VSM-200 USER Manual

SUMIT A, B (PCIe) Interface
Video Capture/Software Compression Card

Vecow

1.0.0 Edition 19/04/2012

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Record of Revision

Version	Date	Page	Description	Remark
V1.0.0	March 2012	All	Perliminary Release	

Declaimer

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Declaration of Conformity

FCC This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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Packing List

No.	Photo	Description	Qty
1		VSM-200-4/-8 Capture Card	1
2		VSM-200-4: 16 pin header to D-sub 15 Cable x 1 or VSM-200-8: 16 pin header to D-sub 15 Cable x 2	
3		D-Sub 15 to BNC Cable	1
4		Driver and Software CD	1

Order Information

Part Number	Description
VSM-200-4	4-CH, D1, Real-time, SUMIT(PCIe), 120 fps, Video Capture Card, include cables and SDK
VSM-200-8	8-CH, D1, Real-time, SUMIT(PCIe), 240 fps, Video Capture Card, include cables and SDK

Suggestion Platform

Part Number	Description
EC-5500-5GDE	Fanless Embedded Controller with 5x GbE, 2x DDR3 SODIMM, 2x eSATA, 4x COM, 2x MiniPCI-e, 2x HDD, Isolated DIO, SUMIT (A, B), iAMT 7.0

Table of Contents

1

General Introduction

1.1 Overview

Thank you for your purchase of the VSM-200 video capture card.

The Vecow VSM-200 series, SUMIT™-based, extended temperature 4-CH/8-CH Video/Audio Capture Card, which provides outstanding transferring rate for industrial level systems that require small footprint and steady performance under harsh environments.

Developed by the by the Small Form Factor special Interest Group (SFF-SIG™), VSM-200 series feature the Stackable Unified Module Interconnect Technology (SUMIT) interface. Main concern of solid, high-speed connector technologies is small form factors now days.

In order to minimize the board space, VSM-200 series have closely spaced pins (fine pitch). In addition, the connector system of VSM-200 series can handle PCI Express and USB high-frequency signals.

Using 10-bit video analog-to-digital convers, a full 10-bit video data path, a two dimensional adaptive comb filter for NTSC, PAL and SECAM video for video quality, and ADCs for audio quality, VSM-200 series support the bridging of up to eight channels of digital video and audio from PCIe, and can output these streams over pins in BT.656 or I2S-style interfaces, respectively.

1.2 Product Specification

1.2.1 Specification of Vecow VSM-200-4

General	
Bus Type /Form Factor	SUMIT (PCI Express)
Dimensions(L x H)	90mm x 96mm (3.5" x 3.8")
I/O Connector	1 x 16 pin header to D-Sub 15 cable 1 x D-Sub 15 to BNC cable
Environment Certifications	FCC, CE, RoHS Compliance
Storage Temperature	-40°C to 85°C (-40 °F to 185 °F)
Operate Temperature	-25°C to 70°C (-13 °F to 158 °F)
Video	
Maximum Channel Number	4
Input Connector	4 input BNC
Resolution	D1 (NTSC: 720 x 480 / PAL: 720 x 576) CIF (NTSC: 360 x 240 / PAL: 360 x 288) 4CIF (NTSC: 704 x 480 / PAL: 704 x 576) DCIF (NTSC: 528 x 320 / PAL: 528 x 384) QCIF (NTSC: 180 x 120 / PAL: 180 x 144)
Recording Rate	4CH with full D1 resolution 120 fps on NTSC system, 100 fps on PAL system
Audio	
Maximum Channel Number	4 mono or 2 stereo
Audio Input Connector	4 input RCA
Software	
OS Support	WindowsXP/VISTA/Windows7 (32 Bits or 64 Bits) Standard Linux kernel 2.6.38 and 2.6.33
SDK	VC++ / .NET
Recommend System	
CPU	Intel Core2 Duo E4500 2.2GHz
Memory	1GB
Graphics Unit	DirectX 9.0c compatible display card
Storage Size	500GB

1.2.2 Specification of Vecow VSM-200-8

General	
Bus Type /Form Factor	SUMIT (PCI Express)
Dimensions(L x H)	90mm x 96mm (3.5" x 3.8")
I/O Connector	2 x 16 pin header to D-Sub 15 cable 2 x D-Sub 15 to BNC cable
Environment Certifications	FCC, CE, RoHS Compliance
Storage Temperature	-40°C to 85°C (-40 °F to 185 °F)
Operate Temperature	-25°C to 70°C (-13 °F to 158 °F)
Video	
Maximum Channel Number	8
Input Connector	Channel 1~4: 4 input BNC Channel 5~8: 4 input BNC to D-Sub 15
Resolution	D1 (NTSC: 720 x 480 / PAL: 720 x 576) CIF (NTSC: 360 x 240 / PAL: 360 x 288) 4CIF (NTSC: 704 x 480 / PAL: 704 x 576) DCIF (NTSC: 528 x 320 / PAL: 528 x 384) QCIF (NTSC: 180 x 120 / PAL: 180 x 144)
Recording Rate	8CH with full D1 resolution 240 fps on NTSC system, 100 fps on PAL system
Audio	
Maximum Channel Number	8 mono or 2 stereo
Audio Input Connector	Channel 1~4: 4 input RCA Channel 5~8: 4 input RCA to D-Sub 15
Software	
OS Support	WindowsXP/VISTA/Windows7 (32 Bits or 64 Bits) Standard Linux kernel 2.6.38 and 2.6.33
SDK	VC++ / .NET
Recommend System	
CPU	Intel Core2 GHz Quad Q8400 2.66GHz
Memory	1GB
Graphics Unit	DirectX 9.0c compatible display card
Storage Size	750GB

1.3 System Requirements

Your PC must have the following hardware and software installed to be able to use the VSM-200 series:

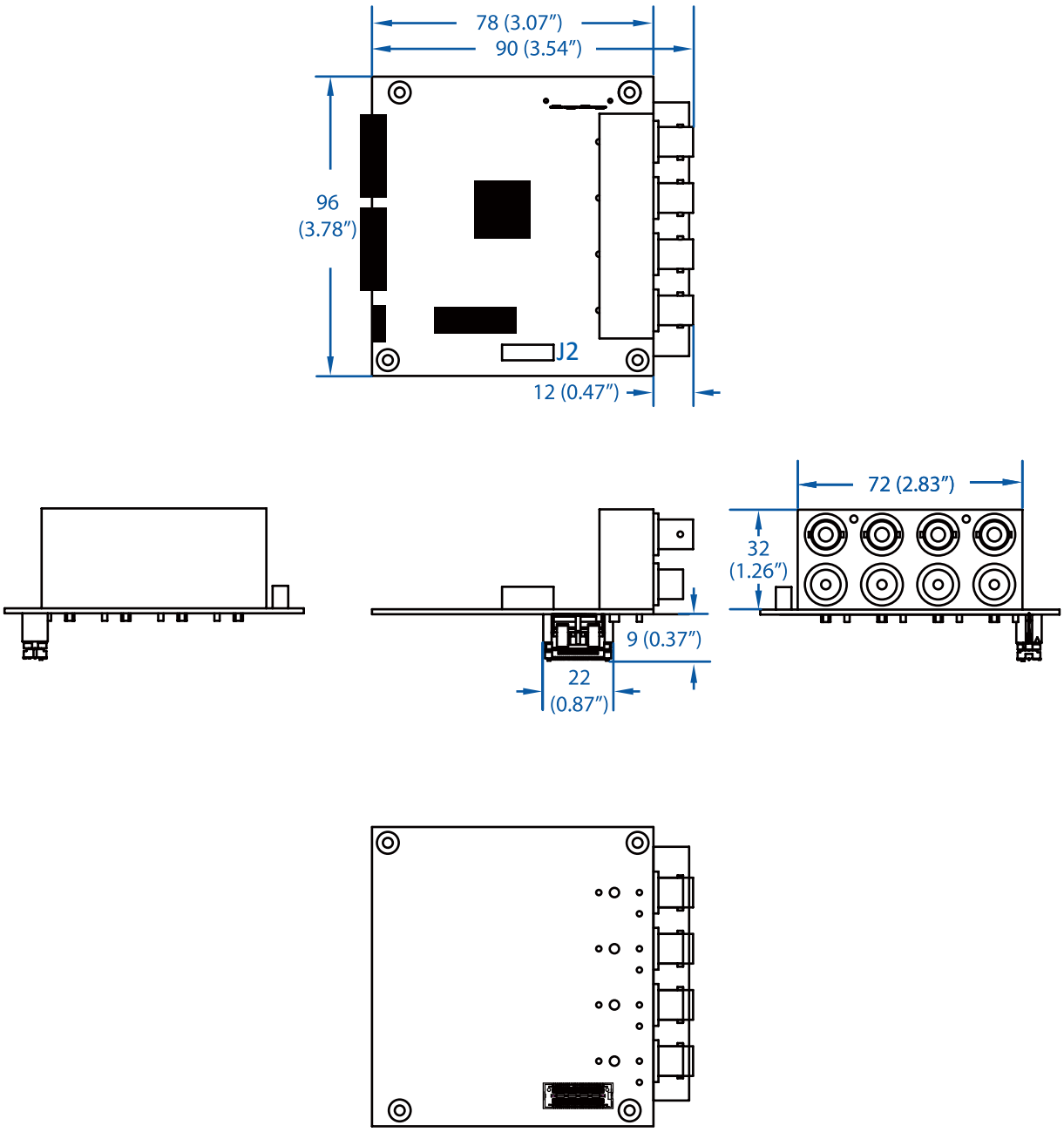
- **Hardware Requiremets**

Item	**VSM-200-4**	**VSM-200-8**
CPU	Intel Core 2 Duo E4500 2.2GHz	Intel Core 2 Quad Q8400 2.66GHz
Memory	DDR2, 1GB	DDR2, 1GB
Graphics Unit	DirectX 9.0c Compatible Display Card	
Storage Size	500 GB	750 GB
Slot/Socket	One Available mini PCI-e 1.1	

- **Software Requirement:**
  Microsoft® Windows 7 or VISTA operating system or above.

1.4 Mechanical Dimension

Unit: mm (inch)



2

Hardware Installation

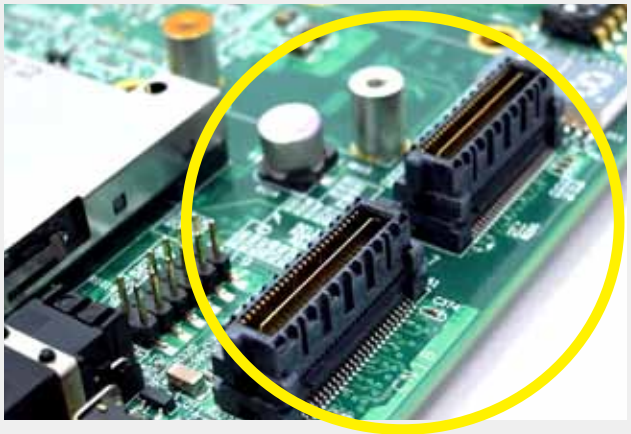
2.1 Install VSM-200

Power input, GbE ports, COM ports and optional isolated DIO are located on the rear panel. In this section, we'll illustrate connectors on the rear panel.

Step1.

Before you install VSM-200, please power off the system for safty.

Step2.



Insert VSM-200 card into Sumit slot

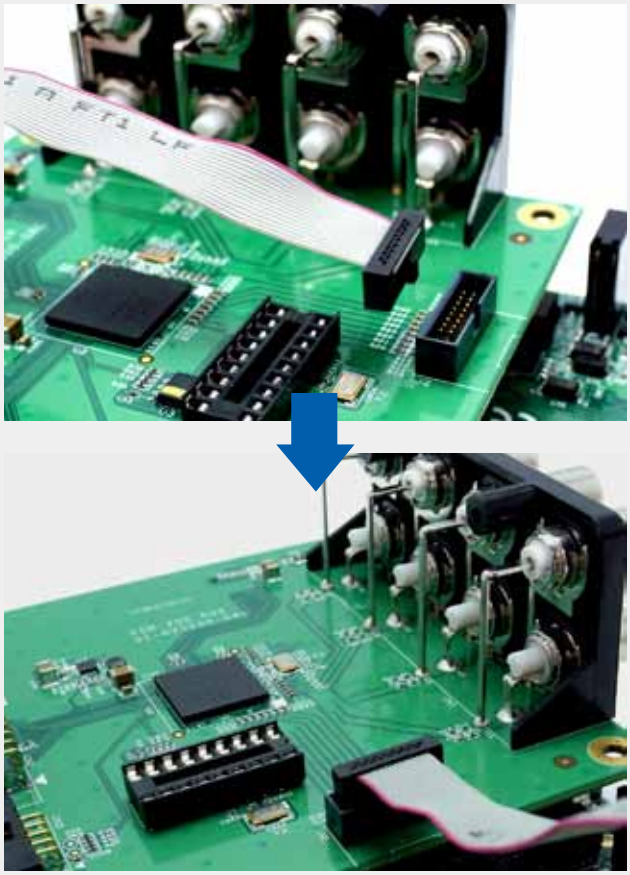
Step3.

Please make sure PCB is firmly blocked on the board.

Step4.

Power On your system and install driver.

Step5.

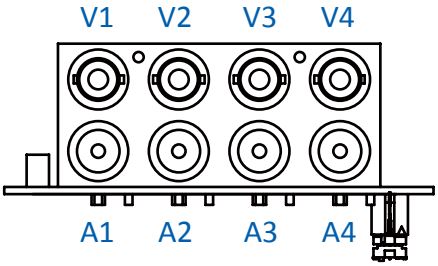


Connect 16 pin to D-sub 15 Cable for source input. Detailed pin defination please refer to 2.1 section.

2.2 Connector Pin Assignments

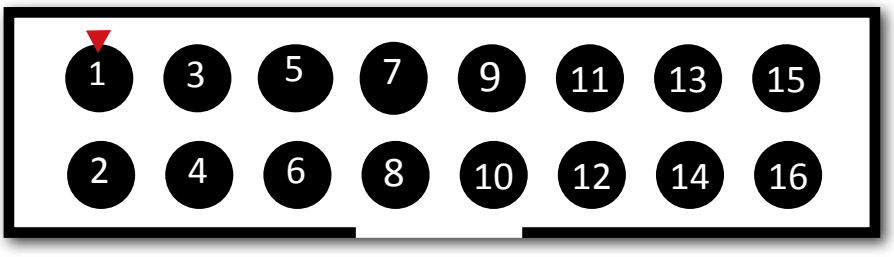
The serial console interface connector is a 16 pin header to D-sub 15 Cable connector. A null modem cable is required to connect a workstation. 2.2.1 and 2.2.2 show the pin assignments for the serial console interface connector

2.2.1 Signal Input Pin Assignments



Position	Connector Type	Signal
V1	BNC	Video Source1
V2		Video Source2
V3		Video Source3
V4		Video Source4
A1	RCA	Audio Source1
A2		Audio Source2
A3		Audio Source3
A4		Audio Source4

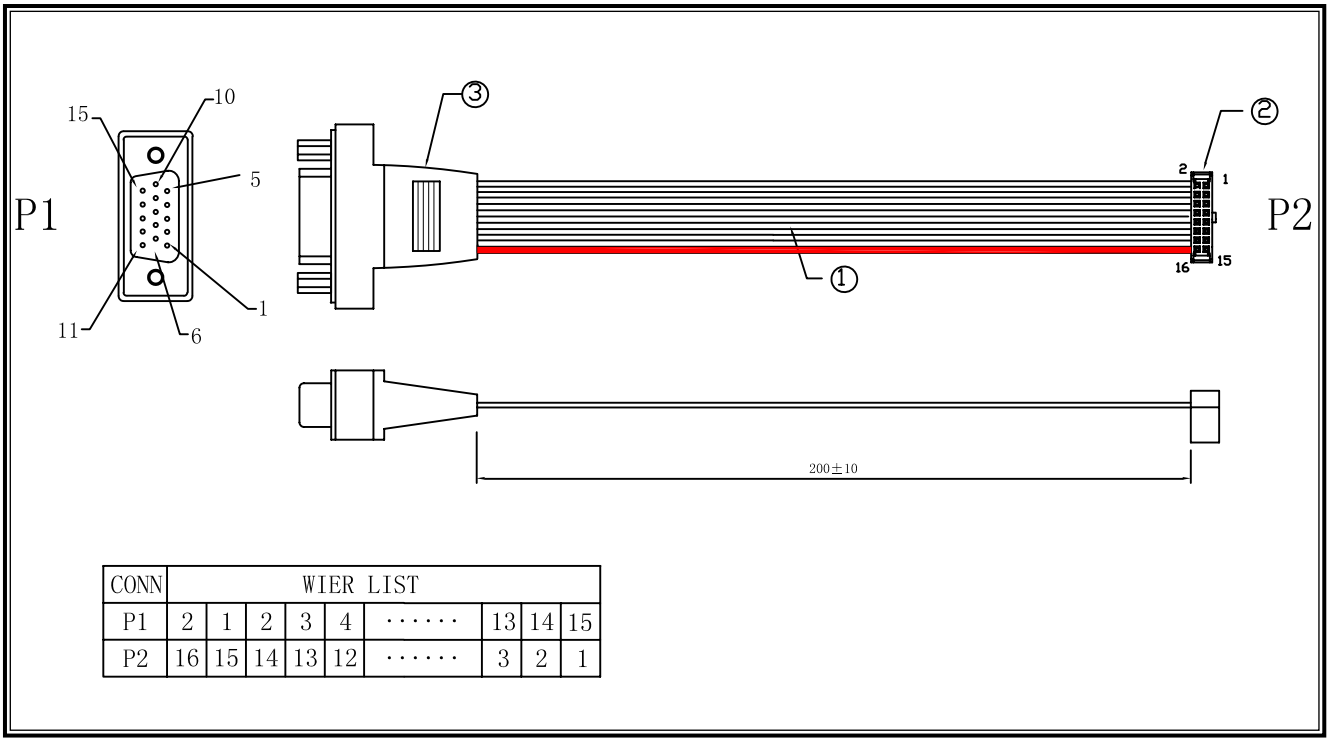
2.2.2 J2 Connector Pin Assignments



Pin No.	1	3	5	7	9	11	13	15
Function	V5	V6	V7	V8	A5	A6	A7	A8
Pin No.	2	4	6	8	10	12	14	16
Function	GND	GND	GND	GND	GND	GND	GND	GND

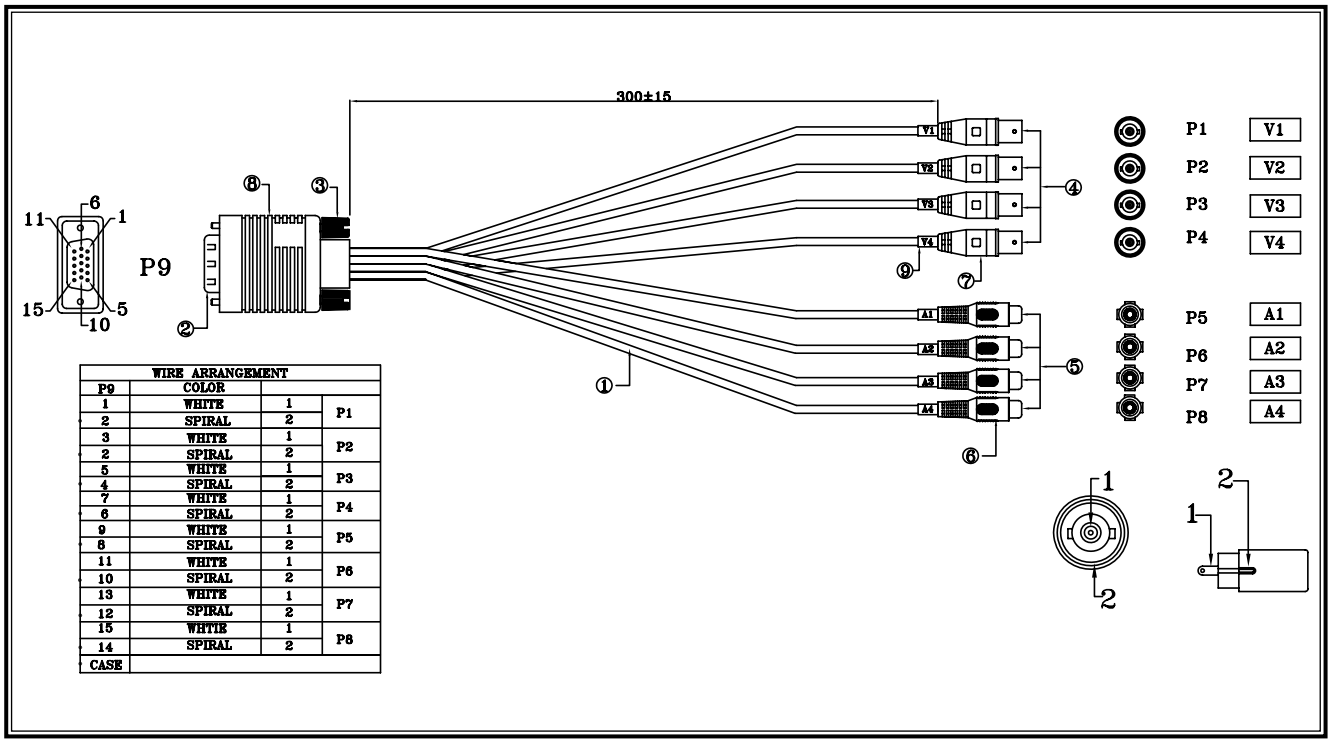
2.3 RCA and BNC Cable Pin Assignment

2.3.1 Main board to DB-15 pin assignment



CONN	WIER LIST								
P1	2	1	2	3	4	·····	13	14	15
P2	16	15	14	13	12	·····	3	2	1

2.3.2 DB15 to 4 Video-in and 4 Audio-in cable pin assignment



WIRE ARRANGEMENT			
P9	COLOR		
1	WHITE	1	P1
2	SPIRAL	2	
3	WHITE	1	P2
2	SPIRAL	2	
5	WHITE	1	P3
4	SPIRAL	2	
7	WHITE	1	P4
6	SPIRAL	2	
9	WHITE	1	P5
8	SPIRAL	2	
11	WHITE	1	P6
10	SPIRAL	2	
13	WHITE	1	P7
12	SPIRAL	2	
15	WHITE	1	P8
14	SPIRAL	2	
CASE			

3

Driver Installation

3.1 Install VSM-200 driver software

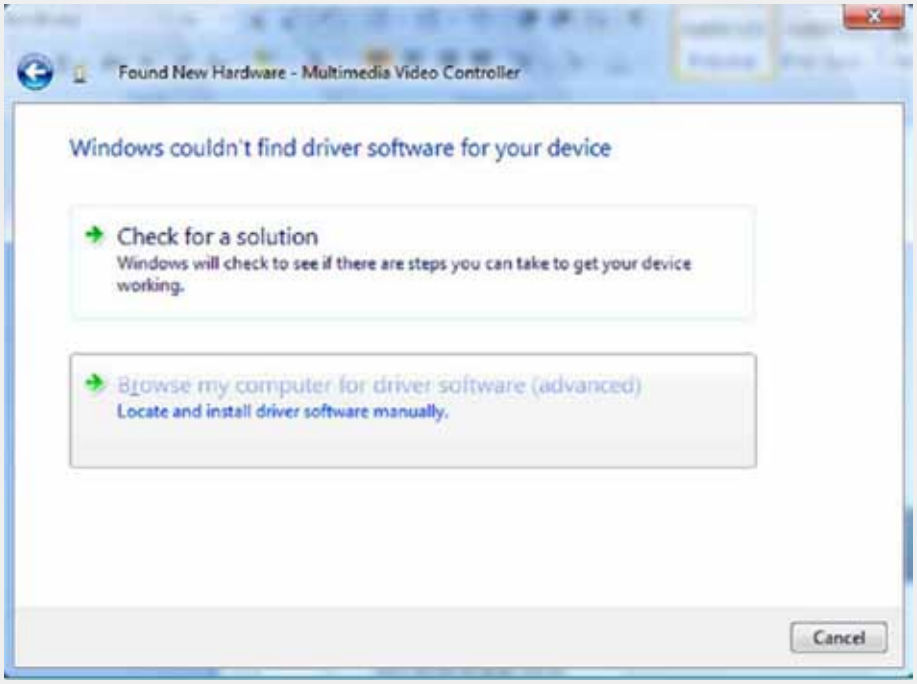
CAUTION!

The screenshots shown below are taken from Windows 7 and may vary slightly depending the Operating System

CAUTION!

Step1.

When you boot your computer after you have installed the VSM-200 PCIe software compression card, Windows will automatically detect the existing card and the following Device Manager Message dialog appears automatically. Please click the "**Browse my computer for driver software (advanced)**" option.



Step2.

Inser the Software and Driver CD, and click "**Browse...**" to choose the file path. The driver folder on the Software and Driver CD is : CD\Windows\Driver\x86.zip or x64.zip

[x86.zip] for 32 bit version windows system, include XP/Vista/Win7.

[x64.zip] for 64 bit version windows system, include XP/Vista/Win7.

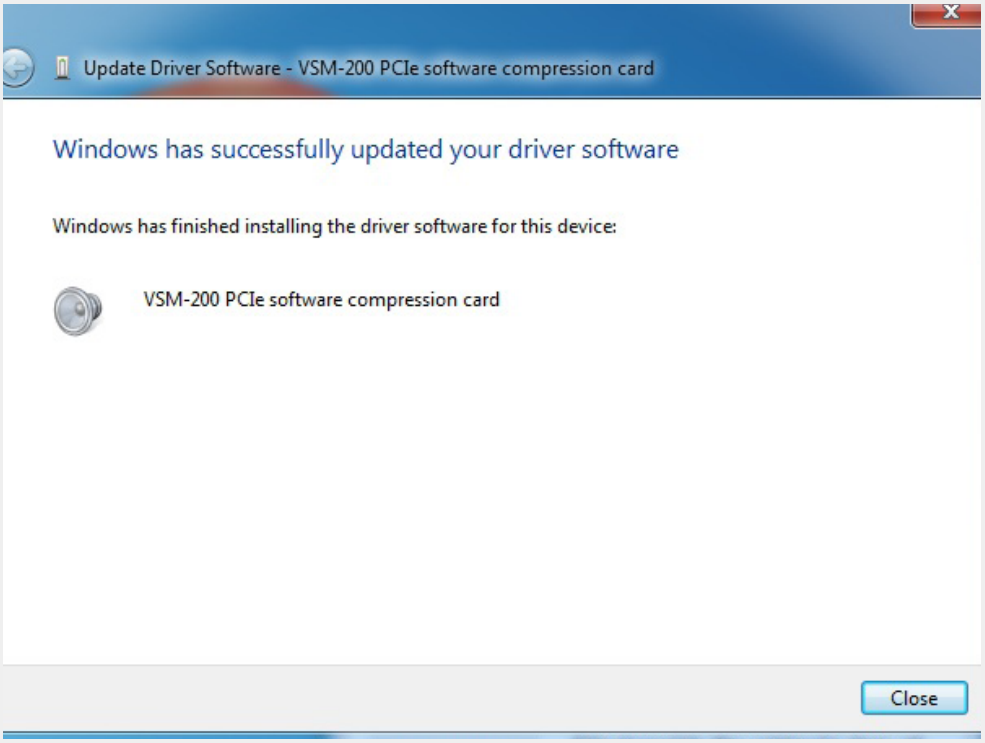
CAUTION!

When the driver is located, ome windows system will show "Windows Security Message" to warring you windows can't varify the publisher of this driver software, please select "Install this driver software anyway" option.

CAUTION!

Step3.

After the driver installation is completed, the windows will pop-up the message as follow:



4

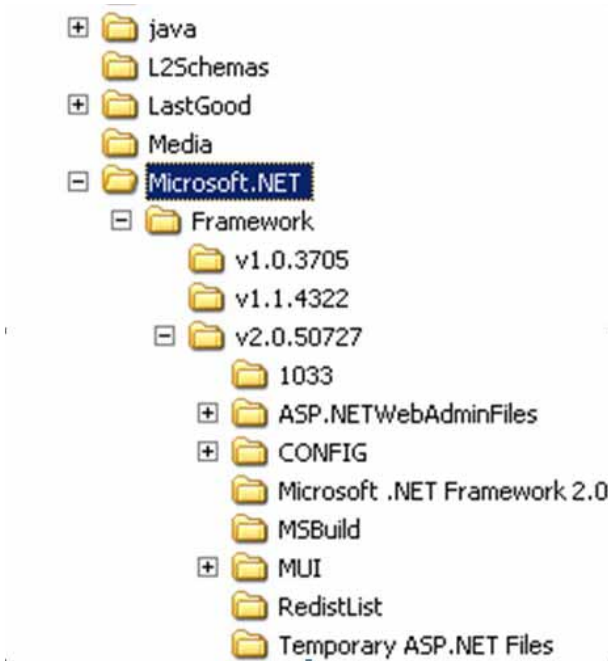
Software Application

Notice before installing the software:
Make sure your system has installed .NET frame work 2.0 especially the WinXP user. If the program is already installed you can safely precede the VSM-200 software and skip 4.1 section.

4.1 Microsoft .NET Frame work installation

The Microsoft .NET Frame work will install on windows install folder. For example, on WinXP SP3, you can check "Windows\Microsoft.NET\Framework"
folder.

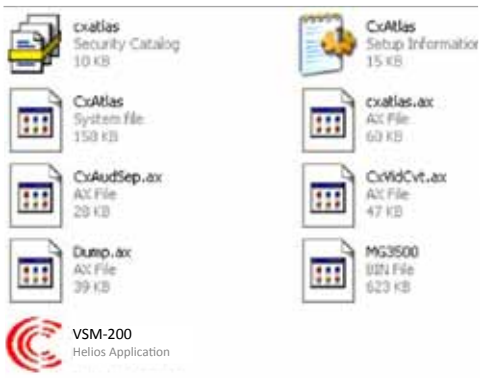
Otherwise, you can get the .NET Frame work here:
http://www.microsoft.com/download/en/details.aspx?id=19



4.2 Start the VSM-200 application

Insert the VSM-200 installation and driver disk into your optical drive. Go to My Computer and double-click the optical drive, the folder displayed which looks like that shown in the screen shot below.

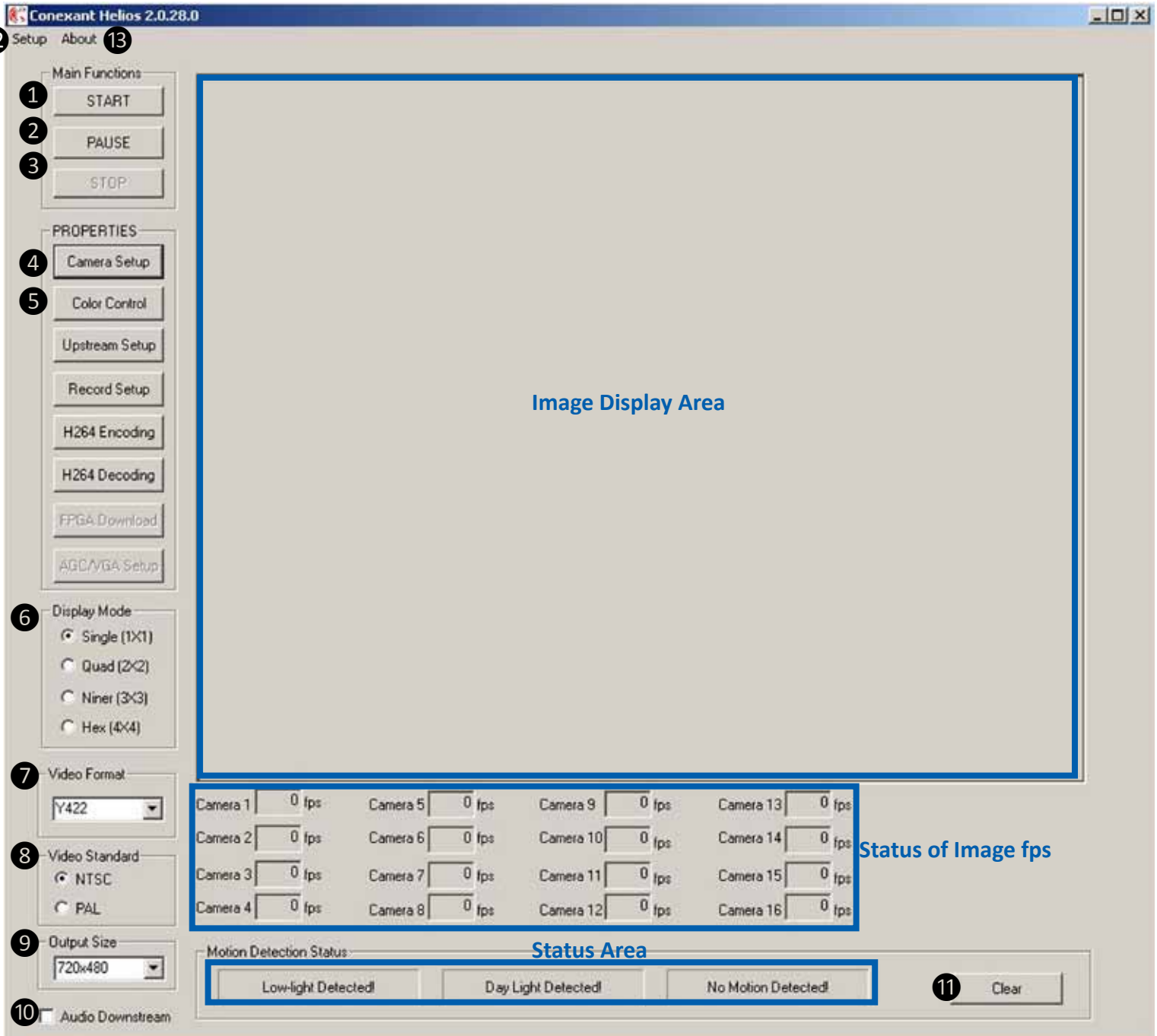
There are 32bit and 64bit version of the VSM-200 application, before you start the execution file, please make sure you choose the file compatible with your system. Start the VSM-200 application by double-click the VSM-200 icon.



4.3 Using the VSM-200 Application

4.3.1 Main Application Window

When entering the VSM-200 Program, the main interface screen will open as shown below.



Function	Description
Image Display Area	Video input image will show in here
Status area	The text will be highlighted under "Low-Light Detected", "Day Light Detected", or "No Motion Detected" status
Status of image fps	fps of the image input channel

No	Function	Description
	Main Function	
❶	START	Show the Video streaming on Image display area
❷	PAUSE	Pause current video streaming
❸	STOP	Close present video streaming
	PROPERTIES	
❹	Camera Setup	Show the Video streaming on Image display area
❺	Color Control	Video quality adjustment
❻	**Display Mode**	
	Single (1x1)	Show 1 video streaming on image display area
	Quad (2x2)	Show 4 video streamings on image display area
	Niner (3x3)	Show 9 video streamings on image display area
	Hex (4x4)	Show 16 video streamings on image display area
❼	**Video Formate**	
	YUV422	Full Color 422 Video display formate option
	YUV411	Full Color 411 Video display formate option
	Y8	Black/White Video display formate option
❽	**Video Standard**	
	NTSC	Video system option
	PAL	Video system option
❾	**Output size**: Every channel image size is control by this setting	
	720x576	
	720x240	
	720x288	
	352x288	
❿	Audio Downstream	Enable audio
⓫	Clear	When detection function becomes highlighted text, use this function to restart it
⓬	Setup	Config the Motion Detection function*
	Enable	Checked this option to enable “Motion Detection” function
	Grid Selection	Click this item to select motion detection area. Once the cell selection is done, you need to specify the threshold values as next step
	Threhold Settings	An 8-bit programmable value used to determine of this function
⓭	About	Show this software version information

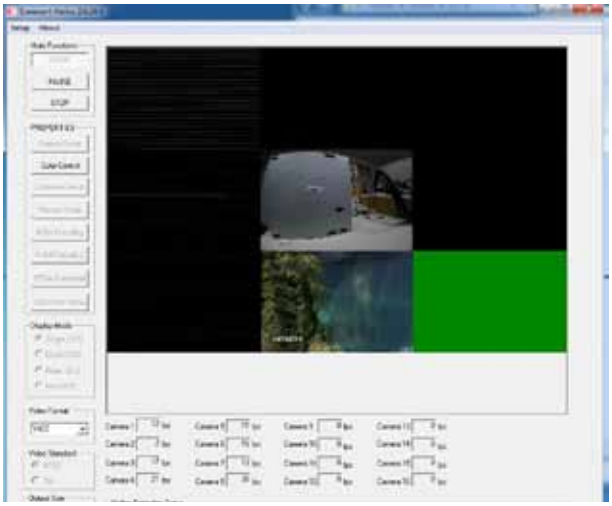
4.3.2 Camera Setup function

Show the Video streaming on Image display area.

Function	Description
LLC (Line Lock Camera)	If your CAMERA source support this function, please checked it.
Camera 1 to 16 check box	You can tick the camera source you want to display.
The BOX of fps	You can type 1 - 30 to control video display frame speed.
Enable ODD cameras	Enable 1,3,5,7,9,11,13,15 cameras.
Enable EVEN cameras	Enable 2,4,6,8,10,12,14,16 cameras.

4.3.3 Color Control Function

You can adjust every single video quality by your own.



VDEC_A: CAMERA1,
VDEC_B: CAMERA2,
VDEC_C: CAMERA3,
VDEC_D: CAMERA4,
VDEC_E: CAMERA5,
VDEC_F: CAMERA6,
VDEC_G: CAMERA7,
VDEC_H: CAMERA8,

Press **'Default'** to restore the original color setting of one VDEC. After you changed the setting, please press **'Apply'** to save it.

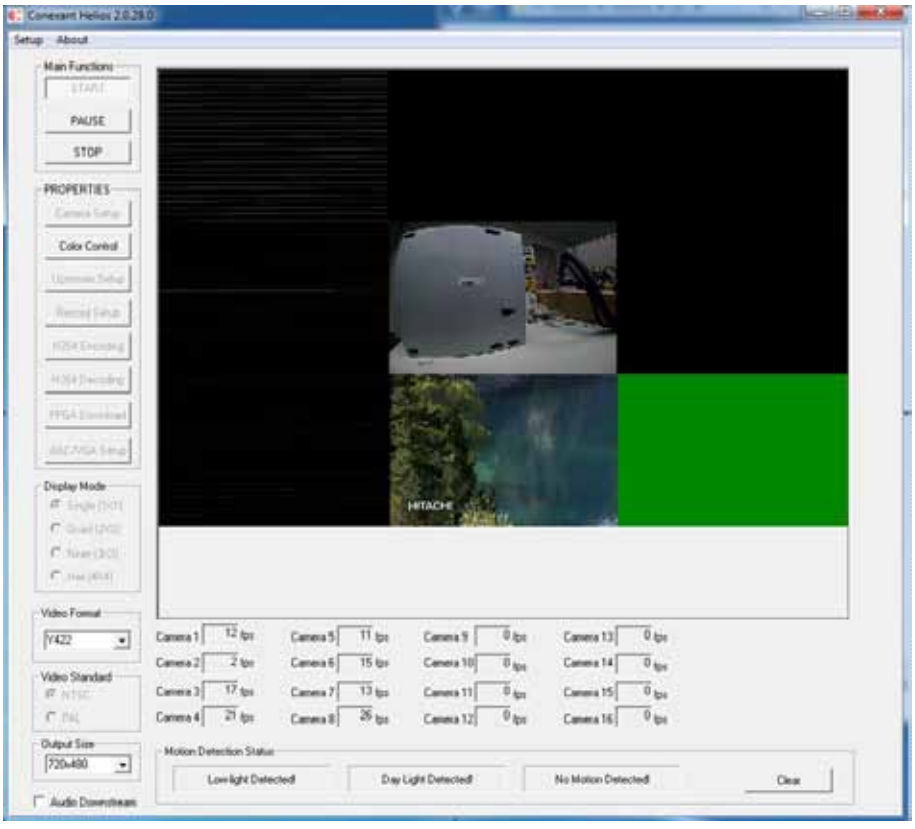
4.3.4 Audio Downstream Selection

Every audio channel accept 2 audio line input , and every audio line is apply for one video line. Please see this table.

Audio Line	Audio Downstream Channel	Speaker
1	A	Left
2	A	Right
3	B	Left
4	B	Right
5	C	Left
6	C	Right
7	D	Left
8	D	Right

When you change the setting , must press '**Apply**' to save it

4.3.5 Demonstration



1. Press "CAMERA Setup" to select CAMERA source that you connect.
2. Select Video Standard: If you do not know your video system standar, please connect your video device vendor.
3. Select Video format & output size : If you are first running, please use the default setting.
4. Press "START" to download video streaming.

4.4 Motion Detection

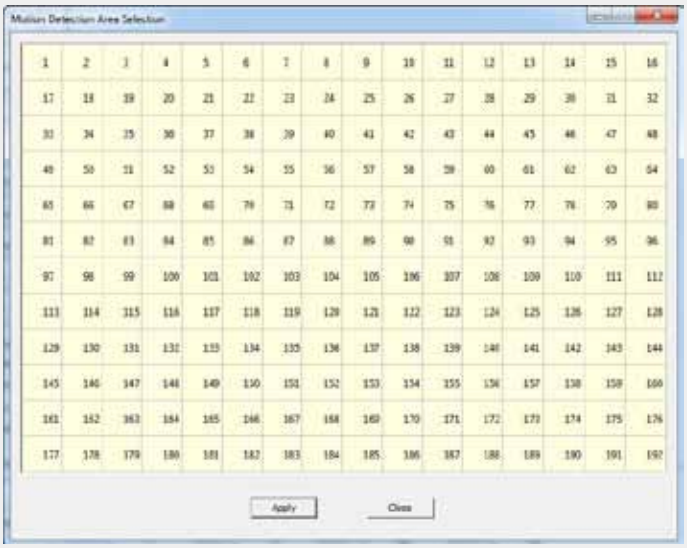
4.4.1 Software Interface

On the Main screen of VSM-200 software, press “Setup” and you will see 3 sub items:

Enable	Checked this option to enable “Motion Detection” function.
Grid Selection	Click this item to select motion detection area. Once the cell selection is done, you need to specify the threshold values as next step.
ThresholdSettings	An 8-bit programmable value used to determine of this function.

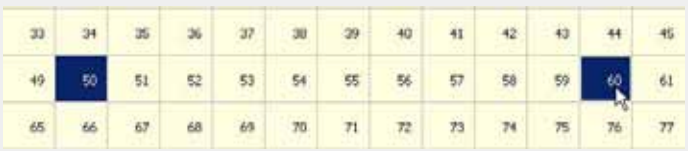
4.4.2 Grid Selection Setup

Point1.



When open this option , the “Motion Detection Area Selection “ will show empty grid table

Point2.



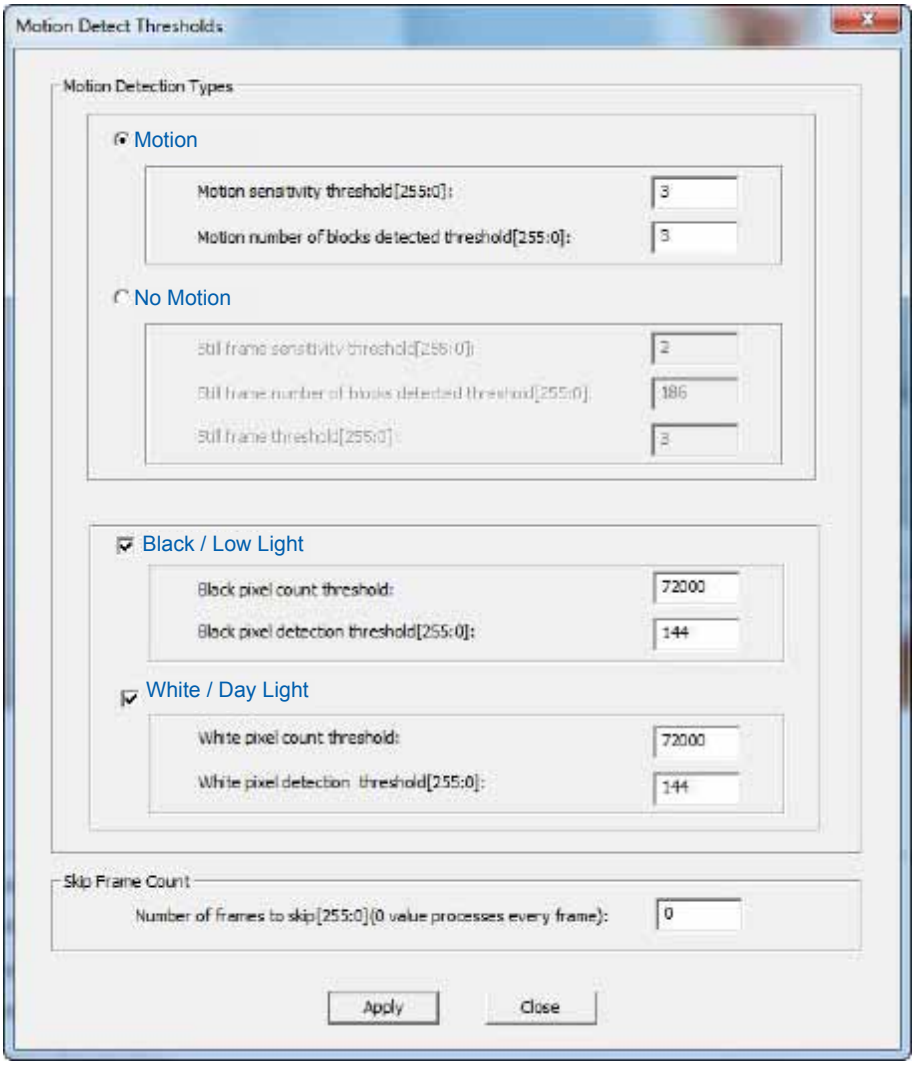
Use “**Ctrl** ” key can get different grid

Use “Shift ” key can get continuous area.

Point3.

Multiple areas are acceptable.

4.4.3 Threshold Interface



Motion	The motion detection threshold is an 8-bit programmable value used to determine the presence of motion. This value represents a minimum delta between scaled block average luma values to indicate motion within a block. The motion number of blocks detected threshold is an 8-bit programmable register field that controls how many blocks must detect motion before the frame comparison indicates motion detected to the host and external interrupts.
No Motion	The still image threshold is an 8-bit programmable value used to determine a non-changing image. This value represents a maximum delta between scaled block average luma values to indicate a constant image within a block. The still number of blocks detected threshold register field indicates how many of the 192 grid regions detected a still image. The still frame threshold register field controls how many blocks per frame must detect a still image to cause the still image frame counter to increment. The still frame threshold field controls how many consecutive still frames are required before the interrupt is asserted.
Black/Low Light & White / Day Light	Black and white detection is performed on each field/frame that is used for motion detection. In order to detect the black and white, the following thresholds and limits are used: i. For every pixel of the field indicated by the top_bot_field_sel register field of the MDET_{x}_CTRL register, if the luma value is less than the black threshold, the black detection counter will be incremented. ii. If the luma value is greater than the white threshold, the white detection counter will be incremented. iii. If, at the end of the field, the black detection counter is greater than the black field limit value, a black detection will be signaled for that channel. iiii. If, at the end of the field, the white detection counter is greater than the white field limit value, a white detection will be signaled for that channel. The black and white detection counters will be reset before the beginning of the next field for detection.

5

SDK Function

5.1 Windows

5.1.1 Driver Build Guide

Before starting to build VSM-200 driver please ensure that you have installed the following development environment:

1. Visual Studio 2005 or later

2. Microsoft WDK 6000. More information on the following link http://www.microsoft.com/whdc/resources/downloads.mspx

3. Microsoft Windows Vista Software Development Kit. While installing the SDK give simple pathname (for e.g. SDK3.0) more information on the following link http://www.microsoft.com/downloads/en/details.aspx?familyid=4377F86D-C913-4B5C-B87EF72E5B4E065&displaylang=en

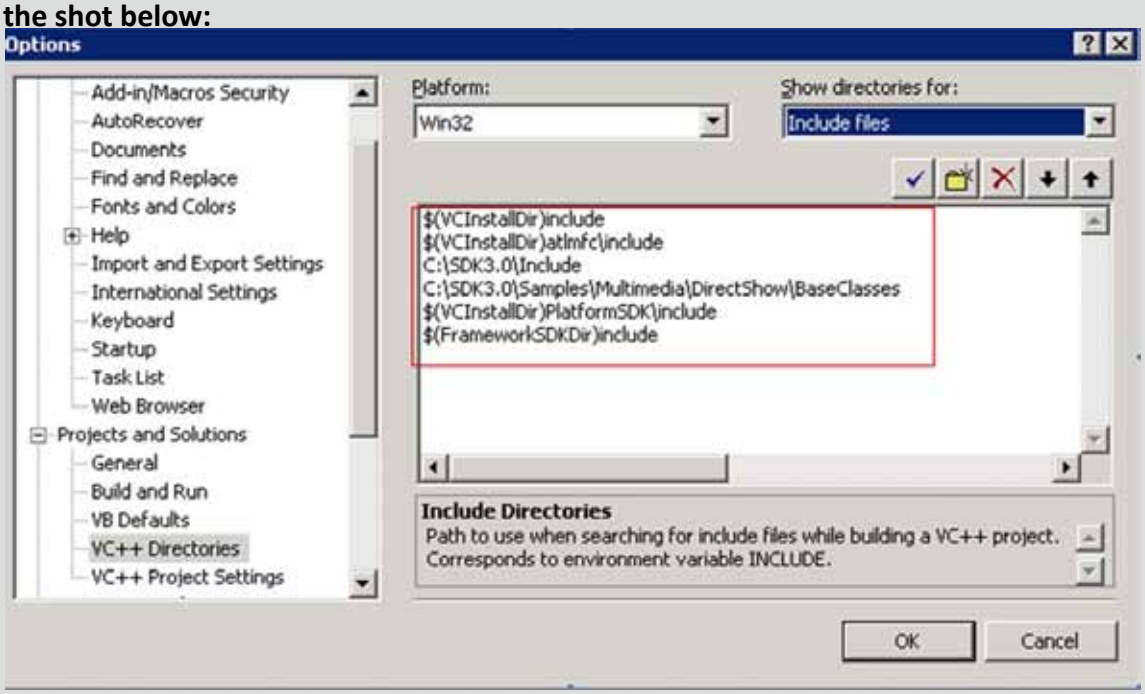
After the installation on the VSM-200 SDK main directory create a batch file with the following contents. Let's assume the batch file name is 'setpath.bat'.

SET SDKROOT = (Full Directory path containing Windows Vista SDK e.g. C:\SDK3.0)
SET WDKROOT = (Full Directory path containing WDK e.g. C:\WINDDK\6000)
Please run this batch file before compiling some of the modules s stated below.

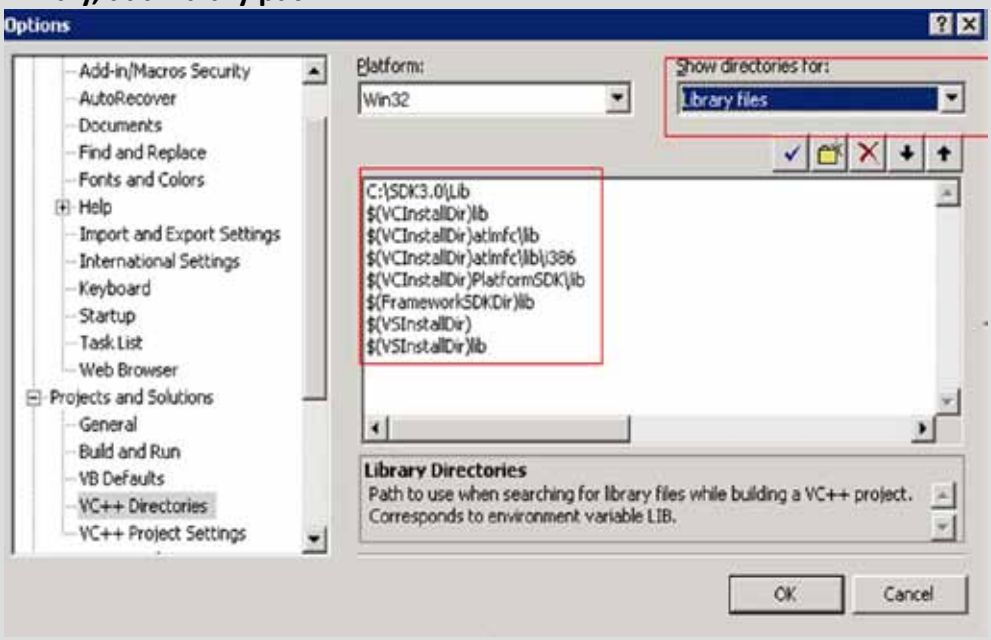
- **Modules in the CX25820/1 driver sources**
  Capture and HeliosApp are the modules that comprise the full CX25820/1 software driver and application system. Please follow the steps to install:

CAUTION!

Before compiling Application software you need to the DirectShow base class. First, add DirectShow base class path to Visual Studio 2005 project. Secondly, add include path as the shot below:



Thirdly, add library path:



Once the path for includes and libraries are set properly, you can start to compile the application to get the executable software.

CAUTION!

- **Compiler the cx25858 driver source**
  Open “Capture” module on source project.
  1. Invoke your build environment as your target O.S
  2. Change directory to SDK\Capture.
  3. At the command prompt run the setpath.bat
  4. Run the build utility with following options, build –c

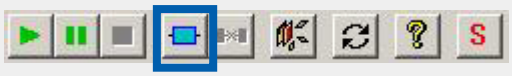
- **Build VSM-200 software**
  Open “HeliosApp” module on source project.

5.1.2 Graphedit demo on Window System

The Microsoft DirectX SDK provides a very useful debugging utility called GraphEdit, which can be used to create Media device model. The demo of download video streaming with GraphEdit step:

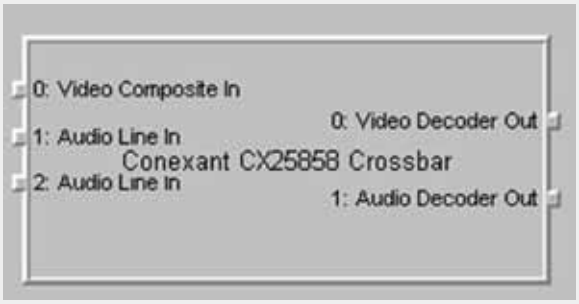
Step1.

Insert filter



From the **Graph** menu of the GraphEdit application, click **Insert Filters…** and choose the desired filters.

Step2.



Add Crossbar Device

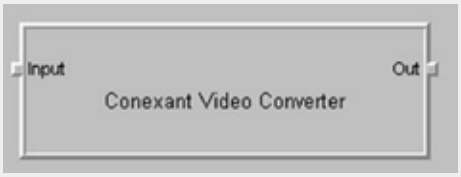
Step3.

Add Capture Device

Step4.

Goto the “DirectShow filter” class and get next filter.

Step5.



Add video convert device.

Step6.

Add Video Renderer

Step7.

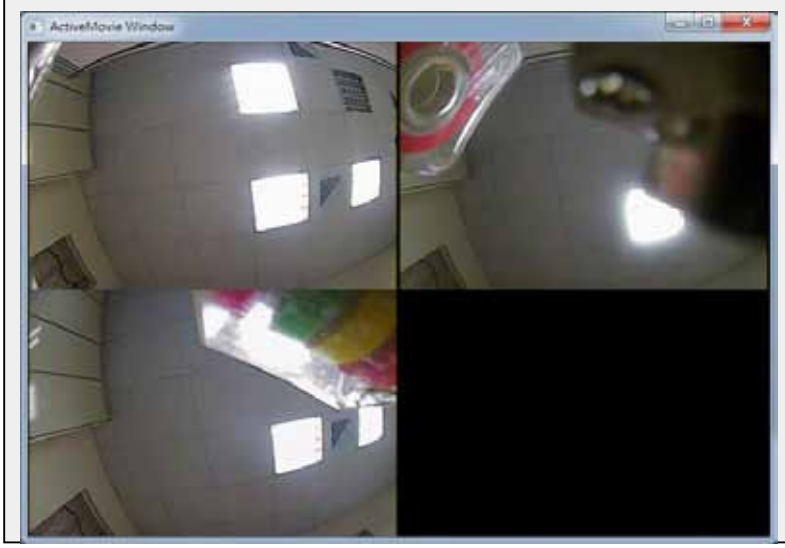
Connect all device as below

Step8.

Play

Press play to show the image

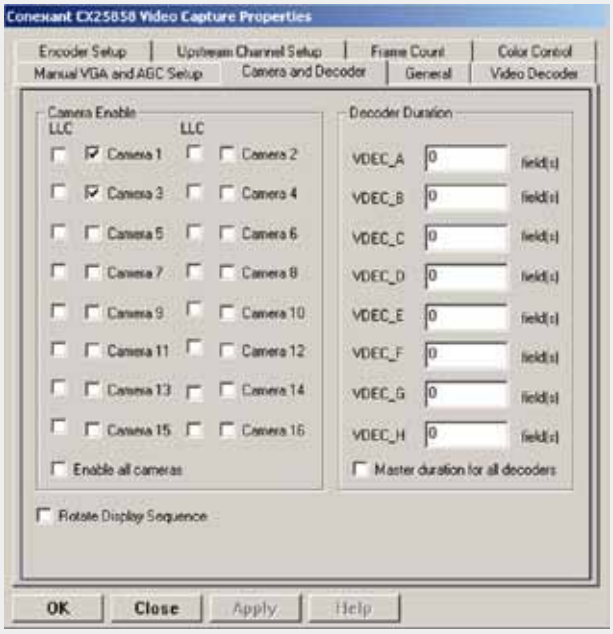
Step9.



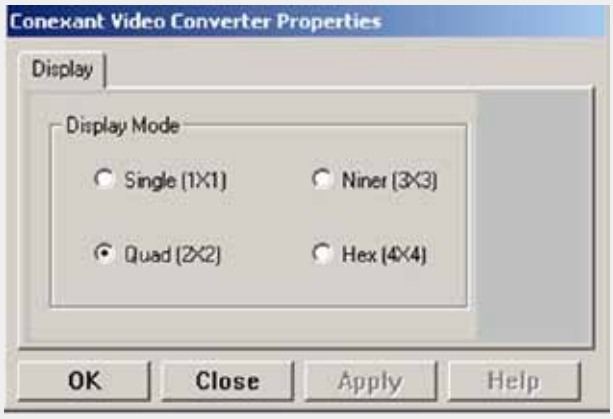
Display image

Step10. Setup the properties of filter

The properties of Crossbar device



The properties of Capture device



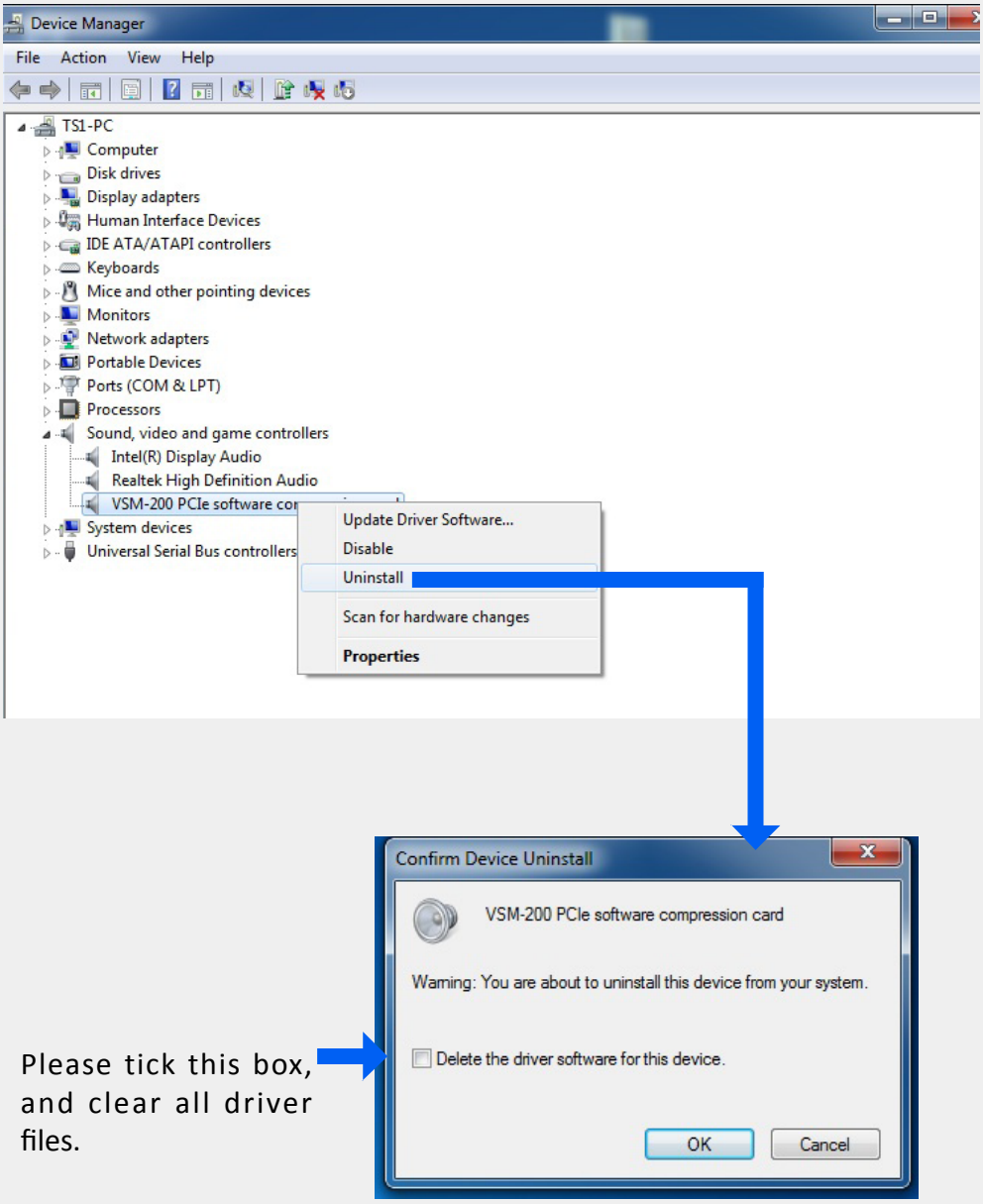
The properties of Video Converter

5.1.3 Multiple Instance Function

On legacy capture card, one Video channel is only assign to one PCI video device. Although VSM-200 has multiple video channels, on Windows Device Manager you can only see one PCI device. In order to separate video streams from one video device, we are promote the “Multiple Instance” function. Please follow the step to enable “Multiple Instance” function on your system.

Step1.

We strongly suggest uninstalling current VSM-200 driver from Windows, but if new installed, please skipping this step.



Please tick this box, and clear all driver files.

Step2.

Modify driver for multiple instance function. Please find the "CxAtlas.inf" and open it with Notpad. Goto the 118 line, you will see the text shows as below:

'HKR,"DriverData","EnableMultiInstances",0x00010001, 0x00, 0x00, 0x00, 0x00'

Please change 2nd value "0x00" to "0x01", the text as below:

'HKR,"DriverData","EnableMultiInstances",0x00010001, 0x01, 0x00, 0x00, 0x00'

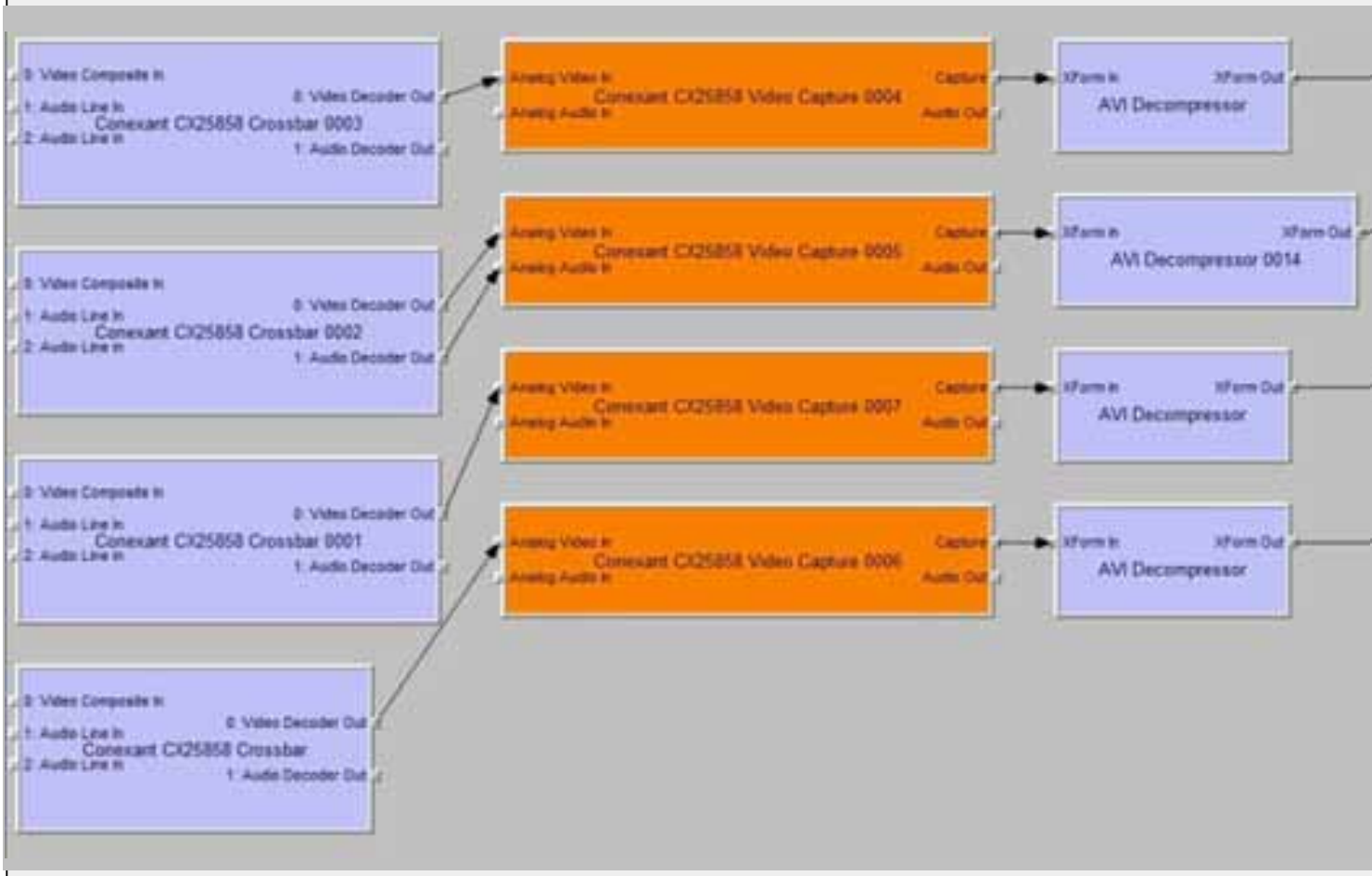
Please save your change and exit the Notepad.

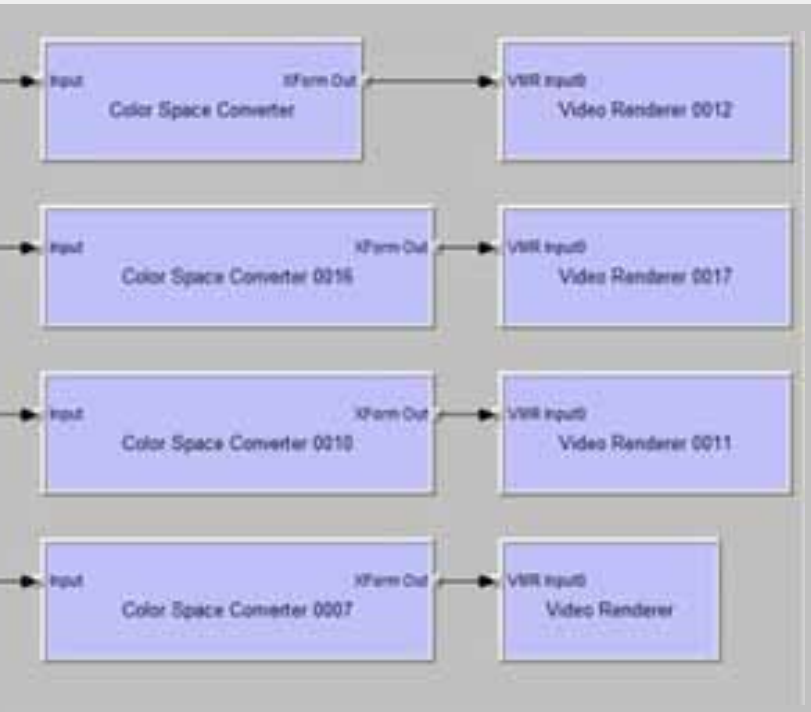
Step3.

Re-install the VSM-200 driver with modified driver, please refer to chapter 3 Driver Installation.

Step4.

Testing Multiple Instance function with GraphEdit, as you can see the chart below:

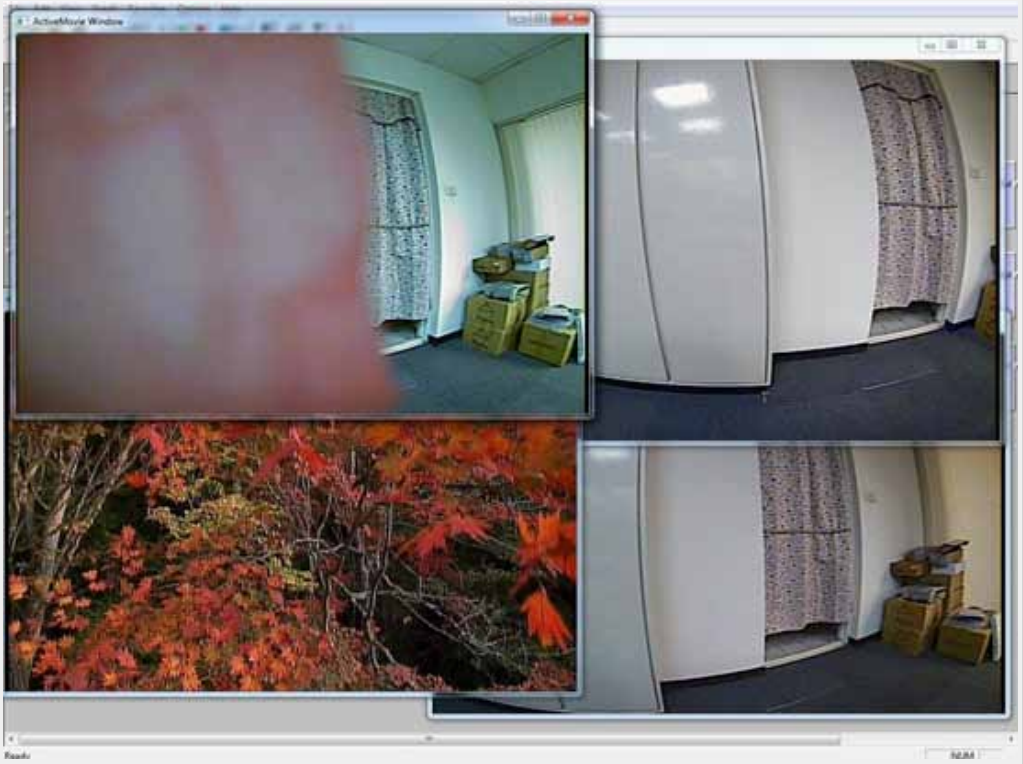




When enable multiple instance, you can create four CX25858 capture device. Please refer as upon figure.

Step5.

Play the Graph, there are four separate vidoe windows shows as follow graphics:



5.2 Linux System

5.2.1 Driver Building Guide

CAUTION!

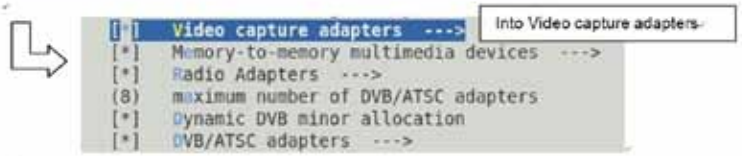
Before you start, please ensure you have root ID and password.

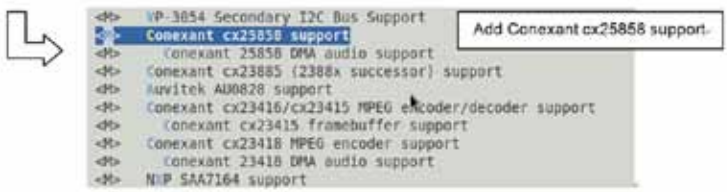
CAUTION!

Please find as these two file that is on Linux SDK package
v4l2_source_2.6.33.tar.bz2
cx25858_src_2.0.108.tar.gz

- Install v4l2 module
  1. Type "**tar -jxvf v4l2_source_2.6.33.tar.bz2**"You will see a folder "v4l-dvb-abd3aac6644e". Please into this folder for next step.
  2. Type "**make**"
  3. Type "**make install**"
  4. Type "**make clean**"
  5. Type "**make distclean**"

- Upgrade driver source file to v4l2 module
  1. Copy "**cx25858_src_2.0.108.tar.gz**" to "**v4l-dvb-abd3aac6644e**" folder.
  2. Type "**tar –zxvf cx25858_src_2.0.108.tar.gz**". The cx25858 source file will copy to v4l2 driver folder. If prompt overwrite the file , please select 'yes'.
  3. Type "**make menuconfig**" (PS*1) Setup the configuration file





  4. Type "make" (PS*2)
  5. Type "make install"

- Install driver module
  1. Change to ““v4l-dvb-abd3aac6644e/v4l” folder.
  2. Type “modprobe cx25858”
  3. Type “modprobe cx25858-alsa”. This is cx25858 audio module , that use ALSA function. (ALSA: Advanced Linux Sound Architecture)

- Check driver
  1. Type “lsmod” to check cx25858 driver.
  2. Type “dmesg” to see cx25858 driver status.

- Display the video stream
  1. Change to ““v4l-dvb-abd3aac6644e/linux/scrips” folder
  2. Use script command “mplay_video #” . (# is 0~7 , for video 1 to video 8)
     For example : Display Video 1 , type “maply_video 0”
     Display Video 5 , type “maply_video 4”

     Please refer the display image as below: