VCube
HD VIDEO SYSTEM

User Manual

MERGING

Merging Technologies
Le Verney 4 1070 Puidoux Switzerland
Tel: +41 21 946 04 44 • Fax: +41 21 946 04 45
www.merging.com

Contents

Document revision-22

Date: 28th-November-2012

Introduction

Thank you!

Congratulations on your purchase of the **VCube HD Video System**. More than just a powerful video solution, VCube is part of a comprehensive range of Audio, Video and Show Control products, software and hardware. Welcome to the worldwide community of users who have already discovered the Merging Technologies advantage.

> **Note: IMPORTANT!** - The first thing you need to do is register your software to acquire your VCube key(s) and to be included in our user support list.

Please also subscribe to the User Forum at:

http://www.merging.com/forum/

Overview

What is VCube?

VCube is a hard-disk based video player / recorder system with real-time editing and resizing functions. It is designed to be an easy to use, flexible, high quality, and reliable video file play out and capture device synchronizable with any time reference standard. For example:

In Sound for Picture Post-Production, ADR etc.

Theatres

Theme Parks

Museums

Trade Shows

AV Presentations

Film Festivals

are just a few of the possible applications for **VCube**.

VCube can operate as a standalone unit, or as part of a multi-system network, fully integrated with **Pyramix** or **Ovation**, over standard Ethernet networks.

Like Pyramix it offers sync to PAL, NTSC, 24fps Film and all the HDTV frame rates.

The Turnkey versions of VCube are also able to sync to a different TimeCode and reference than the internal frame rate. This enables, for example, playing in 24 fps while syncing to a 25 fps TimeCode.
Pro versions of VCube can also be controlled via the 9-pin Sony (P2) protocol by any third-party DAW system, as well as controlling any device equipped with 9-pin remote control for capture. VCube fully supports the Merging Technologies Virtual Transport technology.

The integrated video editor with multi-track, multi-layer features enables the VCube user to remove, add or trim Media Files imported from a Composition (VCube native Composition or OMF. AAF, and Apple XML are optional).

VCube is able to mix different video file formats at different resolutions and frame rates in the same Timeline. It is only necessary to specify the output format. All video Clips are resized and the frame rate compensated as necessary to this format in real time. Therefore it is possible to play out any video file at any frame rate in combination with any other without rendering.

VCube is an open solution that can import OMF, AAF, Apple XML Compositions. VCube is also able to convert, and render Media. A password protected watermark feature enables the administrator to tag both video and graphic outputs. The administrator can also protect VCube settings and editing with a second password.

VCube will be your Swiss Army Knife for video !

Contacting Merging

International Office:

Merging Technologies S.A.

Le Verney 4

CH-1070 Puidoux

Switzerland

Phone: +41 21 946 0444

Fax: +41 21 946 0445

UK:

Merging UK

St Clare House, St Clare Business Park

Holly Road, Hampton Hill

Middx UK

TW12 1QQ

Phone: +44 (0) 20 894 16547

Fax: +44 (0) 870 1231747

USA:

Merging USA (Independent Audio)

43 Deerfield Road

Portland,

ME 04101-1805

United States of America

Phone: +1 (207) 773 2424

Fax: +1 (207) 773 2422

For all documentation inquiries or suggestions for improvement:

http://www.merging.com

VCube Keys & Options

VCube is currently supplied with RGBA, RGB, YUY2, DV25, MJPEG, codecs. DVCPRO (50), DVCPRO-HD (100),DNxHD and IMX/MPEG2 are optional. OMF is provided as a Timeline exchange format. MXF, AAF, and Apple XML are optional.

VCube Keys	Description
VCube	Enable VCube Software
VCube IO SD Composite	
VCube IO SD SDI	Enable Xena LS
VCube IO HD SDI	Enable Xena LH
VCube IO HD SDI Dual-Link	Enable Xena 2K
VCube IO HD SDI Dual-Link Ex	
Vcube IO HD Telecine	
VCube MPEG2-SD/D10/IMX (Sony XDCam SD)	IMX / MPEG2 / MPEG1 support
VCube DVCPro	DVCPRO 25 / 50 support
VCube InterChange - Final Cut Pro XML	XML Timeline exchange
VCube InterChangeAAF	AAF Timeline exchange
VCube HD 2K	formats higher than 1280 x 720
VCube DVCPro HD	DVCPRO 25 / 50 / 100
VCube MXF	MXF file format support
VCube VC-3 (Avid DNxHD)	DNxHD codec support
VCube MPEG2-HD (Sony XDCam HD)	
Vcube AVC-Intra (Panasonic P2)	
VCube SE (no cross-lock)	VCube Without Mykerinos
VCube LE (no cross-lock, no media generation)	Player only
VCube XE (no cross-lock)	Player only
Machine Control	Pro option for SE, LE, XE
Bi-Phase	Pro option for Turnkey, SE, LE, XE

	Includes							
	VCube Player	Render/Export/Wrap	Sync Card (LTC/RS-422/Midi)	Machine Control	Video Record	Video I/O SD-SDI Card	Video I/O SD/HD-SDI Card	Video I/O Dual SD/HD-SDI Card
VCube LE	✓							
VCube LE Pro	✓		✓	✓				
VCube XE	✓	✓						
VCube XE Pro	✓	✓	✓	✓				
VCube SE-SD	✓	✓		✓*	✓	✓		
VCube SE Pro-SD	✓	✓	✓	✓	✓	✓		
VCube SE-HD	✓	✓		✓*	✓		✓	
VCube SE Pro-HD	✓	✓	✓	✓	✓		✓	
VCube SE Pro-DD	✓	✓	✓	✓	✓			✓
	✓*	*Using the PC built-in RS-232 COM Port*						

VCube Versions

Installation

Please see the VCube Installation Guide and the Installation Guides for any hardware you have purchased.

Early VCube Systems

Note: Early VCube systems may include AJA Xena LS, Xena HS or Canopus ADVX-1000 video cards. These are no longer actively supported as of Version 2. If you have one of these cards you may wish to contact your Merging Technologies sales partner to discuss a cross-grade solution.

VCube Concepts

Project

A **Project** is the top level of organization. Projects are saved with the file extension **.VCube**. A **Project** controls and keeps track of all the various elements you are assembling at a given time. A **Project** always contains a **Composition,** viewed on the **Timeline**.

Composition

A **Composition** is any number of **Clips** complete with edits and fades, level settings etc. placed on a **Layer** in a **Track** or tracks in a time relationship to each other and to the **Timeline**.

Track

In the Timeline Video and Audio assets are placed onto Layers within Tracks.

Video Track Layer

Video Track Layers behave in the same manner as layers in a non-linear video editor. I.e. video on the topmost layer of the topmost track will hide concurrent video below it unless there is a compositing blend mode or picture-in-picture mode in force.

Audio Track Layer

Audio Track Layers display the waveform for each channel in the audio media file. Thus a stereo audio track will have two layers and a 5.1 will have six.

About This Manual

Assumptions

This User Manual and the other documentation assume you are thoroughly familiar with PCs and Windows terms and concepts. If the PC is new, please ensure the machine is working correctly before attempting to install VCube.

> **Note:** Although VCube version 2 runs under the 32 bit versions of Windows XP, Windows Vista and Windows 7, it does not support the "Aero" style transparency display features present in Windows Vista and Windows 7. This will be turned off automatically for the duration of the VCube session.

Conventions

Conventions used in this document:

Names found on screens and in menus are shown in bold. E.g. **Information & Settings**

Menu and sub-menu selections are shown like this:

User-Interface > Output > Show Buffer Tab

Which means:

Go to the **User-Interface** pull-down menu, mouse down to the **Output** sub-menu, mouse down to the **Show Buffer Tab** entry and **Click**.

References to VCube Settings Tabs are shown thus:

Settings : Formats & Sync : Composition Video Format : Height

Which means:

In the Settings Page accessed via **Settings > Show All Settings** click on the **Down Arrow** and **Click Format & Sync** to open the Tab. In the **Composition Video Format Section** the **Height** field is the one we are interested in.

Keyboard Shortcuts are shown thus: [**Ctrl + Num 9**].

The VCube User Interface uses a number of buttons. These are dark when unchecked (inactive, not selected) and orange when checked (active, selected) The state of these buttons is referred to as **checked** or **unchecked**.

VCube button states

In the screenshot above the **Transparent Overlay Box** is inactive (unchecked) and **Chase TimeCode** is active (checked).

Documentation

Automatically installed with VCube and available under the **Help** menu or **[F1]**, this manual is intended to be a comprehensive reference source for all the standard features and functions in VCube.

To ensure the document is visible please uncheck **TopMost** in **Settings > Show User Interface Tab : Display - Manual Resize** or use [**Ctrl + Shift + Alt +P**] to open the page.

All the documentation is in the Adobe Acrobat pdf format. (**.pdf** file extension)

In order to read the documentation you will need to have **Adobe Acrobat Reader V5** or later installed on your computer.

Other documentation can be found in the Windows **Start** menu in **All Programs > VCube > Docs**. Please check for the most recent versions at:

http://www.merging.com

Note: All features described in the documentation are available in the **Advanced Mode**. If the user-interface is set to **Simple Mode** some features may remain hidden or unavailable. To change the UI Mode:

User Interface > WorkSpace > UIMode: Advanced [**Alt + F3**]

User Interface > WorkSpace > UIMode: Simple [**Alt + F1**]

Navigation

In electronic form, all the **Contents** and **Index** entries and **Cross-references** are hyperlinks. I.e. Clicking on them will jump to the relevant item.

ToolTips

VCube software is equipped with 'ToolTips'. Hovering the mouse cursor over a tool icon pops-up a box with the name of the function and the keyboard shortcut (where applicable).

Support

If you cannot find an answer to a query in the documentation, please consult the on-line support at:

http://www.merging.com

where you will find answers to F.A.Q.s (Frequently Asked Questions) and further support.

Multiple Monitors

VCube supports 2 screen extended desktop operation. Depending on the Vcube version and the hardware available, analog and digital video outputs are available to feed monitors and or projectors.

Important Note

VCube is not only a very powerful video player/recorder, it is also a highly configurable one, the User Interface as much as the Video and Audio. Therefore screenshots in this document may differ from what you see on screen.

PLEASE DO NOT PRINT THIS DOCUMENT UNLESS ABSOLUTELY NECESSARY

SAVE TREES AND INK BY USING THE HYPERLINKS

User Interface

Overview

VCube is organized with a Tabbed Page interface. Every Tab can be displayed in a broken away window, on top of the Preview, if required, even while Preview is full screen. Classic pull-down menus complement this user interface. In VCube there are usually at least three ways of accessing everything. E.g. Menu, Icon, Tab or Keyboard Shortcut.

To display a Page Tab separately, **Double-click** on its **Title Label**. The floating Tab Page can now be Click-and-dragged anywhere on the screen(s).

To restore the Tab Page to its default position, just **Double-click** again on the **Title Label** or use the close window **X** icon.

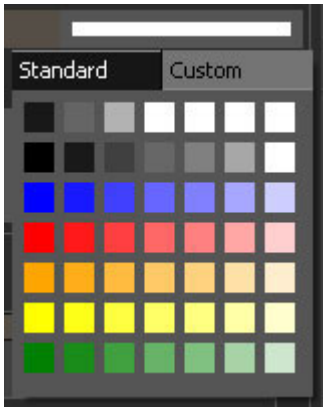
To display an individual Tab separately, [**Ctrl + Double-click**] on its **Title Label**.

To restore to the default position, just **Double-click** on its **Title Label** or use the close window icon.

Individual Tabs can also be displayed separately by a **Double-clicking** on their **Title Labels**.

Color Picker

Several VCube Settings Tabs use a **Color Picker**.



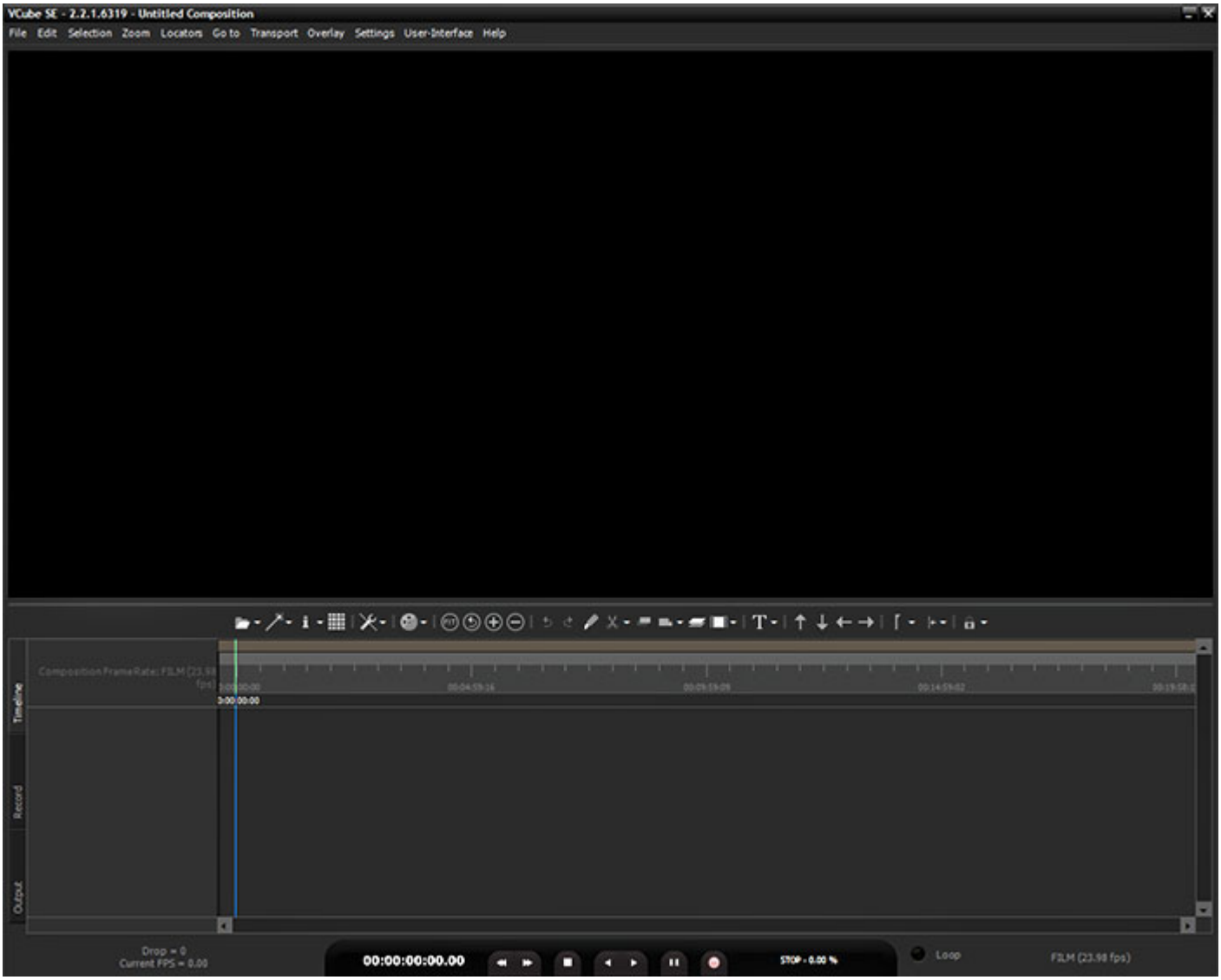
Pick one of the standard colors by simply clicking on it.

Alternatively Click on **Custom** to edit the colors in the first row of the **Color Picker**.

Click in the bottom bar to choose a **Hue** value.

Finally, Click in the Saturation area to define the custom color.

Program Screen



VCube Program Screen

The main **VCube** screen appears when the program is launched. This screen is **NOT** resizable in the conventional Windows manner and will occupy the whole screen area of one PC monitor unless **Floating Window** mode is selected (**[F4]** toggles). It can also be minimized or closed with control boxes at top right.

Pull-down menus are at the top of the screen.

By default the entire upper panel is a Preview video monitor. Beneath this is the **Toolbar** and the **Timeline** panel with the **Locator Bar**, **Time Scale** (plus optional **Film Footage** scale) and **Range Bar** at the top and the **Transport Control** bar at the bottom.

The **Timeline** area is tabbed with **Timeline**, **Record** and **Output** Tabs available on the left.

The **Toolbar** can be made 'floating' by double-Clicking it. Double-Clicking the header of the floating Toolbar re-docks it.

Floating Toolbar

The splitter (dividing line) between the panels may be grabbed with the mouse and moved up or down, thereby varying the space allocated to each panel.

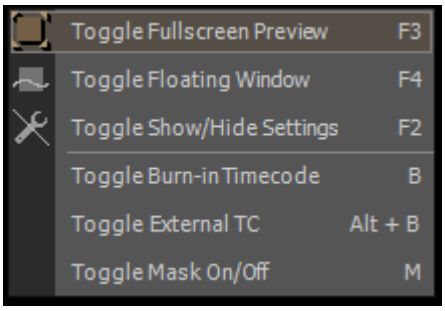
Context Menus

Right-click in the Preview pane or in the Timeline with the Cursor over the tracks to display contextual menus.

Note: The Timeline menu contents varies depending on circumstances.

Preview Context Menu

In Simple, Full Screen or Floating modes, several VCube functions can be accessed with a **Right-Click** on the preview area :



Preview Context Menu

Toggle Fullscreen Preview [**F3**] Toggles Preview Full Screen.

Toggle Floating Window [**F4**] Toggles the Preview window floating and hides the User Interface except for broken away windows

Toggle Show/Hide Settings [**F2**] Toggles Control Settings Pages.

Toggle Burn-in Timecode [**B**] Toggles the Burnt-in TimeCode Counter Show/Hide

Toggle External TC [**Alt + B**] Toggles the External TimeCode Input display Show/Hide

Toggle Mask On/Off[**M**]Toggles the horizontal and vertical Masking **On**/**Off**

Navigating the Interface

Whilst it is perfectly possible to operate VCube without recourse to Keyboard Shortcuts we strongly advise learning at least the basics. Changing the layout of the User Interface during operation and opening and closing the most common Pages and Folders is much more efficient this way rather than delving in menus. The following list gives the most commonly used Interface functions, their shortcuts and menu entries :

Display Control Settings Pages [**F2**] **User Interface > Toggle Show/Hide Settings**

Displays the Settings and Control Pages on the right-hand side of the Preview pane. The Preview is resized to suit. The width of the Control Settings Pages can be changed by clicking and dragging the separator.

Toggle Full Screen Preview [**F3**] **User Interface > Toggle Full Screen preview**

Toggle Floating Window [**F4**] **User Interface > Toggle Floating Window**

Makes the Preview window float and hides the User Interface except for broken away windows. You can choose from

Refresh [**F5**] **User Interface > Refresh**

Toggle File Page [**F6**] **User Interface > Settings Pages > Show File Page**

Toggle Locator Page [**F7**] **User Interface > Settings Pages > Show Locator Page**

Toggle View Page [**F8**] **User Interface > Settings Pages > Show View Page**

Toggle Edit Page [**F9**] **User Interface > Settings Pages > Show Edit Page**

Open Settings Page [**F10**] **User Interface > Settings Pages > Show Settings Page**
Opens the **Settings Page** floating

Previous Settings Page [**Home**] **User Interface > Settings Pages > Previous Settings Page**

Next Settings Page [**End**] **User Interface > Settings Pages > Next Settings Page**

Show Timeline in lower panel [**F11**] **User Interface Show Timeline Page**

Show Record Page in lower panel	[**F12**]	**User Interface > Show Record Page**
Toggle Transport Control Panel	[**T**]	**User Interface > Toggle Transport Tool**
Show Preset Tab	[**P**]	**Settings > Show Preset Tab**

Zoom in the Timeline

To change the Zoom level use [**Alt + Mouse wheel**] or [**Alt + Click into the Time Ruler and Drag**].

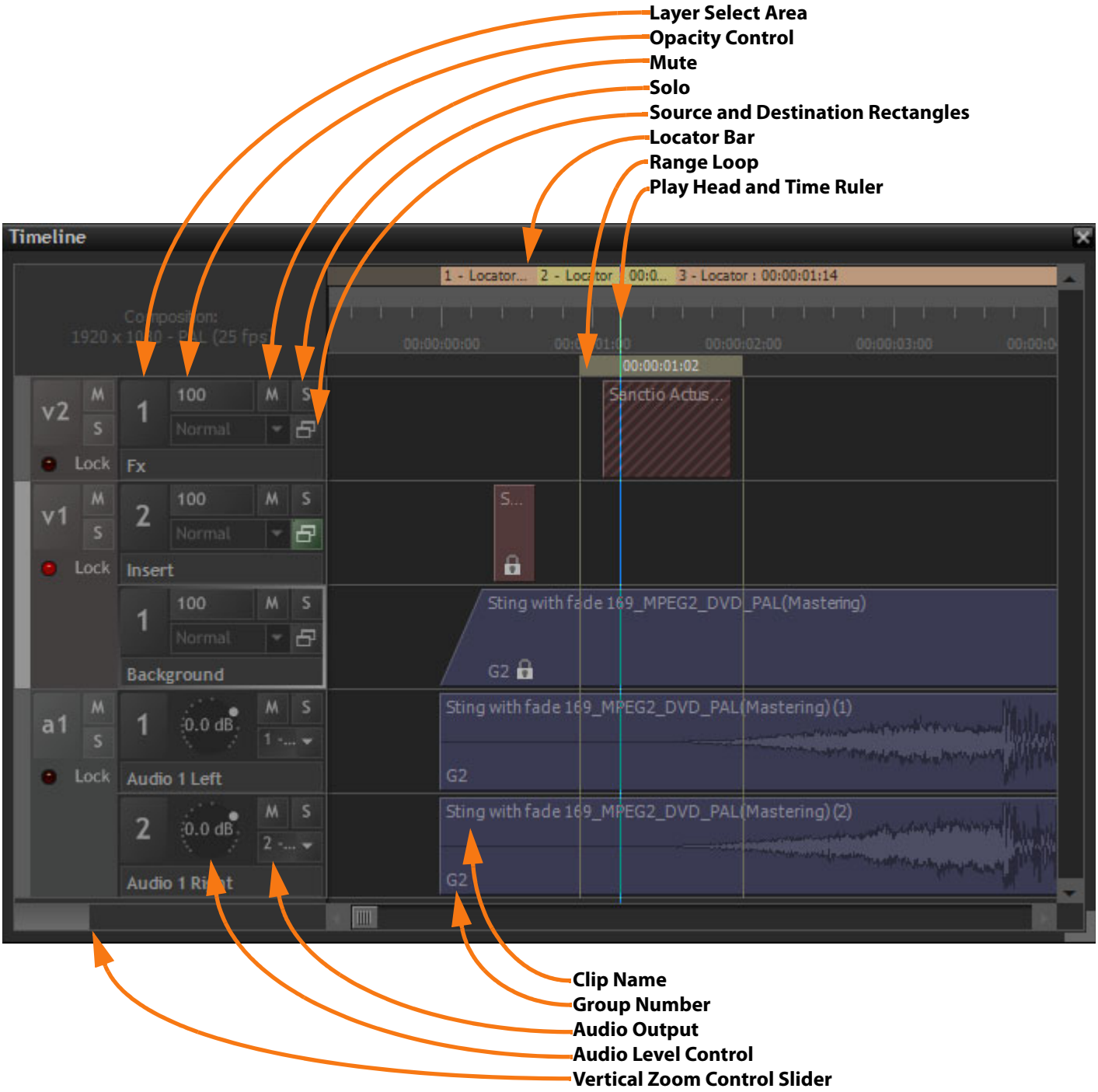
[**Alt + Drag in the Timeline**] Zooms to the Region selected.

Double-click on the Time Ruler acts as **Zoom All** and deselect selected clip(s).

Zoom All	**[Alt + 1]**
Undo zoom	**[Alt + 2]**
Zoom In	**[Alt + 3]**
Zoom Out	**[Alt + 4]**

Timeline

User Interface > Show Timeline Page [**F11**] brings the focus to the Timeline Tab below the Preview pane. Double-clicking the **Timeline** Tab breaks it away as a floating window.



Timeline floating Tab

- The **Locator Tray** is above the **Timeline**. Locators can be dragged with the mouse. Double-click in the Locator tray to open the **Locators** page.
- Below is the **TimeCode Scale**. A Double-click in the TimeCode **Scale** acts as Zoom Fit [**Alt + 1**] and **Deselects All Clips**.
- Underneath is the **Range Tray**. The Range can be dragged and trimmed with the mouse. Double-clicking in the **Range Tray** sets the Range from the **Start** to the **End** of the **Composition**.
- **Video Track 1** has **2** Layers and is locked, **Track 2** has only one Layer.

- Layer **1** is selected in **Video Track 1**. **Track 1** is also selected. **Sting Clip** is set to Fade In.
- Opacity of every Layer is set to full (**100**). **Layer 2** in **Video Track 1** has been modified in Size or Position
- In **Video Track 2** the Red / Blue Clip (crosshatched or "zebra" striped) means the Media is missing but despite this, the Clip can still be edited.
- Audio Clips and Video **Clip Sting...** belong to the same group, G2.
- Click and drag on the **Vertical Zoom Control** to vary the Track height.
- Click on the **Audio Output** indicator to pop-up a list of all available audio outputs.

Note: Right-clicking in a blank area of the Timeline pops-up a context menu. Right-clicking on a Clip pops-up a different context menu.

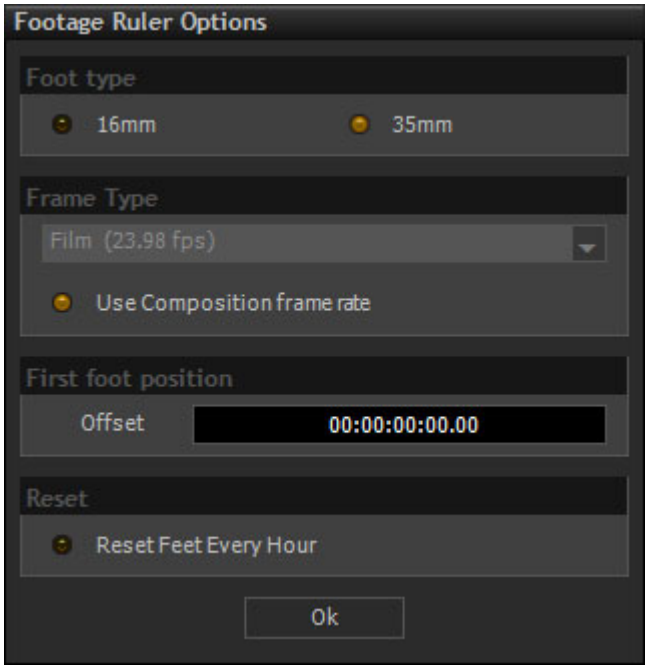
Note: In the Video Layer header, the button labeled **Normal** and associated drop-down are for a future feature under development.

Film Footage Ruler

Settings > Show Timeline Tab : Feet Ruler

When checked, the **Show Feet Ruler** entry shows the **Film Footage Ruler** above the TimeCode Scale.

The Footage Ruler Settings dialog can be accessed by Right-clicking the **Film Footage Ruler** or via **Settings > Show Footage Ruler Options Dialog**



Footage Ruler Options dialog

Footage type

16mm When checked Film Feet are counted in units of 40 Frames

35mm When checked Film Feet are counted in units of 16 Frames

Frame Type

The Frame Type drop-down menu allows for the cadence and temporal subdivisions of the feet & frames counter to be changed independently of the Composition frame rate or incoming timecode. By far the most popular footage counter temporal rate is 24 fps which corresponds to a standard 35 mm frame rate, but you may also need to compensate for picture that has been accelerated frame-for-frame (24=>25 fps) or pull-down frame rates (23.98 film) so that feet & frame values actually match frames in the Timeline regardless of the Composition's or incoming TimeCode's frame rates. The **Use Composition** frame rate button locks the feet & frames counters to the Composition frame rate.

Use Composition frame rate When checked the time-base is the same as the Composition Frame Rate. When unchecked the time-base can be selected from the drop-down list above.

First foot position

The Time field enables an offset to be entered if required. For example when a 15 foot (10 second) leader starting at **01:00:00:00:00** precedes the first frame of action and the first frame of action should show **0.00 Feet & frames** at **01:00:10:00.00** TimeCode then enter an offset of **01:00:10:00:00**

Reset

Reset Feet Every Hour

When checked, the footage counter and footage ruler will return to **0.0** after every hour. This is useful if there are several film reels in a composition with first frame of picture of each reel at the beginning of each hour. E.g. reel one starts at **01:00:00:00:00**, reel two at **02:00:00:00:00** and so on. Thus enabling each reel to count from **0.00** feet.

Settings

All the relevant synchronization settings can be found in the **Settings > Show Format & Sync Tab**.

Requirements

In order to be synchronized properly VCube requires the following as a minimum:

- A Chase TimeCode Source (Virtual-Transport: Network, Sony 9-pin (P2) protocol or external : LTC, VITC, MTC)
- A TimeCode Clock Reference (VCube's Video **Reference In** BNC connector or internal Mykerinos' clock)
- A Clock for audio sampling rate sync. (Internal: Mykerinos, or external: Video, WordClock, or Audio Input)

TimeCode Sources

- LTC (VCube XLR connector) Network (RJ45 Ethernet connection)
- VITC (VCube Video Reference In BNC connector)
- Sony 9 pin protocol (RS-422 serial port). RS-232 on COM1 port is also possible.
- MTC (MIDI TimeCode from a suitable hardware MIDI interface or IP MIDI etc.)

Note: that an Ethernet connection used as a source of TimeCode is also able to feed VCube with an SD stream from a Video Server simultaneously.

Follow VT

TimeCode Chase, whilst effective, is slow. **Follow VT** mode enables VCube (and Pyramix) to enable following Virtual Transport. In effect this is a built in **Chase Synchronizer** for VCube.

Follow VT Configurations

Normal Mode (VCube with Mykerinos)

- VCube is always **Clock Master**
- VCube can Chase **LTC**
- VCube can Chase **VITC**
- VCube can Chase Sony 9-Pin Machine TC
- VCube can Chase **MTC**
- VCube can **Follow VT**

VCube SE with AJA Card and WITH USB Sync card (PRO option):

Clock Master ON:

- VCube can Chase on LTC
- VCube can Chase a Sony 9-Pin Machine TC
- VCube can Follow VT

Clock Master OFF

- VCube can Follow VT ("PyraCube" Setup)

VCube SE Mode with AJA Card and WITHOUT USB Sync (PRO option):

Clock Master ON:

- VCube can Chase Sony 9-Pin Machine TC

- VCube can Follow VT

  Clock Master OFF

- VCube can Follow VT (**PyraCube** Setup)

XE/LE/SE Mode without AJA Card and WITHOUT USB Sync (PRO option):

- VCube is NEVER **Clock Master** and **TC Master**. VCube follows **VT** without using its internal **Chase Synchronizer** because both Clock and TimeCode is sourced from VT.

VCube SE Auto Sync Settings

To simplify setting up VCube in SE Mode some settings are made automatically:

- When **Follow VT** mode is enabled, VCube disables **VT TC Master** and vice versa.
- When **Chase** is enabled, VCube enables **VCube as VT Clock Master**
- When an AJA Card is enabled or if VCube launches with an AJA card enabled, VCube enables **VCube as VT Clock Master** if no Pyramix is detected (running) on the same VT Server instance (on the same computer) and it disables **VCube as VT Clock Master** if Pyramix is running (**PyraCube** Setup)
- When an AJA Card is enabled or if VCube launches with an AJA card enabled, VCube enables **Follow VT** if Pyramix is running on the same VT Server instance (on the same computer for **PyraCube** Setup)
- When **Follow VT** is enabled VCube makes the **Chase** function unavailable
- When No AJA Card is enabled, VCube disables the Clock and TC Master capabilities and makes unavailable the **Chase** function unavailable and enables the **Follow VT** function.

Important Note

In order to ensure optimum sync; the **Mykerinos**, **AJA** and **USB Sync** cards must all be locked to the same Video Reference.

Quick Settings

Overview

In order to ensure that VCube is as versatile as possible there are a very large number of settings. To make it easier to configure VCube for common formats there are two **Quick Settings** options.

These two dedicated Settings panels enable one click setting of the Video Input format, the Composition format, the TimeCode frame rate and the Video Output format. When VCube is configured by using **Quick Settings** it behaves like a VCR for the format selected. Quick Settings can also form a useful basis for more complex configurations.

Using Quick Settings

Set Up

To set up VCube using **Quick Settings:**

- Open the relevant **Quick Settings** Page using :

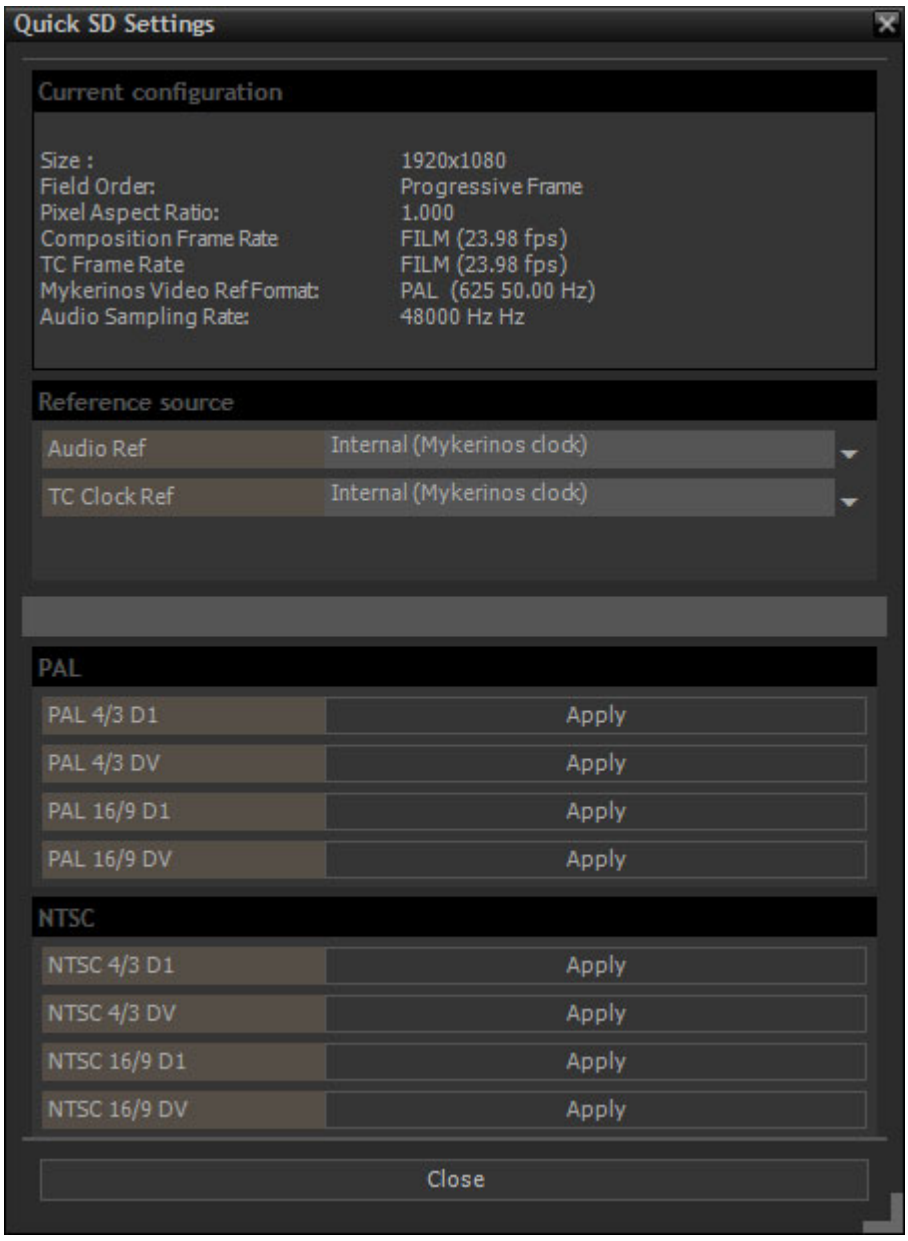
Quick SD Settings for Standard Definition formats: **Settings > Quick SD Settings** [**Alt+F5**]

Quick HD Settings for High Definition formats**: Settings > Quick HD Settings** [**Alt+F6**]

- Ensure that the two or three **Reference Source**s are set appropriately.
- Click on the **Apply** button for the appropriate format.
- Verify in the **Current Configuration** section that the settings are as you desire
- Click on **Close** to finish and close the Page

Please see subsequent pages for screenshots and details.

Quick SD Settings



Quick Standard Definition Settings page

Current Configuration

The **Current Configuration** section summarizes the current state of VCube in terms of:

Size :	Shows the number of horizontal and vertical pixels.
Field Order:	Shows **Progressive Frame** for non field based formats or field order and type.
Pixel Aspect Ratio	Shows the shape of pixels as a ratio
Composition frame Rate	E.g. FILM (23.98 fps)
TC Frame Rate	E.g. FILM (23.98 fps)
Mykerinos Video Ref Format:	E.g. PAL (625 50.00 Hz)
Audio Sampling Rate	E.g. 48000 Hz

Reference Source

The **Reference source** Panel features two or three drop-down lists:

Video Reference Source	Field shows the current Video Reference source. Click on the down arrow to select an alternative. (This line is only present when a Video card is fitted.)

Audio Ref	Field shows the current Audio Reference source. Click on the down arrow to select an alternative.
TC Clock Ref	Field shows the current TimeCode Reference Source. Click on the down arrow to select an alternative.

Note: Except in exceptional circumstances it is highly desirable, if not essential, that all the references are the same and, ideally, sourced from external video syncs.

PAL

PAL 4/3 D1

PAL 4/3 DV

PAL 16/9 D1

PAL 16/9 DV

NTSC

NTSC 4/3 D1

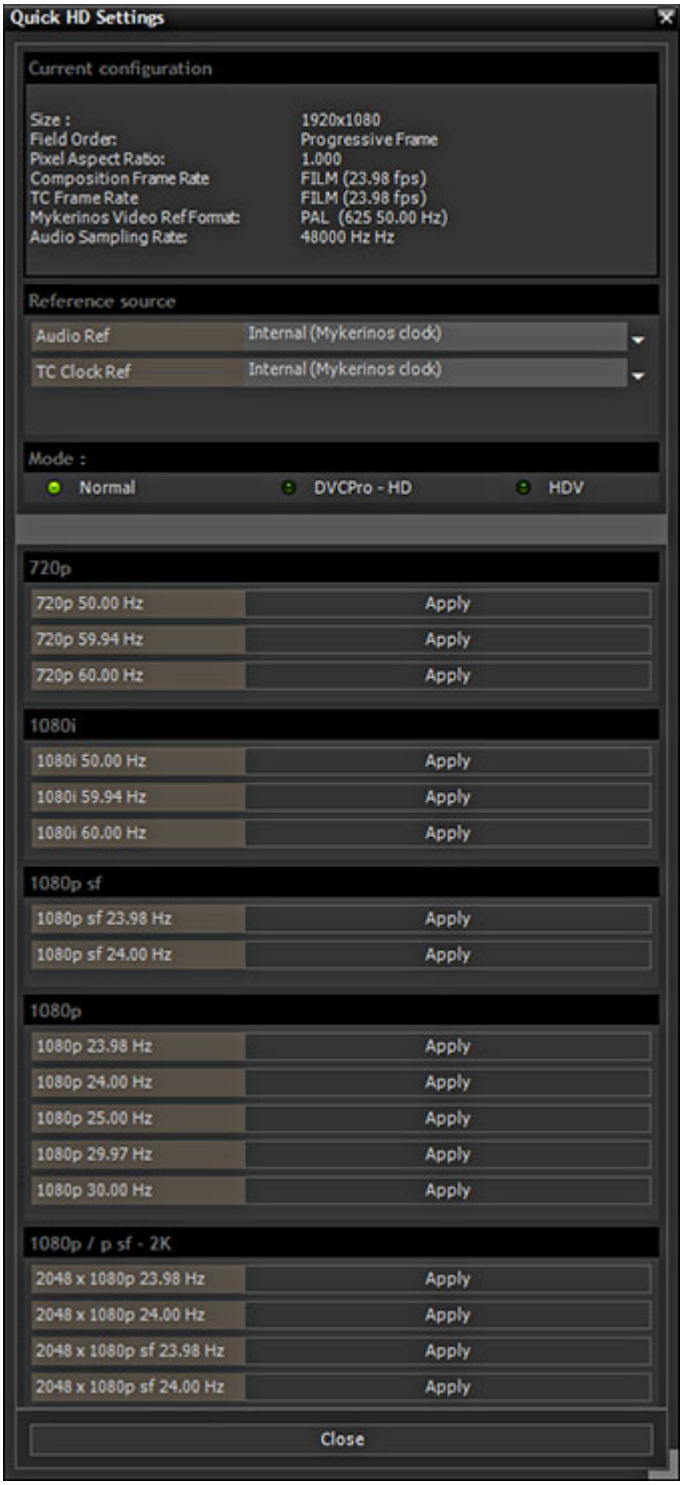
NTSC 4/3 DV

NTSC 16/9 D1

NTSC 16/9 DV

Note: The terms **PAL** and **NTSC** are not strictly accurate in the context of Digital Video but are used commonly as a convenient shorthand to differentiate between European and US standards.

Quick HD Settings



Quick High Definition Settings page

Current Configuration

The **Current Configuration** section summarizes the current state of VCube in terms of:

Size :	Shows the number of horizontal and vertical pixels.
Field Order:	Shows **Progressive Frame** for non field based formats or field order and type.
Pixel Aspect Ratio	Shows the shape of pixels as a ratio
Composition frame Rate	E.g. FILM (23.98 fps)
TC Frame Rate	E.g. FILM (23.98 fps)
Mykerinos Video Ref Format:	E.g. PAL (625 50.00 Hz)

Audio Sampling Rate E.g. 48000 Hz

Reference Source

The **Reference source** Panel features two or three drop-down lists:

Video Reference Source Field shows the current Video Reference source. Click on the down arrow to select an alternative. (This line is only present when a Video card is fitted.)

Audio Ref Field shows the current Audio Reference source. Click on the down arrow to select an alternative.

TC Clock Ref Field shows the current TimeCode Reference Source. Click on the down arrow to select an alternative.

Note: Except in exceptional circumstances it is highly desirable, if not essential, that all the references are the same and, ideally, sourced from external video syncs.

Mode

The three **Mode** buttons enable video card memory usage to be optimized depending of the type of HD media recorded on tape.

DVCPRO-HD and **HDV** require specific settings to achieve maximum performance in **Record** and **Playback**.

Compositions

The top level of organization in VCube is the **Composition**.

A Composition is a set of instructions to VCube. These include format information, screen layout and an EDL indicating what Media is to be played and when. It also determines fades, levels and other parameters. A Composition does not contain Media Files. Compositions are portable between systems.

> **Note:** Only one Composition can be loaded at a time. However it is possible to load elements of other Compositions into the current Composition.

File Extension

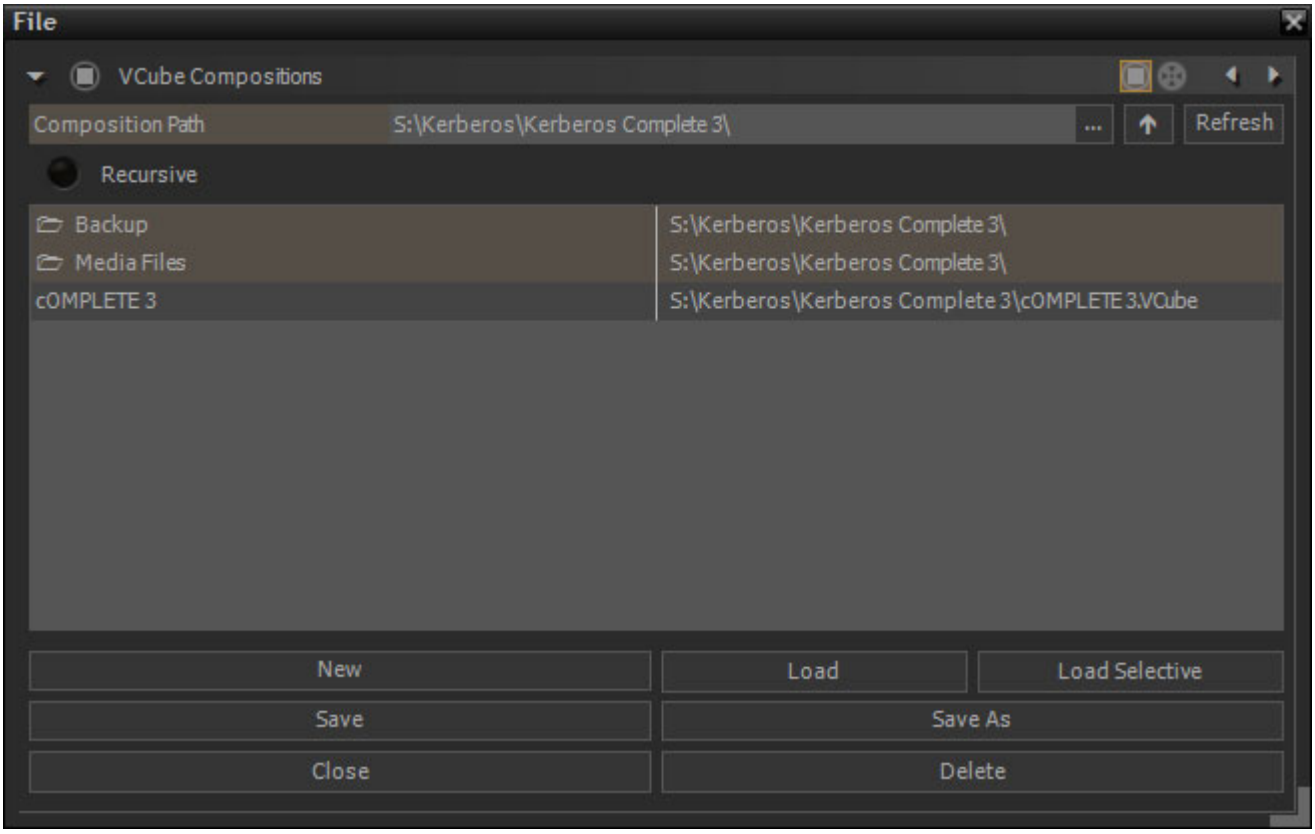
Vcube Compositions are saved with a **.VCube** extension.

Video Files in VCube format are saved with a **.cube** extension.

Composition File Tab Page

To open the **File** Tab Page in **VCube Compositions** mode:

File > Open or [**Ctrl + O**] or the File Open Icon in the Toolbar:



File Page - floating

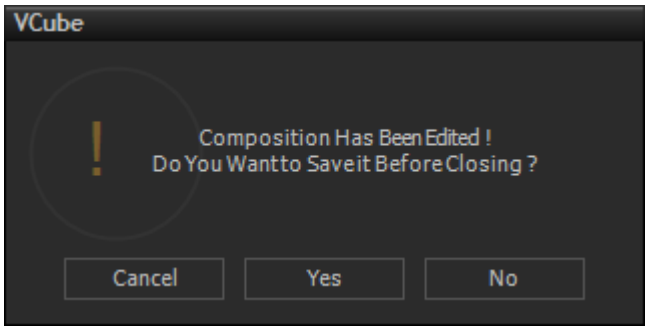
Composition Path — Field shows the Path to the current Composition location. The ... button opens a browser which enables VCube Composition files to be selected from local hard disks or via a network. This Composition Path is also used when a Composition is Saved or Saved As.

Up — Arrow moves up one level in the file hierarchy.

Refresh — Updates the list of Media Files in a specific location. [F5]

Recursive When checked all Media Files in the Folder will be shown including those in sub-folders

New Opens a new Composition with the current settings. [Ctrl + N]. If a Composition is already open then a warning dialog appears:



VCube Save Warning dialog

- **Cancel** Aborts the new Composition and returns to the current one
- **Yes** Saves the current Composition and opens the new one.
- **No** Closes the current Composition without saving it and opens the new one.

Load Opens a pre-existing Composition. [Ctrl + L]

Save Saves the current Composition using the current Composition name. [Ctrl + S]

Save As Opens a Windows browser to enable the Composition to be with a new name or to a new location. This feature is useful since it enables you to save many versions of the same Composition with different names. [Ctrl + Shift + S]

Close Aborts the current Composition. Any edit decisions made since the last time the Composition was saved are discarded. [Ctrl + Shift + Q]

Delete Deletes the selected Composition from the hard drive. [Shift + DELETE]

Note: The associated Media Files remain on the mass storage.

Load Selective Enables Composition objects or properties to be imported into the current one. A dialog determines how the selection will be imported into current one. [Ctrl + Shift + L] Please see: Load Selective on page 33

Open an Existing Composition

File > Open or [**Ctrl + O**] or the File Open Icon in the Toolbar opens the VCube Compositions Browser Page:

1. If the **File** page is showing the **Media File Browser** page switch to the **VCube Compositions** page.
2. Browse and select a folder using the **...** button to open a Windows File Browser
3. If **Recursive** is checked then all files in all sub-folders will be displayed.
4. Click on a Composition to select it.
5. Click on **Load** to open the Composition in VCube

Alternatively, simply Double-click on the desired Composition name in the list.

Drag & Drop

It is also possible to **drag and drop** Compositions and Media Files into the Timeline directly from normal Windows Browser windows. For behaviors **please see: Drag & Drop on page 45**

New Composition

File > New closes the existing Composition (if any is open) and creates a new Composition with the same settings as the last open Composition.

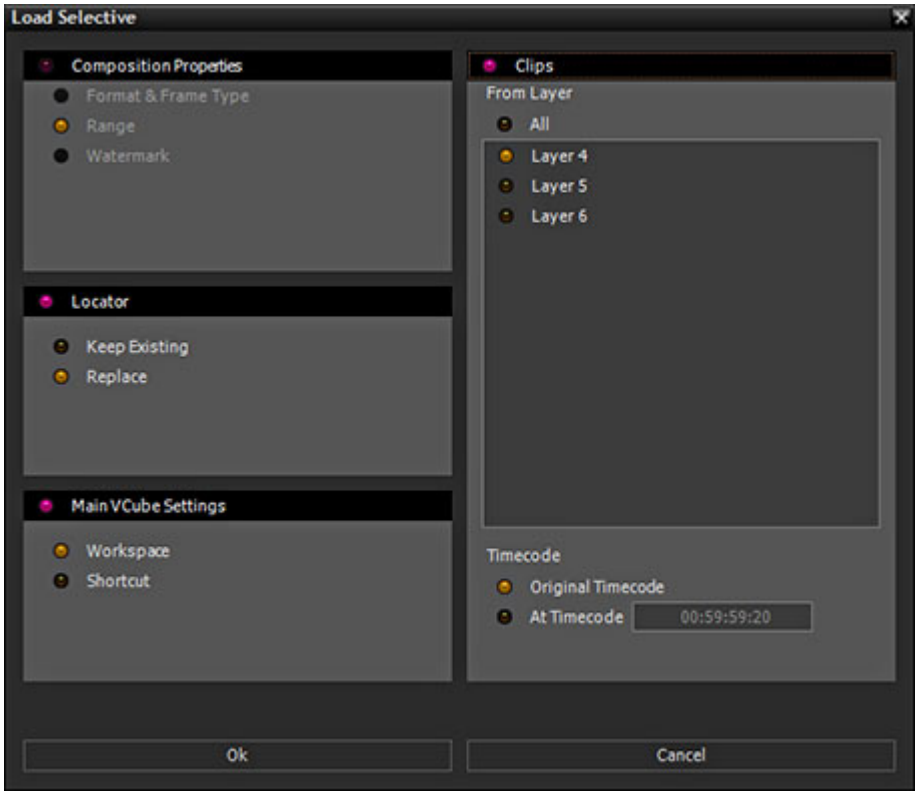
Alternatively open the **VCube Compositions** Browser Page

User Interface > Settings Tabs > File > Show VCube Files [**Ctrl + O**] .

1. Browse and select a destination folder
2. Click on **New**
3. The **New Composition** opens with the same settings as the last Composition opened

Load Selective

Load Selective enables Composition objects or properties to be loaded into the current Composition.



Load Selective dialog

Options are grouped into boxes. Each black box header has a button which, when checked, turns on import of the properties or objects selected in the box itself. Selection can only be made when the box title button is checked.

Composition Properties

Format & Frame Type — When selected Format and Frame rate will be imported when the new Composition is loaded.

Range — When selected the current Composition range markers will be overwritten by new values when the new Composition is loaded.

Watermark — When selected the current Composition **Watermark** (If any) will be overwritten by the Watermark the new Composition when it is loaded.

Locator

Keep Existing — Mutually exclusive with **Replace**. Existing **Locators** can either be retained and merged with the imported ones or replaced by the ones in the Composition to be loaded.

Replace — **See above**

Main VCube Settings

Workspace When selected the **Workspaces** in the current Composition will be overwritten with the ones in the Composition about to be loaded.

Shortcut When selected the **Keyboard Shortcuts** in the current Composition will be overwritten with the ones in the Composition about to be loaded.

Clips

From Layer

All When selected **All Layers** in the current Composition will be imported.

Layer... All layers present in the Composition to be imported are listed. When the **All** button is not checked you can select any of the Layers listed to be imported by clicking on the buttons.

Timecode

Original Timecode When checked Clips will be imported at the original TimeCode in the source Composition.

At Timecode When checked you can enter a Timecode starting point in the field. If this option is used then Locator positions will also be shifted.

Settings Imported With Composition

Settings	Saved in Composition
Overlay	
TC Enable	X
Ext TC Enable	X
TC Position & Size	X
TC Color	X
TC Transparency Enable	X
Mask Enable	X
Mask Size	X
Preview	
Deinterleave	X
Video Frame	X
Safe Area	X
Composition	
Lock Editing	X
Watermark Enable	X
Copyright	X
Position	X
Watermark Color	X
Media Path Link to Composition Path	X
Auto Wipe & Auto Countdown	X
Format & Sync	
Audio Sampling Rate	X
Video Size	X
Field Order	X
Pixel Aspect Ratio	X

Composition Saved Settings

If you use the **Load** option all **Settings** in the table above will be changed as required to those saved in the **Composition** being opened. If you use the **Load Selective** option it is possible to import just Composition Settings such as **Workspaces**, **Keyboard Shortcuts** and **Synchronization**.

Import

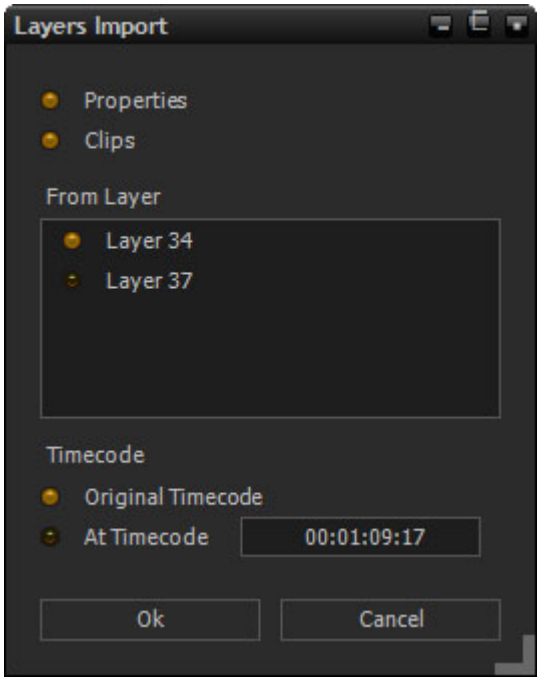
Import Composition and Export Changes

This feature creates an EDL reflecting the differences between two versions of a project.

An .EDL file is created in the Composition folder. This file can also be opened in a text editor e.g. Notepad.

Import Layer

A particular layer or a selection of layers can be imported from a VCube Composition into the current one. [**Ctrl + Alt + L**]

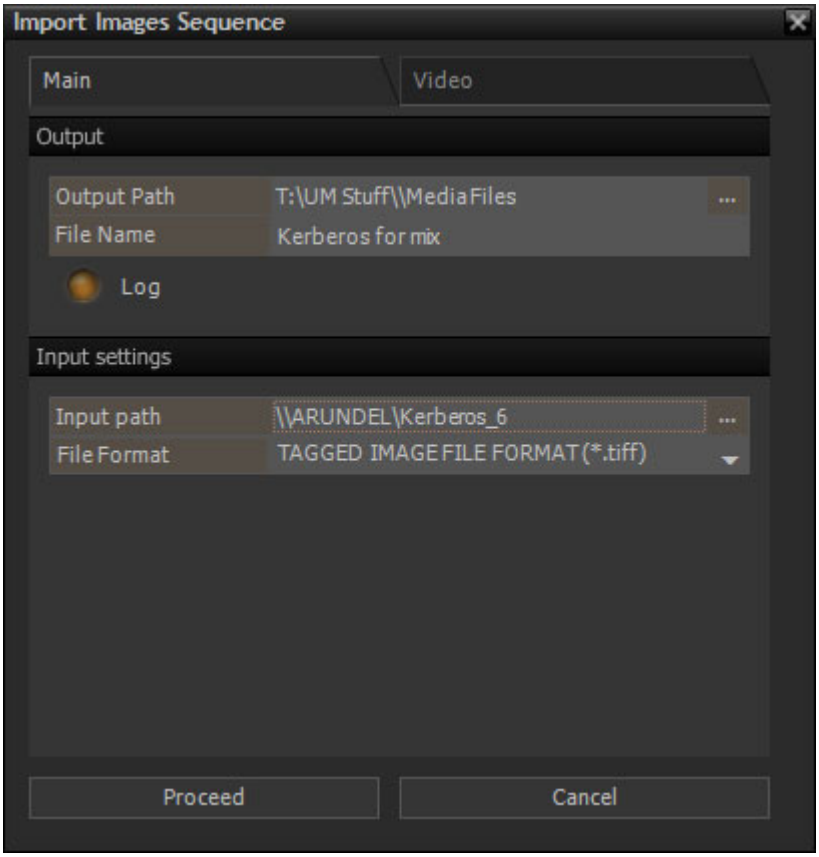


Layers Import dialog

Properties	When checked, also imports the individual Clips Properties (Locked, Invert Fields, Invert Color...)
Clips	When checked Clips in the selected Layer(s) will be imported.
From Layer	All Layers available for import from the source composition are listed. Checked Layers will be imported.
Original Timecode	When checked Clips will be imported at their Original Timecodes.
At Timecode	When checked a Timecode start value can be entered in the field. When unchecked the value shown is the beginning of the first Clip in the selected Layer(s).

Import Images Sequence

Import Images Sequence creates a Video file from a set of Individual Image Files numbered consecutively. A wide range of Image file formats are supported. [**Ctrl + I**]



Import Images Sequence dialog

The **Import Images Sequence** Page has two Tabs, **Main** and **Video**.

Main Tab

Output

Output Path Field shows the current Path where the new Video File will be written.

... Click on the ... button to open a Windows browser to select an alternative directory.

File Name Click in the field and type a suitable name for the new Video file.

Input Settings

Import Path Field shows the directory where the still images are located

... Click on the ... button to open a Windows browser to select the directory where the source image files are located.

File Format Field shows the image file format to be imported. Click on the down arrow to choose the required format from the list below.

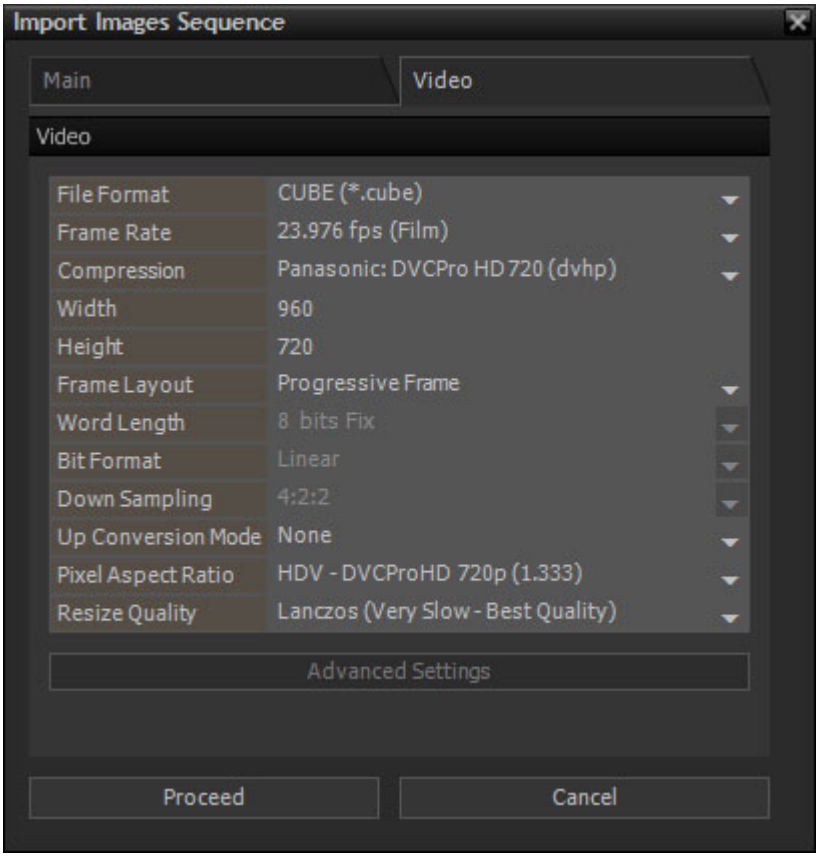
Proceed Click on Proceed to begin the Import and Conversion process

Cancel Click on Cancel to abort the Import

Still Image File Formats Supported

Supported File Extensions	Description
.dpx	Digital Moving Picture Exchange (DPX)
.yuv	YUV RAW
.yuv8	YUV 8 BIT RAW
.yuv10	YUV 10 BIT RAW
.yuv16	YUV 16 BIT RAW
.bmp	Microsoft Bitmap
.png	Portable Network Graphics
.jpg	Joint Photograpic Experts Group
.jpeg	Joint Photograpic Experts Group
.j2k	JPEG 2000
.psd	Adobe Photoshop File
.tga	Targa Graphic File
.gif	Graphics Interchange Format
.wmf	Windows Metafile
.tif	Tagged Image File Format
.tiff	Tagged Image File Format
.pcx	PCX
.mng	Multiple Image Network Graphics
.jng	Multiple Image Network Graphics
.ico	Icon File
.wbmp	Wireless Bitmap
.emf	Windows Metafile
.jbg	JBG
.jpc	JPEG 2000 Code Stream
.pgx	PGX
.ras	Sun Raster Images
.pnm	Portable Bitmap
.pgm	Portable Bitmap
.ppm	Portable Bitmap

Video Tab



Import Images Sequence dialog

File Format Field shows the Output File format selected currently. Click on the down arrow to select from:

CUBE	***. Cube**
AVI	***.avi**
MPEG	***.mpg**
MPEG	***.mpeg**
MPEG	***.m2v**
MPEG	***.m1t**
MPEG	***.m2t**
MXF	***.mxf**
QuickTime	***.mov**

Frame Rate The field shows the Frame Rate selected currently. Click on the down arrow to select an alternative.

Compression The field shows the type of Compression selected currently. Click on the down arrow to select an alternative. The exact composition of the list will depend on options purchased.

Width The field shows the Width of the output Video in pixels. Click in the field to enter a new value manually.

Height The field shows the Height of the output Video in pixels. Click in the field to enter a new value manually.

Frame Layout Field shows the current setting. Click on the down arrow to select an alternative:

Progressive Frame

2 Fields (Interleaved - Lower First)

2 Fields (Interleaved - Upper First)

2 Fields (Separate - Lower First)

2 Fields (Separate - Upper First)

Single Field

Word Length Fixed at 8 bits currently

Bit Format

Down Sampling Field shows the current color sub-sampling scheme. 4.2.2 is the default.

Up Conversion Mode Field shows current conversion mode. Options will vary with the Pixel Aspect Mode setting. E.g. Anamorphic, Letterbox, Pillarbox or None

Pixel Aspect Ratio Field shows the current Pixel Aspect Ratio and the format associated with this. Click on the down arrow to select an alternative.

Resize Quality Field shows the resizing algorithm selected currently. Click on the down arrow to select an alternative.

Nearest neighbour	**Fastest but poor quality**
Linear (Bi Linear)	**Fast and poor quality**
Cubic	**Slow but very good quality**
Lanczos	**Very Slow but excellent quality**
Supersampling	**Slow but very good for large downscaling**

Advanced Settings The button is only available when MJPEG or Avid: VC-3/DNxHD are selected as the Compression scheme or when MPEG is selected in File Format. A dialog appears with compression settings.

Proceed Click on Proceed to begin the Import and Conversion process

Cancel Click on Cancel to abort the Import

Notes

- When either **QuickTime** or **MJPEG** codecs are chosen, **Progressive Frame** must be selected in **Frame Layout** to ensure QuickTime player compatibility.
- **Frame Rate** must be set to match the frame rate of the Composition where the generated Video file is to be used.
- Compression allows the user to select the CODEC used to generate the new Media File(s). Depending on the chosen CODEC, it is possible to adjust the Compression Settings.
- For full details about the **MPEG** Settings, please refer to the dedicated section. We recommend using only regular **Format Type**s in the **Basic Settings** dialog for trouble free operation.
- MJPEG codec - A value of 100 corresponds to an average 1/3 compression ratio, and a value of 50 corresponds to an average 1/20 compression ratio.

Still Image Import

To import a single still image (not a sequence) into the Timeline, use **Files > Import > Media File Browser**. Use the browser to select the image to Import and use an appropriate option to place it in the Timeline. A 5 seconds Clip will be created from a single frame image. Alpha Channel (transparency) is supported.

AAF

VCube can import projects in AAF (Advanced Authoring Format).

About AAF

AAF is a set of specifications for project interchange (.aaf) files. Media files can be embedded or referenced by link. **Note** that VCube only handles Media Files referenced by link currently.

AAF Import follows the **Interchange Import Settings**. These help deal with AAF projects which contain large numbers of files, improving project opening times etc.. Please see: **InterChange Import on page 151**

[**Alt + O**]**File > Import > Composition (Create New)**

If VCube cannot find a Media File the **VCube: Searching for Media File** Tab pops-up.

Use this to point VCube at the file location(s). **Cancel** opens the Composition with the missing Media shown as zebra Clips.

MXF

MXF (**M**aterial e**X**change **F**ormat).

The VCube MXF Module has full support (playback, render, record up to 30 fps) for:

- D10 / Sony IMX (MPEG-2 in SD format)
- MPEG-2-HD / Sony XDCAM HD (MPEG-2 in HD 1080i format)
- VC-3 / Avid DNxHD (in HD 1080i format)
- AVCIntra / Panasonic P2 (class 50 and 100)

For the latest MXF interchange information please see:

http://forum.merging.com/viewtopic.php?f=23&t=2094

MXF Configuration

To record or render an MPEG-2 flavour in MXF:

Select the **Custom (Media Handler Specific)** codec. This will automatically select the D-10 (Sony IMX) MPEG-2 flavour for SD formats, and the MPEG2-HD (Sony XDCam-HD) for HD formats.

To record or render in VC-3 or AVC-Intra simply choose the codec in the codec list.

In Video Advanced Settings, Aspect ratio can be **Transparent**, **Force 4:3** or **Force 16:9**.

A checkbox enables WSS (Widescreen Signaling) on the first visible line.

To record audio embedded in the MXF file:

Select **MXF** in the **Audio** tab

16-bit and 24-bit PCM formats are supported.

OMF

[**Alt + O**] **File > Import > Composition (Create New)**

(Yellow) The Clip is a rendered effect.

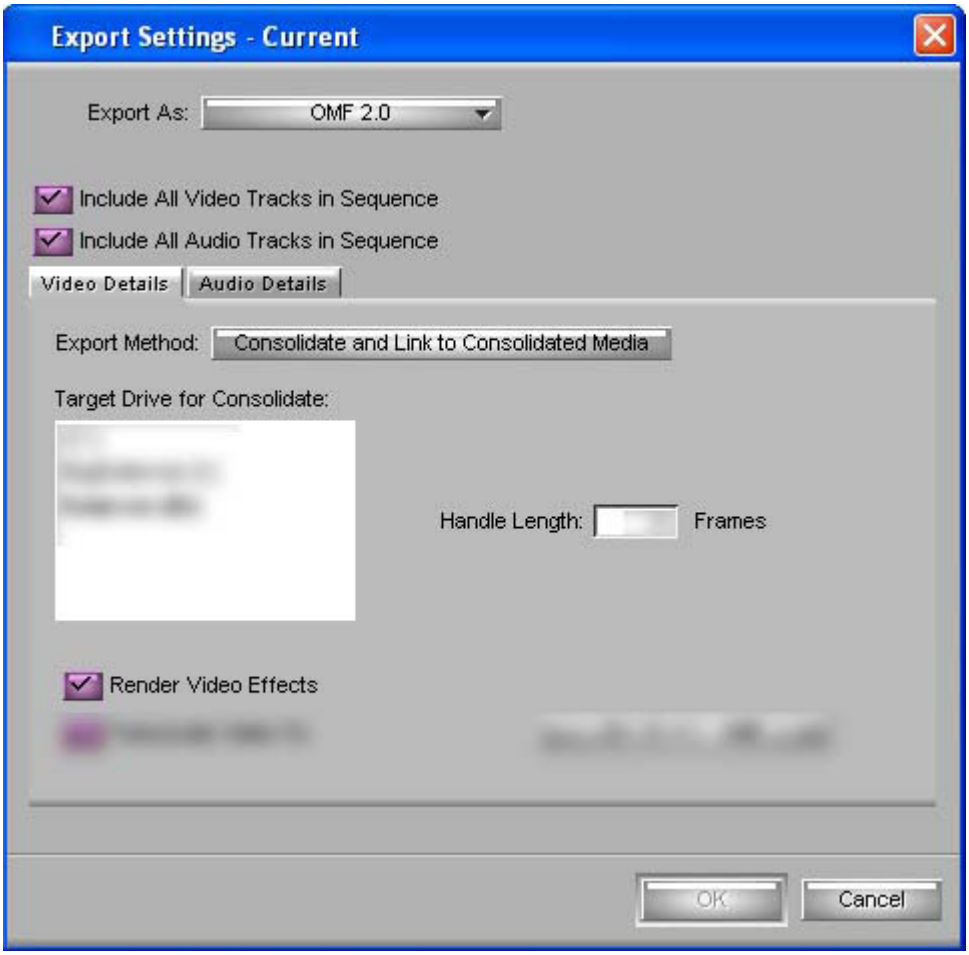
(Green) VCube can render the effect in realtime.

(Red) The VCube does not support the effect.

Note: The **Fx** icon shows when an imported Clip has an effect. The color of the icon denotes VCube treatment of the effect as above.

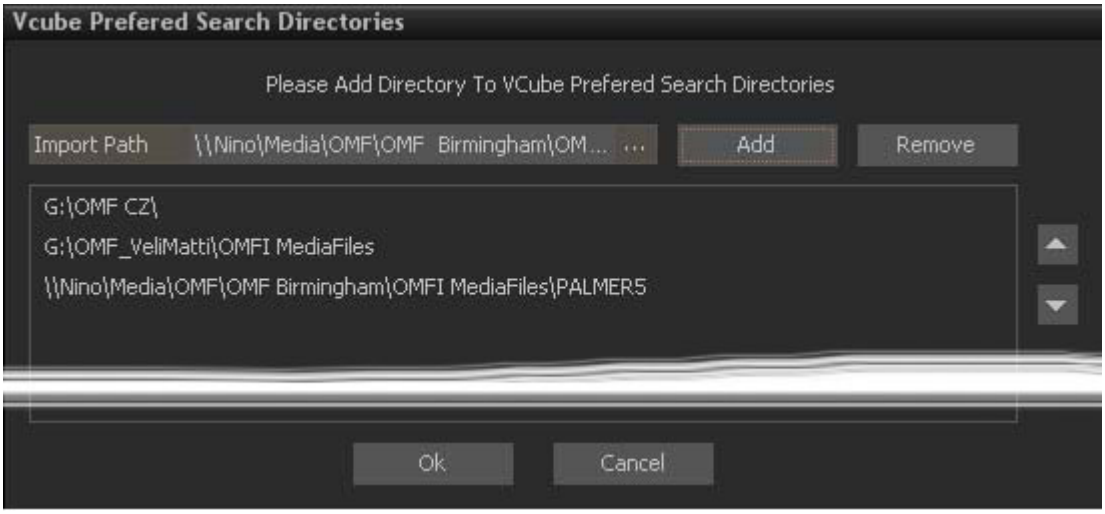
1. If the path to media is included in the Composition, VCube asks the user to specify a network location for those Media Files: Workspace/OMFI Media Files/... or a specific user path. If OMF Media Files are on the local storage, press Cancel when the dialog appears.

2. If the Media Files remain unlocatable, the VCube software looks for Media Files in the sub-folders of the Composition file location on the local storage.
3. Lastly VCube uses the database to re-link Media Files. If the path to Media Files is not available in the OMF Composition, then the Scan function must be used to generate the OMF Media Files data base. The first scan process can take a very long time on a big media server storing thousands of files.



Export Settings - Current dialog

If some media files cannot be found by VCube a dialog is displayed.



VCube Preferred Search Directories dialog

Here, one or many paths to the missing Media Files can be specified to allow VCube to reconnect the needed Media Files.

Import Path	Shows the last Import Path added. Clicking on the ... button opens a Windows File browser to enable paths to be selected.
Add	Clicking on the Add button adds the path displayed in the Import Path field to the list of Paths which will be searched.
Remove	Clicking on the Remove button deletes the path selected (by clicking on it) in the panel below the Import File field.
OK	Click on the **OK** button to commence the search and close the dialog.
Cancel	Click on the **Cancel** button to cancel any changes and close the dialog.

Note: The **VCube Preferred Search Directories** dialog can also be reached directly from the **Settings Menu**. It enables VCube to re-link Media Files spread over different workspaces or servers.

Scope

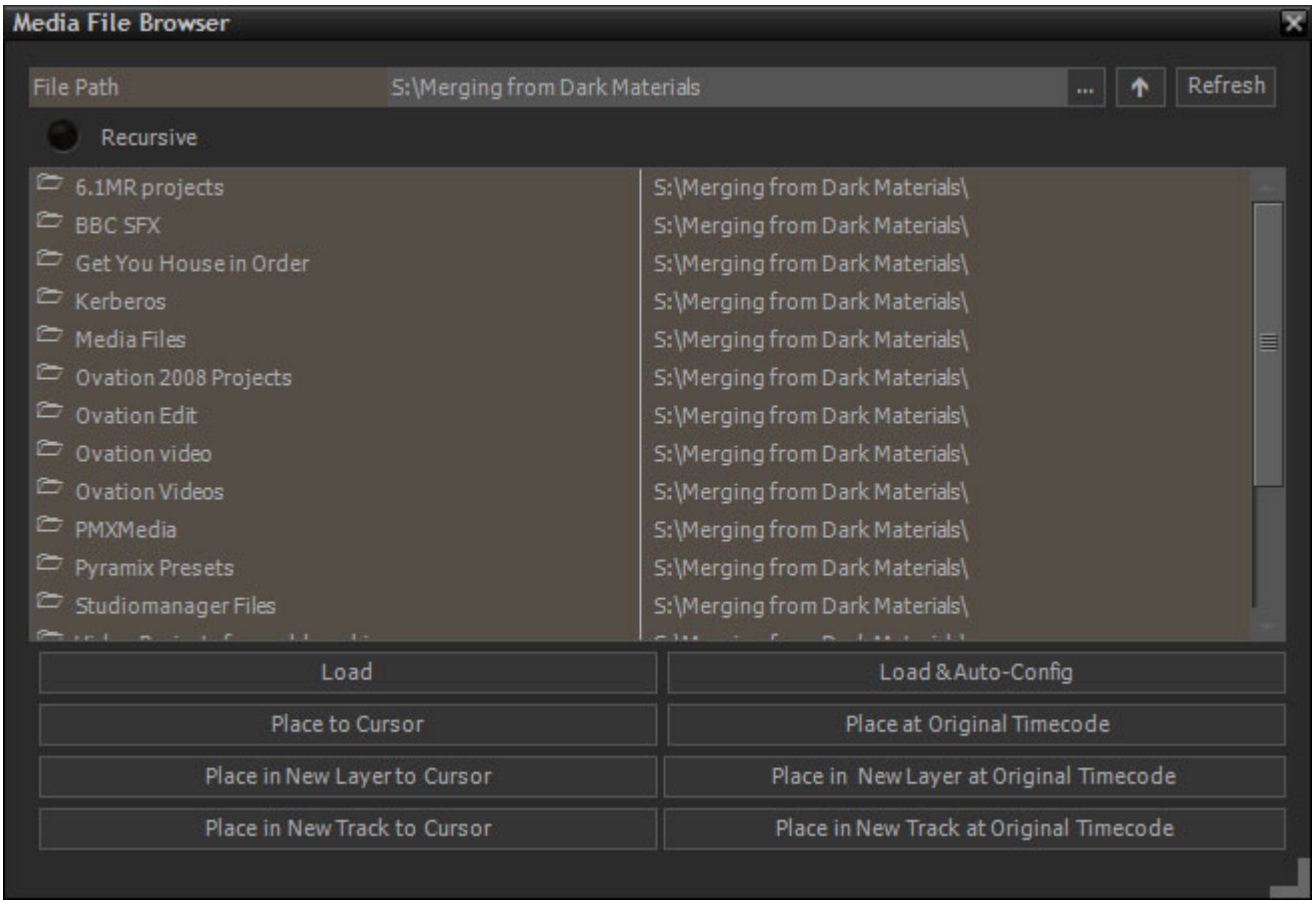
VCube supports Video only, Video + Audio, Audio only, single Still Image and Still Image Sequence Media Files.

VCube has a pair of File management Tabs for managing **Compositions** and **Media Files**.

Media Files can dragged and dropped into the Preview screen or the Timeline. **Please see: Drag & Drop on page 45**

Media File Browser

To open the **Media File Browser** select **File > Import > Media File Browser** or **Ctrl + Shift + O** or choose the **Media File Browser** Icon in the Toolbar :



Media File Browser

Navigate to the Drive, Folder or Network Drive / Folder containing the Media using the **...** button which opens a conventional Windows Browser. Then double-click on any of the Folders displayed in the main area to view the Media Files.

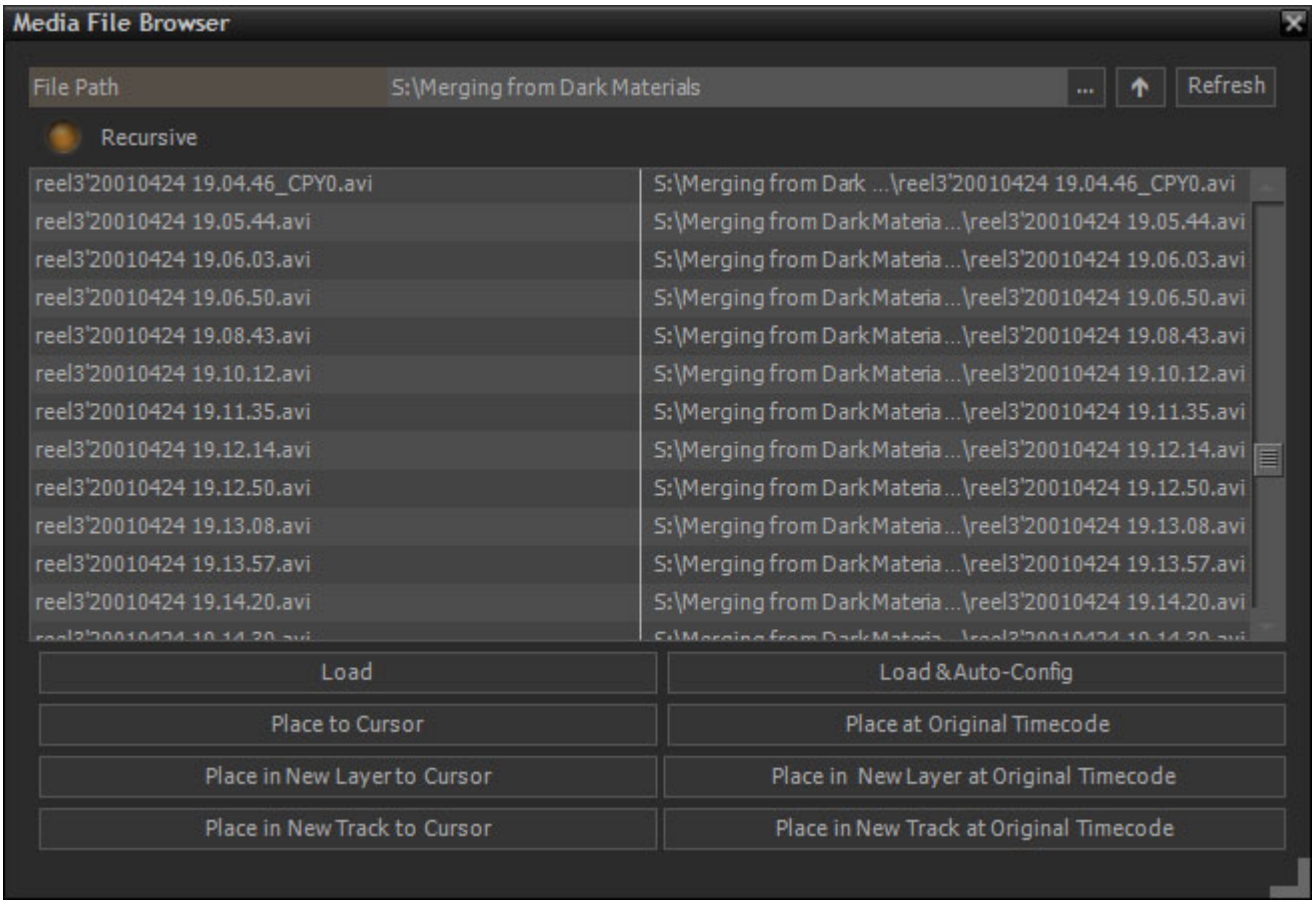
Double-clicking on a Media File will insert it as a Clip into the Composition Timeline at the current Playhead position on the selected Track/Layer. If an Audio Track / Channel is selected currently then a Video Media file Clip will be inserted on the first Video Layer above the Audio Tracks in the Timeline.

- To add a Clip at the end of the last Clip on the selected Layer: **Shift + Double-click.** If no Layer is selected a new one will be created.
- To add a Clip at the current Playhead position in selected Layer: **Double-click**. If no Layer is selected a new one will be created.

- To add a Clip at the current Playhead Position in a new Layer: **Control + Shift + Double-click**

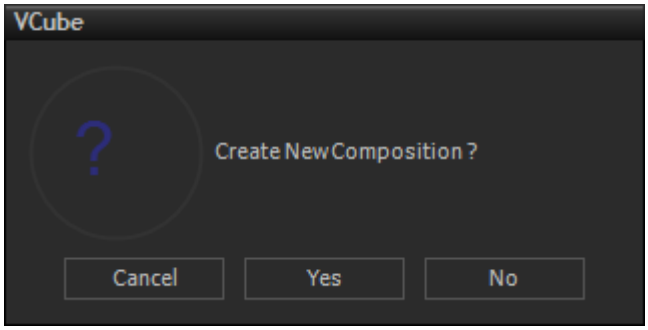
Recursive

If the **Recursive** button is checked then all Media Files in the Drive or Folder listed in the **File Path** field will be listed in the main area, including those in Sub-Folders.



Media File Browser- Recursive

File Path	Field shows the current Path
...	Opens a Windows browser to change the Path to a location on local storage or via a network.
^	Up arrow steps up the path tree to the root directory.
Refresh	Updates the list of Media Files in the current location [F5]
Recursive	When checked all Media Files in the folder specified will be shown including those in sub-folders.
Load	Opens the Create New Composition dialog. [Ctrl + L]



VCube Create New Composition dialog

Cancel	Aborts the **Load**

Yes	Closes the current Composition with a dialog inviting **Save** it if it has been changed, then opens a new Composition with the same Settings as the previous Composition.
No	Places the selected Media File on the selected Layer at the current Playhead Cursor position.

Load & Auto-Config Loads the selected Media File in a new Composition and sets Composition settings from the Media File properties. [**Shift + L**]

Place to Cursor Pastes the selected Media File into the selected Layer at the current Playhead cursor position.

Place at Original Timecode Pastes the selected Media File into the selected Layer at its original TimeCode location.

Place in New Layer at Cursor Pastes the selected Media File into a new Layer at the current Playhead cursor position.

Place in New Layer at Original Timecode Pastes the selected Media File into a new Layer at its original TimeCode location.

Place in New Track at Cursor Pastes the selected Media File into a new track at the current Playhead cursor position.

Place in New Track at Original Timecode Pastes the selected Media File into a new Track at its original TimeCode location.

Note: Media Files can also be drag-and-dropped into the Timeline.

Note: Still images are stored in RAM when dropped in the Timeline. The Alpha channel is preserved. The **Convert Still Image** function [**Ctrl + I**] is the preferred option for numbered still image Sequences. The Alpha channel is not preserved when image sequences are converted into video Clips.

Drag & Drop

Drag & Drop of Media Files from Windows Explorer browser windows is supported as follows:

Drop Into Preview Screen

When the file is dropped the current Composition will be closed (after a confirmation dialog is accepted). A new Composition is then created to suit the characteristics of the Media File being dropped. (Image Size, Frame Rate, Aspect Ratio, Interl;acing...) The Media will be placed at its original TimeCode in the Timeline.

Drop Into Timeline

Drag & Drop into the Timeline adds Media to the current composition.
If more than one file is dropped they are placed in sequence in the Timeline.

Place to Cursor

Place to Cursor is the default behavior. The Media will be placed at the current cursor position in the Timeline.

Insert Mode

If the **Ctrl** key is held down while dropping the file(s) the files are inserted at the Cursor position and all subsequent clips are rippled.

Enqueue Mode

If the **Shift** key is held down while dropping the file(s) the files are placed after the last Clip in the Composition or at the current TimeCode if the Composition is empty.

Media Handlers

QuickTime

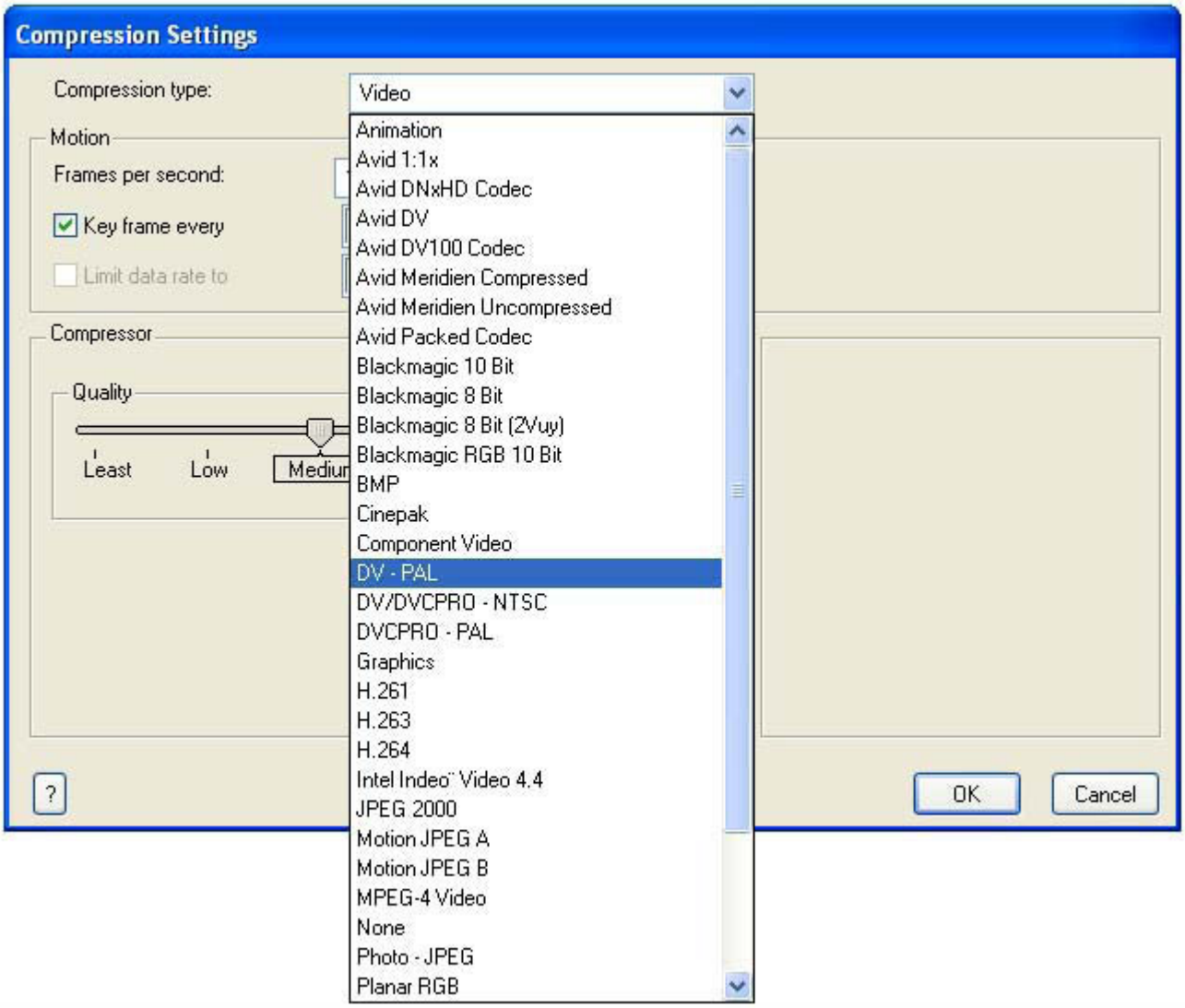
QuickTime is a very popular file format (Media Handler) for audio and video media. **QuickTime 7.4** or above **MUST** be installed to allow VCube to manage this file format.

VCube features complete support of QuickTime for both **Playback** and **Record/Render/Convert Media Files**.

Any QuickTime specific codec can be used in VCube for both Playback and Record/Render/Convert Media Files once installed on your VCube machine.

To use QuickTime specific codecs with VCube when generating a new media file (Record/Render/Convert Media Files), follow the method below:

- Select **QuickTime** (***.mov**) as the File Format for video or audio.
- Select **Custom (Media Handler Specific)** as the **Compression** option
- Set the **Compression Settings** as desired.



Compression Settings

Note: The list shown above includes a number of downloaded options. Please refer to the specific codec documentation for settings options.
Note also that some QuickTime codecs are not real-time capable for recording or playback (especially third-party codecs)

Note: Selecting QuickTime as the file format for both video and audio generates a single QuickTime file including both video and audio.

Note: When using the H264 codec for rendering or conversion, the Keyframe and Data Rate limitation must be unchecked. Please check also that the frame rate reflects the Composition frame rate. VCube also features some codecs (DVCPRO / DVCPRO-HD / MJPEG / YUY2) that may also be used to produce QuickTime files. In these cases, select the desired codec directly from the Record/Render/Convert Tabs and double check that the picture geometry, the Field Order and the Pixel Aspect Ratio match the specific codec requirements. Otherwise Record/Render/Convert may abort.

MXF

VCube supports standard definition and high definition MXF formats for playback at NTSC or PAL frame rates.

SD Files must be encoded with **UYVY**, **DV**, **DVCPro 50 (dv50)**, **MJPEG**, or **D-10** (AKA Sony IMX) codecs.

HD files must be encoded with **DVCPro 100 (dv10)**, **VC-3** (aka AVID DNxHD), **AVC-Intra** (aka Panasonic P2), or **MPEG2-HD** (aka Sony XDCAM-HD) codecs.

VCube can render or wrap MXF files using all the supported codecs listed above. Due to real-time constraints, **Record** is not available for AVC-Intra.

To render [**Ctrl + R**] an MXF file in VCube:

- Select **MXF** as the File Format for both video and audio.
- Select one of the available codecs for video Compression. For Sony XDCAM or XDCAM-HD, **Advanced Settings** will enable you to select the flavour of MPEG-2 and the bit rate.
- Audio settings are available via the **Advanced Settings** dialog box.

Note: VCube can record both video and audio multiplexed in a single MXF file when **MXF** is selected as the **File Format** for both Video and Audio.

MPEG

VCube uses the **Mainconcept MPEG Encoder**. **Please see: MPEG Settings (MainConcept Encoder) on page 245**

File Extensions Supported

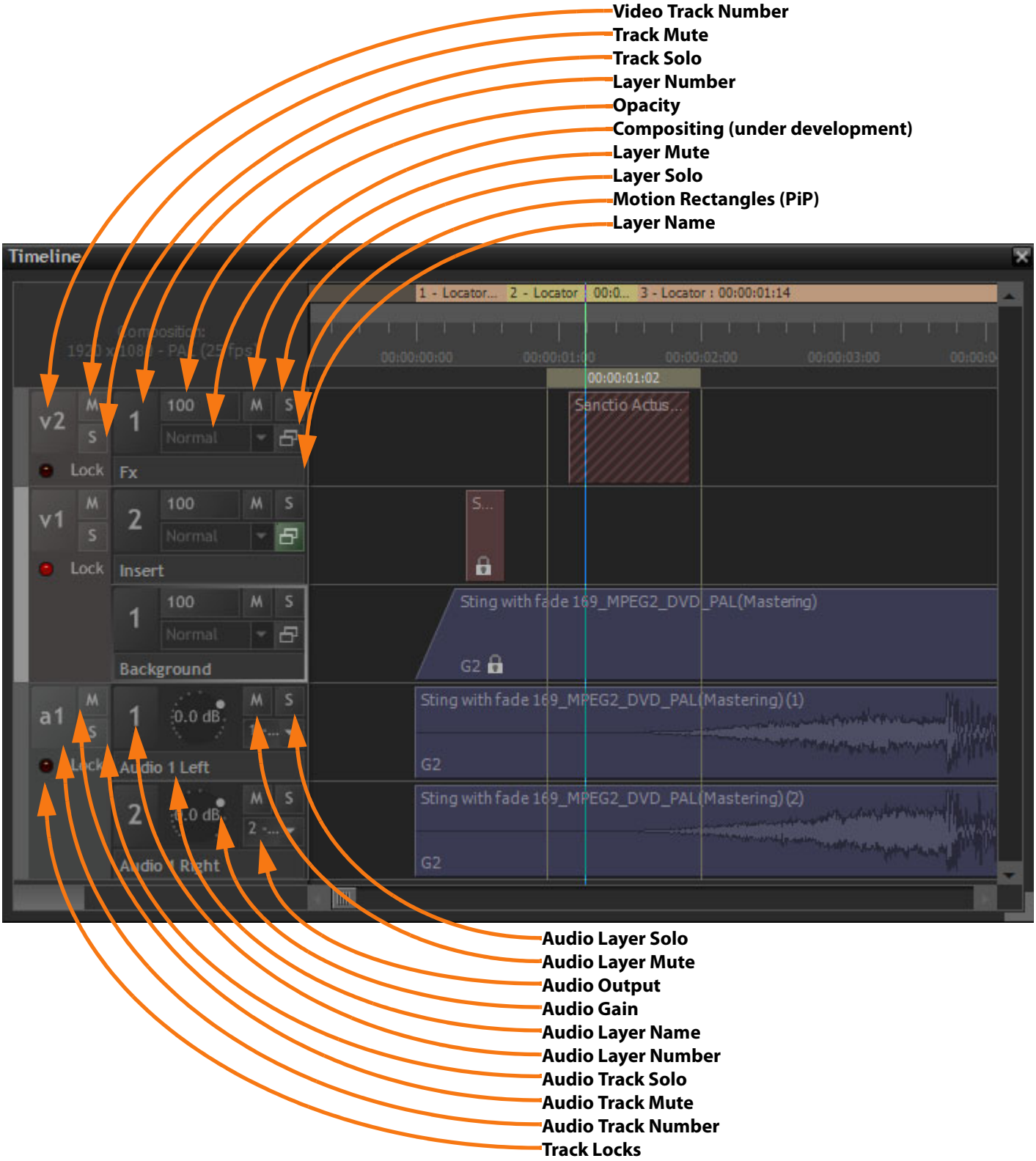
Supported File Extensions	Description	Record / Render / Convert
.cube	VCube native format	Yes
.avi	Audio Video Interleave. AVI is defined by Microsoft. AVI is the most common format for audio/video data on the PC.	Yes
.gen	AVID Nitris file format	
.omf	AVID: Open Media Framework	
.om	AVID: Open Media Framework	
.mov	Apple QuickTime	Yes
.qt	Apple QuickTime	
.bmp	Microsoft Windows Bitmap file	
.jpg	Jpeg	
.jpeg	Jpeg	
.tif	Tagged Image File Format (owned by Adobe, created by Aldus). It's a bitmap raster file format	
.tiff	Tagged Image File Format (owned by Adobe, created by Aldus). It's a bitmap raster file format	
.png	Portable Network Graphics A Turbo-Studly Image Format with Lossless Compression	
.gif	CompuServe graphics interchange format	
.emf	Microsoft Enhanced Metafile	
.tga	Truevison: Targa image file formats	
.mng	Multiple-image Network Graphics : A PNG-like Image Format Supporting Multiple Images, Animation and Transparent JPEG	
.jng	JPEG Network Graphics with Alpha channel	
.psd	Abode Photoshop	
.pcx	PC Bitmap File Format	
.wbmp	Wireless Bitmap File Format	
.j2k	JPeg 2000	
.jp2	JPeg 2000	
.j2c	JPeg 2000	
.jbg	Raster Image File Formats	
.jpc	JPEG-2000 Code Stream Syntax	
.pgx	Portable graymap format (gray scale)	
.pnm	Portable BitMap	
.pgm	Portable GreyMap	
.ppm	Portable PixMap	
.wmv	Microsoft Windows Media Video	
.mp4	MPEG (Moving Pictures Experts Group) 4 File (.mp4, .mpe)	
.mpg*	Moving Pictures Experts Group	Yes*
.mpeg*	Moving Pictures Experts Group	Yes*
.m1v	MPEG (Moving Pictures Experts Group) Layer 1 (.mp1)	
.mpe	Destiny MPE Secure Audio	
.m2v*	MPEG (Moving Pictures Experts Group) Layer 2 (.mp2)	Yes*
.mpv2	MPEG Audio Stream, Layer II	
.m2t	HDV file format	
.vob	DVD file format (Mpeg 2)	
.mxf*	the Material eXchange Format	Yes*
.aaf*	Advanced Authoring Format	
.xml*	Apple Final Cut Pro XML	
.dv	Digital Video File Formats	
.dif	Digital Video File Formats	
.aif	Audio Interchange File	Yes
.mpa*	MPEG Audio Stream, Layer II	Yes*
.wav	WAVE File Format	Yes
.bwf	Broadcast wave	Yes
.pmf	Pyramix media file format	Yes
.ac3	AC3	
.sd2	Sound designer	
.sdii	Sound designer	

*** Optional feature**

Note: A single Still Image is imported as a 5 seconds Clip. A sequence of numbered Still Images is imported one images per video frame. Imported Still images are loaded in RAM.

Tracks and Layers

Each Composition includes a number of Video and Audio **Tracks** on which audio and video **Clips** can be placed. Blocks representing placed or recorded **Clips** will appear on the **Track** as soon as a **Clip** has been placed. The Track itself extends horizontally beneath the **Time Scale** bar, and multiple **Tracks** are stacked vertically.



Track and Layer Headers

On the left side of each **Track** is a **Header** panel with various controls and information displays.

Video Track Header

Lock	When checked the entire Track is locked for editing.
Track Number	
Track Mute	Mutes (Hides) all Layers in the Track.
Track Solo	Solos the Track
Layer Number	Shows the Layer number
(Normal)	Under Development - may be used for compositing.
Layer Opacity	Field shows the current Opacity value. Click in the field and type to enter a value between 0 and 100%.
Layer Mute	Mutes (Hides) the Layer
Layer Solo	Solos the Layer
Compositing	Under development
Motion Rectangles (PiP)	Switches to Motion Rectangles Set-up mode. Please see: Motion Rectangles (PiP) on page 70
Layer Name	Field shows the current Layer Name. Click in the field and type to change

Audio Track Header

Lock	When checked the entire Track is locked for editing.
Track Number	
Track Mute	Mutes all Layers (channels) in the Track
Track Solo	Solos the Track
Layer Number	
Layer Gain	Shows the current Layer (Channel) output gain. Click and drag the pointer to vary the playback gain between -60dB and +24dB. Double-click the pointer to restore the 0dB default value. [Ctrl + Click and Drag] constrains to 6 dB increments.
Layer Mute	Mutes the Layer (channel)
Layer Solo	Solos the Layer (channel)
Layer Name	Field shows the current Layer Name. Click in the field and type to change
Layer Physical Output	Field show the physical output the Layer is patched to currently. Click to drop-down a list of all valid outputs available on the system

Some operations only apply to a selected Video Layer track or Audio track channel. A Video Layer or Audio Track channel is selected by Clicking in the Timeline or on the Layer or Channel number in the Header. The Layer/Channel area of the selection is highlighted and the color of the bar at the left of the Track Header changes to light gray.

Video Tracks and Layers

Video Tracks appear at the top of the Timeline. Each Video Track may contain a number of Layers. The Track Mute and Solo buttons affect all the Layers in the Track. Each Layer also has it's own Mute and Solo buttons which only affect the Layer. Compositing order is from top to bottom. Thus the top Layer takes precedence.

Track and Layer Order

For those users unfamiliar with NLEs it is important to understand that video on the TOP Layer of the top Video Track in the Timeline takes precedence. I.e. when there is video present on the top Layer in the Timeline any video placed on lower Layers or Tracks will be hidden unless the top Layer is made transparent, partially or completely, using the Layer **opacity** setting available in the Layer Header, or if the video in the top Layer is reduced in size, e.g. for **Picture-in-Picture** purposes. Please see: **Motion Rectangles (PiP) on page 70**

Audio Tracks and Layers

Audio Tracks appear below the Video Tracks in the Timeline. Each Audio Track can contain a number of Layers (individual Channels) E.g. a 5.1 Audio Track will have six Layers. As with Video Tracks the Track Mute and Solo buttons affect all the Layers in the Track. Each Layer also has it's own Mute and Solo buttons which only affect the Layer. Each Channel can be routed to any physical Mykerinos or ASIO output present on the system.

The number of Tracks and Layers is effectively unlimited.

Audio Bit Depth

VCube plays 8, 16, 20, 24 or 32 bit audio files and captures in 16, 24 or 32 bits. Sampling rate options for capture are 44 KHz and 48 KHz.

Tracks and Layers Created Automatically

- A new Composition opens with no Tracks in the Timeline.
- Adding a Media File creates a Track or Tracks to contain the resultant Clip(s).
- If the Media File contains video and audio a Video Track and an Audio Track will be created.
- If the Audio is multi-channel then sufficient Layers will be created in the Audio Track to accommodate the number of channels in the Media File.

Certain **Media File Browser** options and **Import** options will also create Tracks and or Layers automatically.

Adding Tracks and Layers

Edit > Auto Create > New Video Track Creates a new Video Track above the topmost Track in the Timeline [Ctrl + Shift + T]

Edit > Auto Create > New Audio Track Creates a new Audio Track below the bottom Track in the Timeline [Ctrl + Alt + T]

Edit > Auto Create > New Layer Creates a new Layer above the topmost Layer in the selected Video Track [Ctrl + Shift + N]

Edit > Auto Create > New Layer Creates a new Layer below the bottom Layer in the selected Audio Track [Ctrl + Shift + N]

Dolby E on the Timeline

In order to use the optional SurCode for Dolby E decoder to monitor a Dolby E encoded audio stream in real-time you must first place the video file into the timeline of VCube according to its original time code by using the **Load & Auto-Config** button in the **Media File Browser**. Using the Load & Auto-Config button ensures that the Safety Gaps of any Dolby E streams are perfectly aligned at the frame edges of the Timeline (within strict video line tolerances) and that the overall VCube video format corresponds to the video file used. If the Dolby E frame boundaries are not placed with this level of accuracy the stream is detected as "out of sync" and will not be decoded.

Dolby E Notes

Encode Decode Status Indication

When either SurCode for Dolby E Decode or Encode are active a notification **SurCode for Dolby E DEC** or **SurCode for Dolby E ENC** appears in the Transport Bar.

When both Decode and Encode are selected **Dolby E THRU** is shown but in fact the stream is decoded and re-encoded.

Plug-In Status	Indicator	Audio Monitor
SurCode for Dolby E Decode ON	**SurCode for Dolby E DEC**	**Dolby E Playout**
SurCode for Dolby E Encode ON	**SurCode for Dolby E ENC**	**PCM Playout**
SurCode for Dolby E Decode & Encode ON	**SurCode for Dolby E THRU**	**Dolby E Playout**
SurCode for Dolby E Decode & Encode OFF		**PCM Playout**

Please see also: Dolby E Decoder on page 154

Navigation

VCube offers a number of ways of navigating around a Composition.

Time Ruler

In the Timeline panel, under the **Locator Bar**, is a larger horizontal gray area with Timecode numbers and graduation marks. This is the Time Ruler. On the left, above the track headers, the Composition Frame Rate is shown.

The simplest way to move the Playhead Cursor within the Timeline is to position the mouse I-beam cursor anywhere along the Time Ruler and Click. The Playhead will immediately jump to the new position. You can also left-click, hold and drag the Playhead Cursor along this bar to scrub through the cue.

[**Ctrl + Click** and **Drag**] In the Timeline moves the Timeline without altering the Playhead Cursor position.

Double-Click on the Time Ruler Zooms to the full extent of the Composition and deselects any selected clips.

Zoom

[**Alt + Click and drag**] in the Timeline varies the Zoom level. Drag Left to Zoom In and Right to Zoom Out.

	**Zoom In**	[**Alt + 3**]	Zooms In to Timeline with each press.
	**Zoom Out**	[**Alt + 4**]	Zooms Out of Timeline with each press.
	**Fit Selection Zoom**	[**Alt + 1**]	Adjusts the Zoom level so that the current selection fills the full visible width of the Timeline.
	**Zoom Undo**	[**Alt + 2**]	Restores Zoom level to previous value.

These options can also be found in the **Zoom** menu.

Locators

Locators are an extremely powerful and intuitive method of locating, almost instantaneously, to any position in the current Composition.

Setting Locators

Locator > Set New Locator [NUMPAD 9] Add a locator at current TimeCode

[Ctrl + Alt + NUMPAD 9]	Create a Locator for Each and Every Clip
[Alt + NUMPAD 9]	Create Locators (override) for Every Clip in the Selected Layer(s)
[Ctrl + NUMPAD 9]	Create Locators (add) for Every Clip in the Selected Layer(s)
[/] (divide)	Move current Locator Start to Cursor

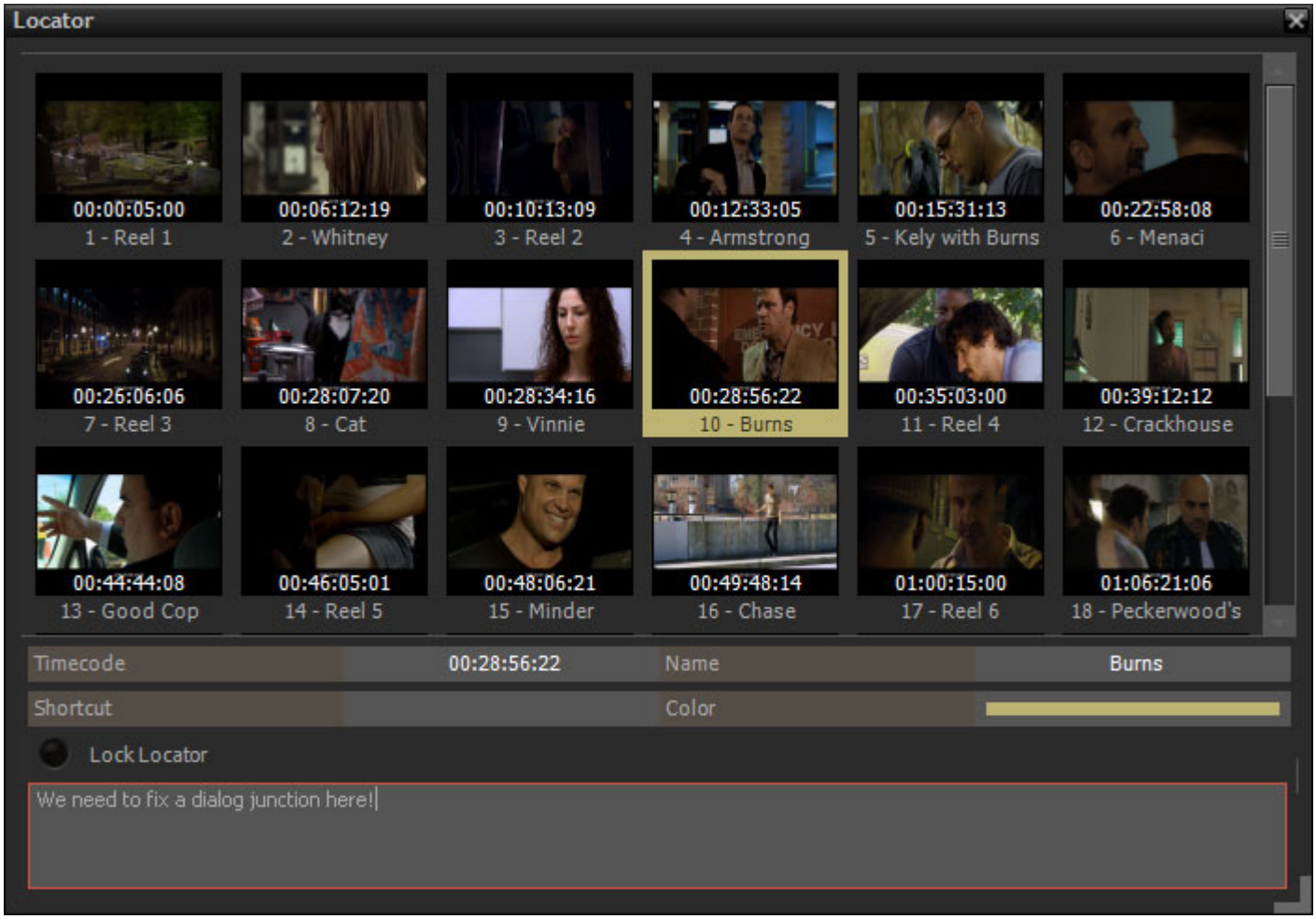
View Locators

To view the **Locator** panel either click on the **Locator Page** icon in the Toolbar double-click on the **Locator Bar** or choose **User Interface > Settings Pages > Show Locator Page** or [**F7**]

Select Next / Previous Locator

Next	[Numpad **+**]
Previous	[Numpad **-**]

Locator Tab Page



Locator page

The **Locator** Tab Page displays all the Locators set in the Composition.

In the upper section thumbnails of all set locators are displayed.

Any change in the Timeline edit is reflected in the Locators thumbnails immediately.

The Tab Page can be resized by clicking and dragging on the edges or the bottom right-hand corner.

Double-Clicking on any of the thumbnails locates to that position.

Timecode

The field shows the Timecode of the Locator selected currently. (Highlighted thumbnail) Type in the field to change the Locator Position.

Name

Type in the gray field to the right of **Name** to add a name to the Locator

Shortcut

Color

Click in the **Color** field to open the **Color Picker**. **Please see: Color Picker on page 17**

Lock locator

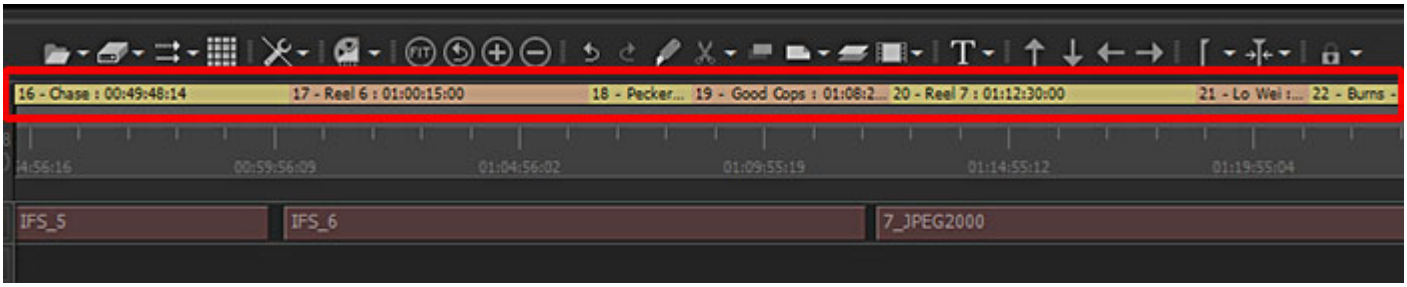
Click on **Lock Locator** to protect the selected Locator from changes. The button is checked when active.

Notes Field

The gray panel at the bottom of the page is a free-text field for notes. Simply Click in the field and type.

Locator Bar

At the top of the Timeline panel lies the **Locator Bar**.

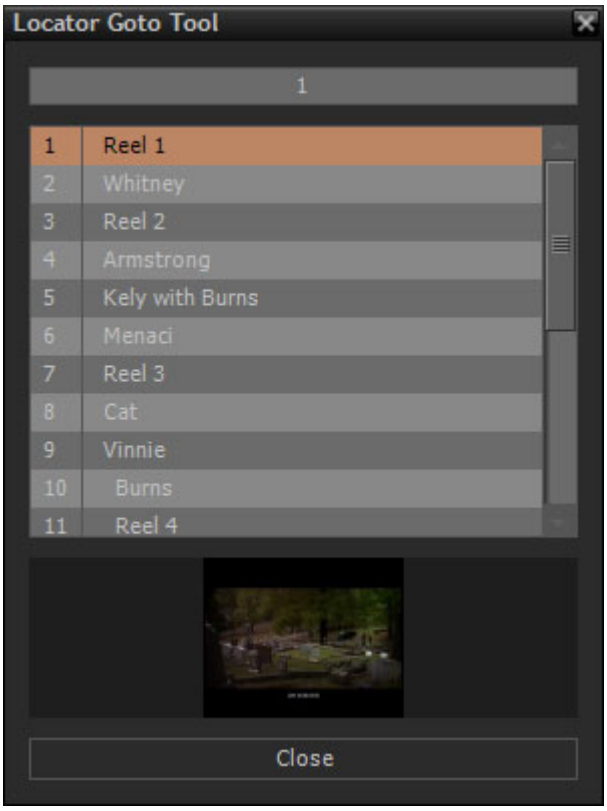


Locator Bar

All set **Locators** are shown. Locators can be moved by clicking and dragging at the junction. (cursor changes to double headed horizontal arrow **<->**. Press and Hold **Shift** to update the corresponding thumbnail continuously while dragging.

Locator Goto Tool

As an alternative to the main Locator panel VCube offers a more compact Tool :



Locator Goto Tool

Open the **Locator Goto Tool** either by choosing **Locator > Goto Tool** or [**Num 6**]

Locators can be selected in the list by clicking on them, by using the up and down cursor keys or by typing the number. Double-clicking the Locator or hitting **Enter** locates the transport to the Locator position and closes the Tool.

Transport Control

VCube features a range of Transport Control options including a Transport Toolbar and Transport Control Panel. Of course, the Transport Commands are also available via remote controllers that support them.

Transport Control Bar

The Transport functions can be controlled with the mouse or keyboard locally.

transport Control Bar

1 **2** **3** **4** **5** **6** **7**

From left to right:

1. Read **Drop** counts the number of missing frames during the preview. A zero value indicates that Playback Buffer Setting is fine-tuned. This number is reset on every **Stop**/**Play** action in the Transport Bar.
   Current FPS shows the current playback frame rate. If the CPU, hard drive, or network is overloaded, playback screen refresh may slow down.
   When a Video I/O plug-in is enabled a **VOut** value is also displayed. This displays the number of missing

frames for the optional video output. A zero value indicates a correct setting of Disk Cache and Playback Buffers.

2. Current TimeCode position. Can also be used as a locator by double-clicking in the field, editing the existing or typing a new TimeCode value and clicking outside the field or hitting **Enter**.
3. Transport Controls

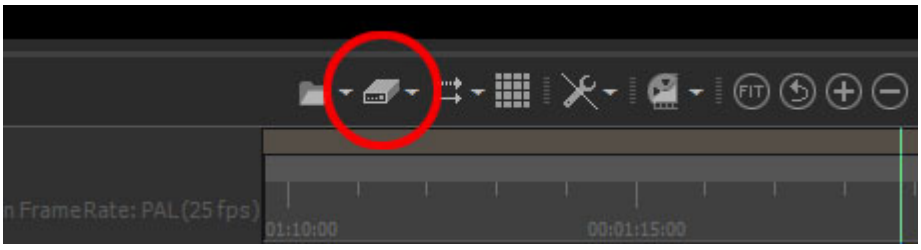
- **Rewind** [**Num 1**]
  - First press 400%
  - Second press 1000%
  - Third press 2000%
  - Fourth press 5000%
- **Fast Forward** [**Num 2**]
  - First press 400%
  - Second press 1000%
  - Third press 2000%
  - Fourth press 5000%
- **Stop** [**Num 0**]
- **Play Reverse** [**Ctrl** + **Enter** or **Ctrl** + **Space**]
- **Play Forward** [**Space** (Toggles Play/Stop) or **Num Enter** (Toggles Play / Pause)]
- **Pause** [**Num 3**]
- **Record** [**Decimal**]

4. Transport Status and Speed
5. When the button is active the Transport will Loop between **In** and **Out** markers.
6. Dolby E Status (Only when the SurCode for Dolby E option is present and active.) Shows **SurCode for Dolby E ENC**, **DEC** or **THRU**
7. Current Format and Frame rate

Note: Read Drop and Current FPS are useful diagnostic tools when trimming Disk Cache and Playback Buffers.

Transport Tool

A VCR like Transport Tool is available from the **Toolbar**. It collates all the information and controls relating to Transport, incoming TimeCode and Chasing.

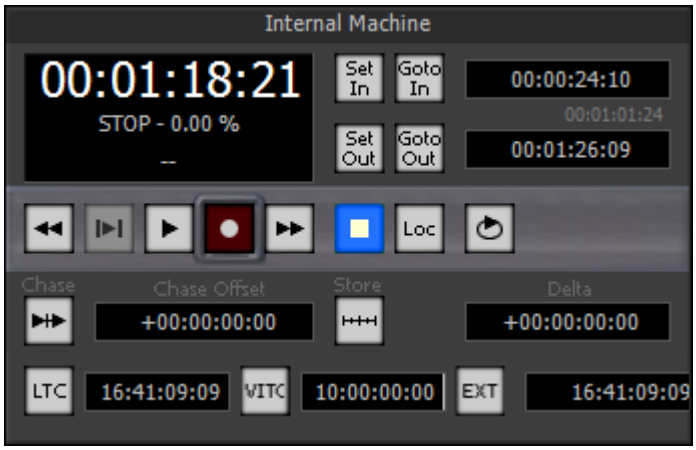


Toolbar Transport Control Panel Icon

Note that the Icon displayed on the Toolbar may differ since the last tool chosen from the drop-down list will be displayed. Alternatively the Transport Tool can be accessed from:

User Interface > Toggle Transport Tool [**T**] or

Transport > Toggle Transport Tool [**T**]



Transport Control Panel

If **Sony 9 Pin Remote Control** is enabled in: **Settings > Format & Sync : Sony 9 Pin Remote Control Remote On** is displayed. This means that the **Internal Machine** is controlled by the Sony 9 pin protocol serial data emanating from another device. **Please see: Remote Control on page 167**

If **Sony 9 Pin Machine Control** is enabled in the same Tab then VCube controls the external machine while chasing its TimeCode. A further Transport Control panel appears below the **Internal Machine**. **Please see: Machine Control on page 175**

- **Set In** [**Num 7**]
- **Set Out** [**Num 8**]

Are linked to the Timeline Range.

- **Goto In** [**Num 4**]
- **Goto Out** [**Num 5**]

Are linked to the Timeline Locator controls.

- **Rewind** [**Num 1**]
  - First press 400%
  - Second press 1000%
  - Third press 2000%
  - Fourth press 5000%
- |>|
- **Play** [**Space** (Toggles Play/Stop) or **Num Enter** (Toggles Play / Pause)]
- **Record** [**Decimal**]
- **Fast Forward** [**Num 2**]
  - First press 400%
  - Second press 1000%
  - Third press 2000%
  - Fourth press 5000%
- **Stop** [**Num 0**]
- **Loc** [**Num 6**] Accesses the **Goto Locator** window.
- **Loop** [**L**] When checked VCube Plays in a Loop from the **In** point to the **Out** point
- **Chase** [Ctrl + F1]. This button cannot be enabled when using the **Follow VT** mode in regular VCube or **Slave to VT** mode in VCube SE.

- **Chase Offset** Shows the current Chase Offset. Double-click in the field to type or edit the value**.** Click on the **Store** button to store the offset.
- **Store** Stores the Chase Offset displayed in the **Chase Offset** field.
- **LTC** When checked the Linear TimeCode Input is used as the reference.
- **VITC** When checked the VITC (Vertical Interval Timecode) in the Video is used as the reference.
- **Delta** The field indicates any discrepancy between the VCube current location and where it should be.
- **EXT** Select to chase serial TimeCode from the Sony 9 pin serial stream. If EXT is not selected, the displayed TimeCode is the current Virtual Transport TimeCode.

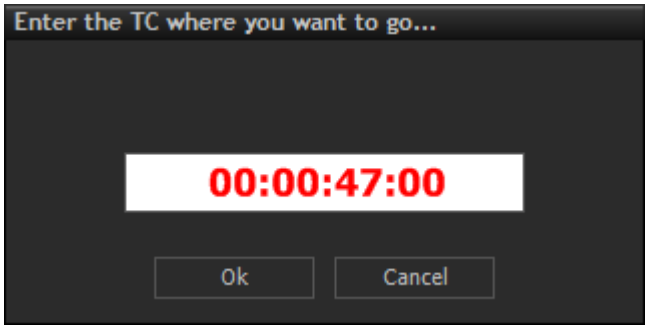
Control of External Machine

When **Ctrl** is used with the Transport controls the **Internal Machine** is unlinked for the controls. In this way it is possible to control the external Sony 9-pin machine to receive control commands directly from the VCube keyboard.

Note: The Internal Machine and Sony 9-pin cannot use the same Serial Port.

Go To TimeCode

The **Go To TC** function is accessed by **Ctrl + Num 6**.



Locator - Enter the TC where you want to go... dialog

Simply type the required TimeCode in the field and click on **OK** to locate the Playhead cursor there.

Acquisition

In many applications recording will be unnecessary. In these cases Compositions can be created by importing projects in formats such as AAF. **Please see: Import on page 35**.

Alternatively, empty Compositions can be created and Media Files imported using the **Media File Browser**. **Please see: Media Management on page 43**.

Recording

Overview

Note: When **Record : Enable** is checked **Quick SD Settings** and **Quick HD Settings** are unavailable. Audio recording is only available with Audio or Video I/O card options.

The plug-in corresponding to the video card must be **enabled** and set up in **User Interface > Settings Tabs > Settings > Show Video I/O Tab** [**Shift + Alt + P**]. **Please see: Video I/O on page 138**

Note: Be sure that both reference video input on the synchronization panel of the VCube and the Video Card Reference Input are referenced to the same genlock, black and burst, or video signal. This is the only way to ensure precise timing of the video signal.

The Record Tab Page has two Tabs.

Record - **Settings > Show Record Settings Tab** includes **Enable** and **Record Settings**. [**F12**]

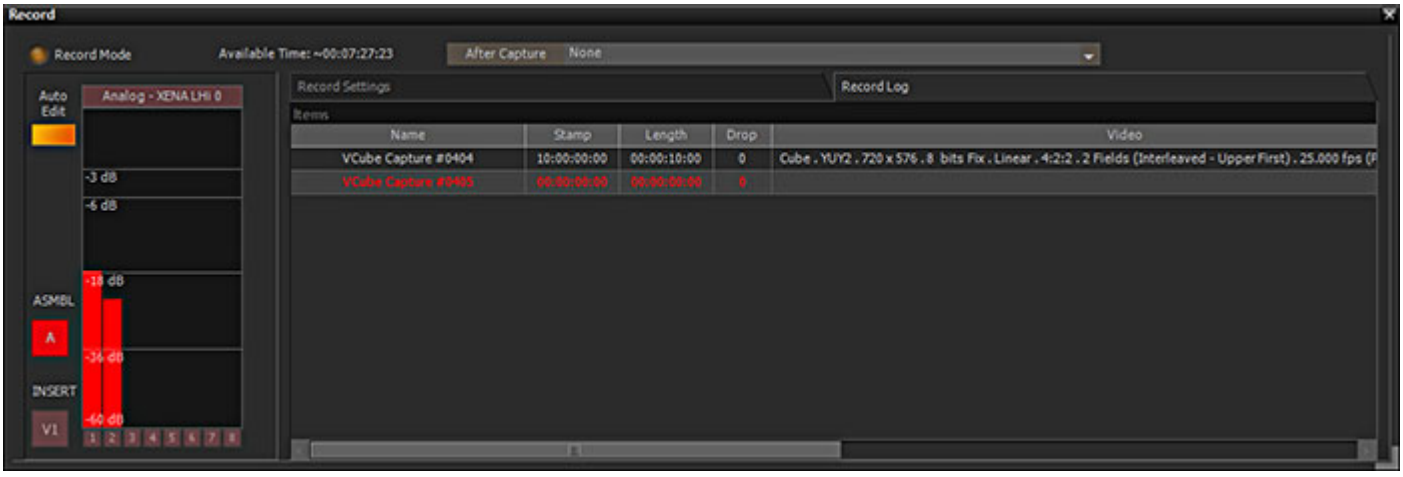
Record Log - **Settings > Show Record Log** shows information about each file recorded. [**Ctrl + R**]

Virtual VTR

VCube record functions mirror closely the record functions found on industry standard VTRs. Both **Insert** and **Assemble** modes are provided.

During recording both Video and Audio monitoring go into E to E mode.

Assemble (ASMBL)



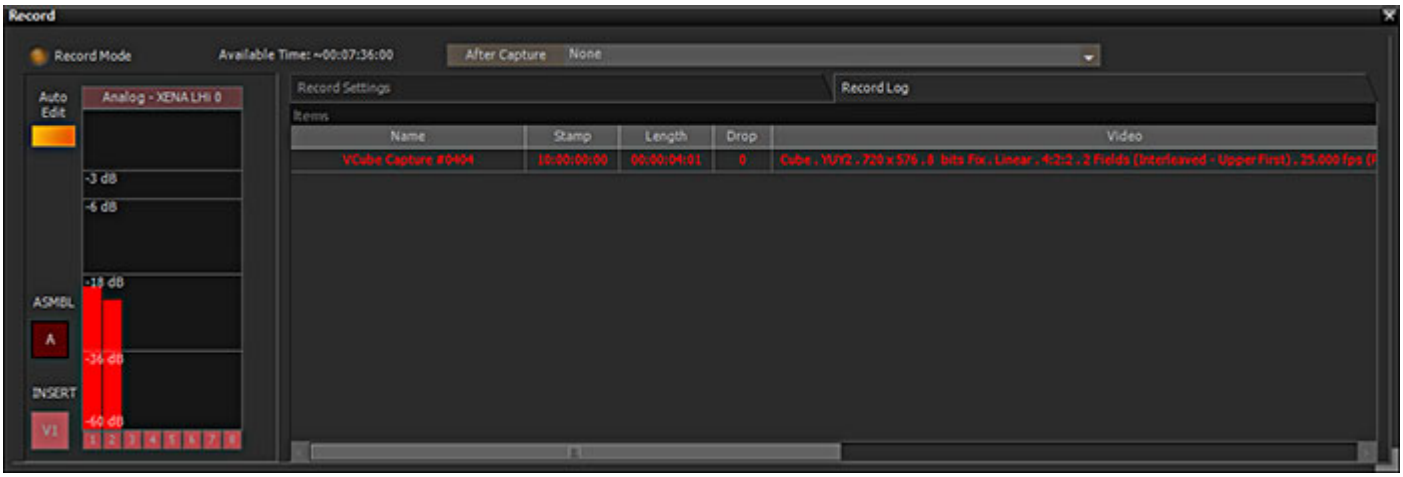
Record Tab page Assemble Auto Edit in progress

- The VCube Assemble mode operates in almost exactly the same way as a VTR:
- Before attempting an Assemble Auto Edit a valid TimeCode source must be set. (LTC, VITC, Ext. (Sony, MTC)

- When ASMBL is selected any active Track Arming buttons are switched off. Recording takes place on the Video and all available Audio Tracks. If a Track Arming button is switched on while in ASMBL mode ASMBL mode is disabled.
- Chase is set Automatically when the **Auto Edit** is initiated.
- VCube commences recording at the Cursor position as opposed to the In point.
- The Record Length is the external machine In to Out length.
- VCube computes the Chase Offset and the In and Out record points automatically.
- If an Auto Edit in Assemble mode fails (Stopped by user, invalid incoming TimeCode etc.) the VCube and VTR cue up where they were at the beginning of the process.
- If an Auto Edit completes successfully the VTR goes back to the Out point after the Postroll, This allows for assembling video end-to-end.

Note: VCube records beyond the Out point (like a VTR) allowing for subsequent Clip trimming.

Insert (INSERT)



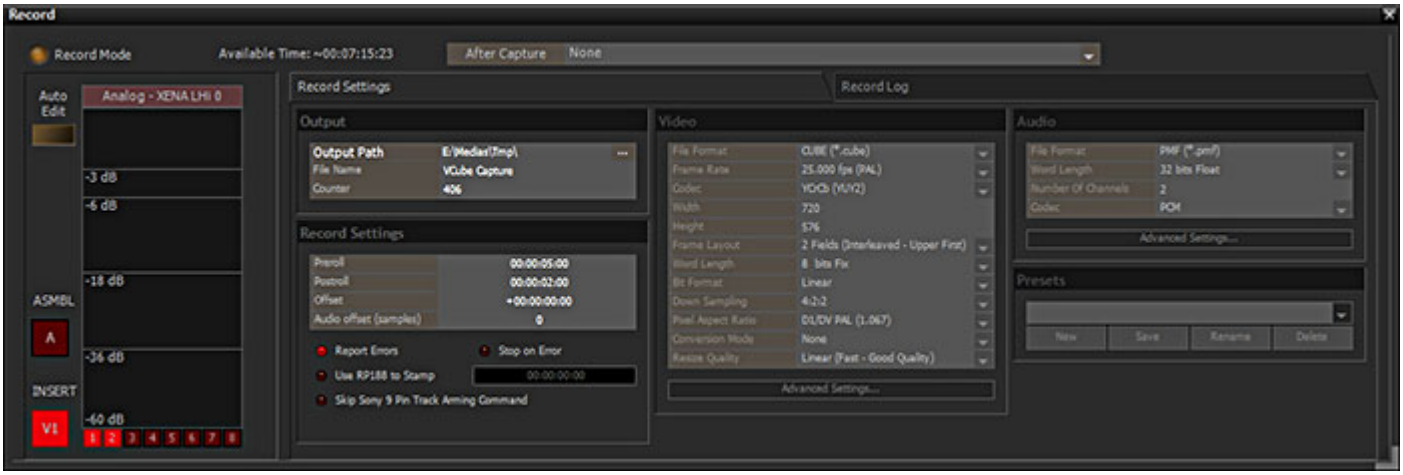
Record Tab page Insert Auto Edit in progress

- VCube Insert mode behaves in a similar manner to a VTR.
- Different In and Out points can be set on the VTR and in VCube.
- When an edit is initiated the Chase offset is set automatically.
- The recorded material duration corresponds (exactly) to the VCube In to Out duration.

External Controller

- When the last track arming button on an external controller is switched off, Record mode is disabled.
- When Record mode is inactive, arming a track from an external controller switches Record mode on.

Record Settings Tab



Record Settings Tab page

Enable — When checked recording is possible using the settings in the rest of the Tab.

Note: The **Enable** button must be disabled (unchecked) in order to see captured Media in the Timeline.

Auto Edit — When lit, Auto Edit Mode is active. This enables VCube to automatically control a VCR via the Sony 9 Pin (P2) protocol, and to record a range of the video tape from In point to Out point set in the Transport Tool - **User Interface > Toggle Transport Tool** [**T**]. **Please see also: Transport Tool on page 56**

Note: During this process, VCube needs to be in chase mode. To bypass possible drop outs in the Reference TimeCode source, **Soft Chase Mode** can be selected in **Formats & Sync**. In this case the Video Card **MUST** be referenced to an external reference signal.

ASMBL — Click on the **AS**se**MBL**e button to use VCube's Assemble edit mode. **Please see: Assemble (ASMBL) on page 59**

Analog - Xena LHi 0 — This section shows the Audio Hardware currently selected for recording. The number of record channels available will vary accordingly to a maximum of 8.

Insert V1 — Click on the V1 button to arm Video for recording in **Insert** mode. When lit (as above) Video is armed for recording. **Please see: Insert (INSERT) on page 60**

12345678 — Click on the numbered buttons to arm Audio Channels for recording in **Insert** mode. Here, Channels 1 & 2 are armed. The number of Audio Channels available will depend on the hardware. Multiple Audio Channels appear as Layers in a single Audio Track. Level meters are above each arming button.

After Capture — The field shows what will be done with the recorded material after capture. Options are None and In Current Composition, Place Clips at Original Timecode. If None is selected the recorded fields are simply added to the Output folder. If the in Current Composition ... option is selected and no Track is selected in the Timeline, a new Track or Tracks will be created.

Output

Output Path — The field shows the current Output Path. Click on the ... button to open a Windows browser to change the path. The Path defaults to the current Composition Media Files Path.

File Name — The field shows the Current root File Name Click in the field and type to enter a new File Name.

Counter — Field shows the start number for the incrementation process. Click in the field and type to enter a different start number.

Record Settings

Note: These settings apply to **Auto Edit** mode. See above.

Preroll	Field shows the current VCR Preroll. Click in the field and type to change the value.
Postroll	Field shows the current VCR Postroll. Click in the field and type to change the value.
Offset	Field shows the current Offset between the incoming and recorded Timecode. This value only affects the Time Stamp of the recorded Media File(s) Click in the field and type to change the value.
Audio Offset (samples)	Field shows the current Audio Offset in samples. Click in the field and type to change the value. Enables sync errors to be corrected at Capture.
Report Errors	When checked a list of errors and their corresponding Timecodes is created.
Stop on Error	When checked Capture is terminated when an error is detected.
Use RP188 to Stamp	When enabled uses the incoming picture Timecode to Timestamp the recorded Media File(s)

Skip Sony 9-pin Track Arming Command

Prefer Mykerinos track for Assemble

Video

File Format Field shows the Output File format selected currently. Click on the down arrow to select from:

CUBE	***. Cube**
AVI	***.avi**
MPEG	***.mpg**
MPEG	***.mpeg**
MPEG	***.m2v**
MPEG	***.m1t**
MPEG	***.m2t**
MXF	***.mxf**
QuickTime	***.mov**

Note: If **Quicktime**, **MPEG mpg** or **mpeg** are selected then a single audio + video file will be produced.

Frame Rate	The field shows the Frame Rate selected currently. Click on the down arrow to select an alternative.
Compression	The field shows the type of Compression selected currently. Click on the down arrow to select an alternative. The exact composition of the list will depend on options purchased.
Width	The field shows the Width of the output Video in pixels. Click in the field to enter a new value manually.
Height	The field shows the Height of the output Video in pixels. Click in the field to enter a new value manually.
Frame Layout	Field shows the current setting. Click on the down arrow to select an alternative:

Progressive Frame

2 Fields (Interleaved - Lower First)

2 Fields (Interleaved - Upper First)

2 Fields (Separate - Lower First)

2 Fields (Separate - Upper First)

Single Field

Word Length	Fixed at 8 bits currently

Bit Format

Down Sampling Field shows the current color sub-sampling scheme. 4.2.2 is the default.

Up Conversion Mode Field shows current conversion mode. Options will vary with the Pixel Aspect Mode setting. E.g. Anamorphic, Letterbox, Pillarbox or None

Pixel Aspect Ratio Field shows the current Pixel Aspect Ratio and the format associated with this. Click on the down arrow to select an alternative.

Resize Quality Field shows the resizing algorithm selected currently. Click on the down arrow to select an alternative.

Nearest neighbour	**Fastest but poor quality**
Linear (Bi Linear)	**Fast and poor quality**
Cubic	**Slow but very good quality**
Lanczos	**Very Slow but excellent quality**
Supersampling	**Slow but very good for large downscaling**

Advanced Settings The button is only available when MJPEG or Avid: VC-3/DNxHD are selected as the Compression scheme or when MPEG is selected in File Format. A dialog appears with compression settings.

Notes

- When **QuickTime** and an **MJPEG** codec are chosen, **Progressive Frame** must be selected in **Frame Layout** to ensure QuickTime player compatibility.
- **Frame Rate** must be set to match the frame rate of the Composition where the generated Video file is to be used.
- Compression allows the user to select the CODEC used to generate the new Media File(s). Depending on the chosen CODEC, it is possible to adjust the Compression Settings.
- For full details about the **MPEG** Settings, please refer to the dedicated section. We recommend using only regular **Format Type**s in the **Basic Settings** dialog for trouble free operation.

MJPEG codec. A 100 value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20

compression ratio.

Audio

File Format The field shows the current File Format. The drop-down list offers a choice of formats from the following depending on the container chosen. If both Video and Audio are of the same type, e.g. AVI or QuickTime they are merged inside a single Media File : The drop-down list offers a choice of formats from the following depending on the container chosen:

None
AVI (*avi)
MPEG (*mpg)
MPEG (*mpeg)
MPEG (*mpa)
PMF (*pmf)
WAV (*wav)
BWF (*bwf)
AIF (*aif)
SD2 (*.sd2)
QUICKTIME (*.mov)

Number of Channels Indicates the number of physical outputs fed by Audio layers in the Composition.

Word Length Field shows the Word Length selected currently. The drop-down list offers a choice of:

16 bits Fix

24 bits Fix

32 Bits Float

Compression Field shows the Compression scheme selected currently. The drop-down list offers a choice of schemes depending on the selected Audio File Format. QuickTime offers various solutions for compressing audio data.

Note: The **AVI** and **QuickTime MPEG2** Media Handlers support multiple audio channels in a single file. When recording more than 2 channels in an AVI2 or QuickTime file, each channel is treated as a separate mono channel. I.e. if you have 4 channels in VCube, they will appear as 4 mono channels in an AVI file. The Windows Media Player from Microsoft and the QuickTime player from Apple will playback a 4 channel audio file into a stereo mix of the 4 mono channels.

Using Video files with embedded audio decreases playback performance. For Compositions with complex compositing, two or more separate Media Files (one for video, one or more for audio) are preferable.

Scope

Editing in VCube is not intended to replace an NLE. It is basic and intended to facilitate the editing required when using Video for playback and presentation.

Editing in the Timeline

The **Timeline** is the place in VCube where Audio and Video **Clips** can be edited, faded up and down and otherwise arranged into an audio visual **Composition**.

Clips in a Composition

Clips in a **Composition** are just pointers to the original audio and video **Media File(s)**. Any actions performed on a **clip** in a **Composition** will not affect the original **Media File(s)**. **Clips** can be edited, shortened, split into 2 **clips**, moved, have level or transparency adjusted, be copied, deleted, etc., and all actions will **ONLY** affect the **Composition**.

Once placed in the Composition, each Audio clip by default displays a Waveform of the Media file to which it points. This Waveform display can be enabled or disabled by the user.

Selections and Groups

Selection

Selections can be made of individual Clips or of a **Range**

Click on a single Clip to select it. If it is a member of a **Group** the entire Group will be selected.

[**Shift + Click**] enables multiple Clips to be selected.

Region

Click and drag anywhere in the Timeline to create a **Region**. Any Layer dragged over will be included in the Region. The Region will be shown highlighted.

Click on the **Region** to create a **Split** in all Clips at the beginning and end of the Region in all Clips included in it. The resultant Clips are Selected and can be moved as a group regardless of whether they are members of other Groups.

[**Shift + Click and drag**] will select all clips partially or totally included in the Region.

[**Enter**] sets the **Range** to the beginning and End of the Region.

[**Ctrl + ENTER**] selects the Range contents as a **Region**.

Double-click on the **Range Tray** will set the Range from the beginning of the Composition to the end.

Groups

The most common **Group**s are created automatically when a Video Clip and its associated Audio with the same source Timecodes and lengths is placed in the Timeline.

[**Ctrl + G**] Groups the Clips selected currently

[Ctrl + U] Ungroups the Group selected currently

Multi-level Grouping

VCube supports multi-level grouping. I.e. a Group or Groups may in turn be grouped. Such a multi-level Group will need to be ungrouped as many times as there are levels in the group to be able to select individual Clips. A Group number, e.g. **G12** is displayed inside a grouped Clip in the Timeline. The number will be the number of the highest level Group that the Clip is a member of.

Note: A Group including a Video clip is constrained to a one-frame grid.

Nudge

[Ctrl + UP or DOWN]	Moves the Selected Clip(s) Up or Down a Layer. If the destination Layer already has a Clip the Clip moved is laid over the existing Clip for the duration of the moved Clip. If transparency is set appropriately both will be visible.
[Shift + UP or DOWN]	Invokes Nudge Overwrite mode for Selected Clip(s). The Clip moved will overwrite an existing Clip in a layer for the duration of the Clip moved.
[Shift + LEFT or RIGHT]	Nudges the selected Clip Left or Right in the Timeline. Where Clips meet the moving Clip overwrites the stationery Clip.
[Ctrl + LEFT or RIGHT]	Nudges Selected Clips Left or Right in the Timeline. Where Clips meet an overlap is created. The incoming Clip takes precedence.
[Ctrl + UP or DOWN]	Nudges Selected Layer Up or Down.
[Ctrl + Shift + UP or DOWN]	Nudges Selected Track Up or Down.

Editing Functions

Editing Functions are similar to Pyramix.

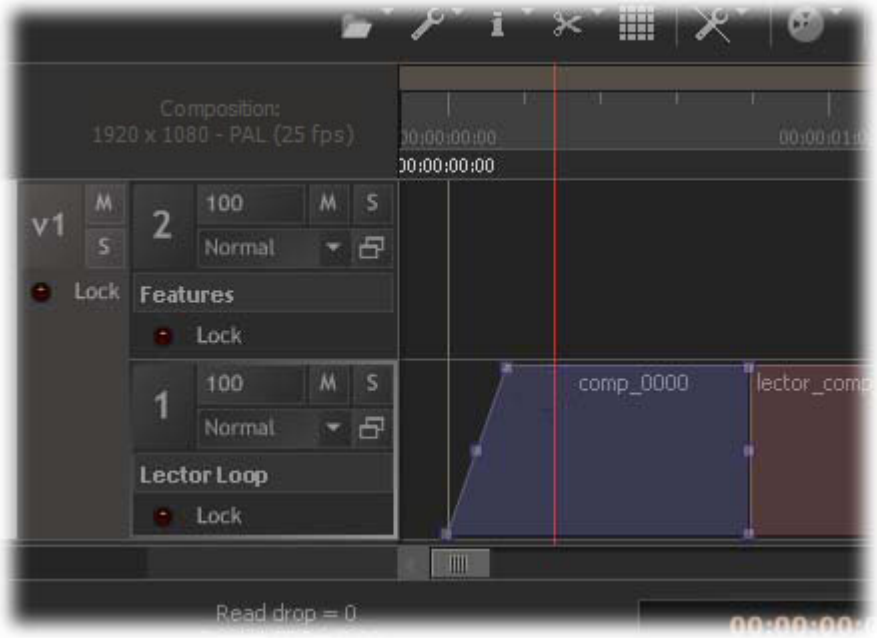
- To split a Clip at the mouse position use [**Ctrl + Right-Click**]. When Clips are Grouped or Selected, every Clip present at the mouse position will be split.
- To slip the Clip content inside fixed in out points in the selected Clip [**Ctrl + Shift + Click** and **Drag**]. When Clips are grouped, contents of grouped clips are slipped.
- Paste at Playhead Cursor in selected Layer/Track [**Ctrl + V**]
- Paste & Ripple at Playhead Cursor in selected Layer/Track [**Ctrl + Shift + V**]
- To split a Selection at the Playhead Cursor position use [**Ctrl + T**]. When Clips are grouped, every Clip present at the locator position will be split.
- To move a Selection in a Track or Layer just Click on the selected element and drag it wherever you wish, up and down between tracks or layers, or left and right to move it in time.
- Use [**Alt**] to constrain moves within the Layer(s). The selected element(s) will be placed before or after the existing element in the Track or Layer, depending on where you move it. This is also valid when you move a Group. In Audio Layers moves with [**Alt**] are constrained to a one frame grid.

Note: that a group with both video and audio can only be moved horizontally in the Timeline. To change the order of video Clips vertically for preview, **Nudge Up / Down Layer** must be used. Select the desired video Layer(s), then use [**Ctrl + Up**] / [**Ctrl + Down**] or **Edit > Nudge > Nudge Up / Nudge Down**.

- A selection in a Track or Layer can be dragged and dropped onto another element already present in a Track or Layer. The default mode when you move a Clip in between two elements is unconstrained within this space anywhere within a one frame grid except in audio Layers where the grid is one sample.
- A moved Clip can overlap a Clip already placed in the Layer. When a Video Clip is placed over another in the same Layer the incoming Clip takes precedence.
- Use [**Ctrl** + **Click** and **Drag**] to create an automatic cross-fade between the Clip moved and the adjacent Clip.

Trim

To trim the **In** or **Out** points of a Clip, just use the six handles on the selected element.



Trim handles

On the left:

The bottom handle controls the **In** point for the selected element. The center one just moves the fade in without shifting the Clip content. The top one enables you to create a real time fade in when moved to the right. If you use [**Ctrl**] the fade can be adjusted symmetrically. If you use [**Ctrl**] while moving a faded Clip, an automatic symmetric cross fade is produced within the adjacent Clips.

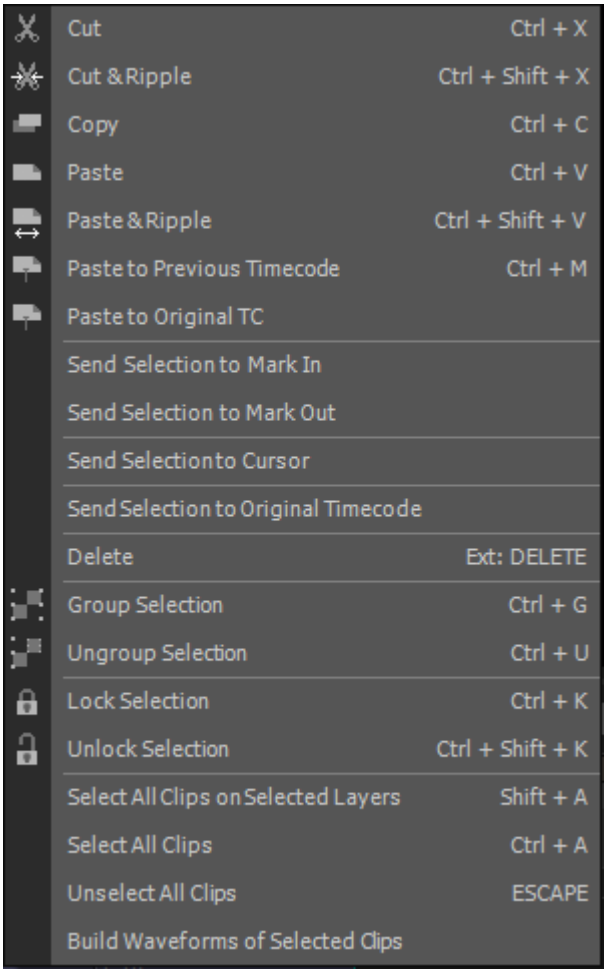
On the right

Handles act in the same manner for the **Out** point

- With Grouped Clips having the same Source In TC and the same In Time in the Timeline, actions on handles are applied to all Clips. [**Click + Shift**] on a handle temporarily unlinks the selected Clips and produces a fade action only on the Clip with the handle clicked. After such an operation the handles remain unlinked until all grouped clips fade handles are restored to no fade in at the same Timecode.

Edit Context Menu

Right-Clicking on the Selection displays a contextual menu with editing functions:



Edit context menu

Cut [**Ctrl + X**]

Cut & Ripple [**Ctrl + Shift + X**]

Copy [**Ctrl + C**]

Paste [**Ctrl + V**] (only available if the Clipboard isn't empty)

Paste & Ripple [**Ctrl + Shift + V**] (only available if the Clipboard isn't empty)

Paste at Previous TimeCode [**Ctrl + M**] (only available if the Clipboard isn't empty)

Paste To original TC (only available if the Clipboard isn't empty)

Send Selection to Mark In

Send Selection to Mark Out

Send Selection to Cursor

Send Selection to Original Timecode

Delete [**DELETE**]

Group Selection [**Ctrl + G**] (only available if more than one Clip is selected)

UnGroup Selection [**Ctrl + U**] (only available if more than one Clip is selected)

Lock Selection [**Clip Ctrl + L**]

Unlock Selection [**Clip Ctrl + Shift +K**]

Select All Clips on Selected Layers [**Shift + A**]

Select All Clips [**Ctrl + A**]

UnSelect All Clips [**ESC**APE]

Build Waveforms of Selected Clips Forces waveform generation for selected Clips whe disables in Settings.

Motion Rectangles (PiP)

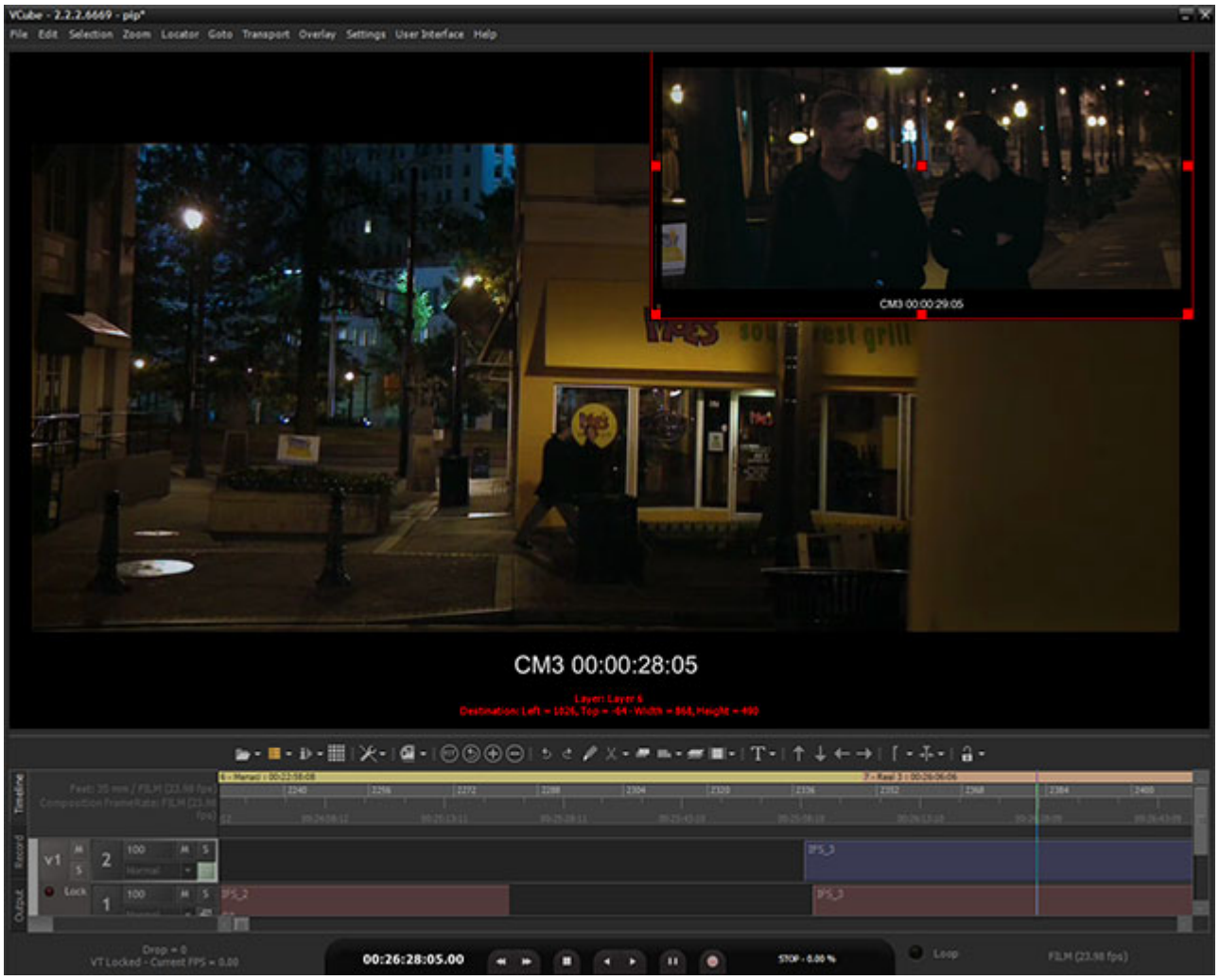
Motion Rectangles enable a Layer's position and size to be altered. The Motion Rectangles interface is only visible on the computer screen. The Video Output only displays the results.

This feature can be useful when different versions of the same video or film project need to be compared. When used in combination with the Import Composition function, 2 versions of the same video or film project can be compared on a single screen without rendering.

It can also be used to crop unwanted picture information, for example a working copy which has several potentially confusing burnt-in Timecodes at the top or bottom.

Advanced Preview

Picture-in-Picture can also be used to give Re-recording (Dubbing) Mixers an advanced Preview when mixing as below:



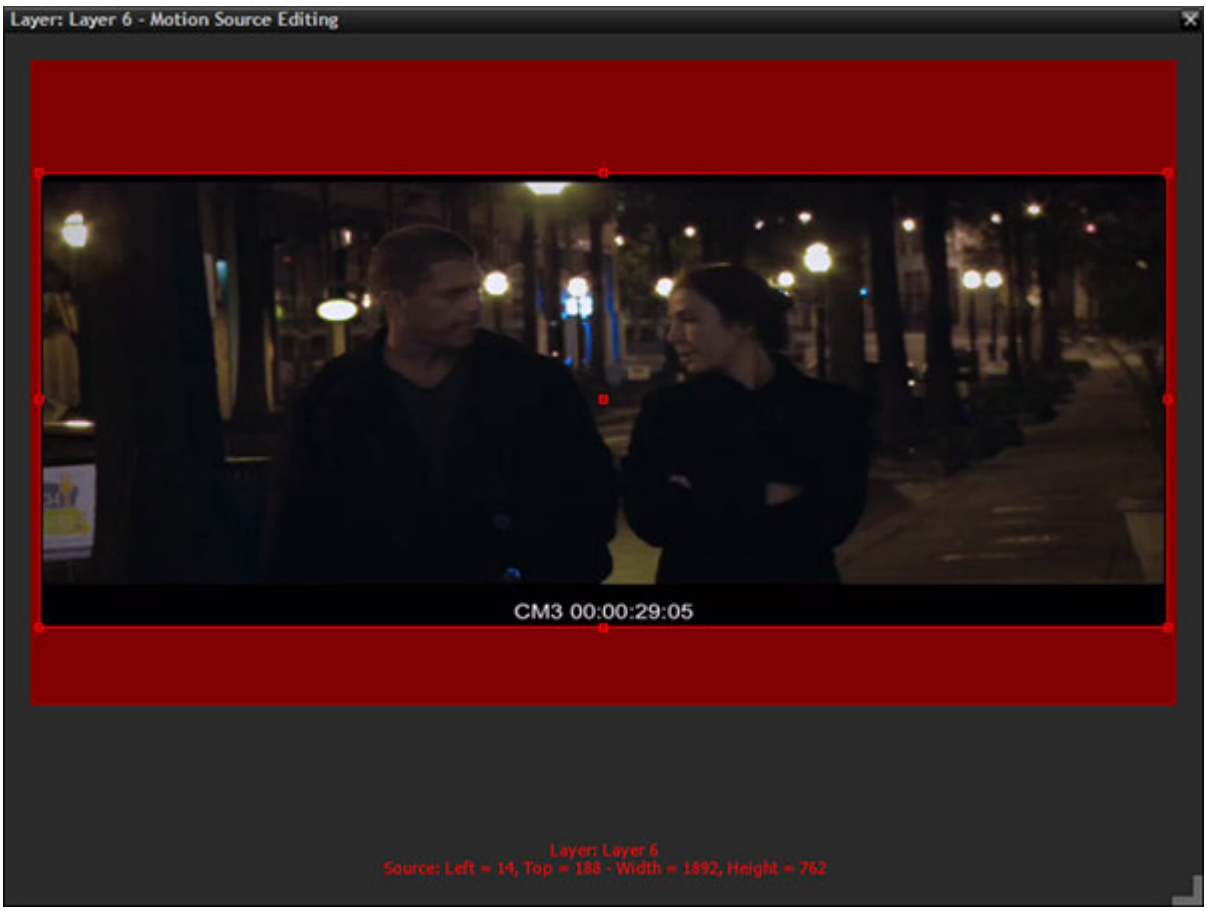
Picture-in-Picture Advanced Preview

In this screenshot the selected Clip on Video Track 1, Layer 2 is advanced by one second and the Motion Rectangles feature is used to shrink and position it at top right. To achieve a similar result do this :

First copy the **Clip** you wish to see in advance. Paste into a higher Layer (Create a new one if necessary) at the desired position in advance (earlier than the original Clip. (Values of one foot (16 frames) or one second are commonly used.

Click on the Motion Rectangles button in the Layer header

1. Click the **Source** button now visible at top left. The **Motion Source Editing** pane opens:



Motion Source Editing

2. [**Alt + Click** and **Drag**] a red handle or handles to crop the image if required.
3. Press **Enter** to accept the **Source Rectangle** changes and close the pane.
4. [**Shift + Click** and **Drag**] a red corner handle to reduce the **Destination Rectangle** to the size desired.
5. [**Click + Drag**] the center red handle to position the **Destination Rectangle** as required
6. Press **Enter** to accept the **Destination Rectangle** changes.

The **Motion Rectangles** icon in the Layer Header turns green to indicate that the layer position and or size has been modified.

Controls and Shortcuts

The **Source Rectangle** is accessed from the **Destination Rectangle** (**Source** button at top left) and determines the shape and size of the portion of the Clip frame which will be sized and positioned on screen.

The **Destination Rectangle** determines the shape and size of the **Source Rectangle** contents on screen.

Playback is still possible while **Destination** or **Source Rectangles** are being adjusted.

With **Motion Rectangles** active (red sizing box displayed):

[Tab] steps Layer selection from top to bottom.

[**Shift + Tab**] steps Layer selection from bottom to top.

Layer number, **Top** and **Left** corner positions, **Width** and **Height** are displayed in red at bottom center.

Crop

[**Alt + Click and Drag**] Both Source and Destination Rectangles can be cropped by using [Alt + Click and Drag] on resize handles. This permits the useful part of the source Layer to be chosen while preserving the geometry and the field order if the selected window is not moved.

Resize

[**Click and Drag**] the external handles to adjust rectangle size.

[**Shift + Click and Drag**] the external handles to adjust rectangle size while preserving the aspect ratio.

[**UP**], [**DOWN**] [**LEFT**] and [**RIGHT**] keys can also be used to move the rectangle.

[**Ctrl + UP**], [**Ctrl + DOWN**], [**Ctrl + LEFT**] and [**Ctrl + RIGHT**] keys resize the rectangle. In this mode the Top Left handle is the fixed reference point.

[**Shift + UP**], [**Shift + DOWN**], [**Shift + LEFT**] and [**Shift + RIGHT**] keys resize the rectangle. In this mode the Bottom Right handle becomes the fixed reference point.

[**ENTER**] accepts Rectangle settings and removes the red frame etc.

[**Esc**] accepts Rectangle settings and removes the red frame etc.

Move

[**Click and Drag**] the central handle to adjust rectangle position.

[**Double-click**] on the central handle centers the rectangle on the X & Y axes.

[**Ctrl + Double-click**] on the central handle restores the Layer to its original size.

[**Alt + Double-click**] on the central handle centers the Layer on the vertical axis.

[**Shift + Double-click**] on the central handle centers the Layer on the horizontal axis.

Watermark and Text

Watermark, Copyright and Text Clips can be added to a Composition. These functions are useful for security and other purposes.

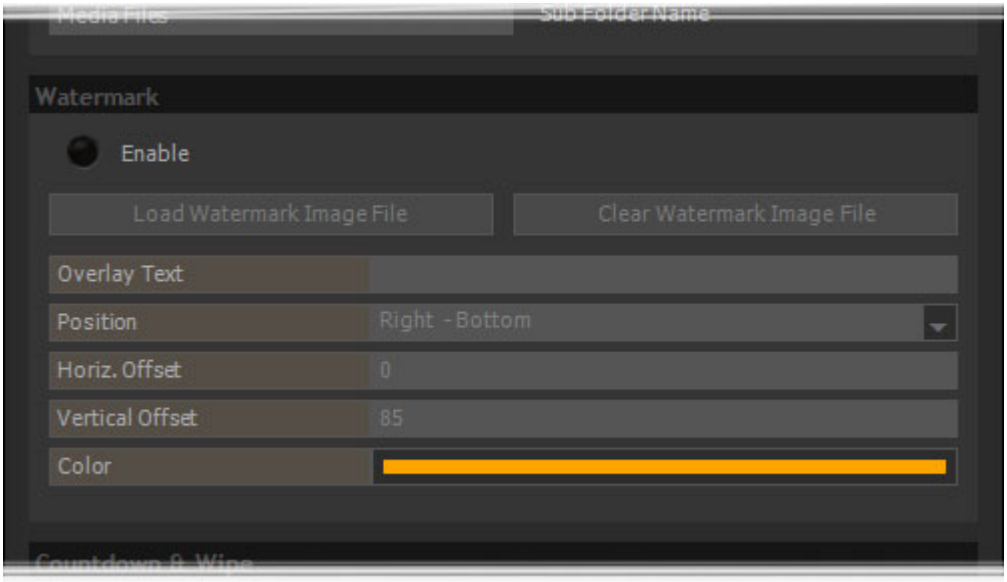
Watermark

Overview

The **Watermark** function enables a still image and or Copyright Text to be added to the current Composition. Simply load a still image file (with alpha channel supported) and or enter and position the Copyright Text. A Watermark image file must be of the same dimensions as the desired output video format to avoid real-time stretching.

Settings

Watermark settings can be found in the **Composition** Tab:



Watermark Settings

Enable When Enable is checked a user selected Watermark image will be added, in real-time, to every video output. Both Text and still image are possible.

Note: Enable must be active in order to access the **Watermark** settings.

Load Watermark Image File Opens a Windows File Browser to locate and open the desired image file.
Image transparency, size and position must be set in the image file in a suitable Image Editor, matching the current video format.

Clear Watermark Image File Unloads the current Watermark Image file

Overlay Text Type any text required in the field

Position The drop-down list offers a wide range of positions on screen for the text.

Horiz. Offset Offsets the text by the number of pixels typed in the box to the right or left depending on the anchor position chosen above. When **Center - xx** is chosen no offset is possible**.**

Vertical Offset	Offsets the text by the number of pixels typed in the box downwards or upwards depending on the anchor position chosen above. When **xxx - Center** is chosen no offset is possible.
Color	The field shows the color selected currently. Click in the field to pop-up a color picker. **Please see: Color Picker on page 17**

Note: Watermark, when activated, is present on all video outputs (both computer screen and video card). No VCube feature, including Mask can hide it.

Text Clip

There are two types of **Text Clip**

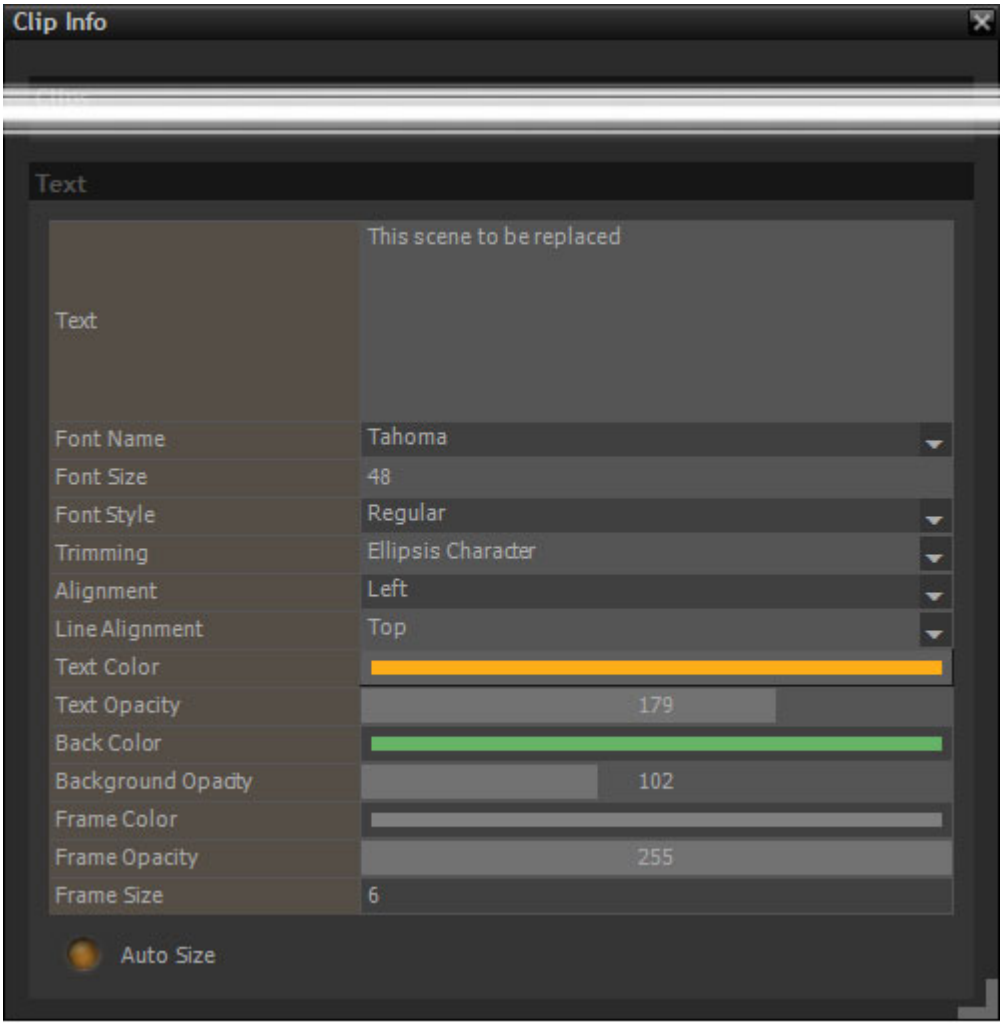
The only differences between the two is the text pre-entered and the Font size etc.

To create a **Text Clip** or a **Sticky** Clip:

Edit > Auto Create > New Text Clip, [**Shift + T**] Creates a new 5 second **Text Clip** in the Layer selected currently.

Edit > Auto Create New Post-it (Text Clip), [**Alt + T**] Creates a new 5 second **Text Clip** in the Layer selected currently.

Double-Click on the Text Clip created in the Timeline to open the **Clips Info** Tab.



Clip Info add text

Text

Text — Click in the box to highlight the field and type the Text you wish to see on screen. The result will be visible in the Preview Text box when the field is no longer highlighted.

Font Name — Field shows Font selected currently. Click to drop-down a list of all fonts available on the system.

Font Size — Field shows the font size in current use. Click in the filed and type to enter an alternative value.

Font Style — Field shows current style. Click to drop-down a list of alternatives:

Regular
Bold

Italic
Bold Italic
Underline
Strike out

Trimming Field shows current selection. Determines how excess text which will not fit in the Text Box will be dealt with. Please see: Trimming Setting on page 77

Alignment Field shows current justification. Click to drop-down list of alternatives:

Left
Center
Right

Line Alignment Field shows current Line Alignment. Click to drop-down list of alternatives:

Top
Center
Bottom

Text Color Field shows current Text Color. Click to open the Color Picker: Please see: Color Picker on page 17

Text Opacity The field is a slider showing the current opacity between 1 and 255. Click and drag the slider to change the value.

Back Color Field shows current Text box Background Color. Click to open the Color Picker: Please see: Color Picker on page 17

Background Opacity The field is a slider showing the current opacity between 1 and 255. Click and drag the slider to change the value.

Frame Color Field shows current Text box Frame Color. Click to open the Color Picker. Please see: Color Picker on page 17

Frame Opacity The field is a slider showing the current opacity between 1 and 255. Click and drag the slider to change the value.

Frame Size Field shows current Frame border width. Click in the field and type to enter an alternative value.

Auto Size Adjusts the rectangle area automatically to the Text content. In Auto Size mode there are no external handles for the rectangle. But the center positioning handle remains available.

Timeline Preview

Text Clips behave differently to video and audio Clips in the Timeline. When a text Clip is moved, the Video Preview follows. When the move ends Preview reverts to the Playhead Cursor position. In fades editing, the preview respects the compositing of the Project at the current TimeCode.

In contrast, when moving audio and video Clips, Preview displays the current Playhead Cursor position. In fades editing, the preview displays only the selected video Clip at the current TimeCode without any other mixed Layer or Motion Rectangle applied (no compositing).

Layer motion and opacity are not applied to text Clips.

Any font installed on the system can be used.

Add a text Clip in the Timeline will display a red Destination Rectangle for text. Then, Double-click inside this rectangle. The text can then be edited in the preview screen. Click outside this rectangle to validate the text.

The Text Properties tab is automatically opened when a text Clip is selected. Text can also be edited in this tab with additional options for style.

Resize

[**Click and Drag**] the external handles to adjust rectangle size.

[**Shift + Click and Drag**] the external handles to adjust rectangle size while preserving the aspect ratio.

[**UP**], [**DOWN**] [**LEFT**] and [**RIGHT**] keys can also be used to move the rectangle.

[**Ctrl + UP**], [**Ctrl + DOWN**], [**Ctrl + LEFT**] and [**Ctrl + RIGHT**] keys resize the rectangle. In this mode the Top Left handle is the fixed reference point.

[**Shift + UP**], [**Shift + DOWN**], [**Shift + LEFT**] and [**Shift + RIGHT**] keys resize the rectangle. In this mode the Bottom Right handle becomes the fixed reference point.

Move

[**Click and Drag]** the central handle to adjust rectangle position.

[**Double-click**] on the central handle centers the rectangle on the X & Y axes.

[**Ctrl + Double-click**] on the central handle restores the Text box to its original size.

[**Alt + Double-click**] on the central handle centers the Text box on the vertical axis.

[**Shift + Double-click**] on the central handle centers the Text box on the horizontal axis.

Finish

[**Enter**] accepts Text box settings and removes the red frame etc.

[**Esc**] accepts Text box settings and removes the red frame etc.

Clicking elsewhere in the Timeline to deselect the Text Clip accepts Text box settings and removes the red frame etc.

Trimming Setting

The **Trimming** setting determines how excess Text which will not fit in the on-screen box is dealt with.

For example: for the phrase **The Rain In Spain Falls Mainly in The Plain**, and for a given Text Box size, the options will display as follows:

Ellipsis Character (default)	The Rain In Spain F...
None	The Rain In Spain Falls
Character	The Rain In Spain Fall
Word	The Rain In Spain
Ellipsis Word	The Rain In Spain...
Ellipsis Path	The Rain ... The Plain

Generated Clips

Countdown Clips, **Wipe** Clips, **Video Test Pattern** Clips, and **Audio Tone** Clips can be generated by the VCube application from **Edit > Auto Create :** or the Tool Bar.

Pyramix ADR capabilities can create Wipe and Countdown clips automatically in the VCube Timeline. This feature either works internally in a **PyraCube** machine or uses the network connection between separate Pyramix and VCube machines to send the corresponding information.

Note: Dedicated shortcuts can be defined in the Shortcuts editor section [**Shift + W**]

Countdown Clock and Wipe

Here **Auto Countdown** and **Auto Wipe** are enabled.

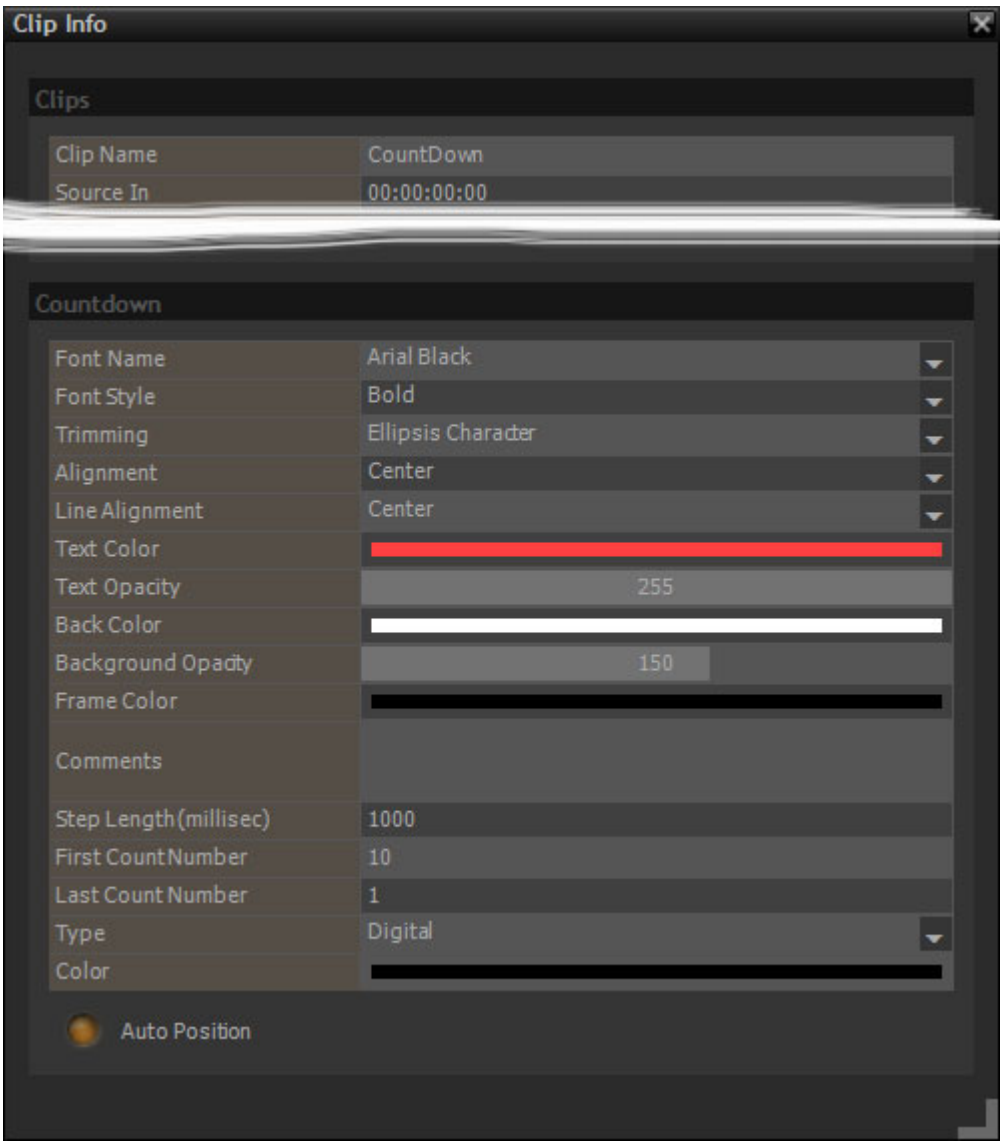
Countdown Clip

Countdown clips can be generated automatically by VCube:

Edit > Auto Create : New Countdown Clip or

 In the Toolbar

Once created in the Timeline, Double-click on the Clip to access its settings in Clip Info:



Clip Info - Countdown Settings

Clips

The fields in this section are the same as for standard Video or Audio Clips. However **Clip Name** appears on the Countdown overlay just below the Count number :

Clip Name Field shows the current Clip Name. Click in the field and type to rename.

Countdown

Font Name Field shows Font selected currently. Click to drop-down a list of all fonts available on the system.

Font Style Field shows current style. Click to drop-down a list of alternatives:

Regular
Bold
Italic
Bold Italic
Underline
Strike out

Trimming

Alignment Field shows current justification. Click to drop-down list of alternatives. Default is Center :

Left

Center
Right

Line Alignment Field shows current Line Alignment. Click to drop-down list of alternatives. Default is Center.

Top
Center
Bottom

Text Color Field shows current Text Color. Click to open the Color Picker. Please see: Color Picker on page 17

Text Opacity The field is a slider showing the current opacity between 1 and 255. Click and drag the slider to change the value.

Back Color Field shows current Text box Background Color. Click to open the Color Picker. Please see: Color Picker on page 17

Background Opacity The field is a slider showing the current opacity between 1 and 255. Click and drag the slider to change the value.

Frame Color Field shows current Text outline Color. Click to open the Color Picker. Please see: Color Picker on page 17

Comments Free text field. Click in the field and type.

Step Length (millisec) Field show the current Step Length between numbers. 1000 = 1 second. NTSC based video standards require 1001 ms per second.

First Count Number Field shows the First step number for the countdown Click in the field and type to enter an alternative value.

Last Count Number Field shows the Last step number for the countdown Click in the field and type to enter an alternative value.

Type Field shows the current Countdown style. Click to drop-down the list of alternatives:

Digital
Watch
Left to Right
Right to Left
Border to Center
Center to Border

Color Field shows current Countdown Bar and Clip Color in the Timeline. Click to open the Color Picker:

Auto Position

Note: Some Clip Properties are not supported by Countdown Clips.
Countdown clips are unaffected by the Layer Source/Destination rectangle settings.
Countdown Clip duration cannot be edited directly in the Timeline using the Clip handles. Use **Clip Settings** to change Countdown Clip duration.

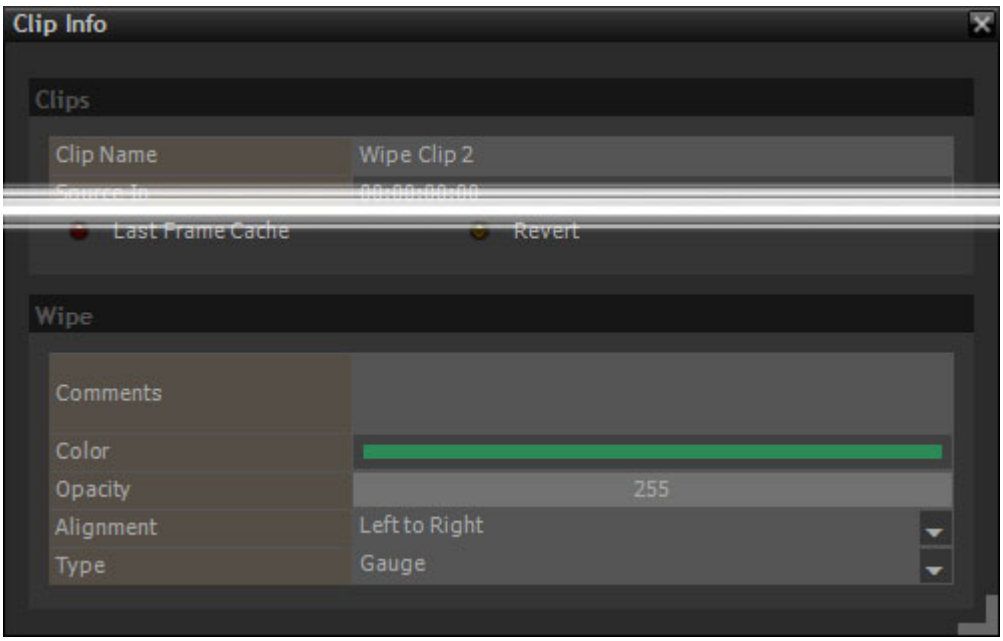
Wipe Clip

Wipe clips can be generated automatically by VCube.

Edit > Auto Create : New Wipe Clip or

W In the Toolbar

Once created in the Timeline, Double-click on the Clip to access its settings in Clip Info:



Clip Info - Wipe settings

Clips

The fields in this section are the same as for standard Video or Audio Clips. However **Clip Name** appears on the Wipe overlay just above the Wipe :

Clip Name Field shows the current Clip Name. Click in the field and type to rename.

Countdown

Comments Free text field. Click in the field and type.

Color Field shows current Wipe Color. Click to open the Color Picker. Please see: Color Picker on page 17

Opacity The field is a slider showing the current Opacity between 1 and 255. Click and drag the slider to change the value.

Alignment Field shows current Wipe direction. Click to drop-down list of alternatives. Default is Left to Right

Left to Right
Right to Left
Border to Center
Center to Border

Type Field shows the current Wipe style. Click to drop-down the list of alternatives:

Gauge (Horizontal)
Vertical

Note: Some Clip Properties are not supported by Wipe Clips.
Countdown clips are unaffected by the Layer Source/Destination rectangle settings.

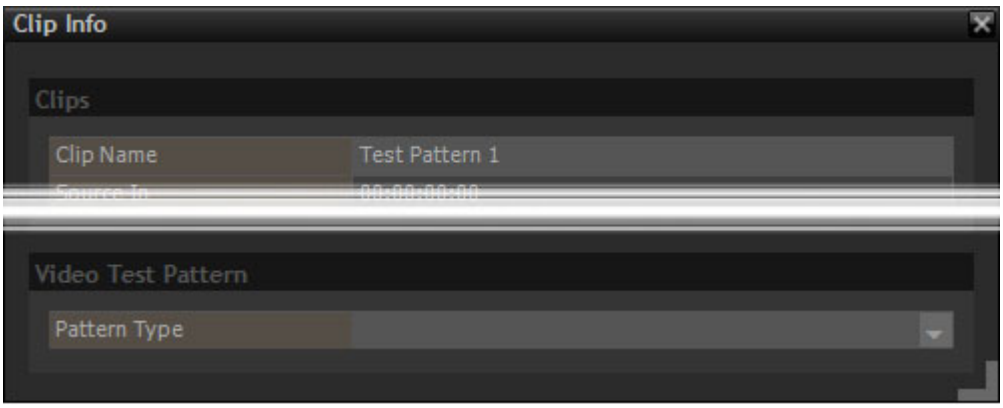
Video Test Pattern Clip

Video Test Pattern clips can be generated automatically by VCube.

Edit > Auto Create : New Video Test Pattern or

 In the Toolbar

Once created in the Timeline, Double-click on the Clip to access its settings in Clip Info:



Clip Info - Video Test Pattern chooser

Video test Pattern

Pattern Type Field shows the Test Pattern selected currently. Click to access the list of patterns available.

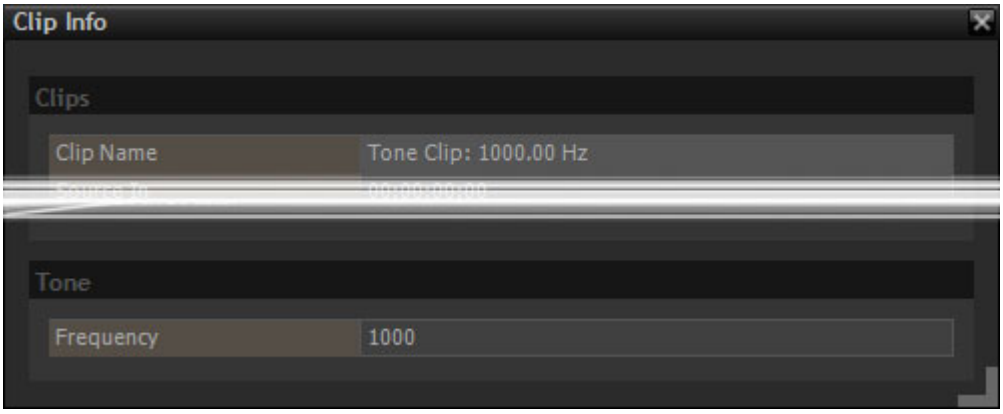
Audio Tone clip

Audio Tone Clips can be generated automatically by VCube.

Edit > Auto Create : or

 In the Toolbar

Once created in the Timeline, Double-click on the Clip to access its settings in Clip Info:



Clip Info - Tone Clip setting

Tone

Frequency Field shows the frequency of the sine wave tone.

Note: When VCube executes Conversion or Rendering processes, the current Composition frame rate is used.

Note: All the VCube Export, Conversion and functions are available in the File Menu. E.g. **File > Export > Wrap**.

Export Composition

XML

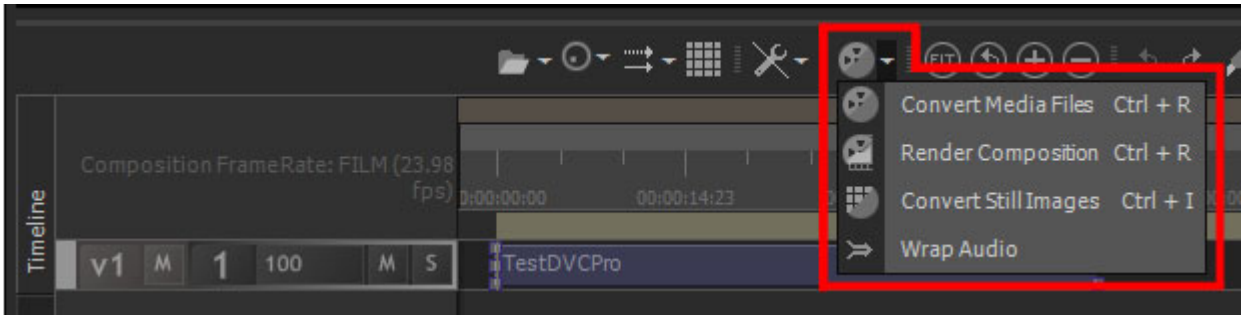
VCube Compositions can be exported as **.xml** files. This feature enables Timelines to be exchanged between the last generation of Merging Technologies software (Pyramix or Ovation).

To export XML choose:

- **File > Export > Composition**
- The **Export Composition** File Browser opens.
- Navigate to the desired destination folder or create a new one.
- The file type is already selected for you. **Interchange file format (*xml)**
- Type a suitable name in the **File name:** drop-down list box. (or choose from the list if overwriting a previous export.
- **Click** the **Save** button to begin the export.

Conversion, Rendering and Wrapping

The **Conversion, Rendering and Wrapping** toolbar icon is a modal Toolpicker. I.e. the icon shown will be for the process last invoked from the adjacent drop-down list. All these options are also available from **File > Export > (function)**



Convert, Render and Wrap toolbar icon/menu

Convert Media Files

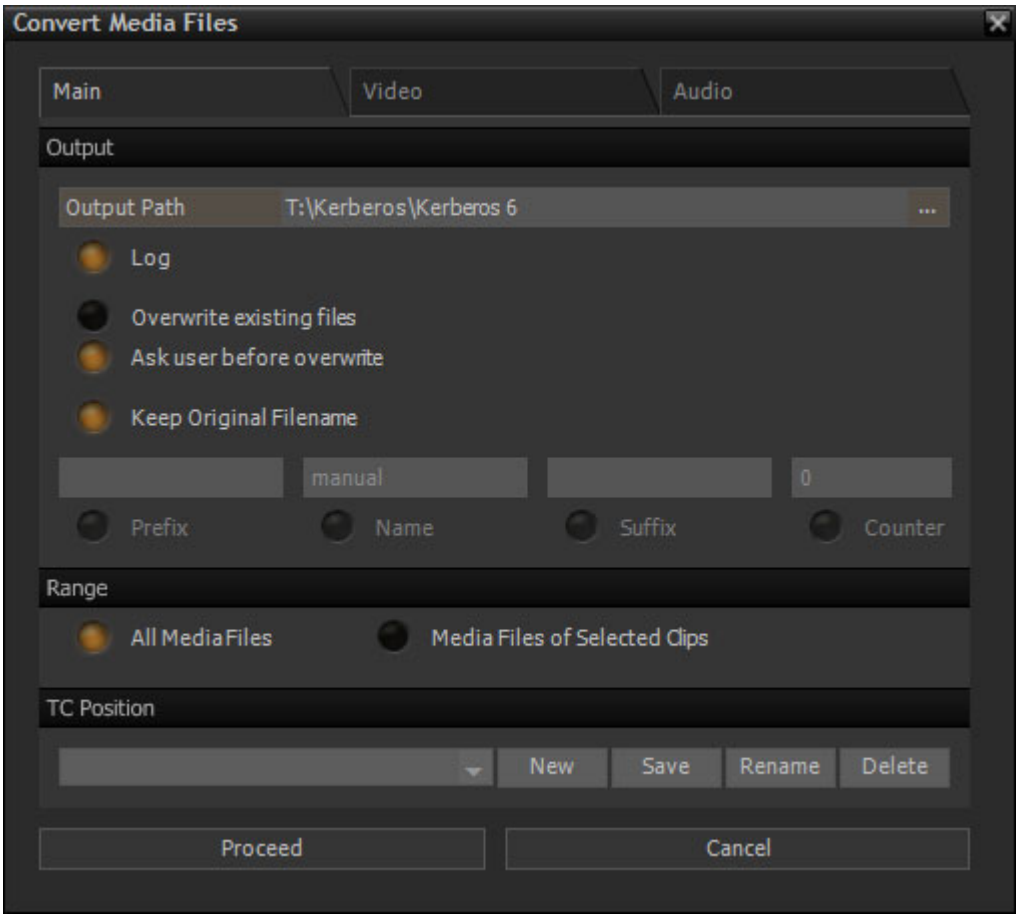
File > Export > Convert Media Files

Convert Media Files allows selected Media Files to be converted into a number of file formats including **.cube** file(s). This file format is optimized for the VCube playback engine.

Media Files can also be converted to AVI, MPEG2 or QuickTime files for compatibility.

The **Convert Media Files** dialog has three tabbed pages. The first of these is :

Main



Convert Media Files dialog Main tab page

Output

Output Path xxxxxx ...	Shows current path for output file(s). Click on**...** to open a browser to change the path.
Log	When active a window will appear at the end of the conversion process reporting success and listing any anomalies.
Overwrite Existing Files	When active existing files in the target folder with the same filename will be over-written automatically.
Ask User Before Override	When enabled, a dialog will appear for each file found in the destination folder with the same name as the file about to be created.
Keep Original File Name	When active the main part of the existing file name will be used to name the newly created Media File. E.g. **trailer 6.mp4** is written as **trailer 6.cube**

The fields and buttons below are only available when **Keep Original Filename** is inactive.

They enable a **Prefix**, a new **Name** and a new **Suffix** to be added while **Counter** allows the first number in the increment sequence to be user defined. All new Media Files will have the name selected along with prefix and suffix if active and an number incremented automatically.

Range

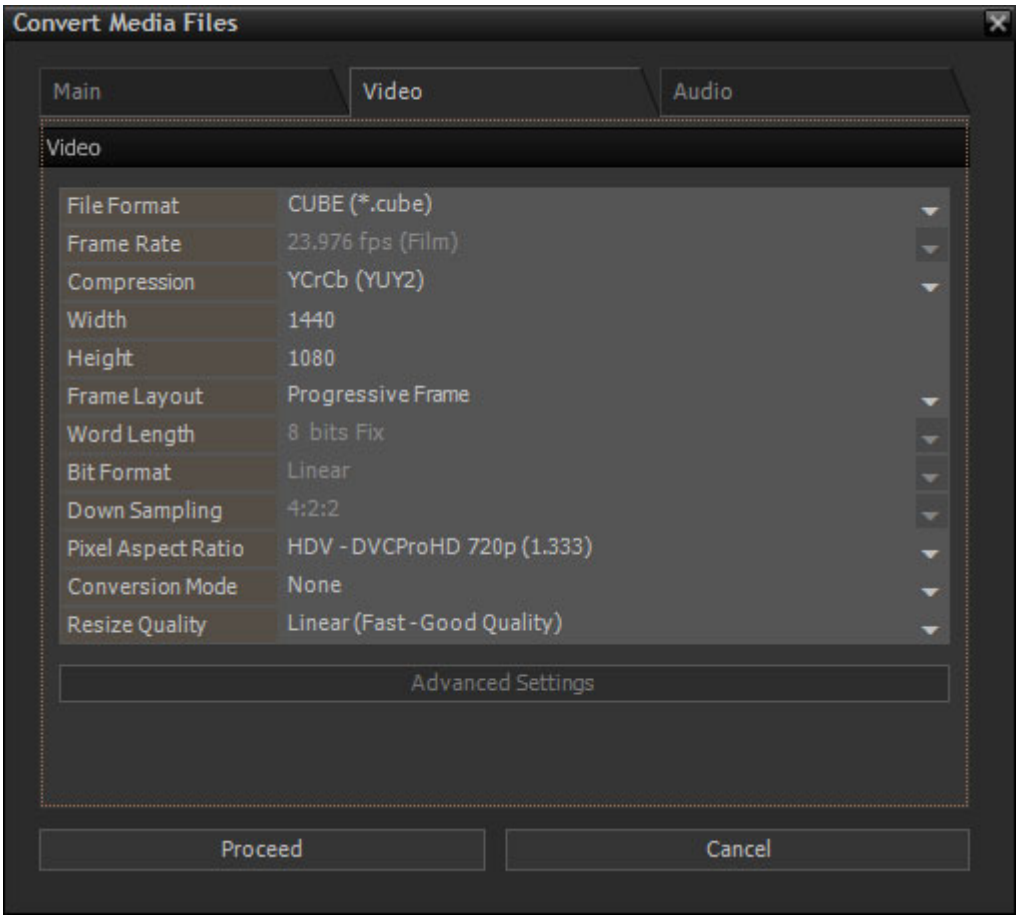
All Media Files	When active all files in the current Composition will be converted.
Media Files of Selected Clips	When active only the Media Files associated with selected Clips will be converted.

TC Position

Proceed Click on this button to execute the conversion**.**

Cancel Click on this button to cancel the conversion and close the dialog.

Video



Convert Media Files dialog Video tab page

As with other VCube settings dialogs, clicking on a field with a down arrow pops up a list of choices available.

> **Note:** Further settings specific to the chosen output may be available via the **Advanced Settings** button at the bottom of each Tab.

File Format

Determines the file type of the video Media File to be generated.

None

Cube (*.cube)

AVI (*.avi)

MPEG (*.mpg)

MPEG (*.mpeg)

MPEG (*m2v)

MPEG (*m1v)

MPEG (*m2t)

QUICKTIME (*.mov)

> **Note:** If any of the MPEG options are selected the **Advanced Settings** button becomes available. This will open a new dialog with settings specific to the codec.

Note: When QuickTime is selected together with the MJPEG codec, progressive scan must also be selected in the **Frame Layout** field to ensure compatibility with the QuickTime player.

Frame Rate

Fixed by Composition Frame Rate - not adjustable here

Compression

Enables the user to select which codec will be used to generate the new Media File(s). Depending on the codec chosen, Compression Settings may be available in **Advanced Settings**. The exact contents of the list will vary according to the selected **File Format**, the keys you have purchased and the Windows codecs you have installed.

Advanced Settings Specific will be the only available choice with certain **File Formats**

YCrCb (YUY2)

YCrCb (UYVY)

RGB

MJPEG (Standard)

Avid: AVID MJEPG 1 (AVRn)

Avid: AVID MJPEG 2 (ADVJ)

Panasonic: AVC-Intra

DV (Standard)

DV (Canopus)

DV (dv25)

DV (DV25)

Panasonic DVCPro 50 (dv50)

Panasonic DVCPro 50 (DV50)

Panasonic DVCPro 50 (DVCP)

Panasonic DVCPro 50 (dvcp)

Panasonic DVCPro 50 NTSC (dv5n)

Panasonic DVCPro 50 PAL (dv5p)

Panasonic DVCPro 100 (dv10)

Panasonic DVCPro 100 NTSC (dv1n)

Panasonic DVCPro 100 PAL (dv1p)

Panasonic DVCProHD 720 (dvhp)

Panasonic DVCProHD 1080i 60 (dvh6)

Panasonic DVCProHD 1080i 50 (dvh5)

Avid: VC-3/DNxHD

VFW: Microsoft Video 1

VFW: Intel IYUV codec

VFW: Cinepak Codec by Radius

Width

Height

Width and Height determine the number of pixels used to display the frame. The fields are filled in automatically by the choice of **Compression** codec and **Pixel Aspect Ratio** but can be altered manually by clicking in the fields and typing.

Frame Layout

Only available with certain **File Format** choices.

2 Fields (Interleaved - Lower First)
2 Fields (Interleaved - Upper First)
2 Fields (Separate - Lower First)
2 Fields (separate - Upper First)
Single Field

Word length

Currently limited to **8 bits fix**

Bit Format

Down Sampling

Shows the color sub-sampling scheme. **Please see: Color Sampling on page 234**

Pixel Aspect Ratio

May be filled in automatically by the choice of **Compression** codec or choose from the list below:

Square Pixels 1.0
D1/DV NTSC (0.9)
D1/DV NTSC Widescreen 16: 9 (1.2)
D1/DV PAL (1.067)
D1/DV PAL Widescreen 16: 9 (1.422)
HDV - DVCProHD 720p (1.333)
DVCProHD (1.5)
Anamorphic 2 : 1 (2.0)
Cinemascope (2.35)
D4/D16 Standard (0.948)
D4/D16 Anamorphic (1.896)

Up Conversion Mode

Title can be **Up** or **Down Conversion** depending on the output picture format selected for rendering.

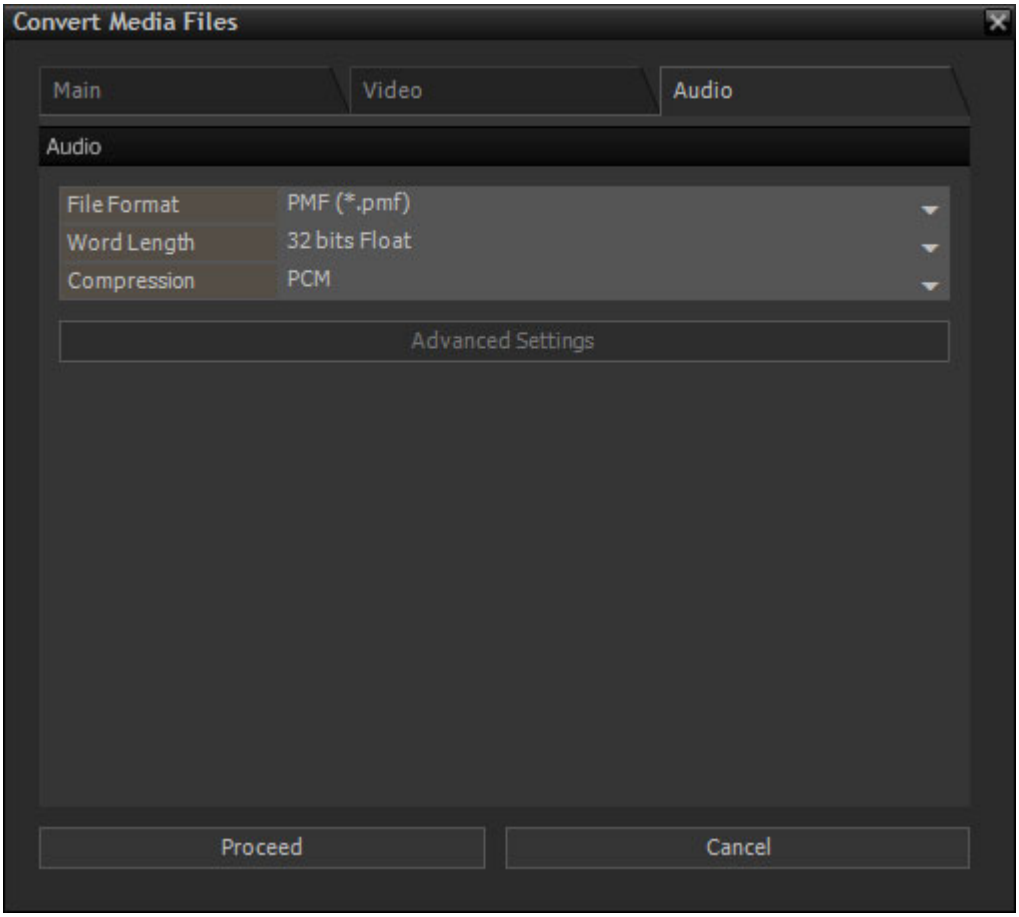
Down Convert:
Letterbox
Crop
Anamorphic
Up Convert:
Anamorphic, Pillarbox 4x3, Letterbox

Resize Quality

Offers a choice of different methods for computing the image in the desired format:

Nearest neighbour	**Fastest but poor quality**
Linear (Bi Linear)	**Fast and poor quality**
Cubic	**Slow but very good quality**
Lanczos	**Very Slow but excellent quality**
Supersampling	**Slow but very good for large downscaling**

Audio



Convert Media Files dialog Audio tab page

File Format

The drop-down list offers a choice of formats from the following depending on the container chosen. determines the type of the generated Media File for audio. If both video and audio are of the same type, they are merged inside a single Media File :

None

AVI (*avi)

MPEG (*mpg)

MPEG (*mpeg)

MPEG (*mpa)

PMF (*pmf)

WAV (*wav)

BWF (*bwf)

AIF (*aif)

SD2 (*.sd2)

QUICKTIME (*.mov)

Word Length

Determines audio resolution / possible dynamic range

16 bits Fix

24 bits Fix

32 Bits Float

Compression

Options depend on selected audio file format. QuickTime offers various solutions for compressing audio data.

Note: The AVI2 and QuickTime MPEG2 Media Handler support multiple audio channels in a single file. When recording more than 2 channels in an AVI2 or QuickTime file, each channel is treated as a separate mono channel. I.e. if you have 4 channels in VCube, they will appear as 4 mono channels in an AVI2 file. The Windows Media Player from Microsoft and the QuickTime player from Apple will playback a 4 audio channel file into a stereo mix of the 4 mono channels.

Using video files with embedded audio decreases playback performance. For Compositions with complex compositing, two separate Media Files (one for video, one for audio) are preferable.

If the original Media File features both video and audio, be sure to select a compatible audio/video Media File format for the converted file in order to retrieve both video and audio once conversion has taken place.

Render Composition

File > Export > Render Composition

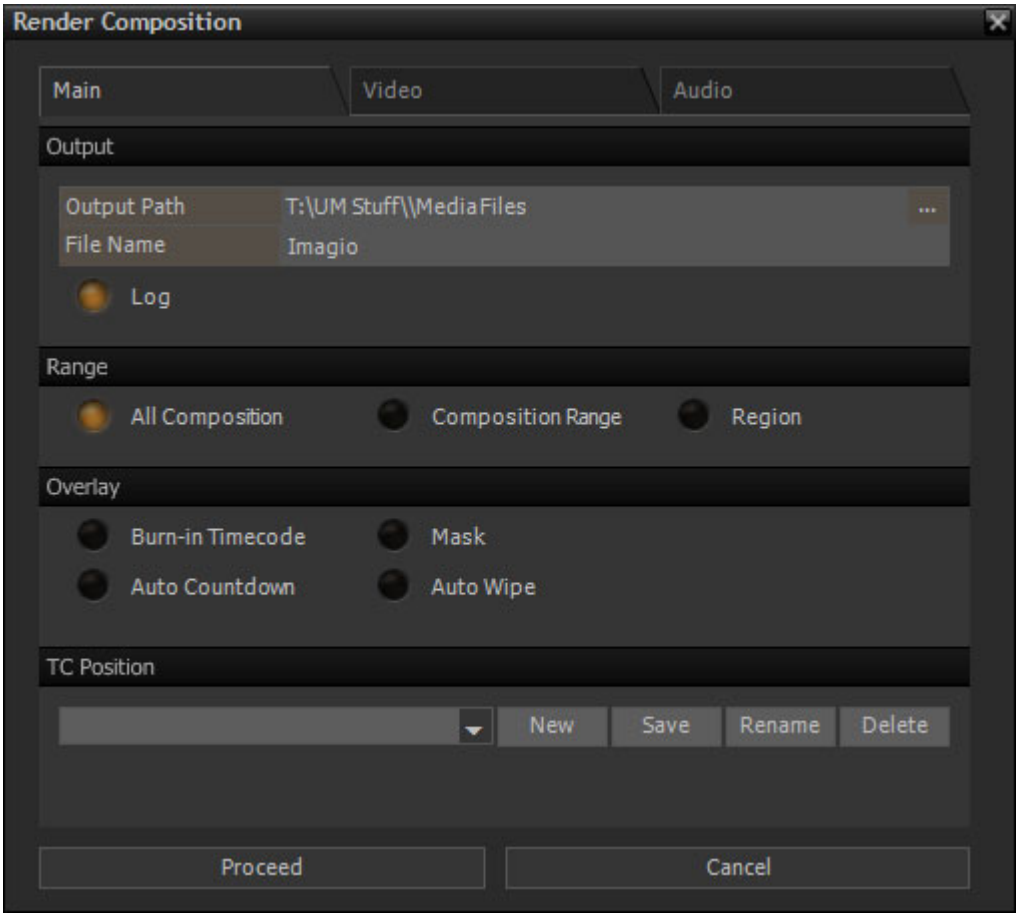
Render Composition enables the entire Composition or a Range or Region of it to be rendered as a single Media File. The render can be to be in any of a number of file formats including **.cube AVI**, **MPEG2** or **QuickTime**.

Selecting **Render Composition** opens the **Render Composition** dialog which has three tabbed pages, **Main**, **Video** and **Audio**.

When suitable settings have been made, the **Proceed** button starts the rendering process while **Cancel** closes the dialog without rendering.

Render Composition Dialog

Main :



Render Composition dialog Main tab page

Output

Output Path xxxxxx ... Shows current path for output file(s). Click on**...** to open a browser to change the path.

File Name Click in this field to type a suitable name for the output Media.

Log When active a window will appear at the end of the conversion process reporting success and listing any anomalies.

Range

All Composition When selected, the whole Composition will be rendered**.**

Composition Range	When selected the range selected in the Composition currently will be rendered.
Region	When enabled, render will be from **Region In** to **Region Out** (Set by placing a **Mark In** and **Mark Out** and choosing **Selection > Range to Region**)

Overlay

Burn-in Timecode

Mask

Auto Countdown

Auto Wipe

When any of the above are checked the relevant overlay will be included in the rendered output.

Presets

Complete sets of render settings can be saved as presets and reloaded for future use.

Drop-down	The drop-down list shows a list of all Presets available.
New	Highlights the Drop-down field inviting entry of a new name. Use **Save** immediately afterwards to create the new Preset.
Save	Saves the current Settings to the Preset shown in the Drop-down field.
Rename	Highlights the Drop-down field inviting entry of a new name for the current Preset.
Delete	Deletes the Preset currently listed in the Drop-down field. **N.B There is no "Are you sure"** dialog.

Video

The **Video** Tab options are the same as those found in the **Convert Media Files** dialog. Please see: **Video on page 85**

Audio

The **Audio** Tab options are the same as those found in the **Convert Media Files** dialog. Please see: **Audio on page 91**

Convert Still Images

This is an ingest function and details can be found here: **Import Images Sequence on page 36**

Wrap Audio

Scope

The Media Wrapper feature enables Audio files to be embedded in to a new file without decoding and re-encoding the video of the original file. A new Media File with embedded Audio is created.

The Media Files to be wrapped (one Video, up to eight Audio) correspond with the Clips selected in the Timeline. Any Audio and Video Files which play in the Timeline can be encapsulated in MXF, AVI or QuickTime containers provided the output format supports the original file format(s).

SurCode for Dolby E

If the optional **SurCode for Dolby E** encoder is present them **Wrap** can include Dolby E encoded audio. **Please see: Audio channel content description on page 96** and also **Dolby E Encoder on page 155**.

Final Check Meter, Final Check Normalizer & Level Magic

If the optional Merging Technologies **Final Check Meter**, **Final Check Normalizer** and **LevelMagic**, by Jünger Audio are present then audio included in the **Wrap** can be processed to conform with loudness standards and a report can be generated. **Please see: Final Check Meter on page 100 and Level Magic™, from Jünger Audio on page 98**

MXFix

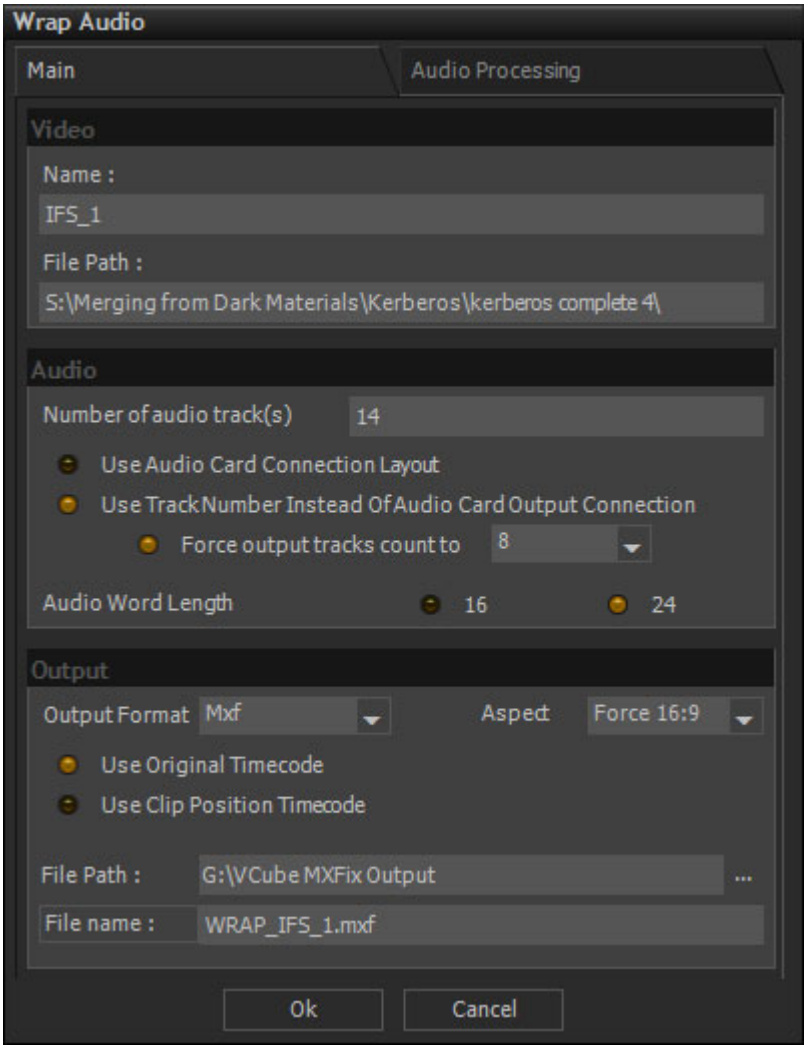
If the optional Merging Technologies **MXFix** batch processor is present then Wrapping and any or all of the above options (where present) can be applied to an entire folder or folders of suitable files. **Please see: MXFix™ (Batch Export, Re-Wrapping) on page 101**.

Wrap Audio Dialog

File > Export > Wrap Audio or the:

 icon in the **Convert Media Files** Toolpicker opens the **Wrap Audio** dialog with the **Main** Tab active:

Main



Wrap Audio dialog - Main Tab page

Video

Name: Field below (Information only) shows the Clip name of the Video to be encapsulated.

FIle Path : Field below (Information only) shows the path to the Media File underlying the Video Clip.

Audio

Use Audio Card Connection Layout Toggles with :

Use TrackNumber Instead Of Audio Card Output Connection

Note: Note that the audio card connection layout in Wrap Audio is associated with the **Routing of 8 First Channels** drop-down menu in the **Audio Engine** tab. The options available in this drop-down vary in relation to the type of audio hardware present in your VCube system (AJA, Mykerinos, ASIO)

Force output tracks count to When active the number of Output Tracks will equal the number shown in the field selected from the drop-down list. (4 or 8) This may be required for certain hardware. If

more tracks are present in the source then the extra tracks will be omitted. If there are less tracks present in the source then extra tracks of silence will be added.

Audio Word Length

16 Sets Output Word Length to 16 bits.

24 Sets Output Word Length to 24 bits.

Note: Dolby E requires 20 bits. MXF files with Dolby E audio commonly use 20 bits in a 24 bit file.

Output

Output Format Field shows the current Output Format. Click to drop-down the list of alternatives

MXF
QuickTime
Avi

Use Original Timecode When checked, Output file will correspond to original Video file TimeCode stamp.

Use Clip Position Timecode When checked, the current TimeCode of the Video Clip in the Timeline will be used in the wrapped file.

File Path : Field shows the current Output File Path. Click to type an alternative or:

... button Opens a Windows File Browser to enable a different File Path to be selected/created.

Output File Name : Click in the field to type a name for the Output file.

OK

Click on **OK** to accept the settings and start the Wrap.

Cancel

Click on **Cancel** to abort the Wrap and close the dialog.

Note: Settings made in the dialog are retained when the Wrap is cancelled.

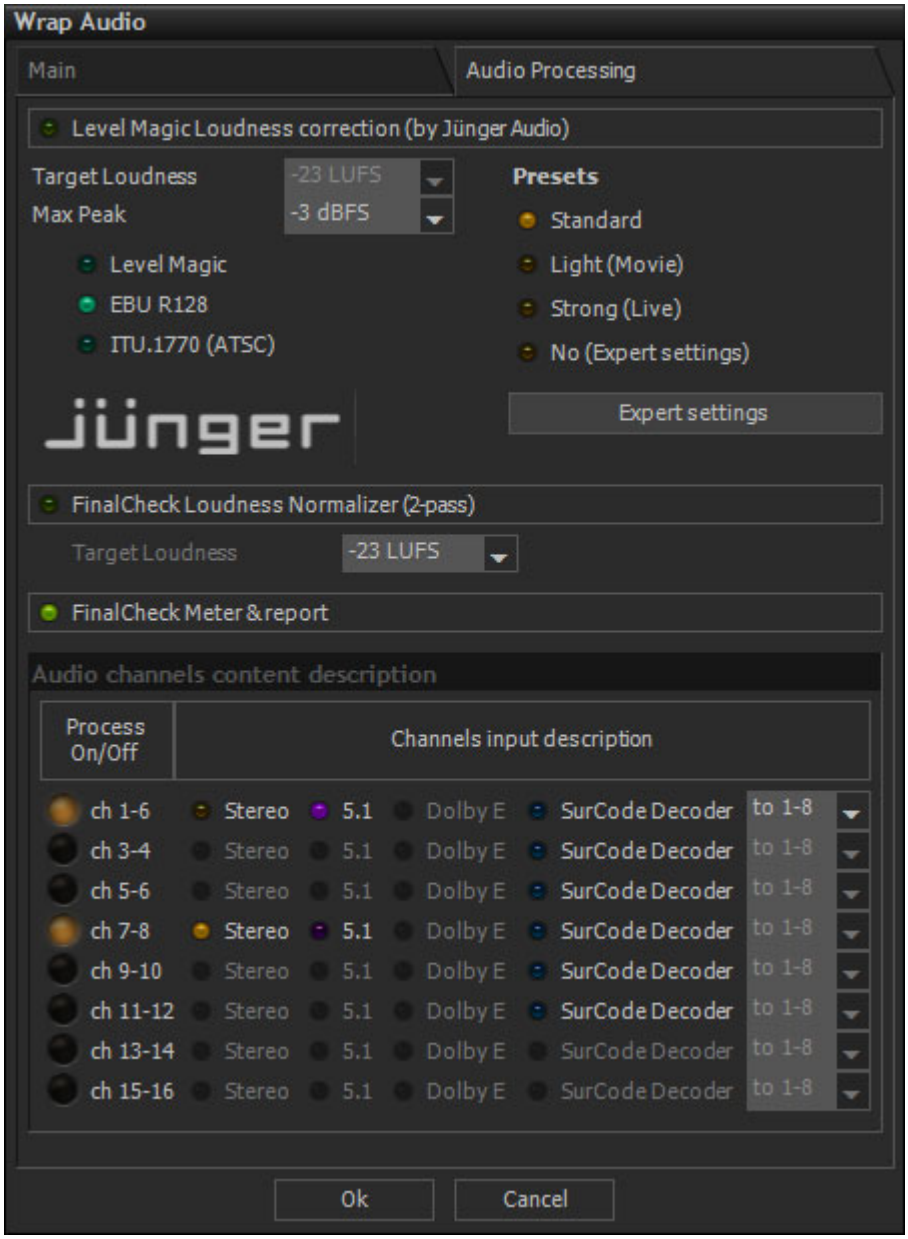
Note: QuickTime files using the following codecs are supported for wrapping:

H.264
MPEG-4
M-JPEG
M-JPEG2000
HDV
IMX
XDCAM

Audio Processing

The **Audio Processing** Tab enables you to manage optional VCube audio processing features:

- - **LevelMagic**, by Jünger Audio
- - **Final Check Meter** by Merging Technologies
- **Dolby E SurCode Decoder**



Wrap Audio dialog - Audio Processing Tab page

Note: For full details **please see Level Magic™, from Jünger Audio on page 98**

LevelMagic Loudness correction (by Jünger Audio)

Click on the label to toggle the process on/off. The green LED indicates process **ON**.

Target Loudness — Field shows the selected Target Loudness. The drop-down enables values between -23LUFS and -27LUFS (in 1LUF increments) to be selected.

Max Peak — Field shows the selected Maximum Peak level permitted. The drop-down enables values between 0dB and -20dB (in 1dB increments to be selected.

Level Magic — When selected (blue LED lit) processing will be in accordance with the Level Magic option chosen below.

EBU R128 When selected the resultant files will be in accordance with EBU R128

ITU.1770 (ATSC) When selected the resulting files will processed in accordance with ITU.1170 (ATSC) tolerances loudness standard and you may still modify the **Max Peak** value but not the **Target Loudness**.

LevelMagic Dynamic Presets

Standard **Standard** processing is deemed by Jünger Audio as a suitable all-around dynamic preset setting for correction of most basic audiovisual programs ready for broadcast with a relatively restrained dynamic range that need to meet loudness compliance standards.

Light (Movie) **Light (Movie)** processing is intended to be suitable for cinema content with a higher overall dynamic range than typical television or radio content where smooth perceptual transition is preferred over tight control of broad dynamic transitions more commonly found in dramatic movie content and not TV, action films or rock concerts, etc.

Strong (Live) **Strong (Live)** processing is intended to be suitable for content with high overall levels and extreme dynamic transitions common to live events, action films and sporting events, that need to be tightly contained within specifications.

No (Expert settings) When selected, the settings will be in accordance with the settings made in the **Expert Settings** dialog.

> **Note:** These four mutually exclusive options apply to whichever **Loudness Compliance Standard Mode** is chosen above, **Level Magic, EBU R128** or **ITU.1770 (ATSC)**. Please see also: **Jünger Level Magic Expert Settings on page 98**

FinalCheck Loudness Normalizer (2-pass)

When selected, this invokes a two-pass normalizing process. The first pass measures audio loudness according to the channels description. The second pass applies the required gain correction to achieve the loudness value set in the **Target Loudness** drop-down.

When required a True Peak limiter is also activated to ensure that the maximum True Peak value is below -1dBTP

The gain correction is however, limited to 15dB to avoid excessive correction of channels containing only background sounds etc.

> **Note:** If correction of over 15dB is required then no gain adjustment will be applied and the MXFix reports will signal a warning..

The gain correction is applied to the entire channel to avoid altering the original balance and is, of course, linked across the entire group of channels to maintain image veracity.

Target Loudness The drop-down list offers a choice of average loudness target values from -20LUFS to -30LUFS.

FinalCheck Meter & report

Click on the label to toggle the process on/off. The green LED indicates process on.

The output of Final Check Meter is an XML report file in the same directory as the wrapped file. This file will include measurements of integrated, momentary and short-term loudness values, as well as the loudness range and the maximum true peak. All these measurements may be checked against the recommendations, delivery requirements or local regulations in force regarding loudness. When LevelMagic is combined with FinalCheck, the measurements are made on the output of LevelMagic, so that the measurements are always consistent with the content of the wrapped files.

Audio channel content description

The sub-panel provides sufficient information to the processing plug-ins as to how they should deal with the channels to be Wrapped. Channels are shown by pairs but this will be modified into larger groups if some are described as 5.1 Surround (I.e. 6 channels involved).

Process On/Off When checked the channel pair or channel group will be processed

Channels description Checkboxes determine the Channel type for processing

Stereo	A pair of discrete stereo channels.
5.1 Surround	6 discrete channels in **L**, **R**, **C**, **Ls**, **Rs**, **LFE** order.
Dolby E	A pair of Dolby E encoded channels, corresponding to 8 discrete channels (usually **2** stereo and **6** surround) When this option is selected the source channel is and will remain a Dolby E stream. If corrections are needed the stream is decoded corrected and re-encoded to a Dolby E stream.
SurCode Decoder	When selected a Dolby E stream will be decoded to 8 discrete channels by the SurCode for Dolby E decoder.
1-8 drop-down	The drop-down sets the channels which will be replaced by the decoded channels.

Final Check Meter and **Level Magic** will deal with the audio input based on this description, using a different algorithm for Surround. If **SurCode for Dolby E** options are activated, the Dolby E pair will be decoded, processed, and re-encoded if needed (when **Level Magic™** is on).

Note: If Dolby E is selected this overrides the Process On/Off buttons settings.

Level Magic™, from Jünger Audio

Level Magic™ is the first software implementation of the well-known hardware product manufactured by Jünger Audio.

Level Magic™ combines a limiter and a leveller to correct your files on-the-fly in one pass* so they are ready to broadcast. It relies on a sophisticated new adaptive level control algorithm capable of setting the correct audio level from any source at any time. It features Transient Processing and Peak Limiting for continuous unattended control of any program material.

* A 2-pass version is under development at Jünger Audio, since this can be more efficient for offline processing of files.

Further information:

http://junger-audio.com/technology/level-magic/

http://www.junger-audio.com/..../LM_PDF2010_pre.pdf

Jünger Level Magic Expert Settings

When **Expert Settings** is chosen in the **Wrap Audio** or **MXFix Wrapper** dialog **Audio Processing** pages the Jünger Level Magic Expert Settings dialog opens:

Jünger Level Magic Expert Settings

The settings available here offer fine-grained control over the Level Magic process.

Level Magic

EBU R128

ITU.1770 (ATSC)

Surround Link Mode Determines which channels are linked for surround processing. The drop-down list offers the choice of **ALL**, **LIVE**, **MOVIE** or **QUAD**. Use **ALL** for loudness control. (LFE is omitted from the linkage in each case.)

All the rest of the variables can be set independently for **Surround** and **Stereo**

Input Gain The drop-down lists offer a range of values from -20dB to 20dB in 1dB increments.

Leveler

Zero Zone Above Sets the upper boundary for AGC unity gain. Input loudness = Output loudness from this point downwards if the input loudness decreases. The drop-down lists offer a range of values from 0dB to 6dB in 1dB increments. Normal value is 0dB

Target Level Sets the target loudness level. The drop-down lists offer a range of values from -50dB to 0dB in 1dB increments. Set according to the required standard. E.g. EBU R128 is -23LUFS

Zero Zone Below Sets the lower boundary for AGC unity gain. Input loudness = Output loudness from this point upwards if the input loudness increases. The drop-down lists offers a range of values from 0dB to 6dB in 1dB increments. Normal value is 0dB

Release Time Sets the time it takes for gain to reach maximum. The drop-down lists offer a range of values between 10s and 2h. 40s is a good starting point with larger values for looser control, smaller for tighter control.

Max Gain Sets the maximum gain which the Leveler will apply. (Attenuation applied may be higher.) The drop-down lists offers a range of values from 0dB to 40dB in 2dB increments. 10dB is “normal”, 14dB for more control, 6dB for less control.

Freeze Level Stop value for gain changeof the Leveler and Transient Processor to prevent unwanted increase in noise. (The process freezes.) The drop-down lists offers a range of values from -60dBFS to -20dBFS in 5dB increments. -40dB is average, -50dB for tighter control and -35dB for looser control.

Transient Processor

Response Determines the “grip” of the Transient Processor. The drop-down lists offer the choice of soft, mid or hard.

Max Gain Sets the maximum gain which the Transient Processor will apply. (Attenuation applied may be higher.) The drop-down lists offers a range of values from 0dB to 15dB in 1dB increments.

Limiter

Max Peak Sets the maximum peak output level. The drop-down lists offers a range of values from -20dB to 0dB in 1dB increments.

Processing Determines the processing program which will be used by the Limiter. The drop-down lists offer the choice of uni, live, pop or classic.

Close Closes the dialog.

Final Check Meter

Final Check is a tool developed by Merging Technologies for monitoring audio levels. In its VCube implementation, it focuses mainly on the loudness measurements defined by the EBU R-128 recommendation.

The output of Final Check Meter is an XML report file in the same directory as the wrapped file. This file will include measurements of **integrated**, **momentary** and **short-term loudness** values, as well as the **loudness range** and the **maximum true peak**. All these measurements may be checked against the recommendations, delivery requirements or local regulations in force regarding loudness.

When **Level Magic™** is combined with **Final Check Meter**, the measurments are made on the output of Level Magic™, so that the measurements are always consisitent with the content of the wrapped file.

Further information about the EBU R-128 recommendations:

http://www.merging.com/..../On the way to Loudness Nirvana (EBU20R128).pdf

Further information about FinalCheck:

http://www.merging.com/products/...

Report Files

A Final Check report file will look something like this when opened in Notepad or a text editor:

<?xml version="1.0" encoding="UTF-8"?>	XML information
<FinalCheck_Metering>	Title and start of results
<Stereo>	First, showing results for the selected stereo pair
<Loudness_INT>-70</Loudness_INT>	Loudness integrated (=averaged) on the whole file in LUFS
<Loudness_Range_LRA>0</Loudness_Range_LRA>	Loudness range AKA lra in LUs
<Max_TruePeak>-144.5</Max_TruePeak>	Maximum True Peak value in dBFS
<MML>-70</MML>	Maximum momentary loudness AKA Max M
<MSL>-70</MSL>	Maximum long-term loudness AKA Max S
</Stereo>	End of results for the stereo pair
<Surround_5.1>	Start of results for surround
<Loudness_INT>1.50099659</Loudness_INT>	Loudness integrated (=averaged) on the whole file in LUFS
<Loudness_Range_LRA>4.75279236</Loudness_Range_LRA>	Loudness range AKA lra in LUs
<Max_TruePeak>6.76408482</Max_TruePeak>	Maximum True Peak value in dBFS
<MML>1.63770938</MML>	Maximum momentary loudness AKA Max M
<MSL>1.53237224</MSL>	Maximum long-term loudness AKA Max S
</Surround_5.1>	End of results for the surround tracks
</FinalCheck_Metering>	End of file

MXFix™ (Batch Export, Re-Wrapping)

Scope

Merging' Technologies MXFix™ batch wrapper is designed to make wrap processing of large amounts of broadcast quality video files as simple as possible for all users in a video workflow. MXFix essentially allows for a primary user to define a series of audio and video wrapping tasks to be performed on a specific type of video file and then associates those tasks to a single "**Watch Folder**" (Input Folder). Multiple Watch folders may be created to fit the different types of media in your workflow, each with their own specific wrap parameters. Once the Watch folders and their tasks are all defined in MXFix it is then either launched to process the files currently present in all Watch folders and halts when finished or is placed in "**Continuous Watch Mode**" where it processes all files as they are added by users at any time day or night.

Only in "**Continuous Watch Mode**" a "**Process"** sub-folder is created automatically in the Watch folder, which contains the source file being processed currently. After each file is successfully processed newly wrapped video files are pushed to their respective Output Folders. The originals are either moved to a sub-folder called "**Done**" or are erased (according to the Watch folder's parameters). If for any reason a file does not meet the requirements to be wrapped properly, MXFix detects the file and moves the original to a sub-folder called, "**Errors**" and continues processing the next file in the queue.

In combination with **FinalCheck** and **Level Magic**, **MXFix** is a very powerful tool for processing and ensuring the Loudness compliance of multiple files in any number of combinations. If the **SurCode for Dolby E®** plug-in options are also present,, MXFix can decode and encode embedded Dolby E® audio tracks transparently as well.

MXFix is a paid for option, which requires the **MXFix** key to be activated in **MTSecurity**.

File Formats Supported

The first version of MXFix (as of version 3.2 of VCube) allows for audio and video wrapping of MXF files as well as compatible QuickTime® MOV files and compatible AVI files.

Measure & fix loudness, fix metadata and wrap it all up with SurCode for Dolby E

MXFix fixes MXF files' metadata as well as the content of embedded audio channels of files. For example a specific MXF metadata correction parameter of the video aspect ratio allows for cross compatibility of files which do not have this field properly defined by the machine that originally created them. If a series of MXF files does not display at the proper aspect ratio MXFix will fix them without degrading the original video essence at all by simply re-wrapping the metadata fields of the MXF concerning the aspect ratio.

MXFix allows for detailed EBU R-128/ITU.1770 (ATSC) compliant loudness measurement of any audio content in the embedded audio channels of a video file including channels that are contained within a Dolby E® encoded audio stream through the use of Merging's Final Check™ loudness measurement technology and the SurCode for Dolby E® OEM plug-in.

In addition to measuring and generating a detailed loudness report file of audio present in either discrete PCM or Dolby E encoded channels, MXFix also allows loudness levels to be corrected through the use of the Final Check Normalizer or Jünger Audio's renowned and exclusively licensed Level Magic® Levelizer algorithm as part of the MXFix suite in the form of a software plug-in.

MXFix re-wraps the corrected and measured audio channels to embedded audio channels as discrete 16 bit or 24 bit PCM channels (that in turn may also contain Dolby E encoded audio streams).

Tasks performed by MXFix

MXFix may perform any or all of the following tasks in combination with each other as needed in association of a single Watch folder:

- Scan multiple video files in multiple Watch folders to determine process priority and compatibility
- Decode Dolby E audio streams to PCM (for re-wrapping or measurement) with the SurCode for Dolby E® decoder plug-in
- Scan and correct loudness levels to user defined target values of stereo and surround channels with Jünger Audio's Level Magic®

- Measure EBU R-128/ITU.1770 (ATSC) compliant loudness levels of any stereo or surround channel with Merging's Final Check technology
- Generate a loudness level report file in .xml format with Final Check
- Correct MXF aspect ratio metadata
- Correct audio word length values
- Correct audio track counts to fit MXF hardware manufacturers' standards
- Encode Dolby E audio streams
- Wrap it all to a new video file
- Push that newly wrapped video file to an Output Folder for deployment
- Erase or move the original file away from the watch folder for archiving

MXFix Quick Procedure

1. Start the process by going to:

File > Export > MXFix or **[Alt + M]**

This opens the **MXFix Folders** dialog. (See below for full details.)

2. Use the Input Folder and Output folder **...** buttons to open browsers to select a suitable Input/Output pair of folders. The Input folder is the "**Watch**" folder.
3. Click on the **Add Folder Pair** button to add the folder pair to the main frame.
4. Click on the pair you've just added to select it.
5. Click on the **Settings** button to open the **MXFix Wrapper** dialog. (See below.)
6. Make any necessary changes to settings
7. Click on the **OK** button to save the settings and exit the dialog.
8. Click on the **OK** button to start the process and close the dialog.

Note: The **Input Folder** must be different to the Input Folder in any existing Folder Pair when adding new Folder Pairs.
If you attempt to add a Folder Pair with the same Input Folder as an existing Folder Pair the **Add Folder Pair** button will not work.

Each pair of Input and Output folders defined will have its own unique settings associated with the Input folder defining what tasks will be performed on the video files placed in that folder.

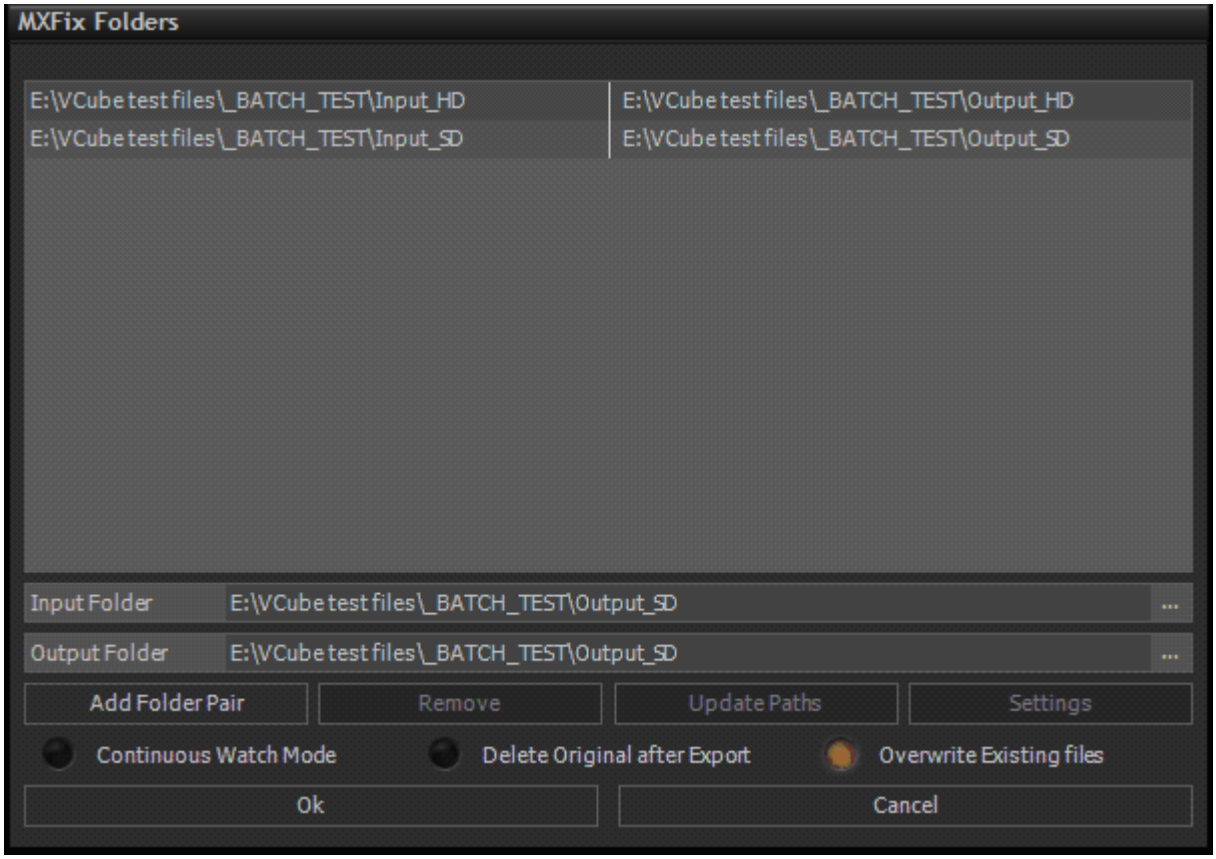
When **Continuous Watch** mode is active :

Processed files will be placed in a new sub-folder **DONE** on the path selected, or will be deleted if **Delete Original after reset** is active.

When the MXFix process is running in "single-shot"mode. I.e. **Continuous Watch** is NOT selected then all VCube functions other than **Cancel** and **Cancel All** are locked out until the process is complete.

Cancel	Cancels processing of the current file and continues with the next. (If any.)
Cancel All button	Stops the MXFix process.

MXFix Folders dialog



MXFix Folders dialog

Input Folder — The field shows the current source folder (if any is defined). The **...** button opens a browser to select a path.

Output Folder — The field shows the current destination folder (if any is defined). The **...** button opens a browser to select a path.

Add Folder Pair — Adds a new Folder Pair to the main frame.

Remove — Deletes the selected Folder Pair

Update Paths — Updates the Paths of the selected Folder Pair to the Paths in the Input Folder and Output Folder fields when a path has been altered manually.

Settings — Opens the MXFix Wrapper settings dialog. (See below.)

Continuous Watch Mode — When selected, this special mode will process all files found in the input folders continuously. When running, the process is stopped with **Cancel All**. The intended usage of this mode is to keep VCube running and watching a folder or folders where you will place files to be processed whenever required. VCube will look at the selected folders regularly to see if any new file to be Wrapped has been added. If **Continuous Watch Mode** is not selected, MXFix operates in "**one-shot**" mode. I.e. when the MXFix process is started every file in every input folder will be processed and the process will be terminated when complete. In MXFix mode all other VCube functions (except cancel) are disabled.

Delete Original after Export — As it says..

Note: This button should only be activated if you are certain to be working with copies of your original files in the input folders and not the true originals because this will literally erase the files in the input folders once the MXFix process is completed.

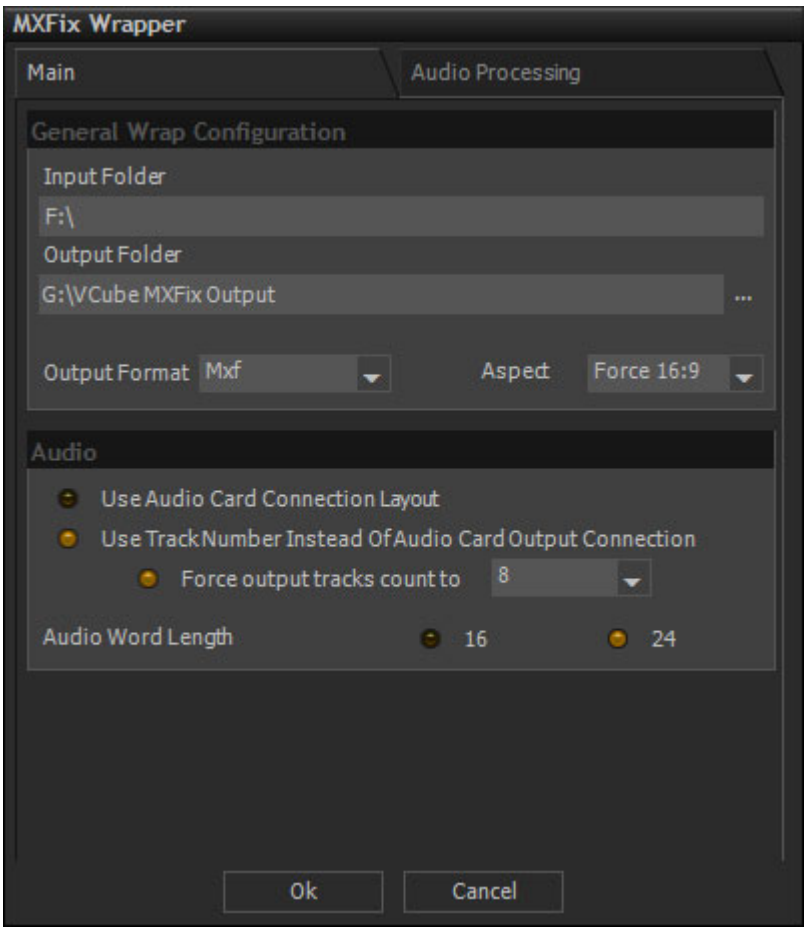
Overwrite Existing Files — When selected existing files in the Output Folder will be overwritten if they have the same file names as the files written. If this option is not selected an error message will be logged in the Output window.

Note: This button allows files remaining in an output Folder to be overwritten without prompting. This may be desirable if a process or series of processes was launched with improper parameters and you do not wish to clean up the output folders manually before launching a new MXFix pass with the proper parameters. Otherwise newly processed files with conflicting names will be incremented numerically without overwriting.

OK Clicking on **OK** will begin the MXFix process.

Cancel Exits the dialog without saving any changes.

MXFix Wrapper Dialog



MXFix Wrapper dialog - Main Tab

The **MXFix Wrapper** dialog has two tab pages, **Main** and **Audio Processing**

Main Tab

General Wrap Configuration

Input Folder Field shows the **Input Folder**.

Output Folder Field shows the **Output Folder**. Click on the **...** button to open a browser if you wish to change the Output folder.

Output Format Field shows the current **Output Format**. The down arrow drops down a list of available Output Formats; currently, **MXF, MOV** or **AVI**.

Note: This setting also determines which type of video container file MXFix will scan for and process in the Input folder.

Aspect Ratio Field shows the current setting. The drop-down list offers the choice of :
Transparent which retains the current aspect ratio,
Force 4/3 or **Force 16/9** if the aspect ratio metadata needs correction. This is particularly useful when there are a lot of files archived with the wrong aspect ratio.

Note: If **Transparent** is selected, aspect ratio metadata field content of the original file is copied to the wrapped file. If it is blank it remains blank and if it has a value then that value is carried over to the newly wrapped file.

Audio

Use Audio Card Connection Layout Toggles with :

Use TrackNumber Instead Of Audio Card Output Connection

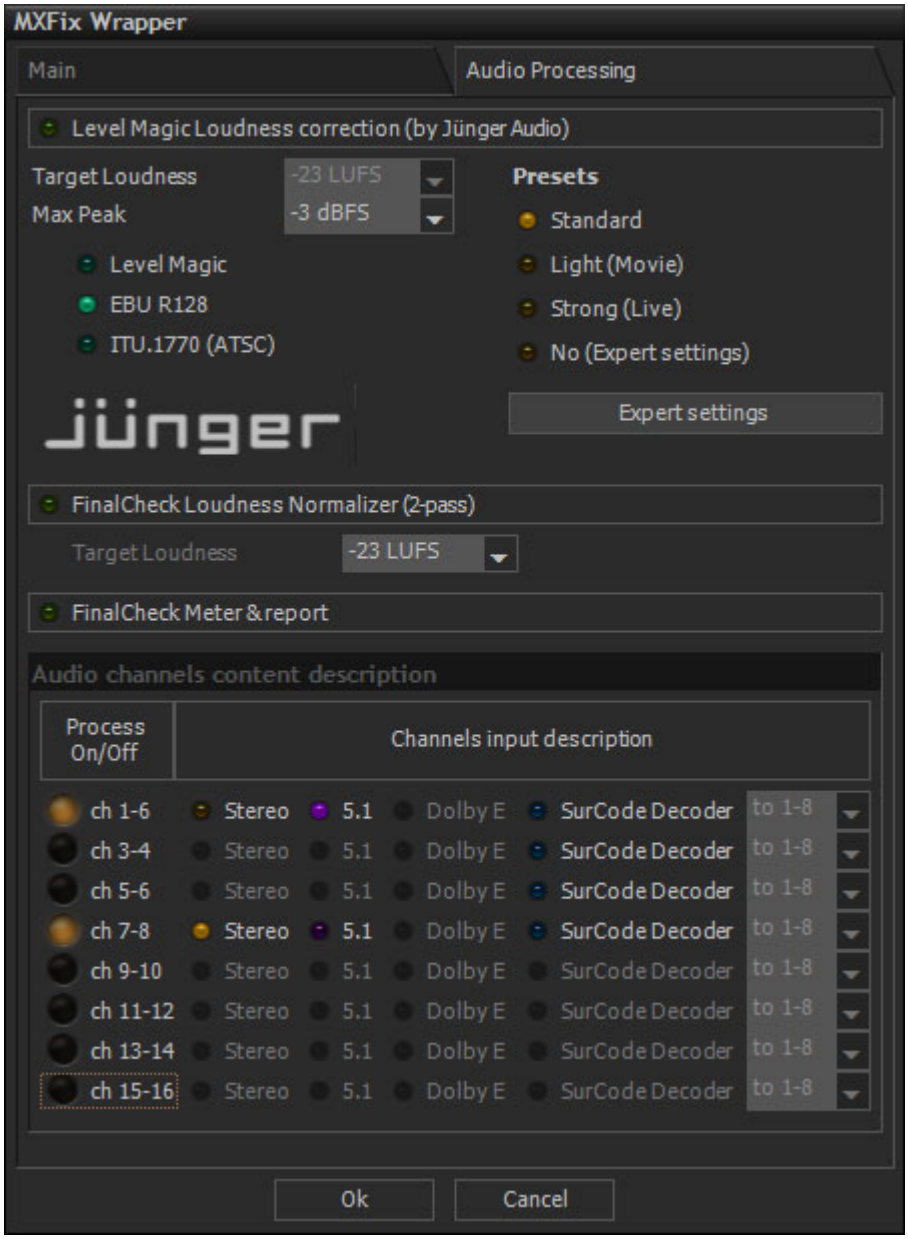
Note: The audio card connection layout in MXFix is associated with the **Routing of 8 First Channels** drop-down menu in the **Audio Engine** tab. The options available in this drop-down vary in relation to the type of audio hardware present in your VCube system (AJA, Mykerinos, ASIO). Using the **Use Tracknumber** option means there is no need to worry about this setting.

Force output tracks count to	When active the number of Output Tracks (embedded audio channels) will equal the number shown in the field selected from the drop-down list. (**4** or **8**) This may be required for certain hardware. If more tracks are present in the source then the extra tracks will be omitted. If there are fewer tracks present in the source then extra tracks of silence will be added.
Audio Word Length	
16	Sets Output Word Length to 16 bits.
24	Sets Output Word Length to 24 bits.

Note: Dolby E requires 20 bits. MXF files with Dolby E audio commonly use 20 bits in a 24 bit file.

OK	Clicking on **OK** accepts the changes and closes the dialog.
Cancel	Exits the dialog without saving any changes.

MXFix Wrapper Audio Processing Tab



MXFix Wrapper dialog - Main Tab

LevelMagic® Loudness correction (by Jünger Audio)

Click on the label to toggle the process on/off. The green LED indicates process on.

Target Loudness Choose the required loudness value from the drop-dopwn list.

Max Peak Choose the required maximum peak level value from the drop-down list.

Loudness Compliance Standard - mode

Level Magic When selected (blue LED lit) processing will be in accordance with the overall default LevelMagic processor settings allowing for modification of the **Target Loudness** and **Max Peak** values from their drop-down menus.

EBU R128 When selected the resulting files will be processed in accordance with EBU R128 tolerances and you may still modify the **Max Peak** value but not the **Target Loudness**.

ITU.1770 (ATSC) When selected the resulting files will processed in accordance with ITU.1170 (ATSC) tolerances loudness standard and you may still modify the **Max Peak** value but not the **Target Loudness**.

LevelMagic Dynamic Presets

Standard	**Standard** processing is deemed by Jünger Audio as a suitable all-around dynamic preset setting for correction of most basic audiovisual programs ready for broadcast with a relatively restrained dynamic range that need to meet loudness compliance standards.
Light (Movie)	**Light (Movie)** processing is intended to be suitable for cinema content with a higher overall dynamic range than typical television or radio content where smooth perceptual transition is preferred over tight control of broad dynamic transitions more commonly found in dramatic movie content and not TV, action films or rock concerts, etc.
Strong (Live)	**Strong (Live)** processing is intended to be suitable for content with high overall levels and extreme dynamic transitions common to live events, action films and sporting events, that need to be tightly contained within specifications.
No (Expert settings)	When selected, the settings will be in accordance with the settings made in the **Expert Settings** dialog.

Note: These four mutually exclusive options apply to whichever **Loudness Compliance Standard Mode** is chosen above, **Level Magic, EBU R128** or **ITU.1770 (ATSC)**.

FinalCheck Loudness Normalizer (2-pass)

When selected, this invokes a two-pass normalizing process. The first pass measures audio loudness according to the channels description. The second pass applies the required gain correction to achieve the loudness value set in the **Target Loudness** drop-down.

When required a True Peak limiter is also activated to ensure that the maximum True Peak value is below -1dBTP

The gain correction is however, limited to 15dB to avoid excessive correction of channels containing only background sounds etc.

Note: If correction of over 15dB is required then no gain adjustment will be applied and the MXFix reports will signal a warning.

The gain correction is applied to the entire channel to avoid altering the original balance and is, of course, linked across the entire group of channels to maintain image veracity.

Target Loudness	The drop-down list offers a choice of average loudness target values from -20LUFS to -30LUFS.

FinalCheck Meter & report

Click on the label to toggle the process on/off. The green LED indicates process on.

The output of Final Check Meter is an XML report file in the same directory as the wrapped file. This file will include measurements of integrated, momentary and short-term loudness values, as well as the loudness range and the maximum true peak. All these measurements may be checked against the recommendations, delivery requirements or local regulations in force regarding loudness. When LevelMagic is combined with FinalCheck, the measurements are made on the output of LevelMagic, so that the measurements are always consistent with the content of the wrapped files.

Audio channel content description

The sub-panel provides sufficient information to the processing plug-ins as to how they should deal with the channels to be Wrapped. Channels are shown by pairs but this will be modified into larger groups if some are described as 5.1 Surround (I.e. 6 channels involved).

Process On/Off	When checked the channel pair or channel group will be processed	
Channels description	Checkboxes determine the Channel type for processing	
	Stereo	A pair of discrete stereo channels.
	5.1 Surround	6 discrete channels in **L**, **R**, **C**, **Ls**, **Rs**, **LFE** order.
	Dolby E	A pair of Dolby E encoded channels, corresponding to 8 discrete channels (usually 2 stereo and 6 surround) When this option is selected the source channel is and will remain a Dolby E stream. If corrections are needed the stream is decoded corrected and re-encoded to a Dolby E stream.

SurCode Decoder	When selected a Dolby E stream will be decoded to 8 discrete channels by the SurCode for Dolby E decoder.
1-8 drop-down	The drop-down sets the channels which will be replaced by the decoded channels.

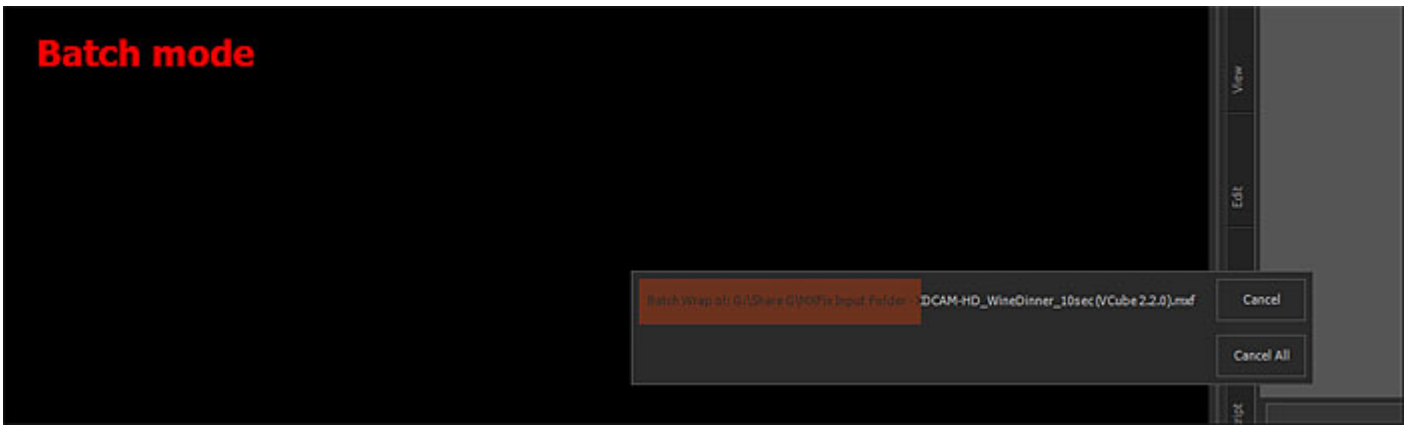
Final Check Meter and **Level Magic** will deal with the audio input based on this description, using a different algorithm for Surround. If **SurCode for Dolby E** options are activated, the Dolby E pair will be decoded, processed, and re-encoded if needed (when **Level Magic** is on).

Note: If Dolby E is selected this overrides the Process On/Off buttons settings.

For more detail about Dolby E encoding and decoding **please see: Dolby E Encoder & Dolby E Decoder on page 154**

Running MXFix

In order to launch MXFix simply click **Ok** in the MXFix Folders dialog box (with or without the **Continuous Watch Mode** button activated to use either mode).



MXFix Batch mode running

MXFix displays **Batch mode** in red lettering across the VCube Preview screen while it is active and any files to be processed appear momentarily one after the other in the VCube timeline as they are being scanned, corrected and wrapped in their respective containers. A progress bar is superimposed over the Preview Window showing the progress of each file in real-time.

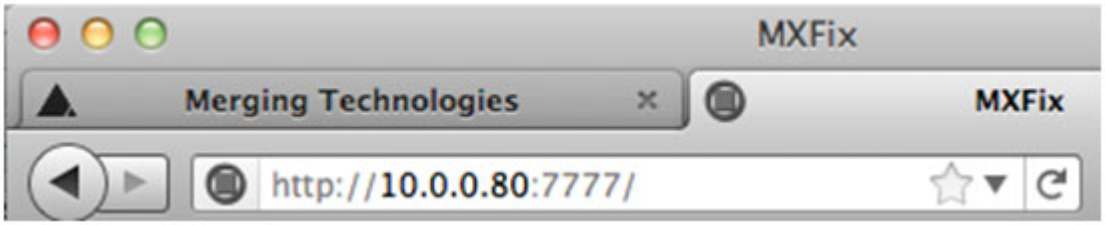
If a file being processed is considered to be taking too long and you would like to skip it without stopping the MXFix Batch Mode, just click on the **Cancel** button. The skipped file is placed in a **Skipped** sub-folder created automatically in the Watch Folder. To exit the MXFix Batch Mode immediately and abort the process in progress click on the **Cancel All** button.

MXFix Web Monitor

Scope

The Web Monitor is available from the moment VCube is running in MXFix mode **[Alt + M]**. It is accessed through any Web Browser such as Internet Explorer, Safari, Firefox, Chrome or a mobile device's Web browser. You simply need to be logged onto the same network domain as that of VCube running MXFix.

Log on to your VCube's IP address and add the following URL of :7777 as in the example below :



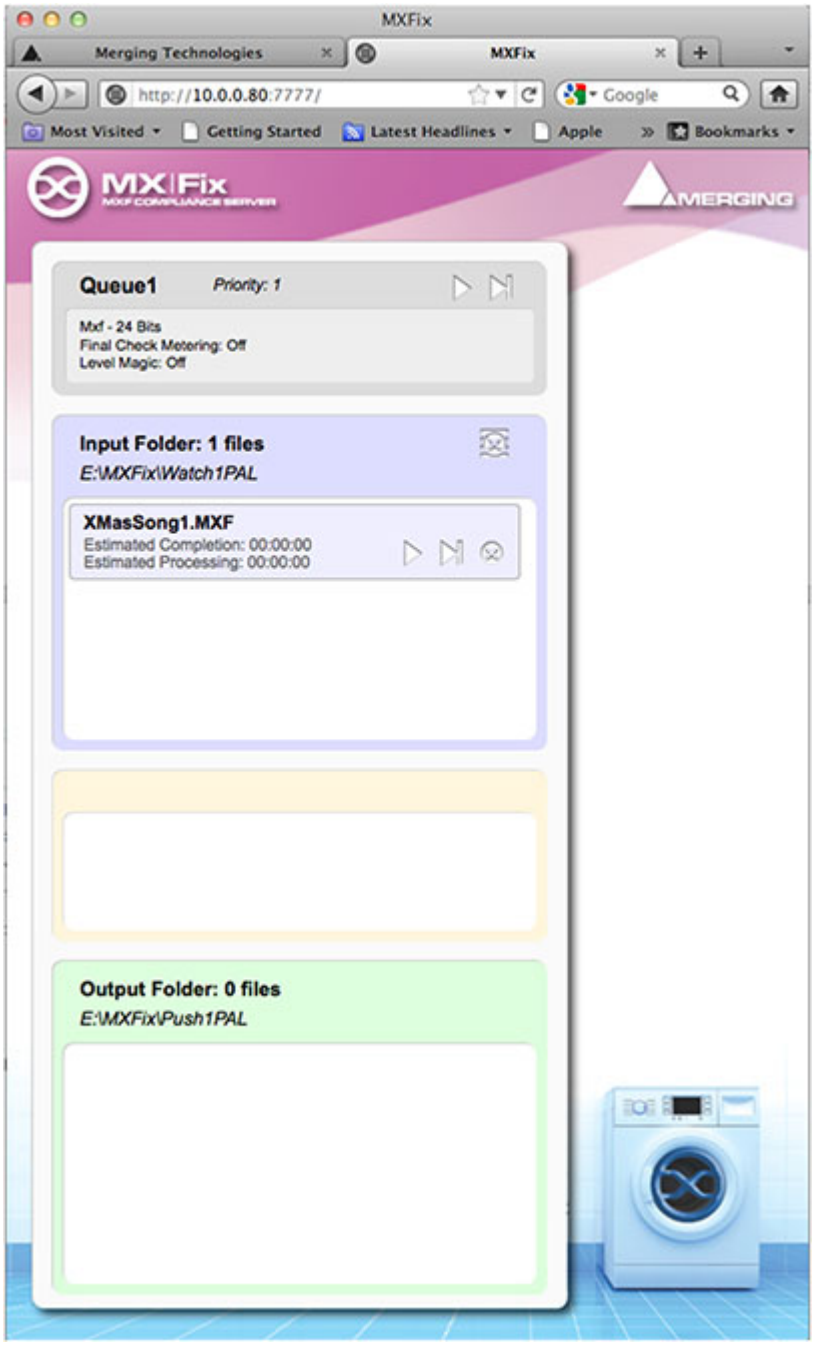
Browser (Safari)

On the local machine running MXFix you may also log on to the MXFix Web Monitor from a browser by entering the following URL in your Web Browser:

http://localhost:7777

Web Monitor Web Page

The Web Monitor appears as in the screenshot below:



MXFix Web Monitor web page

One group of status boxes per Input/Output Folder pair are displayed.

Queue Box

Queue Box

The Queue box displays the basic properties of the tasks to be performed and the current priority level of each Input folder.

Input Folder Box

Input Folder Box

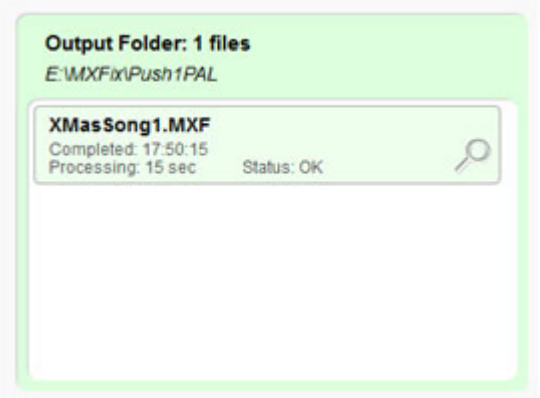
The Input Folder boxes show the files awaiting processing currently in each Input Folder.

Processing Box

When MFXFix processing is activated the Processing Box shows the details of the file being processed currently.

The bar next to the **Processing:** label shows progress.

Output Folder Box



When a file has been processed the Web Monitor displays the file details and its status in the Output Folder box and MXFix moves on to the next task.

Frame Rate Management

The VCube application can manage different frame rates for Media Files, Composition, and TimeCode. For Conversion or Rendering Processes, VCube uses the current Composition frame rate.

Media File Frame Rate Differs From Composition Frame Rate

If the Media File's frame rate is lower than the Composition frame rate, some frames will be duplicated.

If the Media File frame rate is higher than the Composition's frame rate, some frames will be dropped.

The Video Engine will play back the Media File preserving its original duration.

Playback duration can be changed if required by changing the speed of the Clip in the Timeline with a Double-click on the Clip. [**Ctrl + W**]

NTSC Frame Rates

Composition frame rates of the NTSC family are stretched in time (I.e. one second lasts 1001 mS). This requires that Clips be pulled-down to 99.9 % to preserve their original duration. In this case the Clip in the timeline needs to be manually pulled out (expanded) on its Layer(s) to reflect the new duration.

Composition Rate Differs From Incoming TimeCode

The Timeline displays the External and the current Composition frame rate in the right bottom corner of the Timeline.

The **Overlay** Tab settings enable external or internal (Composition) to be selected for Burnt In TimeCode.

The Composition will remain in sync. A second lasts a second for both Composition and TimeCode.

> **Note:** The video engine must produce enough frames to match the chosen video standard of the video card.

E.g:

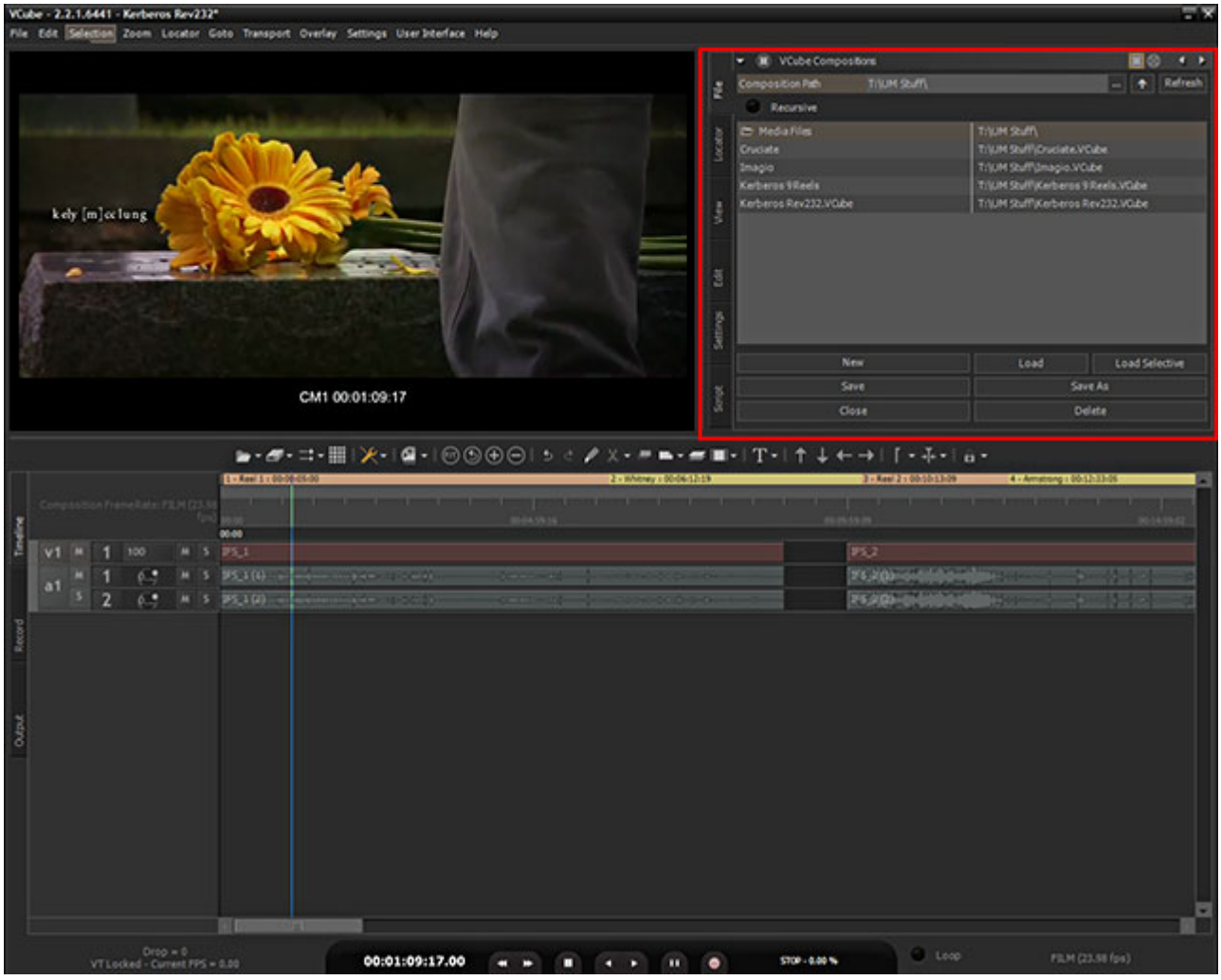
- Using a 25 fps frame rate for the Composition produces video drops out on an NTSC video output. The Composition frame rate must be set to 29.97 fps and the Clips must be pulled-down and resized into the Timeline (expanded time). While playing, a PAL frame will be duplicated every six NTSC frames to preserve the overall duration.
- Using a 24 fps frame rate for Composition produces video drops out on a PAL video output. The Composition frame rate must be set to 25 fps. A frame will be duplicated every second to preserve the overall duration.

> **Note:** If the graphic card output is used, the Composition frame rate need not match any SD video standard. 24 fps can be used as the Composition frame rate.
>
> Only HD video formats allow film frame rates for the Composition on HD video cards.

Control Settings Page

The **Control Settings Page** gives access to the main settings for the VCube working environment.

User Interface > Toggle Show/Hide Settings [**F2**] Brings up a Pane to the right of **Preview** with all the Control Settings Tabs down the left-hand side. **Preview** is resized to suit and the size of the Pane can be adjusted by hovering over the left and bottom splitters (borders). When the cursor changes to a double-headed arrow Click and drag to resize :



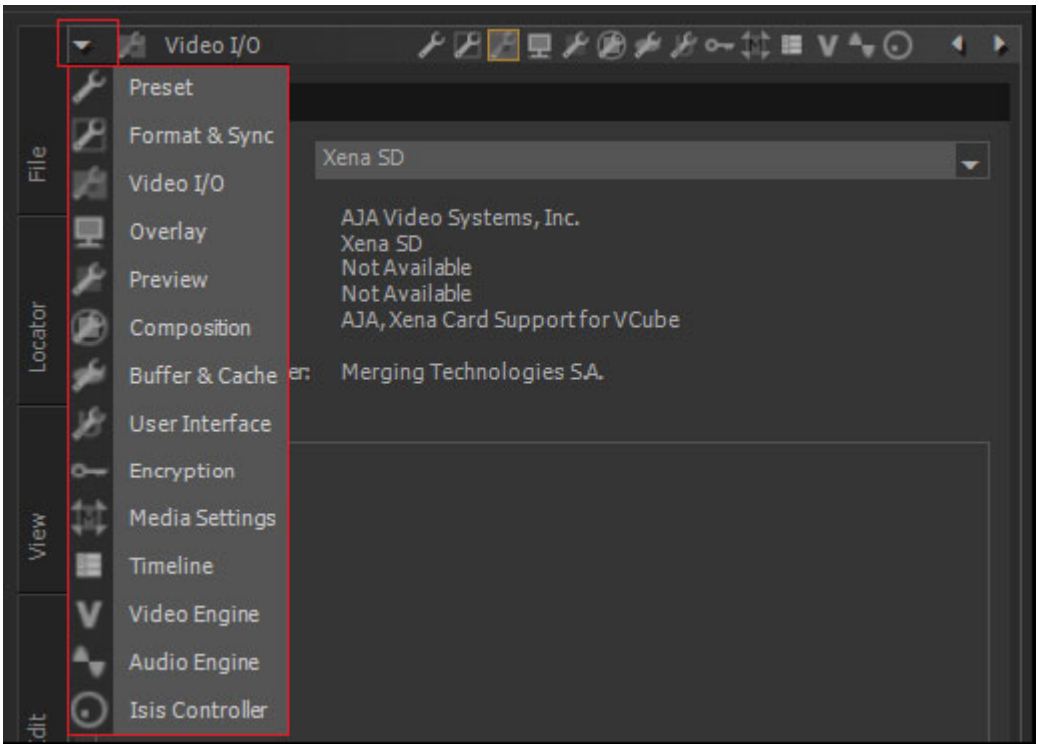
Control Settings

The Tabs on the left access **Tab Pages** each with several **Tabs** or where there is only one Tab, the **Tab** itself. When the **Control Settings** Tabs are in this position and form :

- **Home / End** steps through the different Tabs. (Or: **User Interface > Settings Pages > Previous Settings Page / Next Settings Page**)
- **Page UP / DOWN** steps through the different **Tabs** in each Tab Page.

or...

- Click on the down arrow in the header to see all the Tabs in the Folder, Click on the desired entry to open.



Tab Icons with text labels drop-down list

- or Click directly on one of the Icons to the right of the header
- or Click on the Left Right arrows far right on the header to step forwards and backwards through Tabs.

Individual Tabs

The **Control Settings** Tabs can also be accessed individually via Menus and shortcuts. When accessed this way they appear as broken away windows.

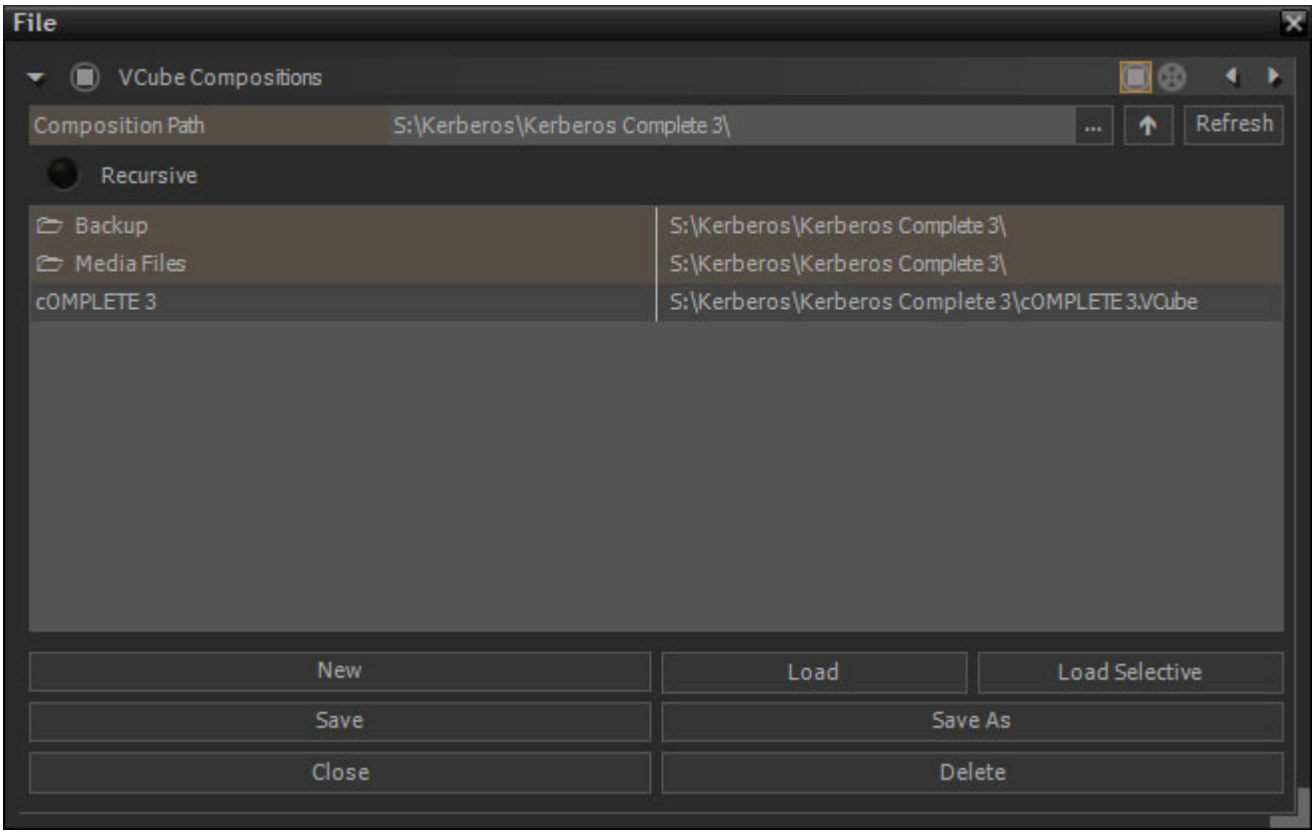
User Interface > Settings Pages > Show File Page	[**F6**]	Toggle File Tab
User Interface > Settings Pages > Show Locator Page	[**F7**]	Toggle Locator Tab
User Interface > Settings Pages > Show View Page	[**F8**]	Toggle View Tab
User Interface > Settings Pages > Show Edit Page	[**F9**]	Toggle Edit Tab
User Interface > Settings Pages > Show Settings Page	[**F10**]	Opens the Control Settings Tab with Tabs in the Preview Pane

File Tab

The **File** Tab Page has two Tabs which enable **Media Files** and **VCube Compositions** to be managed. [**F6**] opens the page as a floating Tab Window.

VCube Compositions and **Media Files** can also be dropped directly onto an existing Timeline track from a Windows folder opened in a Windows file Browser.

VCube Compositions



File Tab

The Compositions Tab can also be opened on its own with **File > Open** [**Ctrl + O**]

Composition Path — Field shows the current Path

... — Opens a Windows browser to change the Path to a location on local storage or via a network.

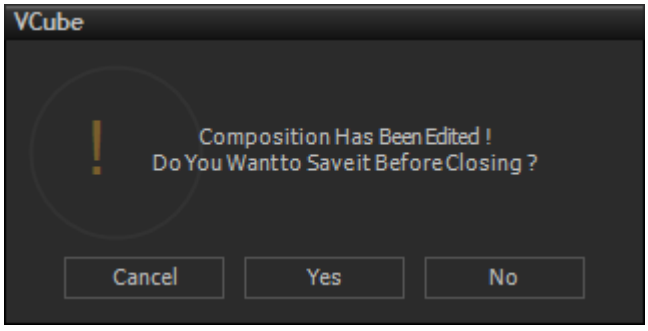
^ — Up arrow steps up the path tree to the root directory.

Refresh — Updates the list of Files in the current location [F5]

Recursive — When checked all Composition Files in the folder specified will be shown including those in sub-folders.

Files — Panel shows all Folders and Composition files in the current Path.

New — Opens a new Composition with the current settings. [Ctrl + N] If a Composition is already open then a warning dialog appears:



VCube Composition Save warning dialog

	Cancel	Aborts the new Composition and returns to the current one
	Yes	Saves the current Composition and opens the new one.
	No	Closes the current Composition without saving it and opens the new one.
Load		Opens a pre-existing Composition. [Ctrl + L]
Save		saves the current Composition using the current Composition name. [Ctrl + S]
Save As		Opens a Windows browser to enable the Composition to be with a new name or to a new location. This feature is useful since it enables you to save many versions of the same Composition with different names. [Ctrl + Shift + S]
Close		Aborts the current Composition. Any edit decisions made since the last time the Composition was saved are discarded. [Ctrl + Shift + Q]
Delete		Deletes the selected Composition from the hard drive. [Shift + DELETE]

Note: The associated Media Files remain on the mass storage.

Load Selective	Enables Composition objects or properties to be imported into the current one. A dialog determines how the selection will be imported into current one. [Ctrl + Shift + L] Please see: Load Selective on page 33

Media File Browser

For full details of the **Media File Browser** Please see: **Media File Browser on page 43**

Locator Tab

For details of the **Locator** Panel please see: **Locator Tab Page on page 53**

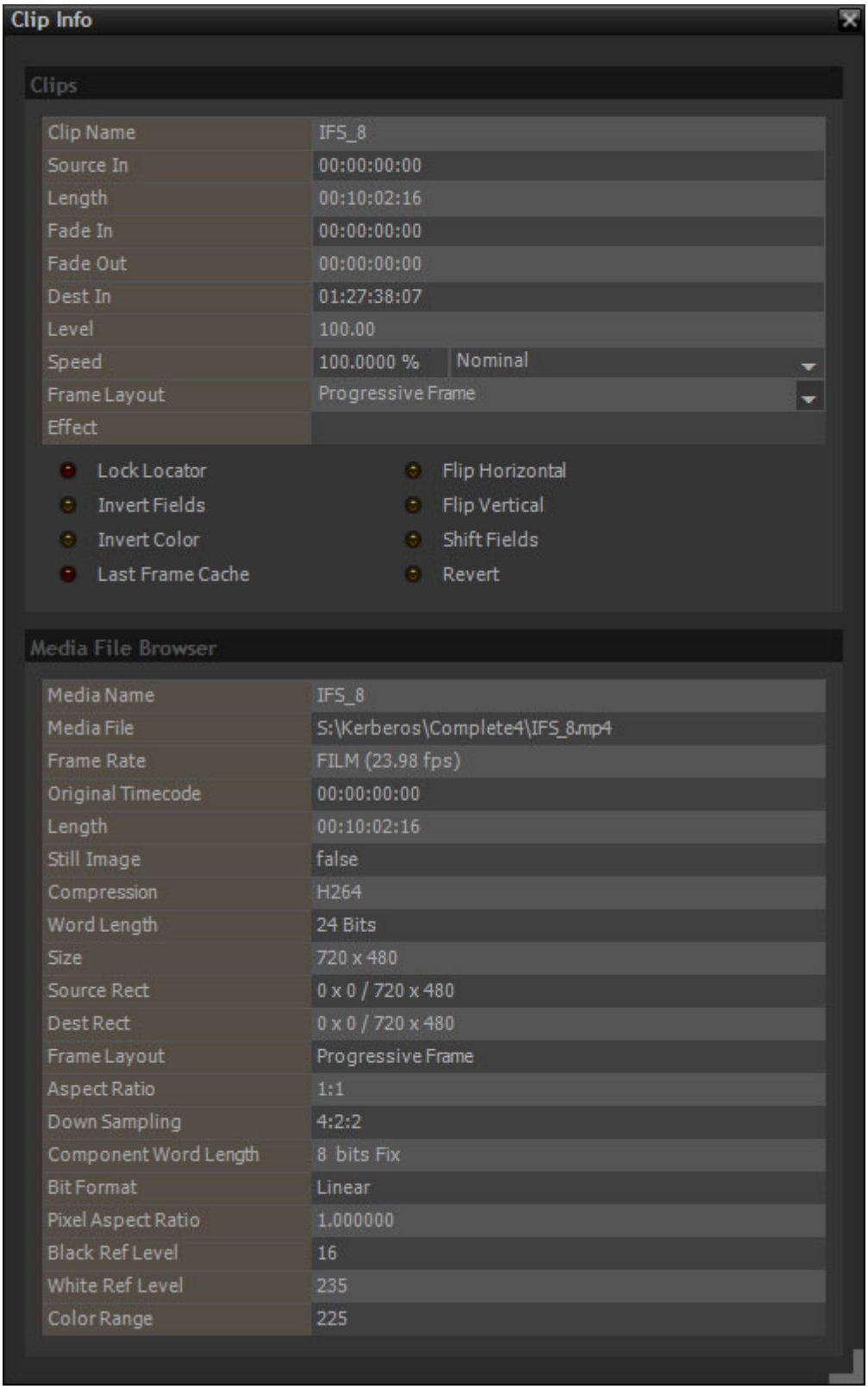
View Tab

The **View** Tab Page has three Tabs, **Clip Info**, Keyboard **Shortcuts** and **Workspaces**.

Clip Info

Note: The **Clip Info** Tab can also be opened as a floating Tab window by Double-clicking on a Clip in the Timeline. Once opened a single Click on a Clip in the Timeline loads that Clip's information into **Clip Info**.

Video Clip



Video Clip Info

Clips

In this section every information field is editable by either Double-clicking in it and typing or selecting from the drop-down where there is a down arrow at the end of the field.

Clip Name Shows the name used in the Timeline. Double-click in field to type an alternative

Source In is the original TimeCode in point for the Clip in the current Composition. Double-click in field to modify.

Length is the Clip's duration in the current Composition. Double-click in field to modify.

Fade In is the length of the Clip's fade in for the current Composition. Double-click in field to modify.

Fade Out is the length of the Clip's fade out in the current Composition. Double-click in field to modify.

Destination In shows the TimeCode for the first frame of the Clip used in the current Composition. Double-click in field to modify.

Level is the opacity ratio in percent of the Clip in the current Composition. Double-click in field to modify.

 Level appears on the Clip when the opacity value isn't equal to 100%.

Speed value adjusts the playback speed of the selected Clip. A drop-down list offers preset values. This setting affects only the speed of the Clip in the Timeline. There is no picture interpolation. The Media File is just played with another frame rate. Sped up Clips have their duration shortened in the Timeline. Slowed down ones keep their original duration in the Timeline. I.e. Slowed down Clips are truncated.

 Speed appears on the Clip when the Timeline playback speed is different to the original fps of the Media File.

Frame Layout can be set for a particular clip in order to correct improper flag.

Effect indicates a particular effect name attached to an OMF Composition.

Selector Buttons

 Lock Locator prevents editing actions on the selected Clip. A selection including a locked clip will also be locked.

Note: Actions such as **Cut** and **Copy** which affect the entire selection are still allowed.

 Invert Fields rearranges the field order on a wrongly defined video file.

 Invert Color transforms the Clip to or from a negative.

 Last Frame Cache keeps the last read frame in memory to reduce disk or network requirements when playing a low frame rate Media File at a fast frame rate.

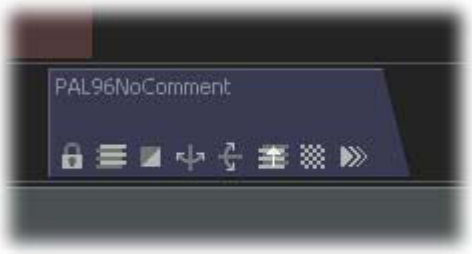
 Flip Horizontal flips the Clip around the vertical axis.

 Flip Vertical flips the Clip around the horizontal axis.

 Shift Fields has to be used to playback an upper field first Media File in a lower field first video format or the inverse.

 Revert displays the Clip's frames from the end to the beginning.

Note: All options for Clips listed above are shown as a small icon inside the Clip in the Timeline when at anything other than the default value.



Clip options icons

Media File browser

Media Name	Could be different from the Media File name. (In an OMF Composition)
Media File	Shows the path to the Media File.
Frame Rate	is the original Media File frame rate.
Original TimeCode	is the TimeCode stamped in the Media File at its creation.
Length	is the total duration of the Media File.
Still Image	is true when the selected Clip is an unconverted Still Image File otherwise false.

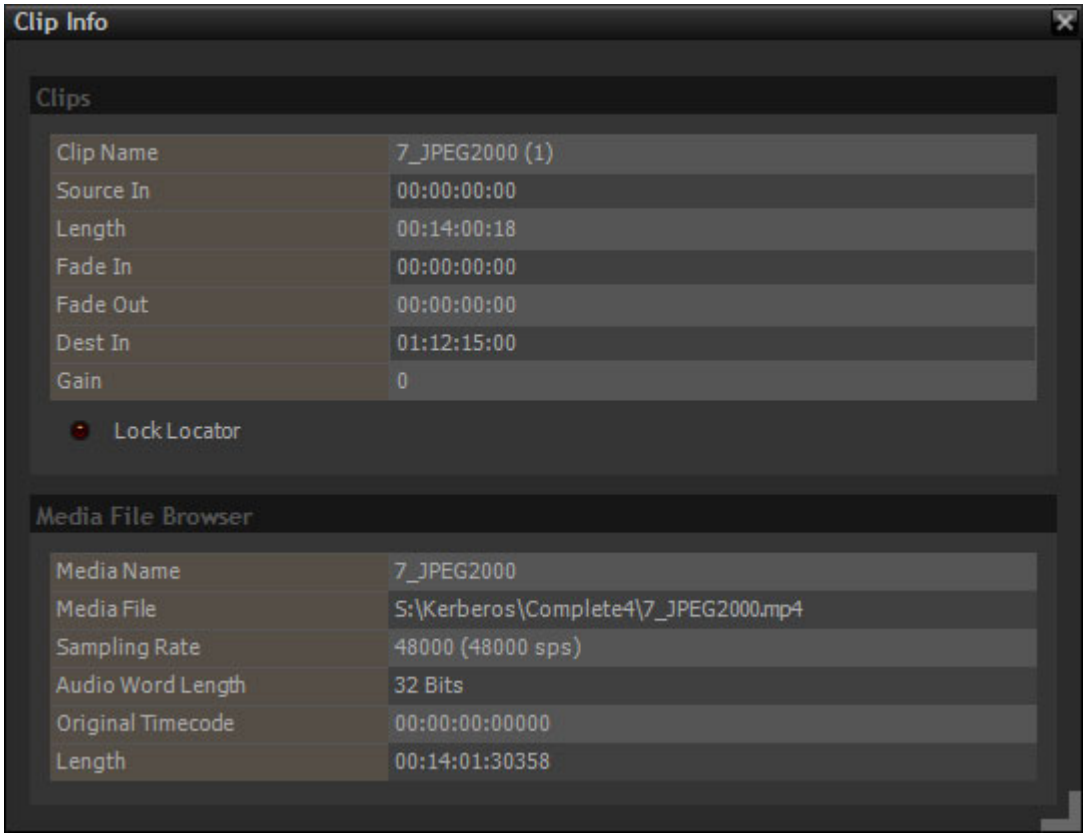
Note: A single Still Image File is always imported as a 5 Second Clip.

Compression	shows the codec used with this Media File.
Word Length	shows the number of bits used for frame sampling.
Size	shows the number of horizontal and vertical pixels used to sample the image.
Source Rect	(Source Rectangle) displays the Layer's size and position settings.
Dest Rect	(Destination Rectangle) displays Layers size and position settings.
Frame Layout	shows if the media is interleaved or not.
Aspect Ratio	shows the original pixel aspect ratio of the media.
Down Sampling	shows how colors have been sampled.

Please see: **Color Sampling 4.1.1 on page 279**

Component Word Length	shows the precision of the sampling process for each component.
Black Ref Level	is the digital value corresponding to the deepest black in the picture.
White Ref Level	is the digital value corresponding to the brightest white in the picture.
Color Range	is the number of possible values for the color components.

Audio Clip



Audio Clip Info

Clips

Clip Name Shows the name used in the Timeline.

Source In Is the original TimeCode in point for the Clip in the current Composition. Double-click in the field to modify.

Length Is the Clip's duration in the current Composition. Double-click in field to modify.

Fade In Is the length of the Clip's fade in for the current Composition. Double-click in the field to modify.

Fade Out Is the length of the Clip's fade out in the current Composition. Double-click in the field to modify.

Destination In Shows the TimeCode for the first frame of the Clip used in the current Composition. Double-click in the field to modify.

Level Shows the Gain ratio in dB of the Clip in the current Composition. Double-click in the field to modify.

Gain icon appears on the Audio Clip when gain setting is other than unity.

Lock Locator

Lock Locator prevents editing actions on the selected Clip. A selection including a locked clip will also be locked.

Media File Browser

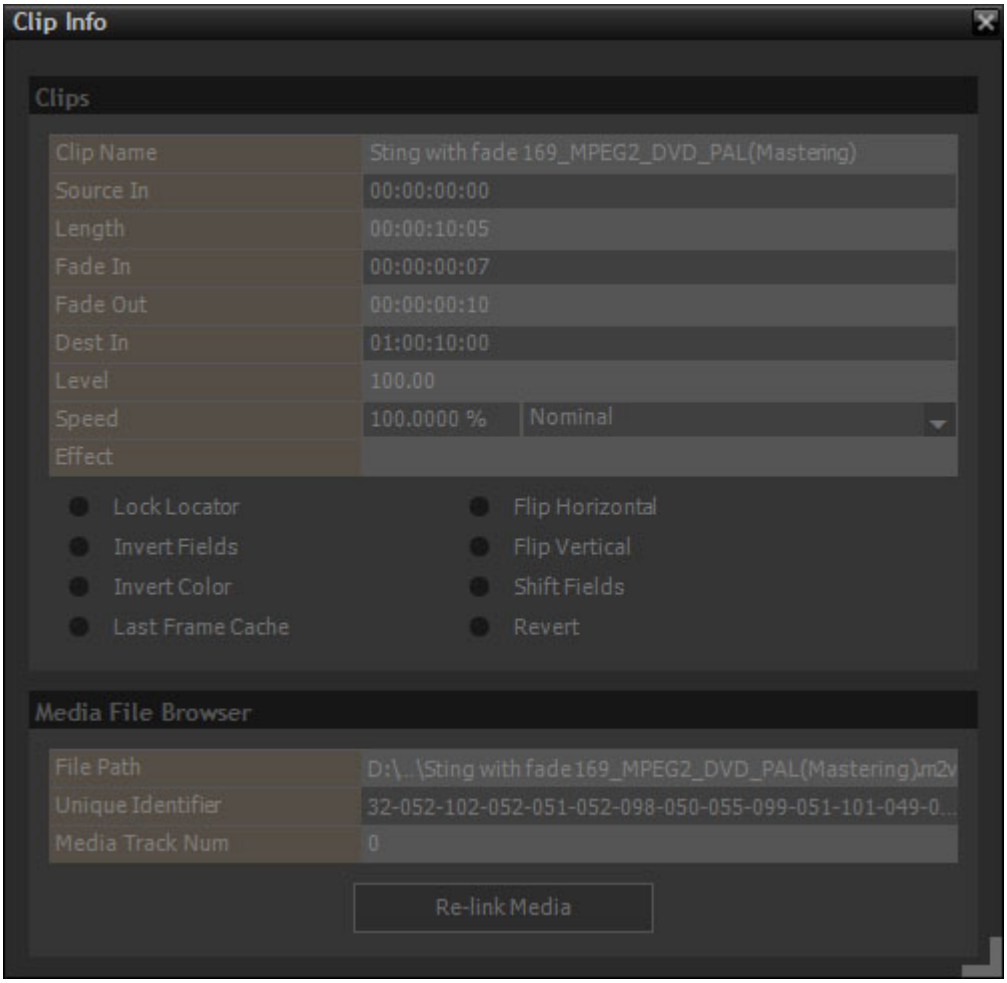
Media Name Could be different from the Media File name. (In an OMF Composition)

Media File Shows the path to the Media File.

Sampling Rate Is the original Media File Sampling Rate.

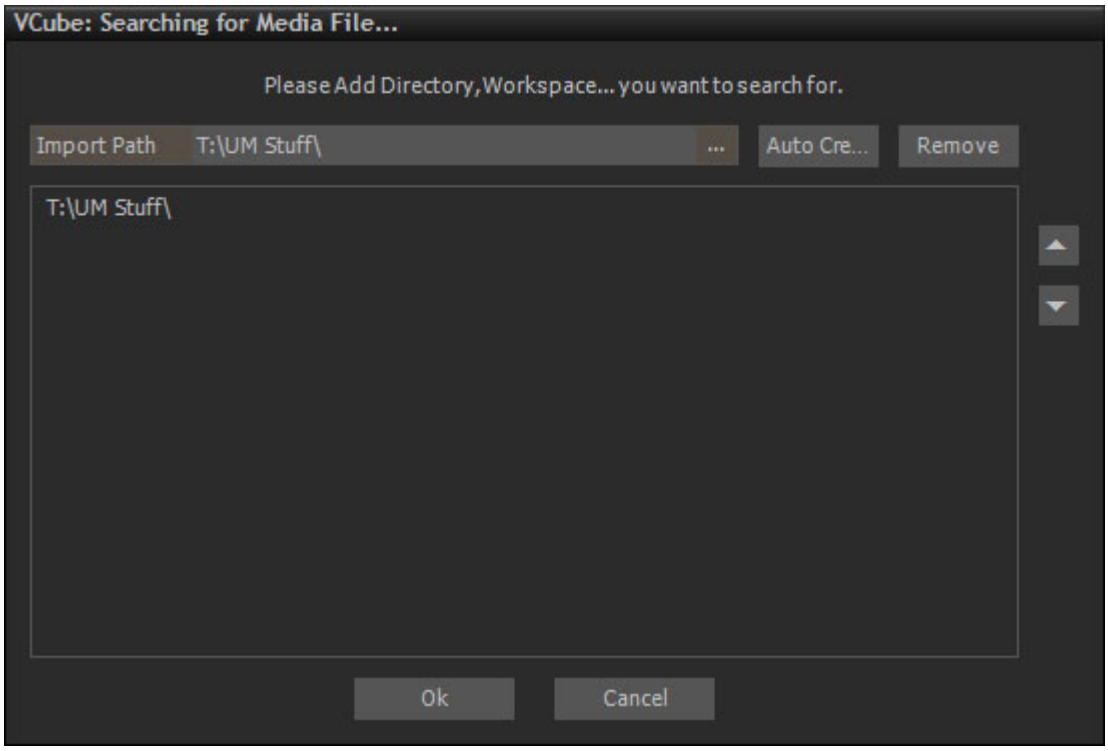
Audio Word Length	Is the original Media File Bit Depth
Original Timecode	The Timecode stamped into the Media File when it was created.
Length	Is the total duration of the Media File

Re-link Media



Re-link Media

The **Re-link Media** button will appear if one or more Media Files are missing or offline (Zebra Clips in the Timeline). Clicking on the button opens the **VCube: Searching for Media File...** dialog :



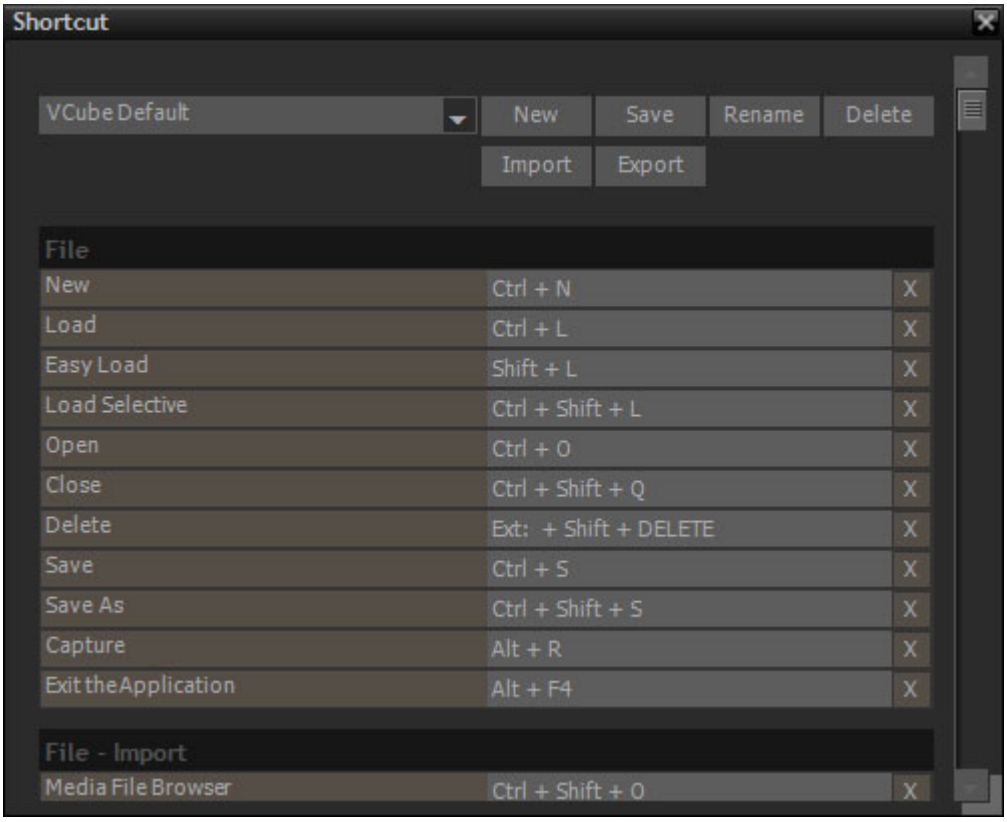
VCube: Searching for Media File... dialog

Import Path	Click on the ... button to open a Windows browser Window. Use this to navigate to the location you believe contains the missing Media File(s)
Add	Adds the location selected to the search path.
Remove	Click on a path in the main pane to select it. Click on Remove to remove it from the list of search paths. (Useful if you inadvertently select a root directory with many thousands of files, which would take forever to search.)
Up Down arrows	Step the selection up and down in the main list pane.
OK	Click on OK to accept the choices and begin the search
Cancel	Click on Cancel to reject any changes and exit the dialog.

Shortcut

The **Shortcut** Tab provides the complete list of current Keyboard Shortcuts. It also enables Shortcuts to be altered and managed. Different sets of Shortcuts can be saved, Imported and Exported.

Note: Please see: Default Shortcuts on page 224 for the full list of Default Shortcuts.



Keyboard Shortcuts settings

VCube Default Drop-down	Shows the name of the Shortcut file loaded currently.
New	Enables new Shortcut Settings to be defined.
Save	Records current Shortcut Settings.
Rename	Enables the current preset to be renamed.
Delete	Erases the current shortcut settings.
Import	Opens a Windows Browser to load Shortcut Settings from a specific folder.
Export	Opens a Windows Browser to save current shortcut settings in a specific folder.

Note: The current set of Shortcuts is stored with the Project and will be reloaded with it unless excluded by a **Load Selective**.

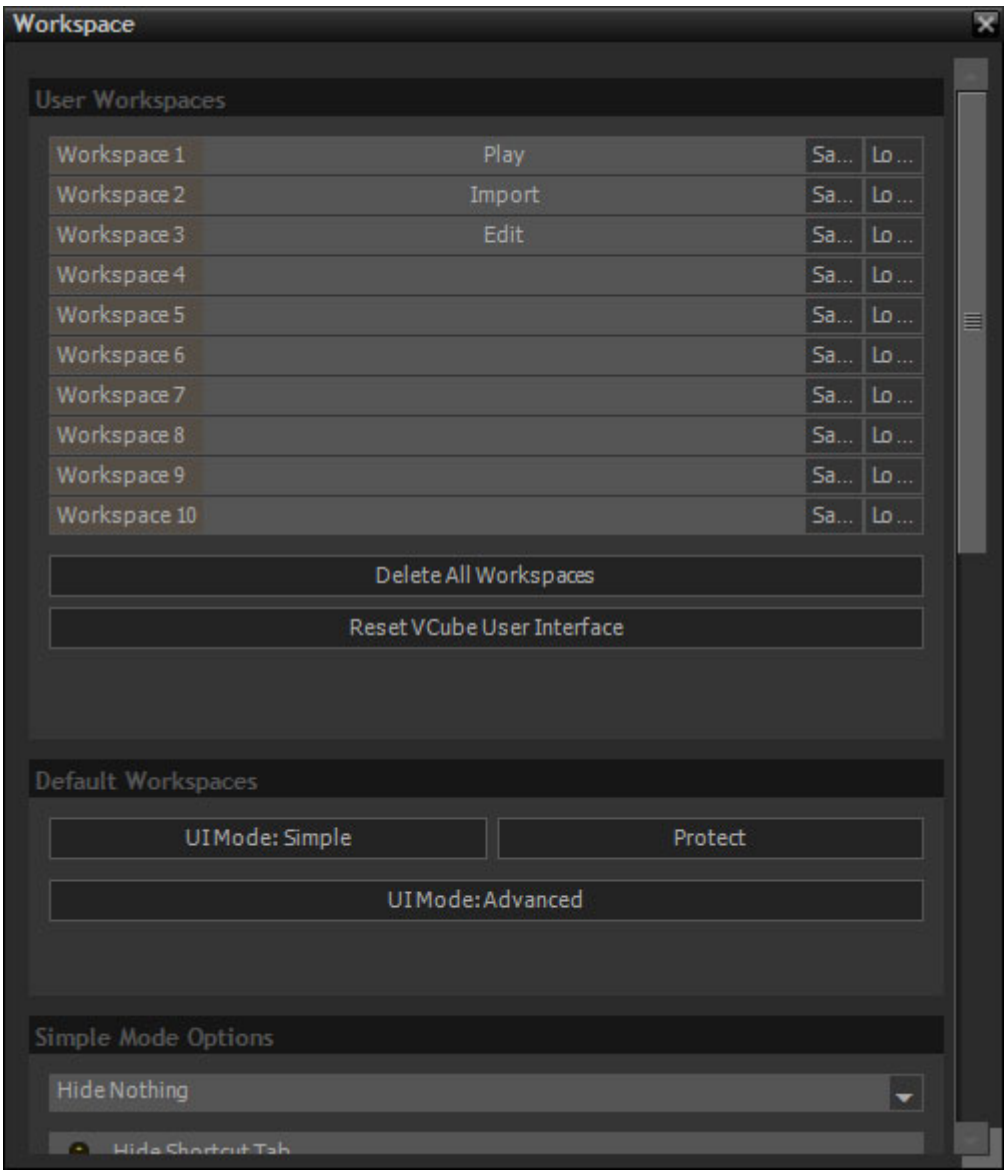
Workspace

Workspaces

Workspaces are a convenient means of storing alternative desktop layouts. The main User Modes, **Simple** and **Advanced** are built in examples of Workspaces.

Note: The current set of Workspaces is stored with the Project and will be reloaded with it unless excluded by a **Load Selective**.

Note: The **Workspace Tab** manages Workspaces :

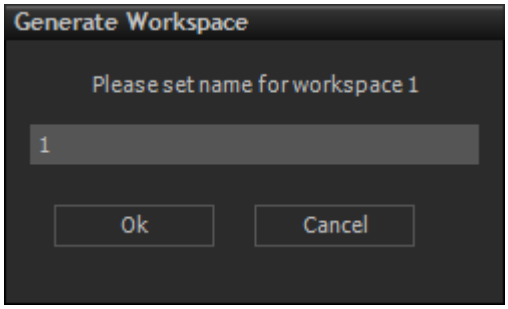


Workspace settings

Note: Use the right-hand scroll bar to view the rest of the Tab. (Shown below)

User Workspaces

Workspace 1 to **10** — Click on the **G...**buttons to Generate the respective Workspace. Or use [**Ctrl + Key Number**]



Generate Workspace dialog

Type a name for the Workspace and Click on **OK** to **Generate**.

Workspace 1 to **10** — Click on the **Lo...** buttons to Load the respective Workspace. Or use [**Shift + Key Number**]

Delete All Workspaces — Deletes all the Workspaces loaded currently.

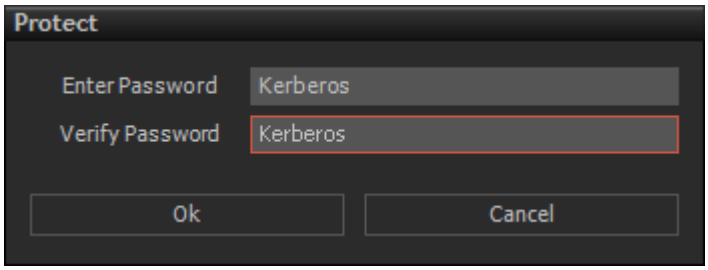
Reset VCube User Interface — Resets the entire VCube User Interface to the factory defaults.

Default Workspaces

UIMode: Simple — Click the button to change the UIMode to Simple

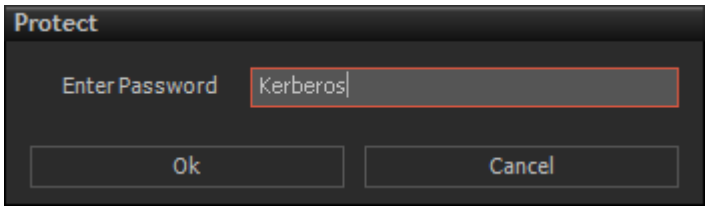
UIMode: Advanced — Click the button to change the UIMode to Advanced

Protect — If the User Interface is Unprotected clicking on the Protect button pops-up the Protect dialog to enable a Password to be entered and Protection to be activated.



Password Protect dialog Lock

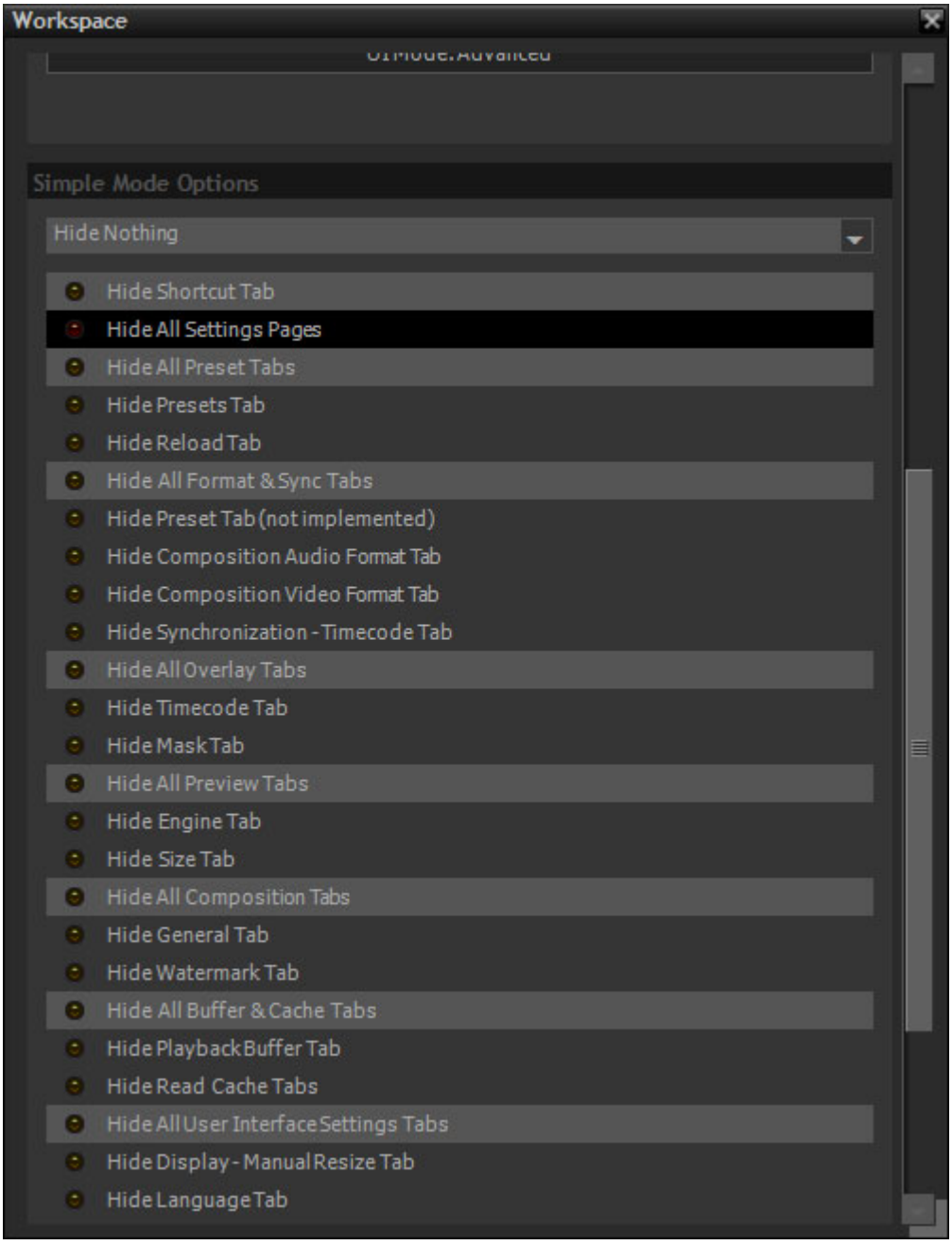
If the User Interface is already Protected attempting to change the User Interface mode pops-up the Protect dialog to enable the Password to be entered to unprotect the UI.



Password Protect dialog Unlock

Note: The **Simple Mode** password is different from the **Composition** protection password.

Simple Mode Options



Workspace - Simple Mode settings

Hide Nothing The drop-down list gives the choice of:

Hide Nothing

Hide All

Hide All But Views

Hide All But Settings

Otherwise any of the individual **Tabs** listed below can be hidden in **Simple Mode** when the buttons are checked. Clicking on one of the Folders will also activate hide for all the panels in that folder.

Hide Shortcut Tab

Hide All Settings Pages

Hide All Preset Tabs

Hide Preset Tab

Hide Reload Tab

Hide All Format & Sync Tabs

Hide Preset Tab (not implemented)

Hide Composition Audio Format Tab

Hide Composition Video Format Tab

Hide Synchronization - Timecode Tab

Hide All Overlay tabs

Hide Timecode Tab

Hide Mask Tab

Hide All Preview Tabs

Hide Engine Tab

Hide Size Tab

Hide All Composition Tabs

Hide General Tab

Hide Watermark Tab

Hide All Buffer & cache Tabs

Hide Playback Buffer Tab

Hide Read Cache Tabs

Hide All User Interface Settings Tabs

Hide Display - Manual Resize Tab

Hide Language Tab

Note: In **Full Screen** and **Floating** modes, all VCube functions can also be accessed from a context menu with a **Right-Click** on the Preview area. In **Simple Mode** only those functions not hidden will be available.

Edit

The **Edit** Tab Page has four Tabs. **Main**, **Clips**, **Layers** and **Tracks**

Main

Main gives access to the other **Edit** Tabs and provides two buttons to **Undo** and **Redo**.

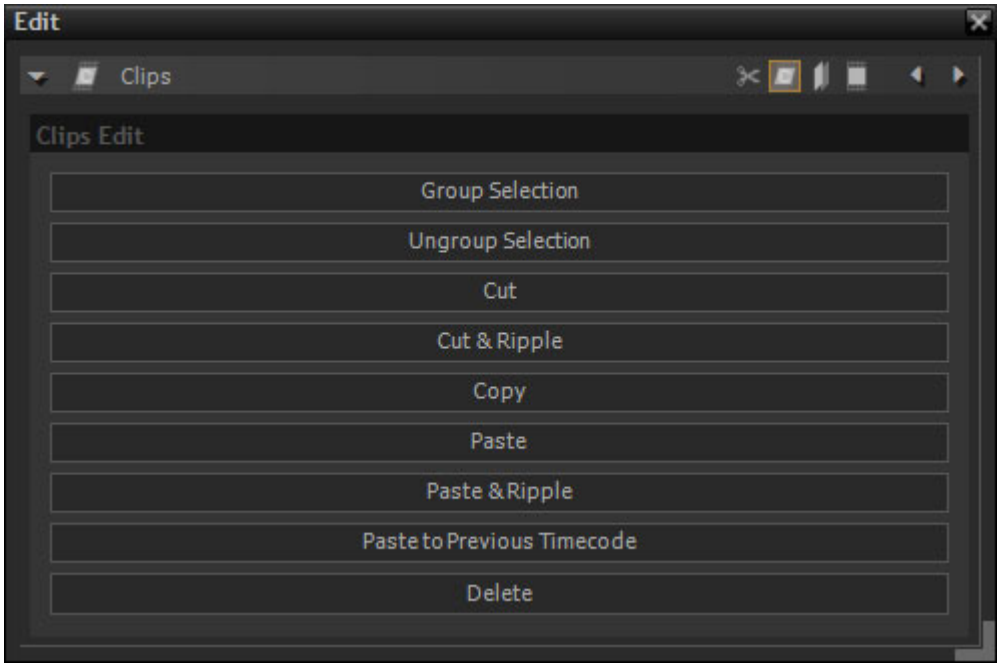
Edit - Main Tab page

The other Tabs can be accessed via the drop-down list on the left, the icons or the left-right arrows on the right.

Undo	Undoes the last Edit action.
Redo	Redoes the last Edit Action to be Undone.

Clips

The **Clips** Tab deals with manipulating and editing Clips.



Edit - Clips Tab page

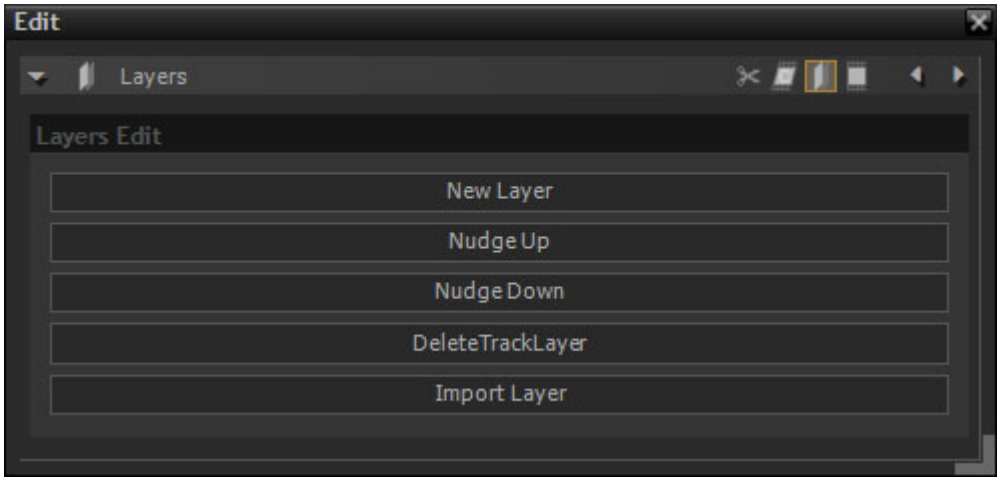
Group Selection	Groups the Selected Clips
Ungroup Selection	Ungroups all Clips in the current Selection when Grouped
Cut	Cuts all selected Clips
Cut & Ripple	Cuts all selected Clips and Ripples (Moves all subsequent Clips to the left in the Timeline (earlier) by the amount corresponding to the duration of the Clip(s) removed.
Copy	Copies the selected Clips to the Clipboard
Paste	Pastes the contents of the Clipboard to the current playhead cursor position starting on the Selected Track/Layer. If no Layer is selected, a new Layer will be created. If Clipboard content includes both Video and Audio, both Video and Audio Layers must to be selected to avoid creating additional Layers.
Paste & Ripple	Pastes the contents of the Clipboard to the current Playhead Cursor position starting on the Selected Track/Layer and Ripples all subsequent Clips to the right in the Timeline (later) by the amount corresponding to the Clip(s) inserted. If no Layer is selected, a new Layer will be created. If Clipboard content includes both Video and Audio, both Video and Audio Layers must to be selected to avoid creating additional Layers.
Paste to Previous Timecode	Pastes the contents of the Clipboard to the position in the Timeline it was last positioned at.
Delete	Deletes the Selected Clip(s) leaving every other Clip in place.

Note: Use [**Shift + Click**] to select multiple Clips to be Grouped. [**Ctrl + G**] Groups [**Ctrl + U**] **Ungroups**.

- A Clip with embedded Audio appears in the Timeline as a Group with one Video Track with one Layer and one Audio Track with as many Channels as there are in the Media File.
- A Group of this type can be moved synchronously in the Timeline until such time that it is Ungrouped.
- If the order of Video Clips needs to be changed for Preview Nudge Up / Down Layer is used. Select the relevant Video Layer(s) and use Nudge Up / Down or [**Ctrl + Up**] or [**Ctrl + Down**]

Layers

The **Layers** Tab manages and manipulates **Layers** in **Tracks**.



Edit - Layers Tab page

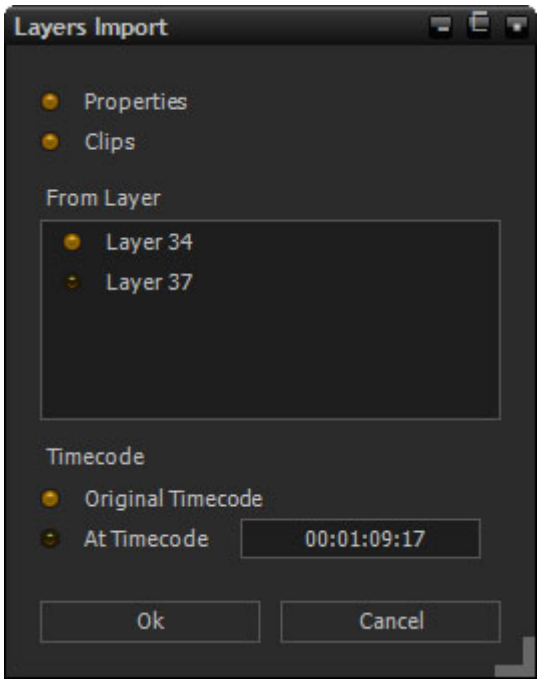
New Layer — Creates a new Layer on the selected track. [Ctrl +Shift + N]

Move Up Selected — Moves the selected item up a Layer. [Ctrl + UP] Note that moving a Layer to another Track deletes the Track if it has no remaining Layers. Note also that the Layer number is not linked to a specific Layer but to its position.

Move Down Selected — Moves the selected item down a Layer. [Ctrl + DOWN] Note that moving a Layer to another Track deletes the Track if it has no remaining Layers. Note also that the Layer number is not linked to a specific Layer but to its position.

Delete Selected Layer — Removes the selected Layer from the Track. [Ctrl + DELETE] Note that a Track with only one Layer will be deleted.

Import Layer — Enables import of a Layer from another Composition. [Ctrl + Alt + L] Opens a Windows Browser to locate the Composition you wish to import a Layer or Layers from. When the Composition has been selected and Open clicked the layers Import dialog opens :



Layers Import dialog

Note: The Layers shown in the Source project will depend on whether a Video Layer or Audio Track Channel is selected in the current Composition. Unless you wish the imported Layer to

overwrite existing Video or Audio then create new Tracks, Layers and Channels to accommodate the Import and select these, one by one, to import the required material.

Layers Import

Properties When checked the Layer Properties will be imported

Clips When checked the Clips on the selected Layer will be imported

From Layer Click on the Layer you wish to import. When the button is checked, the Layer will be imported.

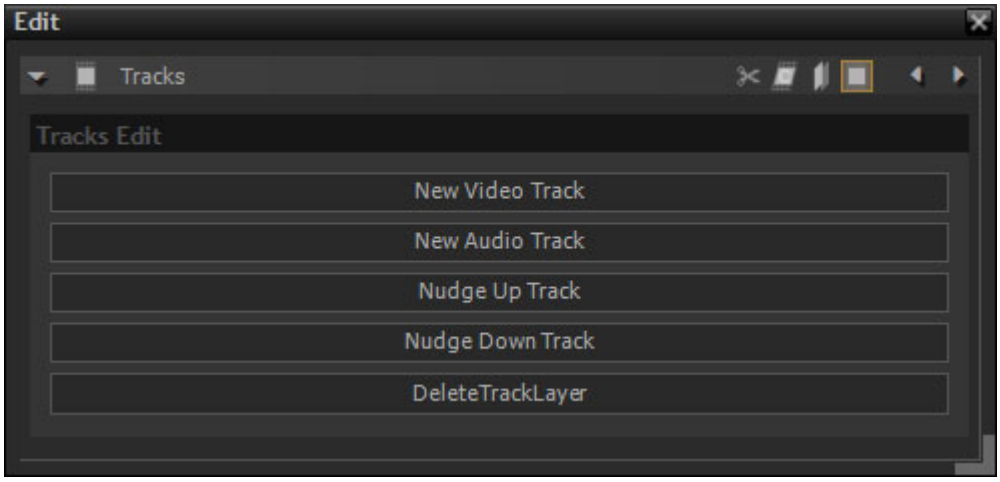
Timecode

Original Timecode When checked the Clip(s) on the selected Layer will be imported at the same Timecode they are positioned at in the donor Project

At Timecode When checked the Clip(s) on the selected Layer will be positioned to start at the Time-code shown in the field. The field shows the current Playhead Cursor position in the destination Project. Double-click in the field to enter an alternative Timecode.

Tracks

The **Tracks** Tab manages and manipulates **Tracks**.



Edit - Tracks Tab page

New Video Track Creates a new Track for Video Clips. [Ctrl + Shift + T]

New Audio Track Creates a new track for Audio Clips. [Ctrl + Alt + T]
Note that a New Audio Track is automatically created when a Video Clip with embedded Audio is placed in the Timeline.

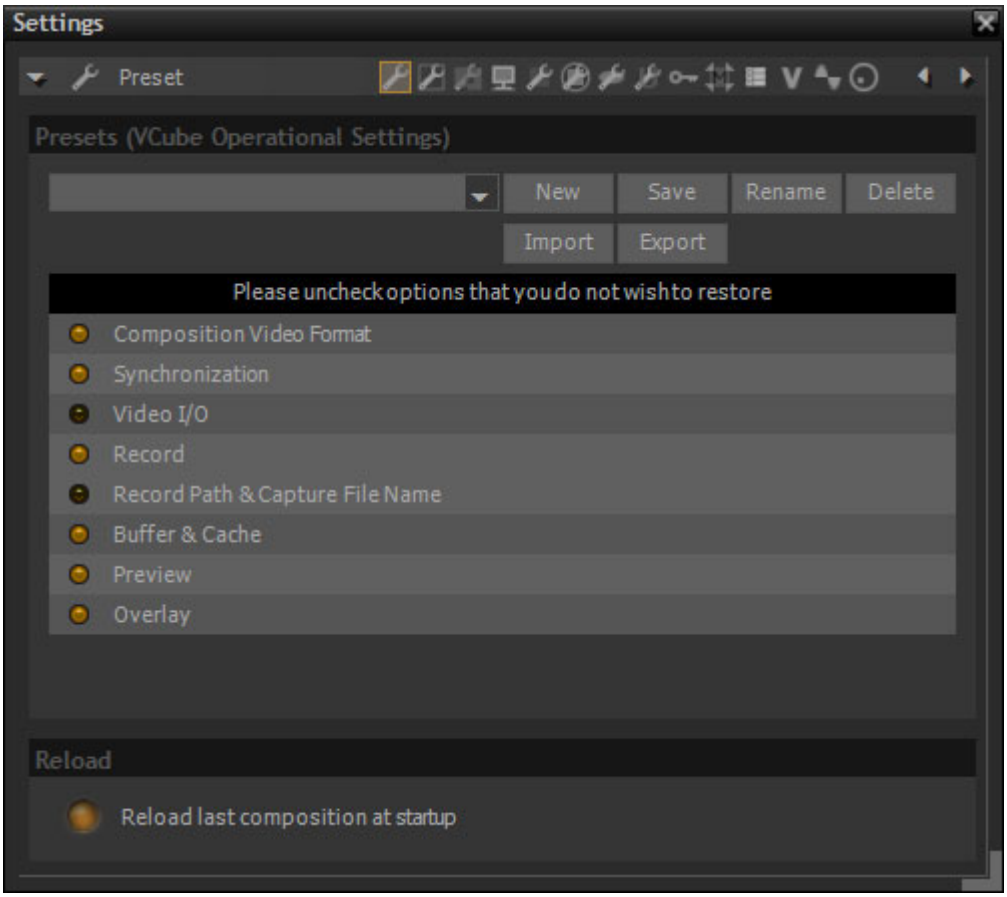
Move Up Selected Moves selected Track Up. [Ctrl + Shift + UP] Note that the Track number is not linked to a specific Track but to its position in the Timeline layout.

Move Down Selected Moves selected Track Down [Ctrl + Shift + DOWN] Note that the Track number is not linked to a specific Track but to its position in the Timeline layout.

Delete Selected Removes the selected Track from the Timeline. [Ctrl + DELETE]

Settings Page

The **Settings** Tab Page gives access to the many parameter Tabs :



Settings Tab page

Preset

[**P**] A VCube **Preset** gathers all current Settings together in a global preset.

> **Note:** The specific codec settings are **not** included in Presets except for the **VCube MJPEG** (standard) codec. Otherwise only the codec type is included and specific Settings must be made for the Project in hand.

Presets (VCube Operational Settings)

New, Save, Rename and Delete — Work as normal.

Import — Opens a Windows File Browser to locate an existing Preset. When a Preset is selected, click on Open to load the Preset parameters.

Export — Opens a Windows File Browser. Type a suitable name for the Preset in the File name field and navigate to a suitable location to write an Export file of the current Settings as a Preset. When the desired location is established Click on Save to save the Preset or Cancel to exit the dialog without saving.

Please uncheck options that you do not wish to restore

This is a filter. Items with unchecked buttons will NOT be changed when **Presets** are recalled.

Composition Video Format

Synchronization

Video I/O

Record

Record Path & Capture File Name

Buffer & Cache

Preview

Overlay

Reload

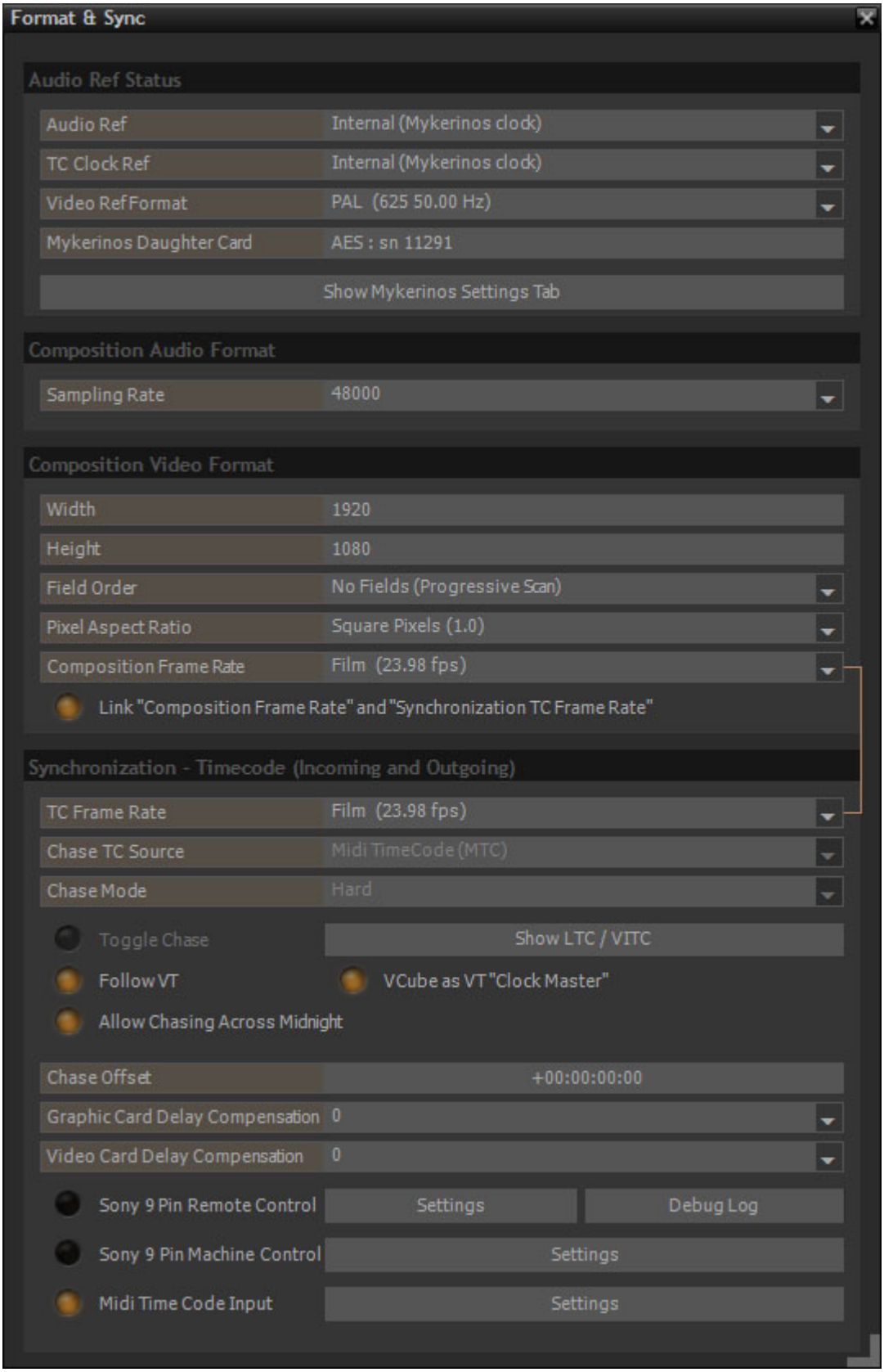
Reload Last Composition at Startup When checked, VCube will reload the last Composition loaded when the application is started.

Creating Global Presets

1. Enable the video I/O [**Shift + Alt + P**] plug-in according the video card present in the machine.
2. Choose an **HD** or **SD** video standard according to your requirements. The simplest manner is to use the Quick SD Settings [**Alt + F5**] or Quick HD Settings [**Alt + F6**]
3. Set the synchronization [**Alt + P**] for VCube.
4. Set the Record settings **F12**
5. **Save** this configuration. It can be recalled later if you have to deal with different video formats, different video I/O or synchronization configurations.

Format & Sync

One of the most important Tabs in the Settings Tab Page, Format & Sync options set the fundamental Composition and Synchronization parameters.



Format & Sync Tab page

Audio Ref Status

Note: This section will not be present except in a system with Merging Technologies Audio hardware, e.g. a Mykerinos card.

Audio Ref — The field shows the Audio Sync Reference Source selected Currently. Use the drop-down list to choose the source. The choices available will depend on the VCube version and the hardware available for example:

Internal (Mykerinos clock)

Video Input

Wordclock Input

Audio Input (lists all available digital audio inputs e.g. AES/EBU. VCube will check each channel for a valid signal and lock to this.)

TC Clock Ref — The field shows the TimeCode Sync Reference selected Currently. Use the drop-down list to choose the appropriate source.

Show Mykerinos Settings Tab

Note: This button will only be available when a Mykerinos card is fitted. Composition Audio Format

Sampling Rate — The field show the current Audio Sampling Rate. Use the drop-down list to choose the Audio Sampling Rate (Contents of the list will depend on the hardware (if any) and the VCube version. E.g. a system with a Mykerinos with AES/EBU daughter card will accommodate anything from 44.1kHz to 384kHz

Composition Video Format

This section determines how the video signal is displayed.

Note: that the all the possible settings supported by the computer graphics card are not supported by the video card. If an unsupported setting is selected a warning message will be displayed on the video output.

- **Please see: Video Formats and Bandwidth on page 232** in the Appendices to find the correct settings for your specific needs.
- Any Format conversion required is applied to the entire Composition including resized Layers on both Preview and Video outputs.

Width — Enables Width in pixels to be trimmed for the Composition.

Height — Enables Height in pixels to be trimmed for the Composition.

Field Order — Offers the choice of whether Upper or Lower Field is displayed First when interlaced or None if the Media is formatted as Progressive Scan.

Pixel Aspect Ratio — The field show the current Pixel Aspect Ratio This is the shape of the individual pixels. HD video systems mainly use a square pixel with aspect ratio of 1:1. NTSC uses an aspect ratio of 0.9:1 resulting in a 648 x 480 display. NTSC 16:9 uses an aspect ratio of 1.2 resulting in an 864 x 483 display. PAL uses an aspect ratio of 1.07 resulting in a 768 x 576 display. PAL 16:9 uses an aspect ratio of 1.42 resulting in a 1024 x 576 display

Note: Anamorphic Wide Screen formats do not use a greater number of pixels to produce the picture. It is the Pixel aspect ratio which determines the shape of the frame. (Assuming the correct flag is set.)

Composition Frame Rate

***Link "*Composition Frame Rate *" and "*Synchronize TC Frame Rate*"**

Synchronization - TimeCode (Incoming and Outgoing)

TC Frame Rate Shows current TimeCode Frame Rate. Click to drop-down the full list of frame Rates.

Chase TC Source Shows Current TimeCode Chase Source. Click to drop-down the list of all sources available. LTC, VITC, Sony 9-pin, Midi TimeCode (MTC)

Chase Mode Shows current Chase Mode. Click to change from Hard to Soft or vice-versa

Toggle Chase When checked, Chase is enabled.

Show LTC/VITC Click to open LTC / VITC Settings dialog Please see: LTC / VITC Settings on page 136.

Follow VT When checked, VCube follows Virtual Transport

VCube as VT "Clock Master" When checked VCube is the sync clock master for Virtual Transport

Allow Chasing Across Midnight When checked, chasing across TimeCode midnight is possible 23:59:59:24 changes to 00:00:00:00 one frame later.

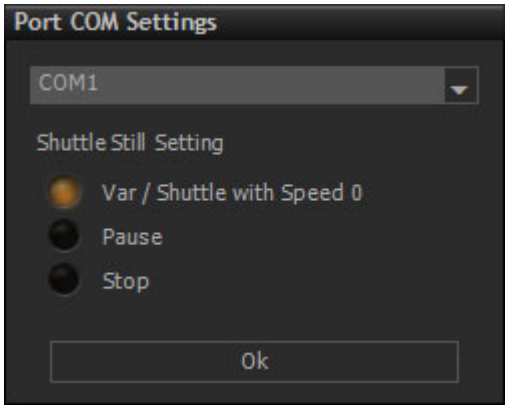
Chase Offset Shows current Chase Offset. Click in the field to type an Offset.

Graphic Card Delay Compensation Shows current delay compensation in frames. Click to drop-down a list of values between -10 and +10

Video Card Delay Compensation Shows current delay compensation in frames. Click to drop-down a list of values between -10 and +10

Sony 9 Pin Remote Control When checked 9-pin Remote control is active.

Settings Opens the Port COM Settings dialog:



Port COM Settings dialog

COM1 Current COM Port. Click to drop-down a list of available COM Ports.

Var / Shuttle with Speed 0 When checked VCube issues a **Var / Shuttle 0 Speed** command when stopped.

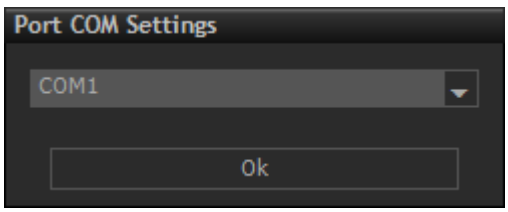
Pause When checked VCube issues a **Pause** command when stopped. Audio data is retained in buffers.

Stop When checked VCube issues a **Stop** command when stopped. Audio data is flushed from buffers.

Debug Log Please see: Sony 9-pin Not Controlling VCube on page 201

Sony 9-Pin Machine Control When checked 9-pin Machine control is active.

Settings Opens the Port COM Settings dialog:



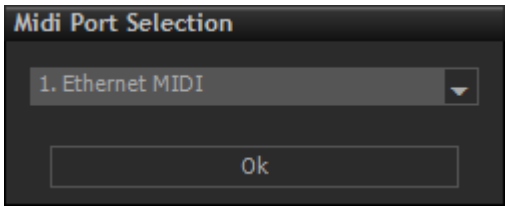
Port COM Settings dialog

COM1 Current COM Port. Click to drop-down a list of available COM Ports.

Note: The Transport Panel [**T**] can also be used to select the **TC Source** for Chasing and to enable the **Chase** function.

Midi Time Code Input When checked, Midi TimeCode (MTC) is active.

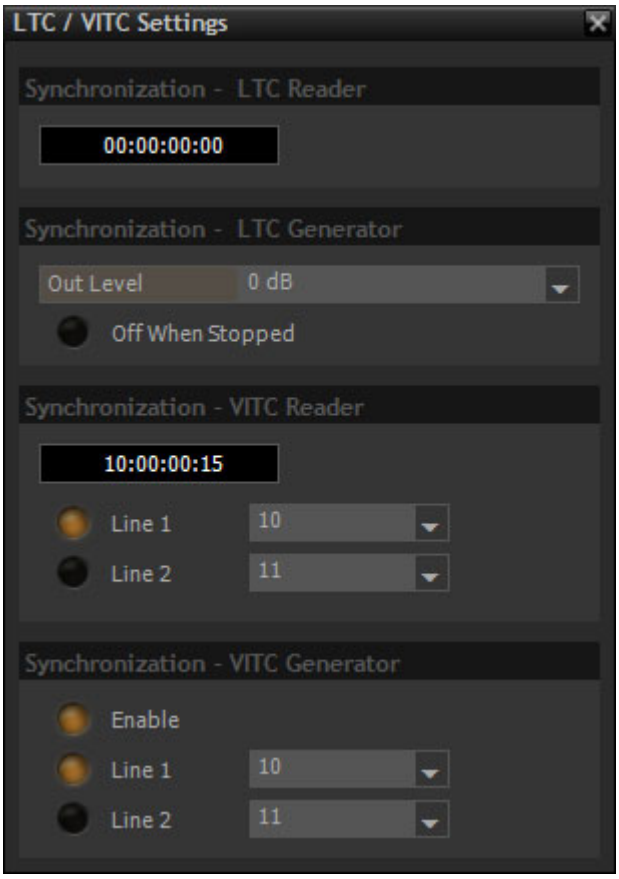
Settings Opens the Midi Port Selection dialog:



Midi Port Selection dialog

1. Ethernet MIDI Current Midi Port. Click to drop-down a list of available ports.

LTC / VITC Settings



LTC / VITC Settings

Synchronization - LTC Reader

Incoming LTC Information only

Synchronization - LTC Generator

Out Level Shows the current LTC output level. Click in the field to drop-down a list of output level options between -24dB and +9dB plus off

Synchronization - VITC Reader

Incoming VITC Information only

Line 1 When checked VCube looks at the video line specified in the field. Click to select values from 10 to 39

Line 2 When checked VCube looks at the video line specified in the field. Click to select values from 10 to 39

Synchronization VITC Generator

Enable	When checked VCube generates VITC
Line 1	When checked VCube inserts VITC into the video line specified in the field. Click to select values from 10 to 39
Line 2	When checked VCube inserts VITC into the video line specified in the field. Click to select values from 10 to 39

Note: Lines 10 and 11 are often used for VITC. Alternative VITC codes are sometimes present on different lines. E.g. original and run time.

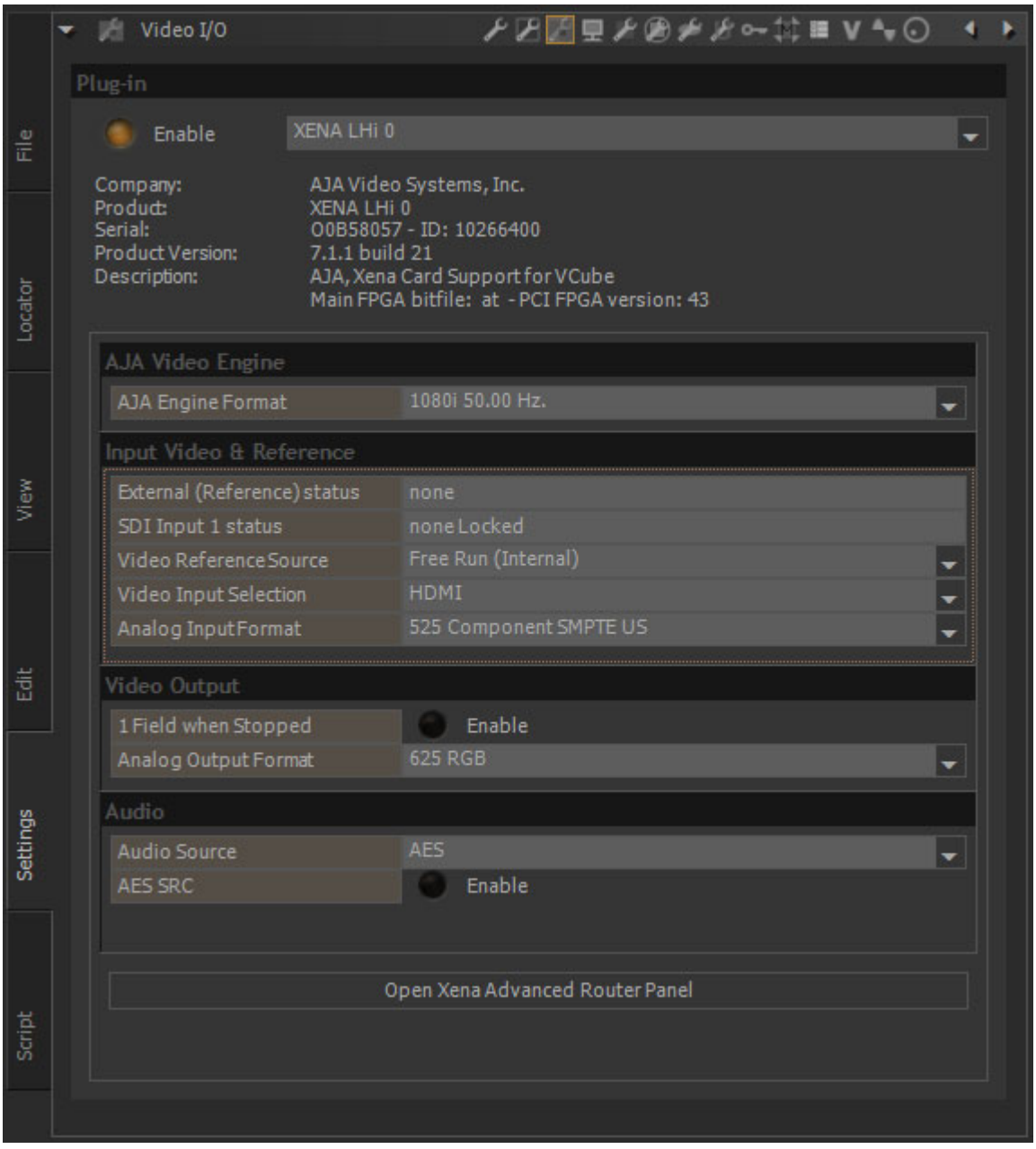
Video I/O

VCube Players do not include a dedicated video card. The video is monitored via the graphics card on VGA or DVI outputs.

VCube Recorders include a Video card. The video can be monitored in the same way as a Player and also from the video card dedicated output(s).

Two different video cards can be installed in a single VCube machine, but only one can be used at a time.

HD VCube also supports SD video cards.



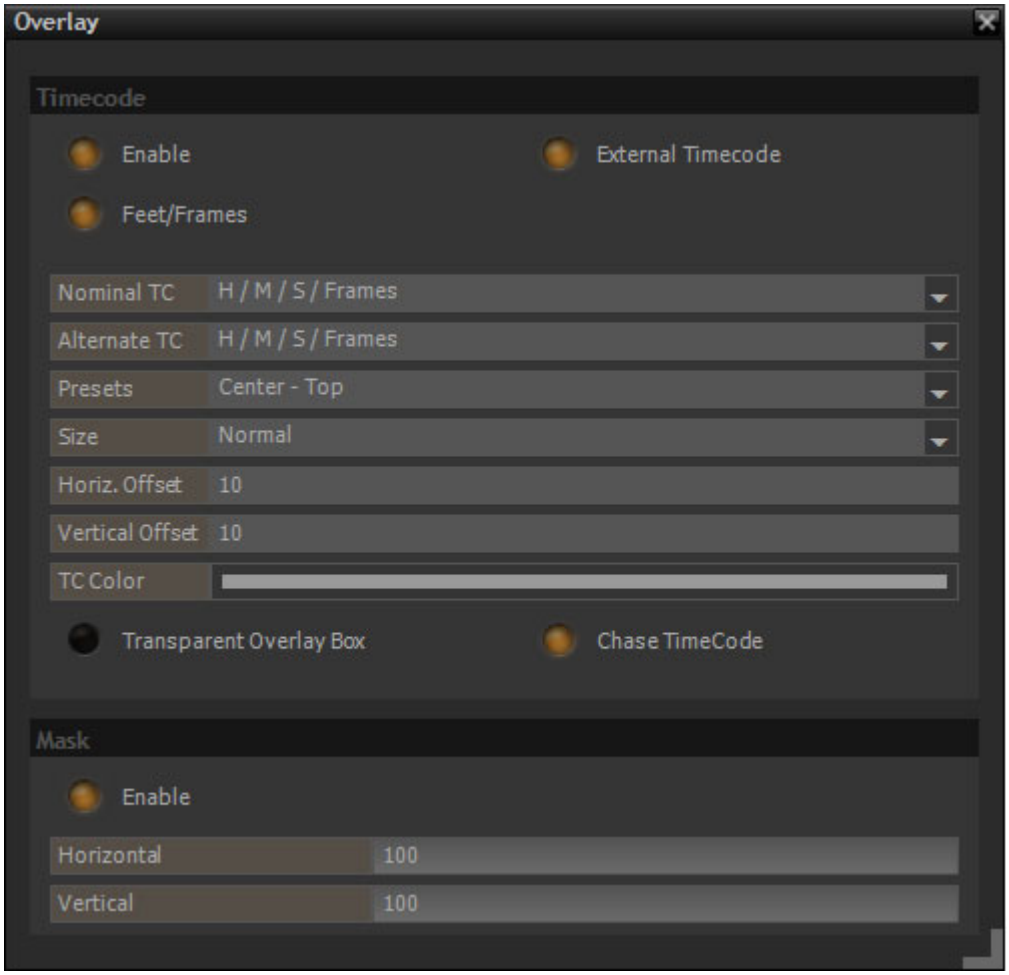
Video I/O Tab page

The plug-in corresponding to the video card installed must be chosen from the drop-down menu. Depending on the optional hardware (if any) inside the VCube workstation any of a variety of Plug-ins will be shown here.

Once the plug-in has been selected it must be enabled in order to make it available for the VCube software.

Please see: AJA Video Cards and Plugins on page 205 for detailed information about the various qualified Video Cards and plugins.

Overlay



Overlay Tab page

Timecode

Enable When checked a TimeCode counter is inserted into the overlay and Video output.

External Timecode When checked the TimeCode Counter displays the incoming TimeCode. This feature is useful with a 24fps Composition synchronized to an external 25 fps TimeCode. A . dot precedes the TC counter when the source is external. [Alt + B]

Feet / Frames When checked the counter displays film Feet and Frames instead of TimeCode. Please see: Film Footage Ruler on page 22 for details and settings.

Nominal TC Shows the current TimeCode display format allows when running at Nominal Play speed. Click in the field to drop down the list of options :

- **H / M / S** **Hours / Minutes / Seconds**
- **H / M / S / Frames** **Hours / Minutes / Seconds / Frames**
- **H / M / S / Samples** **Hours / Minutes / Seconds / Samples**
- **H / M / S / Frames / Hundredths of a frame** **Hours / Minutes / Seconds / Frames / Hundredths of a Frame**
- **H / M / S / Thousandths of a Second** **Hours / Minutes / Seconds / Frames / Thousandths of a Frame**

Alternate TC Format Shows the current TimeCode display format when not running at Nominal Play speed: Click in the field to drop down the list of options. (As for Nominal TC)

Presets Shows the current TimeCode counter position on screen. Click in the field to drop-down the list of alternatives:

Left - Top

Center - Top

Right - Top
Left - Center
Center - Center
Right - Center
Left - Bottom
Center - Bottom
Right Bottom

X Offset Shows current horizontal TC Counter position offset value in pixels. Click to type an alternative value.

Y Offset Shows current horizontal TC Counter position offset value in pixels. Click to type an alternative value.

TC Color Field shows the current TimeCode Counter color. Click in the color window to open the Color Picker. Please see: Color Picker on page 17

Mask

The **Mask** function hides symmetrical areas of the screen Left and Right (**Horizontal**) and Top and Bottom (**Vertical**).

Enable When checked Mask is active.

Horizontal Field shows current Horizontal Mask setting. Click and drag the slider to alter the setting. Results are shown instantly in the Preview area.

Vertical Field shows current Vertical Mask setting. Click and drag the slider to alter the setting. Results are shown instantly in the Preview area.

Preview

Preview shows settings that affect the way the Composition is displayed.

Preview Tab page

Engine

Deinterleave When checked, interleaved Fields will be integrated into single Progressive Frames. Use this option if the source is interlaced and Output is Progressive.

Note: Automatic video resize may produce wave-like artefacts when an interlaced Media File has to be stretched to match the output format.

One Field When Stopped When checked the graphics card is able to output a stable picture on its video output when in Stop.

Shift Fields When checked Field Order is reversed. Thus the Preview and video graphic card output have the converse Field Order to the Composition.

Page Flipping When checked can cancel split artefacts in slow progressive mode. Depending on the model of graphic card, this function may or may not need to be enabled to allow correct refresh of the Preview area. If split artefacts are evident try the opposite setting.

Size

Width Information only - Set in User Interface E.g. by Click and dragging Splitters.

Height Information only - Set in User Interface E.g. by Click and dragging Splitters.

Show Video Frame When checked a white hairline frame is shown around the edges of the selected scan format.

Show Safe Area When checked the standard cut off on a consumer display is shown as the outer dashed box. The inner dashed box shows the Graphics safe area.

Floating Preview Size

The button checked determines the size of the Preview Window when in Floating Mode. ([**F4**] toggles.)

Double Size

Normal Size

Half Size

Quarter Size

Color

Color settings are only applied to the graphic card).They don't affect the AJA cards video output.

Default values are set by Double-clicking on the corresponding slider.

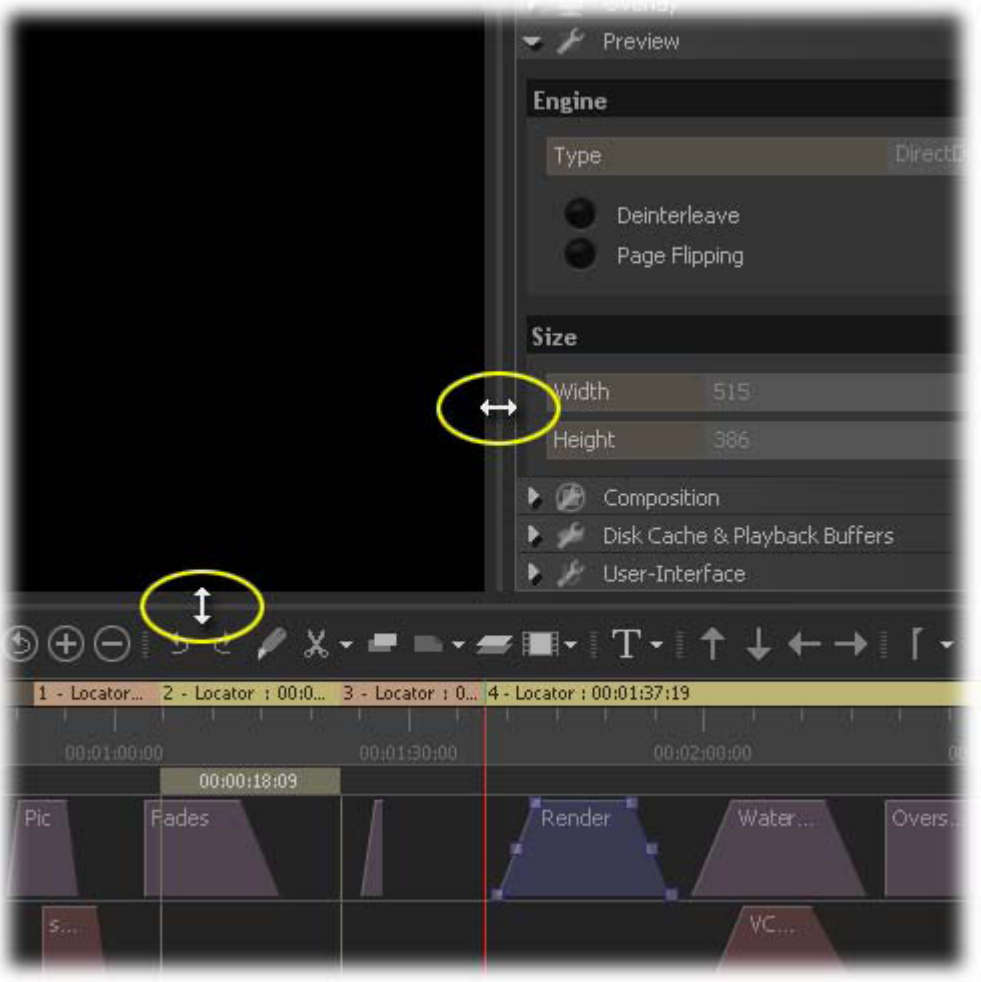
Brightness (IRE) Shows current Brightness Value

Contrast (IRE) Shows current Contrast value

Hue (°) Shows current Hue value in degrees Kelvin

Gamma Shows current Gamma value.

Note: Preview size can also be changed by clicking and dragging the splitter under the preview pane and at the splitter between the Preview pane and the Settings pane (when visible).

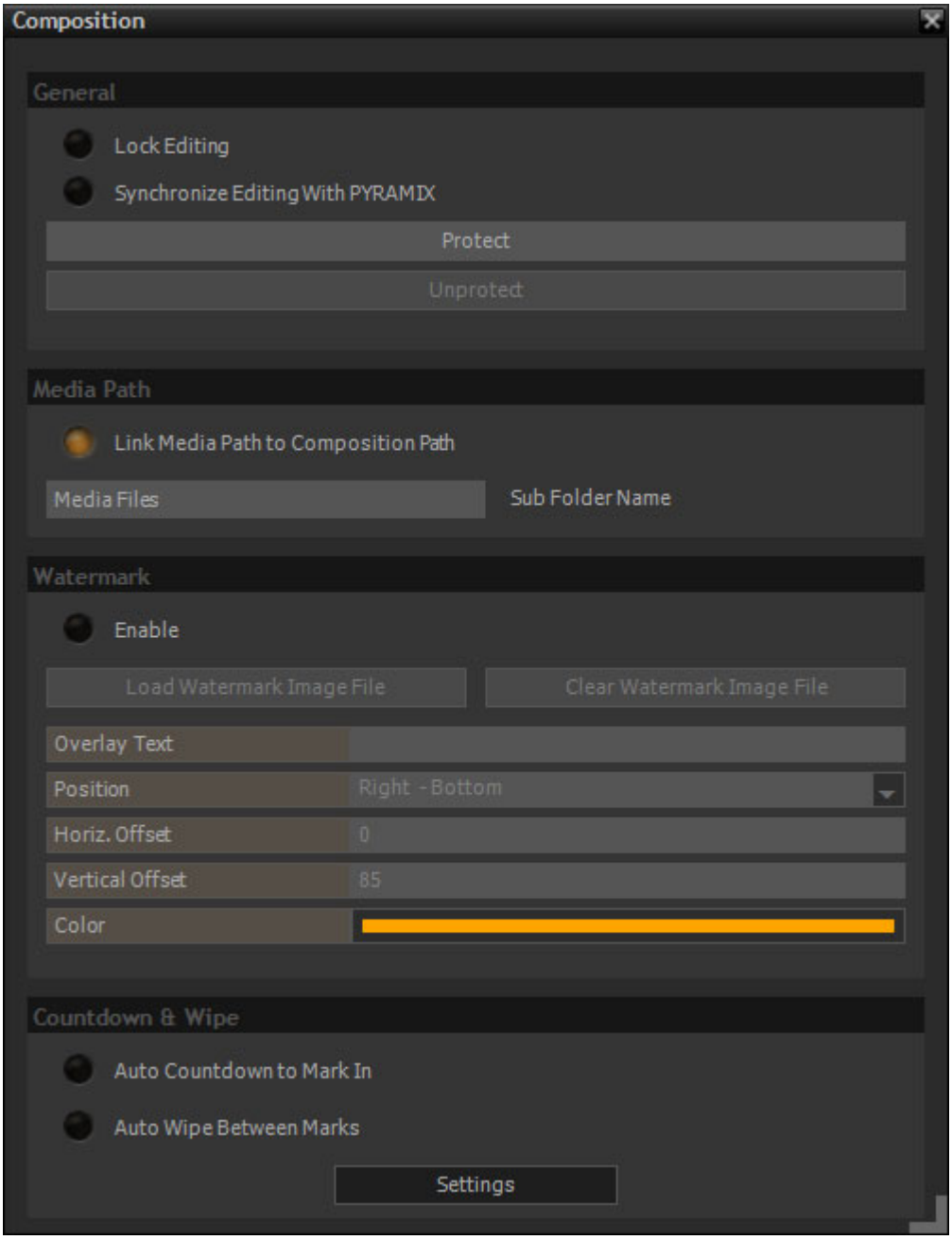


Preview Size Adjust

Double-clicking when the Cursor is in double-headed arrow mode resets the positions to the default value corresponding to the current format.

Composition

The **Composition** Tab includes information about Synchronization, Formats and Overlays used in the current Project.



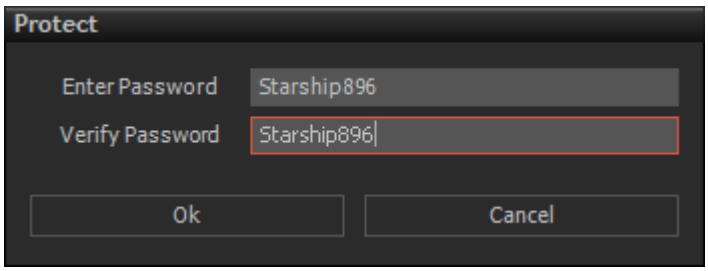
Composition Tab page

General

Lock Editing Prevents unwanted modifications to the Composition. This includes each and every setting except the locators. The Lock/unlock Editing button itself is locked when the Composition is Protected.
Locators remain editable when the Composition is Locked .
Use Save As to preserve Locators.

Synchronize Editing With PYRAMIX When checked edits are synchronized between the two applications.

Protect Clicking on the **Protect** button opens the **Protect** dialog :



Protect Lock dialog

Type in a **Password** in the **Enter Password** and the identical one in the **Verify Password** fields
Click on **OK** to Protect the Composition or **Cancel** to exit.

Unprotect Clicking on the **Unprotect** opens the **Unprotect** dialog :

Protect Unlock dialog

Enter the correct **Password** in the **Enter Password** field and Click on **OK** to Unprotect or **Cancel** to exit the dialog.

WARNING: There is no way to unprotect a Composition if the password is lost. The XML file is encrypted.

Contact us for Composition salvage:

http://www.merging.com

Media Path

Link Media Path to Composition Path When checked a Media Files folder is created in the Folder selected when Saving or Saving As the current composition. This Media Files folder is selected by default as the destination folder for recording.

Sub Folder Name Click in the field to enter an alternative name instead of Media Files

Watermark

Enable When Enable is checked a user selected Watermark image will be added, in real-time, to every video output. Both Text and still image are possible.

Load Watermark Image File Opens a Windows File Browser to locate and open the desired image file.
Image transparency, size and position must be set in the image file in a suitable Image Editor, matching the current video format.

Clear Watermark Image File Unloads the current Watermark Image file

Overlay Text Type any text required in the field

Position The drop-down list offers a wide range of positions on screen for the text.

Horiz. Offset Offsets the text by the number of pixels typed in the box to the right or left depending on the anchor position chosen above. When **Center - xx** is chosen no offset is possible**.**

Vertical Offset Offsets the text by the number of pixels typed in the box downwards or upwards depending on the anchor position chosen above. When **xxx - Center** is chosen no offset is possible.

Color The field shows the color selected currently. Click in the field to pop-up a color picker. **Please see: Color Picker on page 17**

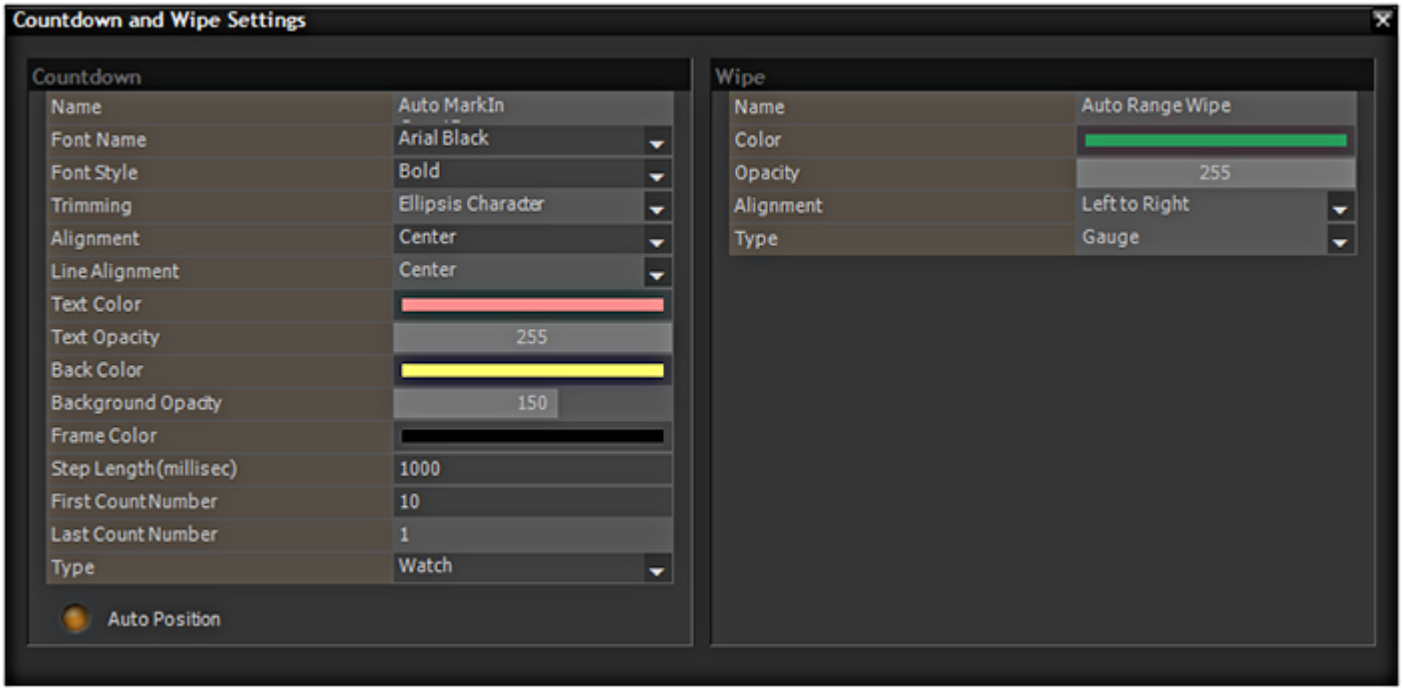
Countdown & Wipe

Auto Countdown to Mark In When active the countdown clock with be shown before the In marker of a range. This feature uses hidden Clips not visible in the Timeline.

Auto Wipe Between Marks When active a wipe will be superimposed on the picture range between the In and Out markers. This feature uses hidden Clips not visible in the Timeline.

Settings

Click on the **Settings** button to open the **Countdown and Wipes Settings** dialog :



Countdown and Wipe Settings dialog

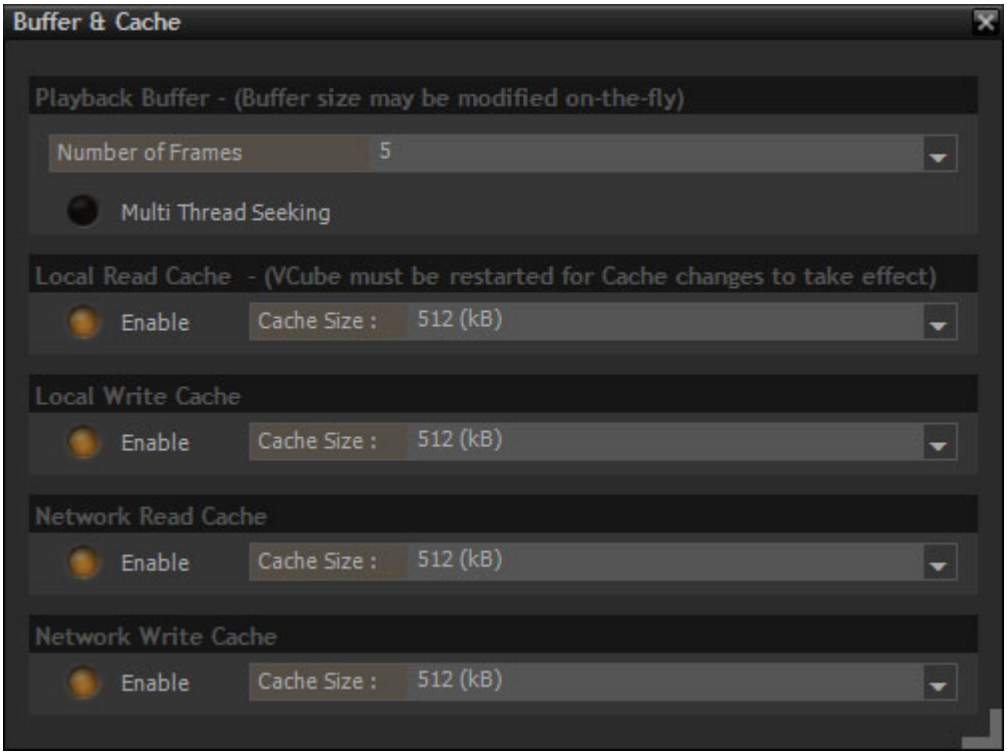
Double-clicking on the **Countdown** or **Wipe** title bars will break the panes away into free floating Tabs**.** Double-clicking the title bar once again re-docks.

Note: When you have finished making changes to **Countdown and Wipes** settings Click on the **X** close box at top-right to accept the changes and close the dialog.

Note: Please see also: Countdown Clip on page 78 and **Wipe Clip on page 80**

Buffer & Cache

The **Buffer & Cache** manages the buffers which affect VCube performance:



Buffer & Cache Settings

Playback Buffer

Number of Frames — The drop-down list offers a choice of values between **3** and **20** frames for fine-tuning Playback performance to the specific configuration. The lower the number, the greater the demand will be on hard-disk or network streaming performance. A setting of **5** is good starting point.

Multi Thread Seeking — When checked enables VCube to run several simultaneous threads in order to reduce overall disk access time.

Local Read Cache

Enable & Cache Size drop-down

Local Write Cache

Enable & Cache Size drop-down

Network Read Cache

Enable & Cache Size drop-down

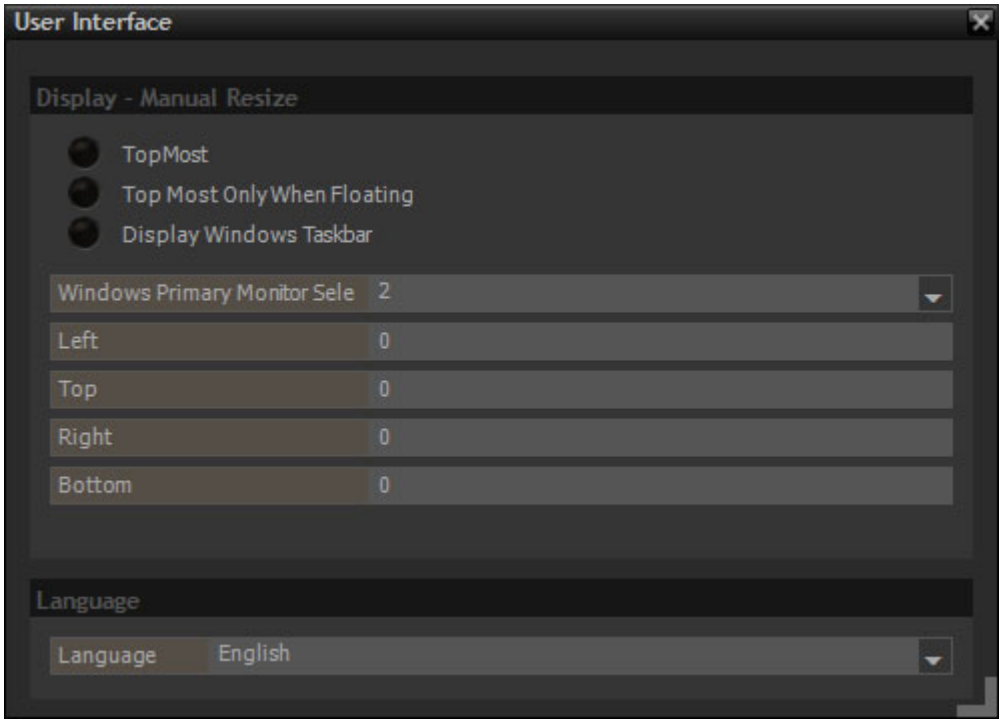
Network Write Cache

Enable & Cache Size drop-down

Note: Caches are enabled by default. The application must be restarted to Change Cache values or to Enable/Disable Caches. Values determine the amount of memory, in bytes, allocated to Cache Memory. The lower the number, the more CPU horsepower is consumed. The effectiveness of these settings can be monitored using the dedicated **Output View** [**Ctrl + F9**] and [**Ctrl + F 10**].

User Interface

The **User Interface** Tab brings together a number of display options.



User Interface Tab page

Display - Manual Resize

Topmost — When checked the VCube window is always on the top of all open windows on screen.

Topmost Only When Floating — When checked the VCube window will only be on top of all other windows when it is in floating mode. ([F4] toggles Floating mode.)

Display Windows Taskbar — When checked the Windows Taskbar is visible at all times in a single monitor configuration. The Taskbar, Status Bar or System Tray remains on the main monitor (number one) in a double monitor configuration.

Windows Primary Monitor Select — The drop-down list shows all available monitors. Simply choose the Screen you wish the VCube user interface to use.

Left — Entering a positive value reduces the width of the VCube display on the left-hand side by the number of pixels entered.

Top — Entering a positive value reduces the height of the VCube display at the top by the number of pixels entered.

Right — Entering a positive value reduces the width of the VCube display on the right-hand side by the number of pixels entered.

Bottom — Entering a positive value reduces the height of the VCube display at the top by the number of pixels entered.

Note: The VCube Window size reduction feature above can be useful with certain models of video projector.

Language

Language — The drop-down list offers the following languages for the VCube User Interface

Chinese - Simplified
Chinese - Traditional
English
Français

Deutsch
Japanese
Russian

Encryption

Locking, Encryption and Decryption of Media Files can be performed in real time by VCube. This process is based on MTAK technology. (Merging Technologies Active Key).

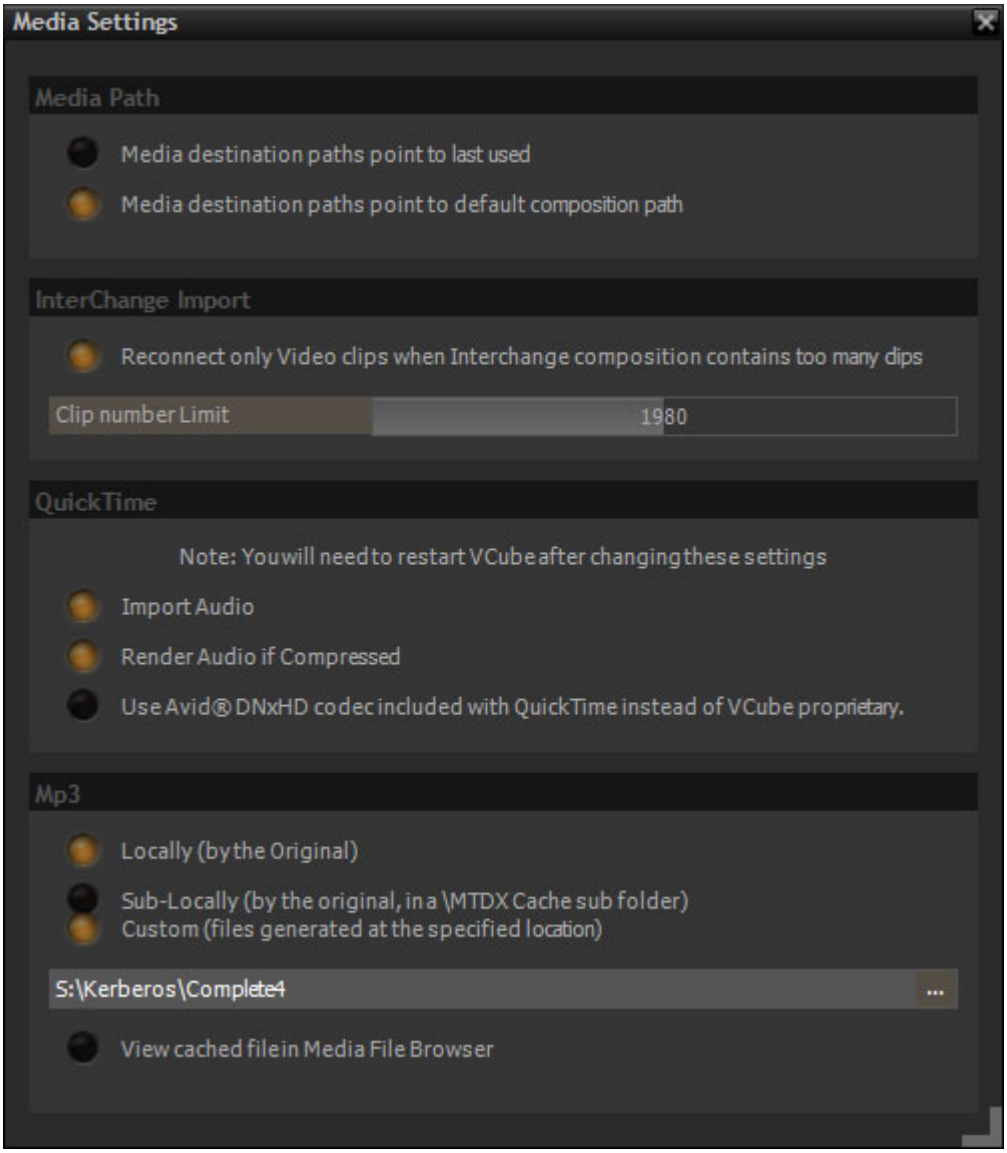
Active Key does two things:

1. Protects non-encrypted Media Files from un-authorized use. This enables Media Files created by VCube or Pyramix to be locked out from Playback or Processing in a VCube or Pyramix Timeline by using a metadata flag in the files themselves. This first level of security prevents media files from Playout but the actual data streams in the files are not encrypted so they remain CPU efficient since they do not require real-time encoding or decoding when they are created or played back.
2. Protects and encrypts media at the time of creation making un-authorized use of these files virtually impossible. 128bit data encryption of the actual media files themselves is applied in real time as well as a metadata flag indicating to VCube and Pyramix that the files in question are protected from playback via Active Key and must be authorized before they may be decoded in real-time for playback or further processing.

Note: If you are interested in this optional feature please contact your Merging Technologies Sales Partner for further detailed information.

Media Settings

The Media Settings Tab manages Media Paths, InterChange Import options for AAF etc and the manner in which QuickTime and Mp3 files are handled by VCube.



Media Settings Tab page

Media Path

Media destination paths point to last used

Media destination paths point to default composition path

InterChange Import

Reconnect only Video clips when Interchange composition contains too many clips When checked only Video Clips are imported if the source composition/project contains more than the number of clips specified in the field below:

Clip number Limit Type in the field to set the maximum number of Audio clips to be imported.

Note: To force video only import check the option and set the maximum number value to **0**

Note: In the case of AAF linking to MXF media the maximum number of files which can be relinked is currently 2000.

QuickTime

Note: You will need to restart VCube after changing these settings

Import Audio When checked, embedded audio (if it exists) will be imported.

Render Audio if Compressed

Use Avid DNxHD codec included with QuickTime instead of VCube proprietary. When checked, supports 10 bit DNxHD files.

Mp3

Locally (by the Original) When checked new uncompressed Audio Files will be created in the same folder as the originals.

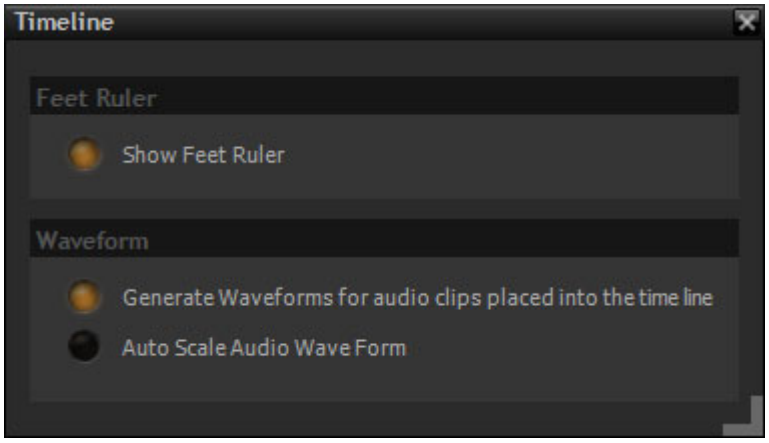
Sub-locally (by the Original in a \MTDX Cache sub folder When checked new uncompressed Audio Files will be created in an \MTDX Cache sub folder in the same folder as the originals.

Custom (files generated at the specified location When checked new uncompressed Audio Files will be created in the location specified by the user in the field below. Clicking on the ... button opens a browser to navigate to the required location.

View cached file in Media File Browser When checked, the cached file will be visible in the Media File Browser Tab.

Timeline

This Tab allows determines whether the Film Feet Ruler will be displayed in the Timeline and if Waveforms are generated and whether they are automatically scaled.



Timeline Tab page

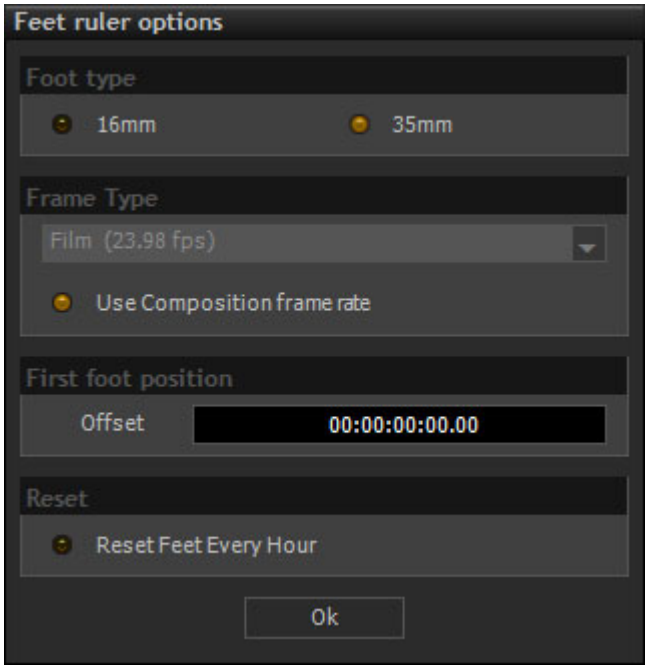
Show Feet Ruler When checked, a Film Feet ruler is displayed above the main Timeline Time ruler.

The **Feet Ruler Options** dialog can be accessed via **Settings > Show Feet Ruler Options Dialog** or [**CTRL + F**]

Generate WaveForms for audio clips placed into the timeline Checked by default. If waveforms are not required uncheck.

Auto Scale Audio Wave Form When checked, the Waveform (not the audio) of Audio Clips is normalized.

Feet Ruler Options Dialog



Feet ruler options dialog

Accessed via **Settings > Show Feet Ruler Options Dialog** or [**CTRL + F**]

Foot type

16mm When checked Film Feet are counted in units of 40 Frames

35mm When checked Film Feet are counted in units of 16 Frames

Frame Type

Use Composition frame rate When checked the time-base is the same as the Composition Frame Rate. When unchecked the time-base can be selected from the drop-down list above.

First Foot Position

First foot position The Time field enables an offset to be entered if required. For example when a leader precedes the first frame of action and the first frame of action should show **0000 Feet** For example for a film with a 15 foot leader with the cross at **01:00:00:00** enter an offset of

Reset

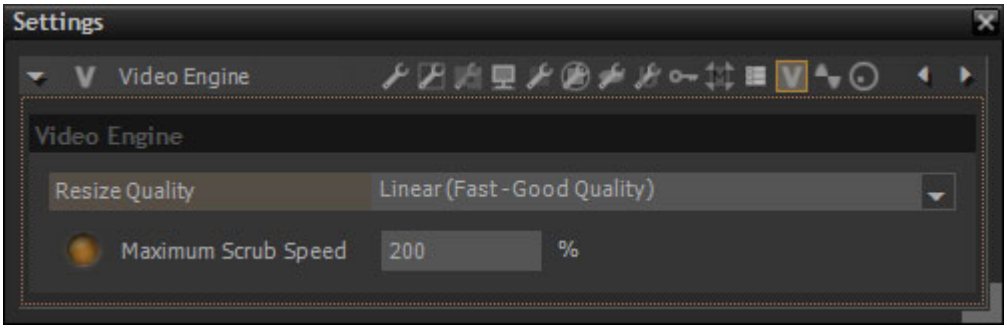
Reset Feet Every Hour When checked the Footage count is zeroed every 60 minutes.

OK

Click on **OK** to accept any changes and exit the dialog

Video Engine

The VCube Video Engine Tab enables tuning to suit the circumstances



Video Engine Tab page

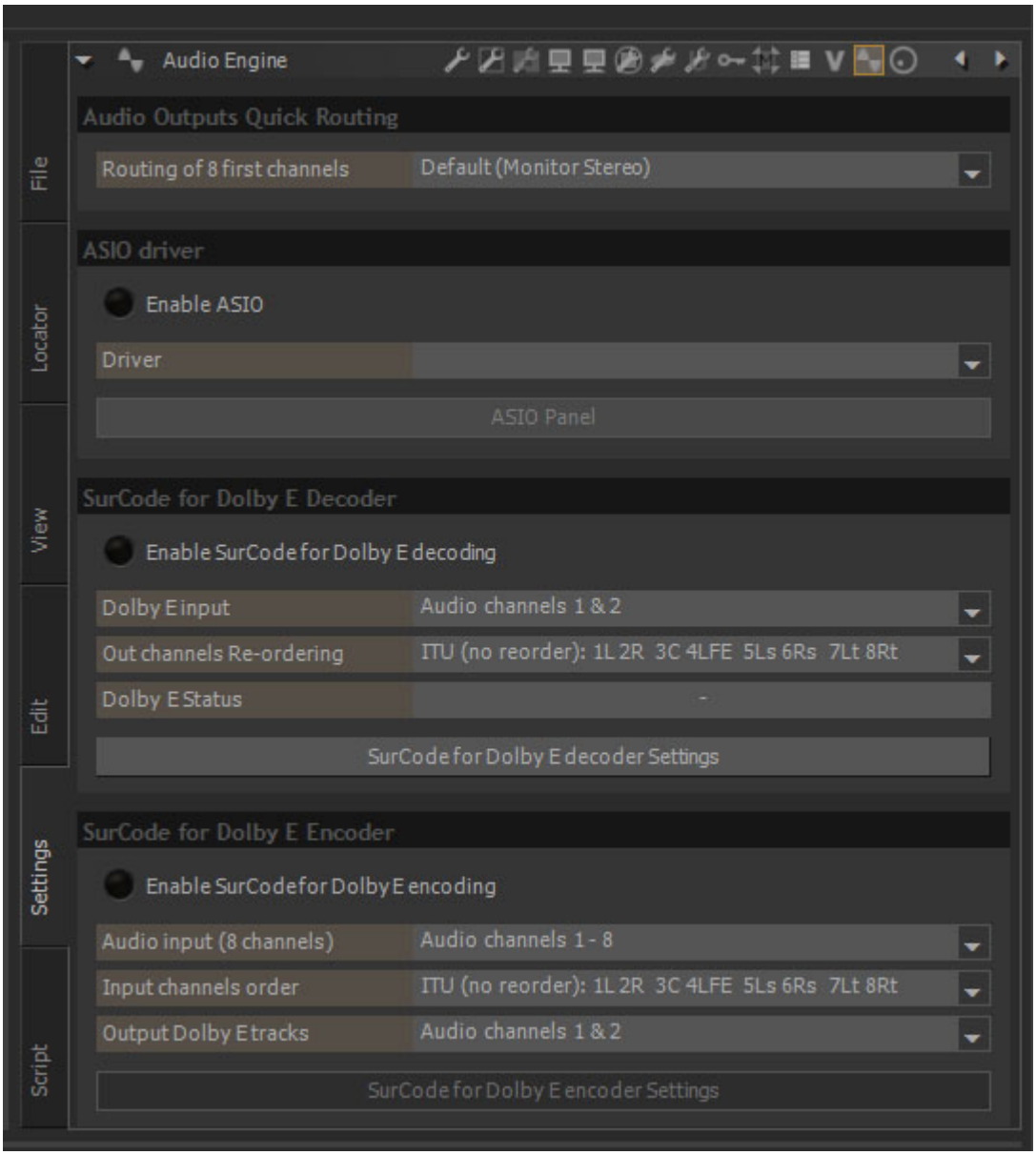
When a interlaced video format must be resized, VCube offers different algorithms to process the picture depending on the CPU capabilities or the visual quality requirements.

Resize Quality The field displays the option selected currently. The drop-down list offers the choice of:

Nearest neighbour	**Fastest but poor quality**
Linear (Bi Linear)	**Fast and poor quality**
Cubic	**Slow but very good quality**
Lanczos	**Very Slow but excellent quality**
Supersampling	**Slow but very good for large downscaling**

Audio Engine

The VCube Audio Engine Tab Sets **Audio Outputs Quick Routing**, enables the **ASIO** driver (where applicable) and gives access to the ASIO Control Panel for the driver selected. Audio Engine Settings is also where settings for the optional **SurCode for Dolby E decoding** and **SurCode for Dolby E encoding** are made.



Audio Engine Tab page

Audio Outputs Quick Routing

Routing of 8 first channels Applies to the first 8 Layers (Channels) in an Audio Track. Default is (Monitor Stereo) Select from the drop-down list to route to Mykerinos or AJA outputs etc. where these are installed.

ASIO Driver

Enable ASIO When a properly installed driver is selected Enables the driver when checked.

Driver Select the appropriate ASIO Drive from the drop-down list.

ASIO Panel Click on the button to access the ASIO Control Panel for the Driver Selected.

Dolby E Decoder

Enable SurCode for Dolby E decoding When the correct SurCode for Dolby E authorizations are present on a Minnetonka iLock (or the correct Merging Technologies Keys are present) click on this button to enable SurCode for Dolby E decoding.

Note: The SurCode for Dolby E Decoder is NOT installed with VCube. It comes as a separate installer.

Dolby E Input Select the odd and even pair of Audio channels which contain the Dolby E encoded audio.
(From 1 & 2 to 23 & 24)

Out channels Re-ordering Choose the order in which the decoded channels are to be output. Options are:

ITU (no reorder): 1L 2R 3C 4LFE 5Ls 6rS 7Lt 8Rt

"Pyramix": 1L 3C 2R 5Ls 6Rs 4LFE 7Lt 8Rt

Analog Tape: 1L 5Ls 3C 6Rs 2R 4LFE 7Lt 8Rt

DTS Music 1L 2R 5Ls 6Rs 3C 4LFE 7Lt 8Rt

Stereo first: 7Lt 8Rt 1L 2R 3C 4LFE 5Ls 6Rs

Dolby E Status Shows the Status of the SurCode for Dolby E decoder e.g. Disabled or 2 Programs: 5.1+2 etc.

Note: When 'SurCode for Dolby E decoding' is enabled, all types of audio outputs (analog through an audio board or an SDI connection etc. but also 'logical' outputs such as audio wrap or rendering) use the SurCode for Dolby E decoder output.

Dolby E Encoder

Enable SurCode for Dolby E encoding When the correct SurCode for Dolby E authorizations are present on a Minnetonka iLock (or the correct Merging Technologies Keys are present) click on this button to enable SurCode for Dolby E encoding.

Note: The SurCode for Dolby E encoder is NOT installed with VCube it comes as a separate installer.

Audio input (8 channels) The field shows the input channels to be encoded. The selection can be changed by selecting alternatives from the drop-down list. Options are: 1 - 8, 3 - 10, 5 - 12 and so on up to 23 - 30.

Input channels order ITU (no reorder): 1L 2R 3C 4LFE 5Ls 6rS 7Lt 8Rt

"Pyramix": 1L 3C 2R 5Ls 6Rs 4LFE 7Lt 8Rt

Analog Tape: 1L 5Ls 3C 6Rs 2R 4LFE 7Lt 8Rt

DTS Music 1L 2R 5Ls 6Rs 3C 4LFE 7Lt 8Rt

Stereo first: 7Lt 8Rt 1L 2R 3C 4LFE 5Ls 6Rs

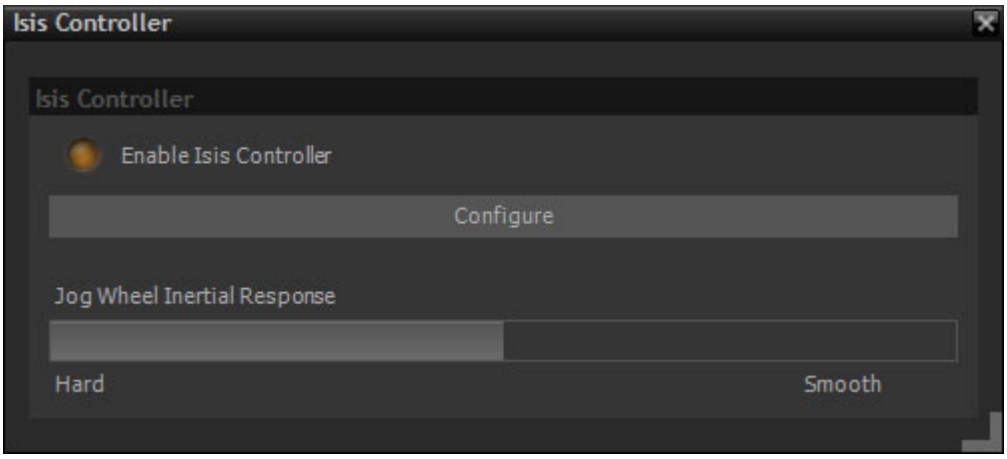
Dolby E tracks The field shows the pair of tracks which will be used for the Dolby E encoded output. The selection can be changed by selecting alternatives from the drop-down list. Options are: 1 & 2, 3 & 4, 5 & 6, and so on up to 23 & 24.

SurCode for Dolby E encoder Settings Clicking in this field opens the SurCode for Dolby E Encoder settings window. For details of specific settings please consult the MinneTonka document available on their website.

Isis Controller

The **ISIS** remote control from Merging Technologies is supported by VCube. VCube SE does not support this feature.

Please refer to the **Isis User Manual** for full operational and Isis specific settings details.



Isis Controller Tab page

Isis Controller

Enable Isis Controller — When checked Isis can control the VCube in addition to the on-screen controls.

Configure — Click on the button to open the Isis Configuration dialog.

Jog Wheel Inertial Response — Click and drag the slider to change the hysteresis of the Isis Jog Wheel between Hard (tight lock) and Smooth (for greater 'flywheel' effect)

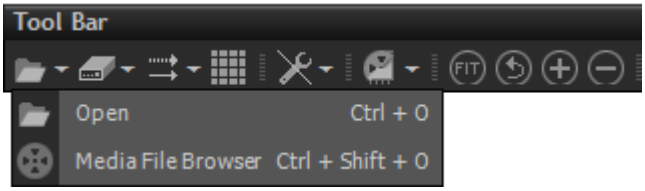
Tool Bar

The Toolbar Contains a range of Icons for performing common tasks. Many Icons also have a 'Tool Picker' down arrow adjacent. Clicking on the down arrow enables the user to choose from a range of grouped tools. When a Tool picker is present the Icon displayed in the Toolbar is the last tool selected.

VCube Toolbar

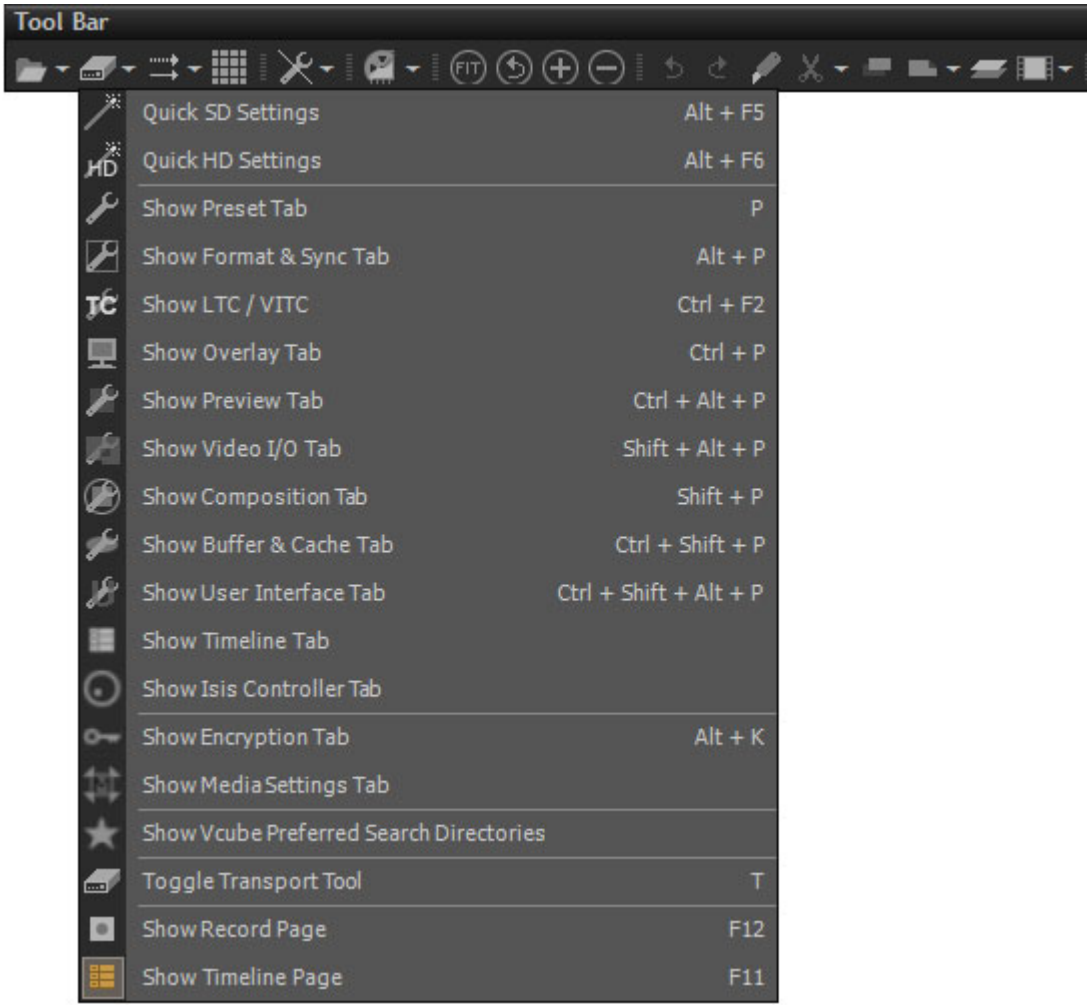
Tools and Toolpickers

File Toolpicker



	Open Composition	[**Ctrl + O**]	Opens the **VCube Compositions** Browser
	Media File Browser	[**Ctrl + Shift + O**]	Opens the **Media File Browser**

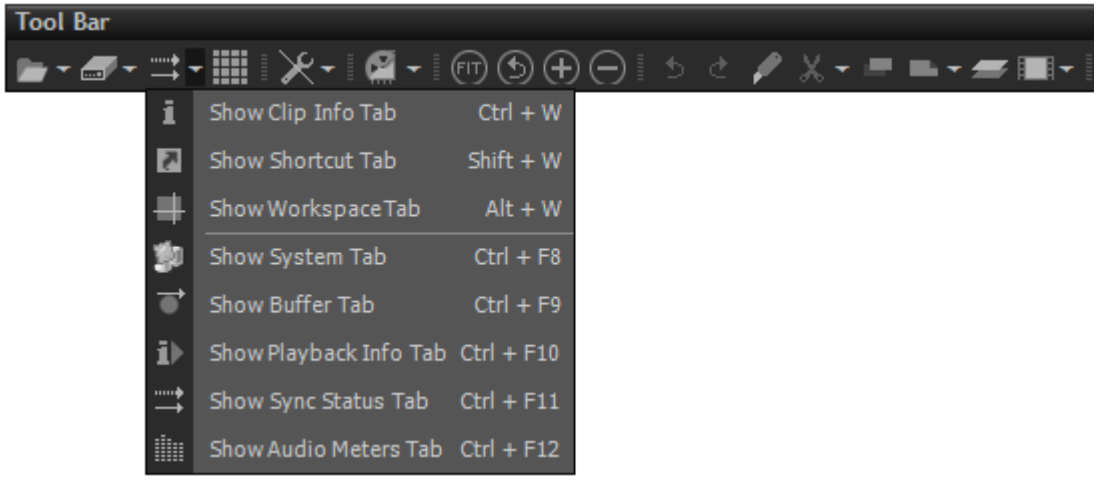
Show Settings Tabs Toolpicker



	Toggle Transport Tool	[**T**]	Opens the **Transport Control Panel**
	Quick SD Settings	[**Alt + F5**]	Opens the **Quick SD Settings** Tab
	Quick HD Settings	[**Alt + F6**]	Opens the **Quick HD Settings** Tab
	Show Preset Tab	[**P**]	Opens the **Preset** Tab
	Show Format & Sync Tab	[**Alt + P**]	Opens the **Formats & Sync** Tab
	Show LTC / VITC	[**Ctrl + F2**]	Opens the **LTC / VITC Settings** Tab
	Show Overlay Tab	[**Ctrl + P**]	Opens the **Overlay** Tab
	Show Preview Tab	[**Ctrl + ALt + P**]	Opens the **Preview** Tab
	Show Video I/O Tab	[**Shift + Alt + P**]	Opens the **Video I/O** Tab
	Show Composition Tab	[**Shift + P**]	Opens the **Composition** Tab
	Show Buffer & Cache Tab	[**Ctrl + Shift +P**]	Opens the **Buffer & Cache** Tab
	Show User Interface Tab	[**Ctrl+Shift+Alt+P**]	Opens the **User Interface** Tab
	Show Timeline Tab		Opens the **Timeline** Tab
	Show Isis Controller Tab		Opens the **Isis Controller** Tab

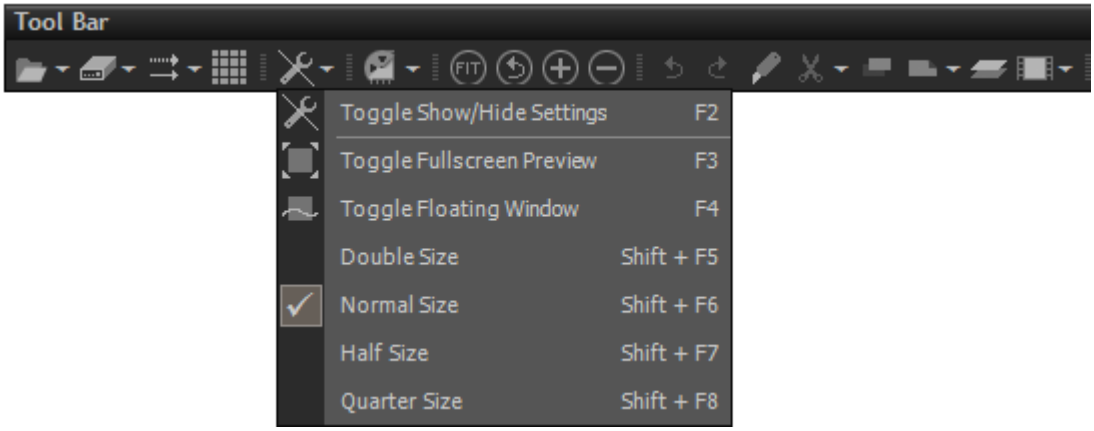
	Show Encryption Tab	[**Alt + K**]	Opens the **Encryption** Tab
	Show Media Settings Tab		Opens the **Media Settings** Tab
	Show VCube Preferred Search Directories		Opens the **VCube Preferred Search Directories** Tab
	Toggle Transport Tool	[**T**]	Toggles the **Transport Control Panel** Open/Close
	Show Record Page	[**F12**]	Shows the **Record Page** in the lower pane
	Show Timeline Page	[**F11**]	Shows the **Timeline** in the lower panel

Show Info Tabs Toolpicker



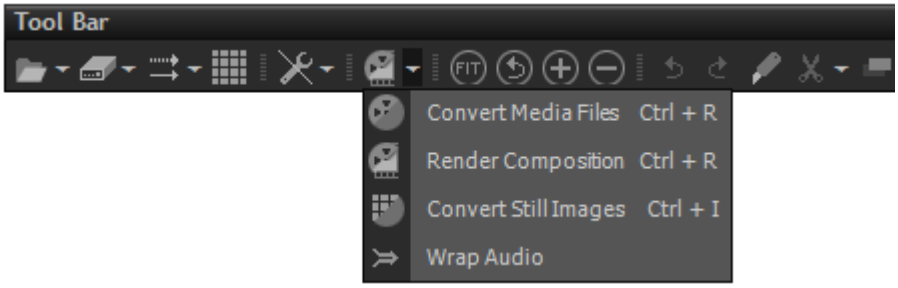
	Show Clip Info Tab	[**Ctrl + W**]	Opens the **Clip Info** Tab
	Show Shortcut Tab	[**Shift + W**]	Opens the Keyboard **Shortcut** Tab
	Show Workspace Tab	[**Alt + W**]	Opens the **Workspace** Tab
	Shoe System Tab	[**Ctrl + F8**]	Opens the **System** Tab
	Show Buffer Tab	[**Ctrl + F9**]	Opens the **Buffer** Tab
	Show Playback Info Tab	[**Ctrl + F10**]	Opens the **Playback Info**Tab
	Show Sync Status Tab	[**Ctrl + F11**]	Opens the **Sync Status** Tab
	Show Audio Meters Tab	[**Ctrl + F12**]	Opens the **Audio Meters** Tab

View Toolpicker



	Toggle Show/Hide Settings [**F2**]		Toggles the Control **Settings** pane **Show/Hide**
	Toggle Fullscreen Preview [**F3**]		Toggles VCube between the User Interface and Full Screen Preview
	Toggle Floating Window [**F4**] ing floating at half size (default)		Toggles VCube between the UI and Preview Float-
	Double Size	[**Shift + F5**]	Doubles the Floating Window size
	Normal Size	[**Shift + F6**]	Default - indicated by **Tick**
	Half Size	[**Shift + F7**]	Halves the Floating Window size
	Quarter Size	[**Shift + F8**]	Quarters the Floating Window size

Convert Toolpicker



	Convert Media Files	[**Ctrl +Y**]	Opens the **Convert Media Files** Tab
	Render Composition	[**Ctrl + R**]	Opens the **Render Composition** Tab
	Convert Still Images	[**Ctrl + I**]	Opens the **Import Image Sequence** Tab
	Wrap Audio		Opens the **Wrap Audio** Tab

Zoom Tools

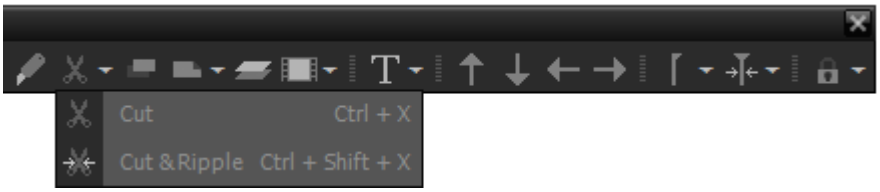
	Fit Selection Zoom fills the full visible width of the Timeline	[**Alt + 1**]	Adjusts the Zoom level so that the current selection
	Zoom Undo	[**Alt + 2**]	Restores Zoom level to previous value

	Zoom In	[**Alt + 3**]	Zooms In to Timeline with each press
	Zoom Out	[**Alt + 4**]	Zooms Out of Timeline with each press

Editing Tools

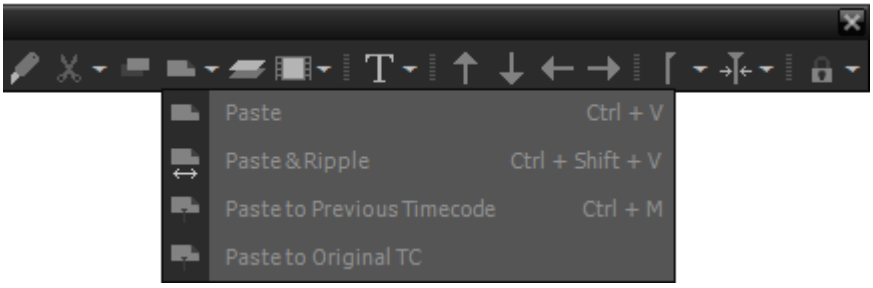
	Undo Edit	[**Ctrl + Z**]	Undo the previous **Edit**
	Redo Edit	[**Ctrl + Shift +Z**]	Redo the last edit undone
	Split Selection	[**Ctrl + T**]	Splits a Selected Clip or Clips at the current Cursor position into separate Clips Left and Right of the Cursor

Edit Cut Toolpicker



	Cut	[**Ctrl + X**]	Deletes the selected Clip(s)
	Cut & Ripple	[**Ctrl + Shift + X**]	Deletes the selected Clip(s) and moves subsequent Clips to the Left (earlier) by the same amount
	Copy	[**Ctrl + C**]	Copies the selected Clip(s) to the Clipboard

Edit Paste Toolpicker

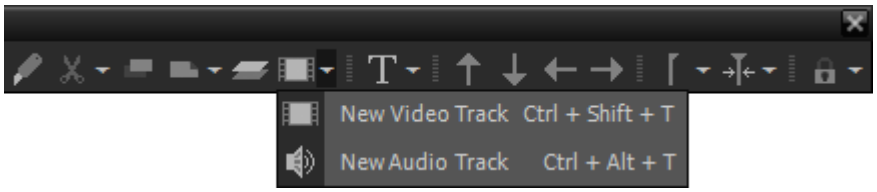


	Paste	[**Ctrl + V**]	Pastes contents of Clipboard to the current Cursor Position starting with the Selected Track
	Paste & Ripple	[**Ctrl + Shift + V**]	Pastes contents of Clipboard at the current Cursor Position starting with the Selected Track moving existing content to the Right (later)
	Paste to Previous Timecode	[**Ctrl + M**]	Pastes contents of the Clipboard back to the position it was in before.
	Paste to Original Timecode		Pastes contents of the Clipboard back to the original position in the Timeline

Timeline Tools

	New Layer	[**Ctrl + Shift + N**]	Creates a New Layer in the Selected Track

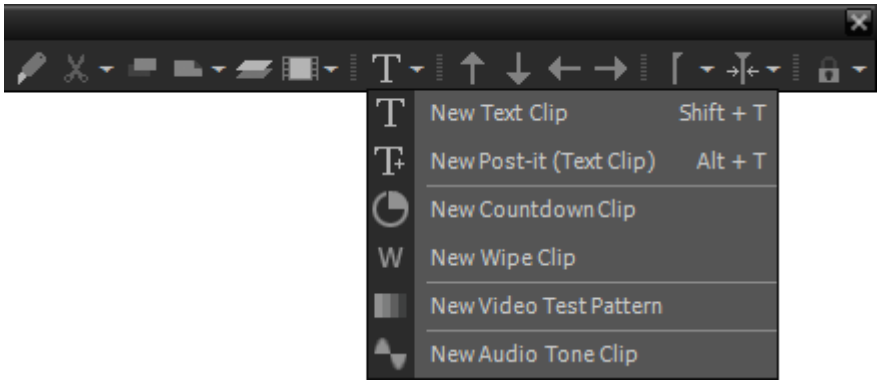
New Track Toolpicker



New Video Track [**Ctrl + Shift + T**] Inserts a **New Video Track**

New Audio Track [**Ctrl + Alt + T**] Inserts a **New Audio Track**

New Clip Toolpicker



New Text Clip [**Shift + T**] Creates a 5 seconds Text holder Clip in the Timeline at the current TimeCode in the selected Track. The Text Properties dialog appears in the **View** Tab.

New Post-it (Text Clip) [**Alt + T**] Creates an overlaid text box of 5 seconds duration from the current Cursor position in the selected Track.

New Countdown Clip Creates a **Countdown Clip** (10 seconds duration) corresponding to the current Composition settings. Default duration is adjustable in the **Clip Info** panel.

New Wipe Clip Creates a Wipe Clip representing a time remaining to the end of the Clip.

New Video Test Pattern Creates a Video Test Pattern Clip in accord with current Composition Settings.

New Audio Tone Clip Creates a new ten second sine wave **Audio Clip**. Frequency and level can be adjusted from the **Clip Info** panel.

Nudge Tools

	**Move Layer Up**	[**Up**]	Move Selected Layer **Up**
		[**Ctrl + Up**]	Move Selection **Up**
		[**Shift+Ctrl+Up**]	nudge track
		[**Down**]	Move Selected Layer **Down**
		[**Ctrl + Down**]	Move Selection **Down**
		[**Shift+Ctrl+Down**]	nudge track
	**Nudge Playhead Left**	[**Left**]	
		[**Ctrl + Left**]	Nudge Selection **Left**
		[**Shift+Ctrl+Left**]	Nudge Overlap **Left**
	**Nudge Playhead Right**	[**Right**]	
		[**Ctrl + Right**]	Nudge Selection **Right**
		[**Shift+Ctrl+Right**]	Nudge Overlap **Right**

Mark and Fade Toolpicker

	**Set Mark In**	[**Num 7**]	Set **Range In** marker
	**Set Mark Out**	[**Num 8**]	Set **Range Out** marker
	**Set New Locator**	[**Num 9**]	Set **New Locator**
	**Set In/Out marks to Selection**	[**Enter**]	Set **In/Out Markers to Selection**
	**Range to Region**	[**Ctrl + Enter**]	
	**Trim Selection In to Cursor**		
	**Trim Selection Out to Cursor**		
	**Fade In Selection to Cursor**		
	**Fade Out Selection from Cursor**		

Locate Toolpicker

	**Goto Composition Start**	[**Ctrl + Num 0**]
	**Goto Composition End**	[**Alt + Num 0**]
	**Goto In**	[**Num4**]
	**Goto Out**	[**Num 5**]
	**Locator Goto Tool**	[**Num 6**]
	**Goto Next Edit**	[**Tab**]

Goto Previous Edit	[**Shift + Tab**]	

Lock and Group Toolpicker

Lock Selection	[**Ctrl + K**]	Locks Selected Clip(s)
Unlock Selection	[**Ctrl+Shift+K**]	Unlocks Selected Clip(s)
Group Selection	[**Ctrl + G**]	Groups Selected Clips
Ungroup Selection	[**Ctrl + U**]	Ungroup Selected Clips
Ungroup All	[**Ctrl+Alt+U**]	Ungroup all Groups in Composition

Non Compensated Telecine at 24 fps

A non-compensated telecine can be used with VCube. A film frame corresponds to a video frame, VCube can playback a 25 fps video capture at 24 fps in order to respect the real duration of the film and to avoid typical pitch/time audio processing.

After a regular PAL capture, the Composition must be set to 24 fps. The fps information embedded in the Media File cannot be changed from 24 fps to 25 fps to give correct playback. However it is possible to change the playback speed of the Clip in the VCube Timeline:

To change the Composition frame rate:

Settings > Format & Sync : Composition Video Format : Composition Frame Rate

To change the Clip Playback Speed: Double-click on the corresponding Clip in the Timeline to display **Clip Info**

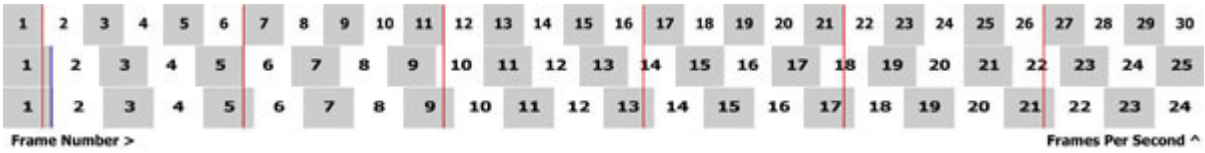
Clips : Speed, set to **24->25** (96%).

Note: 1. VCube can still be synchronized to a 25 fps house clock.

Note: 2. Both external (25fps) or internal (24fps) TimeCodes can be displayed.

24fps Composition Chasing other Timecodes

VCube is able to play a 24 frames per second Composition, chasing a 25, 29.97 or 30 frames per second TimeCode. VCube doesn't interpolate frames. It only uses its own ultra precise internal clock to manage the Composition playback. The external reference TimeCode is only used to synchronize the internal clock.



When the reference TimeCode is different from the Composition TimeCode, it produces artefacts when seeking a particular frame in the Composition. In the above example, red lines indicate that two different 30 fps TimeCode positions can recall the same frame in a 24 fps Composition. The blue line does the same for a 25 fps reference TimeCode.

Note: In nominal playback, such artefacts will only appear if Clips with mismatched frame rates are included in the Composition. The Playback speed can be edited in Clips Info, enabling correct playback. This feature is very useful at 25 fps for uncompensated telecine (frame per frame capture on a PAL video).

Using the Graphic Card S-Video Output

The baseline VCube does not include a dedicated video card. However it is possible to use the S-Video output of a graphic card to feed a video monitor.

Open the **Graphic Card Control Panel** from the Windows desktop.

In **Display Properties** see the **Settings** page. Only screen one should be used. Now click on **Advanced**. In the **Monitor** Tab, uncheck **Hide modes that this monitor cannot display**. In the **Displays** Tab enable **Monitor (computer)** as **Main** and **TV (S-Video output)** as **Clone**. Then go to **Overlay** and set **Theater mode** as follows: **Overlay Theater Mode on**, **Full screen**

Video and **4:3** or **16:9** depending on your video monitor.

Now the S-Video output will only display the VCube overlay content without any graphic user interface.

Note:

1. This feature can also be used to generate a regular SD PAL or NTSC video output from an HD 24p Composition.
2. The minimum display requirement for the VCube user interface is 1024 x 768 pixels. The 720 x 576 or 720 x 480 pixels displayed by a video monitor is insufficient for both monitoring and software control.
3. The quality of this S-Video output cannot be compared to that of a dedicated video card unless you have the **Matrox Parhelia** equipped VCube.

Note: For Canopus video card users:
The two S-Video/Composite adapters (small cables featuring an RCA plug and a mini Din plug) cannot be used to convert the graphic card S Video output to Composite because of a special pin out. The third adapter that doesn't have a cable must be used to perform this conversion.

Remote Control

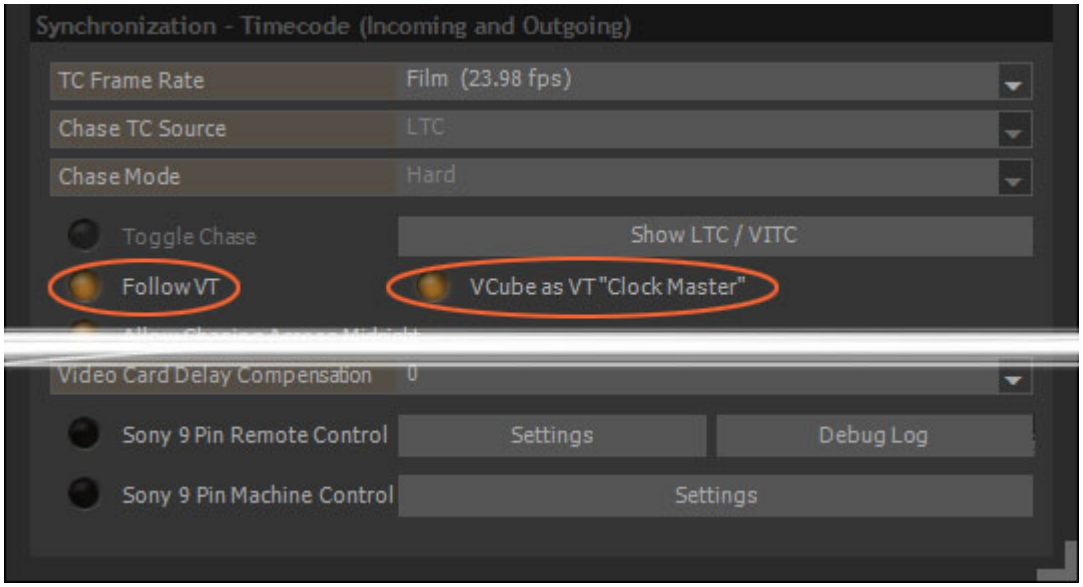
VCube is extremely versatile in its remote control options.

Apart from the obvious synergy with Pyramix via Virtual Transport, VCube can chase TimeCode, be controlled by a Sony 9-pin (P2 protocol) master and accepts MIDI Machine Control commands via Virtual Transport.

VCube Chasing Pyramix Via Virtual Transport in the Same PC (PyraCube)

VCube can be remote controlled by and chase Pyramix when both applications are installed in the same PC.

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:



Formats & Sync tab page - Synchronization section

Toggle Chase	**Unchecked**
Follow VT	**Checked**
VCube as VT "Clock Master"	**Checked**

2. In this configuration Video and Audio References are optional.

VCube Chasing Pyramix Using Virtual Transport Via Network

VCube can be remote controlled by and chase Pyramix across a network via Virtual Transport.

When **Synchronize Editing with Pyramix** is active in the **Composition** Tab every Video Clip handle move in Pyramix will be visible in the VCube outputs. The frame displayed while moving handles is at the TC position of the handle moved in Pyramix. Network must be enabled in Virtual-Transport.

[**Alt + V**] opens the Virtual Transport Server User Interface. Click on the red **Net** button to open the Network Frame:

Virtual Transport Network Frame

DARKMATERIALS is the Pyramix workstation.

ROHMER is the VCube workstation.

1. Click on the **Enable Network** check box to enable the Network.

   Note: This must be done on both machines.

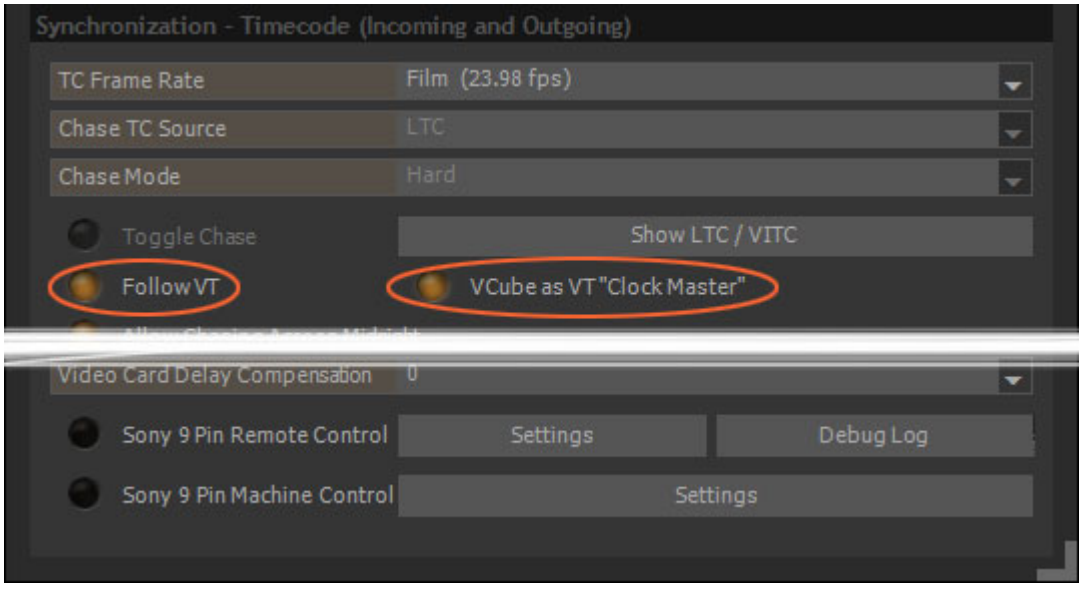
2. Drag the workstations from the right-hand column to the left-hand column.

Virtual Transport Network Frame

Notice that the first workstation dragged across is set as **TC Master** automatically. This can be changed later if required.

Virtual Transport Network Frame

3. Open the **Format & Sync** Tab on the **VCube** workstation :



Formats & Sync Tab - Synchronization section

Follow VT Checked

VCube as VT "Clock Master" Checked

4. Open **Settings > All Settings : Remote Control > Virtual Transport**

5. In the **General** section:

Enable Virtual Transport Communication Checked

Automatically Set as Clock Master Checked

Automatically Set as TimeCode master Checked

6. In the **Chasing Section**

Force TimeCode Source to External / Virtual Transport Checked

7. In the Editing section

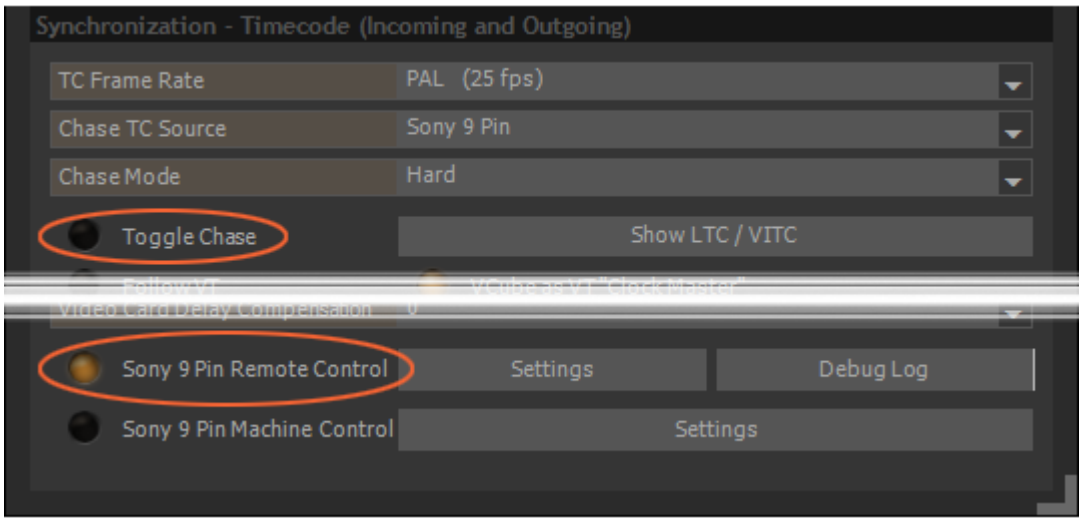
Synchronize Virtual Transport with Editing Moves

Note: For fuller information on using VCube, Pyramix and Virtual Transport together please refer to the Pyramix User Manual and the Virtual Transport User Manual.

Remote Control VCube with a Sony 9-pin Controller

VCube can be remote controlled by a Sony 9-pin compatible device.

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:

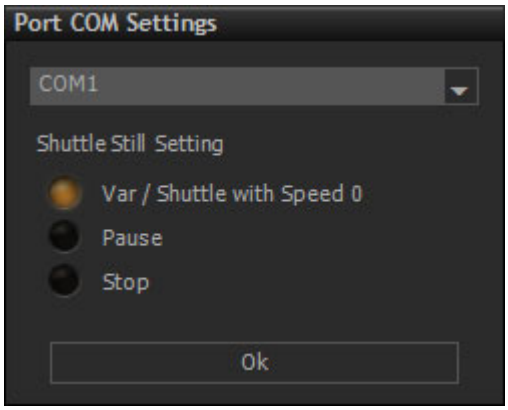


Formats & Sync Tab - Synchronization section

Toggle Chase **Unchecked**

Sony 9 Pin Remote Control **Checked**

2. The RS-422 configuration switch must be set to **From Controller** if you use the RS-422 port. This port is named **COM3** in the Settings dialog. This port is named **COM2** in the Settings dialog for early VCubes using an ASUS motherboard. The RS-232 port is named **COM1**.



Port COM Settings

COM1 Current **COM** Port. Click to drop-down a list of available COM Ports.

Var / Shuttle with Speed 0 When checked VCube issues a **Var / Shuttle 0 Speed** command when stopped.

Pause When checked VCube issues a **Pause** command when stopped. Audio data is retained in buffers.

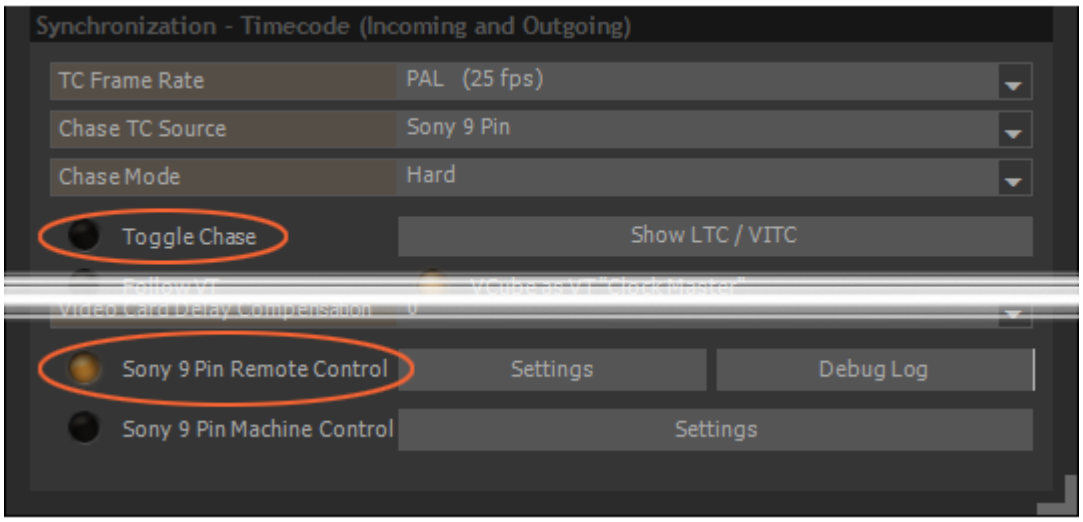
Stop When checked VCube issues a **Stop** command when stopped. Audio data is flushed from buffers.

3. In this configuration Video and Audio References are optional.

Synchronizing VCube to a Sony 9-pin Chase Synchronizer

VCube can chase a Sony 9-pin Chase Synchronizer.

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:



Formats & Sync Tab - Synchronization section

Toggle Chase **Unchecked**

Sony 9 Pin Remote Control **Checked**

2. The RS-422 configuration switch must be set to **From Controller** if you use the RS-422 port. This port is named **COM3** in the Settings dialog. This port is named **COM2** in the Settings dialog for early VCubes using an ASUS motherboard. The RS-232 port is named **COM1**.
3. In this configuration both Audio and Video references must be used. Audio should ideally be referenced to the same source of Video syncs as the Video.

Sony P2 Protocol over IP

Pyramix and VCube can now be synchronized over an ethernet LAN.

VCube does not require any configuration. No special Settings are needed (e.g. no Port Name field)

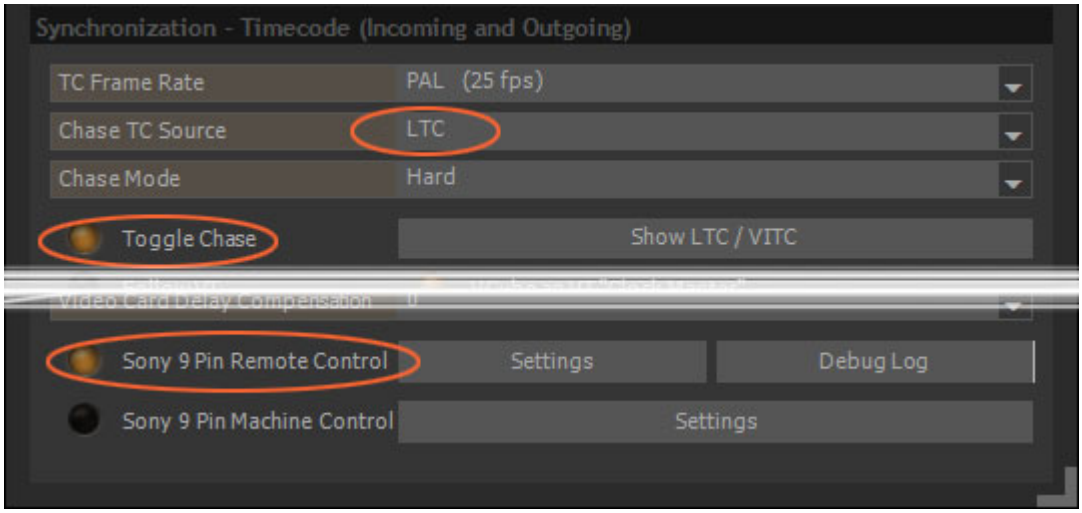
Just turn on **Sony 9 Pin Remote Control**. It only works with VCube as the “machine”

Please see the Pyramix User Manual for all relevant details

VCube Controlled by Sony 9-pin, Chasing an LTC Source

VCube can be controlled by Sony 9-pin while chasing an LTC source.

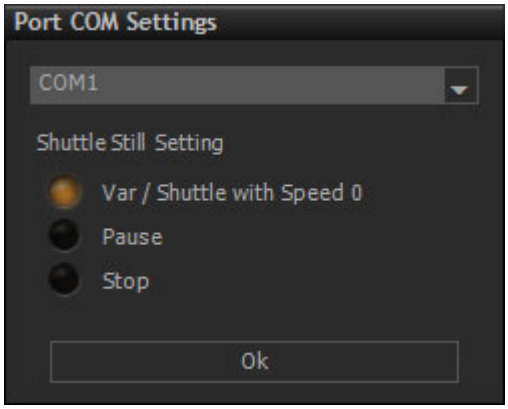
1. In the **Format & Sync** Tab **: Synchronization** section configure as below:



Formats & Sync Tab - Synchronization section

Chase TC Source	**LTC**
Toggle Chase	**Unchecked**
Sony 9 Pin Remote Control	**Checked**

2. The RS-422 configuration switch must be set to **From Controller** if you use the RS-422 port. This port is named **COM3** in the Settings dialog. This port is named **COM2** in the Settings dialog for early VCubes using an ASUS motherboard. The RS-232 port is named **COM1**.



Port COM Settings

COM1 Current **COM** Port. Click to drop-down a list of available COM Ports.

Var / Shuttle with Speed 0 When checked VCube issues a **Var / Shuttle 0 Speed** command when stopped.

Pause When checked VCube issues a **Pause** command when stopped. Audio data is retained in buffers.

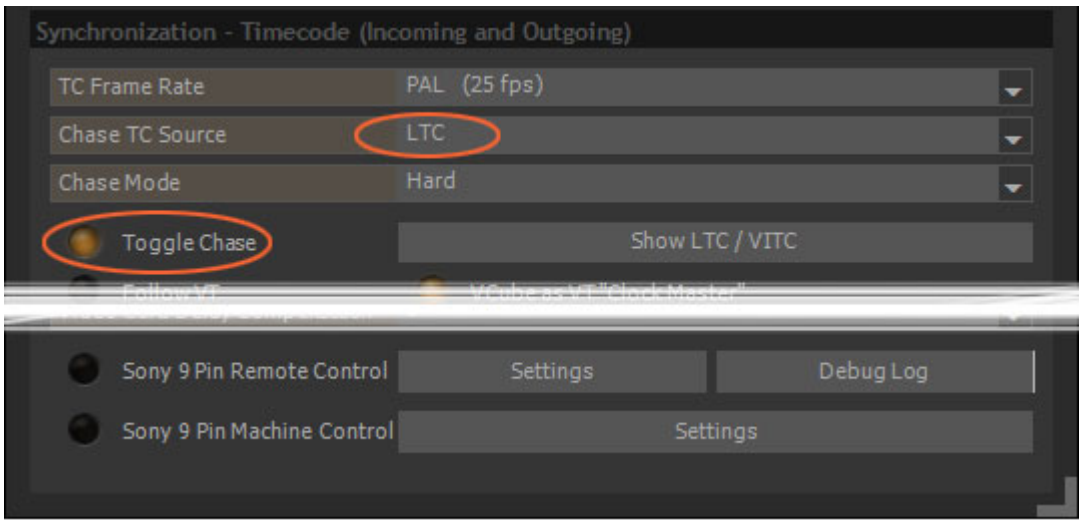
Stop When checked VCube issues a **Stop** command when stopped. Audio data is flushed from buffers.

3. In this configuration Video and Audio References are optional.

Synchronize VCube with an LTC Source

VCube can chase an LTC source.

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:

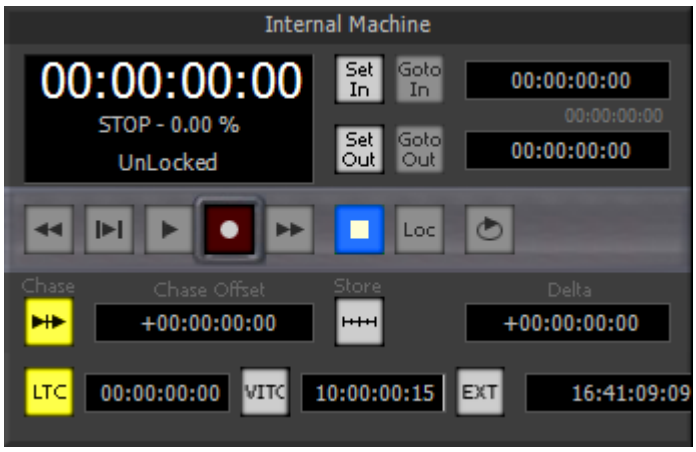


Formats & Sync Tab - Synchronization section

Chase TC Source **LTC**

Toggle Chase **Checked**

Or set from the **Transport Tool** :



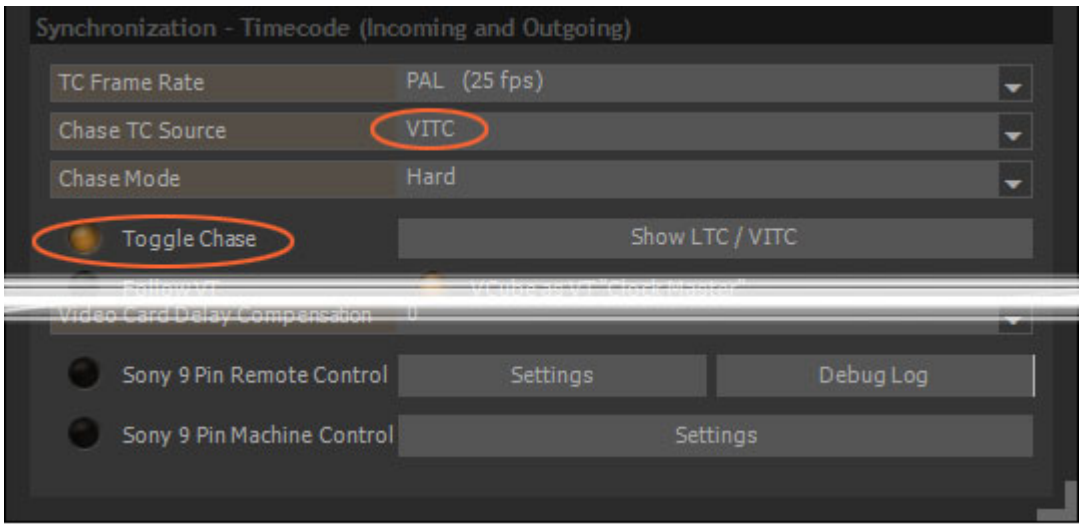
Transport Tool - Internal Machine

2. In this configuration Video and Audio References are optional.

Synchronize VCube with a VITC Source

VCube can chase an LTC source.

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:

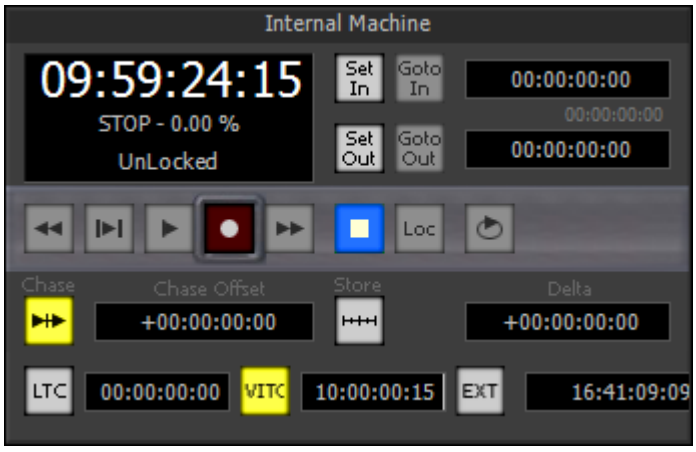


Formats & Sync Tab - Synchronization section

Chase TC Source **VITC**

Toggle Chase **Checked**

Or set from the **Transport Tool** :



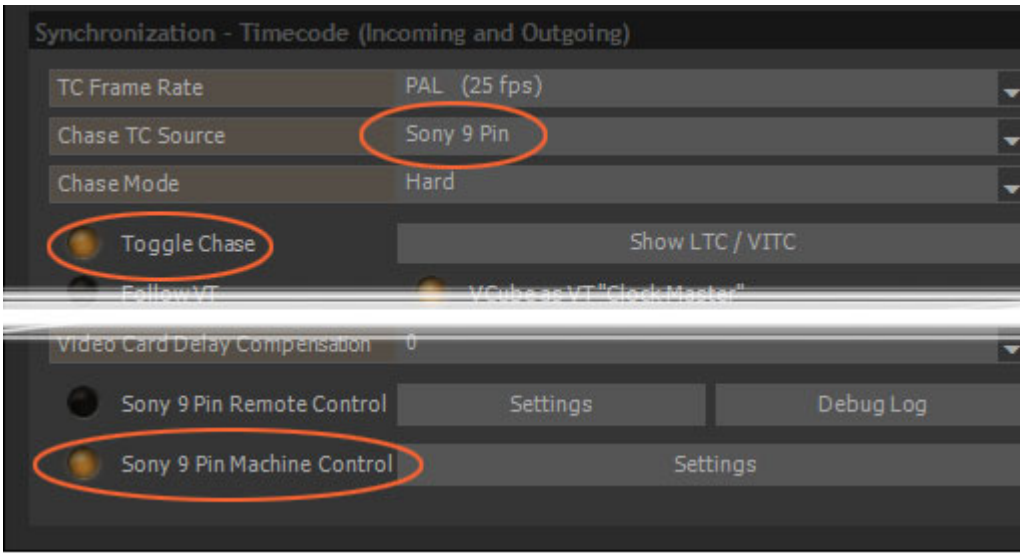
Transport Tool - Internal Machine

2. In this configuration Video and Audio References are optional.

VCube Controlling & Chasing a Sony 9-pin

VCube can remote control and chase another machine via Sony 9-pin (P2 protocol) commands. The following configuration can be used during capture:

1. In the **Format & Sync** Tab **: Synchronization** section configure as below:



Formats & Sync Tab - Synchronization section

Chase TC Source	**Sony 9 Pin**
Toggle Chase	**Checked**
Sony 9 Pin Machine Control	**Checked**

2. The RS-422 configuration switch must be set to **To Machine** if you use the RS-422 port. This port is named **COM3** in the **Settings** dialog. This port is named **COM2** in the **Settings** dialog for early VCubes using an ASUS motherboard. The RS-232 port is named **COM1**.

3. The 9-pin machine is controlled from the VCube Transport Control Panel :

Transport Control Panel

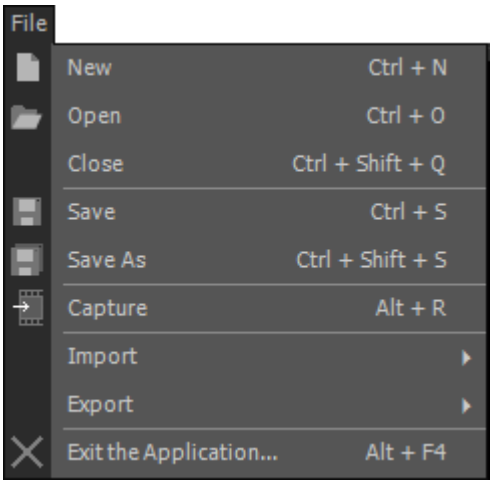
Vcube **Chases TimeCode** from the target machine.

Note: Ensure that the Reference Video Input on the synchronization panel of the VCube, and the Video Card Reference Input are referenced to the same genlock, black&burst, or video signal. This is the only way to ensure precise timing for video signal.

Note: The **Record** button in the **Internal Machine** control panel must be enabled **only** when **"Chasing..."** is no longer displayed in the Preview.

Menus

File



New

Open

Close

Save

Save As

Capture

Import>

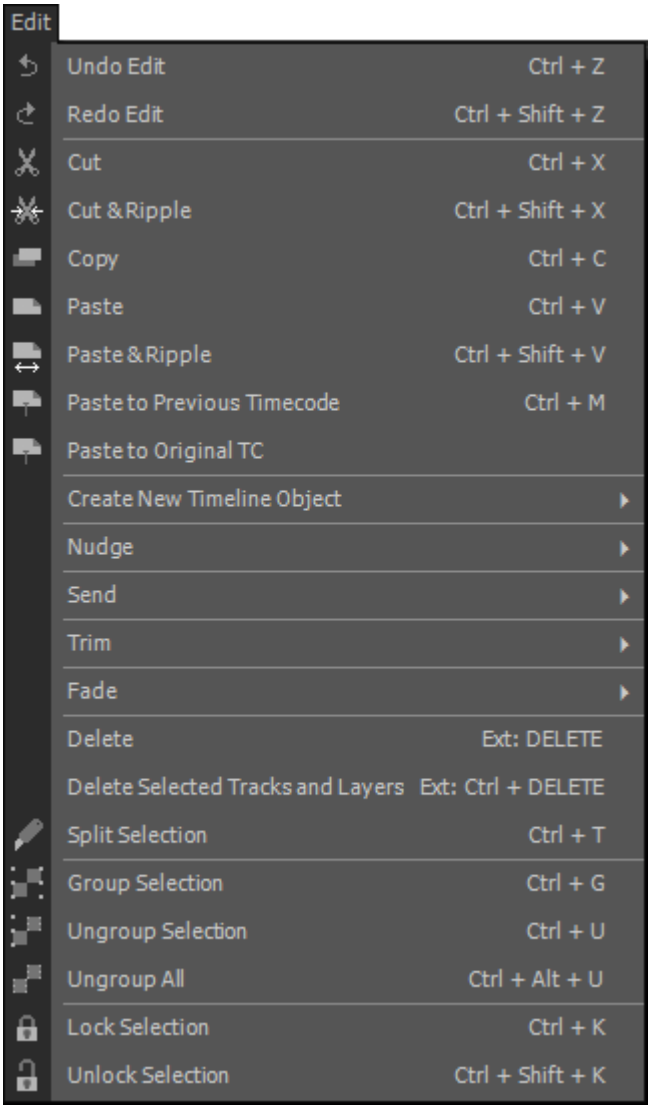
- **Media File Browser**
- **Composition (Create new)**
- **Composition (Add to Existing)**
- **Import Composition & Export Changes**
- **Import Layer ...**
- **Convert Still Images**

Export>

- **Export Composition**
- **Convert Media Files**
- **Render Composition**
- **Wrap Audio**
- **MXFix**

Exit the Application

Edit



Undo Edit

Redo Edit

Cut

Cut & Ripple

Copy

Paste

Paste & Ripple

Paste to Previous Timecode

Paste to Original Timecode

Create New Timeline Object>

- **New Video Track**
- **New Audio Track**
- **New Layer**
- **New Text Clip**
- **New "Sticky Memo" (Text Clip)**
- **New Countdown Clip**

- New Wipe Clip
- New Audio Tone Clip
- New Video Test Pattern

Nudge>

- Nudge Left
- Nudge Right
- Nudge Up
- Nudge Down
- Nudge Overwrite>
  - Nudge Left Overwrite
  - Nudge Right Overwrite
  - Nudge Up Overwrite
  - Nudge Down Overwrite
- Tracks>
  - Nudge Up Track
  - Nudge Down Track

Send>

- Send Selection to Mark In
- Send Selection to Mark Out
- Send Selection to Cursor
- Send Selection to Original Timecode

Trim>

- Trim Selection In to Cursor
- Trim Selection Out to Cursor
- Jog Trim Selection In to Cursor
- Jog Trim Selection Out to Cursor

Fade>

- Fade In Selection to Cursor
- Fade Out Selection from Cursor

Delete

Delete Selected Tracks and Layers

Split Selection

Group Selection

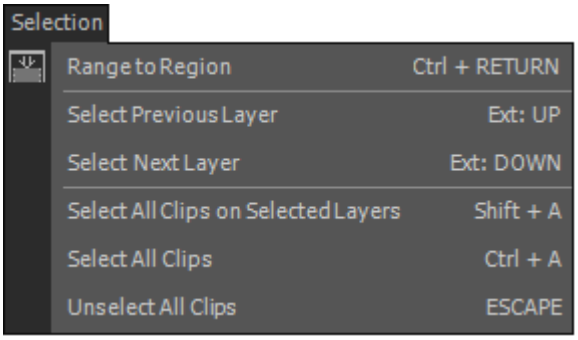
Ungroup Selection

Ungroup All

Lock Selection

Unlock Selection

Selection



Range to region

Select Previous Layer

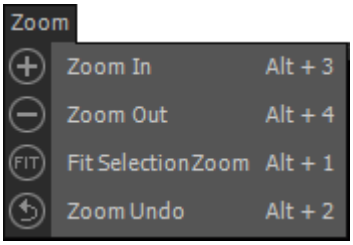
Select Next Layer

Select All Clips on Selected Layers

Select All Clips

Unselect All Clips

Zoom



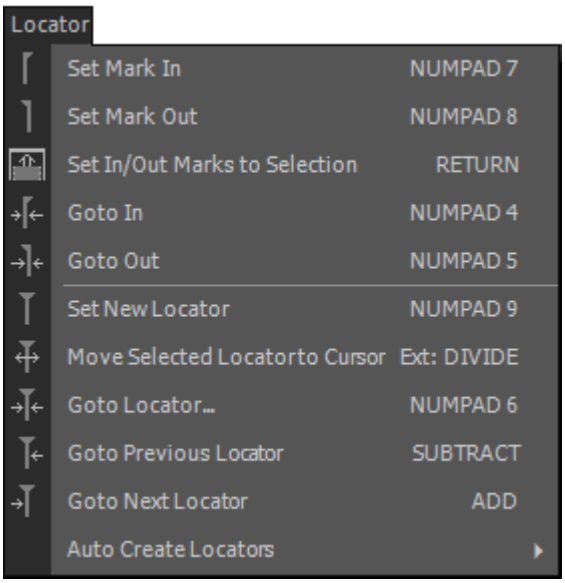
Zoom In

Zoom Out

Fit Selection Zoom

Zoom Undo

Locator



Set Mark In

Set Mark Out

Set In/Out Marks to Selection

Goto In

Goto Out

Set New Locator

Move Selected Locator to Cursor

Goto Locator...

Goto Previous Locator

Goto next Locator

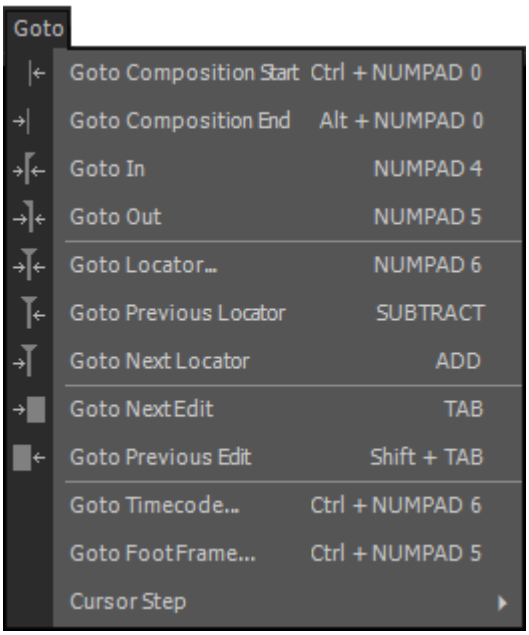
Auto Create Locators>

Auto Create Locators - All layers (Destructive)

Auto Create Locators - Selected Layer (Destructive)

Auto Create Locators - Selected Layer (Add)

Goto



Goto Composition Start

Goto Composition End

Goto In

Goto Out

Goto Locator...

Goto Previous Locator

Goto Next Locator

Goto Next Edit

Goto Previous Edit

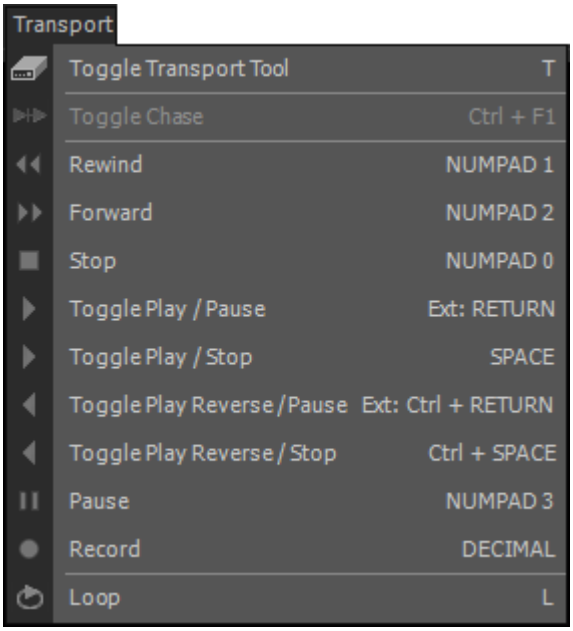
Goto Timecode

Goto Foot Frame

Cursor Step>

- **Step Forward 1 Frame**
- **Step Forward 1 Second**
- **Step Forward 10 Seconds**
- **Step Forward 1 Minute**
- **Step Backward 1 Frame**
- **Step Backward 1 Second**
- **Step Backward 10 Seconds**
- **Step Backward 1 Minute**

Transport



Toggle Transport Tool

Toggle Chase Turns Chase On/Off.

Rewind

Forward

Stop

Toggle Play / Pause

Toggle Play / Stop

Toggle Play Reverse / Pause

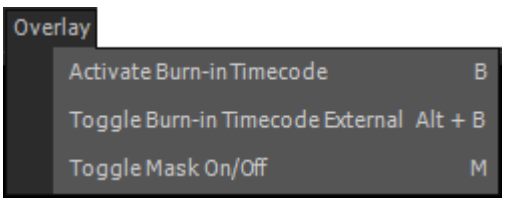
Toggle Play Reverse / Stop

Pause

Record

Loop

Overlay

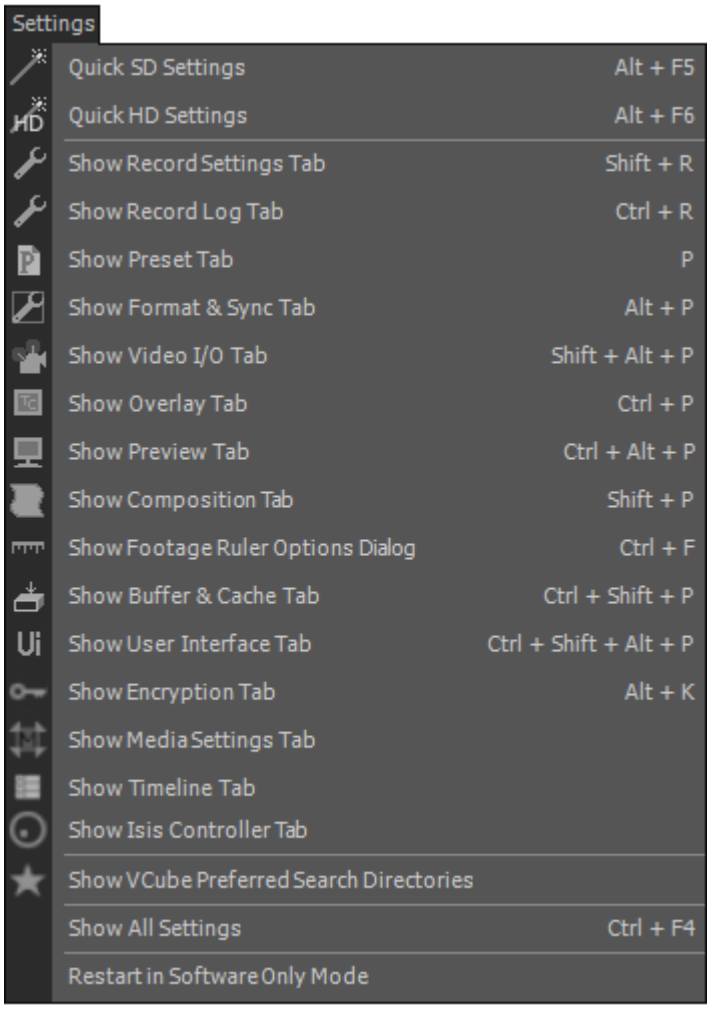


Activate Burn-in Timecode

Toggle Burn-in Timcode External

Toggle Mask On/Off

Settings



Quick SD Settings

Quick HD Settings

Show Record Settings Tab

Show Record Log Tab

Show Preset Tab

Show Format & Sync Tab

Show Mykerinos Settings Tab

Show LTC/VITC

Show Video I/O Tab

Show Overlay Tab

Show Preview Tab

Show Composition Tab

Show Footage Ruler Options Dialog

Show Buffer & Cache Tab

Show User Interface Tab

Show Encryption Tab

Show Media Settings Tab

Show Timeline Tab

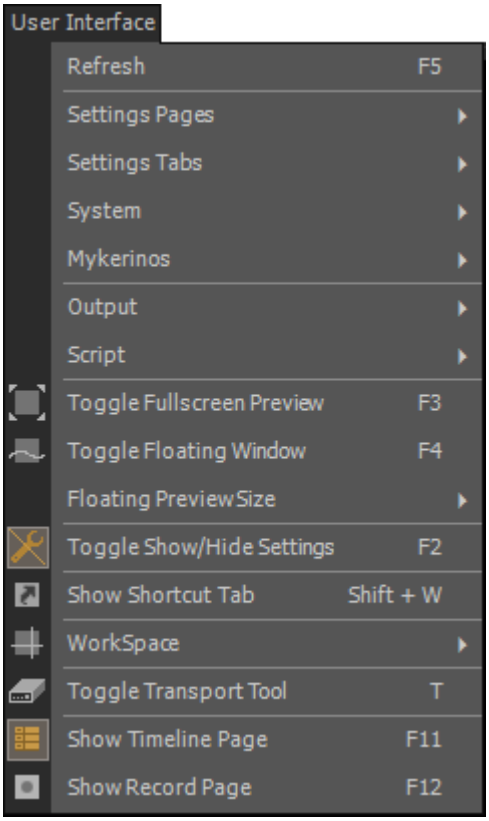
Show Isis Controller Tab (Only present when an Isis is active)

Show VCube Preferred Search Directories

Show All Settings

Restart in Software Only Mode (Only present when a Mykerinos is in the system)

User Interface



Refresh Updates the list of Media Files in a specific location.

Settings Pages >

- **Previous Settings Page** Steps through the **Control Settings Tab Pages** when they are displayed to the right of the Preview pane
- **Next Settings Page** Steps through the **Control Settings Tab Pages** when they are displayed to the right of the Preview pane
- **Show File page** Opens the **Locator Tab** pane in a floating window
- **Show Locator Page** Opens the **Edit Tabs** in a floating window
- **Show view Page** Opens the **View Tabs** in a floating window
- **Show Edit Page** Opens the **Edit Tabs** in a floating window
- **Show Settings Page** Opens the **Control Settings Tabs** in a floating window.

Settings Tabs >

- **Show Previous Settings Tab** Steps through the Tabs available in individual **Control Settings Pages**
- **Show Next Settings Tab** Steps through the Tabs available in individual **Control Settings Pages**
- **File>**
  - **Show VCube Files** Opens the **VCube Compositions** Browser in a floating Tab Window
  - **Show Media File Browser Tab** Opens the **Media File Browser** in a floating Tab Window

View>

Show clip Info Tab

Show Shortcut Tab

Show Workspace Tab

Edit>

Show Edit Main

Show Clip Edit

Show Layer Edit

Show Track Edit

Settings>

Show Preset Tab

Show Format & Sync Tab

Show Video I/O Tab

Show Overlay Tab

Show Preview Tab

Show Composition Tab

Show Buffer & Cache Tab

Show user Interface Tab

Show Isis Controller Tab

Show Encryption Tab

Show Media Settings Tab

Show Timeline Tab

System>

Show Windows Display Settings Dialog

Show Virtual Transport

Mykerinos> Show Mykerinos I/O I Opens the I/O Status Window

Output>

Show Output Page

Show System Tab

Show Buffer Tab

Show Playback Info Tab

Show Sync Status Tab

Show Audio Meters Tab

Script> Show Script Page (Under Development)

Toggle Fullscreen Preview

Toggle Floating Window

Floating Preview Size>

Double Size

Normal Size

Half Size

Quarter Size

Toggle Show/Hide Settings Toggles the Control Settings Tab pane Show/Hide in the right-hand side of the Preview Pane

Show Shortcut Tab

WorkSpace>

Load>

Load Workspace 1

to...

Load Workspace 10

Generate>

Generate Workspace 1

to...

Generate Workspace 10

UI Mode: Simple

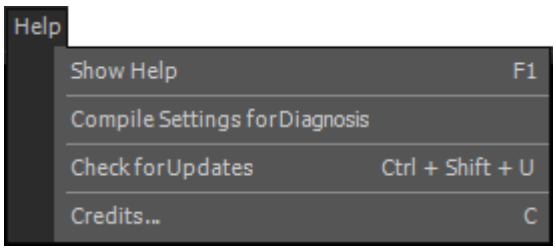
UI Mode: Advanced

Toggle transport Tool

Show Timeline Page

Show Record Page

Help



The **Help** Menu gives quick on-line access to this document.

Show Help	Opens this document
Compile Settings for Diagnosis	This function collects the Vcube registry settings from the installation for use by Merging support. This can speed up the process of understanding a bug dramatically , so please use it when reporting a bug. When the process is complete a dialog opens which offers the choice of sending the file directly on a connected computer or saving it to the desk-top for attaching to an email.
Check For Updates	goes online to check for more recent versions of the VCube Software. (If your VCube PC is connected to the Internet.)
Credits...	pops up a Window with the VCube logo. Credits and version information scrolls upwards on the left-hand side.

Output View

The **Output** Page is one of the three Tabs below the Toolbar. It can also be accessed by [**Ctrl + F7**]

This Page is intended to help expert users to fine tune their VCube configuration to suit local circumstances.

There are five Tabs:

Output Page Diagnostic Tools

The Output page has five diagnostic monitoring pages which enable you to read the current status of different points of system resource consumption, synchronisation and audio levels and can potentially detect a "bottle-neck" which is hindering smooth and reliable playback of the most demanding HD video files.

1. **System**
2. **Buffer**
3. **Playback Info**
4. **Sync Status**
5. **Audio Meters**

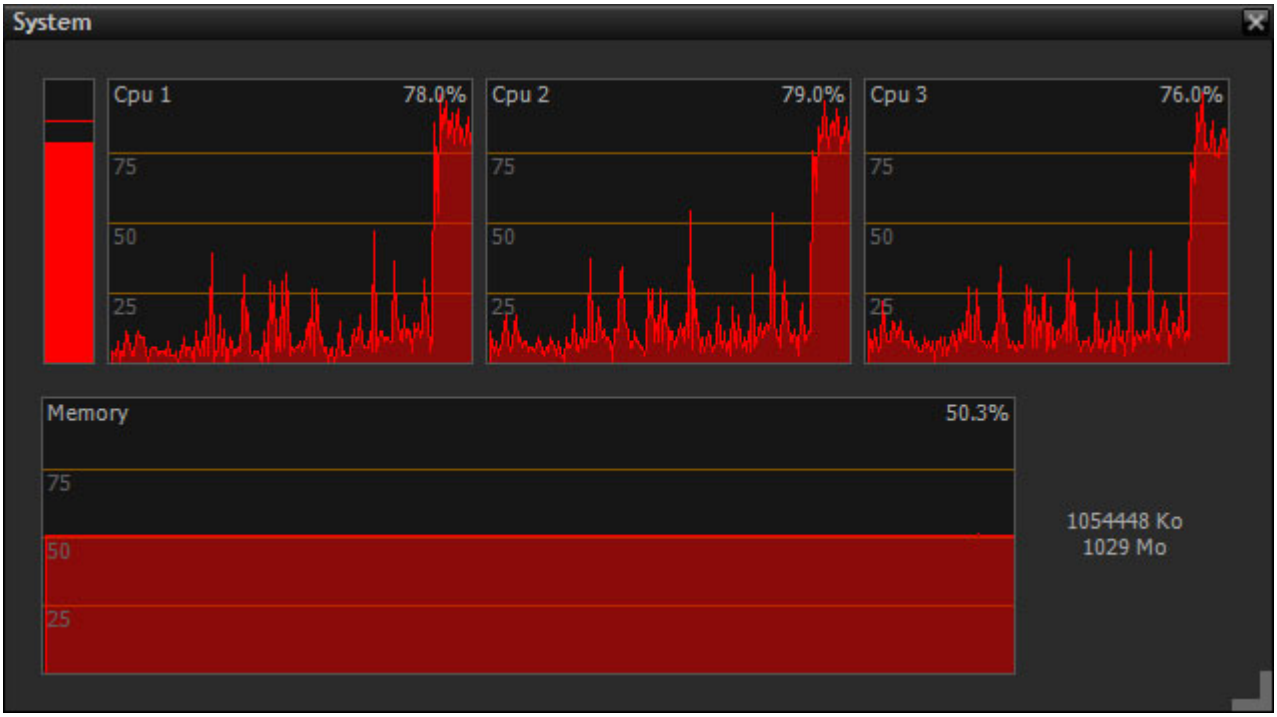
So if you encounter a file that just does not play out smoothly, or as you expect, check these diagnostic tools first in order to determine where the bottleneck or problem is so that you may find a solution such as:

1. Changing the buffering scheme of VCube
2. Moving the Media file to a faster drive
3. Replacing the Media File itself in favor of a new version encoded using a faster, more efficient codec than that used for the original encode.
4. Correcting the sync sources settings or sync source.
5. Replacing the audio Media File(s) with alternative versions.

System Tab

The first diagnostic tool in the Output page is the **System Tab**. This shows a real-time graph of the overall **CPU** usage and the **Memory** consumption of VCube itself. The CPU display shows a graphical percentage plot of each

CPU core for use by VCube under Windows to the right and on the left an average percentage of all cores combined.



Output Page - System Tab

System displays processor and memory activity. On Pyracube systems running MassCore expect to see one or more cores maxed out. This is a function of how MassCore works and is not a matter for concern.

CPU

In order to understand what is to be investigated while comparing the CPU consumption and the other indicators in the diagnostic tabs, it is first necessary to understand the two extremes of the HD video file scale.

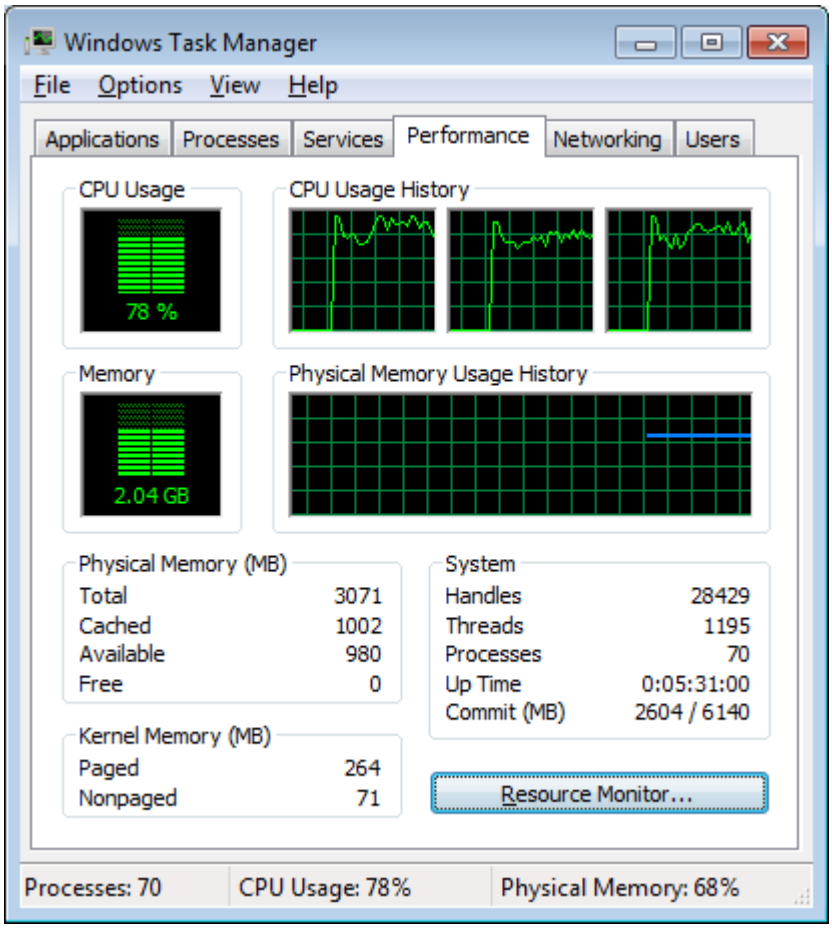
At one end of the scale is video that is encoded with a high data compression ratio and therefore uses a large amount of CPU resources at the moment of decoding but has a very small file size and therefore a reduced bit rate (requiring less disk performance). At the other extreme are totally uncompressed (**RGB**, **YCrCb**, **YCbCr**) type video formats that require almost no CPU usage (due to the absence of decoding) but require huge amounts of disk data throughput do to extreme bit rates.

So if your CPU is exceeding 100% while playing a certain file, the file is most likely highly data compressed or encoded with a codec that is too CPU intensive for your system. Try increasing the Playback Buffer or use a file that is encoded with a lower data compression ratio (higher bit rate) or encoded with a different and more efficient codec altogether.

Memory

Below the CPU graphs is a graph showing the estimated memory consumption of VCube. This memory consumption graph does not include the other processes running under Windows so it is good to compare the memory consumption graphs of the **Windows Task Manager** under the **Performance** tab with that of VCube for compari-

son purposes. To access the Windows Task Manager key **Ctrl + Shift + Esc** (or **Ctrl + Alt + Del** and choose **Start Task Manager**) and click on the **Performance** tab.



Windows Task Manager - Performance Tab

Memory consumption is critical in any system and VCube can potentially consume large amounts of memory depending on three main factors:

1. Resolution and frame rate of the VCube Timeline.
2. Number of Frames set in the Playback Buffer (**Settings** Page : **Buffer & Cache**).
3. The codec used to encode the video file in question.
4. The number of Clips playing simultaneously in the Timeline at any given moment

Warning: The system memory consumption should be kept as low as possible and never exceed approximately 75-80% of the total amount of RAM installed in the system. This is especially critical in 32-bit versions of Windows as only the first 3 gigabytes of RAM are actually addressable by Windows and therefore VCube should never take so much of the RAM for itself as to hinder Pyramix and Windows itself. Exceeding the 80% mark of memory consumption for any reason can render any system unresponsive and even critically unstable.

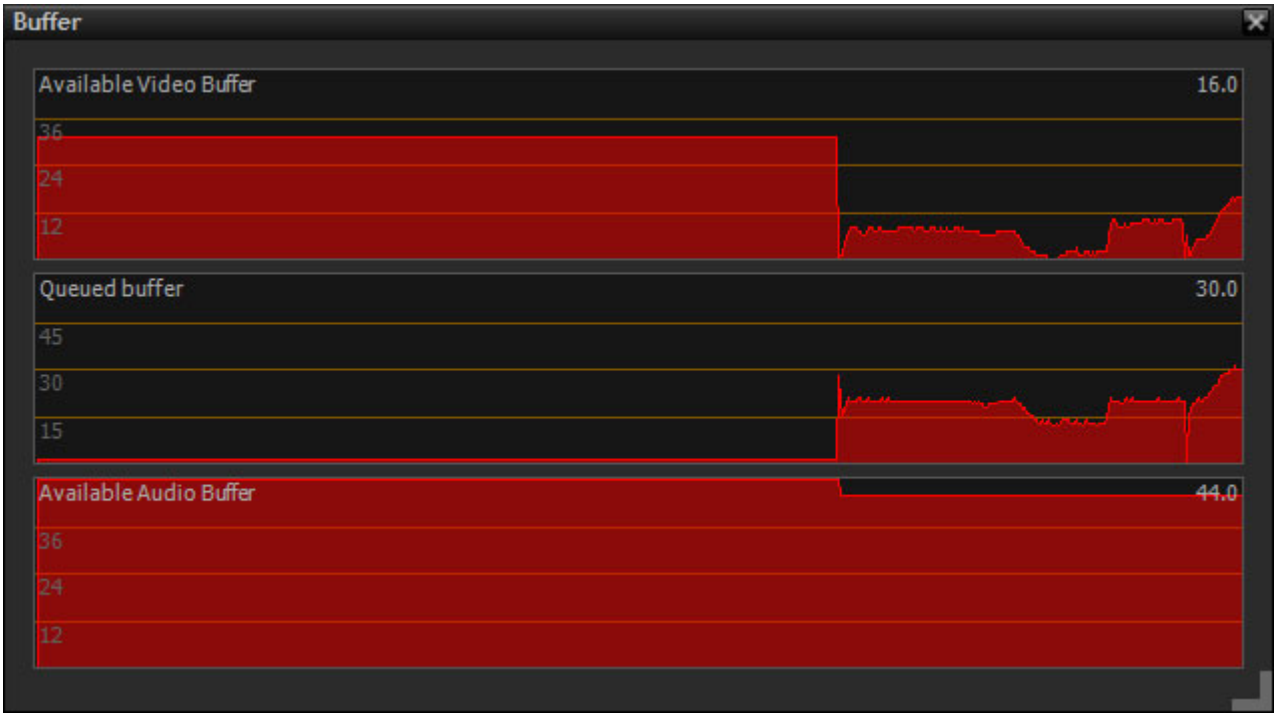
The Playback buffer can be either an ally or an enemy in cases where HD video files do not seem to playback well. Increasing the Number of Frames in the Buffer helps to remedy playback stalls but increases the memory consumption footprint of VCube proportionally leaving less memory for Pyramix and Windows.

When determining what the optimum size should be, begin with the default value of **7** Frames and increase the number of Frames incrementally until playback is satisfactory whilst keeping an eye on memory consumption during playback. There is no point pushing the buffer to an excessive value in the hope that you will have smooth playback all the time if it means sacrificing precious memory elsewhere and causing the system to become unstable. For this reason keep the buffers as small as possible without stalling. If an increase in Playback Buffer size does not remedy playback stalls then investigate further to determine if your media volume is adequately outputting media to VCube or use a smaller more efficient version of the HD video encoded in a different format or at a different bit rate.

Buffer Tab

The Buffer tab shows three graphical plots:

1. **Available Video Buffer**
2. **Queued Buffer**
3. **Available Audio Buffer**



Output Page - Buffers Tab

All three of these graphs show a direct correlation of the scale of available buffer resources in relation to the **Playback Buffer** frame size. Raising or lowering the number of frames in the buffer also raises or lowers the scales of the graphs. The **Available Video Buffer** and **Available Audio Buffer** scales are subtractive and the red line is lower as the buffers are used in playback while the **Queued Buffer** graph is additive and rises to show the overall headroom of both the Video and Audio buffers. None of the three buffers should ever bottom out during playback. If they do this indicates a stall in the system due either to a CPU problem, a data throughput problem from the Media Volume to the playback engine or even possibly a PCI(e) bus problem on the Motherboard due to a saturation of activity in the system (although this is rare).

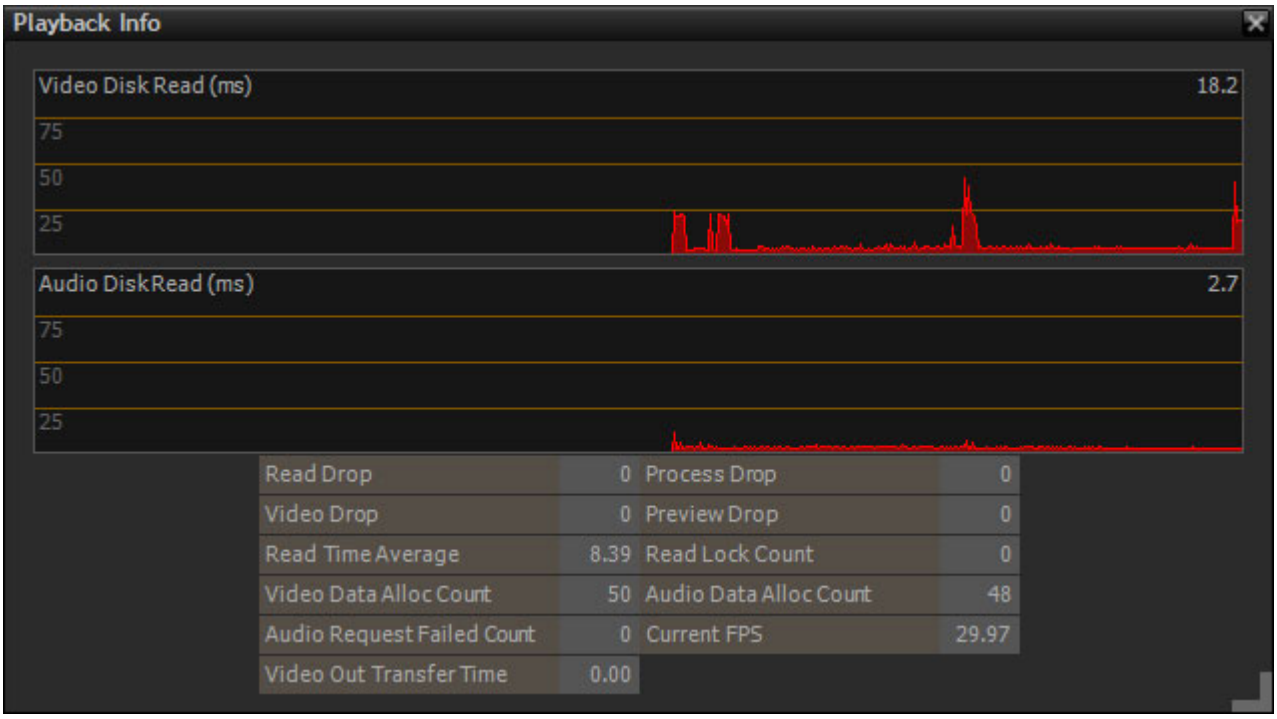
The Buffers should remain relatively flat and stable without bottoming out so, once again, watch for dips in buffers and adjust the Number of Frames in the Playback Buffer accordingly without over consuming system memory.

Playback Info Tab

The **Playback Info** tab shows two graphical plots with **Video Disk Read (ms)** and **Audio Disk Read (ms)** timings and 11 individual diagnostic numeric value boxes. The principal indicators, which are relevant to VCube Essentials and therefore that will be explained here, are:

1. **Video Disk Read** graph
2. **Audio Disk Read** graph
3. **Read Drop** counter
4. **Read Time Average**
5. **Preview Drop** counter
6. **Current FPS**

Playback Info



Output Page - Playback Info Tab

Note: The remaining counters not listed above either only apply to systems which include an AJA® video board or are not helpful in determining the cause of poor playback.

Video and Audio Disk Read graphs

The **Video** and **Audio Disk Read** graphs show the delays between the moment a media frame is requested from a disk volume and the moment it is available for use by VCube. These graphs therefore show the transfer time before the media is decoded and placed into the **Playback Buffer**. So the number of Frames in the buffer itself has no bearing on this information. As the bit-rate of the media increases so will the time it takes to read it from a disk volume. The overall transfer time in milliseconds, displayed in the upper right corners of each graph as well as plotted out in red, should never exceed the delay in milliseconds of the duration of one frame of video of the current VCube playback engine. Just to be on the safe side it should even be considered that a safe ratio of Disk Read delay to a single frame of video should be about half that of the time of a single frame to allow for occasional media volume transfer bottlenecks. These bottlenecks may occur in very short periods of time but must never exceed the remaining number of frames in the Playback Buffer. That is what the Playback Buffer is there for.

Here is a quick table to show the length of a single frame of video in milliseconds for each major frame rate and the subsequent approximate target Disk Read delays that should give reliable play out performance.

Frame rate	Milliseconds	Safe Delay
24	41.67	20.83-30
25	40	20-30
29.97	33.37	16.68-28

If the **Disk Read** delays systematically exceed the safe delay values then the Buffer will quickly empty out causing stalling and skipped frames during playback.

Remedy: Use higher performance disk volumes that transfer the media files uninterrupted and fast enough for VCube to process them and put them into the Play Buffer continuously or use a Media File with a lower bit rate.

Read Drop Counter

The **Read Drop** Counter shows a continuous display of how many frames of video were dropped (due to insufficient throughput of the media volume to the VCube playback engine) during a single playback pass. If the raw media data arrives late to VCube because the disks are too slow, then VCube does not even have a chance to process them.

> **Note:** Stopping and restarting playback resets the values in all the counters so consult them during playback.

Read Time Average

The **Read Time Average** shows the delay of processed video frames (post playback engine) from disk-to-Playback Engine to the Playback Buffer. This value must never exceed the Safe Delay values listed above for a succession of frames larger than the size of the Number of Frames in the Playback Buffer. If it does the result is a playback stall.

Preview Drop Counter

The **Preview Drop** counter shows the number of frames dropped in the VCube Preview Window running on the display engine of the computers graphic board (as opposed to video frames dropped on the AJA board shown in the **Video Drop** counter). When in doubt as to if VCube is dropping frames, consult this counter during playback. It is also displayed at the lower left-hand side of the VCube interface **Drop=0**.

Current FPS

The **Current FPS** counter shows the real-time frame rate per second of the VCube playback engine. If this value varies after the initial lock cycle of VCube is established then VCube has detected a drift in the playback speed. This is most likely due to a problem between the lock reference of VCube and the incoming TimeCode value. It may also be due to a conflict between the frame rate of VCube and that of Pyramix or Virtual Transport.

Remedy: Verify that all three are running at the same frame.

Note: Buffer & Cache Tab

The **Buffer and Cache** Tab located on the **Settings** Page is crucial to the proper setup of VCube and, as discussed in the previous section, must be carefully adjusted for the type of Media being played back by VCube.

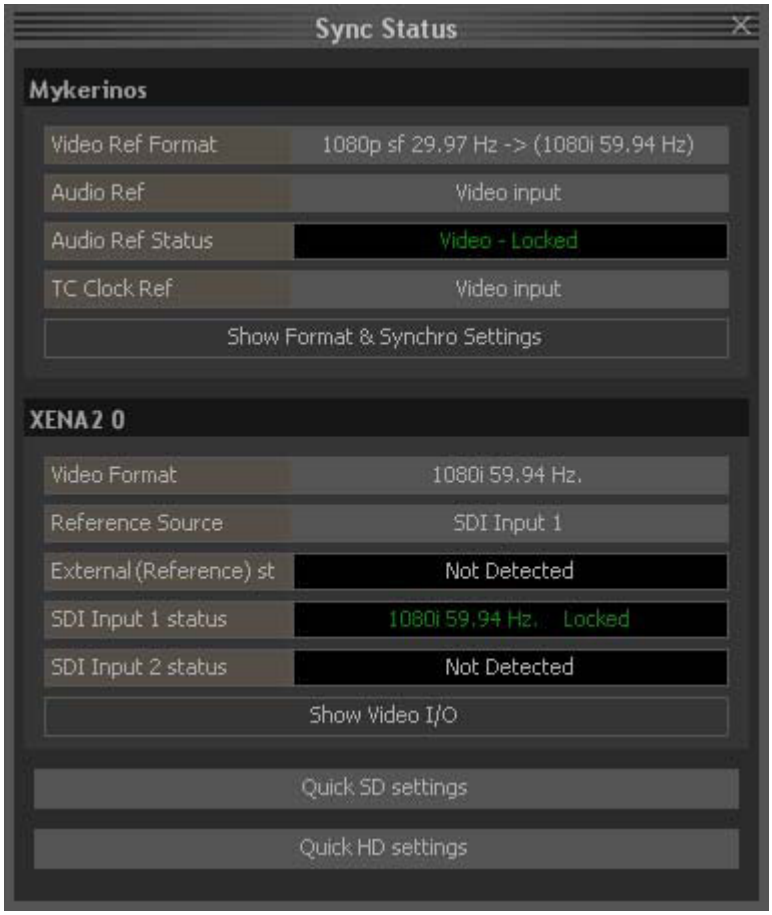
It has been found that the best general default parameters are:

1. Start with a Buffer value of **7** for SD picture and **15** for HD picture
2. Deactivate all four of the read and write caches and restart VCube for the cache changes to take effect.

Adjustments may be made to facilitate certain HD files that prove to be problematic during playback but the Buffer itself should be gradually increased and not just set to it's maximum value at all times which (like any buffer) may seriously hinder the performance and reliability of the system by consuming excessive amounts of precious RAM, especially on a 32-bit operating system.

> **Note:** The Multi Thread Seeking button has negligible effect due to the vast improvements in IT hardware in general since the introduction of VCube v1.0 and may be left off.

Sync Status



Output Page - Sync Status

Shows all video, audio, synchronization and clock status'.This panel also appears when clock, format or sync are inconsistent. The mismatched parameter flashes red until a valid setting is made whereupon it changes to green.

Note: The devices displayed depend on what you have installed on the system.

Sync Status with XENA LH and USB Sync Option

Output Page - Sync Status

If the USB Sync Reference Source is Video, one of the following statuses is possible :

- Locked to the Video:

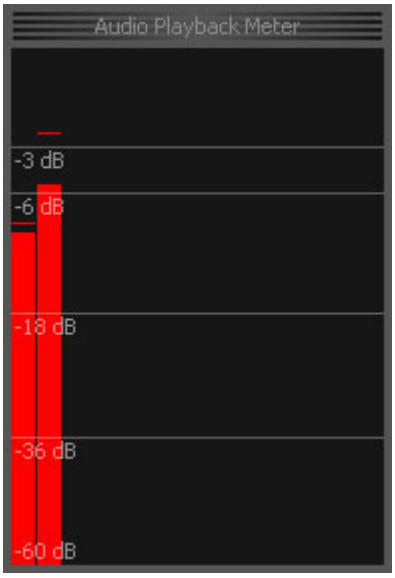
- Locked to the Video but the framerate is incompatible with the video framerate:

- No video present or video is not decoded:

If the reference source is Internal :

If the reference source is LTC :

Audio Meters



Output Page - Audio Meters

Shows audio Playback levels.

Note: Please read this section in conjunction with: **Output Page Diagnostic Tools on page 188**

Read Drops During Playback

If Read Drops occur during playback, the **Disk Cache** must be adjusted.

Settings > Show Buffer and Cache Tab : Local Read Cache. For replay from a local disk this value should be set to around 64k.

Network Read Cache if streaming over a network this value should be set to around 8k.

These values may vary depending on the specific network or storage configuration and the video format.

Current FPS Reduced

If Current FPS goes down, the number of frames should be increased.

Settings > Show Buffer and Cache Tab : Playback Buffer.

For regular SD video formats and DV codecs, **5** is the recommended starting point.

Flickering Video Output

Problem:

The video output (video card) displayed on a CRT monitor flickers during playback.

Solution:

The Field order in the Media Files doesn't match the Field Order of the Composition's video format. Go to **Settings > Formats & Sync : Composition Video Format** and set the correct **Field Order**.

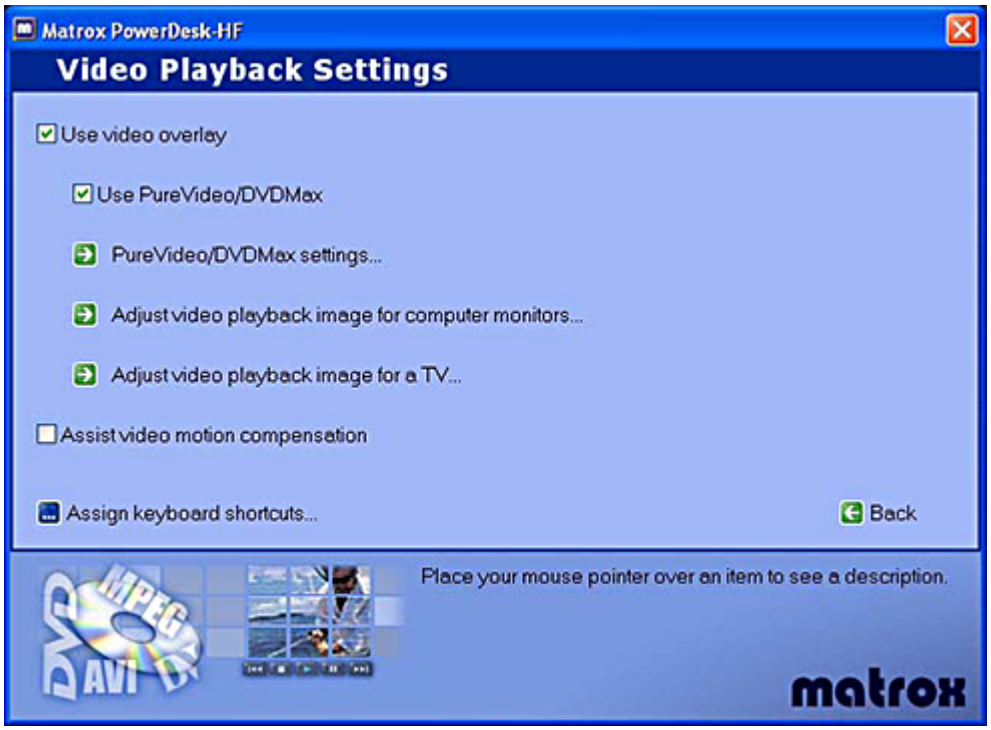
Matrox Parhelia Settings

VCube hardware can include a Matrox Parhelia graphics card instead of the regular ATI.

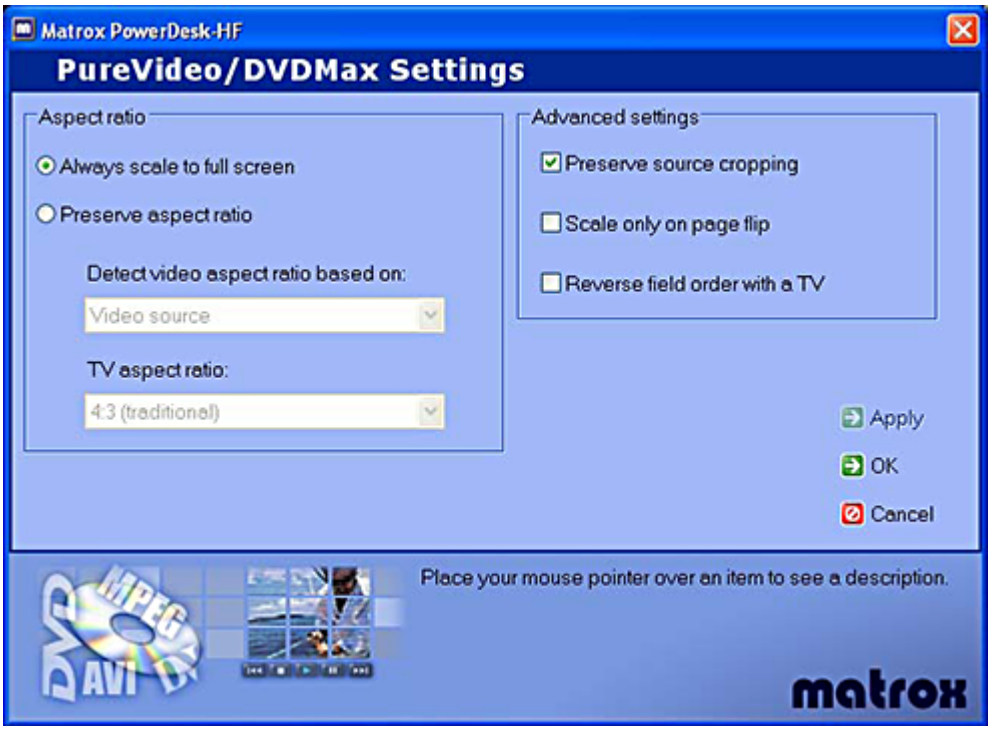
This option allows a perfect control of the de-interleave process for the video output especially useful when using a "Band Rythmo" (lip-sync band) system and without a video card installed.

Depending on your specific screen configuration, please refer to the Matrox instructions.

If you plan to use the video output to feed an additional monitor, settings must be made as in the following screen shots.



Matrox Video Playback Settings



Matrox PureVideo/DVDMax Settings

Depending of the BIOS version of the Matrox graphic card, **Preserve source cropping** may require disabling to ensure correct video output.

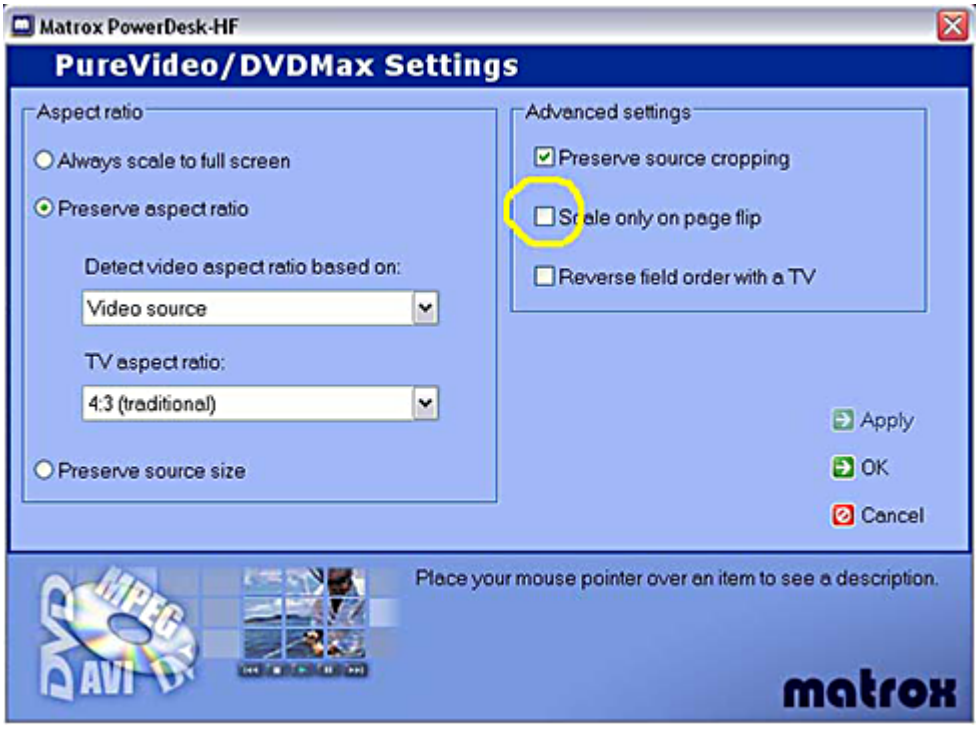
Frozen Image on Matrox Parhelia Output

Problem:

The Matrox Parhelia graphic card video output is frozen but the preview display is OK in VCube.

Solution:

Ensure that the settings of the graphic card are in accordance with this screen shot.



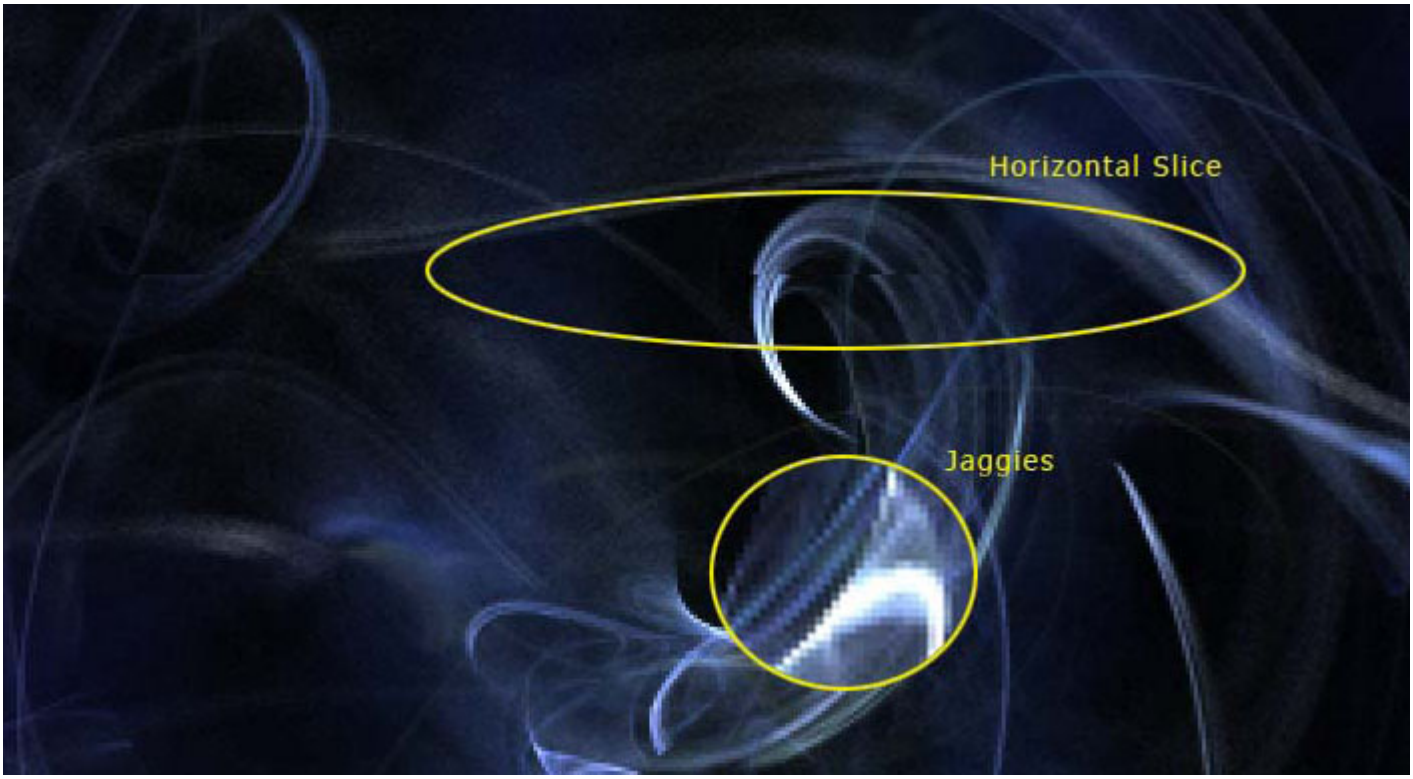
Matrox PureVideo/DVDMax Settings

If **Scale only on page flip** is enabled in the Matrox dialog then **Settings > Show Preview Tab : Page Flipping** must be active in the Composition enable the Matrox graphic card video output.

Poor HD Image Quality

Problem:

The PQ (Picture Quality) on screen does not come up to expectations when using an HD video projector plugged into the graphic card output. Images are stepped on diagonals and curves (Jaggies). They also features a random horizontal slice on rapid movements.



Horizontal Slicing and jaggies

Solution:

Ensure the Composition settings correspond to the HD format used. Double-click on the video clip in the Timeline to display **Clip Info**. This includes the native format of the media file (e.g. 1980x1080 pixels at 24 fps). Ideally, the projector's native resolution (DLP or LCD) should match this format, and the frame rate should be an integer multiple of the composition frame rate e.g. 24 fps (composition) and 72 fps (projector/graphic card settings). To avoid slice artefacts in slow progressive mode (23.98, 24, 25 fps), **Settings > Show Preview Tab : Page Flipping** should be active.

Frame Shifting with Virtual Transport

Problem:

Your VCube is controlled by a Pyramix via the Virtual Transport protocol. The transport controls on the Pyramix are transmitted to the VCube. But you experiment with some shifting when you're using a jog command on the Pyramix and discover VCube is not frame accurate.

Solution:

In the VCube application, press **T** to display the **Internal Machine** panel. **LTC**, **VITC** and **EXT** TimeCode Sources for chasing should be disabled. Then the Virtual Transport protocol becomes the default source for the TimeCode to chase.

Enable **Chase** on the **Internal Machine** panel. Now VCube will be frame accurate when you are jogging in Pyramix.

Sony 9-pin Not Controlling VCube

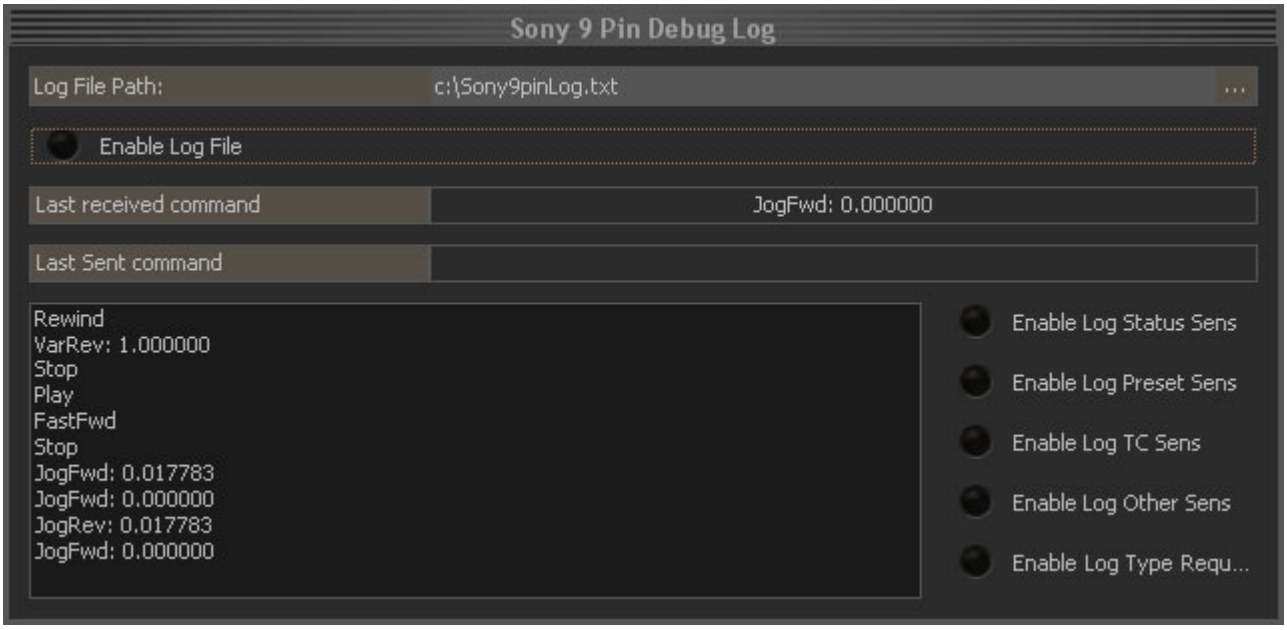
Problem:

The RS-422 configurator is set to **From Controller**. In **Settings** > **Format & Sync : Synchronization - TimeCode (Incoming and Outgoing)**, the Sony 9-pin Remote Control is enabled and correctly set to **COM3** (RS-422 connector), but VCube doesn't respond to all commands.This port is named **COM2** in settings specific panel for early VCubes featuring an ASUS mother board.

Solution:

Be sure that the RS-422 configurator switch is set to "From Controller" if you use this port.

In **Settings** > **Format & Sync : Synchronization - TimeCode (Incoming and Outgoing)**, activate the **Debug Log**. This feature displays all incoming commands or requests from the external controller. It is a powerful tool for analyzing and remedying incorrect controller settings or hardware problems.



Sony 9 Pin Debug Log

Recorded Media Files have incorrect Timestamp

Problem:

The capture is successful except that Media Files are not stamped with the correct Time Code. A one-frame shift appears randomly despite the fact that VCube is chasing the VCR TimeCode.

Solution:

Ensure that both the reference video input on the synchronization panel of the VCube, and the video card reference input are referenced to the same genlock, black&burst, or video signal. This is the only way to ensure precise timing for the video signal.

Video Playback is shifted

Problem:

VCube displays the correct image at the correct TimeCode on the PC monitor preview. But the video output is not synchronized correctly. A shift of one or more frames appears to be present on the output of the video card.

Solution:

1. Ensure that both reference video input on the synchronization panel of the VCube, and the video card reference input are referenced to the same genlock, black & burst, or video signal. This is the only way to ensure precise timing for the video signal.
2. Be sure that the specification of the video display you use, does not feature some latency. All plasma displays and some LCD displays introduce significant video delay. If this is the case VCube features independent compensation offset for graphic and video cards. **Settings > Formats & Sync : Synchronization - TimeCode > Graphic Card Delay Compensation / Video Card Delay Compensation**.
3. It is equally possible you will observe the same delay with the PC preview. To compensate use **Settings > Formats & Sync : Synchronization - TimeCode > Graphic Card Delay Compensation**.

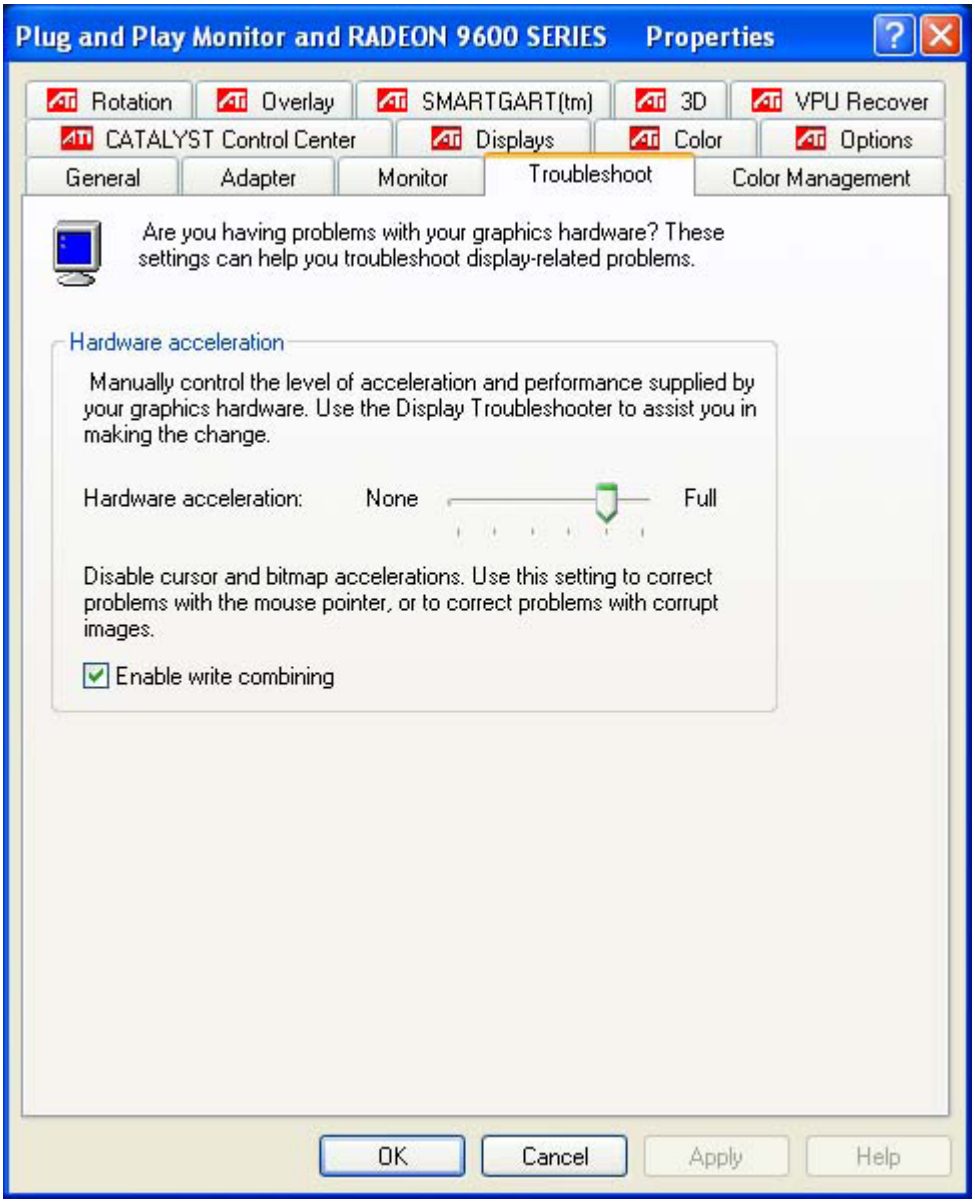
User Interface with ATI Graphic Card

Problem:

The VCube User Interface does not refresh correctly. Some labels are missing or appear to be disabled.

Solution:

In Windows Advanced Display Properties, be sure that the ATI Troubleshoot Control Panel is set as on the screen shot below:



Display Control Panel

NTSC Video Output Exhibits Some Dropped Frames with PAL Media Files

Problem:

A PAL Composition or a PAL Media File is loaded using the **Easy Load** function into the Timeline. NTSC video output is required. This output exhibits some dropped frames (on the display at bottom left corner of the User Interface).

Solution:

If the Composition is set to 25 fps, then, the VCube video engine only produces 25 frames per second and the video card needs 29.97. This is the source of the dropped frames.

The Composition frame rate must be set to 29.97 fps in order to feed the video card. This can be done even if 25 fps media files are used.

If the Media File frame rate is lower than the Composition frame rate, then some frames will be duplicated to match the number of pictures that the video engine must produce every second to feed the video card. This means that the Media File duration won't be changed when played at a higher frame rate.

> **Note:** VCube does not interpolate missing pictures to achieve the frame rate management. It only duplicates or omits frames in order to match the Composition frame rate which must reflect the frame rate of the video standard in use.
>
> In all cases the VCube video engine provides the exact number of frames required when they are required.

Apple Compatibility 2GB Limitation

Problem:

QuickTime files generated by Apple Final Cut copied on DVD can't be read once transferred to VCube.

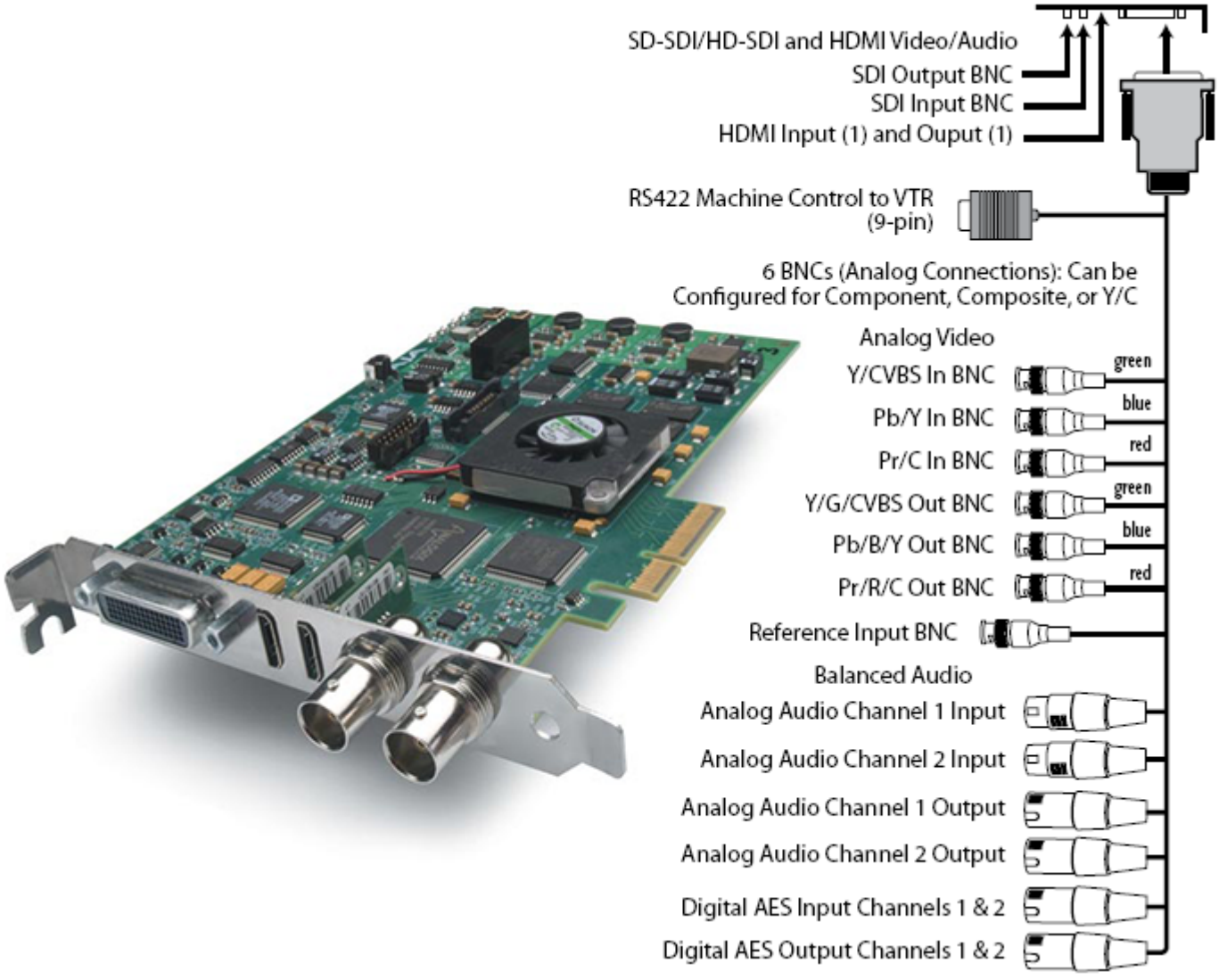
Solution:

Only DVD-ROMs complying with the UDF format can be used to transfer Media Files bigger than 2 GB. Using the Mac/PC compatibility option when burning a DVD on an Apple computer leads to an error -2048 on the PC QuickTime player and an unmounted media file in VCube media browser. The DVD-ROM (UDF) option must be checked when burning a DVD on an Apple computer in order to override this 2 GB limitation.

Toast 7 from **Roxio** offers this option.

AJA Video Cards and Plugins

LH-i - SD-SDI/HD-SDI/HDMI/Analog



Notes:

- SDI embedded audio and the Merging Technologies' audio option cannot be used to capture audio simultaneously.
- VCube does not use the RS422 connector on the breakout cable currently.

Video Formats Supported

Video Formats

525i 29.97

625i 25

720p 23.98 (PC)

720p 24 (PC)

720p 25 (PC)

720p 29.97 (PC)

720p 30 (PC)

720p 50

720p 59.94

720p 60

1080i 25

1080i 29.97

1080i 30

1080PsF 23.98

1080PsF 24

1080PsF 25 (PC)

1080PsF 29.97 (PC)

1080PsF 30 (PC)

1080P 23.98

1080P 24

1080P 25

1080P 29.97

1080P 30

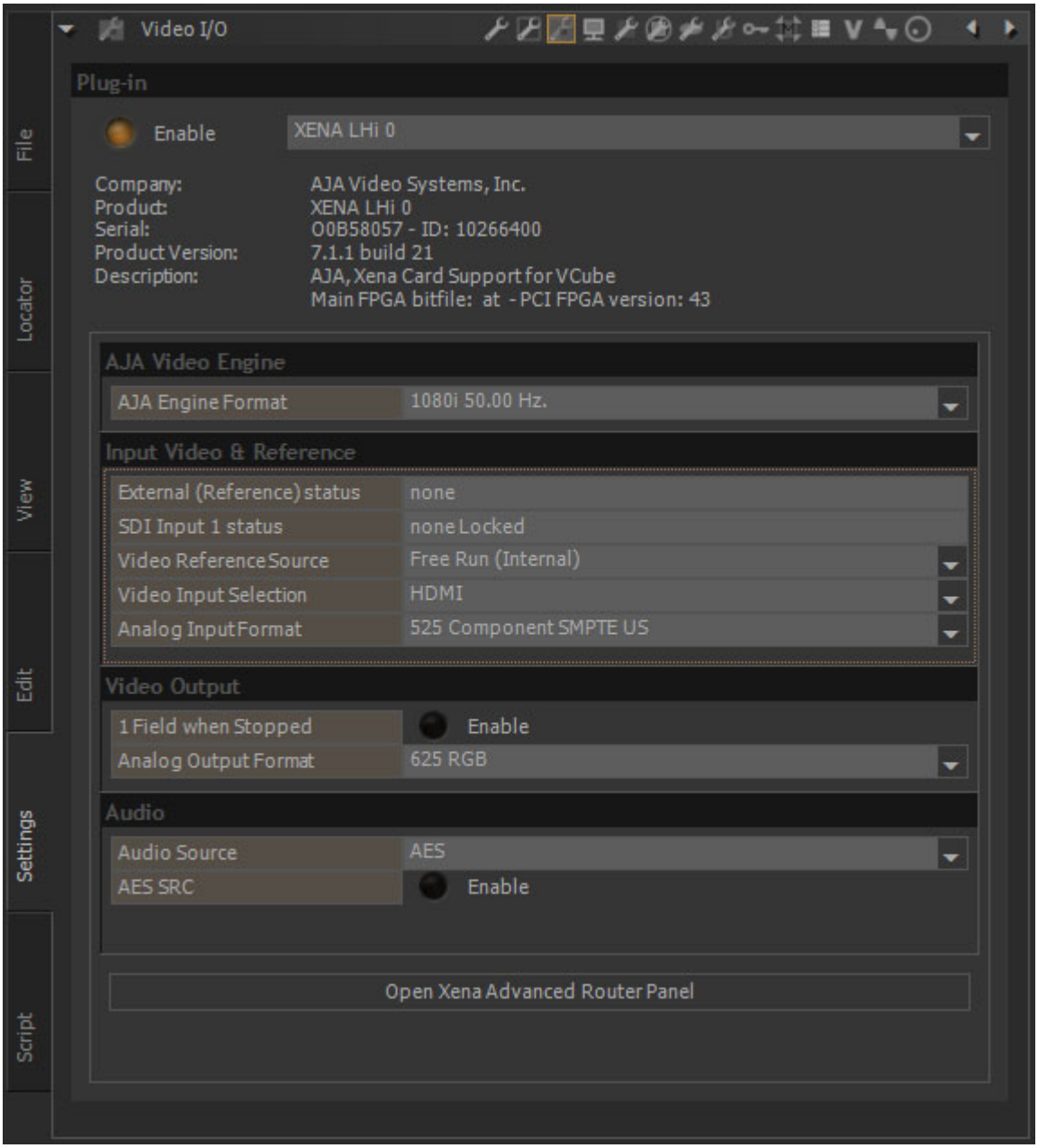
1080P 50

1080P 59.94

1080P 60

LH-i Plug-in

The LH-i and 2K/3G plug-ins are almost identical. LH-i is one of the possible AJA video capture hardware options inside your VCube station. It supports Analog Component / Composite, HDMI and SDI video for both SD and HD formats..



AJA LH-i Video I/O Settings

Plug-in

Enable — When lit the plug-in/card selected in the drop-down list is active.

Card and plug-in details are shown under the **Enable** button.

AJA Video Engine

AJA Video Engine Format — The current internal AJA Engine format is shown. Alternatives are selected in the drop-down list.

Input Video & Reference

External (Reference) status — Displays the video format of the incoming genlock signal if present. Otherwise none is shown

SDI Input 1 status — Displays the format of SDI video arriving at SDI Input 1 if any. Otherwise none is shown.

Analog Input status	Displays the format of analog video arriving at the analog input.
Video Reference Source	Displays the current Video Reference Source. The drop-down list offers a choice of all available sources If no external source is available this defaults to Free Run (internal). External (Genlock) or Analog Input (video input) are possible.
Video Input Selection	Displays the video Input selected currently. THe drop-down offers a choice of Analog (Component / Composite) or SDI (digital).
Video Analog Input Format	Displays the Analog Input format selected currently. Alternatives are selected in the drop-down list.

Video Output

1 Field when Stopped	Must be Enabled to allow a stable picture for interlaced video formats on stop.
Video Analog Output Format	Displays the Analog Video Outpput format selected currently. The drop-down list offers a choice of all available formats.

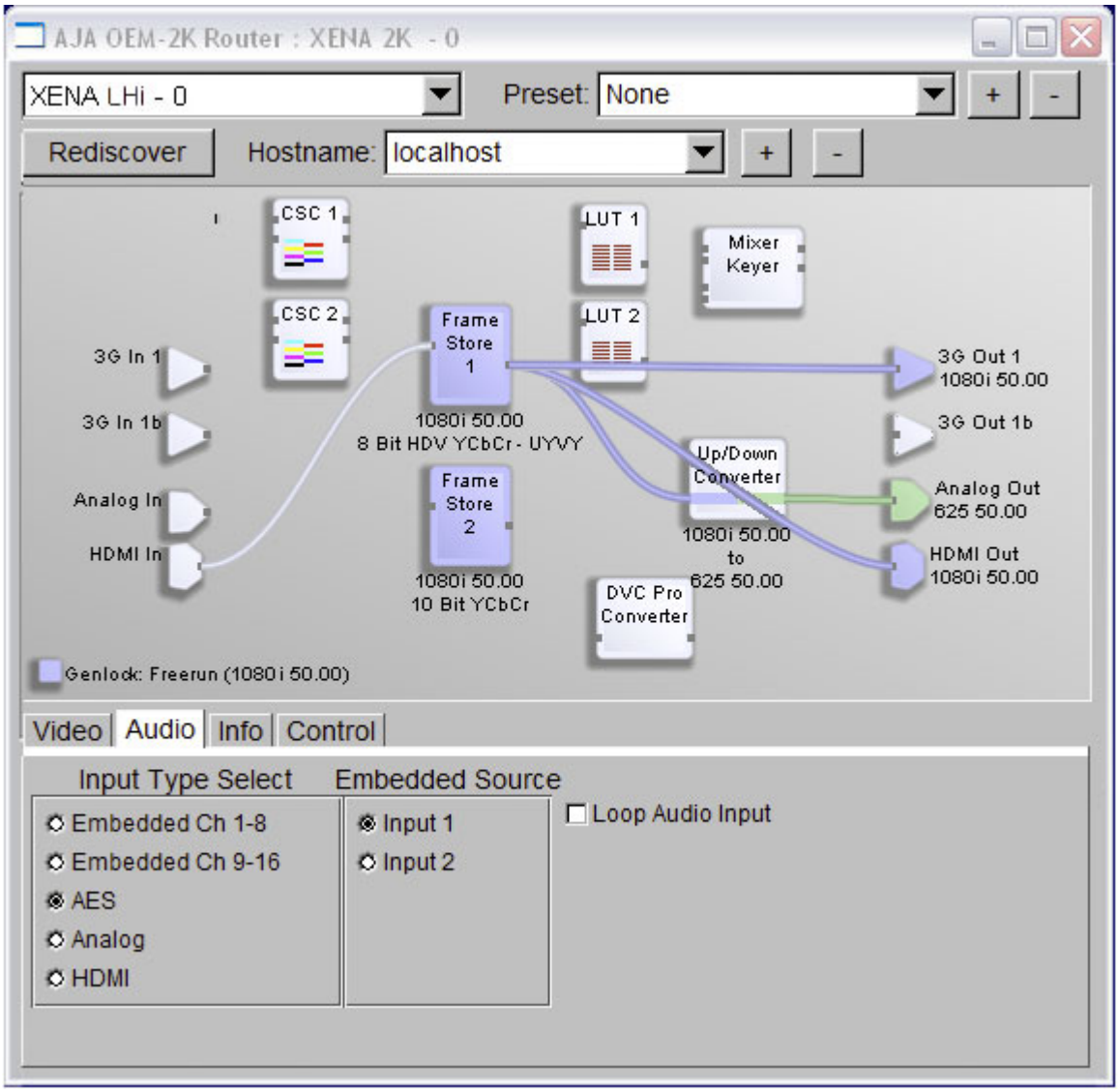
Audio

Audio Source	Displays the Audio Source selected currently. Alternatives are selected from the drop-down list.
AES SRC	When lit Sample Rate Conversion is enabled for the AES/EBU inputs.
Audio Analog Level	Displays the Analog Audio Level selected currently. Alternatives are selected form the drop-down list.

Note: During capture the reference source is toggled to the active video input.

Open Advanced Router Panel

Click the button to open the Advanced Router Panel.

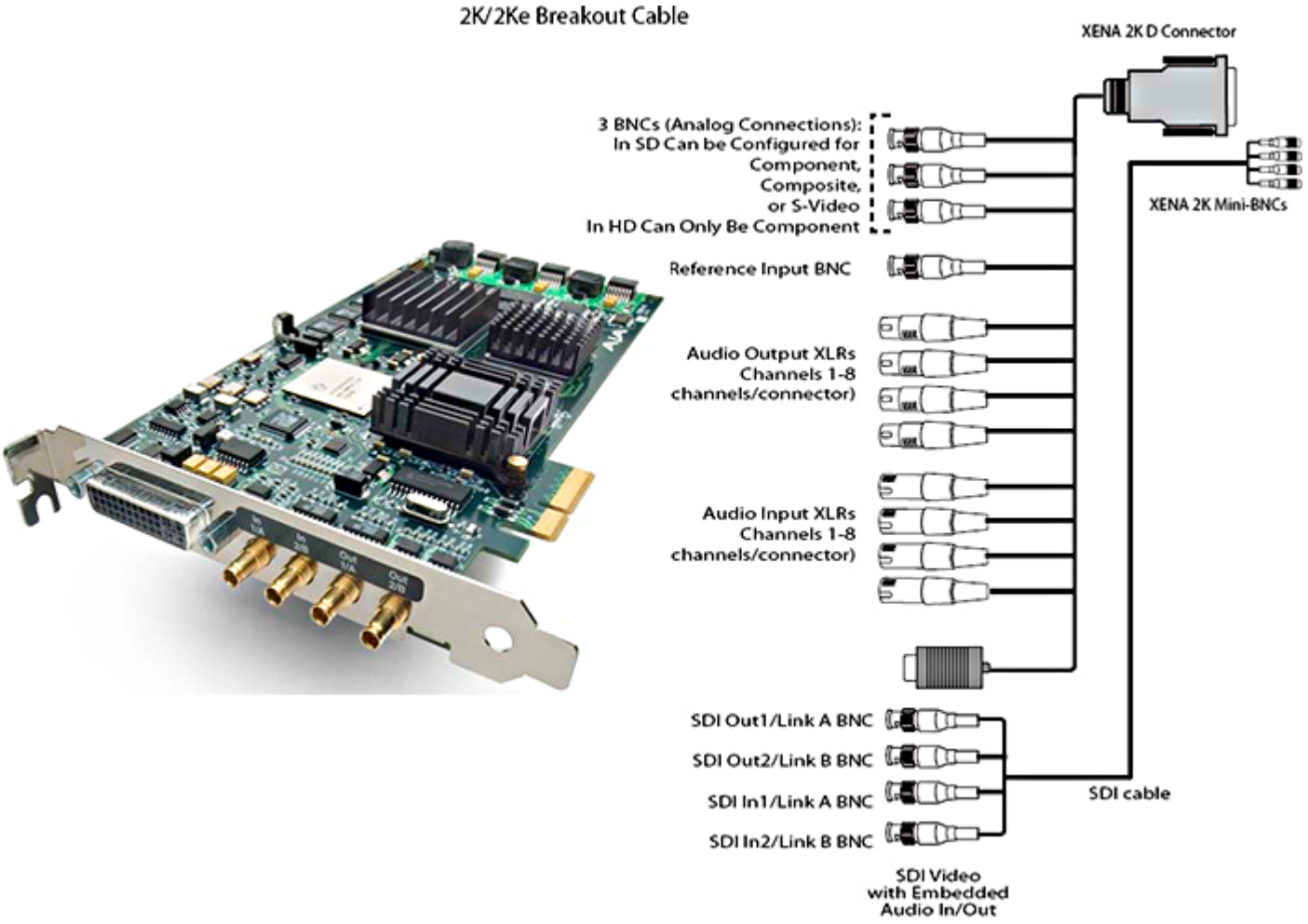


AJA LH-i/2K Router Control Panel

The screenshot shows the default playback routing for HD.

- Click-and-Drag connects the different elements.
- Right-click accesses the context drop-down list of settings for every element.
- User configurations can be saved as presets.
- The configuration last used is recalled automatically when the PC is started up.

2K - SD-SDI/HD-SDI/ 2K/ Analog



Notes:

- SDI embedded audio and the Merging Technologies' audio option cannot be used to capture audio simultaneously.
- VCube does not use the RS422 connector on the breakout cable currently.

SD Formats Supported

- PAL 4/3 D1
- PAL 4/3 DV
- PAL 16/9 D1
- PAL 16/9 DV

- NTSC 4/3 D1
- NTSC 4/3 DV
- NTSC 16/9 D1
- NTSC 16/9 DV

HD Formats Supported

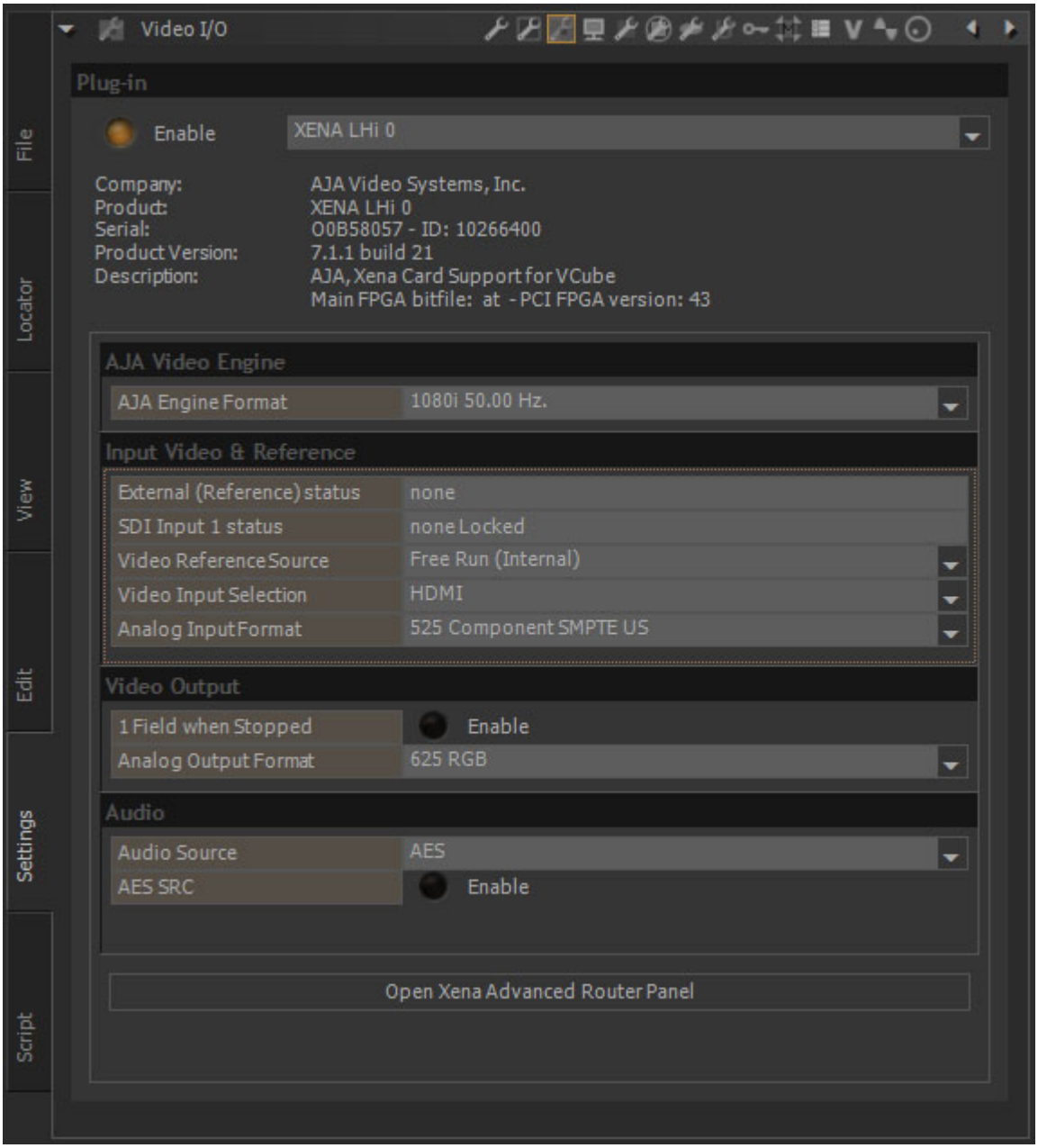
- 720p 50.00 Hz
- 720p 59.94 Hz
- 720p 60Hz
- 1080i 50.00 Hz
- 1080i 59.94 Hz
- 1080i 60.00 Hz
- 1080p sf 23.98 Hz
- 1080p sf 24.00 Hz
- 1080p 23.98 Hz
- 1080p 24.00 Hz
- 1080p 25.00 Hz
- 1080p 29.97 Hz
- 1080p 30.00 Hz
- 2048 x 108p 23.98 Hz
- 2048 x 1080p 24.00 Hz
- 2048 x 1080p sf 23.98 Hz
- 2048 x 1080p sf 24.00 Hz

Notes:

- SDI embedded audio and the Merging Technologies' audio option cannot be used to capture audio simultaneously.
- VCube does not use the RS422 connector on the breakout cable currently.

2K Plug-in

The LH-i and 2K/3G plug-ins are almost identical. 2K is one of the possible AJA video capture hardware options inside your VCube station. It supports Analog Component / Composite/ S-Video, SD-SDI and HD-SDI video for both SD and HD formats.



AJA LH-i Video I/O Settings

The LH-i version is shown above. Options available in drop-down lists will reflect the different capabilities.

Plug-in

Enable — When lit the plug-in/card selected in the drop-down list is active.

Card and plug-in details are shown under the **Enable** button.

AJA Video Engine

AJA Video Engine Format — The current internal AJA Engine format is shown. Alternatives are selected in the drop-down list.

Input Video & Reference

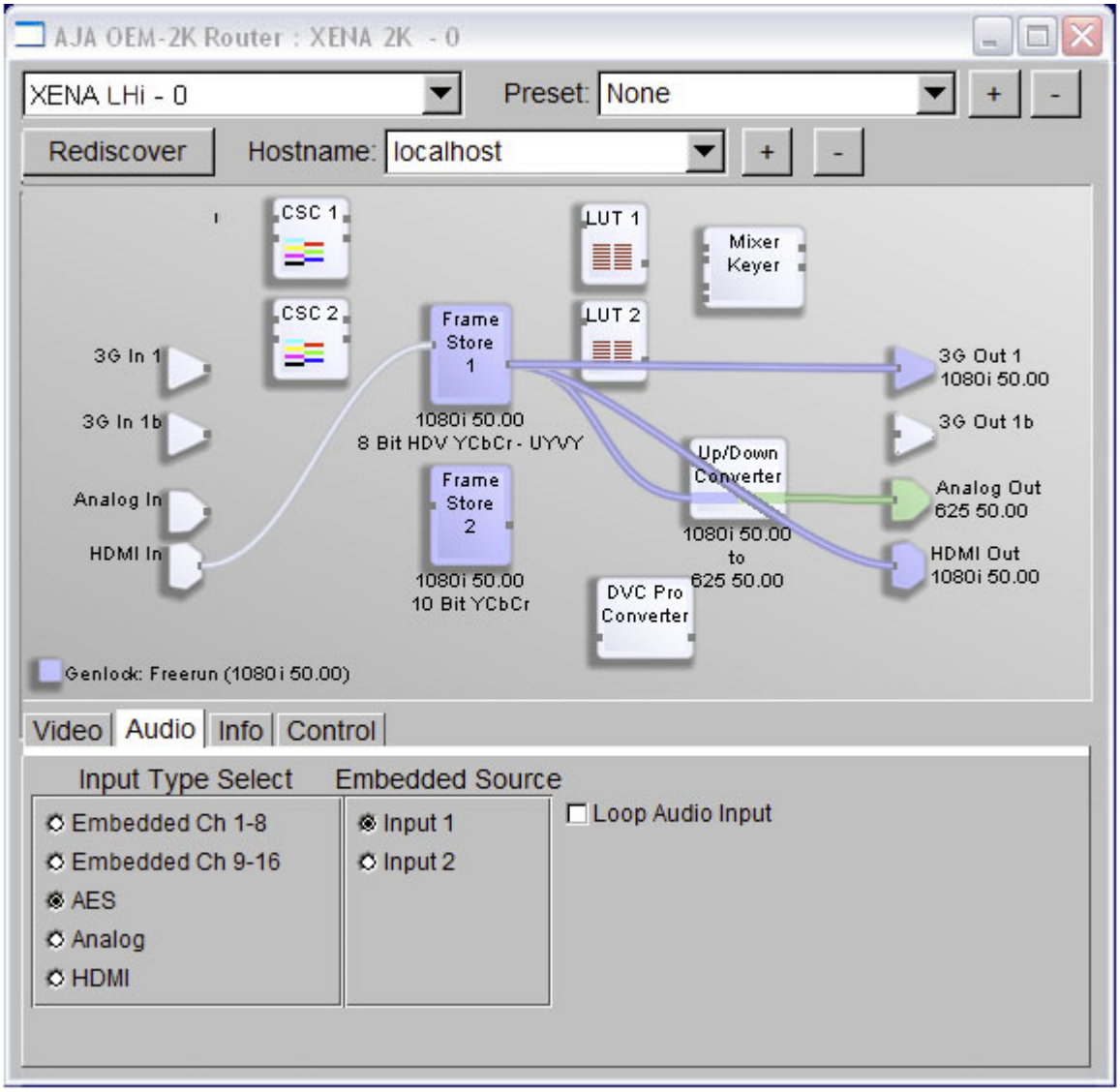
External (Reference) status — Displays the video format of the incoming genlock signal if present. Otherwise none is shown

SDI Input 1 status	Displays the format of SDI video arriving at SDI Input 1 if any. Otherwise none is shown.
Analog Input status	Displays the format of analog video arriving at the analog input.
Video Reference Source	Displays the current Video Reference Source. The drop-down list offers a choice of all available sources If no external source is available this defaults to Free Run (internal). External (Genlock) or Analog Input (video input) are possible.
Video Input Selection	Displays the video Input selected currently. THe drop-down offers a choice of Analog (Component / Composite) or SDI (digital).
Video Analog Input Format	Displays the Analog Input format selected currently. Alternatives are selected in the drop-down list.
Video Output	
1 Field when Stopped	Must be Enabled to allow a stable picture for interlaced video formats on stop.
Video Analog Output Format	Displays the Analog Video Outpput format selected currently. The drop-down list offers a choice of all available formats.
Audio	
Audio Source	Displays the Audio Source selected currently. Alternatives are selected from the drop-down list.
AES SRC	When lit Sample Rate Conversion is enabled for the AES/EBU inputs.
Audio Analog Level	Displays the Analog Audio Level selected currently. Alternatives are selected form the drop-down list.

Note: During capture the reference source is toggled to the active video input.

Open Xena Advanced Router Panel

Click the button to open the Advanced Router Panel.

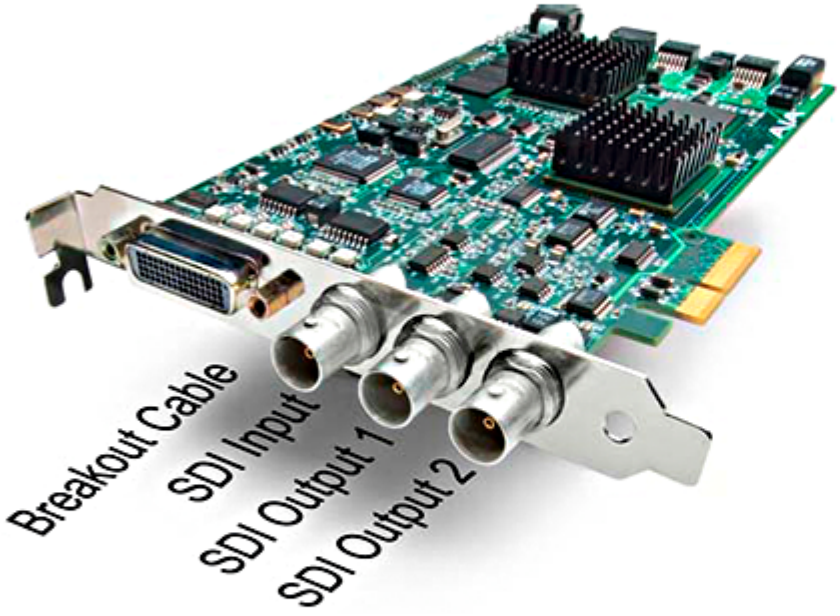


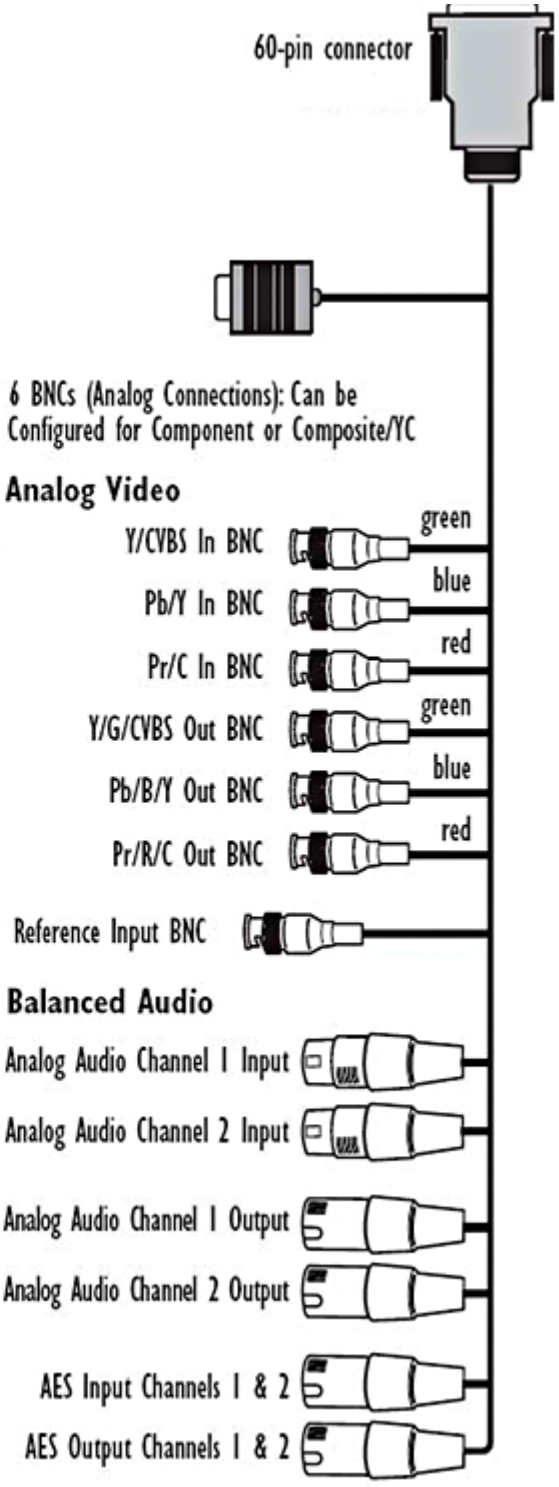
AJA LH-i/2K Router Control Panel

The screenshot shows the default playback routing for HD.

- Click-and-Drag connects the different elements.
- Right-click accesses the context drop-down list of settings for every element.
- User configurations can be saved as presets.
- The configuration last used is recalled automatically when the PC is started up.

Xena LHe - SD-SDI/HD-SDI/Analog





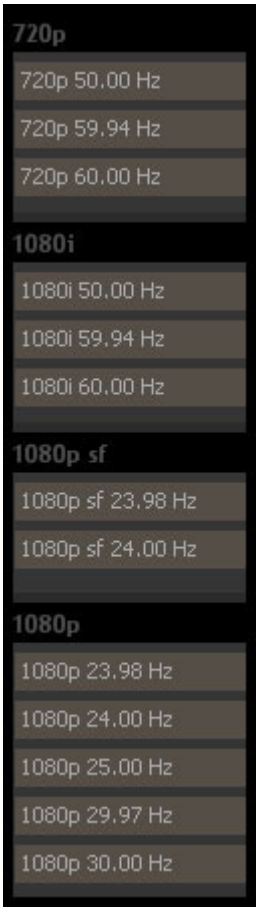
- 1 Input + 2 Outputs
- PAL and NTSC complying to SMPTE 259/292/296
- Genlock (BNC)
- Component/Composite/S Video Input (3 x BNC)
- Component/Composite/S Video Output (3 x BNC)
- Balanced Audio In (2 x XLR)
- Balanced Audio Out (2x XLR)
- 8 channels 24 Bit/48Khz of embedded audio (SDI/HDSDI)
- 2 AES audio channels In (1XLR)
- 2 AES audio channels Out (1XLR)

SD Video Formats Supported

- PAL 4/3 D1
- PAL 4/3 DV
- PAL 16/9 D1
- PAL 16/9 DV

- NTSC 4/3 D1
- NTSC 4/3 DV
- NTSC 16/9 D1
- NTSC 16/9 DV

HD Video Formats Supported



- 720p 50.00 Hz
- 720p 59.94 Hz
- 720p 60Hz

- 1080i 50.00 Hz
- 1080i 59.94 Hz
- 1080i 60.00 Hz

- 1080p sf 23.98 Hz
- 1080p sf 24.00 Hz

- 1080p 23.98 Hz
- 1080p 24.00 Hz
- 1080p 25.00 Hz
- 1080p 29.97 Hz
- 1080p 30.00 Hz

Notes:

- SDI embedded audio and the Merging Technologies' audio option cannot be used to capture audio simultaneously.
- The SDI embedded audio is not available for capture if the analog video input is selected for recording.
- SDI embedded audio cannot be captured if the analog video input is selected for recording.
- The video card analog **Video Reference Input** is not connected internally to the VCube video Reference input. Both must to be fed by the same video reference signal.

Reference Input (video card):

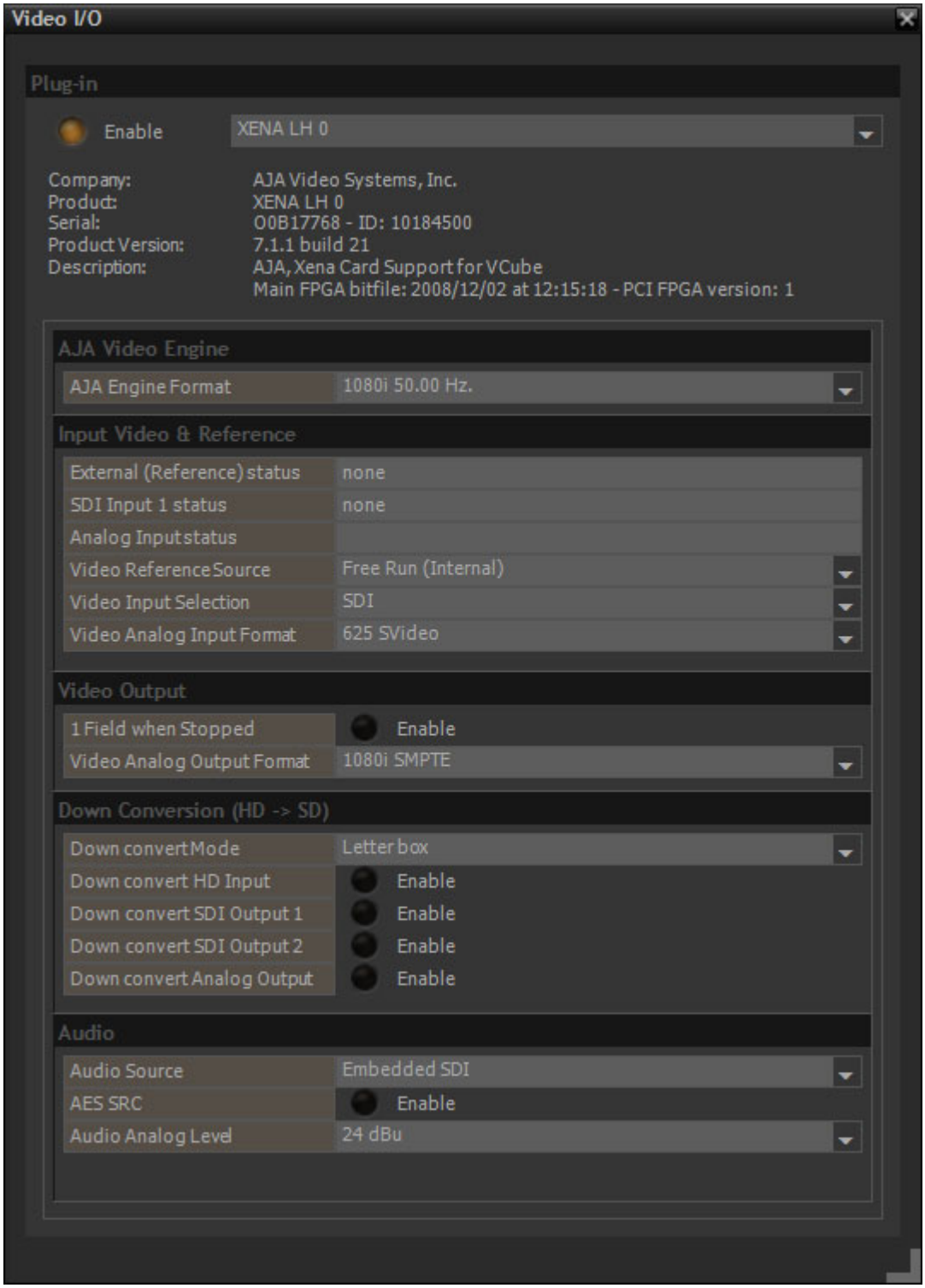
- This BNC connector allows you to synchronize outputs to your house reference video signal (or black burst). If you have a sync generator or central piece of video equipment to use for synchronizing other video equipment in your studio, then connect its composite output here. When Xena outputs video it uses this reference signal to lock to.For 1080i and 720p modes only, you may also use analog 525 or 625 **black & burst**

Sampling Rate

- The **Composition Sampling Rate** must be set to **48 KHz** when the **Xena** audio channels are used for capture or playback.
- During capture audio monitoring must be done from the card outputs where audio inputs are connected.

Xena LH Plug-in

Xena LH is one of the possible AJA video capture hardware options inside your VCube station. It supports Analog Component / Composite and SDI video for both SD and HD formats.



AJA LH Plug-in

Plug-in

Enable — When lit the plug-in/card selected in the drop-down list is active.

Card and plug-in details are shown under the **Enable** button.

AJA Video Engine

AJA Video Engine Format	The current internal AJA Engine format is shown. Alternatives are selected in the drop-down list.

Input Video & Reference

External (Reference) status	Displays the video format of the incoming genlock signal if present. Otherwise none is shown
SDI Input 1 status	Displays the format of SDI video arriving at SDI Input 1 if any. Otherwise none is shown.
Analog Input status	Displays the format of analog video arriving at the analog input.
Video Reference Source	Displays the current Video Reference Source. The drop-down list offers a choice of all available sources If no external source is available this defaults to Free Run (internal). External (Genlock) or Analog Input (video input) are possible.
Video Input Selection	Displays the video Input selected currently. THe drop-down offers a choice of Analog (Component / Composite) or SDI (digital).
Video Analog Input Format	Displays the Analog Input format selected currently. Alternatives are selected in the drop-down list.

Video Output

1 Field when Stopped	Must be Enabled to allow a stable picture for interlaced video formats on stop.
Video Analog Output Format	Displays the Analog Video Outpput format selected currently. The drop-down list offers a choice of all available formats.

Down Conversion (HD -> SD)

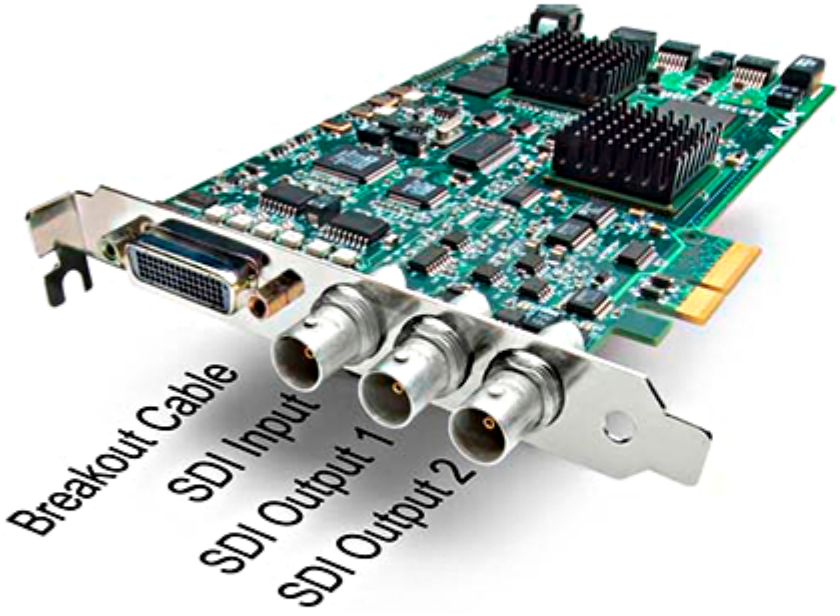
Down ConvertMode	Displays the Down ConvertMode selected currently. Alternatives are avaioable in the drop-down list. Can be Letter Box, Crop or Anamorphic for picture resize.
Down Convert HD Input	When lit, Down Conversion is enabled.
Down Convert SDI Output 1	Individual Output enable for SDI output 1.
Down Convert SDI Output 2	Individual Output enable for SDI output 2.
Down Convert Analog Output	Individual Output enable for Analog output.

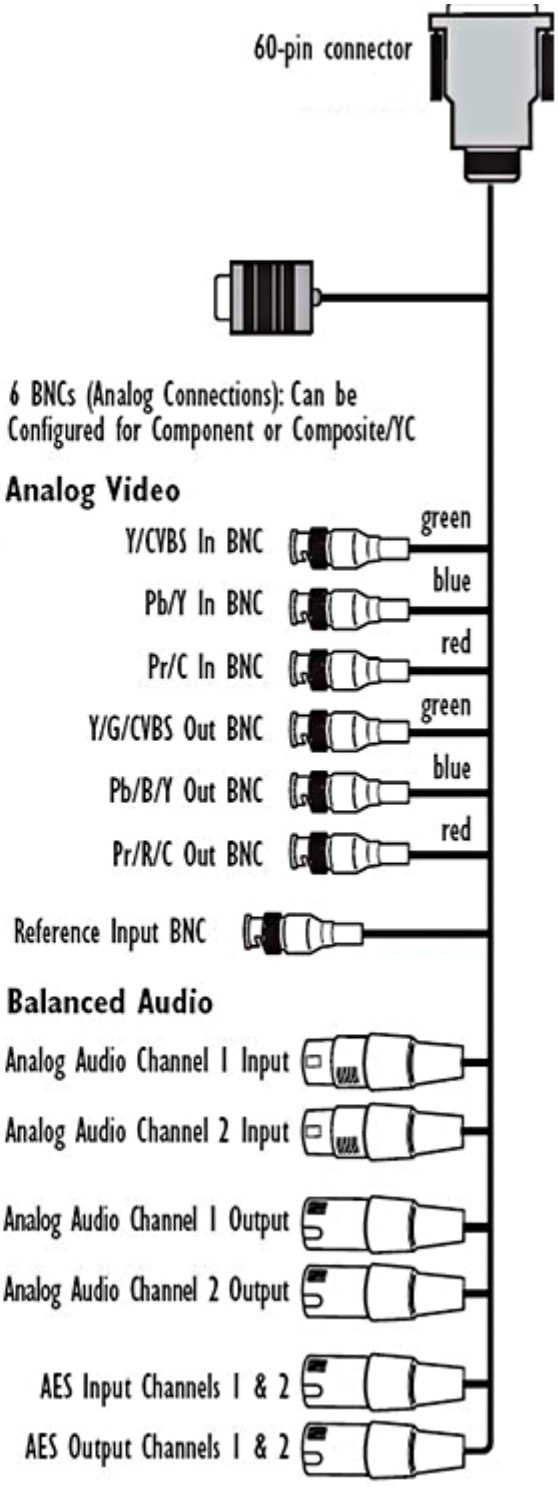
Audio

Audio Source	Displays the Audio Source selected currently. Alternatives are selected from the drop-down list.
AES SRC	When lit Sample Rate Conversion is enabled for the AES/EBU inputs.
Audio Analog Level	Displays the Analog Audio Level selected currently. Alternatives are selected form the drop-down list.

Note: During capture the reference source is toggled to the active video input.

LSe - SD-SDI/Analog





- 1 Input + 2 Outputs
- PAL and NTSC complying to SMPTE 259M (SDI)
- Genlock (BNC)
- Component/Composite/S Video Input (3 x BNC)
- Component/Composite/S Video Output (3 x BNC)
- Balanced Audio In (2 x XLR)
- Balanced Audio Out (2x XLR)
- 8 channels 24 Bit/48Khz of embedded audio (SDI)
- 2 AES audio channels In (1XLR)
- 2 AES audio channels Out (1XLR)

SD Video Formats Supported

- PAL 4/3 D1
- PAL 4/3 DV
- PAL 16/9 D1
- PAL 16/9 DV

- NTSC 4/3 D1
- NTSC 4/3 DV
- NTSC 16/9 D1
- NTSC 16/9 DV

Notes:

- SDI embedded audio cannot be captured if the analog video input is selected for recording.
- The video card analog **Video Reference Input** is not connected internally to the VCube video Reference input. Both must to be fed by the same video reference signal.

Reference Input (video card):

- This BNC connector allows you to synchronize outputs to your house reference video signal (or black burst). If you have a sync generator or central piece of video equipment to use for synchronizing other video equipment in your studio, then connect its composite output here. When Xena outputs video it uses this reference signal to lock to.

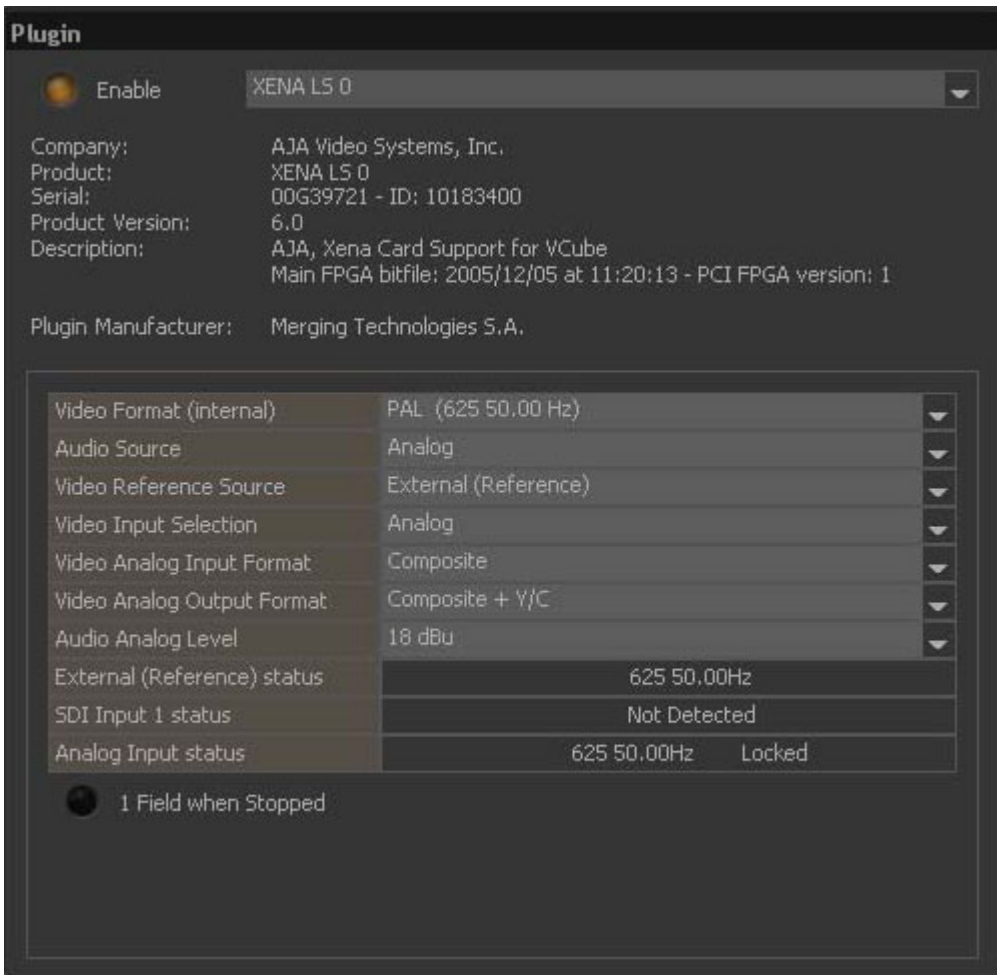
Sampling Rate

- The **Composition Sampling Rate** must be set to **48 KHz** when the **Xena** audio channels are used for capture or playback.

Xena LS Plug-in

Xena LS is one of the AJA video capture hardware options inside your VCube station. It supports Analog Component / Composite and SDI video formats. Native resolution is 720 X 576 PAL D1 / 720 X 486 NTSC D1.

Xena SD and Xena LS share the same LXXXena.dll plug-in.



AJA Xena SD and Xena LS Plug-in

Video Format switches the Xena SD card from NTSC to PAL. This format is also the output format for the Xena SD video Output. The target VTR must be capable of recording in this format.

A warning message will be displayed on the Xena SD Output if the Composition format is different from the Xena SD. (E.g. an HD Composition at 24fps progressive)

Audio Source can be analog, AES or SDI embedded.

Reference Source offers the choice of which source will be selected as reference. Free Run (internal), External (Genlock) or Input 1 (video input) are possible.

During capture the reference source is toggled to the active video input.

Input Selection offers the choice of which source will be selected. Analog (Component / Composite) or SDI (digital)

Video Analog Input Format: Composite, S video, Component SMPTE, or Component Beta are possible.

Video Analog Output Format: Composite, Component SMPTE, or Component Beta are possible.

Audio Analog Output Level: Sets the analog audio level referring to the digital full scale 0 dB during playback.

External Status displays the video format of the incoming genlock signal.

SDI Input 1 Status displays the video format of the incoming digital video signal.

Analog Input Status displays the video format of the incoming analog video signal.

VCube Hardware Sync Connections

A VCube chassis is equipped with these sync connections.

- LTC In XLR
- LTC Out XLR
- 75 ohm switch Terminates the Video Reference Input
- Video Ref In BNC Ref / VITC
- Video Ref Out BNC Ref / VITC
- Audio Word Clock In / OutBNC
- RS-422 Config switch
- RS-422 In / Out 9-pin D-Sub

15.1 Connections for synchronization

RS-422

The switch labelled **To Machine** and **From Controller** helps to configure this port correctly depending on what is connected to it.

To Machine means that VCube will control an external Machine

From Controller means that an external controller will control VCube.

This connection is used by the Sony 9-pin (P2) protocol.

COM 3 (**COM 2** on early VCubes) is the designation of this port in the **Sony 9-pin Machine Control** and **Sony 9-pin Remote Control Settings** dialogs.

Word Clock

The word clock connection has the same functionality as the one found on the (optional) Mykerinos TC breakout cable. This is a bi-directional socket, software controlled by VCube directly. It has been tested on cable runs of up to 50m in length.

> **Note:** Take care not to connect a word clock signal to this rear connector and to the breakout cable simultaneously.

Video Reference Out and Video Reference In

A switch enables/disables the 75 Ohms termination for the incoming video signal.

> **Note:** A Video Reference should be present on the **Video Reference Input** to enable the VCube to generate a VITC output on the **Video Ref Output** connector.

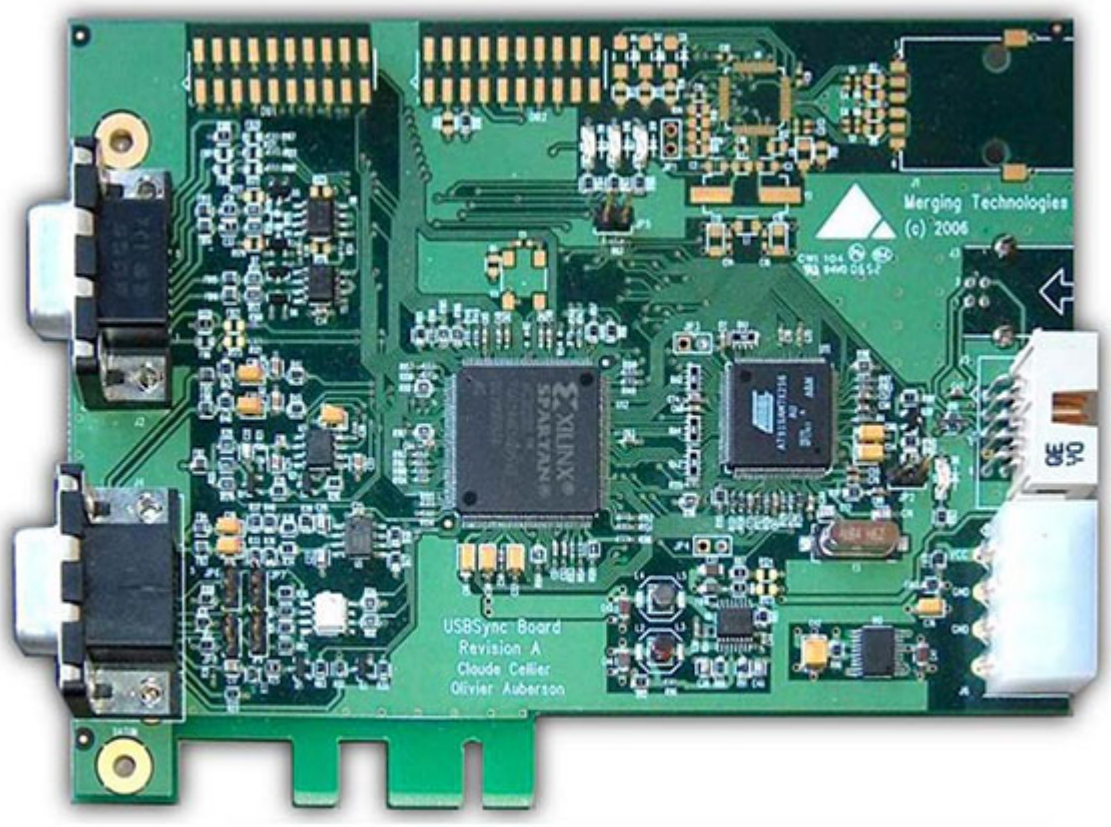
LTC Out and LTC In

LTC In accepts balanced signals and unbalanced signals. The LTC Out offers a fully balanced output signal. The level can be set in VCube.

USB Sync Board Option

VCube SE, XE, and LE require a dedicated hardware (PRO Option) to support RS-422, LTC, MIDI or optional Bi Phas-esynchronization.

This Bi-Phase option is also supported by VCube turnkey systems.



Merging Technologies USB Sync board

The card can be inserted in a PCI or PCIe slot. There are no electrical connections to the slot. An internal USB cable makes the connection to the motherboard.

External Connections

9-pin D-Sub Connector

RS422	(Sony 9-pin (P2) protocol)

15-pin mini D-Sub Connector (VGA type) for Breakout Cable

Video Reference Input	BNC
2 x Biphase I/O (4 connectors)	DIN 5p 180°
2 x MIDI I/O	(uses the Biphase connectors)
LTC In	XLR
LTC Out	XLR

Driver Installation

The necessary Drivers are installed with VCube

Default Shortcuts

	Shortcut
File	
New	**Ctrl + N**
Load	**Ctrl + L**

Easy Load	**Shift + L**
Load Selective	**Ctrl + Shift + L**
Show VCube Files	**Ctrl + O**
Close	**Ctrl + Shift + Q**
Delete	**Ext: + Shift + DELETE**
Save	**Ctrl + S**
Save As	**Ctrl + Shift + S**
Capture	**Alt + R**
Exit the Application...	**Alt + F4**

Import

Media Files	**Ctrl + Shift + O**
OMF, MXF, AAF, Apple XML Import (Create New)	**Alt + O**
Import Composition & Export Changes	
Import Layer	**Ctrl + Alt + L**
Convert Still Images	**Ctrl + I**
Export	
Export Composition	
Convert Media Files	**Ctrl + Y**
Render Composition	**Ctrl + R**
Wrapper	
Edit	
Undo	**Ctrl + Z**
Redo	**Ctrl + Shift + Z**
Cut	**Ctrl + X**
Cut & Ripple	**Ctrl + Shift + X**
Copy	**Ctrl + C**
Paste	**Ctrl + V**
Paste & Ripple	**Ctrl + Shift + V**
Paste at Previous TimeCode	**Ctrl + M**
Paste at Original TC	
Delete Selected	**Ext: DELETE**
Delete Track(s) or Layer(s)	**Ext: Ctrl + DELETE**
Split Clip(s)	**Ctrl + T**
Group	**Ctrl + G**
UnGroup	**Ctrl + U**
UnGroup All	**Ctrl + Alt + U**
Lock Selected Clips	**Ctrl + K**
UnLock Selected Clips	**Ctrl + Shift + K**
Add	
New Video Track	**Ctrl + Shift + T**
New Audio Track	**Ctrl + Alt + T**
New Layer	**Ctrl + Shift + N**
New Text Clip	**Shift + T**
New Post-it (Text Clip)	**Alt + T**
New Countdown Clip	

New Wipe Clip	
New Audio Tone Clip	
New Video Test Pattern Clip	
Nudge	
Nudge to Left	Ext: Ctrl + LEFT
Nudge to Right	Ext: Ctrl + RIGHT
Nudge Up	Ext: Ctrl + UP
Nudge Down	Ext: Ctrl + DOWN
Nudge Override	
Nudge to Left Override	Ext: + Shift + LEFT
Nudge to Right Override	Ext: + Shift + RIGHT
Nudge Up Override	Ext: + Shift + UP
Nudge Down Override	Ext: + Shift + DOWN
Tracks	
Nudge Up Track	Ext: Ctrl + Shift + UP
Nudge Down Track	Ext: Ctrl + Shift + DOWN
Selection	
Range To Region	Ctrl + RETURN
Select Previous Layer	Ext: UP
Select Next Layer	Ext: DOWN
Select All Clips on Selected Layers	Shift + A
Select All Clips	Ctrl + A
UnSelect All Clips	Esc
Zoom	
Zoom In	Alt + 3
Zoom Out	Alt + 4
Zoom All	Alt + 1
Zoom Undo	Alt + 2
Locators	
Set mark In	NUMPAD 7
Set mark Out	NUMPAD 8
Set Mark I/O From Selection	RETURN
Go to In	NUMPAD 4
Go to Out	NUMPAD 5
Set Locator	NUMPAD 9
Set Locator at Cursor	Ext: DIVIDE
Go to Locator	NUMPAD 6
Go to Previous Locator	SUBTRACT
Go to Next Locator	ADD

Add

Auto Create Locators All Layers	Ctrl + Alt + NUMPAD 9
Auto Create Locators on Selected Layer	Alt + NUMPAD 9
Auto Create Locators on Selected Layer (Add)	Ctrl + NUMPAD 9
Go to	
Goto Composition Start	Ctrl + NUMPAD 0

Goto Composition End	**Alt + NUMPAD 0**
Go to In	**NUMPAD 4**
Go to Out	**NUMPAD 5**
Go to Locator	**NUMPAD 6**
Go to Previous Locator	**SUBTRACT**
Go to Next Locator	**ADD**
Goto Next Edit	**TAB**
Goto Previous Edit	**Shift + TAB**
GoToTC	**Ctrl + NUMPAD 6**
Goto Foot	**Ctrl + NUMPAD 5**

Step

Step Forward 1 frame	**Ext: RIGHT**
Step Forward 1 second	**Ext: + Alt + RIGHT**
Step Forward 10 seconds	**Ext: Ctrl + Alt + RIGHT**
Step Forward 1 minute	**Ext: + Shift + Alt + RIGHT**
Step Backward 1 frame	**Ext: LEFT**
Step Backward 1 second	**Ext: + Alt + LEFT**
Step Backward 10 seconds	**Ext: Ctrl + Alt + LEFT**
Step Backward 1 minute	**Ext: + Shift + Alt + LEFT**

Transport

Show / Hide Transport Frame	**T**
Chase Enable	**Ctrl + F1**
Rewind	**NUMPAD 1**
Forward	**NUMPAD 2**
Stop	**NUMPAD 0**
Toggle Play / Pause	**Ext: RETURN**
Toggle Play / Stop	**SPACE**
Toggle Play Reverse / Pause	**Ext: Ctrl + RETURN**
Toggle Play Reverse / Stop	**Ctrl + SPACE**
Pause	**NUMPAD 3**
Record	**DECIMAL**
Loop	**L**

Overlay

Toggle Burn In Timecode	**B**
Toggle External TC	**Alt + B**
Toggle Mask On/Off	**M**

Settings

Show Quick Settings for SD video formats	**Alt + F5**
Show Quick Settings for HD video formats	**Alt + F6**
Show Settings Preset	**P**
Show Format & Synchro Settings	**Alt + P**
Show LTC / VITC Settings	**Ctrl + F2**
Show Video I/O	**Shift + Alt + P**
Show Overlay Settings	**Ctrl + P**

Show Preview Settings	**Ctrl + Alt + P**
Show Composition Settings	**Shift + P**
Show Disk Cache & Playback Buffer Settings	**Ctrl + Shift + P**
Show User Interface Settings	**Ctrl + Shift + Alt + P**
Show Isis Settings	
Show Encryption Settings	**Alt + K**
Show Media Settings	
Show Timeline Settings	
Show VCube Preferred Search Directories	
Show All Settings	**Ctrl + F4**
Toggle VCube version	
User-Interface	
Refresh	**F5**
Simple Mode	**Alt + F1**
Advanced Mode	**Alt + F3**
Show / Hide Transport Frame	**T**
Show Timeline	**F11**
Show Record Page	**F12**
Page	
Previous Page	**Ext: HOME**
Next Page	**Ext: END**
Show Files Page	**F6**
Show Locators Page	**F7**
Show View Page	**F8**
Show Edit Page	**F9**
Show Settings Page	**F10**

Folder

Show Prior Folder	**Ext: PRIOR**
Show Next Folder	**Ext: NEXT**

File

Show VCube Files	**Ctrl + O**
Show OMF Import	**Shift + O**
Show Media Files	**Ctrl + Shift + O**

View

Show Clip Info	**Ctrl + W**
Show Shortcuts	**Shift + W**
Show Workspaces	**Alt + W**

Edit

Show Edit Main	**Ctrl + D**
Show Clip Edit	**Shift + D**
Show Layer Edit	**Alt + D**
Show Track Edit	**Ctrl + Shift + D**

Settings

Show Settings Preset	**P**
Show Format & Sync Settings	**Alt + P**
Show Video I/O	**Shift + Alt + P**
Show Overlay Settings	**Ctrl + P**
Show Preview Settings	**Ctrl + Alt + P**
Show Composition Settings	**Shift + P**
Show Disk Cache & Playback Buffer Settings	**Ctrl + Shift + P**
Show User Interface Settings	**Ctrl + Shift + Alt + P**

System

Show Windows Display Settings Dialog	**D**
Show Virtual Transport	**Alt + V**

Mykerinos

Show Mykerinos I/O	**I**
Mykerinos Settings	**Alt + I**

Output

Show Output Page	**Ctrl + F7**
Show System Output	**Ctrl + F8**
Show Buffers Output	**Ctrl + F9**
Show Playback Infos Output	**Ctrl + F10**
Show Sync Status Output	**Ctrl + F11**
Show Playback Monitor Output	**Ctrl + F12**

Script

Show Script Page	**Ctrl + F6**
Toggle Fullscreen Preview	**F3**
Toggle Floating Window	**F4**
Toggle Show/Hide Settings	**F2**
Show Shortcuts	**Shift + W**

UIWorkSpacesGroup

Load Workspace 1	**Shift + 1**
Load Workspace 2	**Shift + 2**
Load Workspace 3	**Shift + 3**
Load Workspace 4	**Shift + 4**
Load Workspace 5	**Shift + 5**
Load Workspace 6	**Shift + 6**
Load Workspace 7	**Shift + 7**
Load Workspace 8	**Shift + 8**
Load Workspace 9	**Shift + 9**
Load Workspace 10	**Shift + 0**
Generate WorkSpace 1	**Ctrl + 1**
Generate WorkSpace 2	**Ctrl + 2**
Generate WorkSpace 3	**Ctrl + 3**
Generate WorkSpace 4	**Ctrl + 4**

Generate WorkSpace 5	**Ctrl + 5**
Generate WorkSpace 6	**Ctrl + 6**
Generate WorkSpace 7	**Ctrl + 7**
Generate WorkSpace 8	**Ctrl + 8**
Generate WorkSpace 9	**Ctrl + 9**
Generate WorkSpace 10	**Ctrl + 0**

Help

Show Help	**F1**
Credits...	**C**

HDTV Recorded Media

HDTV Recording Standards			
	D9-HD	**DVCPRO-HD**	**HDCAM**
Tape	1/2"	1/4"	1/2"
Video Rate	100 Mbps	100 Mbps	140 Mbps
Audio	8x(48 Khz, 16bits)	8x(48 Khz, 16bits)	12x(48 Khz, 24bits)
Tape Durations S/L	62 min	46min	40/124 min
Disk Requirements	45 Gbytes	33.7 Gbytes	41.1/127.2 Gbytes
CODEC	DV 6.7:1	DV 6.7:1	M-JPEG 4.4:1
Scan	720p/1080i	720p/1080i 24&25p	1080i 24&25p
	HDCAM-SR	**D5-HD**	**D6 VooDoo**
Tape	1/2"	1/2"	3/4"
Video Rate	600 Mbps	235 Mbps	920 Mbps
Audio	12x(48 Khz, 24bits)	8x(48 Khz, 16bits)	12x(48 Khz, 24bits)
Tape Durations S/L	40/124 min	124 min	64 min
Disk Requirements	175/545 Gbytes	213.5 Gbytes	431.2 Gbytes
CODEC	MPEG-4 2.7:1	M-JPEG 4:1	none
Scan	1080i 24&25p	720p/1080i 24p	1080i 24p

SDTV Recorded Media

SDTV Uncompressed Recording Standards		
	D1 Sony/BTS	**D5 Panasonic**
Tape	3/4"	1/2"
Video Rate	172 Mbps	218 Mbps
Audio	4x(48Khz, 20bits)	4x(48Khz, 20bits)
Tape Durations S/M/L	6/34/94 min	23/63/124 min
Disk Requirements	7.6/42.9/118.5 Gbytes	36.8/100.6/198 Gbytes

SDTV Compressed Recording Standards			
	Digital Betacam	**MPEG-IMX**	**D9 Panasonic**
Tape	1/2"	1/2"	1/2"
Video Rate	99 Mbps	50 Mbps	50 Mbps
Audio	4x(48Khz, 20bits)	8x(48Khz, 16bits) 4x(48Khz, 24bits)	4x(48Khz, 16bits)
Tape Durations S/M/L	40//124 min	72//220 min	/124/ min
Disk Requirements	29//90 Gbytes	26.4//80.6 Gbytes	/45/ Gbytes
CODEC	Sony's MJPEG	MPEG-2 Intra-field	DV
	DVCPRO50	**BetacamSX**	**DVCPRO25**
Tape	1/4"	1/2"	1/4"
Video Rate	50 Mbps	18 Mbps	25 Mbps
Audio	4x(48Khz, 16bits)	4x(48Khz, 16bits)	2x(48Khz, 16bits)
Tape Durations S/M/L	/31/93 min	62//194 min	/ 63/184 min
Disk Requirements	/11.4/34.1 Gbytes	8.2//25.6 Gbytes	/11.6/33.7 Gbytes
CODEC	DV	MPEG-2 Inter-field	DV
	DVCAM	**DV**	
Tape	1/4"	1/4"	
Video Rate	25 Mbps	25 Mbps	
Audio	2x(48Khz, 16bits) 4x(32Khz, 12bits)	2x(48Khz, 16bits) 4x(32Khz, 12bits)	
Tape Durations S/M/L	40//184 min	60// 270 min	
Disk Requirements	7.4//33.7 Gbytes	11//49.5 Gbytes	
CODEC	DV	DV	

Video Formats and Bandwidth

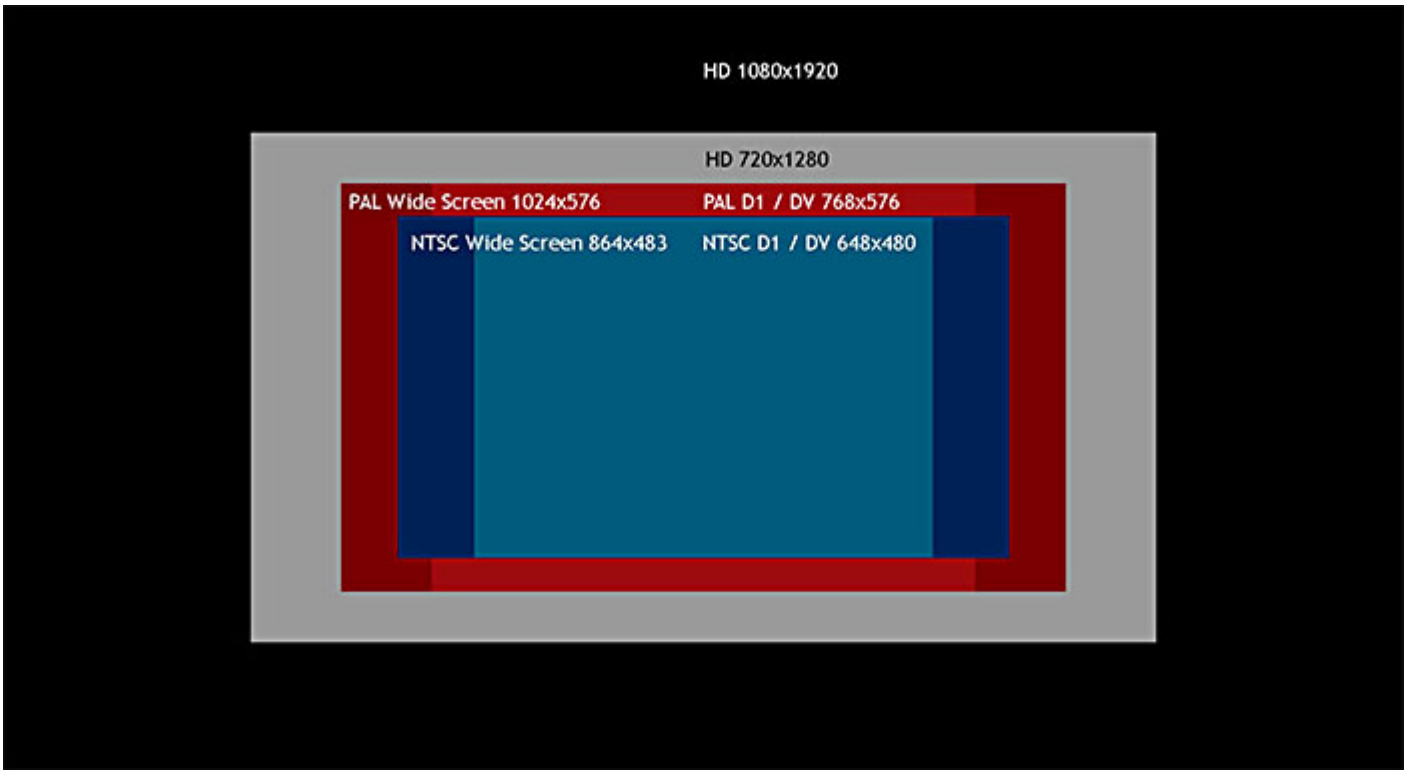
Video formats are not just defined by the number of pixels on the screen. This section gives you some clues to understand the language video people use.

As usual in electronic signals, the bandwidth is the value determining the amount of transmitted information per second.

In both analog and digital worlds, this value is critical.

A high definition color picture is more bandwidth demanding than a standard definition one.

Number of Pixels:



The number of pixels is only a part of the equation leading to the bandwidth, storage and streaming requirements computation. But since it's a two dimensional value, we must use it as the starting point of the computations.

SD Video Standards

The world is divided in two zones. One using the PAL system and one using the NTSC system. The SECAM system is almost dead for production equipment and is only used in some countries for broadcasting purpose only.

NTSC is a **720** points x **480** lines format at **29.97** frames per second.

PAL is a **720** points x **576** lines format at **25** frames par second.

Despite a greater number of elements per frame in the PAL system, it uses almost the same bandwidth as the NTSC system because of its lower frame rate. PAL transmits 10,368,000 points per second and NTSC transmits 10,487,102 points every second.

HD Video Standards

HD video systems exist in two main standards. The first one is 1280 pixels x 720 lines. It's also called 1K. The second one is 1980 pixels x 1080 lines. It's also called 2K. The frame rate may vary from 23.98 fps to 60 fps, leading to very different results in terms of the bandwidth used.

A 720 HD video at 23.98 fps requires 22,096,303 points per second transmission and a 1080 HD video at 29.97 fps needs 62,145,792 points per second transmission.

Pixel Aspect Ratio

This is the shape of the individual pixels.

HD video systems use mainly square pixels with aspect ratio equal to 1:1

NTSC uses an aspect ratio of 0.9:1 resulting in a 648 x 480 display.

NTSC wide uses an aspect ratio of 1.2:1 resulting in a 864 x 483 display.

PAL uses an aspect ratio of 1.07:1 resulting in a 768 x 576 display.

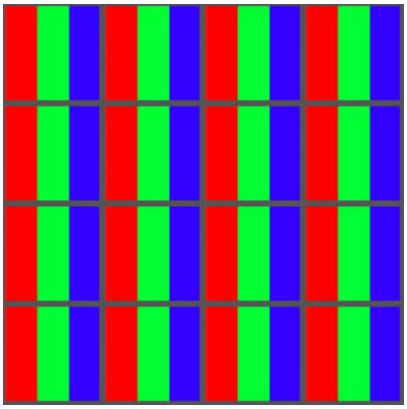
PAL wide uses an aspect ratio of 1.42:1 resulting in a 1024 x 576 display.

Note: that wide screen formats don't use a greater number of pixels to produce a larger picture.

Color Sampling

RGB

RGB means Red, Green and Blue. Every pixel is sampled for three values representing Chroma and Luma.



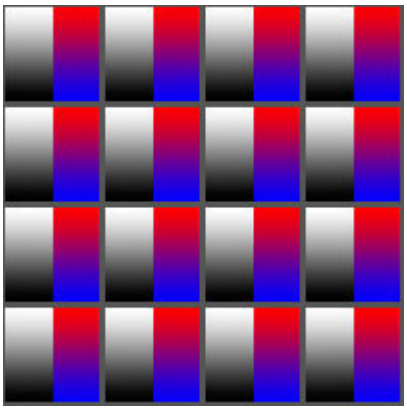
4.4.4 means that every pixel is sampled for **Chroma** and **Luma** value.

The two Chroma values are the result of:

Luma minus Red value

and

Luma minus Blue value



The RGB and 4.4,4 color sampling systems lead to a high bandwidth requirement while preserving color definition.

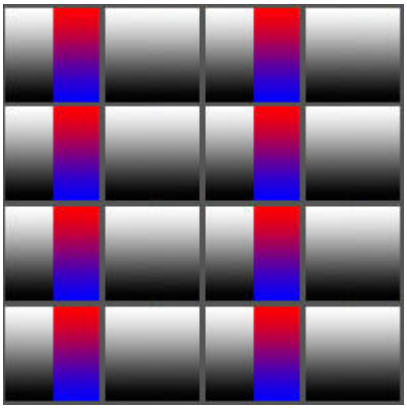
They are used by graphics and special effects designers. The maximum Chroma information is required to avoid artefacts when the picture is processed. There are 3 values per pixel.

Since high bandwidth requirement means expensive equipment, video engineers have developed ingenious strategies to reduce these requirements in a transparent manner. Fortunately, human vision is less acute for color than for luminosity. For this reason color sampling can be undertaken at a lower resolution than the luminance sampling in order to reduce overall bandwidth requirement with no visible impact.

4.2.2

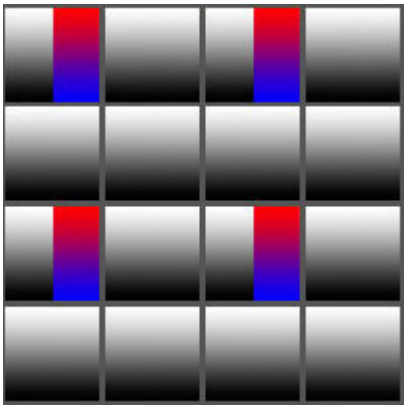
4.2.2 has been widely adopted by the video industry and broadcasters because of its good quality to bandwidth ratio.

Here, for every four luminance samples, there are two samples of each color difference channel. We have 4 values for 2 pixels leading to 2 for computation purposes.



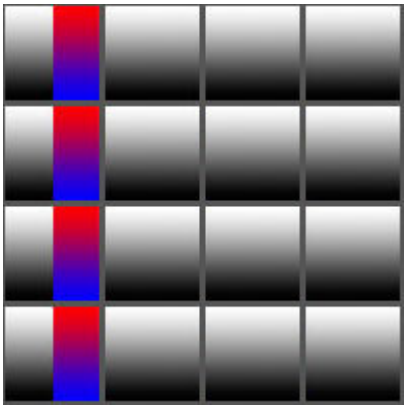
4.2.0

4.2.0 Is the color sampling mode used in DV PAL. It's also used for HD video broadcast. There are 6 values for 4 pixels leading to 1.5 for computation purposes.



4.1.1

4.1.1 Is the color sampling mode used in DV NTSC. There are 6 values for 4 pixels leading to 1.5 for computation purposes.



Color Space

Color space as a color model is an abstract mathematical model describing the way colors can be represented as numbers, typically as three or four values or color components (e.g. RGB and CMYK are color models). However, a color model with no associated mapping function to a reference color space is a more or less arbitrary color system with little connection to the requirements of any given application.

RGB uses additive color mixing, because it describes what kind of light needs to be emitted to produce a given color. Light is added together to create form from out of the darkness. RGB stores individual values for red, green and blue. RGBA is RGB with an additional channel, alpha, to indicate transparency.

YPbPr (also referred to as "YPrPb", "PrPbY", and "PbPrY") is a color space used in video electronics. It is numerically equivalent to the YCbCr colour space, but is designed for use in analogue systems whereas YCbCr is intended for digital video.

YCbCr is a family of color spaces used in video systems. Y is the luma component and Cb and Cr the chroma components. It is often confused with the YUV colour space and typically the terms YCbCr and YUV are used interchangeably, leading to confusion. In fact, when referring to signals in digital form, the term "YUV" probably really means "YCbCr" more often than not.

Bit Depth

As usual in digital conversion of values, the higher the bit depth, the higher the resolution.

As usual, more bits means more information, higher bandwidth, higher technical requirements.

- -8 bit leads to 256 possible values
- 10 bit leads to 1024 possible values

- 12 bit leads to 4096 possible values
- More bits for pixel sampling is only used for special cases like film color calibration and other computing intensive processes.
- Linear scale means that the input value is reflected with no change to the output
- Logarithmic scale is a scale of measurement that outputs the logarithm of a physical quantity instead of the quantity itself.

This is often used if the underlying quantity can take on a huge range of values; the logarithm reduces this to a more manageable range. Some of our senses operate in a logarithmic fashion (doubling the input strength adds a constant to the subjective signal strength), which makes logarithmic scales for these input quantities especially appropriate. This type of scale is use in digital cinema to emulate the 35 mm film capability of high light transmission.

Frame Rate

- 23.98 HD
- 24 Film, HD
- 25 PAL, HD
- 29.97 NTSC, HD
- 30 HD
- 50 HD
- 59.94 HD
- 60 HD

We are using the term **frames**, but most common video formats use 2 fields per frame since they're interleaved. This means that a frame is constructed from 2 fields (one for odd lines, one for even lines) displayed at twice the frame rate of the video standard. To simplify the bandwidth computation, the frames value will be used.

Bandwidth Computation

Number of pixels per frame x color sampling value x bit depth x frame rate = number of bits per second

We will compute the required bandwidth for NTSC format with 8 bit 4.2.2 broadcast color sampling and 1080p with 12 bit 4.4.4 for processing quality.

NTSC -> 159.5 Mbps -> 20 MB / s

1080 @ 29.98 fps -> 2133.6 Mbps -> 266.7 MB / s

These are the absolute minimum sustained performances required for network and storage.

These data rates can be reduced by using a data compression codec.

Compression Codecs

The previous computations show that video is a bit gluttonous. This bandwidth requirement has its price. That why a data compression is frequently applied in order to reduce the data flow demands.

Loss-less

Loss-less codecs are mathematical solutions which regenerate the compressed data exactly. The compression ratio is often lower than 3:1

Lossy

Lossy codecs are also mathematical solutions. But they are a compromise between efficiency and quality. The compression ratio can vary from 3:1 (the quality is almost the same as the original) to more than 100:1 with visible artefacts.

Intra Frame:

DV, MJPEG, IMX. Every frame is processed individually.

Inter Frame:

MPEG with groups of pictures (GOPs). The use of GOPs is a very efficient way to compress video. But for post production purposes, intra frame codecs are to be preferred since every frame is individually encoded, allowing instant access with a lower computional overhead.

VCube features a DV codec (compression ratio ~ 1:5) and a MJPEG codec (possible compression ratio from 1:2.4 to 1:23) if required during capture or render processes.

Audio

Since video media can also feature a sound track, audio data flow must be added to the video streaming requirements.

PullUp - PullDown

One of the key features of VCube is the capability of changing the playback speed of Clips.

This function allows VCube to accomplish both PullUp and PullDown operations.

PullDown

All the story is around the NTSC video standard. In the NTSC world, a second lasts 1001 mS. That means that 30 fps

(SMPTE norm) media is displayed at 29.97 frame per second. This conversion is called pulldown.

- • VCube can convert a 30 fps Media to 29.97 fps : In the Timeline (29.97 fps) select the Clip(s) you need to change the frame rate properties of. Double-click on the selection to display the **Clips Information** page. Here, the speed can be set to **99.9%** (PullDown). Once done, the Clip(s) length remains the same in the Timeline. Now 1 frame will be missing every 1001 frames. You can use the Clip's handle to extend the Clips duration reflecting their new fps value.
- Film production in the NTSC zone uses 24 to 23.98 fps conversion to facilitate transfers to tape etc.. In this case, the speed value is also **99.9%** (PullDown). With this new frame rate an integer number of film frames corresponds to an integer number of video (NTSC) frames for telecine. This telecine technique is called the 3:2 pulldown. There are 4 frames of film for every 5 frames of NTSC video.

PullUp:

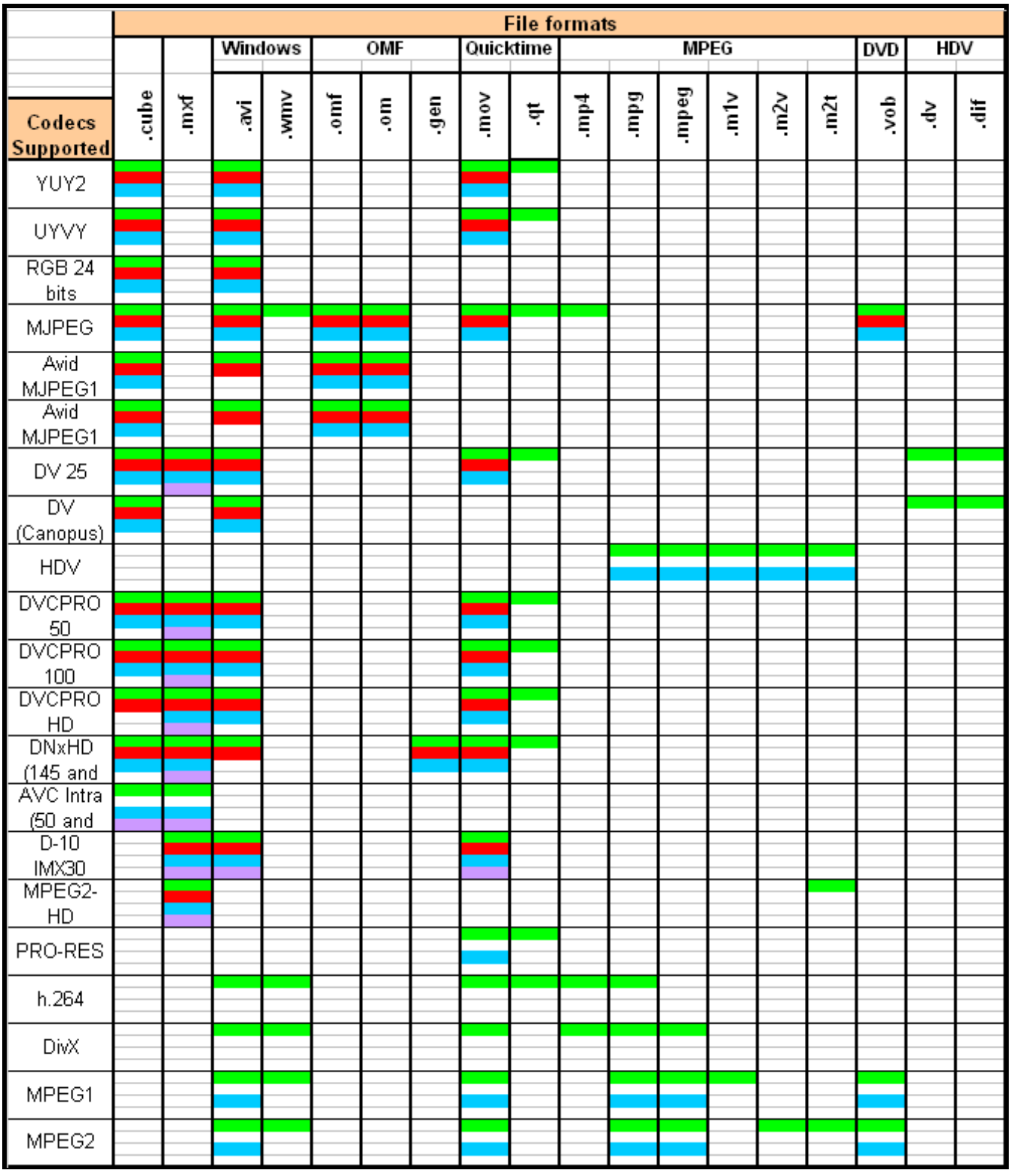
Is the reciprocal process. 1001ms becomes one second.

Drop Frame

Drop Frame is a SMPTE TimeCode format that counts 30 frames per second continuously but drops 2 frames from the count every minute except for every tenth minute (I.e. it drops a total of 108 frames every hour) to maintain synchronization of TimeCode with clock time. This is necessary because the actual frame rate of NTSC video is 29.97 frames per second rather than an integer 30 frames.

VCube displays "drop frame" TimeCode in this form 00:00:00;00 Notice the semi-colon separator before the frames instead of the normal colon.

Video Codecs Supported



Key	
	Direct playback (NO CONVERSION REQUIRED)
	Direct record up to 30 fps (needs VCube model with AJA video card)
	Render
	Wrap

Note: For DV video in QuickTime files we recommend using standard sizes such as 720x576 for PAL in order to use the Windows DV codec which is better optimized than the QuickTime DV

codec. The Windows DV codec does not support non-standard sizes.

Note: VCube is supplied with DV and MJEPG codecs as standard. DVCPRO and MXF are options. Some codecs will require additional activation keys and or installation of third party plug-ins.

Frame Rates Supported

Frame Rates Supported
Some frame rates may be incompatible with certain files/codecs

23.98	HD
24.00	Film/HD
25.00	PAL/HD
29.97	NTSC/HD
30.00	HD
50.00	HD
59.94	HD
60.00	HD

Interchange Protocols Supported

Interchange Protocols supported by VCube / some require optional activation key

	Audio	VCube watermarking	Reconform composition with same medias
AAF	YES	YES	YES
MXF D10	YES/BWF DOLBY E	YES	
MXF MPEG2 HD	YES/BWF/DOLBY	YES	
Apple XML Final Cut	YES	YES	YES
VCube	YES	YES	YES

Resolutions Supported

SVGA Analogue or DVI Digital Graphics Card Output Formats

	VCube Models								
Formats	SE-SD	SE Pro-SD	SE-HD	SE Pro-HD	SE Pro-DD	LE	LE Pro	XE	XE Pro
PAL 4/3 D1	✓	✓	✓	✓	✓	✓	✓	✓	✓
PAL 4/3 DV	✓	✓	✓	✓	✓	✓	✓	✓	✓
PAL 16/9 D1	✓	✓	✓	✓	✓	✓	✓	✓	✓
PAL 16/9 DV	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC 4/3 D1	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC 4/3 DV	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC 16/9 D1	✓	✓	✓	✓	✓	✓	✓	✓	✓
NTSC 16/9 DV	✓	✓	✓	✓	✓	✓	✓	✓	✓
750p 50	✓	✓	✓	✓	✓	✓	✓	✓	✓
720p 59,94	✓	✓	✓	✓	✓	✓	✓	✓	✓
720p 60	✓	✓	✓	✓	✓	✓	✓	✓	✓
1080 i 50	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080i 59,94	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080i 60	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080 psf 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080 psf 24	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080p 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080p 24	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080p 25	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080p 29,94	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
1080p 30	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
2048x1080p 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
2048x1080p 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
2048x1080p 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt
2048x1080p 23,98	Opt	Opt	✓	✓	✓	Opt	Opt	Opt	Opt

Note: Opt = 2K Option

Note: VCube supports any picture resolution from 160x120 pixels to the maximum resolution of the graphic card.

AJA Card I/O Formats

	VCube Models				
	SE-SD	SE Pro-SD	SE-HD	SE Pro-HD	SE Pro-DD
Formats					
PAL 4/3 D1	✓	✓	✓	✓	✓
PAL 4/3 DV	✓	✓	✓	✓	✓
PAL 16/9 D1	✓	✓	✓	✓	✓
PAL 16/9 DV	✓	✓	✓	✓	✓
NTSC 4/3 D1	✓	✓	✓	✓	✓
NTSC 4/3 DV	✓	✓	✓	✓	✓
NTSC 16/9 D1	✓	✓	✓	✓	✓
NTSC 16/9 DV	✓	✓	✓	✓	✓
750p 50			✓	✓	✓
720p 59,94			✓	✓	✓
720p 60			✓	✓	✓
1080 i 50			✓	✓	✓
1080i 59,94			✓	✓	✓
1080i 60			✓	✓	✓
1080 psf 23,98			✓	✓	✓
1080 psf 24			✓	✓	✓
1080p 23,98			✓	✓	✓
1080p 24			✓	✓	✓
1080p 25			✓	✓	✓
1080p 29,94			✓	✓	✓
1080p 30			✓	✓	✓
2048x1080p 23,98					✓
2048x1080p 23,98					✓
2048x1080p 23,98					✓
2048x1080p 23,98					✓

Note: VCube is now supplied with AJA LHi or AJA 2K cards depending on model.

MJPEG Compression Ratios

MJPEG Quality	Average Compression Ratio
100	2.4
99	5.5
98	6.4
97	7
96	7.4
95	8.4
94	9
93	9.8
92	10.5
91	10.9
90	11.3
85	13.5
80	15.5
75	17
70	18.4
60	21
50	23

Files Supported.

Supported File Extensions	Direct Playback or Import for Numbered Still Image Sequences	Record / Render / Convert
.cube	VCube native format	Yes
.avi	Audio Video Interleave AVI is defined by Microsoft. AVI is the most common PC AV format	Yes
.gen	AVID Nitris file format	
.omf	AVID: Open Media Framework	
.om	AVID: Open Media Framework	
.mov	Apple QuickTime	Yes
.qt	Apple QuickTime	
.bmp	Microsoft Windows Bitmap file	
.jpg	JPEG	
.jpeg	JPEG	
.tif	Tagged Image File Format (owned by Adobe, created by Aldus) It is a bitmap raster file format	
.tiff	Tagged Image File Format (owned by Adobe, created by Aldus) It is a bitmap raster file format	
.png	Portable Network Graphics A Turbo-Studly Image Format with Lossless Compression	
.gif	CompuServe graphics interchange format	
.emf	Microsoft Enhanced Metafile	
.tga	Truevison: Targa image file formats	
.mng	Multiple-image Network Graphics : A PNG-like Image Format Supporting Multiple Images, Animation and Transparent JPEG	
.jng	JPEG Network Graphics with Alpha channel	
.psd	Adobe Photoshop native format	
.pcx	PC Bitmap File Format	
.wbmp	Wireless Bitmap File Format	
.j2k	JPEG 2000	
.jp2	JPEG 2000	
.j2c	JPEG 2000	
.jbg	Raster Image File Formats	
.jpc	JPEG-2000 Code Stream Syntax	
.pgx	Portable graymap format (gray scale)	
.pnm	Portable BitMap	
.pgm	Portable GreyMap	
.ppm	Portable PixMap	
.wmv	Microsoft Windows Media Video	
.mp4	MPEG (Moving Pictures Experts Group) 4 File (.mp4, .mpe)	
.mpg	Moving Pictures Experts Group	Yes*
.mpeg	Moving Pictures Experts Group	Yes*
.m1v	MPEG (Moving Pictures Experts Group) Layer 1 (.mp1)	
.mpe	Destiny MPE Secure Audio	
.m2v	MPEG (Moving Pictures Experts Group) Layer 2 (.mp2)	
.mpv2	MPEG Audio Stream, Layer II	
.m2t	HDV file format (Mpeg2 HD 2K)	
.vob	DVD file format (Mpeg 2)	
.mxf	the Material eXchange Format Yes* (D10)	
.dv	Digital Video File Formats	
.dif	Digital Video File Formats	
.aif	Audio Interchange File	Yes
.mpa	MPEG Audio Stream, Layer II	Yes*
.wav	WAVE File Format	Yes
.bwf	Broadcast wave	Yes
.pmf	Pyramix media file format	
.ac3	Dolby AC3 audio file format	
.sd2	Sound designer	Yes
.sdii	Sound designer	

* Means optional feature.

All standard Video CODECs for Windows are supported.

A still image file such as JPEG or BMP is imported as a 5 seconds Clip in the Timeline. You can of course adjust its duration with the Clip handles in the Timeline

Notes:

A single still image is imported as a 5 second Clip.

A sequence of numbered still images is imported as one image per one video frame.

Imported still images are loaded in RAM.

Ctrl + I creates a regular video Media File from a sequence of numbered still images. The alpha channel is not used by this conversion.

AVI 1, AVI 2 and AVI ref

AVI 1, AVI 2, & AVI ref are variants of AVI Windows Media File formats.

- AVI 1 only supports files smaller than 2 GB (which allows not much more than an 11 minutes DV file to be recorded).
- AVI 2 supports files larger than 2GB.
- AVI ref can be used in order to record a group of AVI 1 files exceeding 11 minutes.

If you have to move AVI ref files from one location to another (typically from one VCube recorder to different Pyramix DAWs), make certain that the path to files will remain exactly the same. E.g. if AVI ref video Media Files are saved in the folder **D:\Video capture** on the VCube station, they must also be copied to an identical folder **D:\Video capture** on the Pyramix station. Otherwise, the path inside to AVI referenced media will no longer be valid, and DS video player or Windows Media Player won't be able to play the video files. Annoyingly, Windows Media Player and DS Player are not able to seek (fast forward, rewind...) in an AVI ref file. This type of video Media File has to be played from the beginning.

With VCube it's quite different. VCube is able to play displaced AVI ref files without any difficulty as long as all the elementary files composing an AVI ref (I.e. the AVI ref file and the referenced Media Files) are in the same folder. The path to the media must not to be the same as the original path on the recording machine. VCube is able to seek in a displaced AVI ref file.

AVI 2 files recorded with a VCube can be universally read by any standard Direct Show Video applications such as the DS video player option in Pyramix without any of the above limitations. Then the path to media can be whatever you want on the playback machine. Windows Media Player and DS Player are also able to seek freely in such an AVI 2 file.

MPEG Settings (MainConcept Encoder)

MPEG Overview

MPEG is both a compression codec and a file format (.mpeg,.mpg etc.)

MPEG Types

The following MPEG types are available as outputs for the Encoder. This list introduces the different formats; for a detailed explanation, please refer to a specialized technical reference book.

MPEG-1 — The MPEG-1 format has been developed by the Motion Pictures Experts Group, and it enables you to compress video and audio data with lower bitrates using a specific standard. You can save the format on a computer or a normal CD-ROM, and play it back using a software or hardware decoder. The MPEG-1 format is used for VCDs.

VCD (Video CD) — This profile produces MPEG-1 output suitable for burning to a recordable CD in a special format that can be played in Video CD players, computers and many standalone DVD players. The maximum resolution for MPEG-1 VCD is 352x288 with 25 frames per second and 352x240 with 30 frames per second respectively.

MPEG-2 — The MPEG-2 format has been created by the Motion Pictures Experts Group, and it enables you to compress video and audio data with a higher bitrates for best quality using a specific standard. You can save the format on a computer as well as a normal CD-ROM or DVD, and play it back using a software or hardware decoder. The MPEG-2 format is used for SVCDs and DVDs.

SVCD (Super Video CD) — This option generates MPEG-2 output suitable for burning to a Super Video CD. This format is similar to Video CD, but offers higher quality. The disadvantages are that Super Video CDs require more processing power when played back on computers. They are generally not as compatible with standalone DVD players, and they cannot hold as much video as standard Video CDs.

DVD — Please select this MPEG type to produce high quality MPEG-2 output for DVD (Digital Versatile Disc), which can be played back on normal DVD-Player.

CableLabs_ Produces a very low constant bitrate and can be used for both SD or HD formats

DVB — Is the abbreviation for Digital Video Broadcast, I.e. it is a standardized process for digital video and television transmission. Using this method, the video and audio streams are combined. The data will be compressed in MPEG-2. There are several DVB standards for different transmission methods, such as DVB-T, DVB-S, DVB-C etc.

MicroMV — The MMV format is generated by Sony MICROMV camcorders. The video footage is recorded in MPEG-2 format with a data rate of 12 MBit. It needs less space in a quality which is only slightly worse than DV. When you convert video files with the MPEG Encoder into MMV, you can play them back to the MIRCOMV camcorder afterwards.

DVHS — D-VHS (Digital Data-Video Home System) is a specific extension of the popular VHS format. It can process ATSC, HDV and DVB data streams. D-VHS allows digital high-definition MPEG-2 transport streams recordings and playback.

HDV HD1 (720p) — 720p is a HDV (High-Definition Video) format for digital video, which has been introduced by several companies (Canon, Sony JVC and Sharp). HD1 has a resolution of 1280x720 pixels progressive (frame based), and it always has an aspect ratio of 16:9. Depending on the video standard 720p uses 60, 50, 30 or 25 frames per second. HDV is an MPEG-2 format, which can store high-resolution HD video footage on a normal DV tape.

HDV HD2 (1080i) — 1080i has been developed along with the HDV format 720p, and it is not quite certain yet which of the two standards will establish itself in the end. HD2 has a resolution of 1440x1080 pixels interlaced (field based), and is always displayed in 16:9. Depending on the video standard 1080i uses 50 or 60 frames per second. HDV is an MPEG-2 format, which can store high-resolution HD video footage on a normal DV tape.

ATSC — This is the abbreviation for Advanced Television Systems Committee, the name of the group, who originated the standard for digital television in the USA. ATSC offers norm specifications for high-definition digital television (HDTV) as well as for normal standard digital television (SDTV) in MPEG format. It supports resolutions such as 720p and 1080i. The i stands for interlaced (field based), and the p for progressive (frame based).

D10 — Is a professional video format using a I frame every picture. No GOP with a constant bitrate.

XDCAM IMX — Is the Sony version of the D10. Embedded AC3 audio isn't supported by VCube for this format.

XDCAM HD— Is the HD version of the XDCAM IMX. It uses GOP to fit into almost the same bitrate as SD. Embedded AC3 audio isn't supported by VCube for this format.

Inconsistent Settings

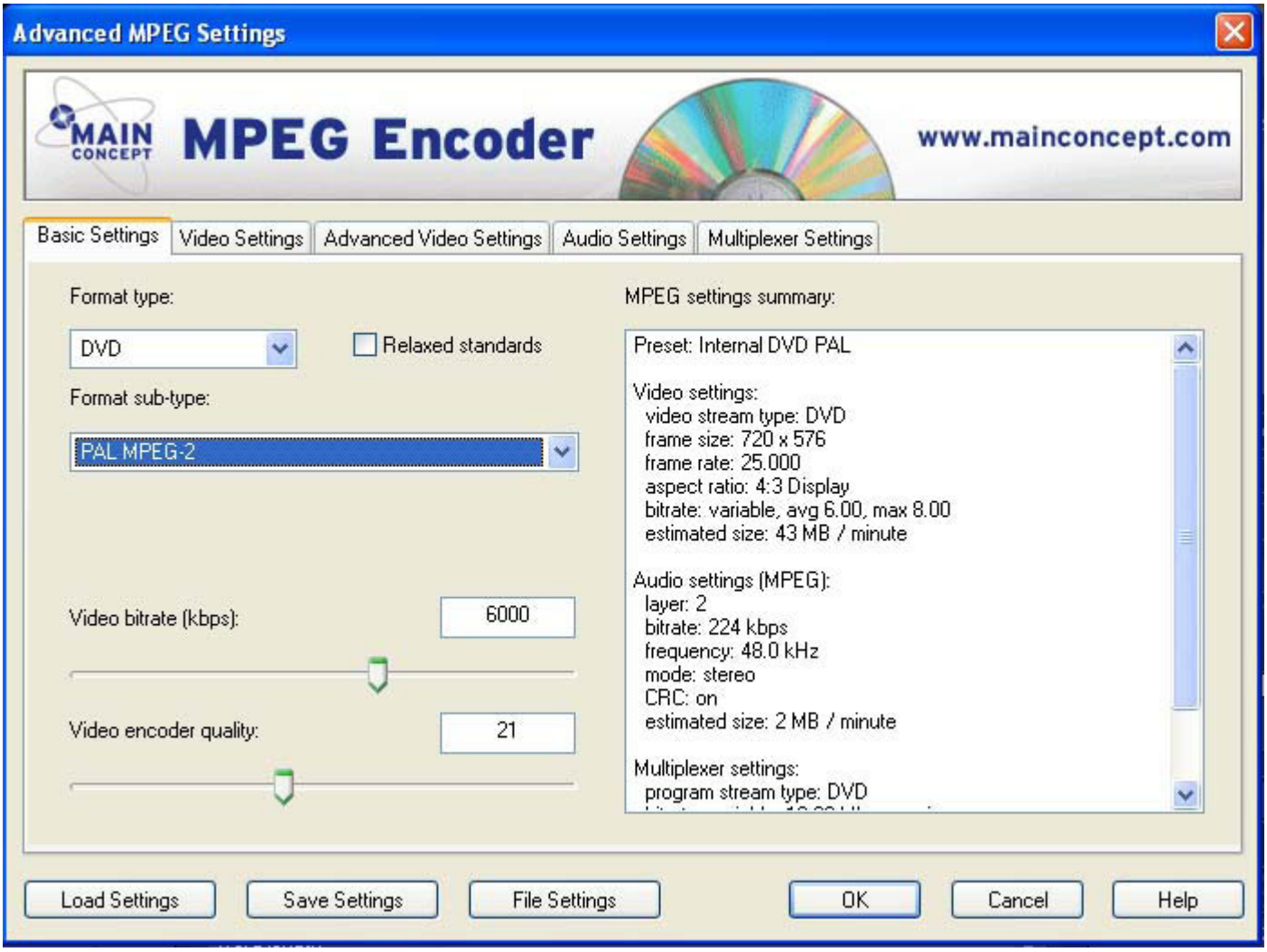
Inconsistent settings are highlighted in **red** in the MPEG settings summary. Render settings or codec settings must be adjusted to match.

• Mpeg settings using long GOP should be avoided for use in VCube to ensure a responsive seeking.

• MJPEG or DV codecs are preferred because of their intra-frame compression.

Export

Choosing an MPEG format in the **Convert Media Files : Video : File Format** field makes the **Advanced Settings** button available. Clicking it opens the **Advanced MPEG Settings** dialog :



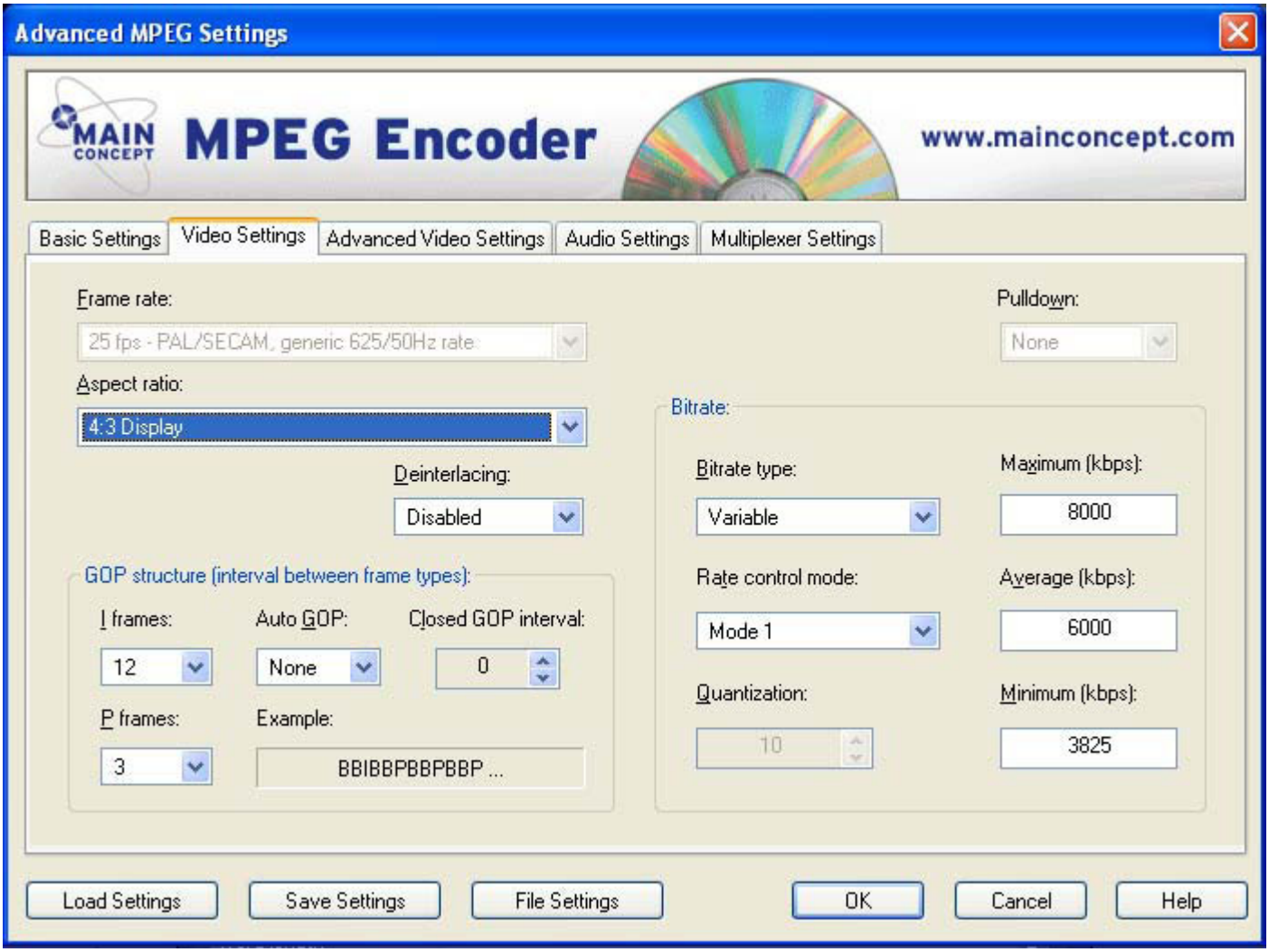
Basic Settings

The **Basic Settings** Tab enables standards compliant MPEG2 files to be produced using only a few settings:

Format type:	Choose an appropriate format from the list.
Format sub-type:	Choose an appropriate
Video bitrate (kps):	Increasing this value can improve the picture quality but the file will be bigger.
Video encoder quality:	Increasing this value can improve the picture quality but encoding time will increase.

Video Settings

This Tab enables settings to be made for **Frame rate**, **Aspect ratio** and **GOP** (Group of Pictures) structure. You can also make various adjustments to the **Bitrate**:



Frame rate: Shows current Frame Rate. Will be unavailable for change if inappropriate due to choice of Format Type in the Basic Settings Tab. Otherwise, offers a list of available Frame rates.

Deinterlacing Shows current deinterlacing status. Offers a choice of Enabled or Disabled

Aspect Ratio Shows current Aspect Ratio. Click to choose from:

Square Pels (pixels)
4 : 3 Display
16 : 9 Display
2.21 : 1 Display

Pulldown Shows current Pulldown parameters.

The parameters under Pulldown convert 23.976 fps (frames per second) to 29.97 fps, or 24 fps to 30 fps,This is should only be done to progressive frame video (like film). The movie studios slow their films from 24 fps to 23.987 and then encode using Pulldown to display at 29.97 fps. The video encoder manipulates the Top Field First (tff) and Repeat First Field (rff) flags to convert 4 frames (8 fields) to 5 frames (10 fields) like this:

(T = top field, B = bottom field)

frame 1: tff = 1, rff = 0 fields displayed: TB frame 2: tff = 1, rff = 1 fields displayed: TBT

frame 3: tff = 0, rff = 0 fields displayed: BT frame 4: tff = 0, rff = 1 fields displayed: BTB

So you get the sequence of fields: TB TBT BT BTB or grouped as frames: TB TB TB TB TB. The above would be considered 2:3 pulldown as it is 2 fields, 3 fields, 2 fields etc.

3:2 is the reverse:

frame 1: tff = 1, rff = 1 fields displayed: TBT frame 2: tff = 0, rff = 0 fields displayed: BT frame 3: tff = 0, rff = 1 fields displayed: BTB frame 4: tff = 1, rff = 0 fields displayed: TB.

In this case you get the sequence of fields: TBT BT BTB TB or grouped as frames: TB TB TB TB TB.

In most cases the MPEG Encoder adjusts the necessary settings automatically, so that the **Pulldown** option remains disabled.

GOP structure (interval between frame types)

I frames: These frames are also called Key Frames. All GOPs start with an I frame. I frames contain information for a complete picture, and can be decoded independent of any other frame. I frames are the largest (and least compressed) frames.

P frames: P frames are encoded using information from the previous I or P frame, and can only be decoded correctly if the previous I / P frame is available. P frames are smaller than I frames.

B frames: B frames are usually encoded using information from the previous I or P frame and the next I or P frame. In this case, B frames can only be decoded correctly if the previous and the next I / P frames are available. B frames are smaller than P frames. In addition, B frames can be encoded using only information from the next I / P frame but then they are larger than if they were encoded using both the previous and next frame information.

As a general rule for practical settings: The **GOP size** (in frames) is specified with the I frame setting and it must be a multiple of the P frame setting. When I frame is set to 1, all frames in the video will be I frames. When I frame is larger than 1, it specifies the size of the GOP, and the P frame setting specifies how often P frames occur in the GOP. If P frame is set to 1, the video will consist of only I and P frames. If P frame is larger than 1, B frames are placed between the P frames and the video will consist of I, P and B frames. Larger GOPs will yield greater compression but will possibly cause a loss of quality. We recommend using the default settings.

Auto GOP: This function always starts a new GOP when there is a scene change, I.e. the encoder sets an I frame. If you choose None from the drop-down menu, there will be no scene detection. The Fast option is a quick method of scene detection where no VCSD happens. During the motion search the application checks if a scene change occurs, and - if yes - the P frame is encoded as an I frame. Then the encoder starts a new GOP. VCSD is the abbreviation for Visual Content

Scene Detection, which is a better way of doing scene detection. At first, the VCSD is carried out, I.e. the analysis of the frames, and then the GOP planning. It will yield a slightly slower encoding.

Closed GOP interval: This value specifies how often the GOPs should be closed and is only of importance if there are B frames present in the GOPs. A value of 0 means do not close any of the GOPs, a value of 1 means close every GOP and a value of 2 means close every other GOP etc. If a GOP is closed, it can be decoded by itself. If a GOP is not closed, the first few B frames of the GOP will be dependent on the last P frame of the previous GOP and cannot be decoded correctly without decoding the previous GOP first. When a GOP is closed, the first few frames of a GOP are encoded so they only depend on the I frame in the GOP (the previous GOP is not required). This can be useful for setting “chapter“points so a player can jump to these GOPs and can start decoding immediately without having to read the previous GOP (or discarding the first few B frames).

Bitrate

Bitrate type: Shows current Bitrate mode Constant, Variable or Constant Quantization

Constant bitrate (CBR): Fixed bitrate (the relevant input prompt will be enabled if selected)

Variable bitrate (VBR): The minimum and maximum values define the bitrate range the encoder should stay within while encoding. The average value is the desired average bitrate of the video stream. The relevant input prompts will be enabled if selected.

Constant quantization affects the macroblock quantization value, approximately the “compression“of the macroblocks. Lower numbers yield better quality and larger files (larger bitrate results in less compression). The range is 1 ... 31; 1 is probably excessive in that the quality does not improve much but the file size increases quite a bit. A range is probably 3 ... 15 for constant quantization operation. In normal VBR/CBR modes, the encoder changes the macroblock quantization value to adjust the bitrate; in constant quality mode it does not.

Note: The Average (kbps) and the Minimum (kbps) bitrate settings must be zero in order to activate the Constant quantization option.

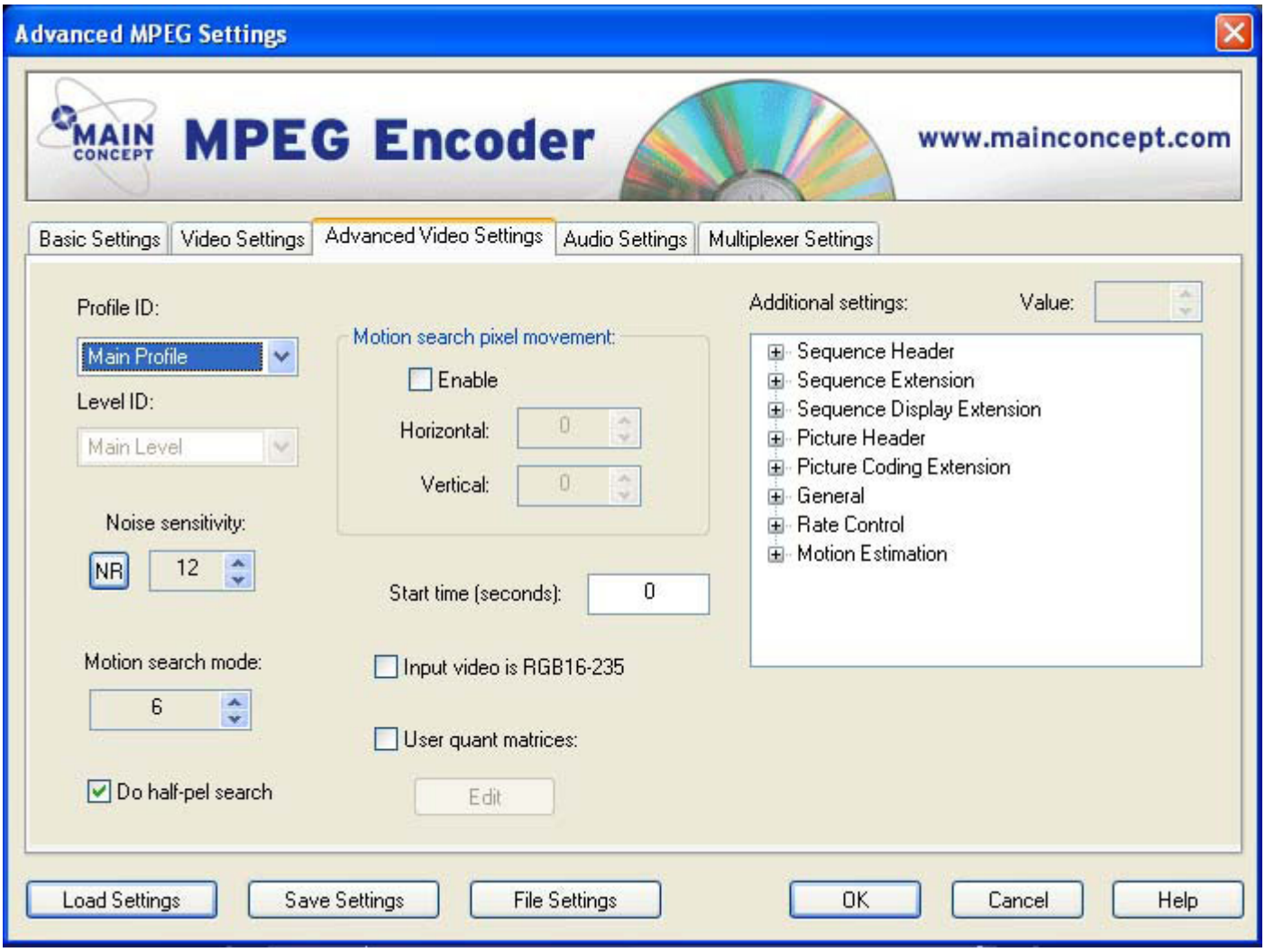
Rate control mode: Shows the current Rate control mode. Click to choose between

Mode 1 Standard mode (recommended)

Mode 128 Experimental (will probably cause problems. Should only be used for testing.)

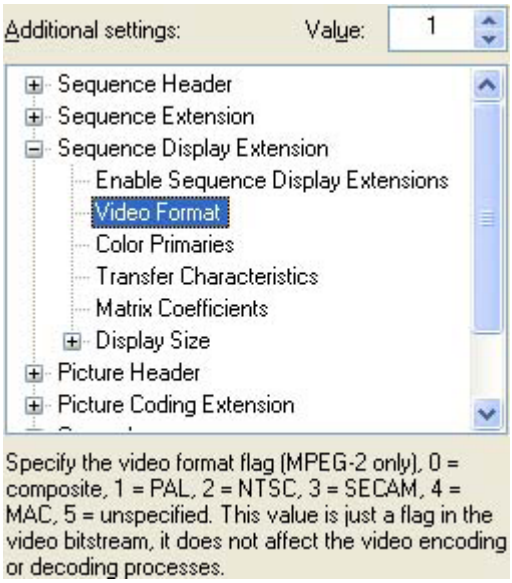
Advanced Video Settings

This Tab offers professional settings which should not be changed if you are creating MPEG streams for VCD, SVCD or DVD. These adjustments are designed for use in specific, highly technical environments.



The **Additional Settings** box on the right-hand side of this Tab contains many more parameters for professional users. If you click on an option, details are listed under the box.

Note: We strongly recommend that changes in this section are performed only by professional users.



Profile ID: Five options available: High Profile, Main Profile (standard setting), Simple Profile, 4:2:2 Profile and Multiview Profile

Level ID: Four options available: High Level, High 1440 Level, Main Level (standard setting), and Low Level.

The MPEG-2 spec (specification) allows for a large number of variations in the settings, e.g. the frame resolution can theoretically be as large as 2^14 x 2^14. The Profiles and Levels just set limits on what the values of some of the other settings can be; so if a specification (like the DVD spec) says only Main Profile/Main or Low Level is allowed, the decoders can safely assume what the bounds of some settings are going to be. A DVD player does not have to account for the resolution being 2^14 x 2^14 because the DVD spec only allows a maximum of Main Profile/Main Level which only enables for a maximum frame resolution of 720x576.

Noise Sensitivity and Noise Reduction: The NR button toggles between Noise Sensitivity and Noise reduction. The box determines the value.

Noise Sensitivity specifies how sensitive the video encoder is to noise in the source video; it does not reduce the noise in the source video at all. It sets a motion search threshold at which point the encoder will stop the search for matching blocks of pixels from one frame to another. Higher values mean low sensitivity (faster search times, less quality), while lower values mean higher sensitivity (longer search times, better quality). Typically this option is set in the **1** ... **14** range as follows:

1 ... **5** - Computer animation, VCD from DV-Source, after a line-filter or noise reducing filter (virtually no noise in the source video)

3 ... **7** - Digital video, DV-quality, Hi8-quality etc. 5 ... 14 - Analog captured video, Video 8, Hi8, broadcast TV

The setting is based entirely on the condition of the source video; it has nothing to do with the type of output (DVD, SVCD or VCD).

If you are only concerned with quality (at the expense of speed), you should set the value to 1 all the time, as this would yield the best results (but for noisy video it would slow the encoder quite a bit without any quality benefit). Basically, what the setting does, is set a level in the encoder at which point the encoder will give up trying to match a pixel between two frames.

If the source video is noisy and the setting is set to a low value, the encoder will spend more time trying to match pixels from frame to frame, and (in the case of noise) it may not find a match at all, so excessive time is spent trying to find a match when there is none.

If the source video has no noise at all, and the setting is set to a very high value, the encoder may give up to soon and not match some pixels from frame to frame (wasting bits).

Noise Reduction is a specific noise filter. It reduces the noise in a frame (spatial reduction), but it doesn't do it from frame to frame (temporal reduction). The value range is **0** ...**31**. It increases the video quality but also the encoding duration.

Motion Search Mode:

Motion search mode — Defines which method is used to search for pixel movement in the video stream. A higher value specifies a better method and will normally yield better quality. The practical range is 3 to 11. It increases the video quality but also the encoding duration.

Do half-pel Search — When this option is activated the Motion Search operation also looks for pixels that move only 1/2 of a pixel from one frame to the next (a subpixel search). This should usually be enabled and should only be disabled if speed is desired above quality.

Set motion search areas from pixel movement: These settings specify the maximum movement of a pixel from one frame to the next.

They are used to calculate the Motion Search Areas, the maximum area the encoder will search in an attempt to find a match for a block of pixels from one frame to the next. If the video has quite a bit of movement, it is useful to raise these values. Unfortunately, this also extends the encoding time.

These settings are an easy way to manipulate the Motion Search vectors. The motion search vectors can also be manually manipulated in the Motion Estimation section of the Additional Settings tree. The motion search vectors are different and optimized for the different frames and frame types.

Start Time (seconds): This option specifies the starting TimeCode in the GOP header of the video stream.

It is independent of the TimeCodes in the program stream. This TimeCode is specified as a frame number which is converted to a hr:min:sec:frames type TimeCode and placed in all GOP headers (automatically incremented). For instance, with 25 fps and a Start Time set to 300, the first TimeCode would be 00:00:12:00 or 12 seconds As another example, one could encode 1 hour of video with the start time set to zero, then encode another hour of video with the start time set to 3600 seconds. Then when the two videos are played one after the other the TimeCode will be continuous between the two files.

Input video is RGB 16-235 — When checked, particular black and white values are preserved.

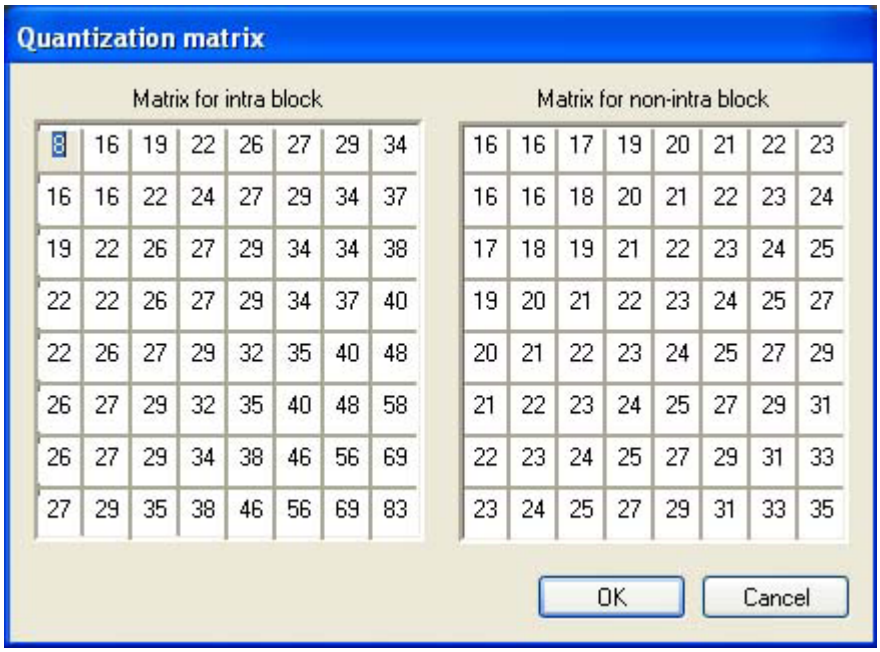
During encoding and decoding the RGB color space with R=G=B=16 is used, which corresponds to the color black. Furthermore, the RGB color space with R=G=B=235 is used, which corresponds to the color white. Normally the values for white are R=G=B=0, and for black R=G=B=255. The specification ITU601R now defines black (Y=16) and white (Y=235), i.e. the real video signal receives values which are "blacker than black"or "whiter than white"(so called super-black and super-white values). These super-black and super-white values get lost in the normal PC RGB 0..255 color space, but they are preserved with the **Input video is RGB 16-235** option.

User Quant(ization) Matrices — When checked a user defined quantization matrix is used. The matrix can be edited by clicking on the Edit button.

Each 8x8 block of pixels in the image is run through a DCT (Discrete Cosine Transformation) function which yields an 8x8 block of DCT coefficients. These coefficients are arranged in the 8x8 array with the lower frequencies in the upper left corner of the array and the higher frequencies in the lower right corner. The numbers of these 8x8 blocks are the results of mathematical functions performed by the encoder to represent the video in a smaller number of bits.

The quantization matrices determine the divider used by the quantization function for each DCT coefficient. Lower numbers mean the coefficient will be quantized less (better quality, closer to the original DCT value but more bits are needed), while higher numbers mean the coefficients are quantized more (lower quality but less bits are needed). The default intra matrix values are biased towards the low frequency coefficients; they are represented better while the high frequency coefficients are not represented as well. The numbers on the top left handle the low frequency regions, and the numbers on the bottom right handle the high frequency regions. The human eye is less sensitive to the high frequencies, so that region can be compressed to a higher degree; this is why the values are higher there. If the whole matrix consists of 1, there would be virtually no compression at all

(but a very large number of bits). If you set all numbers of the matrix to 255, you will obtain a very bad picture because it has been compressed to such a degree that it will lead to a significant loss of quality.



When you activate the **User quant matrices** checkbox you can click the **Edit** button in order to adjust the parameters for Matrix for Intra Block and Matrix for non-Intra Block. In the following window you can change these settings.

These values must be in the range 16 ... 256, with the exception that the first entry in the intra block matrix must be 8. Intra blocks are macroblocks coded using only information from the current picture (I frames), non-intra blocks are macroblocks coded using information from the current picture and other pictures (B and P frames). If the bitrate is high you should not change the parameters. Ultimately, these values depend on the source material. If the bitrate is low you can change the parameters to get better results.

Additional Settings

The different options are displayed in the tree. You can change the settings by using the Value parameter box. Depending on the setting you have to adjust the appropriate option in the corresponding tree. A short definition of the selected option is offered under the display.

Under Sequence Header you find the following option:

VBV Buffer size: This value specifies the size of the Video Buffering Verifier (VBV) buffer in KB (1024 bytes). Decoders can use this value to determine the largest buffer needed to decode the video stream. Set it to zero to have the encoder compute a value based on the video bitrate. VCD specifies 40 KB, SVCD and DVD specify 224 KB. Use the Value prompt in order to change the parameters. See ISO/IEC 13818-2 or ISO/IEC 11171-2.

The option Sequence Extension offers two settings:

Progressive Sequence: If set to 1 all frames in the video are progressive, if set to 0 both progressive and interlaced frames can appear in the video. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Chroma Format: The option specifies whether to use the 4:2:0 or 4:2:2 (high profile only) chroma format for the encoded video. See ISO/IEC 13818-2. Only the 4:2:0 and 4:2:2 formats are supported. This option is only valid for MPEG-2.

Under Sequence Display Extension you can edit several options:

Enable Sequence Display Extension: If set to 1, sequence display extension headers are placed in the video stream after the sequence extension headers. If set to 0, the Video format, Color Primaries, Transfer characteristics, Matrix coefficients and Display Size settings are not used or present in the video stream. Some SVCD players can have problems if sequence display extensions are present, for DVD the sequence display extension may or may not be present. See ISO/IEC 13818-2.

This option is only valid for MPEG-2.

Video Format: This setting is just a flag in the bitstream to inform the decoder how the pictures were represented before encoding. If the sequence display header is not present, the decoder will assume "Unspecified video format". This setting does not affect the encoding process at all. It is part of the sequence display extension and is only used when the Sequence display extension setting is 1. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Color Primaries: This field specifies the x, y chromaticity coordinates of the source picture primaries. It is strictly an informative flag to the video decoder and does not affect the video encoding at all. DVD specifies a value of 2 (ITU-R BT.470-2 System M) or 4 (SMTPE 170M) for NTSC or 3 (ITU-R BT.470-2 System B,G) for PAL. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Transfer Characteristics: This field specifies the opto-electronic transfer characteristics of the source picture. It is strictly an informative flag to the video decoder and does not affect the video encoding at all. DVD specifies a value of 2 (ITU-R BT.470-2 System M) or 4 (SMTPE 170M) for NTSC or 3 (ITU-R BT.470-2 System B,G) for PAL. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Matrix Coefficients: This field specifies the matrix coefficients used in deriving luminance and chrominance signals from the green, blue, and red primaries when RGB =>YUV conversion (if any) is done. DVD specifies a value of 3 (ITU-R Rec. 624-4 System B, G) for both NTSC and PAL. Currently only a value 3 is supported regardless of the setting of this field. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Display Size: These values specify a rectangle which may be used by decoders as their active display area. MPEG itself does not define what these values are actually used for, so it is up to the decoders to handle as they see fit. DVD does define uses for these values, and the values should be 720x480 (NTSC) or 720x576 (PAL). These settings are part of the sequence display extension and are only used when the Sequence display extension setting is 1. Use the options Horizontal and Vertical to specify the exact value. See ISO/IEC 13818-2. This option is only valid for MPEG-2.

The DVD specification does specify the values to use for the Color primaries, Transfer characteristics, Display horizontal size and Display vertical size settings, if the SDE is present.

Under Picture Header the encoder offers one more setting:

Force VBV Delay: Set to 1 to have the VBV delay in the picture headers fixed to a value of 0xFFFF. Normally this is 1 when doing VBR encoding and 0 when doing CBR encoding. When the VBV delay is 0xFFFF a different method is used to input data to the VBV than if VBV delay is not fixed to 0xFFFF. See ISO/IEC 13818-2 or ISO/ IEC 11172-2 .

The option Picture Coding Extension offers several additional settings:

Intra DC Precision: Specifies the effective precision of the DC coefficients in intra-coded macroblocks. 10-bits usually achieves quality saturation, 11-bits can be used if the quantization is very low (the bitrate is quite high compared to the frame size/rate). See ISO/IEC 13818-2. This option is only valid for MPEG2.

Use Frame Prediction and Frame DCT: Set to 1 to have the motion estimation and DCT (Discrete Cosine Transformation) computations done on both fields of a frame in the same pass, set to 0 to have them done on each field independently. Normally this should be 0 for interlaced frames and 1 for progressive frames. Setting this field to 1 will result in slight faster encoding but will yield less quality in interlaced frames. This setting can be specified independently for each frame type (I, B and P). See ISO/IEC 13818-2 section. This option is only valid for MPEG-2.

Quantization Scale Type: Specifies which mapping to use between the encoded quantization scale factor and the quantizer scale applied in the inverse quantization arithmetic. Set to 0 to specify a linear mapping or 1 to specify a non-linear mapping. This setting can be specified independently for each frame type (I, B and P). See ISO/IEC 13818-2 section 6.3.10 for more information. This option is only valid for MPEG-2.

Intra VLC Format: VLC is the acronym for Variable Length Coding. This option specifies one of two MPEG defined variable length coding tables used for intra coded blocks. Table 1 is considered to be statistically optimized for Intra coded pictures coded within the sweet spot range (e.g. 0.3 to 0.6 bit/pixel) of MPEG-2. Normally set to 1 for MPEG-2 video, this setting can be specified independently for each frame type (I, B and P). See ISO/IEC 13818-2. This option is only valid for MPEG-2.

Use Alternate Scanning Pattern: Specify one of two entropy scanning patterns which define the order in which quantized DCT coefficients are run-length coded. Set to 1 for the alternate scanning pattern or 0 for the zig-zag scanning pattern. The alternate scanning pattern is considered to be better suited for interlaced video where

sophisticated forward quantization is not enabled. This setting can be specified independently for each frame type (I, B and P). See ISO/IEC 13818-2. This option is only valid for MPEG-2.

The General option offers two more parameters you can change:

Sequence End Code: If set to 1 a sequence end code is written at the end of the video stream (it terminates the stream). Normally this is set to 1, set to 0 if you intend to concatenate video streams together after encoding. See ISO/IEC 13818-2 section 6.3.2 or ISO/IEC 11172-2.

Embed SVCD User Blocks: If set to 1, user data blocks are placed in the bitstream to reserve space for the SVCD scan information data. The multiplexer then fills in the correct values when the video stream is muxed. Should only be enabled for SVCD video, but disabled for non-standard SVCD video.

Under Rate Control you find the following options:

The options Reaction Parameter, Initial Average Activity, Initial Global Complexity Measure and Initial Virtual Buffer Fullness are very complex as well as highly mathematical. These values are default to 0 and should not be changed unless advised to do so by MainConcept support.

Minimum Frame Percentage: This option is basically the target number of bits (as a percentage of the VBV size) for the first frame in the stream.

Pad Frame Percentage: This function is used when the VBR bitrate drops below the specified minimum bitrate. It is only applicable for VBR; if this field is 0 no padding occurs and the minimum bitrate is permitted to drop below the specified minimum. If the field is 100, the stream is padded to keep the minimum bitrate near the specified minimum.

Motion Estimation offers the following options:

- P Frame Motion Vector
- Forward Search Width
- Forward Search Height
- B Frame Motion Vectors
- Forward Search Width
- Forward Search Height
- Backward Search Width
- Backward Search Height

The search width and height settings set the (half) width of the window used for motion estimation. Here is an example of how to set these values, assuming a maximum motion of 10 pixels per frame in horizontal direction and 5 pixels per frame in the vertical direction and M = 3 (I B1 B2 P). Table 1: Search Width and Height values

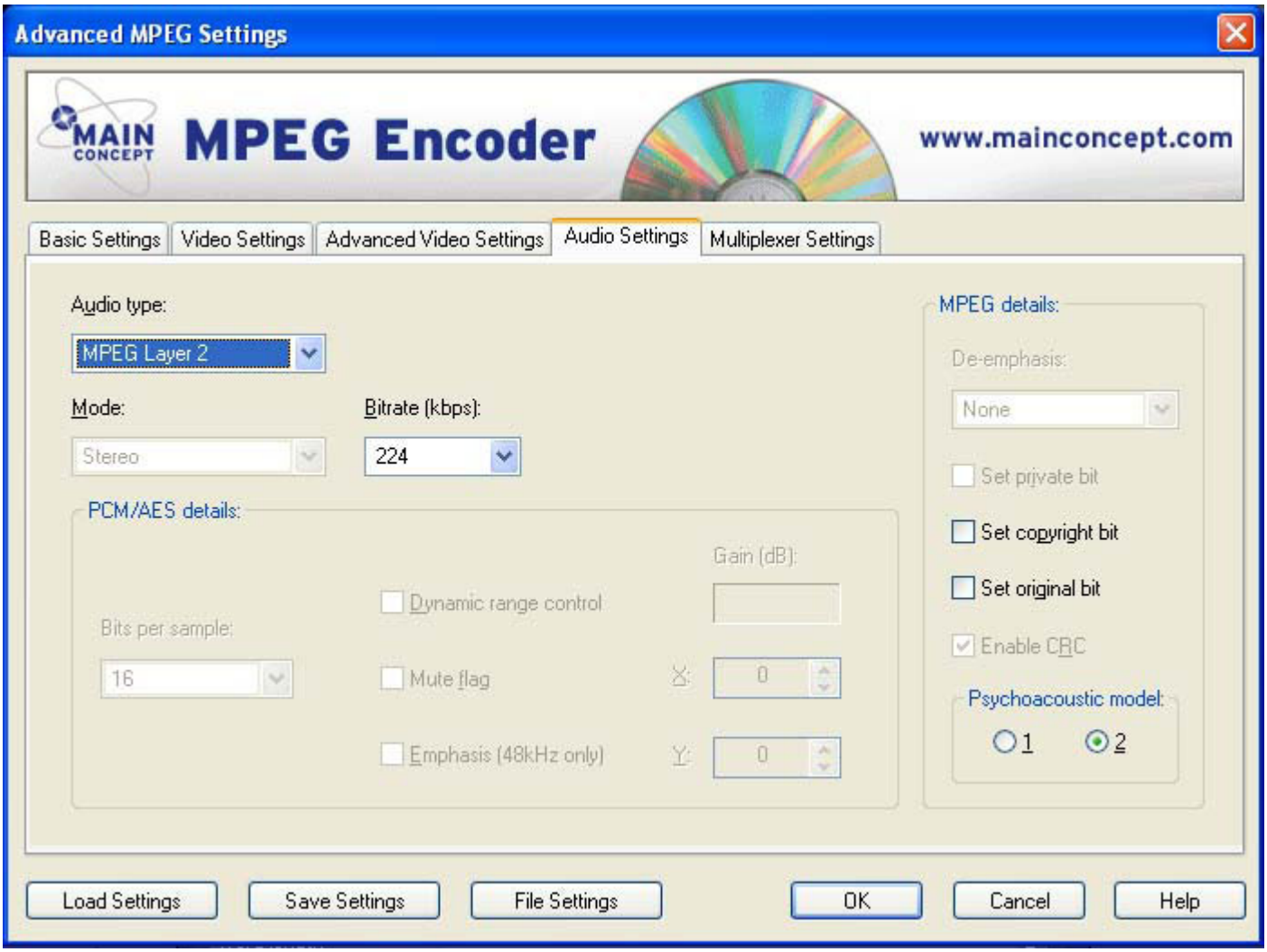
Forward	Horizontal	Vertical	Backward	Horizontal	Vertical
I > B1	10	5	B1 > P	20	10
I > B2	20	10	B2 > P	10	5
I > P	30	15			

The search window settings are +/- values, for instance if a search window value is 10, the actual search for a matching pixel is done from (x + 10, y) to (x - 10, y) for each pixel (x, y).

These values are usually set automatically by either the Video encoder quality sliders (Search method and Search range) or the Motion search pixel movement settings but can be set manually here.

Audio Settings

This Tab offers adjustments for audio export :



The Audio Settings include the following options and parameters:

Audio type: Shows the current Audio type. Click to change the type;

None	If you do not want to encode audio, select **None** here.
MPEG-1 Layer 1	Not used commonly
MPEG-1 Layer 2:	Used for **VCD**, **SVCD** and **PAL DVD**
PCM	Used for **NTSC DVD**

NTSC DVDs use LPCM (Linear PCM) audio (or AC3) as the standard audio type instead of MPEG Layer2. LPCM is an uncompressed audio format, which offers higher quality but it also uses far more of the total bitrate (consequently less bitrate is available for the video stream). PCM is only available for MPEG-2 type streams, and is seldom used for PAL DVDs.

MPEG: details

De-Emphasis Shows current de-emphasis option. Click to choose from:

None
50/15 uS
ccitt. j 17.

This is a flag to the player specifying what kind of de-emphasis to perform on the audio. DVD and SVCD specify None, VCD can be either None or 50/15 uS.

Mode Shows the current mode. Click to choose Stereo or Standard stereo, Joint Stereo, Dual Channel or Single Channel.

Joint Stereo: This option can convert the sound to mono in the lower frequency range (which can hardly be perceived by the human ear). This results in an enhancement of the stereo quality in the median and higher frequency ranges. The setting is useful if the audio bitrate is below 200 Kbps.

Dual Channel: In this case both audio channels are output separately as mono channels; it is normally used for two-channel sound. The compression of the channels takes place separately.

Single Channel: Another expression for mono audio.

Audio Bitrate (kbps): 32-384 This specifies the bitrate of the audio stream.

Depending on the MPEG type selected, some values may not be available. Increasing the bitrate will yield better sound quality and result in larger files, or if the total bitrate is limited it will mean less of the total bitrate is available for the video.

Set private bit — Just a spare bit in the audio headers, which is user defined. DVD specifies it shall be 0.

Set copyright bit — Specifies whether the audio is copyrighted or not, this setting is completely arbitrary; it has no effect whatsoever.

Set original bit — Specifies whether the audio is a copy or an original, this setting is completely arbitrary; it has no effect whatsoever.

Enable CRC: — Specifies whether a CRC is embedded in each audio frame, both SVCD and DVD specify enabled.

Psycho-acoustic model — Two different models (1 and 2) specified by MPEG to compute the "just noticeable noise level".

PCM/AES details:

Dynamic range control — The option is a recommended gain value which can be applied to all audio samples decoded from the first access unit. Ticking the checkbox enables the Dynamic range control. The setting does not affect the encoding of the audio at all. It is simply a value decoders may use when playing the audio.

Mute flag — Flag to the player whether to mute or not when all samples in an audio frame are zero.

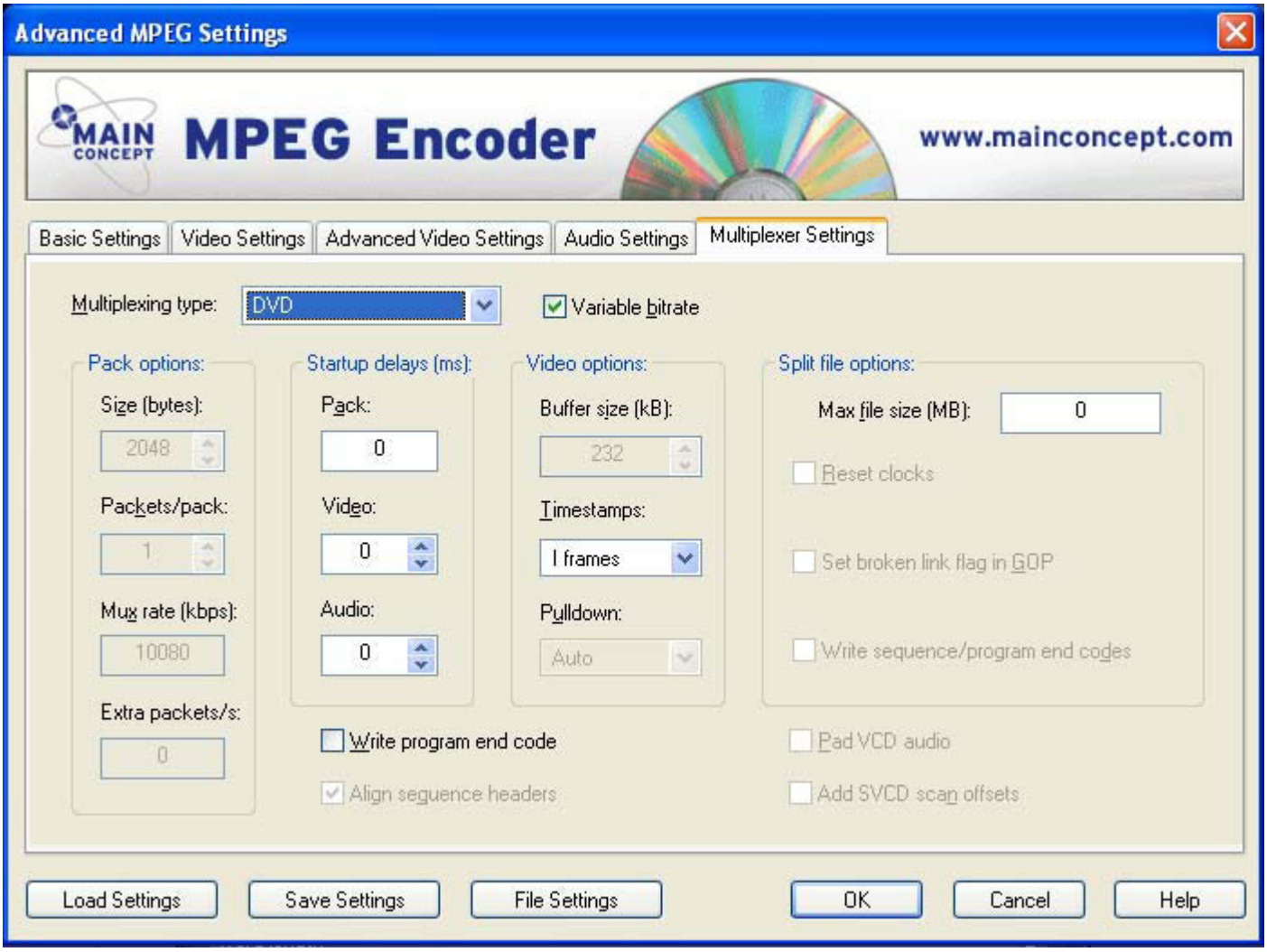
Emphasis (48 KHz only) — Flag to the player whether emphasis is to be applied to all audio samples from the start of the audio stream.

Gain (dB) — The Gain value (X and Y) is a recommended gain value to be applied to all audio samples by the player, where:

$$\text{Gain} = 24.082 - 6.0206 * X - 0.2007 * Y.$$

Multiplexer Settings

In this Tab you can control whether your exported MPEG files will be multiplexed (also referred to as “muxed”). Multiplexed output means that the video and audio are exported in a single file. This Tab also offers some more professional settings for muxing.



In general, the basic settings for this pane and the other advanced panes are set by the options in the Output format section of the main window.

Here are the Multiplexer Settings in detail:

Multiplexing Type: The drop-down menu offers the options of MPEG-1, VCD, MPEG-2, SVCD, DVD, TS (transport stream), None and many more parameters, such as HDV HD1, HDV HD2, DVB (which can also be used for transport streams), and MircoMV. The settings are usually defined by the parameters of the MPEG Encoder.

Variable Bitrate: When checked VBR is on. This option sets the muxing mode to variable or constant bitrate. If it is turned off (constant bitrate), the output data stream will contain padding packets (if needed) to maintain the constant bitrate. In variable bitrate muxing no padding packets are added.

Pack Options:

Under this heading you find the options **Size** (bytes) and **Packets/Pack**. Pack size is the number of bytes in each pack (or sector); VCD and SVCD use 2324 bytes, DVD uses 2048 and general MPEG-1/2 can use up to 4096 bytes (4096 is our limit, not MPEG's limit). The muxed bitstream is broken up into these 'packs' with a pack header starting each one and they contain 1 or more PES (= Program Elementary Stream) packets (chunks of the video or audio stream). The Packets/Pack setting specifies the number of PES packets that are placed in each pack. VCD, SVCD and DVD always want 1 PES packet per pack.

Mux. Rate (kbps):

The Mux Rate is the total bitrate, i.e. video bitrate plus audio bitrate plus muxing overhead bitrate. This option specifies the bitrate of the multiplexed program stream.

Startup delays (ms):

The **Pack** value specifies the starting TimeCode of the muxed stream (this can be different than the starting Time-Code of the video stream). It is the starting SCR (= System Clock Reference) in ms of the program stream. The Video and Audio delays are respective to the Pack delay

For example, if you set the Pack delay to 500 ms, and the Video as well as the Audio delays to 300 ms, the first SCR of the stream would be 500 ms, and the first video and audio PTS (= Presentation Timestamps) would be 800 ms.

If you make the Pack delay five seconds (5000 ms) and the Audio/Video delays 400 ms the first SCR would be 5000 ms and the first audio/video PTS would be 5400 ms.

The **Video**, **Audio1** and **Audio2** delays actually specify the starting time of the respective stream (relative to the pack delay).

If these settings do not match, the streams will start at different times. Normally they are the same, but say you have a video stream and an audio stream where you know the audio actually starts 500 ms after the video, you would set the video delay to some value and set the Audio1 delay to Video delay + 500, this would then synchro-nize the two streams when played.

For example, if you specify the Pack delay as 0 ms (the normal case), the Video delay as 200 ms and the Audio delay as 300 ms, the first SCR will be 0, the first video PTS would be 200 ms and the first audio PTS would be 300 ms. This would shift the audio/video synchronization, so the audio is 100 ms behind the video.

Video Options:

Buffer Size (kB):

These settings specify the size of the buffers needed to decode the video. If it is too low, you will get buffer over-flows, which could show up as stuttering video. Usually it is set to the same size as the video VBV buffer (although the VBV units are half these units), DVD specifies 232 for the video buffer. Software decoders usually ignore the buffer sizes, but most hardware players will have problems if the buffer size is not correct.

VBV is the abbreviation of Video Buffering Verifier. It is a hypothetical decoder with a buffer whose size is specified by the Video Buffer Size. Encoded pictures from the MPEG stream are placed into the buffer (hypothetically) and removed from the buffer at regular intervals. The MPEG video stream is supposed to be constructed by varying the size of the encoded frames such that the buffer does not underflow (i.e. becomes empty where there are no frames in the buffer when it is time to decode one) or overflow (i.e. becomes full where no space is available for more encoded pictures).

Pulldown:

This option contains four parameters: None, 2:3, 3:2 and Auto. When pulldown is present in the video stream, the multiplexer must adjust the PTS/DTS timestamps to account for the extra fields displayed. This option should be set to the same value as the video pulldown setting (or to Auto).

Timestamps:

You find All frames, I & P frames and I frames in this menu. Here you can choose which frames in the stream have a timestamp attached. The timestamps are needed for synchronization of video and audio. In general, it is enough to set this option to I Frame. For particular formats the values are clearly defined.

Split File Options:

Max. file size: You enter the value (in MBs) here, from which a further file shall be written.

Reset clocks: If Reset clocks is enabled, the SCR, PTS and DTS clocks are reset to the 'startup delay' values (the starting values) when starting a new file. This would make the TimeCodes in each of the files start with the same values. If disabled, the clocks are not reset and the TimeCodes would be continuous from one file to the next.

Set broken link flag in GOP: This option has to do with the way MPEG compresses frames. Usually a GOP consists of 1 I frame and several B and P frames. I frames are not dependent on any other frames, P frames are normally dependent on the preceding P or

I frame, and B frames are normally dependent on the preceding and successive I or P frames.

A standard GOP (the default settings) are 15 (maybe 18) frames long and they look like this (in the order the frames are displayed):

B B I B B P B B P B B P B B P, B B I B B P B B P B B P B B P, ...

Here the first two B frames are dependent on both the I frame after them and the last P frame of the previous GOP. The Broken link flag in the GOP header is there to inform decoders that some kind of action was taken such that the preceding P frame is not present and the first 2 B frames cannot be decoded correctly (the decoder may then ignore them). When splitting files, the files are split on a GOP boundary so that the previous P frame of the first few B frames is not present in the new file (it is in the previous file). If the files are played one after another, and the last P frame of the first file is kept by the decoder, the decoder can correctly decode the first few B frames of the second file.

The Set broken link setting just allows one to specify whether the Broken link flag is set or not, and it depends on whether you intend to play the files one after another or separately.

Write sequence/program end codes: When enabled, sequence and program end codes are written to the old file when switching to a new file. If the files are meant to be played one after another, the streams should not be terminated. This option only applies to the files that are split; it does not apply to the last (or only) file generated.

Pad VCD Audio: Some VCD burning programs require this flag to be set and some do not. VCD video packs are 2324 bytes long, but the audio packs are only 2304 bytes long. When the data is written to a VCD disk, the audio packs are put in normal 2324 byte sectors. Some VCD burning programs deal with the extra 20 bytes themselves, while others require the extra 20 bytes to be present. When this setting is enabled, the audio packs are padded with 20 zero bytes so they are 2324 bytes long, if not enabled the audio packs are only 2304 bytes long. This setting is only meaningful for VCD.

Write program end code: When enabled, a program end code is written at the end of the file. This setting only applies to the last file if the splitting option is enabled, or if there is only one file generated.

Align sequence headers: When enabled, the sequence headers present in the video stream are placed at the beginning of a PES packet, this makes it easier to find the sequence headers and the start of a GOP. When a sequence header is aligned, it is possible that the previous video PES packet will need to be padded to make it the correct size, so this option can consume a little of the total bitrate. This option is required for SVCD and DVD.

Add SVCD scan offset: SVCD defines some navigation information that is put into the video stream to help players jump back and forth or skip ahead easily. The info is called scan offsets, this option is normally required for SVCD. This option also consumes a little of the video bitrate. Note: this option will be ignored if the user mux rate is set higher than allowed for SVCD.

Media Storage Requirements

	Name	MB per second	GB per minute	GB per hour	Recommended Capacity GB per hour
Generic	MPEG2 4.2.2	6.25	0.37	21.9	32.9
	MPEG2 4.2.0	2.5	0.15	8.7	13.1
	MJPEG 8 bit	21	1.23	73.8	110.7
	MJPEG 10 bit	26	1.52	91.4	137.1
	DV25	3.6	0.21	12.6	18.9
	DV50	7.2	0.42	25.3	37.9
	DV/DVCAM	3.6	0.21	12.6	18.9
	DVCPRO 50	7.2	0.42	25.3	37.9
	DVCPRO HD	14.4	0.84	50.6	75.9
	Digital 8	3.1	0.18	10.8	16.3
	SDTI (QSDI)	8.44	0.5	29.6	44.5
	NTSC 150k/frame	4.5	0.26	15.8	23.7
	PAL 180k/frame	4.5	0.26	15.8	23.7
	NTSC 300k/frame	9	0.52	31.6	47.4
	PAL 360k/frame	9	0.52	31.6	47.4
	Uncompressed YUV	21	1.23	73.8	110.7
	Uncompressed RGBA	30	1.75	105.4	158.4
Apple FCP	DV PAL/NTSC	3.6	0.21	12.6	18.9
	CineWave HD Mac	125	7.32	439.4	659.1
	CineWave SD	21	1.23	73.8	110.7
	D1 Desktop 64 8 bit	21	1.23	73.8	110.7
	D1 Desktop 64 10 bit	30	1.75	105.4	158.2
	D1 Desktop 128 HD 10 bit	170	9.96	597.6	896.4
	RTMac DV 25	3.6	0.21	12.6	18.9
Avid	Avid DS HD Nitris	125	7.32	439.4	659.1
	Avid DS	21	1.23	73.8	110.7
	Media Composer Offline XL	4.5	0.26	15.8	23.7
	Media Composer AVR75	6.3	0.37	22.1	33.25
	Media Composer AVR77	9	0.52	31.6	47.4
	Media Composer Uncompressed	21	1.23	73.8	110.7
	Symphony	21	1.23	73.8	110.7
	Xpress	9	0.52	31.6	47.4
	Xpress DV25	3.6	0.21	12.6	18.9
Incite	Digisuite LX DV 25	3.6	0.21	12.6	18.9
	Digisuite LX MPEG2 25 Mbit	3.1	0.18	10.8	16.3
	Digisuite	21	1.23	73.8	110.7
	Digisuite LE	15	0.88	52.7	79.1
	Digisuite DTV DV 25	3.6	0.21	12.6	18.9
	Digisuite DTV DV 50	7.2	0.42	25.3	37.9
	Digisuite DTV MPEG2 25 Mbit	3.1	0.18	10.8	16.3
	Digisuite DTV MPEG2 50 Mbit	6.2	0.36	21.7	32.6
Media100	Media 100 i 150/180 Kb/frame	4.5	0.26	15.8	23.7
	Media 100 i 300/360 Kb/frame	9	0.52	31.6	47.4
	iFinish 150/180 Kb/frame	4.5	0.26	15.8	23.7
	iFinish 300/360 Kb/frame	9	0.52	31.6	47.4
	CineStream	3.6	0.21	12.6	18.9
	Cleaner	3.6	0.21	12.6	18.9
Pinnacle	CineWave HD Mac	125	7.32	439.4	659.1
	CineWave SD	21	1.23	73.8	110.7
	ReelTime	14.4	0.84	50.6	75.9
	ReelTime NITRO	14.4	0.84	50.6	75.9
	Targa 2000/DTX/RTX/SDX	14.4	0.84	50.6	75.9
	Targa 3000 MPEG	6.25	0.37	21.9	32.9
	Targa 3000 YUV	21	1.23	73.8	110.7
	Targa 3000 RGB	42	2.46	147.6	221.4

There is no specific information for VCube in this table because it supports almost all SD and HD standards and codecs.

(DVCPRO and IMX are available as options)

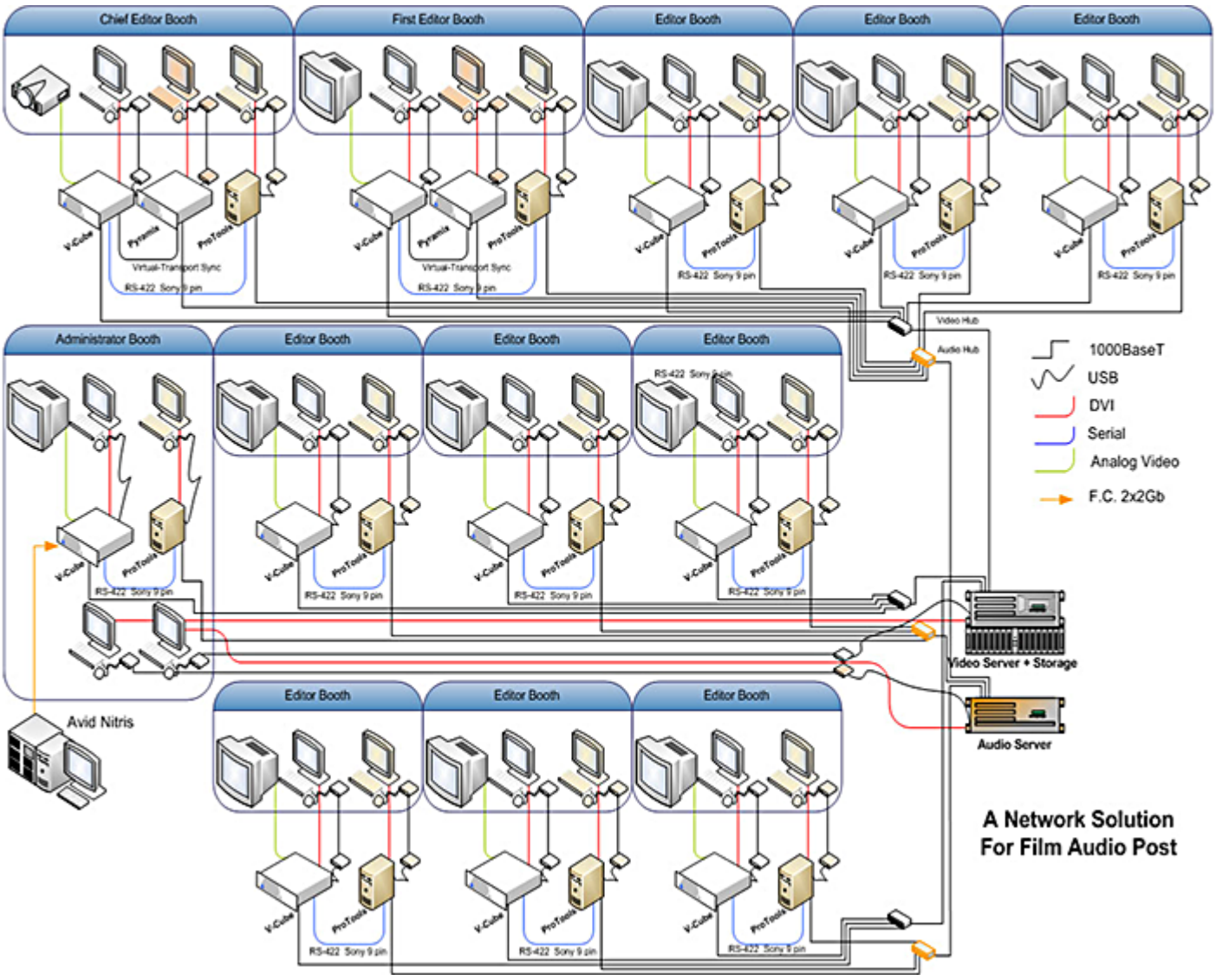
Installation Examples

A Great Solution for Audio Post for Film

This is an example of SD streaming configuration:

- Pro Tools workstations control VCube via Sony 9-pin protocol.
- Pyramix workstations control VCube via Ethernet (Virtual-Transport).

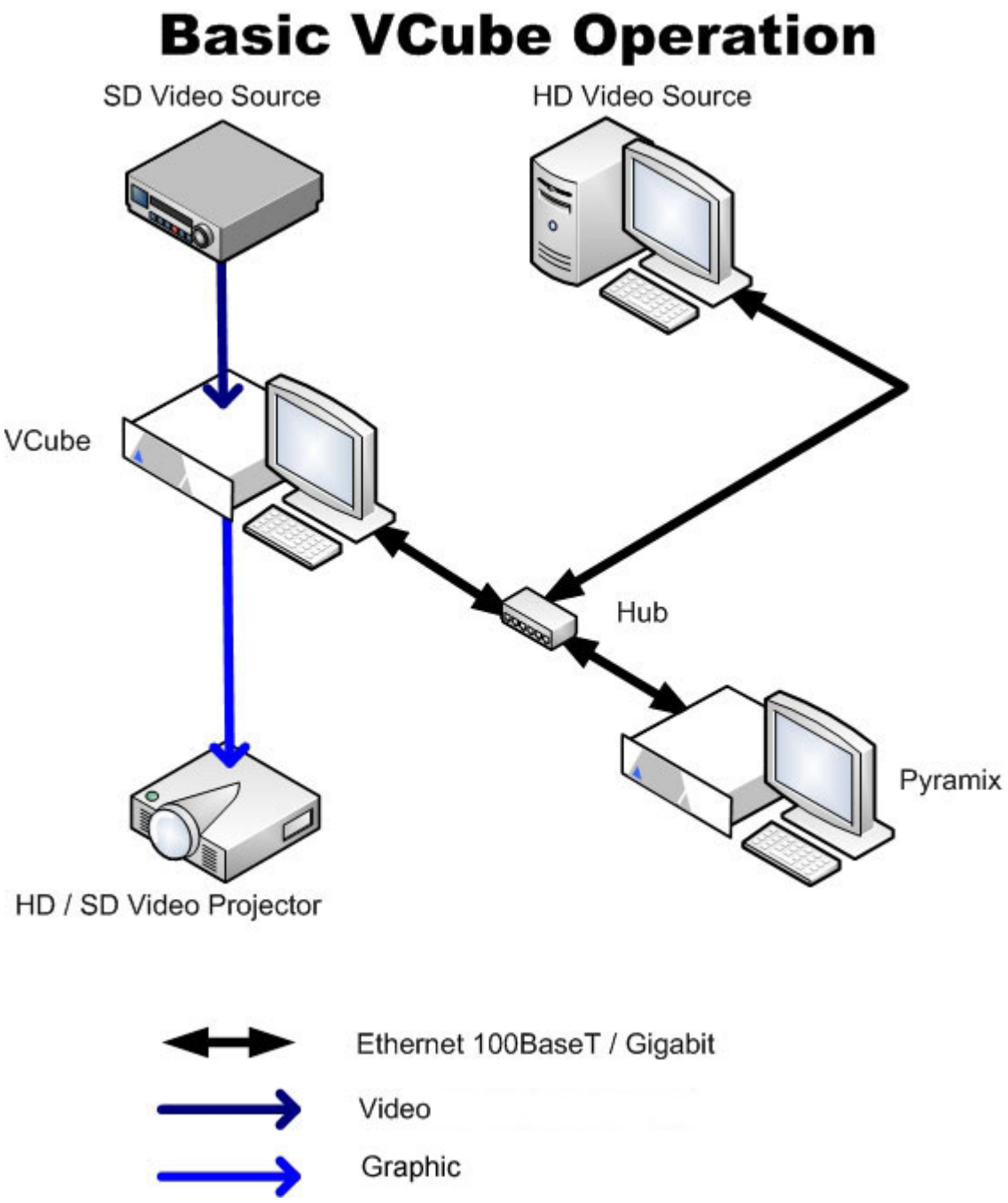
Note that one VCube can be controlled by two editing workstations.



The Video Server is fed through the network by an Avid Nitris even while audio editors are using the streaming video flow from this server.

The same network can be used for both Virtual-Transport chasing and video streaming. In this example, an extra Ethernet card for Pyramix and VCube was preferred because both racks were in the same machine room.

Basic VCube Operation



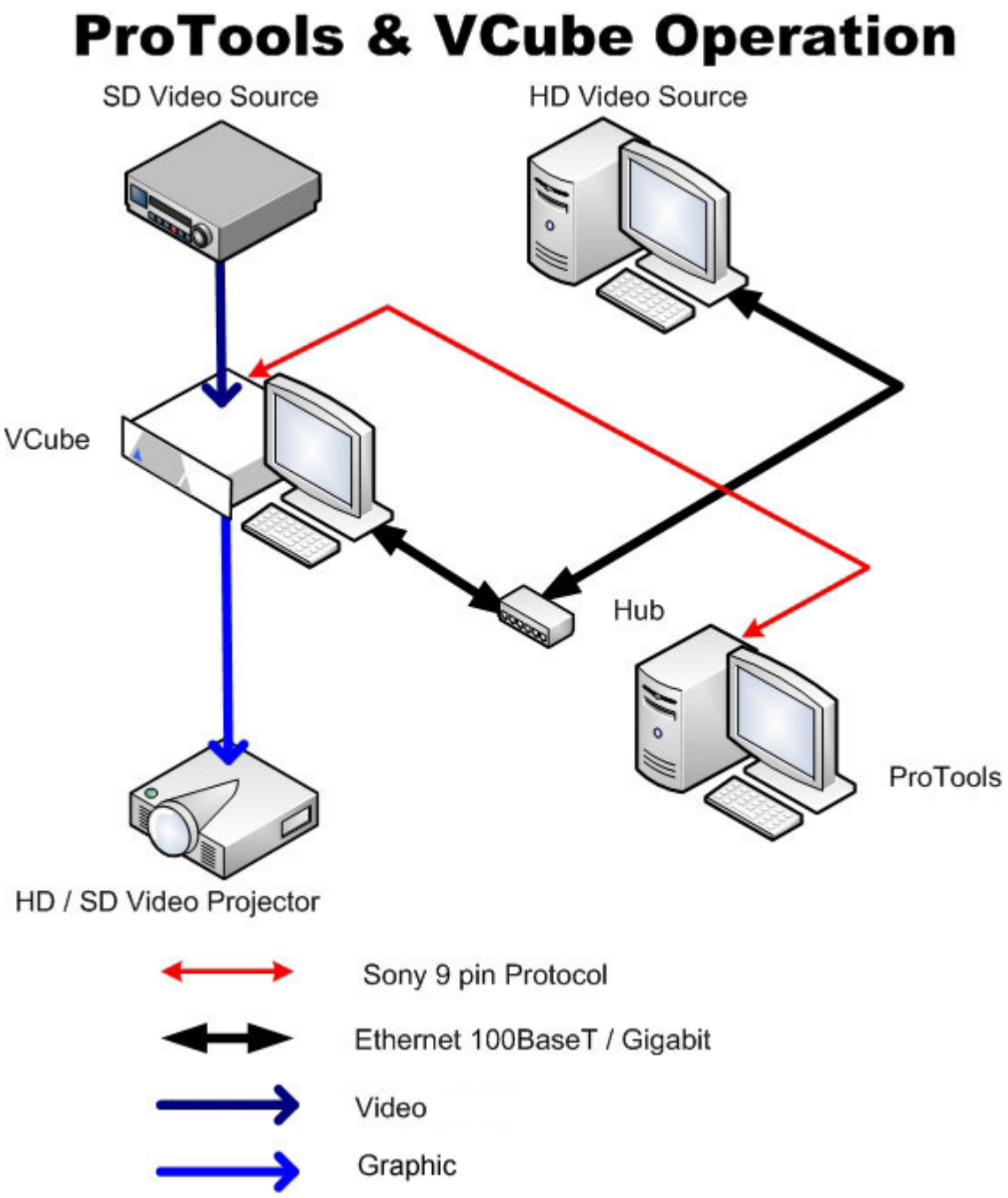
This is a typical VCube set up:

- The network is used to synchronize VCube and Pyramix DAW. It's also used to transfer HD or SD material on the VCube's local hard disk.
- A SD VCR is connected to the video input allowing SD capture.
- The graphic output is connected to an HD video projector allowing compressed HD to be displayed (authorization key required) at full resolution.

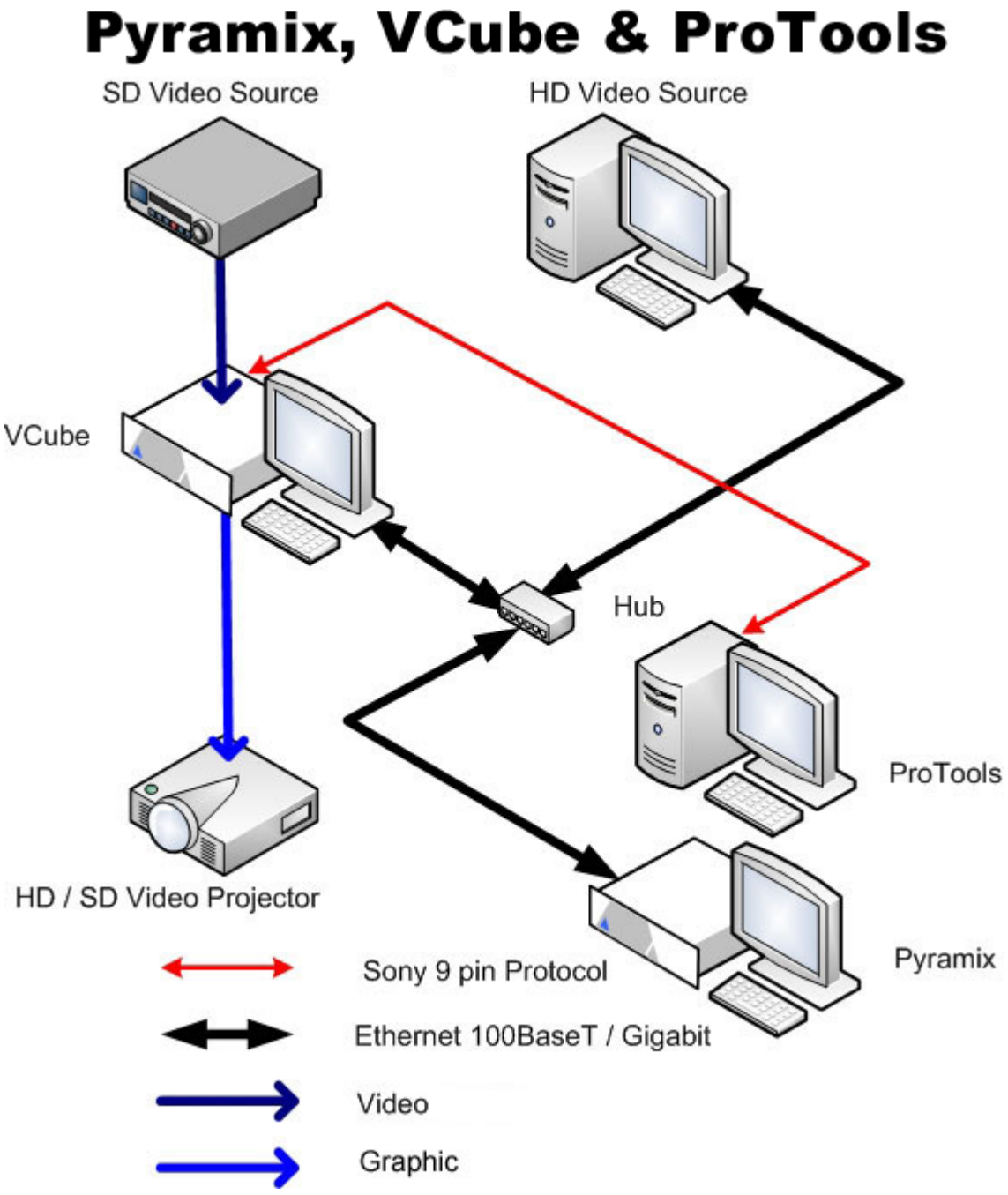
Note: Due to the storage transfer speed limitation of the single SATA disk, only MJPEG 1/10 (90% quality) compressed 2K HD can be used. You also need the 2K (for Composition) authorization key. Uncompressed 2K HD can be converted to 1/10 compressed by VCube render feature.

HD Media Files can be used into a SD Composition without this authorization key.

Pro Tools & VCube Operation



Pyramix, VCube and ProTools



Avid Unity and VCube

VCube can import OMF Compositions and stream linked/referenced Media Files directly from a Unity server.

There are two ways of accessing the Unity server:

1. Install a Fiber Channel Adapter in the VCube and connect to an available port on the server. The currently recommended Fiber Channel Adapter is the ATTO FC 3300.

   Note: Never install the ATTO drivers delivered with the adapter but use those delivered by Avid along with the current version of the Unity server to connect to. Please ask the system administrator responsible for the server for the proper drivers installer.

2. The Unity server can include a so-called Port Server Pro which allows connection through a standard Gigabit Ethernet network. In this case just plug the VCube into this network to access the server files.

   Note: This configuration does not always allow for streaming Media Files very efficiently. The use of a Port Server Pro should be limited to copying files from the server to the local VCube hard disks.

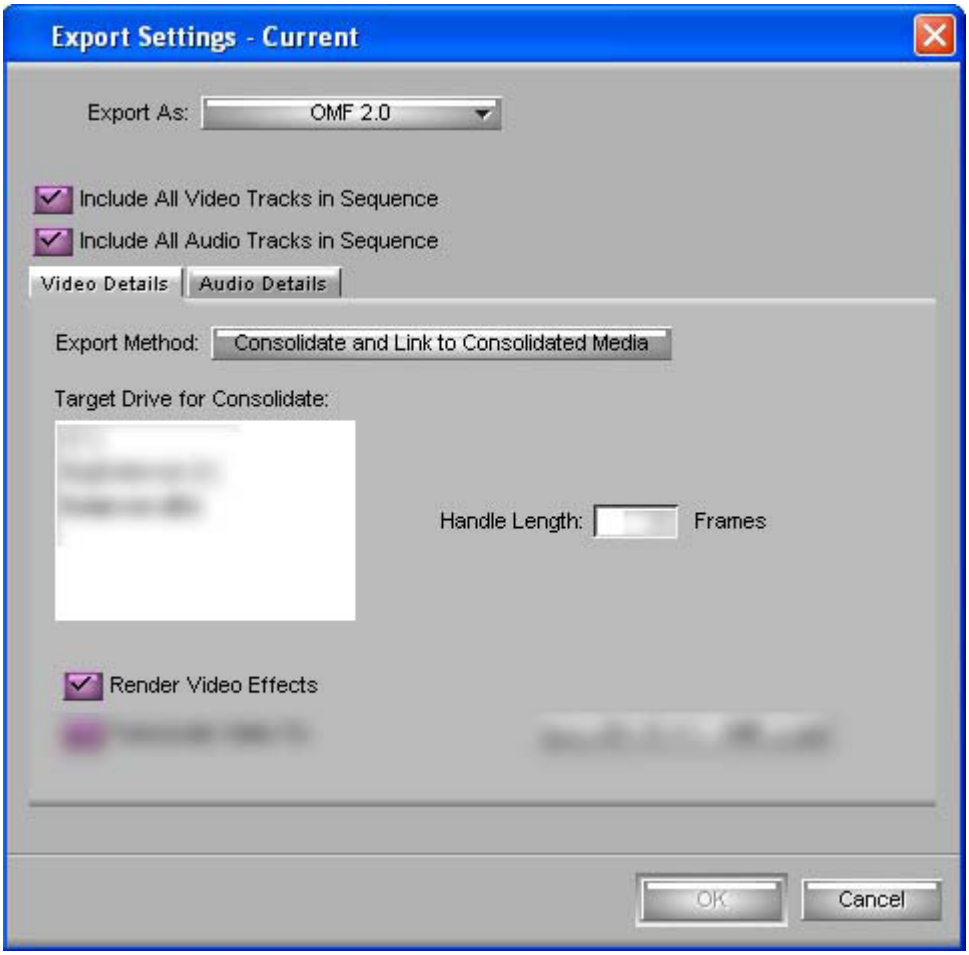
When connecting to the Unity server with a Fiber Channel Adapter directly, some settings can be adjusted to optimize the streaming performance in a multi-user environment. On the VCube side go to **Settings > Show Buffer & Cache Tab : Read Cache**. There are two ways of adjusting the cache size:

Set the Mode to **Unity** and set the **Nb Drives** value to the number of discs installed on the Unity server partition the VCube is connected to. The cache size will then be automatically adjusted to optimal.

If the above solution is not applicable (unknown number of discs for instance), then keeping the Mode to **Default** and setting the Cache Size to **4 (MB)** will ensure reasonable performance.

To import OMF Compositions and access referenced Media Files from the Unity server, go to Files : OMF Composition and choose a path for the Compositions (to the Unity), for the Media Files (also in Unity), and for the OMF database (this can be on the VCube local disk). Scanning OMF Media Files will then generate a local media database in the VCube for best performance.

Available Compositions should then appear in the list. Just load the desired one and play it.



On an Avid NLE, the Composition must be consolidated in OMF2 as in the screenshot above.

Embedded Compositions aren't currently supported by VCube.

Fairlight Controlling a VCube

Fairlight DREAM/MFX3

Jogsh

The **jogsh** modifier is used to modify the behavior of the DREAM Console transport when acting as a master, controlling slave 9-pin devices in jog or shuttle mode. The default setting is **jogsh=1**.

When **jogsh=0** the DREAM Console sends jog commands to the slave and then reads and chases the slave's Time-Code. This provides uniform picture jogging but in some cases may cause excessive variations in audio jog speed.

SYSTEM FILES

When **jogsh=1** the DREAM Console sends jog commands to the slave, the slave then reads and chases the DREAM Console's TimeCode. This provides uniform audio jogging but in some cases may cause excessive variations in video jog speed.
Add **jogsh=#** to the end of the device definition you wish to modify, where # is 1or 0.

9- PIN CONTROL

In the configuration file, **SYS:cd /dd/usr/sys/tcs_cfg** file, be sure the **ALT_JOG** option is removed by adding an asterisk before the **@SETENV ALT_JOG** entry in **tcs_cfg**.

Additional **tcs_cfg** settings required for control of VCube via 9-pin are:

R**ETRY_LIMIT = 50**

SONY-TIMEOUT = 50

LAME-SLAVE-DELAY = 2

***@SETENV ALT_JOG**

In VCube the port COM settings for the **Sony 9-pin Remote Control** must be set to **Var / Shuttle / Jog with speed 0**
Then the VCube no longer interprets these commands.

For correct behavior of VCube with the **FFW** and **REW** commands from the Fairlight station, on the MFX3 the **Unlace** parameter must be set to **off** and the **Lace** parameter must be set to **0 sec**.

Fairlight DREAM Satellite

Enabling the LTC Generator

The LTC generator will output the current TimeCode when in **PLAY**, and output a short burst of TimeCode when locating the transport.

Press **GEN** to toggle the generator on or off.

Fairlight DREAM Station

Enabling the LTC Generator

The LTC generator will output the current TimeCode when in **PLAY**, and output a short burst of TimeCode when locating the transport. MIDI TimeCode is also output when GEN is enabled.

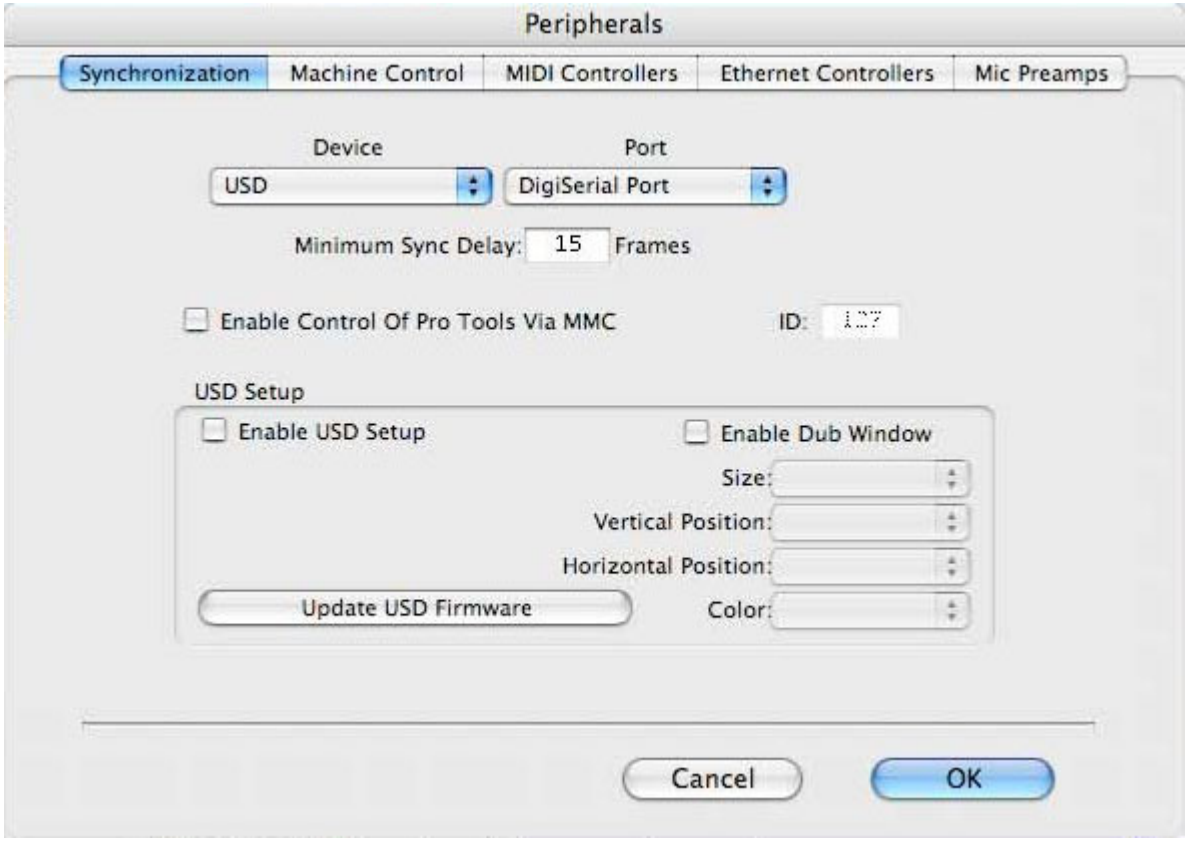
Press **GEN** to toggle the generator on or off.

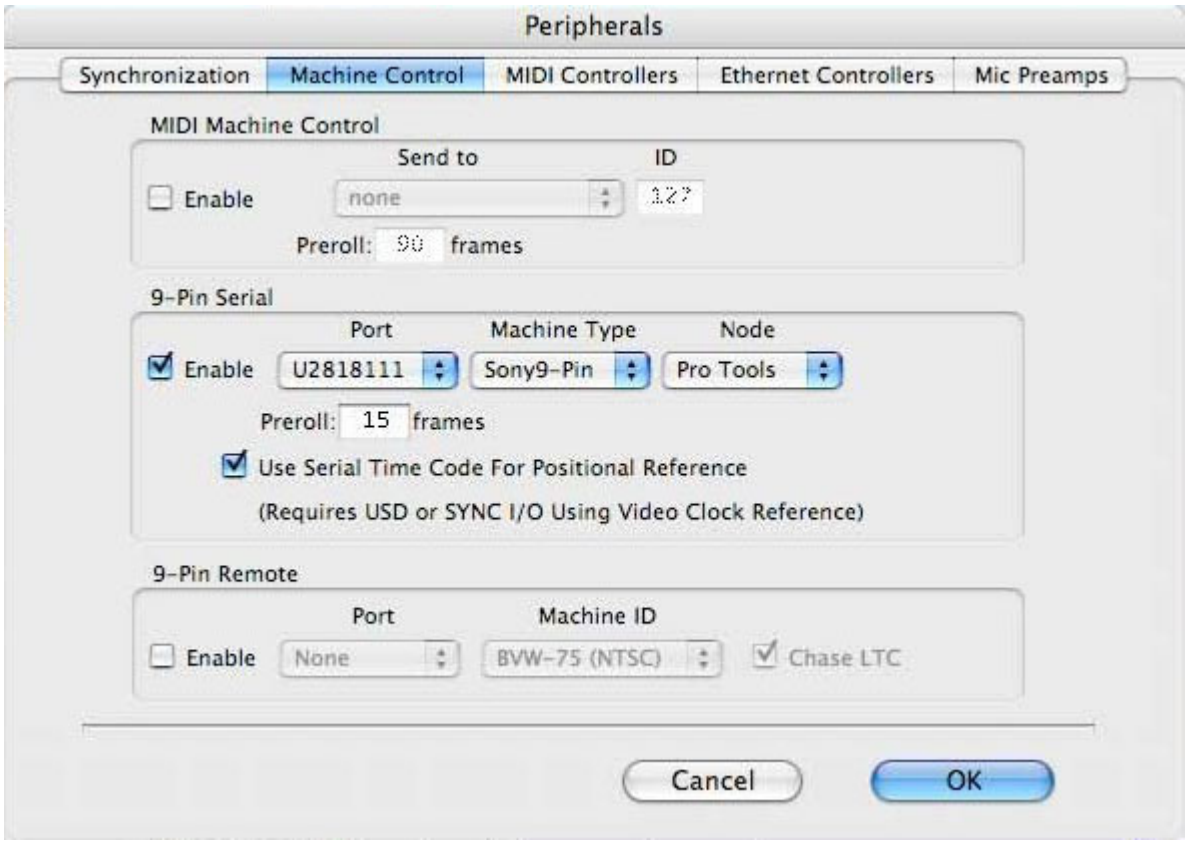
Pro Tools and VCube

Pro Tools 6.4.1, Mac OS 10.3 and a KeySpan

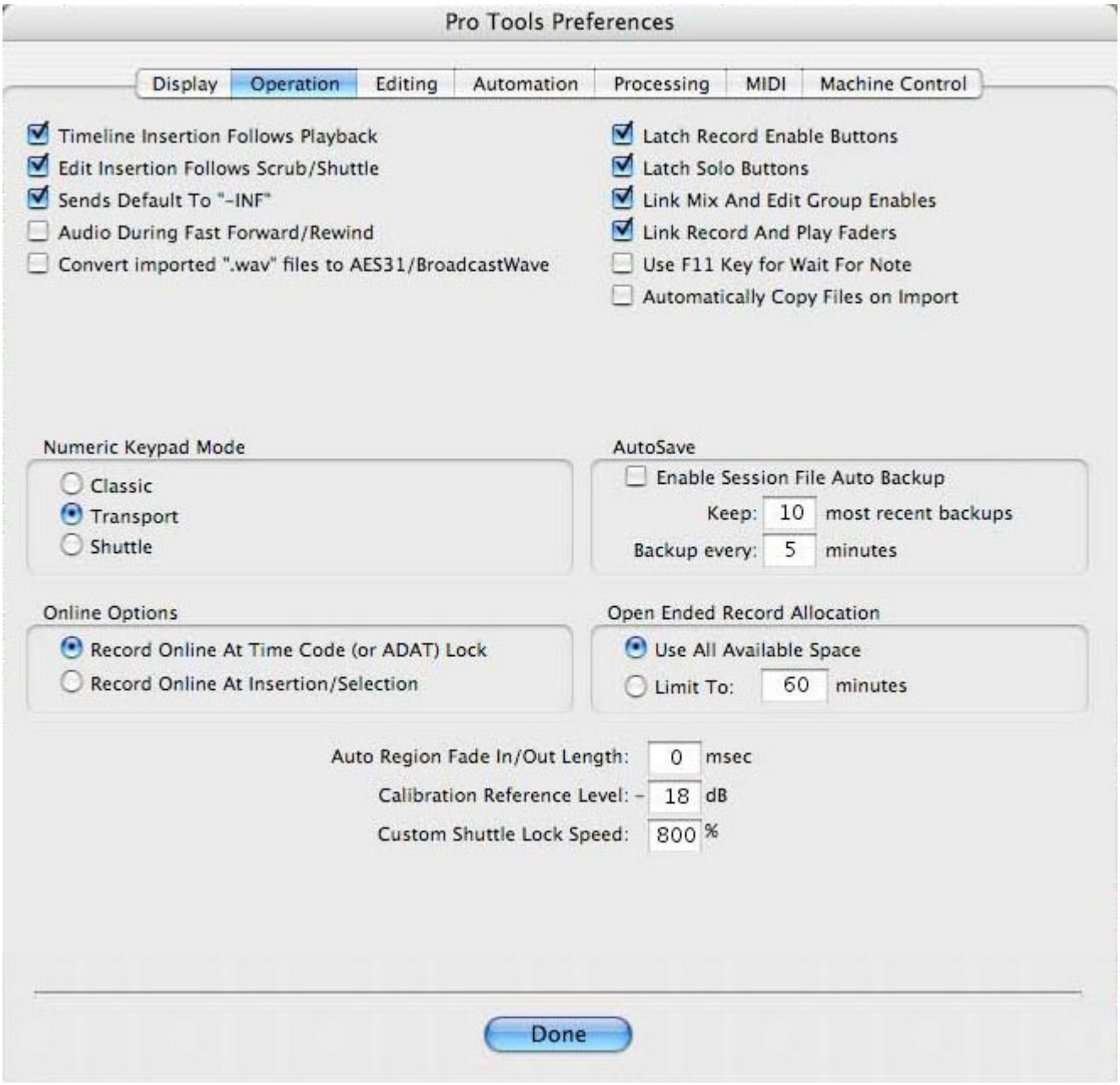
Pro Tools cannot generate a TimeCode when it's in chase mode or using Sony 9-pin. Of course your transport control should be set to **On Line** in Pro Tools.

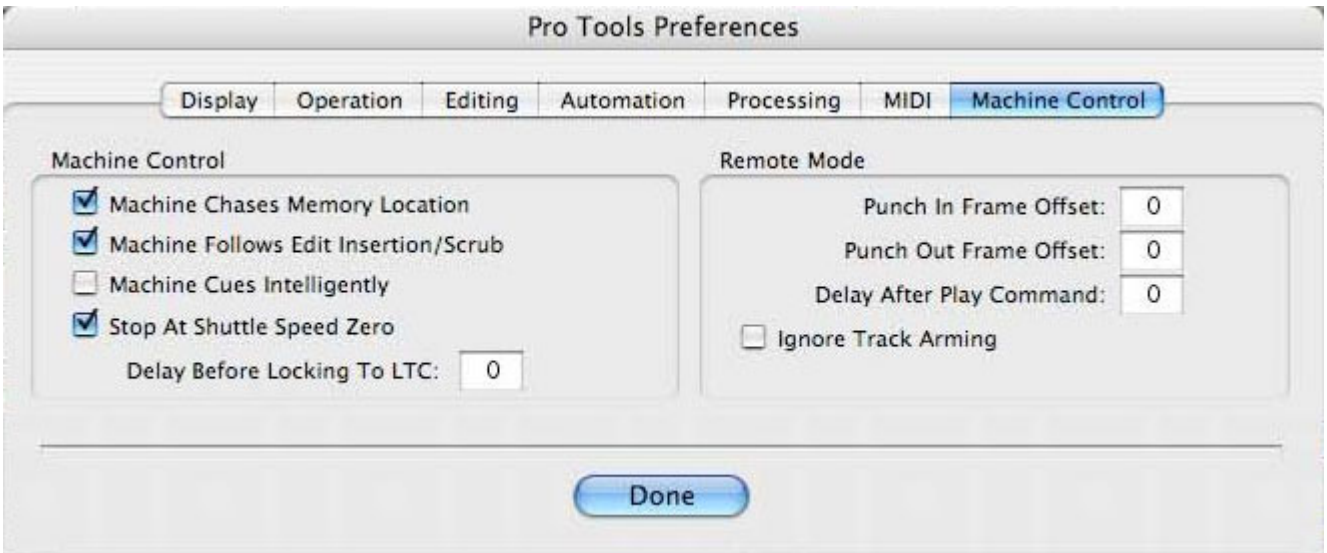
You absolutely must disable all the generate TimeCode options in the **Session Setup** window as shown in the **Peripheral - Machine Control** screen shot.





- **Minimum Sync Delay** should be as small as possible (works with 15 frames on mixplus)
- Enable 9-Pin Serial machine control. Select the correct Keyspan **Port**, **Machine Type: Sony9-Pin** mode, **Node**: If your VCube is configured correctly, Pro Tools should see it in the node list (as a generic2). Set Pro-Tools film or PAL or NTSC (depending on your project).
- Enable **Use Serial Time Code For Positional Reference**. ProTools must be supplied with a video reference signal.


Pro Tools Preferences
Display
Operation
Editing
Automation
Processing
MIDI
Machine Control
Timeline Insertion Follows Playback
Edit Insertion Follows Scrub/Shuttle
Sends Default To "-INF"
Audio During Fast Forward/Rewind
Convert imported ".wav" files to AES31/BroadcastWave
Latch Record Enable Buttons
Latch Solo Buttons
Link Mix And Edit Group Enables
Link Record And Play Faders
Use F11 Key for Wait For Note
Automatically Copy Files on Import
Numeric Keypad Mode
Classic
Transport
Shuttle
AutoSave
Enable Session File Auto Backup
Keep: 10 most recent backups
Backup every: 5 minutes
Online Options
Record Online At Time Code (or ADAT) Lock
Record Online At Insertion/Selection
Open Ended Record Allocation
Use All Available Space
Limit To: 60 minutes
Auto Region Fade In/Out Length: 0 msec
Calibration Reference Level: - 18 dB
Custom Shuttle Lock Speed: 800 %
Done


Pro Tools Preferences
Display
Operation
Editing
Automation
Processing
MIDI
Machine Control
Machine Control
Machine Chases Memory Location
Machine Follows Edit Insertion/Scrub
Machine Cues Intelligently
Stop At Shuttle Speed Zero
Delay Before Locking To LTC: 0
Remote Mode
Punch In Frame Offset: 0
Punch Out Frame Offset: 0
Delay After Play Command: 0
Ignore Track Arming
Done

Preferences / Machine Control tab

- Disable **Machine Cues Intelligently**.
- Enable **Stop At Shuttle Speed Zero**.

In Session Setup :

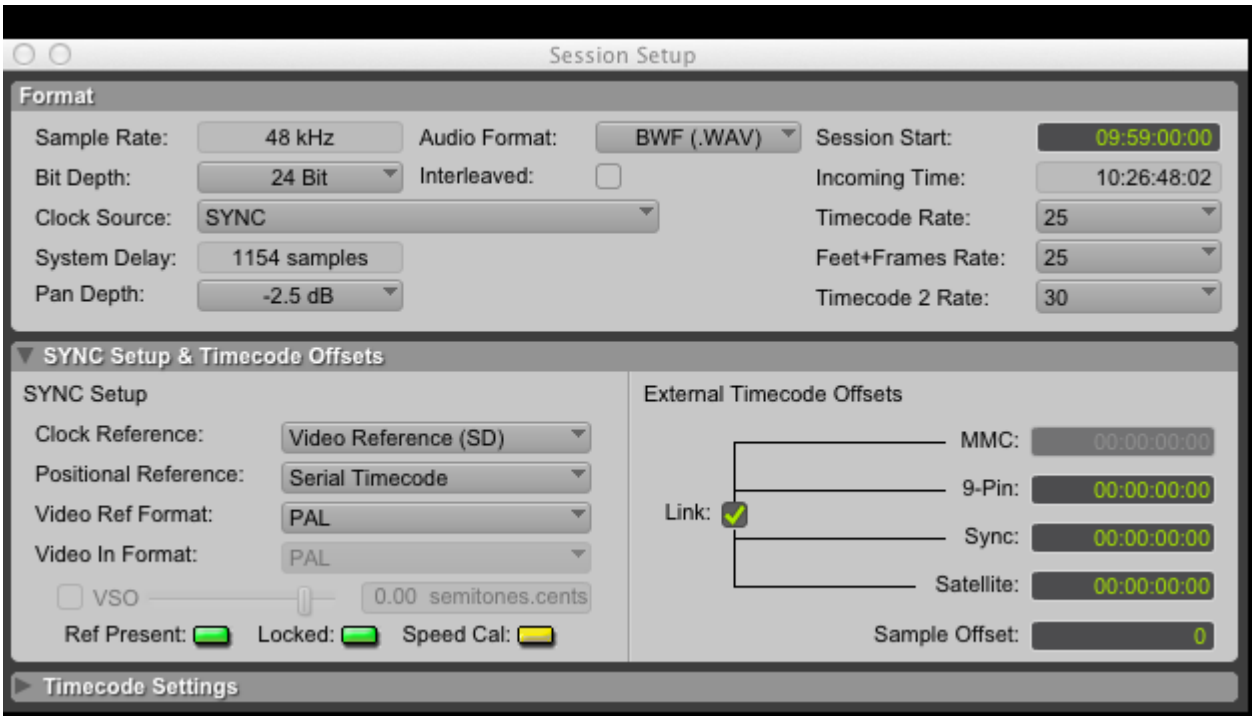
- Ensure that Serial Time Code is used as Incoming Time also ensure **Video Ref** is set correctly and Choose the correct **fps** setting.

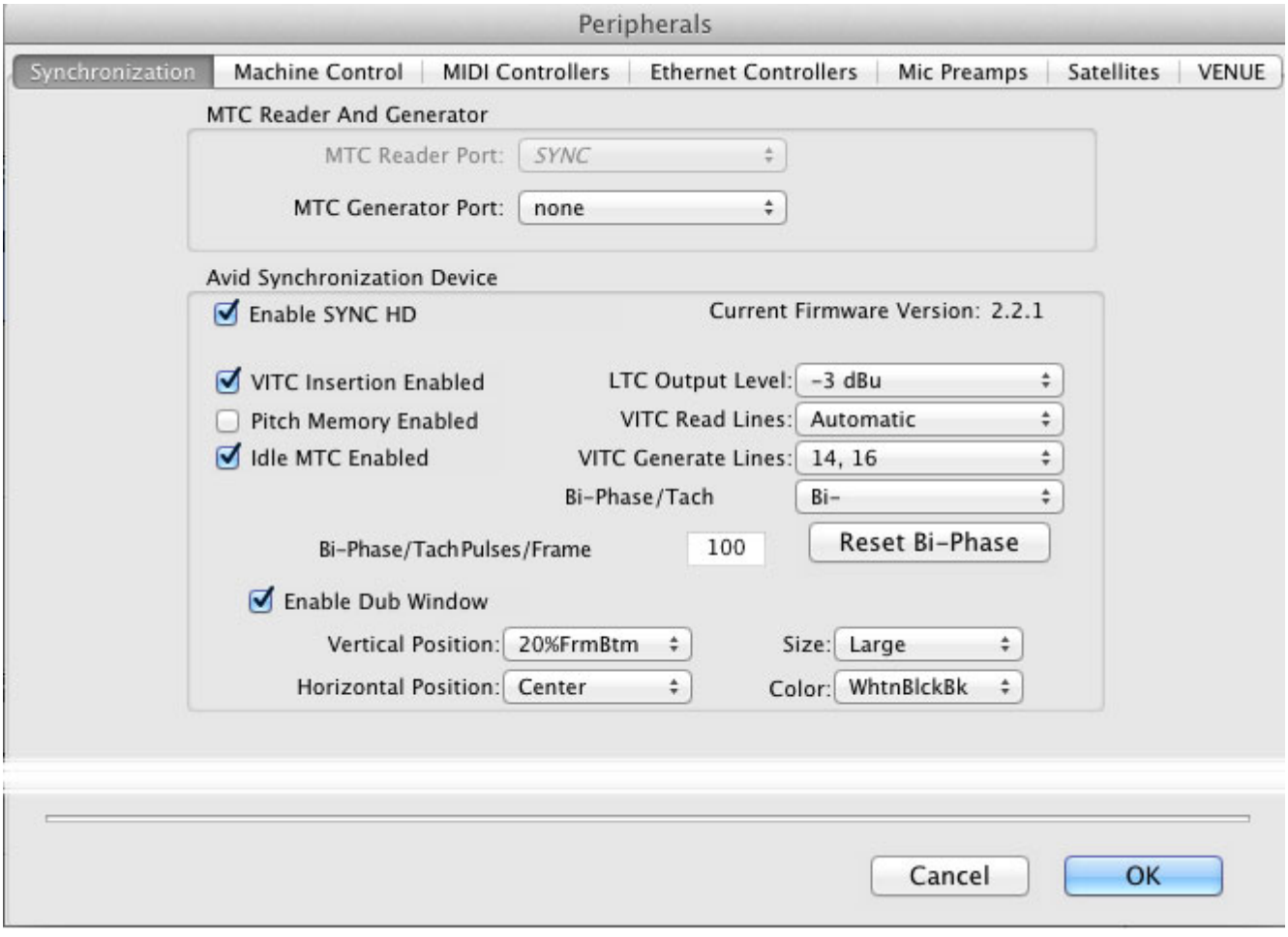
VCube configuration:

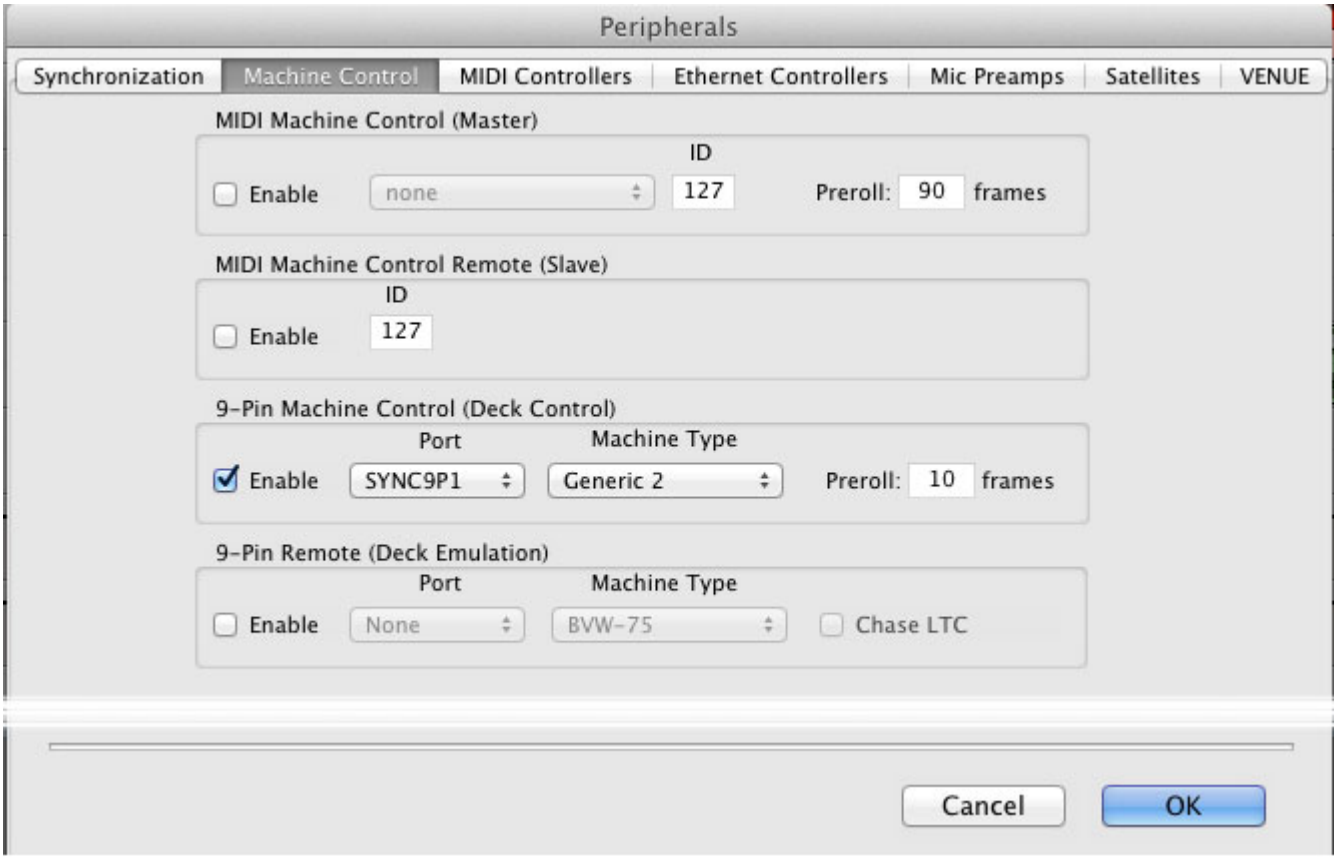
- In **Settings > Format & Sync : Synchronization - TimeCode (Incoming and Outgoing** verify that **Toggle Chase** is **OFF**
- In **Settings > Format & Sync : Audio Ref Status** check that **Audio Ref** is set to **Video Input** if you have connected the Video ref to VCube; otherwise it should be **Internal**. To verify if the Video reference is present and correct in the VCube, click on the **Show Mykerinos Settings Tab** button. The **Video** Green Led Highlighted. If the Audio Ref is set to "Video Input", set Video Red Led should be highlighted too
- Sampling Rate: As required.
- Width: 720 (in SD)
- Height: 480 (in SD)
- Field Order: Lower Field First
- Pixel Aspect Ratio: 0.9 or 1.2 if you are in WideScreen.
- Composition Frame Rate: NTSC (29.97)
- Link Frame Rate: On
- TC Frame Rate: NTSC (29.97)
- TC Clock Ref: "Video Input" if you have connected the Video ref to VCube; otherwise it should be "Internal".
- TC Clock Ref: NTSC (this settings is available only if "TC Clock Ref" is set to "Video Input"
- Chase TC Source: Auto (we are not going to use the chase but leave the setting as default)
- Chase Mode: Hard (we are not going to use the chase but leave the setting as default)
- Chase Enable: Off Chase Offset: 00:00:00:00
- Graphic Card delay compensation: 0
- Video Card delay compensation: 0
- Sony 9 Pin Remote Control: On
- About Sony 9 pin Remote Control Settings: Shuttle Still Settings: "Stop"
- Serial Port: "COM 2"
- Sony 9 Pin Machine Control: Off

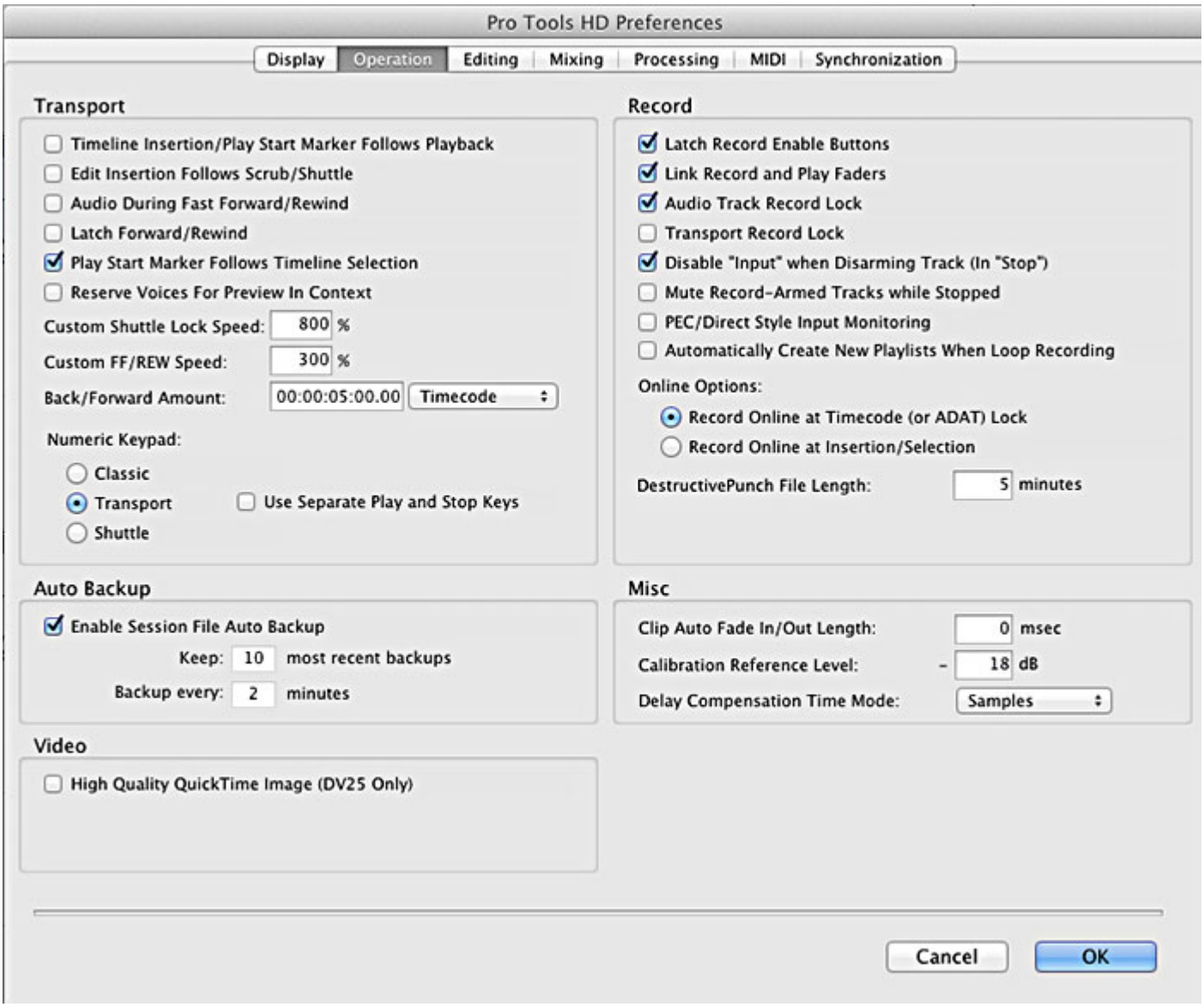
Pro Tools HD

The following screen shots show a representative setup for Pro Tools HD as used in Swiss TV.
Since individual set-ups will inevitably differ some settings may need to be altered to suit your circumstances. If you encounter insoluble difficulties please contact your Merging Technologies Sales Partner.






Peripherals
Synchronization
Machine Control
MIDI Controllers
Ethernet Controllers
Mic Preamps
Satellites
VENUE
MIDI Machine Control (Master)
ID
Enable
none
127
Preroll:
90
frames
MIDI Machine Control Remote (Slave)
ID
Enable
127
9-Pin Machine Control (Deck Control)
Port
Machine Type
Enable
SYNC9P1
Generic 2
Preroll:
10
frames
9-Pin Remote (Deck Emulation)
Port
Machine Type
Enable
None
BVW-75
Chase LTC
Cancel
OK


Pro Tools HD Preferences
Display
Operation
Editing
Mixing
Processing
MIDI
Synchronization
Transport
Timeline Insertion/Play Start Marker Follows Playback
Edit Insertion Follows Scrub/Shuttle
Audio During Fast Forward/Rewind
Latch Forward/Rewind
Play Start Marker Follows Timeline Selection
Reserve Voices For Preview In Context
Custom Shuttle Lock Speed: 800 %
Custom FF/REW Speed: 300 %
Back/Forward Amount: 00:00:05:00.00 Timecode
Numeric Keypad:
Classic
Transport
Shuttle
Use Separate Play and Stop Keys
Record
Latch Record Enable Buttons
Link Record and Play Faders
Audio Track Record Lock
Transport Record Lock
Disable "Input" when Disarming Track (In "Stop")
Mute Record-Armed Tracks while Stopped
PEC/Direct Style Input Monitoring
Automatically Create New Playlists When Loop Recording
Online Options:
Record Online at Timecode (or ADAT) Lock
Record Online at Insertion/Selection
DestructivePunch File Length: 5 minutes
Auto Backup
Enable Session File Auto Backup
Keep: 10 most recent backups
Backup every: 2 minutes
Misc
Clip Auto Fade In/Out Length: 0 msec
Calibration Reference Level: - 18 dB
Delay Compensation Time Mode: Samples
Video
High Quality QuickTime Image (DV25 Only)
Cancel
OK

Sony 9-Pin RS422 Wiring Chart

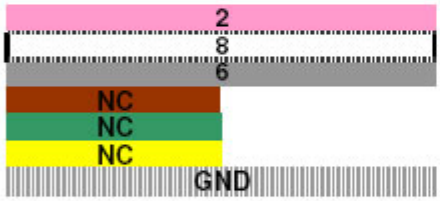
1) RS232 to/from RS422 acting as a Slave Port

RS422 → RS232 VCube Slave from Controller Master

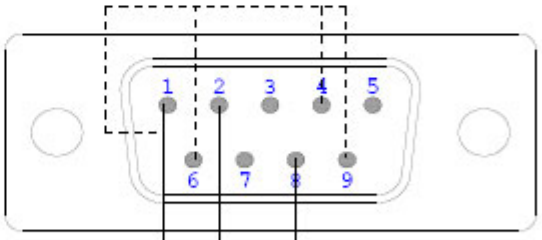
FUNCTION (RS 422)	RS422 SUB-D 9P MALE	→	RS232 SUB-D 9P FEMALE	FUNCTION (RS232)
		NC	1	DCD/RLSD
TX-	2	→	3	TX
		NC		
		NC	4	DTR
GND	1+(9,4,6)	→	5	GND
		NC	6	DSR
		NC	7	RTS
RX-	8	→	2	RX
		NC	9	RI
	SHIELD	→	SHIELD	

NOTE:
NC = NOT CONNECTED

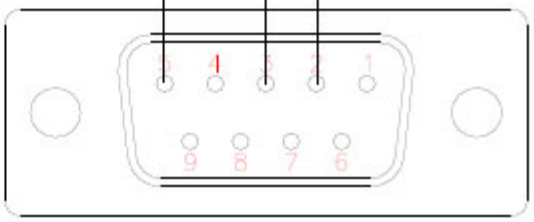
CABLE COLOUR CODE



SUB-D 9P MALE
RS422 (Sony 9pin)



SUB-D 9P FEMALE
RS232



2) RS232 to/from RS422 acting as a Master Port

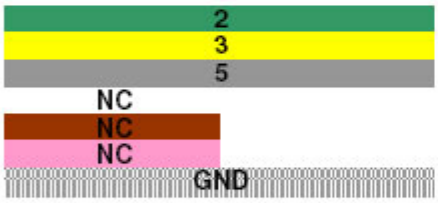
RS232 → RS422 VCube Master to External Machine Slave

FUNCTION (RS 232)	RS232 SUB-D 9P FEMALE	→	RS422 SUB-D 9P MALE	FUNCTION (RS422)
DCD/RLSD	1	NC		
RX	2	→	2	RX-
TX	3	→	8	TX-
DTR	4	NC		
GND	5	→	1+(9,4,6)	GND
			LINKED TOGETHER	
DSR	6	NC		
RTS	7	NC		
CTS	8	NC		
RI	9	NC		
	SHIELD	→	SHIELD	

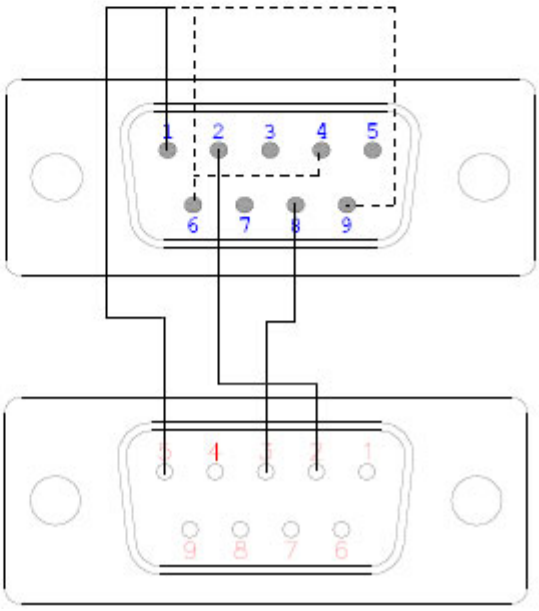
NOTE:

NC = NOT CONNECTED

CABLE COLOUR CODE



SUB-D 9P MALE
RS422 (Sony 9pin)



SUB-D 9P FEMALE
RS232

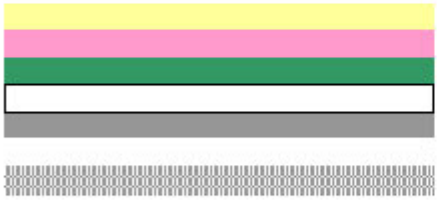
3) USB (EasySync) or PCI RS-485 (RS422 industrial) Adapter to/from a RS-422 acting as Slave port

Adapter → RS422 VCube Slave from Controller Master

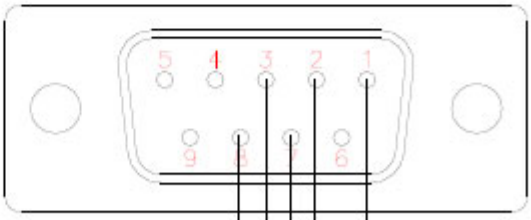
FONCTION Adapter	RS422 Industrial SUB-D 9P FEMALE	→	RS422 Sony 9 pin SUB-D 9P FEMALE	FONCTION (RS422)
TXD-(A)	1	→	2	TXD-(A)
TXD+(B)	2	→	7	TXD+(B)
RXD+(B)	3	→	3	RXD+(B)
RXD-(A)	4	→	8	RXD-(A)
GND	5	→	1+ (9,4,6)	GND
RTS-(A)	6	NC		
RTS+(B)	7	NC		
CTS+(B)	8	NC		
CTS-(A)	9	NC		
	SHIELD	→	SHIELD	

NOTE:
NC = NOT CONNECTED

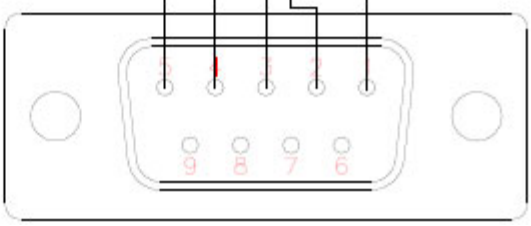
CABLE COLOUR CODE



SUB-D 9P FEMALE
RS422 (Sony 9pin)



SUB-D 9P FEMALE
RS422 (Industrial)



4) USB (EasySync) or PCI RS-485 (RS422 industrial) Adapter to/from a RS-422 acting as a Master port

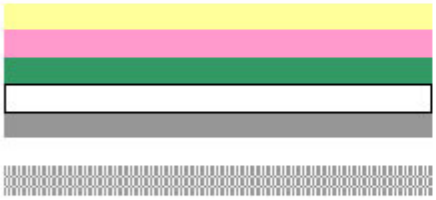
Adapter → RS422 VCube Master to External Machine Slave

FUNCTION (Adapter)	RS422 Industrial SUB-D 9P FEMALE	→	RS422 Sony 9 pin SUB-D 9P FEMALE	FONCTION (RS422)
TXD-(A)	1	→	8	TXD-(A)
TXD+(B)	2	→	3	TXD+(B)
RXD+(B)	3	→	7	RXD+(B)
RXD-(A)	4	→	2	RXD-(A)
GND	5	→	1+(9,4,6)	GND
RTS-(A)	6	NC		
RTS+(B)	7	NC		
CTS+(B)	8	NC		
CTS-(A)	9	NC		
	SHIELD	→	SHIELD	

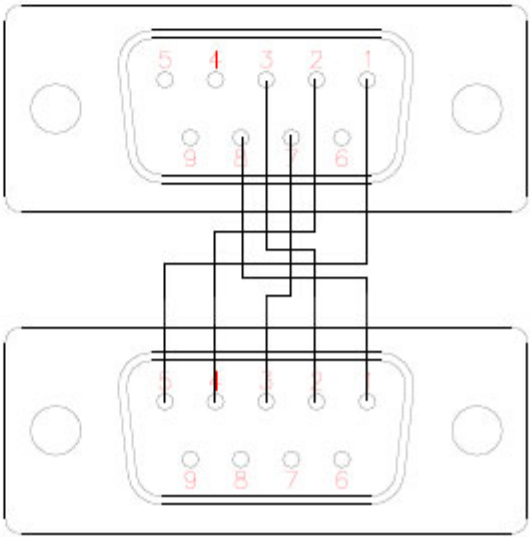
NOTE:

NC = NOT CONNECTED

CABLE COLOUR CODE



SUB-D 9P FEMALE
RS422 (Sony 9pin)

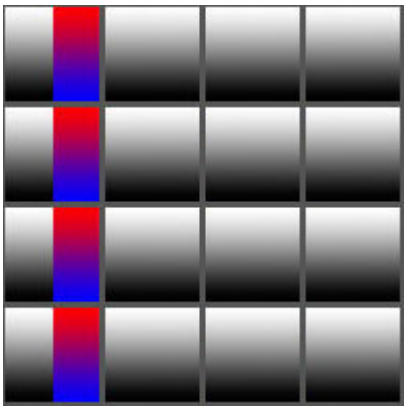


SUB-D 9P FEMALE
RS 422 (Industrial)

Glossary

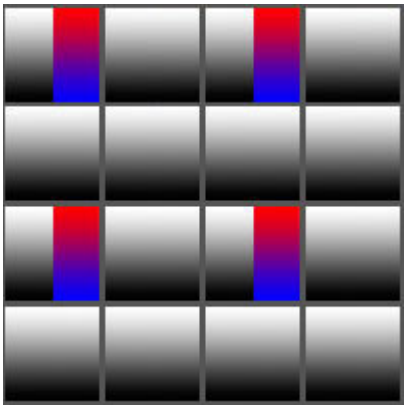
4.1.1

- Is the color sampling mode used in DV NTSC.



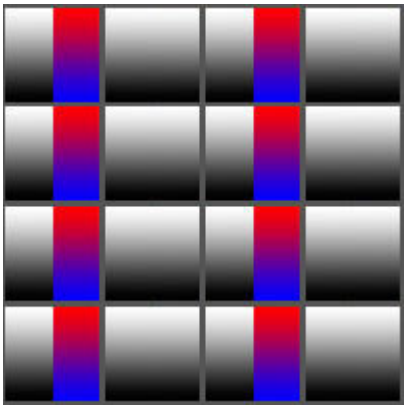
4.2.0

- Is the color sampling mode used in DV PAL.



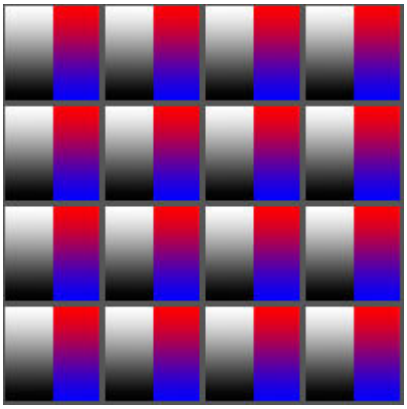
4.2.2

- A commonly used term for a component digital video format. The details of the format are specified in the ITU-R BT.601-2 standard document. The numerals 4.2.2 denote the ratio of the sampling frequencies of the single luminance channel to the two color difference channels. For every four luminance samples, there are two samples of each color difference channel. See ITU-R BT.601-2.



4.4.4

- Similar to 4:2:2 except that for every four luminance samples, the color channels are also sampled four times.



A

- **AES/EBU:** Informal name for a digital audio standard established jointly by the AES and EBU organizations. The sampling frequency for this standard varies depending on the format being used; the sampling frequency for D1 and D2 audio tracks is 48 kHz.
- **alpha channel:** is really a mask. It specifies how the pixel's colors should be merged with another pixel when the two are overlaid, one on top of the other. It all allows transparencies inside a picture.
- **aspect ratio:** The ratio of television picture width to height. In NTSC and PAL video, the present standard is 4:3.
- **Autoconform:** Where the Audio media files associated with an EDL are not available to the Pyramix PC, Pyramix can control a tape deck or other device to import the required audio.
- **AVI:** an acronym for Audio Video Interleave, is a file format designed to store both audio and video data in a standard package to allow its simultaneous playback. It's part of the Video for Windows technology.

B

- **black level:** The lowest transmittable luminance level that can occur during the active picture portion of a video signal. When viewed on a monitor this signal level portrays the color black.
- **buffer:** A digital storage device used to compensate for a difference in the rate of flow of information or the time of occurrence of events when transmitting information from one device to another.

C

- **caption:** Text or titles to be inserted in video.
- **chrominance:** That portion of the video signal, which contains the color information (hue and saturation). Video picture information contains two components: luminance (brightness and contrast) and chrominance (hue and saturation).
- **clip:** In desktop editing, a pointer to a piece of digitized video or audio that serves as source material for editing.
- **codec:** Coder-decoder. A device that converts analog video and audio signals into a digital format for transmission over telecommunications facilities and also converts received digital signals back into analog format.
- **Conform:** Conforming is the process of making and positioning audio Cues in the Timeline from Audio media files already present in a folder available to the Pyramix PC in conformity with an imported EDL (Edit Decision List.) or video project, for example, AAF, Final Cut Pro or OMF.
- **component:** Video signal the keeps luminance and chrominance separate for better picture quality.
- **composite:** Video signal the combines luminance and chrominance in a single signal. Less expensive than component video, but lower picture quality.
- **compression:** Reduction of the size of digital data files by removing redundant information (non-lossy) or removing non-critical data (lossy). Also used to describe reduction in dynamic range.

- **conforming:** Transferring EDL (Edit Decision List) information gathered from an off-line edit to an on-line edit for final assembly.

D

- **D1:** Sony's D1 format was the first major push towards fully digital videotape operations. D1 used a 19mm (3/4") tape loaded into cassettes as its media. Component video was encoded as YUV 4:2:2 with PCM audio tracks as well as TimeCode. D1 was notoriously expensive and the equipment required very large infrastructure changes in facilities which upgraded to this format. Early D1 operations were plagued with difficulties, though the format quickly stabilized and was renowned for its superlative image quality.
- **D10:** is the SMPTE specification for a professional video format, it is composed of MPEG Video 4:2:2 I-frame only and8-channel AES3 audio streams. These AES3 audio usually contain 24bit PCM audio samples. It is possible to find video bit rates of 50, 40 and 30 MBits/s.
- **DV:** uses DCT (Discrete Cosine Transform) intraframe compression, which is similar to MJPEG, at a fixed bit rate of 25 Megabit per second, which amounts to roughly 3.6 Megabytes per second or 4 minutes per Gigabyte. The chroma subsampling is 4:1:1 for NTSC or 4:2:0 for PAL, which reduces the amount of color resolution stored. Therefore, not all analog formats are outperformed by DV. The lower sampling of the color space is also a reason why DV is sometimes avoided in applications where chroma-key will be used. However, a large contingent feel the benefits (no generation loss, small format, digital audio) are an acceptable trade off given the compromise in color sampling rate. DV allows either 2 digital audio channels (usually stereo) at 16 bit resolution and 48 kHz sampling rate, or 4 digital audio channels at 12 bit resolution and 32 kHz sampling rate. For professional or broadcast applications, 48 kHz is used almost exclusively. The IEEE 1394 or Firewire serial data transfer bus is not a part of the DV specification, but co-evolved with it. Nearly all DV cameras have a IEEE 1394 interface and analog composite video and Y/C outputs. High end DV VCRs may have additional professional outputs such as SDI, or analog component video.
- **drop-frame TimeCode:** SMPTE TimeCode format that continuously counts 30 frames per second but drops 2 frames from the count every minute except for every tenth minute (drops 108 frames every hour) to maintain synchronization of TimeCode with clock time. This is necessary because the actual frame rate of NTSC video is 29.97 frames per second rather than an even 30 frames.

E

- **edit decision list (EDL):** A list of edit decisions accumulated in a video editor. The list typically includes the source reel, track(s), in time, and out time and destination track(s) In time and Out time for each edit.
- **embedded audio:** Digital audio that is multiplexed onto a serial digital video data stream.
- **essence:** The raw encoded form of audio and video data is often called essence, to distinguish it from the metadata information that together make up the information content of the stream and any "container" data that is then added to aid access to or improve the robustness of the stream.

F

- **fade:** The gradual disappearance of a picture to black (fade, fade-out, fade-to-black), or the gradual appearance of a new picture from black (fade-in, fade-up).
- **field:** Half of the interlaced horizontal lines (262.5 in NTSC, 312.5 in PAL) needed to create a complete frame. A correct field order must be applied to produce a smooth motion. Odd / Upper / Top or Even / Lower / Bottom are fortunately the two possible solutions.
- **flywheel:** Condition in which a sync generator has been locked to an outside source, which is no longer present. Sync generator continues to provide sync on the basis of the last rate received from the outside source related to its own internal clock. (Mykerinos Internal Clock in Soft chase mode)
- **frame:** A complete video picture composed of two fields (two complete interlaced scans of the monitor screen). A frame consists of 525 interlaced horizontal lines of picture information in NTSC, 625 in PAL. In HD a frame can consist of 720 or 1080 horizontal lines of pixels which may be interlaced or progressive (non-interlaced).
- **free-run:** Condition in which a sync generator is not locked to any outside source but is providing sync on derived from its own internal clock. (Mykerinos Internal Clock)

G

- **gen-lock (genlock):** To phase-lock the timing of one piece of equipment to another.

H

- **house sync:** Video sync signal generated within the studio and used as a reference for generating and/or timing other video signals.

I

- **IMX:** is the Sony implementation of the MXF for the D10 video format.
- **interlaced:** Short for interlaced scanning. Also called line interlace. A system of video scanning whereby the odd- and even-numbered lines of a picture are transmitted consecutively as two separate interleaved fields.
- **IRE (Institute of Radio Engineers):** Units of measurement dividing the area from the bottom of sync to peak white level into 140 equal units. One hundred and forty IRE equals 1 volt peak-to-peak. The range of active video is 100 IRE.
- **ITU-R BT.601-2:** Formerly known as CCIR 601. An international standard for component digital television from which was derived SMPTE 125M (was RP-125) and EBU 3246E standards. This International Telecommunications Union (ITU) recommendation defines the sampling systems, matrix values, and filter characteristics for both Y, B-Y, R-Y and RGB component digital television.
- **ITU-R BT.656** Formerly known as CCIR 656. The physical parallel and serial interconnect scheme for ITU-R BT.601-2 (CCIR 601). ITU-R BT.656 defines the parallel connector pinouts as well as the blanking, sync, and multiplexing schemes used in both parallel and serial interfaces. Reflects definitions in EBU Tech 3267 (for 625 line signals) and in SMPTE 125M (parallel 525) and SMPTE 259M (serial 525).

J

- **jog, jogging:** Process of moving the video forward or backward one field or frame at a time. Also refers to the use of a **jog wheel** to move the picture slowly backwards and forwards.

K

L

- **LAN:** Local area network.
- **Layer:** A single video image that is processed so that it can be inserted into the final composite image. There may be other Layers in the image, and they can be prioritized as to Layer location.
- **LTC:** Linear TimeCode. TimeCode recorded on a linear analog track on a video tape. It is audible and can be read at high speeds, but not when the tape is stationary.
- **luminance:** is the measure of the intensity of the combined color (white) portion of a video signal.

M

- **Metadata:** is data about data. An example is a library catalog card, which contains data about the nature and location of a book: It is data about the data in the book referred to by the card.
- • MJPEG is a video codec where each video field is separately compressed into a JPEG image. The resulting quality is independent from the motion in the image which differs from MPEG video where quality often decreases when footage contains lots of movement.M-JPEG is best suited for broadcast resolution interlaced video (720x486 D1 NTSC or 720x576 PAL). Because it is designed for interlaced video, M-JPEG is not well suited for movies that are smaller than television resolution. Movies designed to be viewed on progressive scan computer monitors (like web movies or CD-ROM video games) are ill suited for M-JPEG.
- **MPEG:** Compression standards for moving images conceived by the Motion Pictures Expert Group, an international group of industry experts set up to standardize compressed moving pictures and audio. The moving picture coding systems such as MPEG-1, MPEG-2, and MPEG-4 add an extra step, where the picture content is predicted from past reconstructed images before coding, and only the differences from the reconstructed pictures, and any extra information needed to perform the prediction, are coded.
- **MXF:** is a "container" or "wrapper" format that supports a number of different streams of coded "essence", encoded with any of a variety of codecs, together with a metadata wrapper which describes the material contained within the MXF file. MXF has been designed to address a number of problems with non-professional formats. MXF has full TimeCode and metadata support, and is intended as a platform-agnostic stable standard for future professional video and audio applications. VCube supports currently OP-Atom (a very simple and highly constrained layout for simple MXF files) and OP-1a (the layout options for a minimal simple MXF file).

N

- **NTSC:** signal The standard composite video signal adopted by the NTSC that has 525 interlaced lines at a frame rate of 29.97 frames per second. AKA Never Twice the Same Color due to the constantly changing color rendition in early analogue TV broadcasts.

O

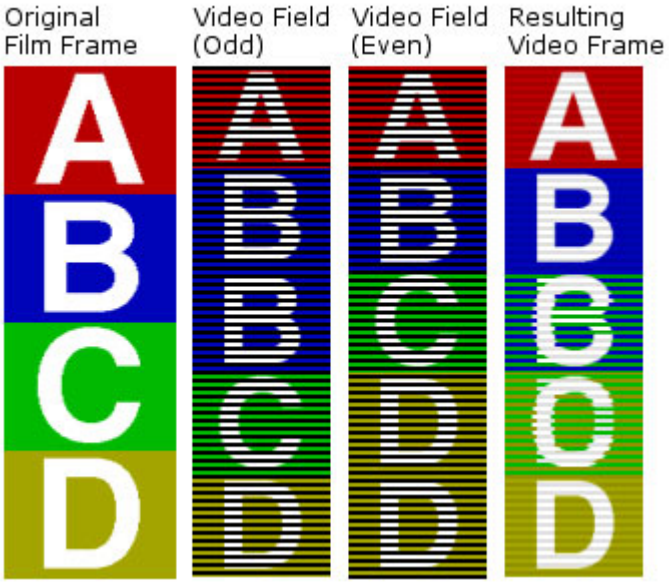
- **overscan:** A video monitor condition in which the raster extends slightly beyond the physical edges of the CRT screen, cutting off the outer edges of the picture.

P

- **PAL:** signal The most common composite video signal used in Europe. Describes the way in which color used to be encoded in analogue signals, Phase Alternating Line. It has a frame rate of 25 fps.
- **pixel:** A single picture element. The smallest element in a graphic image. Pixels are combined with other pixels to make up a graphic image. Picture quality increases as the number of pixels increase in a measured area of an image.
- **postroll:** is a preset period of time during a preview when a Clip will continue to play past the OUT point before stopping or rewinding.
- **preroll**: is the process of rewinding videotapes to a predetermined cue point (for example, 6 seconds) so the tapes are stabilized and up to speed when they reach the selected edit point (during recording or digitizing of source material from a video deck).
- **pulldown:** In countries that use the PAL or SECAM video standards, film destined for television is photographed at 25 frames per second. The PAL video standard broadcasts at 25 frames per second, so the transfer from film to video is simple; for every film frame, one video frame is captured. Theatrical features originally photographed at 24 frame/s are simply sped up by 4% to 25 frame/s. This can cause a noticeable increase in audio pitch, which is sometimes corrected using a pitch shifter. In the United States and other countries that use the NTSC television standard, film is generally photographed at 24 frame/s. Color NTSC video is broadcast at 29.97 frame/s. For the film's motion to be accurately rendered on the video signal, an NTSC telecine must use a technique called the 3:2 pulldown to convert from 24 to 29.97 frame/s. The 3:2 pulldown is accomplished in two steps.
  - The first step is to slow down, or "pulldown" the film motion by 0.1%. This speed change is unnoticeable to the viewer, and makes the film travel at 23.976 frame/s.
  - The second step of the 3:2 pulldown is the 3:2 step. At 23.976 frame/s, there are 4 frames of film for every 5 frames of NTSC video:

$$\frac{23.976}{29.97} = \frac{4}{5}$$

  - These four frames are "stretched" into five by exploiting the interlaced nature of NTSC video. For every NTSC frame, there are actually two complete images or "fields," one for the odd-numbered lines of the image, and one for the even-numbered lines. There are, therefore, ten fields for every 4 film frames, and the telecine alternately places one film frame across two fields, the next across three, the next across two, and so on. The cycle repeats itself completely after four film frames have been exposed, and in the telecine cycle these are called the "A," "B," "C," and "D" frames, thus:

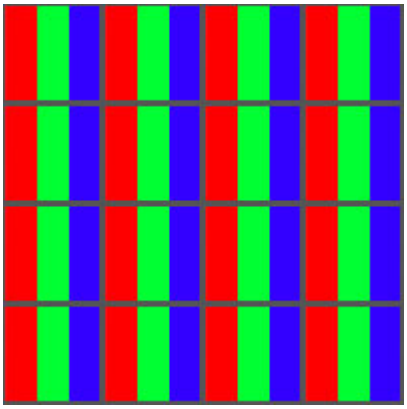


Q

- **quantization:** The process of sampling an analog waveform to convert its voltage levels into digital data.
- **QuickTime:** is a multimedia technology developed by Apple Computer, capable of handling various formats of digital video, sound, text, animation, music. A QuickTime file functions as a multimedia container file that contains one or more tracks, each of which store a particular type of data, such as audio, video, effects, or text (for subtitles, for example). Each track in turn contains track media, either the digitally encoded media stream.

R

- **Reconform:** Pyramix can conform audio to match a several flavours of EDL and also reconform an existing project to match a CMX change EDL.
- **reference video signal:** A composite video signal to which other signals are compared or locked for timing purposes.
- **RGB:** Every pixel is sampled for red, green and blue.



- **RP 188:** is a SMPTE recommended Practice describing the transmission of the TimeCode in the ancillary data space of a television data stream. The Xena LS and the Canopus video cards don't support this feature.
- **RS-232:** A standard, single-ended (unbalanced) interconnection scheme for serial data communications. The maximum permissible line length under the specification is approximately 15 meters.
- **RS-422:** A standard, balanced interconnection scheme for serial data communications. It allows for higher data rates and an extended line length to approximately 1200 meters.

- **ruler:** A graphic element of a video editing application that shows time or TimeCode along a horizontal axis. Similar to the ruler in word processing applications except calibrated in units of time.

S

- **safe action area:** and **safe title area:** are the regions of the video image considered safe from cropping for either the action or on-screen titles, taking into account variations in adjustments for video monitors or television receivers. Safe action is 90 percent of the screen measured from the center, and safe title is 80 percent.
- **SDI Serial Digital Interface:**, standardized in ITU-R 656, is a digitized video format used for broadcast grade video. It typically uses 75 Ohm BNC coaxial cables (which makes it easily upgradeable from analog video setups, which use the same cables). Uncompressed digital component signals are transmitted. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a data rate of 270 Mbit/s. A SDI signal may also contain embedded AES/EBU 48kHz, 16bit audio channels along with the video.
- **SMPTE TimeCode:** TimeCode that conforms to SMPTE standards. It consists of an eight-digit number specifying hours: minutes: seconds: frames. Each number identifies one frame on a videotape. SMPTE TimeCode may be of either the drop-frame or non-drop frame type.
- **shuttle:** is the process of viewing of footage at speeds greater than real time.

T

- **TBC:** Time base corrector. Device used to correct for time base errors and stabilize the timing of the video output from a tape machine.
- **TCP/IP (Transmission Control Protocol/Internet Protocol):** Transmission control protocol/Internet protocol. TCP/IP is a combined set of protocols that perform the transfers of data between two computers. TCP monitors and ensures correct transfer of data. IP receives the data from TCP, breaks it up into packets, and sends it to a network within the Internet. Every computer on the Internet supports TCP/IP.
- **telecine:** A device for capturing movie film as a video signal.
- **TimeCode:**
  - The time, measured in hours, minutes, seconds and frames, which is recorded on a tape along with program material and user bit information. The TimeCode is used to locate particular points on a tape.
  - A method of identifying video frames on a recorded format. A TimeCode number is a series of 8 digits (SMPTE TimeCode) which represents the hour, minute, second, and frame number of video. Two popular systems are: Longitudinal TimeCode (LTC) and Vertical Interval TimeCode (VITC).
- **Timeline:** A window within a video editing application where Clips and other production elements can be graphically arranged to create a fully edited production. The horizontal axis of the timeline window represents a timeline of the show.
- **toggle:** To change back and forth between two states (for instance: on, off, on, off, etc.)
- **track:** Levels in the timeline window of an editing application where video and audio elements can be placed to insert them into the production.
- **tri-level:** Synchronization signal dedicated to HD. The signal consists of a three-level sync pulse (zero volts (0V) Blank, -0.3 V pulse, +0.3 V pulse) followed by the video image data. Like analog sync, the signal is repeated every scan line as it creates an entire HD video frame.
- **trim:** In video editing systems, to add or subtract TimeCode to adjust edit points.

U

- **Underscan:** The process of displaying a TV picture on an area smaller than the TV picture tube size permitting view of the entire video picture, including sync and blanking. Many professional TV monitors have an underscan button or switch to allow for viewing the entire TV picture.

V

- **VCR:** Video cassette recorder.
- **VITC:** Vertical interval TimeCode. TimeCode encoded into the vertical interval of the video. It can usually be read out even when a VTR is still-framed or running at slower or faster than play speed.

W

X

Y

- **Y, U, V:** PAL luminance & color difference components. U and V are the names of the B-Y and R-Y color difference signals (respectively) when they are modulated onto subcarrier.
- **YUY2:** see 4:2:2.

Z

Index

M

N

O

P

Q

R

S

T

U

V