>• The SVO board is performing the processing</li> <li>• The application is not aware of the board.</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• To wait for the SVO board to finish processing</li> </ul> If the above cannot be dealt with, the action of item number 1 is performed.

Item number	3
Error messages	Shared Memroy UnOpen
Error content	SVO memory data and memory space for image display cannot be secured.
Causes of error	Lack of virtual memory space
The solution	Increase virtual memory space

Item number	4
Error messages	File Open Failure
Error content	File Open failed
Causes of error	<ul style="list-style-type: none"> <li>• The specified file cannot be opened.</li> <li>• The specified file has already been opened in another application.</li> <li>• The file cannot be found in the specified path</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• If you are using a file, quit using</li> <li>• Set the correct file path</li> </ul>

Item number	5
Error messages	Update Incomplete
Error content	Failed to update FPGA or firmware
Causes of error	<ul style="list-style-type: none"> <li>• The SVO device cannot open</li> <li>• The SVO board is performing the processing</li> <li>• Invalid file data</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• To terminate the SVO board processing</li> <li>• Check the file</li> </ul>

Item number	6
Error messages	Not Data Analyze
Error content	Data analysis not finished
Causes of error	<ul style="list-style-type: none"> <li>• Not getting data</li> <li>• File data cannot be parsed</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• Get the data</li> <li>• Check the file</li> </ul>

Item number	7
Error messages	Not Selected Device
Error content	SVO Board not selected
Causes of error	Not making the SVO board selection in the settings
The solution	Select the SVO board

Item number	8
Error messages	Not Idol
Error content	The SVO board is performing the processing
Causes of error	The SVO board is performing the processing
The solution	To wait for the SVO board to finish processing Perform a workaround for item number 1

## 10.2. SVOAPI Error

Item number	9
Error messages	Win32API Error (More information about the error on the second line)
Error content	Windows API Error
Causes of error	See more information
The solution	See more information

Item number	1 0
Error messages	Connect No Device or Power Off
Error content	The SVO board is not connected to the USB or is not turned on.
Causes of error	<ul style="list-style-type: none"> <li>• The SVO board is not connected to the USB</li> <li>• The SVO board is not turned on.</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• Verify that SV0USB20 is recognized in Device Manager</li> <li>• To connect the SVO board</li> <li>• Turn on the SVO board</li> </ul>

Item number	1 1
Error messages	Device Multi Open
Error content	Trying to open multiple SVO boards.
Causes of error	<ul style="list-style-type: none"> <li>• Trying to open multiple SVO boards.</li> <li>• Trying to open double against one SVO board.</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• Check for Double Open</li> <li>• Make sure you are not trying to open multiple SVO boards in one application</li> </ul>

Item number	1 2
Error messages	Device UnOpened
Error content	The SVO board is not open
Causes of error	Trying to process a non-open SVO board.
The solution	<ul style="list-style-type: none"> <li>• To open the SVO board</li> <li>• Close the Control dialog and select Control on the menu.</li> </ul>

Item number	1 3
Error messages	Parameter Incorrect
Error content	Abnormal configuration parameters
Causes of error	Wrong setting parameters
The solution	Checking configuration parameters

Item number	1 4
Error messages	FW Update TimeOut
Error content	Firmware update failed
Causes of error	<ul style="list-style-type: none"> <li>• The SVO board is performing the processing</li> <li>• Invalid file data</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• To terminate the SVO board processing</li> <li>• Check the file</li> </ul>

Item number	1 5
Error messages	FPGA Update TimeOut
Error content	FPGA update failed
Causes of error	<ul style="list-style-type: none"> <li>• The SV0 board is performing the processing</li> <li>• Invalid file data</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• To terminate the SV0 board processing</li> <li>• Check the file</li> </ul>

Item number	1 6
Error messages	Image Data Not Stored In SV0
Error content	The memory of the SV0 board does not store any data.
Causes of error	The memory of the SV0 board does not store any data.
The solution	Transfer data to the SV0 board

Item number	1 7
Error messages	Command Busy
Error content	The SV0 board is performing the processing
Causes of error	The SV0 board is performing the processing
The solution	To wait for the SV0 board to finish processing

Item number	1 8
Error messages	Command Incorrect
Error content	Sent a non-specified command to the SV0 board
Causes of error	Sent a non-specified command to the SV0 board
The solution	Check Send Command

Item number	1 9
Error messages	Paramater Incorrect
Error content	Command parameter incorrect
Causes of error	<ul style="list-style-type: none"> <li>• Wrong command parameter value</li> <li>• Command parameter values are different</li> </ul>
The solution	<ul style="list-style-type: none"> <li>• Checking command parameters</li> </ul>

Item number	2 0
Error messages	Command Not Supported
Error content	Sent a non-specified command to the SV0 board
Causes of error	Sent a non-specified command to the SV0 board
The solution	Check Send Command

Item number	2 1
Error messages	Not Idol
Error content	The SV0 board is performing the processing
Causes of error	The SV0 board is performing the processing
The solution	To wait for the SV0 board to finish processing Perform a workaround for item number 1

## 11. Limitations

Item number	Limitations	Workaround
1	If you check "Sync" in the "Device Control" dialog, the SVOGenerator screen will display the image in the SVO board data output, but the screen display will be delayed for the SVO output data.	•Make it a high-performance PC. ( There is no underlying workaround because it is a processing delay)
2	When you check "Sync" in "Device Control" dialog and display "File Option" dialog or "Device Setting" dialog during "PLAY", it will appear on the back of the main window	If you want to display the "File Option" or "Device Setting" dialog, press the "ALT" key on the keyboard to bring it to the front.
3	"Win32API Error" occurs when you perform a SVO board-related operation, such as "Device Select", and subsequent access to the SVO board becomes abnormal.	Exit the SVOGenerator and turn off the SVO board. Then turn on the SVO board and start the SVOGenerator.
4	If the "Device Setting" setting is different from the information in the image being analyzed, the SVO board may behave abnormally.	Avoid using settings that cause abnormal behavior
5	If the SVO board behaves abnormally during "PLAY" operation in the "Device Control" dialog, the Stop button will not work.	Exit the SVOGenerator and turn off the SVO board. Then turn on the SVO board and start the SVOGenerator.
6	You receive an "Not Support" error message when you specify an AVI file in File-open ".	※For AVI files, the supported color spaces are "YUY2", "UYVY", "DIB ". It is also uncompressed support only.

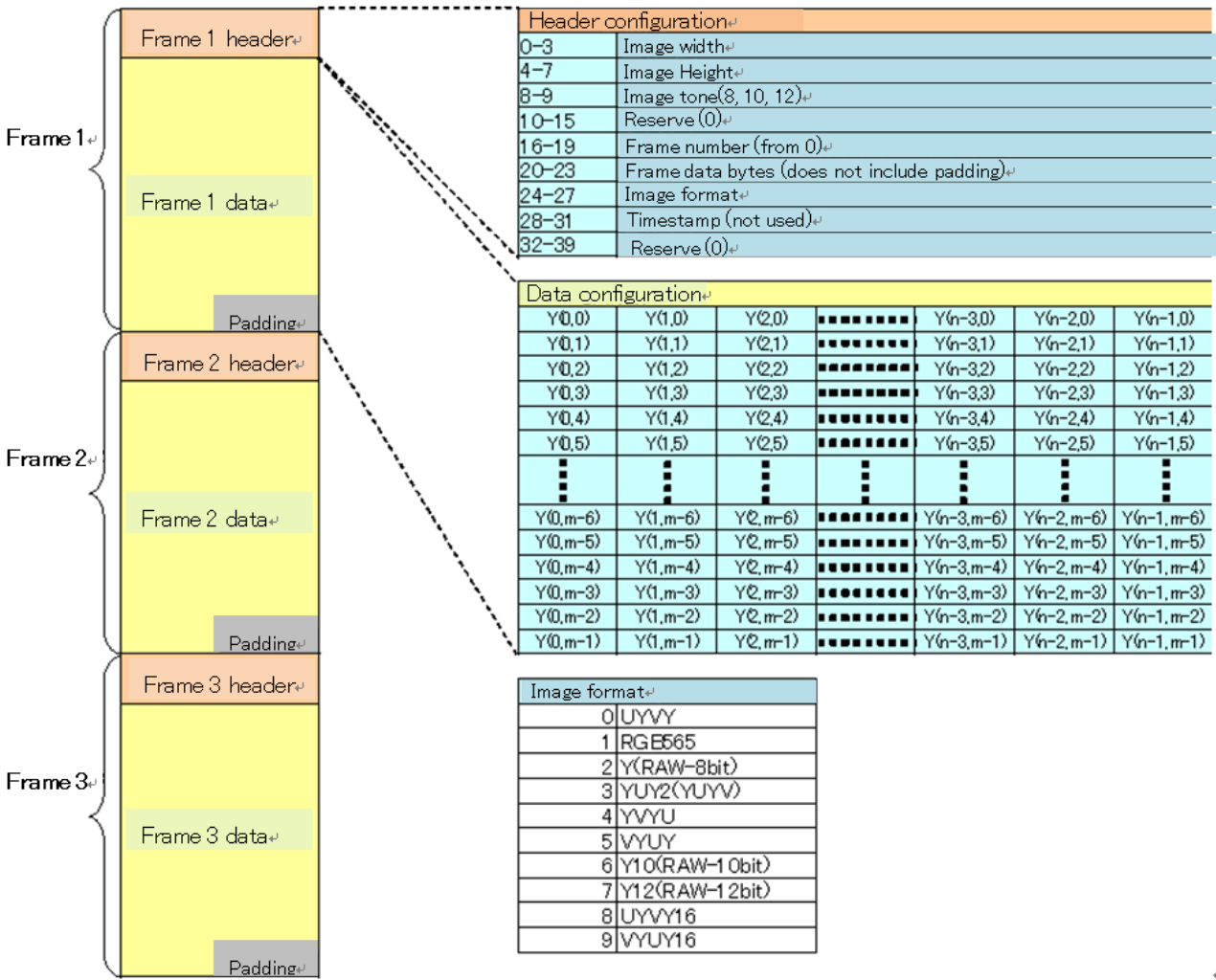


12. Image data formats in frm format

The corresponding image data in the SVO system is general AVI format or the FRM format created by the SVI system.

The FRM format is the data output from the camera module or image sensor, with a 40-byte header appended to each frame. The header is recorded at the beginning of the frame. The data part records the output from the camera. However, the padding data is appended so that the number of bytes in the frame portion is divisible by 64.

The following are the details of the FRM format image File format:



Example) dump the top 112 bytes of FRM format data at Raw-10bit																	
	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F	0123456789ABCDEF
0000:0000	B4	02	00	00	07	02	00	00	0A	00	00	00	00	00	00	00	Header
0000:0010	00	00	00	00	00	F6	0A	00	06	00	00	00	8C	00	00	00	.....
0000:0020	00	00	00	00	00	00	00	00	0E	00	BE	00	FE	00	BE	00	.....
0000:0030	7E	00	7E	00	7E	00	BE	00	FE	01	BE	01	BE	00	BE	00	.....
0000:0040	FE	00	BE	00	3E	00	7E	00	FE	00	FE	00	BE	00	BE	00	Data
0000:0050	FE	00	3E	00	BE	00	FE	00	7E	01	3E	01	FE	00	BE	01	.....
0000:0060	7E	01	FE	01	FE	00	FE	00	BE	00	FE	00	FE	00	BE	00	.....

The image has 10-bit, 12-bit, 16-bit bytes, and is big-endian.

The FRM file has a limit of 2GB, so if it is more than one FRM file, then use the FRMT file to manage it. The FRMT file is a text format that records the FRM file name with an absolute path.

Example) if you have two FRM files in a folder called Data under C drive

```
C:¥Data¥data0001.frm
```

```
C:¥Data¥data0002.frm
```

Because the FRMT file is in text format, you can edit it in a text editor such as Notepad. Even if there are only two FRM files, it is possible to output for a long time by selecting multiple lines of the same FRM file as follows. The output will be output in the order as described in the FRMT file.

Example) if you have two FRM files in a folder called Data under C drive, and you copy the same file three times to respond to long-term output

```
C:¥Data¥data0001.frm
```

```
C:¥Data¥data0002.frm
```

```
C:¥Data¥data0001.frm
```

```
C:¥Data¥data0002.frm
```

```
C:¥Data¥data0001.frm
```

```
C:¥Data¥data0002.frm
```

```
C:¥Data¥data0001.frm
```

```
C:¥Data¥data0002.frm
```

### 13. Device Setting Details

Describes the "Device Setting" dialog that appears in the "Device"-"Setting" menu. In this dialog, you can select and set four different settings depending on the tab page switching.

It is a tab enclosed in the red frame of the figure below (Easy), but it is possible to set four kinds.

Easy : Set the image size and one blank area (X-blank).

Standard : Set the image size and three blank areas (SYNC, FP, BP).

Advance : Make a fine setting for the PCLK unit.

Hdmi : Set up to operate as a SVO-03HDMI version.

[SAVE SET], [RESTORE SET], [Apply] buttons correspond to the current Tappage.

The screenshot shows the "Device Setting" dialog box with the "Easy" tab selected. The dialog is organized into several sections:

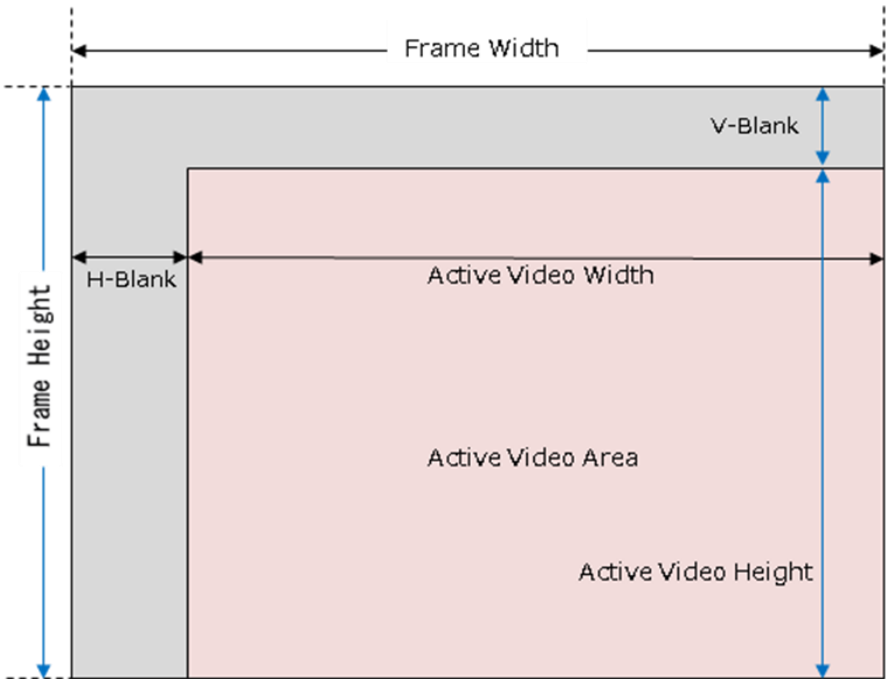
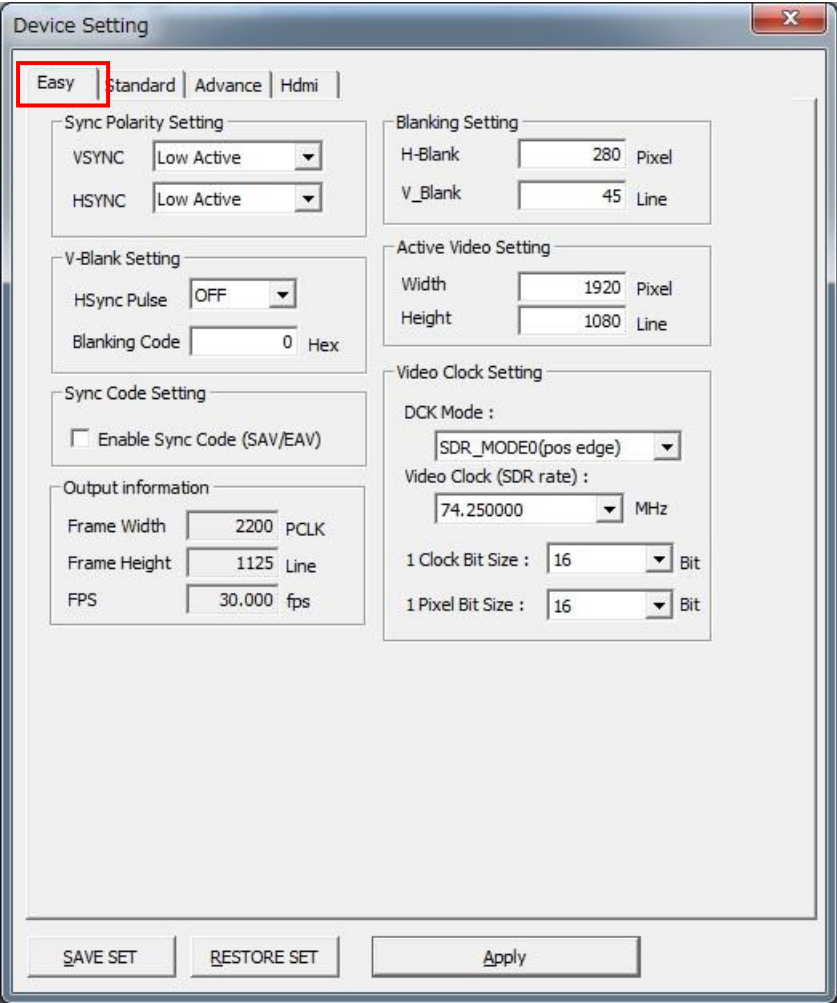
- Sync Polarity Setting:** VSYNC and HSYNC are both set to "Low Active".
- Blanking Setting:** H-Blank is 280 Pixel, and V\_Blank is 45 Line.
- V-Blank Setting:** HSync Pulse is OFF, and Blanking Code is 0 Hex.
- Active Video Setting:** Width is 1920 Pixel, and Height is 1080 Line.
- Sync Code Setting:** The checkbox for "Enable Sync Code (SAV/EAV)" is unchecked.
- Output information:** Frame Width is 2200 PCLK, Frame Height is 1125 Line, and FPS is 30.000 fps.
- Video Clock Setting:** DCK Mode is SDR\_MODE0(pos edge), Video Clock (SDR rate) is 74.250000 MHz, 1 Clock Bit Size is 16 Bit, and 1 Pixel Bit Size is 16 Bit.

At the bottom of the dialog are three buttons: "SAVE SET", "RESTORE SET", and "Apply".

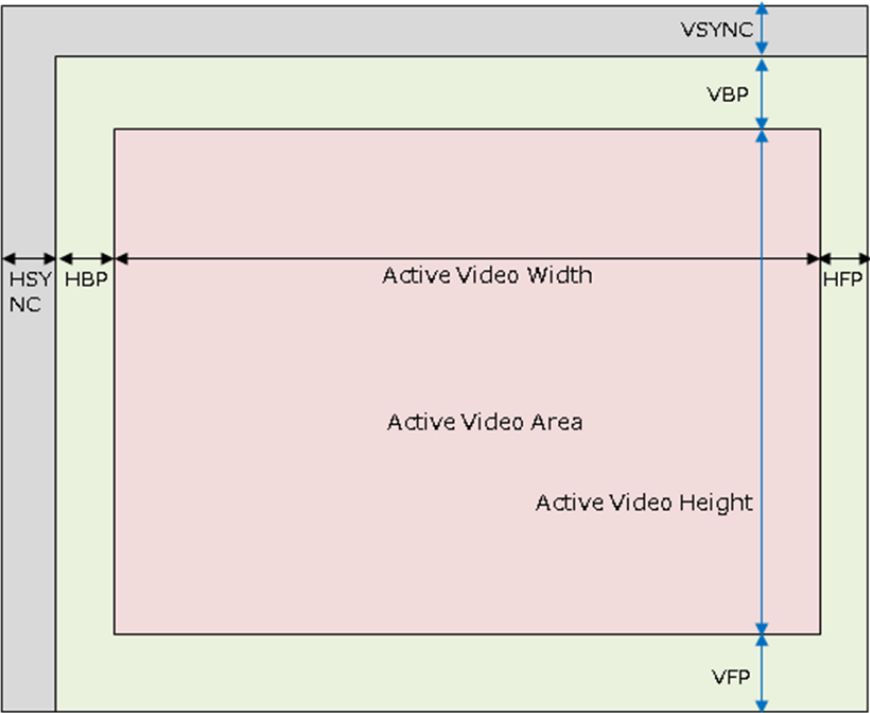
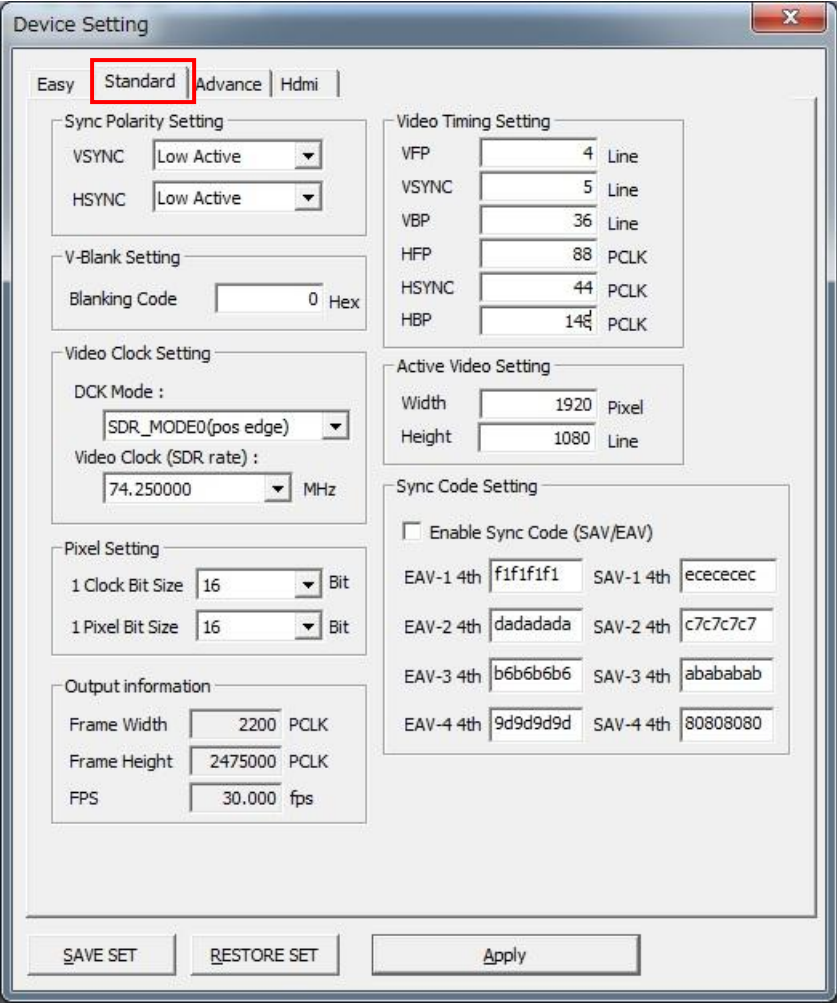
The following pages show the dialog and output images from the settings on the Easy tab,

the Standad tab, the Advance tab, and the HDMI tab.

Settings and output images in the Easy tab: FullHD, YUV, 16bit output



Settings and output images in the Standard tab: FullHD, YUV, 16bit output



Settings and output images in the Advance tab: FullHD, YUV, 16bit output

**Device Setting**

Easy | Standard | **Advance** | Hdmi

**Sync Polarity Setting**

VSYNC: Low Active  
HSYNC: Low Active

**V-Blank Setting**

Blanking Code: 0 Hex

**Video Clock Setting**

DCK Mode: SDR\_MODE0(pos edge)  
Video Clock (SDR rate): 74.250000 MHz

**Pixel Setting**

1 Clock Bit Size: 16 Bit  
1 Pixel Bit Size: 16 Bit  
8bit Output Mode: D0-D7

**Output information**

Frame Width: 2200 PCLK  
Frame Height: 2475000 PCLK  
FPS: 30.000 fps

**Video Timing Setting**

VSSP: 11000 PCLK  
VSPP: 2464000 PCLK  
HSSP: 44 PCLK  
HSPP: 2156 PCLK  
HSIP: 44 PCLK  
HSPR: 1125 Repeat  
DESP: 90392 PCLK  
DEPP: 1920 PCLK  
DEIP: 280 PCLK  
DEPR: 1080 Repeat

**Active Video Setting**

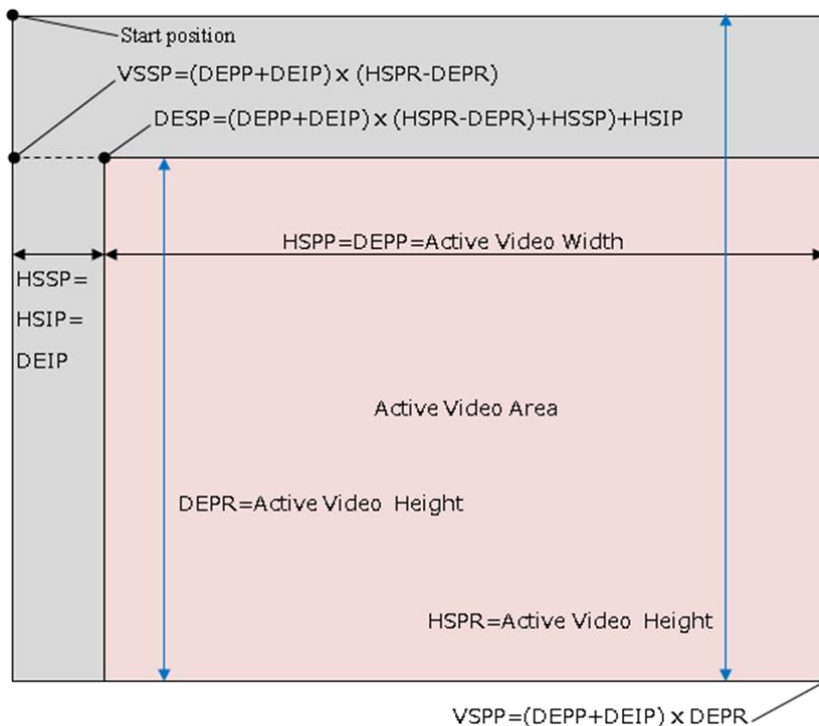
Width: 1920 PCLK  
Height: 1080 Line

**Sync Code Setting**

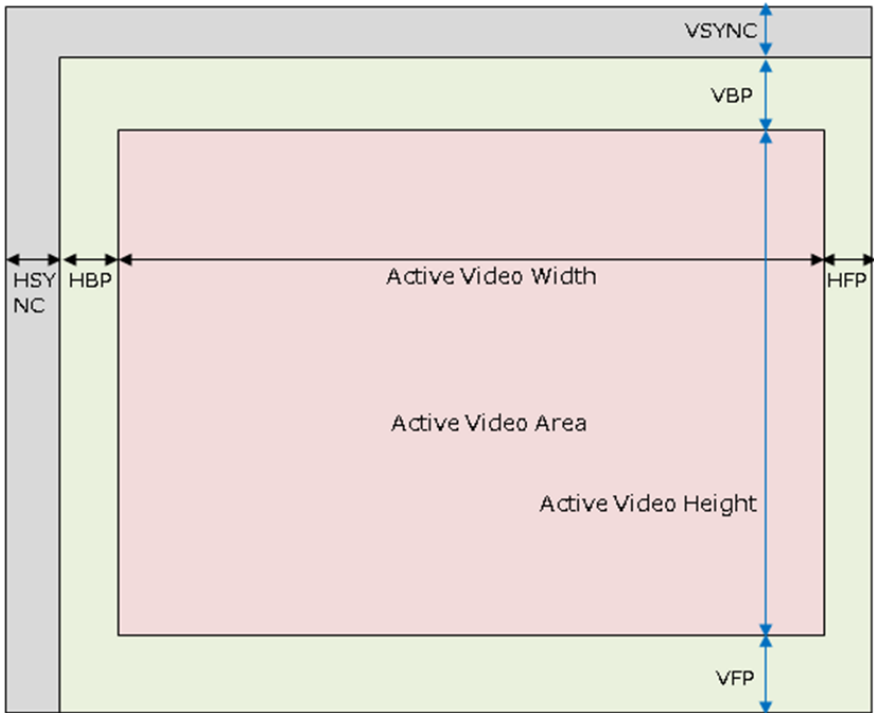
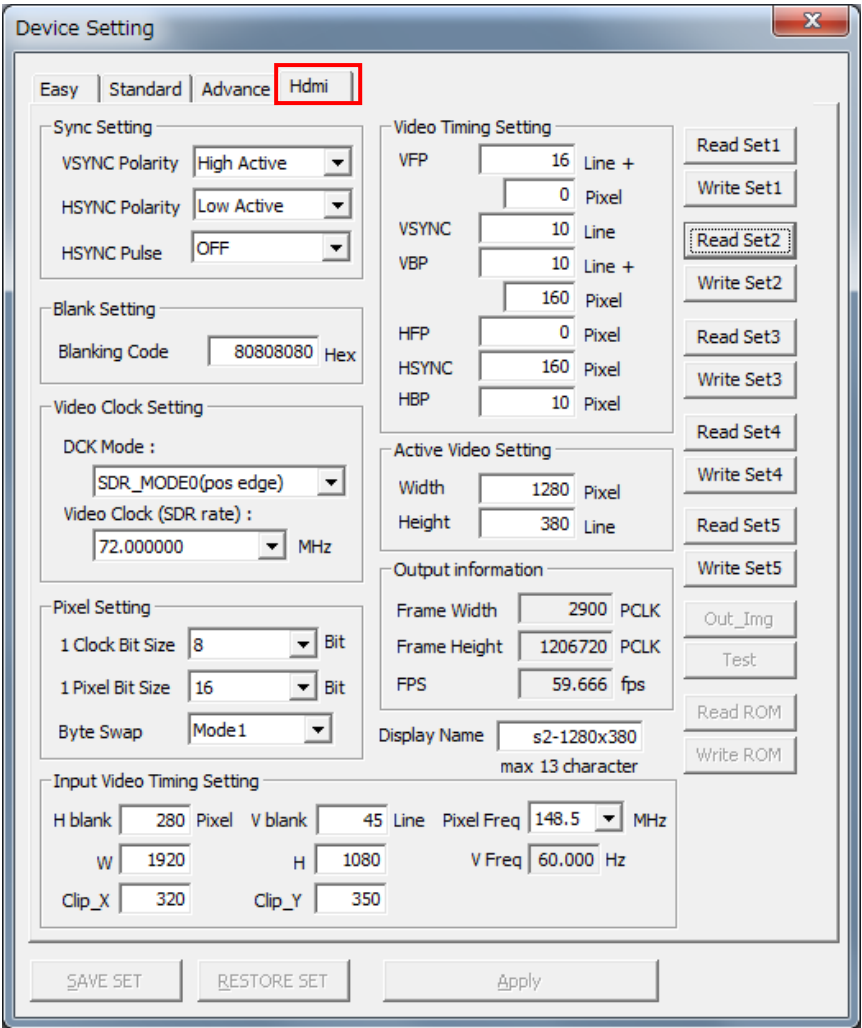
☐ Enable Sync Code (SAV/EAV)

EAV-1 4th: f1f1f1f1 SAV-1 4th: ecececec  
EAV-2 4th: dadadada SAV-2 4th: c7c7c7c7  
EAV-3 4th: b6b6b6b6 SAV-3 4th: abababab  
EAV-4 4th: 9d9d9d9d SAV-4 4th: 80808080

SAVE SET | RESTORE SET | Apply

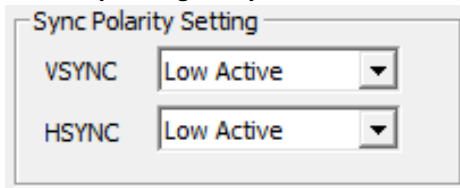


Settings and output images in the Hdmi tab: FullHD, YUV, 16bit output





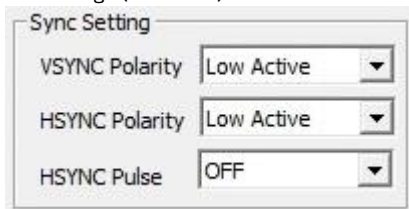
## 13.1. Sync Polarity Setting (Easy tab, Standard tab, Advance tab)



VSYNC : You can specify the polarity of the VSync sync period. Low active and high active can choose.

HSYNC : You can specify the polarity of the HSync sync period. Low active and high active can choose.

## 13.2. Sync Setting (Hdmi tab)

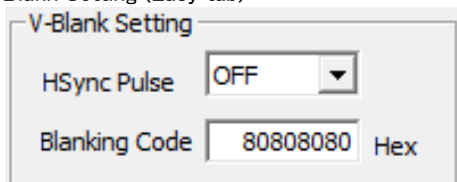


VSYNC Polarity : You can specify the polarity of the VSync sync period. Low active and high active can choose.

HSYNC Polarity : You can specify the polarity of the HSync sync period. Low active and high active can choose.

HSYNC Pulse : It can be set to generate a Hsync pulse during V blank.

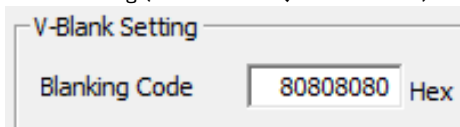
## 13.3. V-Blank Setting (Easy tab)



HSync Pulse : It can be set to generate a Hsync pulse during V blank.

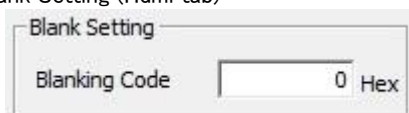
Blanking Code : You can set the data for V blank and H blank period.

## 13.4. V-Blank Setting (Standard tab, Advance tab)



Blanking Code : You can set the data for V blank and H blank period.

## 13.5. Blank Setting (Hdmi tab)



Blanking Code : You can set the data for V blank and H blank period.

### 13.6. Video Clock Setting (Easy tab)

Video Clock Setting

DCK Mode :  
SDR\_MODE0(pos edge)

Video Clock (SDR rate) :  
74.250000 MHz

1 Clock Bit Size : 16 Bit

1 Pixel Bit Size : 16 Bit

DCK Mode : Sets the DCK (Video Clock) that the SV0-03 outputs.

Video Clock Setting

DCK Mode :  
SDR\_MODE0(pos edge)

Video Clock (SDR rate) :  
74.250000 MHz

1 Clock Bit Size : 16 Bit

1 Pixel Bit Size : 16 Bit

SDR\_MODE0(pos edge)  
SDR\_MODE1(neg edge)  
DDR\_MODE0(0)  
DDR\_MODE1(180)  
DDR\_MODE2(-90)  
DDR\_MODE3(+90)

DCK mode allows you to select six types as shown above.

For more information, see "11 SDR/DDR mode settings" in the SV0-03 hardware specification.

Video Clock (SDR rate) : Sets the video clock frequency at SDR rate.

Video Clock Setting

DCK Mode :  
SDR\_MODE0(pos edge)

Video Clock (SDR rate) :  
74.250000 MHz

1 Clock Bit Size : 16 Bit

1 Pixel Bit Size : 16 Bit

27.000000  
36.000000  
48.000000  
54.000000  
72.000000  
74.250000  
84.000000  
94.500000  
148.500000  
2.700000  
98.182500

If there is no frequency you want to use, please contact us.

1 Clock Bit Size : Sets the image data bus width per clock. 8, 16, 24, 32 can be set. If set to 8, it means that the D0-D7 8 bits of the data output bus are valid on a single pixel clock. If set to 16, it means that the D0-D15 16 bits of the data output bus are valid on a single pixel clock.

If set to 32, it means that the D0-D31 32 bits of the data output bus are valid on a single pixel clock. The YUV output is 2 pixels in one clock. The CN5 10pin header must also be implemented because the CN5 is used when outputting at 32 bits.

If set to 24, it means that the D0-D23 24 bits of the data output bus are valid on a single pixel clock. Because it is RGB24 only, it is necessary to implement the CN5 10pin header because it uses CN5 when outputting it.

If the AVI file (DIB-uncompressed) is set to 24.

1 Pixel Bit Size : Sets the number of bits to make up one pixel to match the image format.  
8, 10, 12, 16, 24 are configurable.

If set to 8, it means that 1 pixel is 8 bits. (RAW8)

If set to 10, it means that 1 pixel is 10 bits. (RAW10)

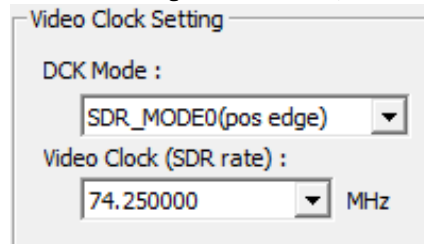
If set to 12, it means that one color component is 12 bits. (RAW12)

If set to 16, it means that one color component is 16 bits. (YUV, RGB565)

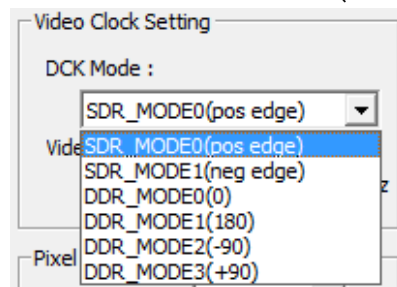
If set to 24, it means that one color component is 24 bits. (RGB24)

If the AVI file (DIB-uncompressed) is set to 24.

### 13.7. Video Clock Setting (Standard tab, Advance tab, Hdmi tab)



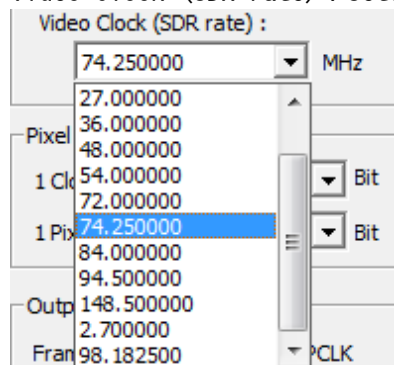
DCK Mode : Sets the DCK (Video Clock) that the SV0-03 outputs.



DCK mode allows you to select six types as shown above.

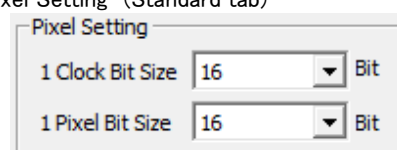
For more information, see "11 SDR/DDR mode settings" in the SV0-03 hardware specification.

Video Clock (SDR rate) : Sets the video clock frequency at SDR rate.



If there is no frequency you want to use, please contact us.

### 13.8. Pixel Setting (Standard tab)



1 Clock Bit Size : Sets the image data bus width per clock. 8, 16, 24, 32 can be set.

If set to 8, it means that the D0-D7 8 bits of the data output bus are valid on a single

pixel clock. If set to 16, it means that the D0-D15 16 bits of the data output bus are valid on a single pixel clock.

If set to 32, it means that the D0-D31 32 bits of the data output bus are valid on a single pixel clock. The YUV output is 2 pixels in one clock. The CN5 10pin header must also be implemented because the CN5 is used when outputting at 32 bits.

If set to 24, it means that the D0-D23 24 bits of the data output bus are valid on a single pixel clock. Because it is RGB24 only, it is necessary to implement the CN5 10pin header because it uses CN5 when outputting it.

If the AVI file (DIB-uncompressed) is set to 24.

1 Pixel Bit Size : Sets the number of bits to make up one pixel to match the image format. 8, 10, 12, 16, 24 are configurable.

If set to 8, it means that 1 pixel is 8 bits. (RAW8)

If set to 10, it means that 1 pixel is 10 bits. (RAW10)

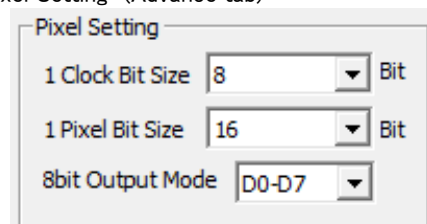
If set to 12, it means that one color component is 12 bits. (RAW12)

If set to 16, it means that one color component is 16 bits. (YUV、RGB565)

If set to 24, it means that one color component is 24 bits. (RGB24)

If the AVI file (DIB-uncompressed) is set to 24.

### 13.9. Pixel Setting (Advance tab)



1 Clock Bit Size : Sets the image data bus width per clock. 8, 16, 24, 32 can be set. If set to 8, it means that the D0-D7 8 bits of the data output bus are valid on a single pixel clock. If set to 16, it means that the D0-D15 16 bits of the data output bus are valid on a single pixel clock.

If set to 32, it means that the D0-D31 32 bits of the data output bus are valid on a single pixel clock. The YUV output is 2 pixels in one clock. The CN5 10pin header must also be implemented because the CN5 is used when outputting at 32 bits.

If set to 24, it means that the D0-D23 24 bits of the data output bus are valid on a single pixel clock. Because it is RGB24 only, it is necessary to implement the CN5 10pin header because it uses CN5 when outputting it.

If the AVI file (DIB-uncompressed) is set to 24.

1 Pixel Bit Size : Sets the number of bits to make up one pixel to match the image format. 8, 10, 12, 16, 24 are configurable.

If set to 8, it means that 1 pixel is 8 bits. (RAW8)

If set to 10, it means that 1 pixel is 10 bits. (RAW10)

If set to 12, it means that one color component is 12 bits. (RAW12)

If set to 16, it means that one color component is 16 bits. (YUV、RGB565)

If set to 24, it means that one color component is 24 bits. (RGB24)

If the AVI file (DIB-uncompressed) is set to 24.

8bit Output Mode : Set the output to CD0-CD7 or CD8-CD15 of the CN4 connector when the 8bit output. Output to CD0-CD7 in the D0-D7 setting and output to CD8-CD15 in the D8-D15 setting.

## 13.10. Pixel Setting (Hdmi tab)

Pixel Setting

1 Clock Bit Size: 8 Bit

1 Pixel Bit Size: 16 Bit

Byte Swap: Mode1

1 Clock Bit Size : Sets the image data bus width per clock. 8, 16, 24, 32 can be set. If set to 8, it means that the D0-D7 8 bits of the data output bus are valid on a single pixel clock. If set to 16, it means that the D0-D15 16 bits of the data output bus are valid on a single pixel clock.

If set to 32, it means that the D0-D31 32 bits of the data output bus are valid on a single pixel clock. The YUV output is 2 pixels in one clock. The CN5 10pin header must also be implemented because the CN5 is used when outputting at 32 bits.

If set to 24, it means that the D0-D23 24 bits of the data output bus are valid on a single pixel clock. Because it is RGB24 only, it is necessary to implement the CN5 10pin header because it uses CN5 when outputting it.

If the AVI file (DIB-uncompressed) is set to 24.

1 Pixel Bit Size : Sets the number of bits to make up one pixel to match the image format. 8, 10, 12, 16, 24 are configurable.

If set to 8, it means that 1 pixel is 8 bits. (RAW8)

If set to 10, it means that 1 pixel is 10 bits. (RAW10)

If set to 12, it means that one color component is 12 bits. (RAW12)

If set to 16, it means that one color component is 16 bits. (YUV, RGB565)

If set to 24, it means that one color component is 24 bits. (RGB24)

If the AVI file (DIB-uncompressed) is set to 24.

Byte Swap : Specifies the method of swapping the Byte Allinment of the data signal.

Mode0 : Output "D3d2d1d0" as "D3d2d1d0" (For YUV, "Y0UY1V" output)

Mode1 : Output "D3d2d1d0" as "D2d3d0d1" (For YUV, "UY0VY1" output)

Mode2 : Output "D3d2d1d0" as "D3d0d1d2" (For YUV, "Y0VY1U" output)

Mode3 : Output "D3d2d1d0" as "D0d3d2d1" (For YUV, "VY0UY1" output)

## 13.11. Sync Code Setting (Easy tab)

Sync Code Setting

☐ Enable Sync Code (SAV/EAV)

Enable Sync Code : Set whether to append SAV/EAV code. When checked, it adds. The fourth byte of SAV/EAV code to be added when checked is shown below.

EAV-1 4th	f1f1f1f1	SAV-1 4th	ecececec
EAV-2 4th	dadadada	SAV-2 4th	c7c7c7c7
EAV-3 4th	b6b6b6b6	SAV-3 4th	abababab
EAV-4 4th	9d9d9d9d	SAV-4 4th	80808080

## 13.12. Sync Code Setting (Standard tab, Advance tab)

Sync code setting can be set to append SAV/EAV code to both ends of active video. When you check "Enable Sync Code (SAV/EAV)", you can output it by adding SAV/EAV codes. In this case, the VSYNC/HSYNC sync code will be output. EAV-[1-4] 4th, SAV-[1-4] The fourth edit box allows you to specify your own synchronization code. By default, the above code is outputted.

## 13.13. Output information (Easy tab)

Frame width Displays the number of horizontal video clocks in a frame.  
 Frame height Displays the number of lines in the entire frame.  
 FPS Displays the output frame rate.

## 13.14. Output information (Standard tab, Advance tab, Hdmi tab)

Frame width Displays the number of horizontal video clocks in a frame.  
 Frame height Displays the total number of video clocks per frame.  
 FPS Displays the output frame rate.

## 13.15. Blanking Setting (Easy tab)

H-Blank : Sets the horizontal blanks by the number of pixels.  
 V-Blank : Sets the vertical blanks by the number of lines.

13.16. Video Timing Setting (Standard tab)

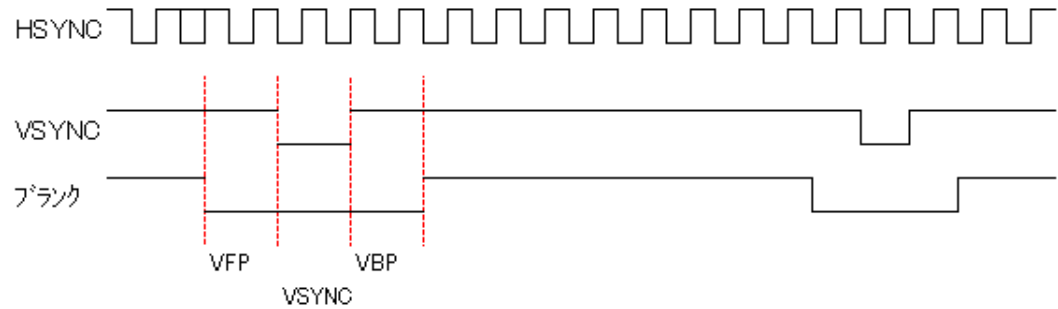
Video Timing Setting

VFP	4	Line
VSYNC	5	Line
VBP	36	Line
HFP	88	PCLK
HSYNC	44	PCLK
HBP	148	PCLK

VFP : Set the vertical front porch by the number of lines.

VSYNC : Sets the vertical synchronization period by the number of lines.

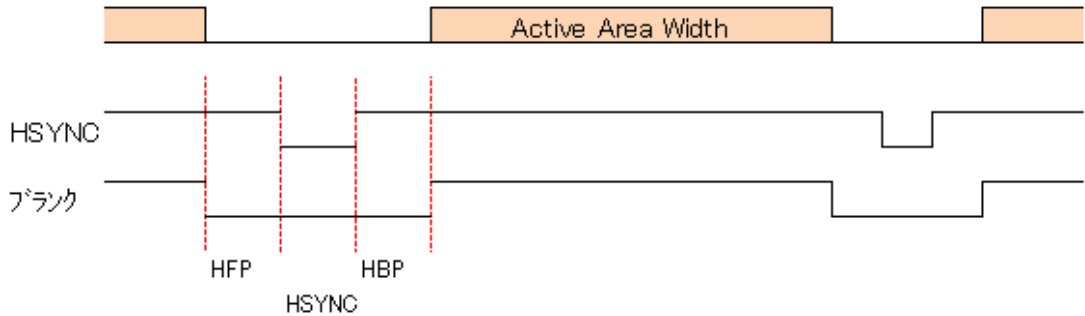
VBP : Sets the vertical back porch by the number of lines.



HFP : Set the horizontal front porch in PCLK number.

HSYNC : Sets the horizontal synchronization period in PCLK number.

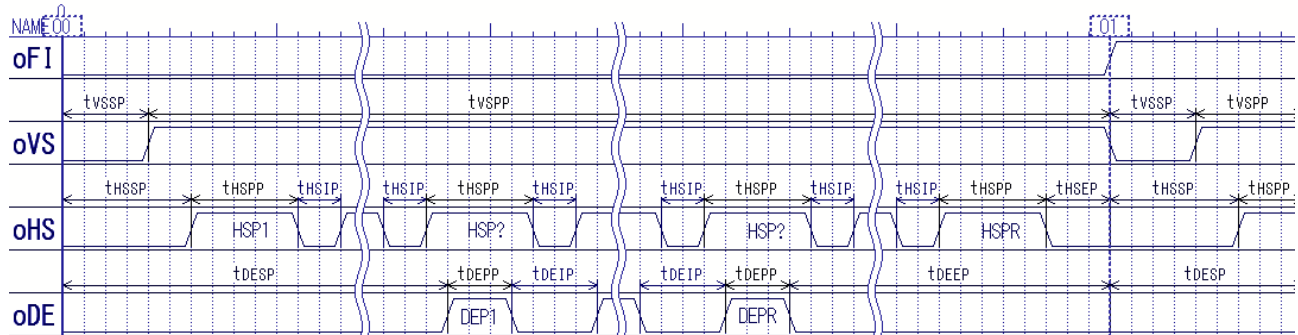
HBP : Set the horizontal back porch in PCLK number.



## 13.17. Video Timing Setting (Advance tab)

Video Timing Setting		
VSSP	11000	PCLK
VSPP	2464000	PCLK
HSSP	44	PCLK
HSPP	2156	PCLK
HSIP	44	PCLK
HSPR	1125	Repeat
DESP	90392	PCLK
DEPP	1920	PCLK
DEIP	280	PCLK
DEPR	1080	Repeat

Sets the video timing to be output. Refer to the timing chart below to set the number of PCLK or repeat numbers in decimal. HSPR becomes the HSP1-HSP?-HSPR of the figure below, and generally sets the number of lines. DEPR will be similar. DEPP, DEPR is the same as the width and height of the active video setting, and this setting automatically updates the active video setting.



## 13.18. Video Timing Setting (Hdmi tab)

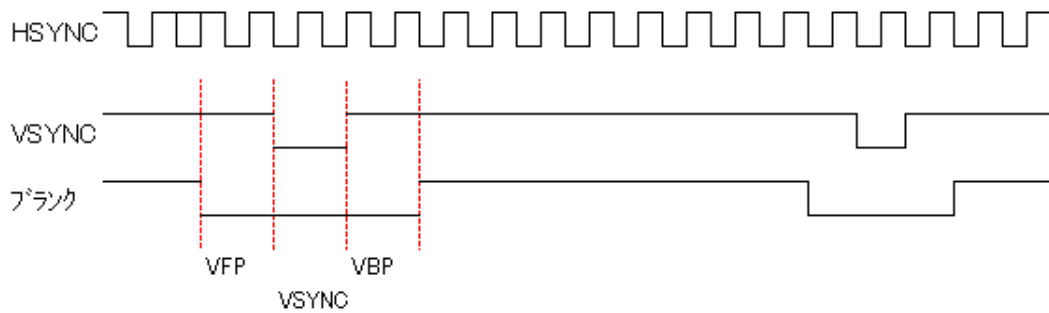
Video Timing Setting		
VFP	4	Line +
	0	Pixel
VSYNC	5	Line
VBP	36	Line +
	0	Pixel
HFP	88	Pixel
HSYNC	44	Pixel
HBP	148	Pixel

VFP : Set the vertical front porch by the number of lines.

VSYNC : Sets the vertical synchronization period by the number of lines.

VBP : Sets the vertical back porch by the number of lines.

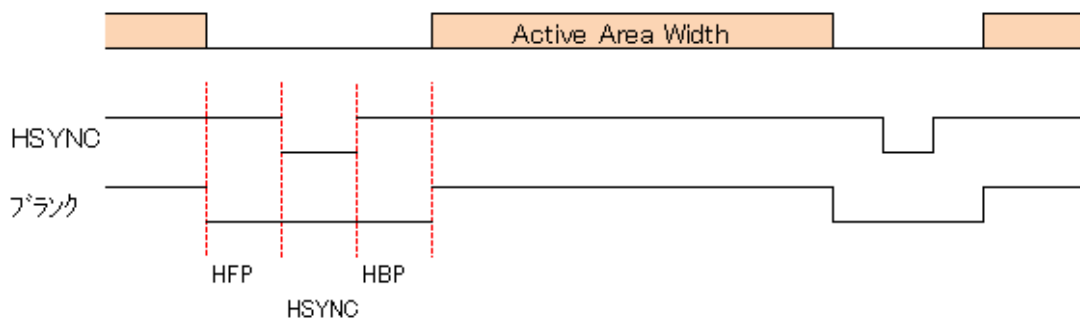




HFP : Set the horizontal front porch in PCLK number.

HSYNC : Sets the horizontal synchronization period in PCLK number.

HBP : Set the horizontal back porch in PCLK number.



#### 13.19. Active Video Setting (Easy tab, Standard tab, Hdmi tab)

Active Video Setting		
Width	1920	Pixel
Height	1080	Line

Set the image size by width (pixels), height (number of lines).

#### 13.20. Active Video Setting (Advance tab)

Active Video Setting		
Width	1920	PCLK
Height	1080	Line

Displays the width (pclk) and height (number of lines) of the image data. The DEPP of the video Timing setting, the same as the DEPR, and the values entered in the DEPP and DEPR are automatically reflected here.

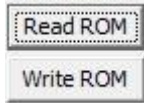
#### 13.21. Output Image / Test (Hdmi tab)

Output Image / Test	
Output Image	Test

Output Image : Displays the waveform image by the value you set. Not currently available.

Test : The value set with DIP Switch 7 turned off is reflected on the board. Because it is not written to the SPI-ROM, the setting is not held on the board when the board is turned off.

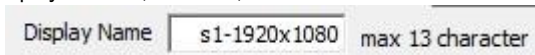
## 13.22. Read ROM / Write ROM (Hdmi tab)



**Read ROM :** From the SPI-ROM on the board, read the previously written settings and display them in the HDMI tab. It becomes available by specifying the board by Device Select.

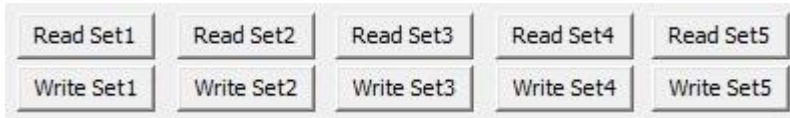
**Write ROM :** Writes the settings in the HDMI tab to the SPI-ROM on the board. It becomes available by specifying the board by Device Select. Because the setting is kept even if the power of the board is turned off, the data can be output without setting it from the PC again when the DIP switch 7 is turned on and the board is started.

## 13.23. Display Name (Hdmi tab)



**Display Name :** You can specify the name of the virtual display created by SVO-03HDMI within 13 characters.

## 13.24. Read Set / Write Set (Hdmi tab)



**Read Set :** Load the settings from the .svo file.

**Write Set :** You can write the setting value to the .svo file. It is possible to write up to five sets.

## 13.25. Input Video Timing Setting (Hdmi tab)

Set the video settings for the HDMI input destination.

H blank : Sets the number of horizontal blanks in pixels. (Even)

V blank : Sets the number of blank lines in the vertical direction.

W : Sets the number of pixels in the horizontal direction. (Even)

H : Sets the number of lines in the vertical direction.

Clip\_X : Sets the horizontal start coordinate for clipping. (Even)

Clip\_Y : Sets the vertical start coordinate for clipping.

Pixel Freq : Select the pixel frequency for the monitor from below.

27MHz、54MHz、72MHz、74.25MHz、108MHz

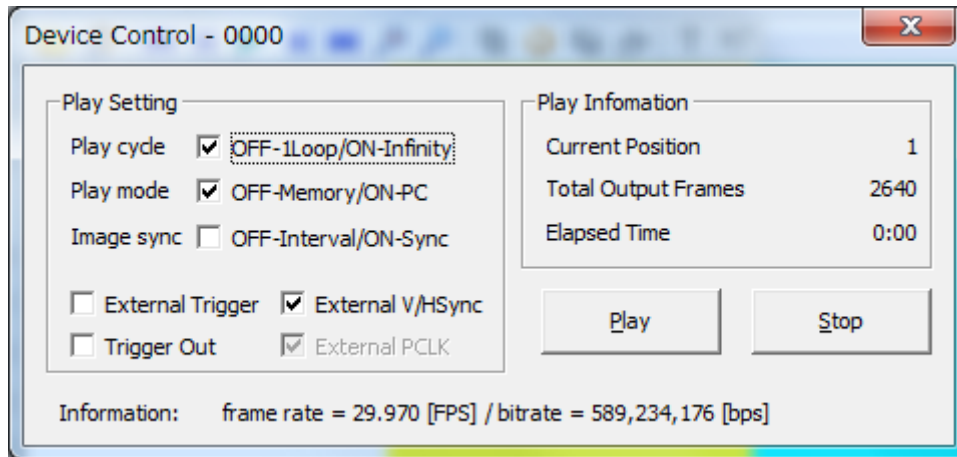
V Freq: Calculates and displays the refresh rate from the width, height, and above settings in the Active Video setting group. If this calculated value is not supported with the HDMI signal output device, the video cannot be received properly.

If you want to clip to an input image from HDMI, set the clip width and clip height in clip\_x, clip\_y, start coordinates, Active Video setting width, height.

If you do not want the clip, clip\_x and clip\_y set it to 0. Naturally, the width and height of the active video setting are the same as the input video Timing setting W and H.

## 14. Device Control Details

Describes the settings and behavior of the "Device Control" dialog that appears in the "Device"-"Control" menu.



### 14.1. Play Setting

In the image output timing set with "Device-Setting", we set the output of each image frame. It also uses an external synchronous output and multiple SVO boards to configure synchronous output.

- "Play cycle" sets whether the imported image file is output as infinite or only once. It outputs it only once by the check off, and it outputs it infinitely by check on.
- "Play mode" sets whether the image data is always sent from the PC or only the image data stored in the memory in the SVO board. When the check is off, the image data stored in the memory in the SVO board is output, and the image data is always sent from the PC when it is checked on. If the image file does not fit in the memory of the SVO board when the check is off, only the amount of memory from the beginning of the image file is stored in memory.
- "Image Sync" sets whether the image display screen is updated during image output. Check off does not update the screen. If checked on, refreshes the screen every second. However, play mode is enabled when it is checked on.
- "External trigger" will enter the external trigger signal connected to the general-purpose input port (P4) of the SVO board and set the image output to start. If check off, outputs without an external trigger. When checked on, the image output by an external trigger is performed.

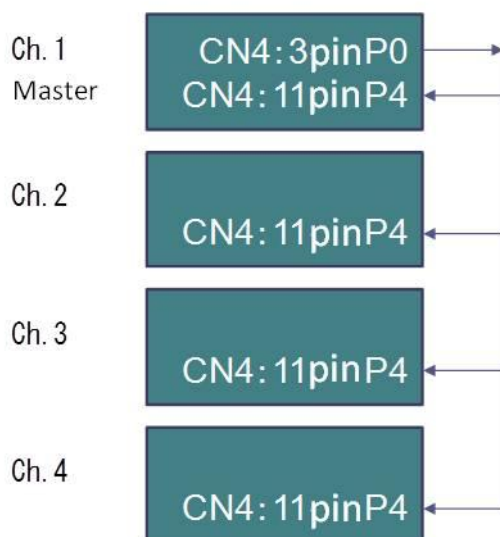
- “External V/hsync” sets the external vsync signal connected to the general-purpose input port (P4, P5) of the SVO board, the external HSync signal, and the image output at the timing of the sync signal entered. Outputs without external V/hsync input when check off. The image output is performed at the external V/hsync timing in case of check on. If this check is on, unconditionally “External PCLK” will also be checked on and can not be selected. VSync, HSync accept each input is the following pin.

- External VSync signal Input pin; Connector4 11pin
- External HSync signal Input pin; Connector4 50pin
- External PCLK signal Input pin; Connector4 9pin

- “External PCLK” will enter the external PCLK signal connected to the general-purpose input port (P3) of the SVO board and set the image output at the timing of the PCLK signal entered. Output without external PCLK input when check off. The image output is done by the external PCLK timing when checking on.

- “Trigger out” sets the output of an external trigger signal connected to the general-purpose output port (P0) of the SVO board. No external trigger output in case of check off. There is an external trigger output in the case of check on. External trigger outputs are used in operations that assume synchronous output from multiple SVO boards. Outputs an external trigger signal from the master SVO board. The external trigger input including the master itself is performed, and the image output is started as an image output start trigger signal input.

## SVO Board



The CN4 3-pin (P0) is an external trigger output signal and the CN4 11 pin (P4) is an external trigger input signal. When synchronizing output is performed on the four SVO

boards shown above, the image output is started as "Extrenal trigger on" in Svogenerator, which controls the SVO board of Ch 4 from Ch 2. Then, the master of CH1 will start the image output with the "Extrenal trigger on", and after 100msec wait, the external trigger output is done. From Ch 1 to Ch 4, the SVO board receives an external trigger input and produces an image output.

- Information fps / bps : Displays the output frame rate and output bit rate.