



VCE-PRO™

User's Manual

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Revision History

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Chapter **1**



Introduction

This chapter outlines the key features of the Imperx VCE-PRO card.

VCE-PRO

The VCE-ANCB frame grabber is a TYPE II PC Card with both an analog video interface and Cardbus interface. It provides the ability to capture analog NTSC/PAL video data from either a CVBS or S-Video source and transfer that data to host memory via a Cardbus (PCI) interface.

Functionality

- Provides two composite or S-Video inputs.
- Captures video data from standard NTSC, PAL or SECAM analog sources, formats this data and stores it into local SDRAM.
- Retrieves the formatted data from the SDRAM and transfers it into host memory via scatter/gather DMA over the Cardbus.
- Provides a hardware based scaler function which can scale the image size to 100%, 50% , 25% or a user defined scaling factor. Since the scaling is performed on the card, less Cardbus bandwidth is required to transfer the image to host memory.
- VCE-PRO is capable of saving images to disk as either BMP, JPEG or AVI files.
- Provides an internal triggering capability that can qualify image capture based on time as specified by the user.
- Provides an external triggering capability that can qualify image capture based on external signals.
- Automatically overlays the captured image with a date stamp, time stamp or user text.
- Provides adjustable image brightness, contrast, hue and saturation.

Interfaces

Analog interface

The VCE-PRO provides two CVBS (composite) or two S-Video inputs using either a set of stereo phono-jacks (model VCE-PRO) or a 15 pin connector (model VCE-PRO-F).

PCMCIA/CardBus interface

The VCE-PRO card complies with the TYPE II PC Card package dimensions as defined in the PC Card Release 8.0 Standard. The VCE-PRO includes a 30mm x 10mm extension area, used to house the stereo phono-jack connectors. The VCE-PRO-F version does not include the extension area.

The VCE-PRO provides a 33 MHz 32 bit PCI Master/Target interface (Cardbus) compliant with the PC Card Release 8.0 specification. This interface provides a single 'function', as defined in the Cardbus specification. The design does not support any memory mapped or I/O mapped peripherals on card. Access to the VCE-PRO's SDRAM devices is achieved through DMA operations that move the data from the SDRAM into host memory. The host cannot directly access the contents of the SDRAM. The design supports host access into configuration registers, DMA registers, local registers and CIS data via configuration space accesses.

A functional block diagram of the VCE-PRO card is illustrated in Figure 1.

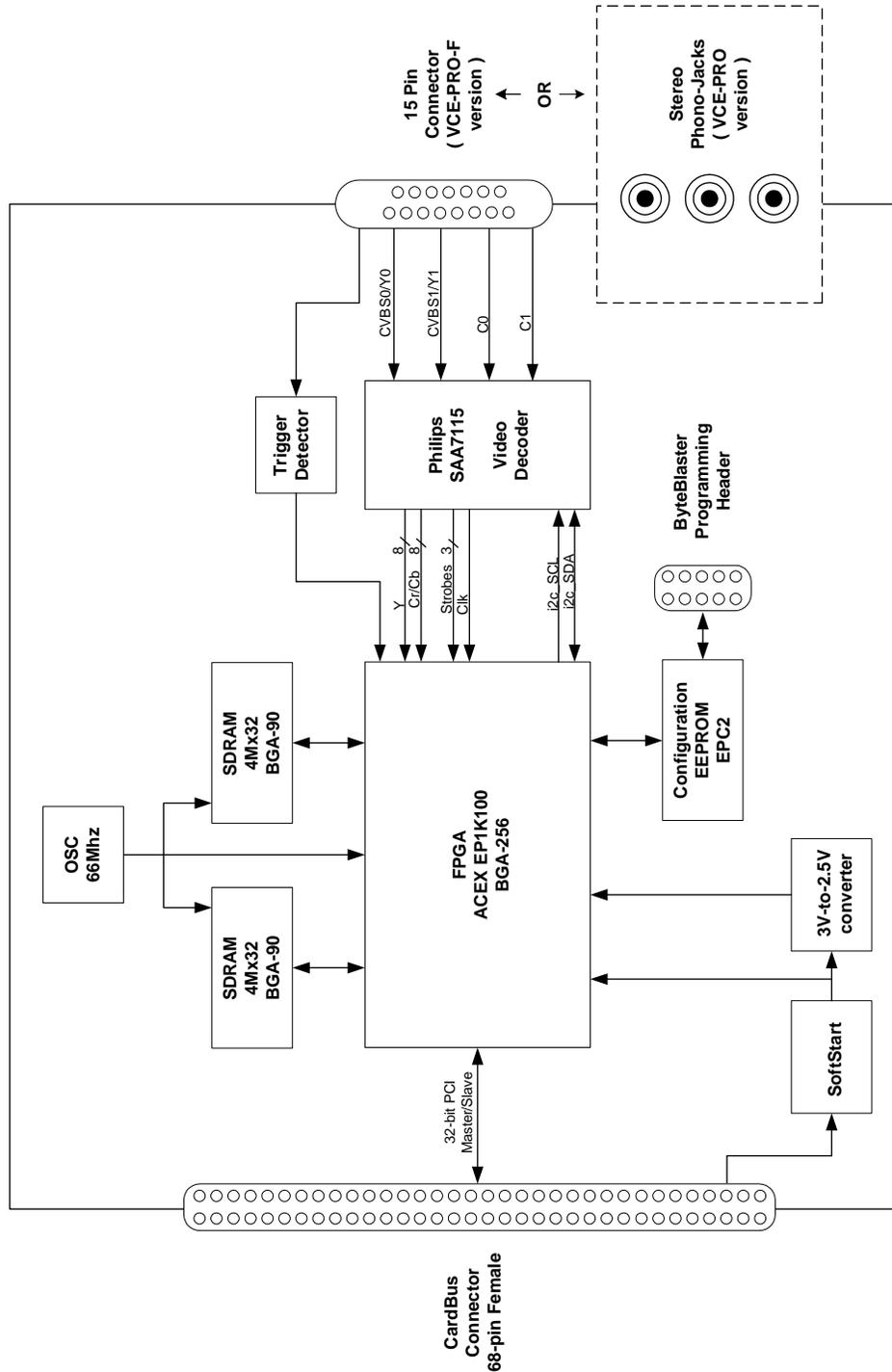


Figure 1 – VCE-PRO Block Diagram

Video Capture

The video capture engine is responsible for receiving video pixel data and qualifiers from the on-board video decoder chip, formatting the data and transferring it into on-board memory. The data that it receives from the video decoder is 4:2:2 YCrCb data formatted per Table 1. The video decoder delivers 8 bits of Luminance data (Y) and 8 bits of Chrominance data (Cr/Cb).The video capture engine translates this data into longwords (32 bits) as defined in Table 2. This format reflects how the data will appear in host memory. The module packs two pixels into each longword in order to use the Cardbus bandwidth more efficiently and conserve memory space.

H-Port								I-Port							
d15	d14	d13	d12	d11	d10	d9	d8	d7	d6	d5	d4	d3	d2	d1	d0
Cr/Cb (chrominance)								Y (luminance)							

Table 1 – Video decoder pixel data

d31	d30	d29	d28	d27	d26	d25	d24	d23	d22	d21	d20	d19	d18	d17	d16	d15	d14	d13	d12	d11	d10	d9	d8	d7	d6	d5	d4	d3	d2	d1	d0
Cr/Cb-pixel2								Y-pixel2								Cr/Cb-pixel1								Y-pixel1							

Table 2 – VCE-PRO Image data mapping into memory

Pixel Buffering

The pixel data formatted by the video capture engine is stored into two on-board 4Mx32 SDRAM devices. This memory serves as a local store for formatted video pixel data. Each SDRAM will buffer a single frame's worth of data, supporting a maximum frame size of 8 million pixels/frame. The SDRAMs are managed by an independent pair of controllers, implemented in the FPGA, supporting concurrent operation. The two SDRAMs are utilized in a ping-pong fashion such that while one is being filled with new pixel data, the other is being emptied via DMA into host memory.

DMA

The DMA engine is responsible for reading formatted pixel data from the on-board SDRAM devices and transferring them into host memory via the Cardbus interface. An intelligent scatter-gather method is utilized, providing for an efficient use of the Cardbus bandwidth. The use of non-contiguous 4Kbyte buffers provides support for the Windows operating system's memory allocation model.

FPGA

The heart of the VCE-PRO is a dense Field Programmable Gate Array (FPGA). This FPGA implements all of the functions related to video data capture, storage and DMA. The firmware contents of the FPGA can be upgraded while in the field by following the instruction outlined in Section 3 of this document entitled 'Firmware Upgrade from Web Site'.

In System Programming:

The VCE-PRO design supports ISP programming during operation. This capability is useful when the FPGA code needs to be upgraded and the unit is at a remote customer location. The programming is accomplished using a JamPlayer utility, which runs on the host PC. The JamPlayer utility downloads a new FPGA image into the EEPROM via the Cardbus interface. The FPGA provides a set of I/O pins which are connected to the EEPROM's JTAG interface. The JamPlayer utility toggles these I/O pins, which are mapped into a register in configuration space, and thus can communicate with the EEPROM's JTAG controller and affect a programming operation.

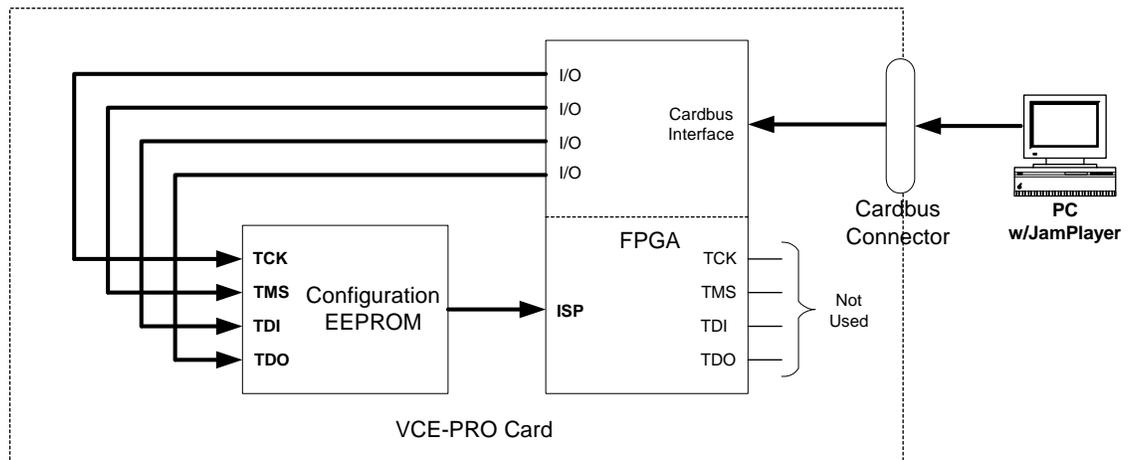


Figure 2 – EEPROM Programming In System

What you need to get started

To begin using the VCE-PRO card, you need the following:

- A computer with a PCMCIA slot that is Cardbus compliant.
- Microsoft Windows XP or 2000 software.
- A computer with a relatively up to date Cardbus-to-PCI chipset (sometimes referred to as a 'Cardbus Controller'). You can determine which chipset your laptop uses by looking in:

Control Panel – System – Hardware – Device Manager – PCMCIA Adapters

These chipsets are recommended because they generally offer better performance in terms of DMA transfer rates:

TI PCI-1520
TI PCI-4510

These chipsets are discouraged because of their poor DMA performance:

O2 Micro OZ6912
TI PCI-1225

- A computer with at least 256M bytes of RAM.
- A CD drive, and a hard disk on which to install the VCE-PRO software.

Inspecting the VCE-PRO package

When you unpack your VCE-PRO package, you should visually inspect all of its contents. If something is missing or damaged, contact your Imperx representative.

Package contents

You should have received the following items:

- The VCE-PRO PCMCIA card
- A phono-plug to S-Video cable (VCE-PRO)
- A 15-pin plug to S-Video cable (VCE-PRO-F)
- An S-Video to RCA cable
- A CD with the VCE-PRO software suite
- A 'Quick Start' installation guide
- A 'User's Manual' (this document)

Chapter 2



Hardware Installation

Installing the VCE-PRO card is as simple as plugging it into an available PCMCIA slot on your computer.

Chapter

3

Software Installation

This chapter explains how to install the VCE-PRO software.

Software Suite

The VCE-PRO software suite consists of the following files:

Windows 2000 and XP application files:

VCEANCB.dll	- VCE-PRO library
ijl15.dll	- Intel JPEG encoding/decoding library
console.exe	- console program (for debug purposes)
VCEANCB.exe	- VCE-PRO main application
vceancb.chm	- VCE-PRO help file

Windows 2000 and XP driver files:

vceancb.sys	- VCE-PRO Win2000/XP driver file
vceancb.inf	- VCE-PRO Win2000/XP driver info file

WDM Streaming (DirectX) files:

Vcecbks.sys	- VCE-PRO WDM Streaming driver
Vcecbks.inf	- VCE-PRO WDM Streaming info file
Install_ks.txt	- WDM Streaming installation instructions
instvcecbks.exe	- WDM Streaming installation program
VceAncbKs.ax	- WDM Streaming driver's properties plugin
AMCap.exe	- DirectX sample application

Note that our VCE-PRO application program was created using our SDK (software developers kit). Our SDK is a separately purchased product and is not included in the standard VCE-PRO software suite that comes with the card. For more information on the SDK, please visit our web site at <http://www.imperx.com/products.asp?catName=software&buy=yes>.

Software Installation from CD

Use the following steps to install the VCE-PRO software supplied on a CD:

The first step is to install the application software:

1. Remove the VCE-PRO card from the PCMCIA slot.
2. If you have previously installed any VCE-PRO software then:
 - 2.1 Left mouse click on *“Start”*.
 - 2.2 Left mouse click on *“Settings”*.
 - 2.3 Left mouse click on *“Control Panel”*.
 - 2.4 Double left mouse click on *“Add or Remove Programs”*.
 - 2.5 Left mouse click on *“VCE-PRO”*.
 - 2.6 Left mouse click on *“Remove”*.
 - 2.7 Left mouse click on *“Yes”*.
 - 2.8 Left mouse click on *“Close”*.
3. Insert the VCE-PRO CD into the appropriate drive; the setup.exe file will run automatically. Note: If setup does not start automatically, left mouse click on to *“Start”*, *“Run”*, enter *“(CD drive): Setup.exe”* and click *“OK”*.
4. Wait for the *“InstallShield Wizard”* screen to appear.
5. Follow the on-screen instructions.

The next step is to install the Windows 2000/XP driver software:

6. Insert VCE-PRO card into a PCMCIA slot.
7. If the system prompts you with a *“New Hardware Found”* dialog box then:
 - 7.1 Left mouse click on *“Next”*.
 - 7.2 Left mouse click on *“Search for best driver for your device”* and then click *“Next”*.
 - 7.3 Browse CD and point to the *“driver”* folder. Click *“OK”* and then click *“Next”*.
8. Otherwise, if the system does NOT prompt you with a *“New Hardware Found”* dialog box then:
 - 8.1 Right mouse click on *“Start”*
 - 8.2 Left mouse click on *“Explore”*
 - 8.3 Browse CD and point to the *“driver”* folder.
 - 8.4 Right mouse click on *“vceancb.sys”*.
 - 8.5 Left mouse click on *“Copy”*.
 - 8.6 Browse laptop and point to the *“C:/WINDOWS/system32/drivers”* folder for WinXP or the *“C:/WINNT/system32/drivers”* folder for Win2000.

- 8.7 Right click on folder and then left click on *“Paste”*.
- 8.8 If the message *“This folder already contains a file named ‘vceancb.sys’. Would you like to replace the existing file”* appears, then left mouse click *“yes”*.
9. Reboot the computer.

If you plan on using a DirectX compliant application, then install the DirectX driver software as follows:

10. Right mouse click on *“Start”*
11. Left mouse click on *“Explore”*
12. Browse CD and point to the *“DirectX_Driver”* folder.
13. Run the *“instvcecbks.exe”* program.
14. Reboot the computer.

Software Upgrade from Web Site

New application and/or driver software may be released periodically to reflect improvements and/or functionality added to the VCE-PRO. You can retrieve these updates by visiting the download page of our web site at <http://www.imperx.com/downloads.asp>.

Use the following steps to install newly released application software:

1. Download and unzip the application (.zip) file to a folder on your PC (we will use c:\application as an example).
2. Browse the “C:” drive and point to the “*application*” folder.
3. While holding down the ‘control’ key, right mouse click on the “*vceancb.dll*” and “*ijl15.dll*” files.
4. Left mouse click on “*Copy*”.
5. Browse laptop and point to the *C:/WINDOWS/system32*” folder for WinXP or the “*C:/WINNT/system32*” folder for Win2000.
6. Right click on folder and then left click on “*Paste*”. If the message “*This folder already contains a file named Would you like to replace the existing file*” appears, then left mouse click “*yes*”.
7. Reboot the computer.

Use the following steps to install newly released Windows 2000/XP driver software:

1. Download and unzip the driver (.zip) file to a folder on your PC (we will use c:\driver as an example).
2. Browse the “C:” drive and point to the “*driver*” folder.
3. Right mouse click on “*vceancb.sys*”.
4. Left mouse click on “*Copy*”.
5. Browse laptop and point to the *C:/WINDOWS/system32/drivers*” folder for WinXP or the “*C:/WINNT/system32/drivers*” folder for Win2000.
6. Right click on folder and then left click on “*Paste*”. If the message “*This folder already contains a file named ‘vceancb.sys’. Would you like to replace the existing file*” appears, then left mouse click “*yes*”.
7. Reboot the computer.

Use the following steps to install newly released DirectX driver software:

1. Download and unzip the DirectX (.zip) file to a folder on your PC (we will use c:\DirectX as an example).
2. If you have previously installed a DirectX driver for the VCEPRO then you must first uninstall it by:
 - 2.1 Left mouse click on "*Start*".
 - 2.2 Left mouse click on "*Settings*".
 - 2.3 Left mouse click on "*Control Panel*".
 - 2.4 Double left mouse click on "*System*".
 - 2.5 Left mouse click on "*Hardware*".
 - 2.6 Left mouse click on "*Device Manager*".
 - 2.7 Left mouse click on "+" symbol of "*Sound, video and game controllers*".
 - 2.8 Right mouse click on "*VCEPRO Streaming Device*".
 - 2.9 Left mouse click on "*Uninstall*".
 - 2.10 Left mouse click on "*OK*".
 - 2.11 Close all control panel windows.
3. Run the "*instvcebks.exe*" program from the c:\DirectX folder.
4. Reboot the computer.

Firmware Upgrade from Web Site

Your newly received VCE-PRO card has been programmed in the factory with the latest firmware prior to shipping. New firmware, however, may be released periodically to reflect improvements and/or functionality added to the VCE-PRO FPGA. You can retrieve these updates by visiting the download page of our web site at <http://www.imperx.com/downloads.asp>.

Use the following steps to install newly released firmware:

1. Download and unzip the firmware patch (.zip) file to a folder on your PC (we will use c:\fw_patch as an example).
2. If you haven't previously installed the JamPCI drivers then:
 - 2.1 Left mouse click on to “*Start*”, “*Run*”, enter “*C:/fw_patch/loadsys.bat*” and click “*OK*”.
 - 2.2 Wait until "Press any key to continue . . ." message appears.
 - 2.3 Press any key to exit batch file.
3. Insert the VCE-PRO card into the laptop. Note that if your system has two PCMCIA slots, then you must insert the card into the slot in which it was placed during the original driver installation.
4. If the system prompts you with a “New Hardware Found” dialog box, press “*Cancel*”.
5. **Note: DO NOT POWER DOWN OR REMOVE CARD WHILE PROGRAMMING IS IN PROGRESS!**
6. Left mouse click on “*Start*”, “*Run*”, enter “*C:/fw_patch/VCE-PRO_patch_x_y.bat*” and click “*OK*”. Note that ‘*x_y*’ refers to the revision number (i.e. 1.3).
7. Wait until "Press any key to continue . . ." message appears.
8. If line above it reads "Exit code = 0...Success" then proceed with installation, otherwise contact techsupport@imperx.com.
9. Press any key to exit batch file.
10. You must either reboot the PC or remove and then reinsert the VCE-PRO card in order for the changes to take effect.

Chapter 4



Using the VCE-PRO

This chapter contains information on how to configure and use the VCE-PRO card.

Running the VCE-PRO Application

The VCEANCB.exe program supplied with the VCE-PRO card is a stand-alone Windows based application. It provides an easy to use graphical user interface (GUI), allowing the user to configure the VCE-PRO card and to view, record and playback video data received from the analog interfaces. The application consists of a main window as well as ‘Control Panel’, ‘Player Control’ and ‘Player Dialog’ windows.

Launching Application

To launch the VCE-PRO application, simply double left mouse click on the VCEANCB.exe icon.

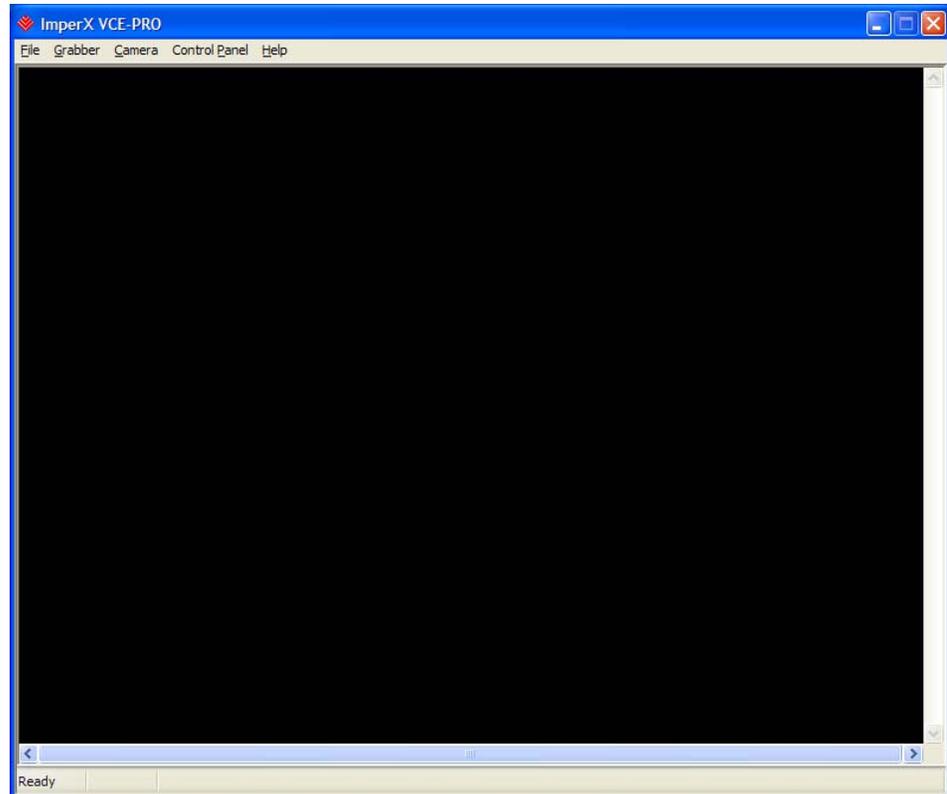


Note

In the remainder of this chapter, references to ‘clicking’ on objects in the GUI refers to the left mouse button.

Main Window

When the VCECLB_app.exe program is executed, a main window titled 'ImperX VCE-PRO' will appear. The main window provides the primary area for viewing real-time images received from the camera. This window can be sized and moved to suit your needs. When image viewing is active, the size of this window will automatically be scaled as a function of the incoming video signal (i.e. NTSC or PAL).



File

Clicking on this item reveals a pull-down menu with two options: 'Player' and 'Exit'.

Player

This option opens the 'Player Dialog' and 'Player Control' windows.

Exit

Clicking on this option causes the program to terminate.

Grabber

Clicking on this item reveals a pull-down menu with a 'Refresh' option and a list of PCMCIA slots populated with VCE-PRO cards.

Refresh

Clicking on this option causes the program to search all slots and update the list of installed VCE-PRO cards.

Slot List	If a single VCE-PRO is installed, then only 'Slot #0' will appear. If two VCE-PRO cards are installed, then both 'Slot #0' and 'Slot #1' will appear. The user can select which card is to be active by clicking on the appropriate slot number.
Camera	Clicking on this item reveals a pull-down menu with the following options:
Interlace	Select this item if the video source is interlaced.
Composite1	Select this item if the video source is a composite signal and is connected to channel #1.
Composite2	Select this item if the video source is a composite signal and is connected to channel #2.
S-Video1	Select this item if the video source is an S-Video signal and is connected to input #1.
S-Video2	Select this item if the video source is an S-Video signal and is connected to input #2.
Control Panel	Clicking on this item reveals a pull-down menu with the following options:
Show panel	Selecting this item causes the 'control panel' dialog to appear. When the 'control panel' dialog is open, the 'Show panel' menu item changes to 'Hide panel'. Clicking on 'Hide panel' causes the 'control panel' dialog to close.
Zoom	Reveals a pull-down menu which allow the user to select the image scaling factor. The image scaling factordetermines the size of the display window and the captured image. Changing from one scale to another scale automatically updates the display window and image size.
Help	Clicking on this item reveals a pull-down menu with two options: 'About' and 'Help Manual'.
About	Clicking on this option causes version information to be displayed including release identifiers for the application software, library,

driver and firmware. This information should be provided to Imperx technical support personnel during a service call.

**Help
Manual**

Clicking on this option causes an interactive point-and-click style help manual to be displayed. The help manual provides a summary description of all GUI controls and fields.

Control Panel

This dialog is invoked by clicking on 'Show panel' under the 'Control Panel' item in the top level menu. The Control Panel dialog allows the user to program the operating parameters of the VCE-PRO card and gives the user complete control over image viewing and storage. The window can be moved anywhere around the screen to suit your needs.

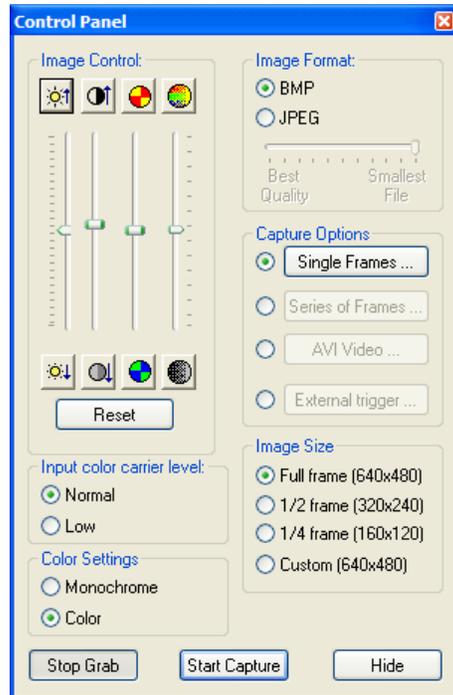


Image Control

These sliders allow the user to control the brightness, contrast, hue and saturation of the image. 'Reset' causes all sliders to revert back to their default settings.



Brightness Moving the slider up increases brightness causing more white while moving it down decreases brightness causing less white.



Contrast Moving the slider up increases contrast causing greater differences between dark and light while moving the slider down decreases contrast causing fewer differences between dark and light.



Hue Moving the slider up increases hue causing an increase in the intensity of Red and Yellow while moving the slider down causes an increase in the intensity of Blue and Green.



Saturation Moving the slider up increases saturation causing white to be removed from the colors while moving the slider down decreases saturation causing white to be added to the colors.

Input Color Carrier Level

This selection informs the VCE-PRO of the strength on the incoming color signal. If the input signal's strength is low (due to a worn VCR head or excessive cabling) then set this field to 'Low' otherwise set it to 'Normal'.

Color Settings

Specifies the video mode as either monochrome or color.

Image Format

When recording images to disk, this option selects the format, 'BMP' or 'JPEG', that the image will be saved in. Selecting 'JPEG' activates a compression slider. 'Best Quality' provides the least compression while 'Smallest File' provides the most compression.

Image Size

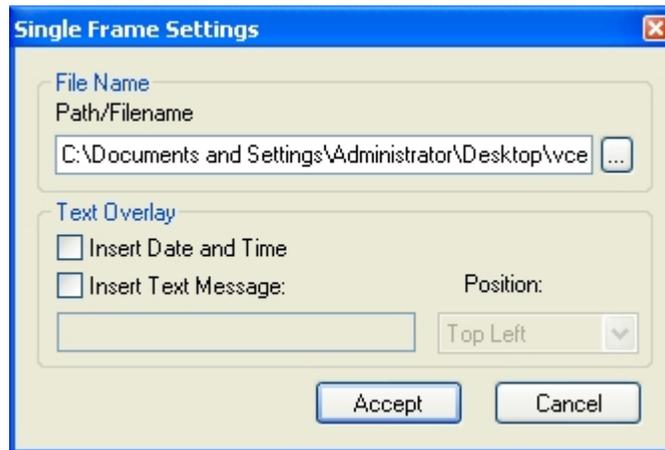
Determines the size of the display window and the captured image. Changing from one scale to another scale automatically updates the display window and image size. Selecting 'Custom' causes another dialog box to pop-up with fields that allow the user to specify an arbitrary width and height for the image.

Capture Options

Determines how, when and where images are recorded to disk. Three choices are provided: 'Single Frames', 'Series of Frames' and 'AVI Video'. Clicking on each option opens a new dialog window providing additional options.

Single Frames

Select this option when you wish to record one frame only. Clicking on this button causes the 'Single Frame Settings' dialog window to open.



Path/Filename

This text field allows you to provide a path and filename for the recorded image file. Clicking on the '...' box will cause a Windows 'browse' box to appear. The user can then browse to a folder and enter a file name. The filename extension, .BMP or

.JPG, will automatically be added depending on the image format chosen and therefore you do not need to include the filename extension.

Text Overlay

Enabling **'Insert Date and Time'** automatically places the date and time on each image recorded. Date and time formats are the same as those used on your computer. Enabling **'Insert Text Message'** allows you to enter a text string to be automatically overlaid on each image recorded. Clicking on **'Position'** causes a pull-down menu to appear which defines the placement position of the date/time/text message within the image. Available options include: Top-Left, Top-Center, Top-Right, Bottom-Left, Bottom-Center and Bottom-Right.

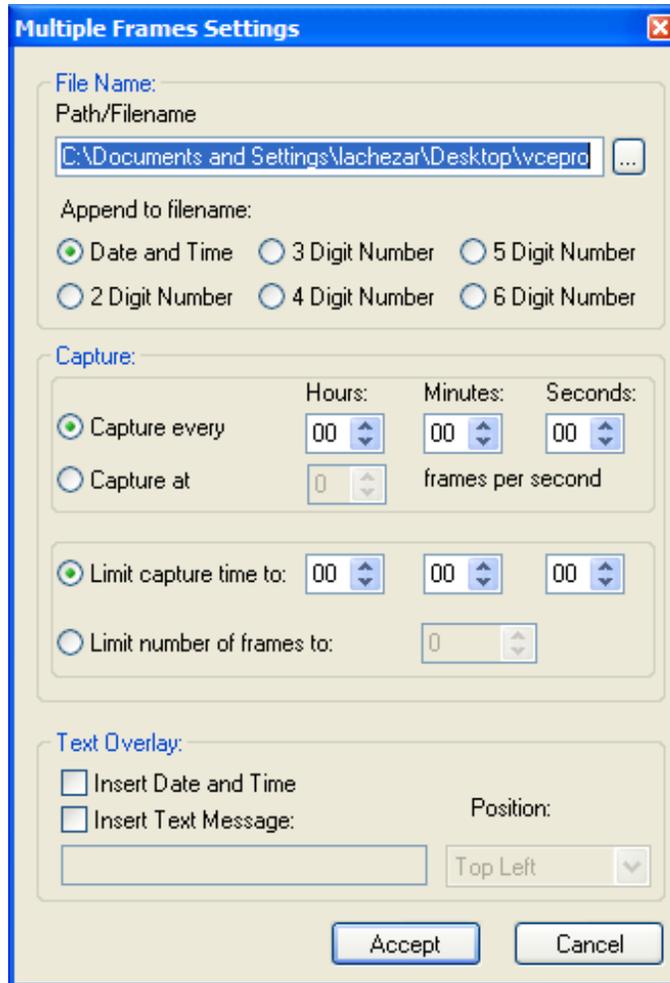
Accept

Clicking on this causes the entries made to the various fields to be accepted and then closes the 'Single Frame Settings' dialog window.

Cancel

Clicking on this causes the entries made to the various fields to be rejected and then closes the 'Single Frame Settings' dialog window.

Series of Frames Select this option when you wish to record multiple frames. Clicking on this button causes the 'Multiple Frames Settings' dialog window to open.



Path/Filename Same as in 'Single Frames'.

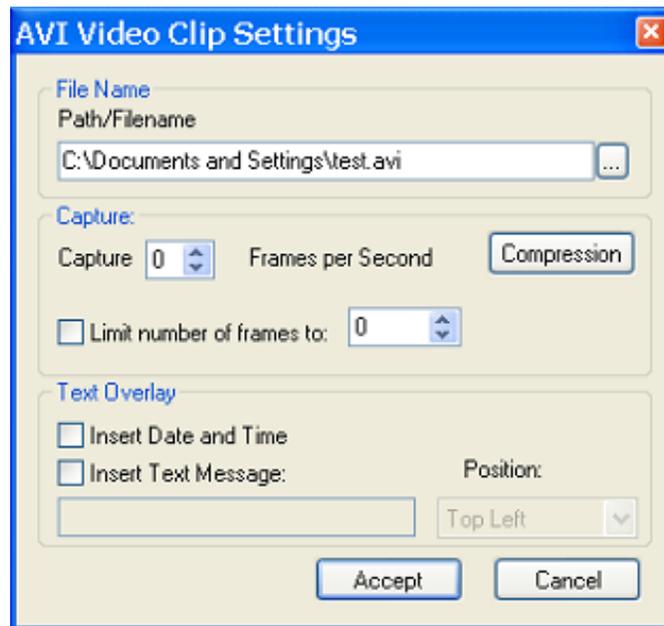
Append to filename User can choose a text suffix to be automatically appended to the end of the filename selected in 'Path/Filename'. Every time a recording file is created, the filename suffix will automatically be incremented.

Capture every Allows you to control how often an image is captured. Use this feature to take snapshots at regular intervals in order to create a time-lapse series of images.

Capture at	Allows you to control the rate at which frames are captured in terms of frames per second.
Limit capture time to	Allows you to limit the duration of the recording by the amount of time specified. This option is mutually exclusive with the 'Limit number of frame to' option.
Limit number of frames to	Allows you to limit the duration of the recording by the number of frames specified. This option is mutually exclusive with the 'Limit capture time to' option.
Text Overlay	Same as in 'Single Frames'.
Accept	Same as in 'Single Frames'.
Cancel	Same as in 'Single Frames'.

AVI Video

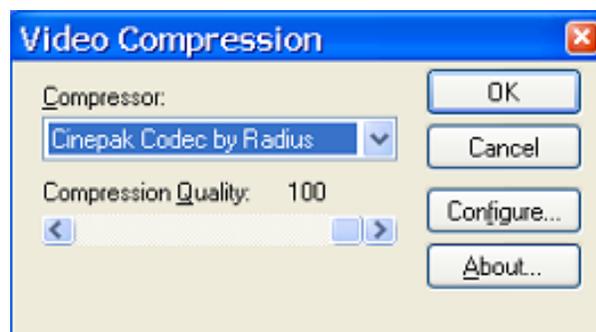
Select this option when you wish to create an AVI movie file. An AVI movie is a series of BMP files assembled into a single AVI file. This choice is not available if JPEG was chosen as the 'Image Format'. Clicking on this button causes the 'AVI Video Clip Settings' dialog window to open.



Path/Filename Same as in 'Single Frames'.

**Capture []
Frames per
Second** Limits the frame rate of the recorded movie.

Compression Allows you to choose between a variety of compressor implementations and options. Clicking on this button causes the 'Video Compression' dialog window to open.



Compressor	This pull-down menu lists several different implementations of AVI compressors. Each has its own set of configuration options.
Compression Quality	Lets you trade off quality versus file size. The higher the quality, the larger the file size and the lower the quality, the smaller the file size.
OK	Clicking on this causes the entries made to the various fields to be accepted and then closes the 'Video Compression' dialog window.
Cancel	Clicking on this causes the entries made to the various fields to be rejected and then closes the 'Video Compression' dialog window.
Configure...	Provides additional configuration options that are specific to the type of compressor chosen.
About...	Provides version number information for the chosen compressor.
Limit number of frames to	Allows you to limit the duration of the recording by the number of frames specified.
Text Overlay	Same as in 'Single Frames'.
Accept	Same as in 'Single Frames'.
Cancel	Same as in 'Single Frames'.

Trigger Capture Settings

Select this option when you want the recording process to be controlled by the state of the 'external trigger' input.

The screenshot shows a dialog box titled "Trigger Capturing Settings" with a close button in the top right corner. The dialog is organized into three main sections: "File Name:", "Capture:", and "Text Overlay:".

- File Name:** A text field labeled "Path/Filename" contains the path "C:\Documents and Settings\lachezar\Desktop\wcepro" followed by a browse button "...". Below it, the "Append to filename:" section has six radio button options: "Date and Time" (selected), "3 Digit Number", "5 Digit Number", "2 Digit Number", "4 Digit Number", and "6 Digit Number".
- Capture:** This section contains several controls:
 - "Capture every:" with three spinners for "Hours:", "Minutes:", and "Seconds:", all set to "00".
 - "Trigger behaviour:" with a dropdown menu set to "Trigger while high".
 - "Limit capture time to:" with three spinners for "Hours:", "Minutes:", and "Seconds:", all set to "00".
 - "Limit number of frames to:" with a spinner set to "0".
 - A checkbox labeled "Save all frames to same folder" which is currently unchecked.
- Text Overlay:** This section has two checkboxes: "Insert Date and Time" and "Insert Text Message:", both of which are unchecked. To the right of the "Insert Text Message:" checkbox is a "Position:" dropdown menu set to "Top Left". Below these is a text input field for the message content.

At the bottom of the dialog are two buttons: "Accept" and "Cancel".

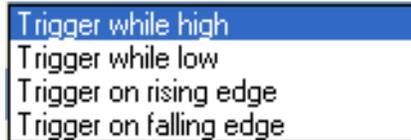
Path/Filename Same as in 'Single Frames'.

Append to filename Same as in 'Series of Frames'.

Capture every Same as in 'Series of Frames'.

Trigger behavior

This drop-down box allows the user to specify the conditions, of the external trigger, necessary to start image capture. Note that all triggers work in conjunction with ‘*Limit capture time to:*’ and ‘*Limit number of frames to:*’. If you do not want these settings to affect the trigger then set them to zero.



Trigger while high

Start capturing images when the trigger is high (voltage present) and continue capturing images until the trigger goes low (voltage absent).

Trigger while low

Start capturing images when the trigger is low (voltage absent) and continue capturing images until the trigger goes high (voltage present).

Trigger on rising edge

Start capturing images when the trigger goes from low (voltage absent) to high (voltage present).

Trigger on falling edge

Start capturing images when the trigger goes from high (voltage present) to low (voltage absent).

Limit capture time to

Same as in ‘Series of Frames’.

Limit number of frames to

Same as in ‘Series of Frames’.

Save all frames to same folder

Causes frames captured as a result of multiple trigger events to be saved to the same folder. If this is not selected, then a new folder will automatically be created with each trigger event.

Text Overlay

Same as in ‘Single Frames’.

Accept

Same as in ‘Single Frames’.

Cancel

Same as in ‘Single Frames’.

Start/Stop Grab

This button will toggle between **'Start Grab'** and **'Stop Grab'** every time the user clicks on it. Clicking on **'Start Grab'** enables the VCE-PRO's DMA engine and causes the main window to display live images received from the camera. Clicking on **'Stop Grab'** disables the DMA engine and causes the display to freeze.

Start/Stop Capture

This button will toggle between **'Start Capture'** and **'Stop Capture'** every time the user clicks on it. Clicking on **'Start Capture'** starts the process of recording the images to disk. The options set in the **'Capture Options'** field determine what, how and when actual recording is performed. Clicking on **'Stop Capture'** causes recording to stop.

Hide

Clicking on this option causes the control panel dialog to close. To reopen, click on **'Control Panel'** and **'Show panel'** in the top level menu of the main window.

Player Control

Clicking on the 'Player' item under the 'File' pull-down menu at the top of the VCE-PRO main window causes two windows to appear: 'Player Control' and 'Player Dialog'. These windows can be moved anywhere around the screen to suit your needs.

The Player Control window is used to select the pre-recorded image(s) that you wish to view. Note that support for AVI playback has been removed from the VCE-PRO. Instead, use Windows Media Player to view AVI movies.

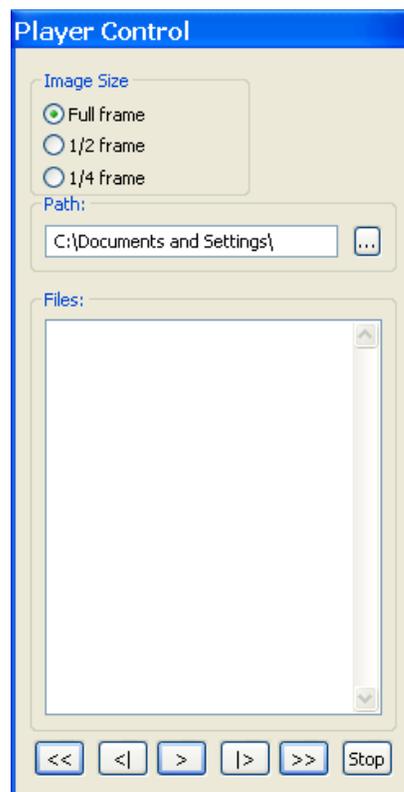
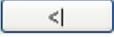


Image Size Determines the size of the Player Dialog window and the playback image. Changing from one scale to another automatically updates the Player Dialog window and image size.

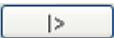
Path This text field allows you to enter the name of the folder or directory containing the image file(s). Clicking on the '...' box will cause a Windows 'browse' box to appear.

Files This box lists all of the image files (either .BMP or .JPG) that are in the folder selected under 'Path'. Note that .AVI files are not listed.

Rewind  Displays a series of images (one after another), in rapid reverse order, starting from the currently selected file, in the Player Control window's list, to the first file in the list.

Step Backwards  Displays the previous image (file) in the list.

Play  Displays a series of images (one after another) starting from the currently selected file in the list.

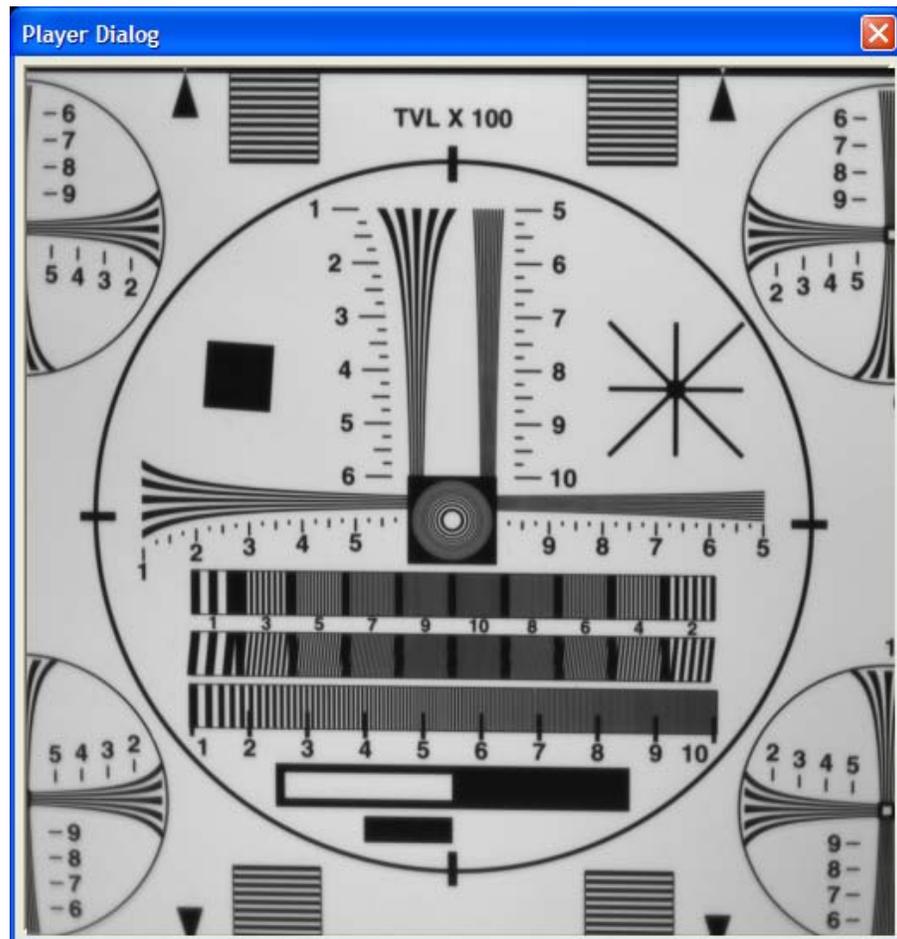
Step Forward  Displays the next image (file) in the list.

Fast Forward  Displays a series of images (one after another), in rapid forward order, starting from the currently selected file to the last file in the list.

Stop  Halts current playback.

Player Dialog

The Player Dialog window appears when the user selects the 'Player' item under the 'File' pull-down menu at the top of the VCE-PRO main window. The Player Dialog window provides the primary area for viewing playback of pre-recorded images. This window can be moved anywhere around the screen to suit your needs. The size of the window (and image) is determined by the size of the image file selected in the 'Player Control' window and can be scaled using the 'Image Size' option. For example, if the user selects an image file that was produced by a NTSC camera, then the 'Full frame' window size will be 640x480. In this example, selecting '½ frame' produces a window size of 320x240 and selecting '¼ frame' produces a size of 160x120.



Close



Closes the 'Player Control' and 'Player Dialog' windows.

Chapter 5



Electrical Interfaces

This chapter contains information on the VCE-PRO's connectors.

Video Connector

There are two versions of the VCE-PRO: the VCE-PRO, which utilizes stereo phono jacks and the VCE-PRO-F which utilizes a 15 pin i/o connector.

VCE-PRO

The analog video interface for the VCE-PRO card consists of two 2.5mm stereo phono-jacks (one per video channel). The pin-out for the mating phono plug is illustrated in Figure 3. Each phone jack provides three signals:

CVBS/Y - A composite signal or the luminance component of an S-Video signal.

C - A chrominance component of an S-Video signal.

Chassis GND - A shield/ground signal.

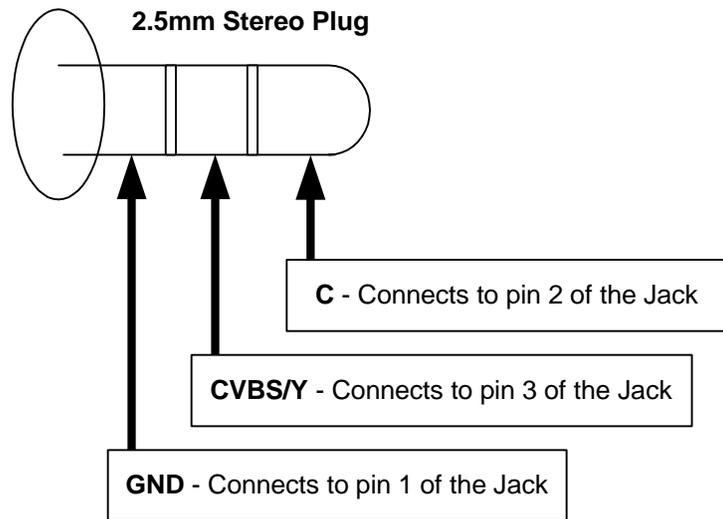


Figure 3 – VCE-PRO video – mating plug

VCE-PRO-F

The analog video interface for the VCE-PRO-F is a surface mount, right angle, 15 position, female connector. The pins are used for analog video and trigger inputs as indicated in Table 3.

Pin #	Signal
1	ANALOG GND
2	ANALOG GND
3	CVBS0/Y0
4	ANALOG GND
5	ANALOG GND
6	CVBS1/Y1
7	ANALOG GND
8	ANALOG GND
9	C0
10	ANALOG GND
11	C1
12	DIGITAL GND
13	Trigger_In +
14	Trigger_In -
15	DIGITAL GND

Table 3 – VCE-PRO-F Connector Pin-out

External Trigger Connector

VCE-PRO

The external trigger for the VCE-PRO card consists of a 3.5mm female stereo phono jack. The pin-out for the mating phono plug is illustrated below.

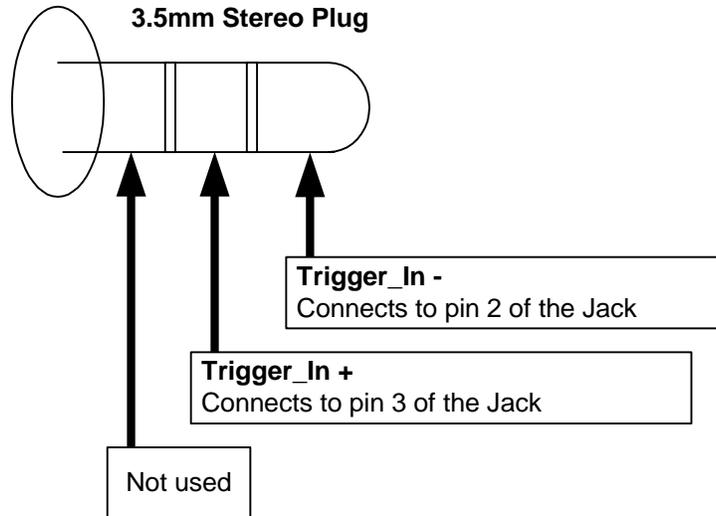


Figure 4 – VCE-PRO External Trigger – mating plug

VCE-PRO-F

The external trigger of the VCE-PRO-F card utilizes pins on the 15 pin connector. Pins 13 and 14 are used for the Trigger_In + and Trigger_In – signals, respectively.

Functionality

If external triggering is enabled, the VCE-PRO will use the state of the external trigger signal to qualify when to start (and optionally end) capturing video images to disk. The VCE-PRO will wait until the trigger condition (as specified in the 'Trigger behavior' field of the 'Trigger Capture Settings' dialog) has been satisfied before beginning to store video images to the disk. It will stop storing video images on the disk when the programmed end condition has been met. The following external trigger conditions can be specified:

Rising Edge

Image capture begins when a 'logic-0' to 'logic-1' transition occurs on the trigger inputs.

Image capture ends when 'limit number of frames to' or 'limit time to' has been met.

Falling Edge

Image capture begins when a ‘logic-1’ to ‘logic-0’ transition occurs on the trigger inputs.

Image capture ends when ‘limit number of frames to’ or ‘limit time to’ has been met.

While High

Image capture begins when a ‘logic-1’ signal is present on the trigger inputs.

Image capture ends when ‘logic-1’ to ‘logic-0’ transition occurs on the trigger inputs.

While Low

Image capture begins when a ‘logic-0’ signal is present on the trigger inputs.

Image capture ends when ‘logic-0’ to ‘logic-1’ transition occurs on the trigger inputs.

Electrical Considerations

The external trigger input is optically isolated from the rest of the VCE-PRO hardware. An internal 300 ohm series resistor is used to limit the input current. The input signals “TRIGGER IN +” and “TRIGGER IN -” are used to connect to an external trigger source.

A ‘logic-0’ is considered a positive voltage (between TRIGGER_IN + and TRIGGER_IN -) of 0v to 1.0v.

A ‘logic-1’ is considered a positive voltage (between TRIGGER_IN + and TRIGGER_IN -) of 4.0v to 5.0v.

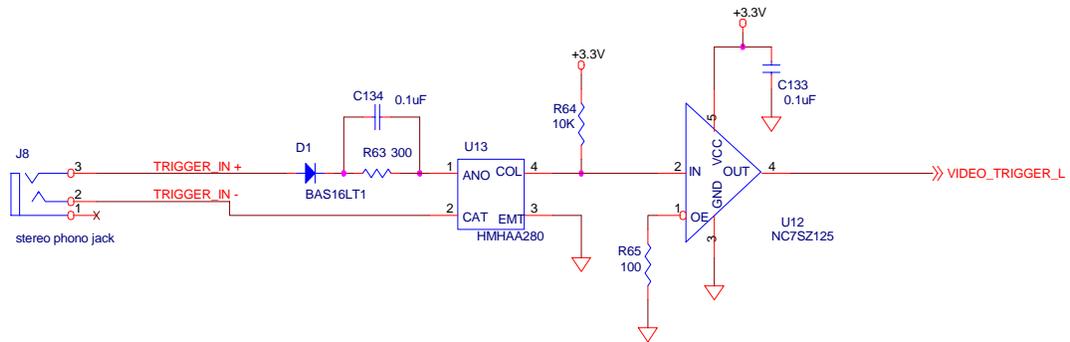


Figure 5 – External trigger schematic

CAUTION NOTE

The maximum input current MUST NOT exceed 10mA or else damage may occur to the card!

PCMCIA/Cardbus Connector

The Cardbus connector is a surface mount, right angle, 68 position, female connector.

Pin #	Signal	Pin #	Signal
1	GND	35	GND
2	ad0	36	cd1#
3	ad1	37	ad2
4	ad3	38	ad4
5	ad5	39	ad6
6	ad7	40	rfu
7	C/be0#	41	ad8
8	ad9	42	ad10
9	ad11	43	vs1
10	ad12	44	ad13
11	ad14	45	ad15
12	C/be1#	46	ad16
13	par	47	rfu
14	perr#	48	block#
15	gnt#	49	stop#
16	int#	50	devsel#
17	VCC	51	VCC
18	VPP1	52	VPP2
19	clk	53	trdy#
20	irdy#	54	frame#
21	c/be2#	55	ad17
22	ad18	56	ad19
23	ad20	57	vs2
24	ad21	58	rst
25	ad22	59	serr#
26	ad23	60	req#
27	ad24	61	c/be3#
28	ad25	62	audio#
29	ad26	63	stschg
30	ad27	64	ad28
31	ad29	65	ad30
32	rfu	66	ad31
33	clkrun#	67	cd2#
34	GND	68	GND

Table 4 – Cardbus Connector Pin-out

Chapter

6

Specifications

Video Source

NTSC/PAL/SECAM

External Trigger

$V_{lo_{min}}$	= 0.0V	minimum forward voltage for logic-0
$V_{lo_{max}}$	= 1.0V	maximum forward voltage for logic-0
$V_{hi_{min}}$	= 4.0V	minimum forward voltage for logic-1
$V_{hi_{max}}$	= 6.0V	maximum forward voltage for logic-1
$V_{r_{max}}$	= 5.0V	maximum reverse voltage
I_{min}	= 5.0mA	minimum current
I_{max}	= 10.0mA	maximum current... MUST NOT BE EXCEEDED!

Physical Dimensions

VCE-PRO :
PCMCIA Type II: 115.6mm(4.55in) x 54mm(2.1in) x 5mm(.2in)
with a 30mm x 10mm extension.

VCE-PRO-F:
PCMCIA Type II: 115.6mm(4.55in) x 54mm(2.1in) x 5mm(.2in)

Weight

35 grams (1.25 oz)

Electrical Characteristics

Operating voltage:	3.3V +/- 5%
Operating current:	160mA
Inrush current:	360mA

Operating Environment

Operating temperature:	0°C to 65°C
Relative humidity:	90% non-condensing