



**VCube2**  
HD VIDEO SYSTEM



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**VCube2**

Merging Technologies © 2008

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# 1 Welcome

## Welcome to VCube 2 User Manual

### Assumptions

This **User Manual** assumes you are thoroughly familiar with PCs and Windows terms and concepts.

This **User Manual** is focused around the Page and Folder interface.

Classical menu access is also available. A **Right-Click** displays contextual menus.

### Conventions

Conventions used in this manual:

Names found on VCube screens and pages are shown in bold. E.g. **Settings**

Pages and folder selections are shown like this: **Settings: Format & Synchro > Video Format**

Which means:

Click on the **Settings** page, click on the **Format & Synchro** folder and select **Video Format**.



Indicates a warning.



Indicates important information.



**F1** accesses the electronic version of this manual from the VCube software.



(**TopMost** must be unchecked in **Settings: User-Interface > Display** to allow the Help window to be displayed). All features described in the documentation are available in the Advanced Mode. **Alt + F3**. If the user-interface is set to Simple Mode **Alt + F1**, some features may remain hidden or unavailable.

## 2 What's New in VCube 2?

### Global Design:

- Windows and Vista 32 bit are supported
- The "Follow VT" mode allows VCube to be ultra reactive when controlled by Pyramix thru VT. It integrates an internal chase synchronizer. This mode is now the normal operation mode when syncing Pyramix and VCube using network, or Pyramix and VCube SE running on the same machine.
- Networked ADR features from Pyramix.
- Ovation support.
- Native version: VCube also exists in LE and XE modes. Note that only the VCube hardware allows cross-lock (different frame rate for TimeCode and Composition). VCube SE, LE and XE don't allow this feature.
- New video engine allowing artifact free interlaced video formats real time resizing. Different algorithms are available.
- Feet overlay TimeCode
- Comprehensive installer
- Online check for update

### Media Management:

- DNxHD codec support for QuickTime, AVI and cube file formats
- IMX 30 or IMX 50 options for generated MXF media files
- Linked Composition and file Path for recorded media files
- To speed up MXF file parsing, "Validate All Index Frames" can now be disabled from the Media Settings Panel

### Composition Management:

- Countdown clip (Real time countdown generation)
- Auto Countdown clip (Real time countdown generation before Mark In)
- Wipe clip (Real time wipe generation)
- Auto Wipe clip (Real time wipe generation on Mark IO)
- Test pattern clip (Real time test pattern generation)
- Audio Tone clip (Real time audio tone generation)

### Enhancements:

- Field accurate sync engine; even over the network thru virtual transport
- Improved Real-time playback (faster)
- Improved stability; especially when editing composition (clips) while playing
- Improved Render engine (faster: better multi-thread especially with 4 and 8 core system) can handle up to 16 core at a



time

- Improved Undo/Redo (faster; especially while playing)
- Improved AAF support
- Improved MXF support
- Improved Media re-linking when importing composition (with preferred search directory).
- Improved RS-422 (Sony 9 pin) support (faster)
- Audio waveform normalization
- Optional wave form generation
- Mother board audio outputs supported for playback (SE, LE and XE players)
- Simplified transport panel
- Improved Isis controller support
- Virtual Transport control enhancement (in VCube UI)
- General software speed enhancement

#### Audio:

- Audio waveform normalization
- Optional wave form generation
- Mother board audio outputs supported for playback (SE, LE and XE players)

#### Hardware:

- USB Sync board for VCube, SE, XE and LE > RS-422, LTC, Bi-Phase.
- VS3 6.x support
- Latest AJA 6.5 Drivers support (for Xena LS, LH and 2K)
- Store and restore AJA Xena 2 configuration and routing.

VCube Keys	Description
VCube	Enable VCube Software
VCube IO SD SDI	Enable Xena LS
VCube IO HD SDI	Enable Xena LH
VCube IO HD SDI Dual-Link	Enable Xena 2K
VCube IMX and MPEG2	IMX / MPEG2 / MPEG1 support
VCube DVCPRO	DVCPRO 25 / 50 support
VCube Final Cut Pro XML	XML Timeline exchange
VCube AAF	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 Avid DNxHD	DNxHD codec support
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						

## 3 VCube Overview

VCube is a hard-disk based video player / recorder system designed specifically for use in audio post production. VCube can operate as a standalone unit, or as part of a multi-system network, fully integrated with Pyramix, through standard Ethernet. Like Pyramix it offers sync to PAL, NTSC, 24fps Film and all the HDTV frame rates. VCube is also able to sync to a different TimeCode and reference to the internal frame type. This enables, for example, playing in 24 fps while syncing to a 25 fps TimeCode. VCube SE doesn't support the previous feature. VCube can also be controlled via the 9-pin Sony P2 protocol by any third-party DAW system, as well as controlling any 9-pin controllable VTR for capturing. 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 or OMF. AAF, and Apple XML are optional). VCube is able to mix different formats in the same Timeline. It is only necessary to specify the output format. All video Clips will be resized to this format in real time. Therefore it is possible to play out an HD file on a standard SD output 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 allows the administrator to tag both video and graphic outputs. The administrator can also protect VCube settings and editing with second password.

VCube will be your Swiss Army Knife in video for film post production.



Note that VCube is currently supplied with **RGBA, RGB, YUY2, DV25, MJPEG**, codecs. DVCPRO (50), DVCPRO-HD (100), DNxHD and IMX/MPEG2 remain optional.

**OMF** is provided as Timeline exchange format. MXF, AAF, and Apple XML are optional.

## 4 How to Update

Before installing VCube 2, uninstall the previous VCube version using the Add or Remove Programs from Windows or Vista.

Then run the installer and follow the instructions.

Once installed VCube now features a Check for Update (from the Help menu) that allows online updates if the machine has access to Internet.



Early VCube may feature AJA Xena SD, Xena HS, and Canopus ADVX-1000 video cards. these cards aren't supported anymore.

Ask for a video card crossgrade to your Merging dealer if requiered.

## 5 VCube User Interface

VCube is organized around a page & folder based interface.

Every page or folder can be displayed in a broken away window on the top of the preview even while preview is full screen.

To display a page separately, **Double-click** on its title label. VCube supports 2 screen extended desktop operation.

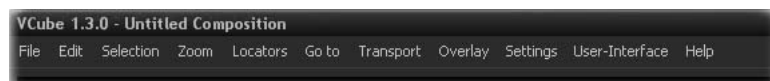
To restore the page back to its default position, just **Double-click** one more time on its title label or use the close window icon.

To display a folder separately, **Ctrl + Double-click** on its title label.

To bring restore the folder back to its default position, just **Double-click** one more time on its title label or use the close window icon.

A particular sub-folder panel can also be displayed separately by a **Double-clicking** on its title label.

Classical menu access is also available.



A **Right-click** in the Timeline or in preview area displays contextual menus.

A **Double-click** in the preview area toggles full screen. Or you can press **F3**.

When in full screen mode, a **Right-click** on the preview gives access to the menus.



Note that menu items present will vary depending on circumstances.

**F2** displays **Control Pages**:



- **Files** enables you to manage the Media Files and Compositions you're working on. **F6**
- **Locators** allows you to customize the locators. **F7**
- **View** gives access to keyboard shortcuts and Clip properties. **F8**
- **Edit** shows the editing tools. **F9**
- **Settings** configure the system. **F10**
- **Script** allows power users or administrators to use the Python language to create a sequence of actions in the VCube software. This feature is still under development and not fully implemented. **Ctrl + F6**





All control pages and folders can directly be accessed with a combination of **Function Key + Home**, and **End** buttons.

Double-clicking on a page title will break away a new window.

Double-clicking on a title inside a tab will break away a new window.

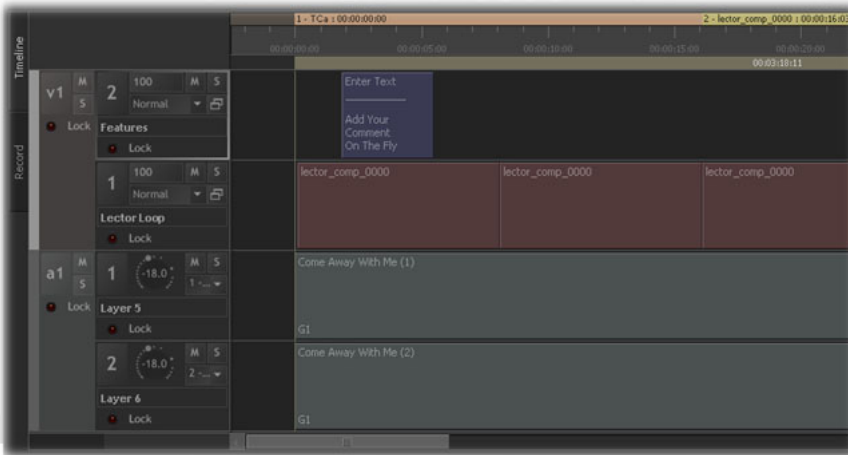
Double-clicking on the header of a broken away window restores the window to its default position.

- **Tool Bar** gives you direct access to the main functions of VCube.

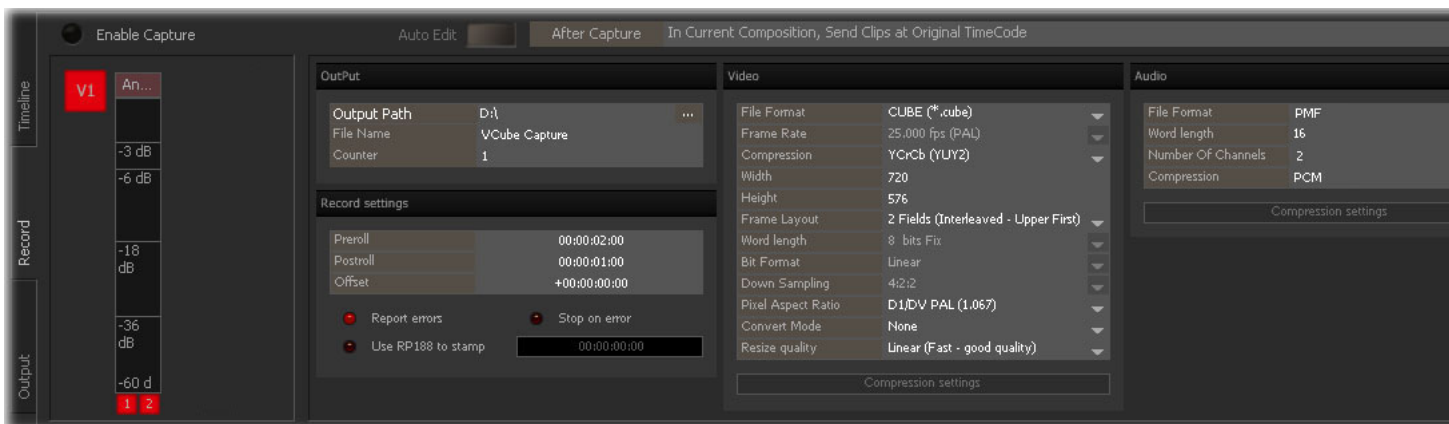


5

- **Timeline** activates the Timeline editor view. **F11**



- **Record** opens settings for capture. **F12**



- **F4** makes the Preview window float and hides the User Interface except for the broken away windows.
- **F3** toggles Preview Full Screen.
- **F2** toggles Control Pages.

- **F1** accesses the electronic version of this manual. (TopMost must be unchecked in **Settings: User-Interface > Display** or **Ctrl + Shift + Alt + P** to allow the help window to be displayed)
- To open an existing VCube Composition:
  - **Files: VCube Composition** or **Ctrl + O > Composition Path**
    1. Browse and select a folder
    2. Double-click on the desired Composition name in the list.
- To import an existing OMF, AAF, MXF or Apple XML Composition:
  - **File Menu: Import Composition (Create New)** or **Alt + O > Composition Path**
    1. Browse and select a folder
    2. Double-click on the desired Composition name in the list.
- To open a Media File in current Composition:
  - **Files: Media Files** or **Ctrl + Shift + O > File Path**
    1. Browse and select a folder
    2. Double-click on the Media File's name in the list. The Media File will be added as a Clip on a new Layer in the first track at current TimeCode.
- To open a Media File in a new Composition:
  - **Files: Media Files** or **Ctrl + Shift + O > Media Files Path**
    1. Click on the File Path ... button to open a browser window. Browse and select the folder containing the required Media File(s).
    2. Double-click on the Media File's name in the list. The Media File will be added as a Clip on the first track at current TimeCode.
    3. **Easy Load (Shift + L)** can also be used to create a new Composition with settings matching the selected Media File properties. (If a Composition is already open it will be closed)
- To set video format and synchronization:
  - **Quick SD Settings Alt+F5** or **Quick HD Settings F6** must be used for standard video formats.
  - Show transport Panel **T**
    1. Select the TC Source. **LTC**, **VITC**, or **EXT** for Sony 9 pin. All including Auto must be disabled if **Virtual Transport** is the chase TC source.
    2. Enable Chasing if needed **Ctrl + F1**



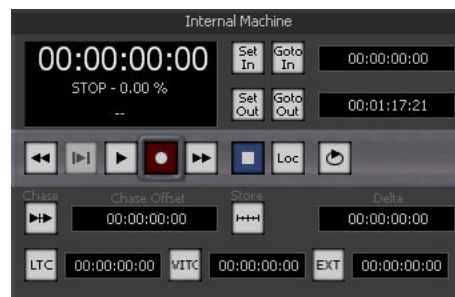
When the Video Card I/O (**Shift + Alt + P**) plug-in is enabled, the **Quick Settings** for video format are also applied to the video card.

Depending on your setup, a video reference may be required. All clocking inconsistencies will generate a red warning message. This will prevent any further operation.

- To Record:

- **Quick SD Settings Alt+F5** or **Quick HD Settings F6** to select standard video formats.
- Recall the Record Panel **F12**
  1. Select the volume you want to record on
  2. Set the desired video and audio file formats
  3. Select the codec for video and audio
  4. Arm video and audio tracks
  5. Enable Capture
  6. Select a TimeCode source and enable Chasing if required from the transport panel **T**
  7. Press Record once the VCube is locked
- [To Playback recorded media file](#)
  - Uncheck Enable Capture
  - Go back to the Timeline **F11**
  - Remove Chase from the transport panel **T** if needed
  - Press Play **Space bar**

#### The Transport Panel



A Global preset Section (**P**) allows to create and recall a complete environment. The specific codec settings aren't included. Only the codec type is included.

#### Here is the method to create useful global presets:

1. Enable the video I/O **Shift + Alt + P** plug-in according the video card present in the machine.
2. Choose a HD or SD video standard according to your requirements. The simplest manner is to use the Quick SD **Alt + F5** or Quick HD **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 different synchronization configurations.

---

## 6 Tool and Transport Bars


The **Tool and Transport Bars** gather together essential functions of VCube.


## 6.1 Tool Bar




**Tool Bar** features the main functions of VCube.




-  **Open** Gives direct access to the VCube Composition tab. **Ctrl + O**
  -  **Medias** Gives direct access to the Media Files tab. **Ctrl + Shift + O**
- 
-  **Quick SD Settings** Gives direct access to Quick Settings for SD video formats. **Alt + F5**
  -  **Quick HD Settings** Gives direct access to Quick Settings for HD video formats. **Alt + F6**
  -  **Show Settings Preset** Gives direct access to Settings Preset. **P**
  -  **Show Format & Synchro Settings** Gives direct access to Format & Synchro Settings. **Alt + P**
  -  **Show LTC / VITC Settings** Gives direct access to LTC / VITC Settings. **Ctrl + F2**
  -  **Show Overlay Settings** Gives direct access to Overlay Settings. **Ctrl + P**
  -  **Show Preview Settings** Gives direct access to Preview Settings. **Ctrl + Alt + P**
  -  **Show Composition Settings** Gives direct access to Composition Settings. **Shift + P**
  -  **Show Feet Ruler Options Dialog** Gives direct access to Feet Ruler Settings. **Ctrl + F**
  -  **Show Video I/O** Gives direct access to Video I/O Settings. **Shift + Alt + P**
  -  **Show Disk Cache & Playback Buffer Settings** Gives direct access to Disk Cache & Playback Buffer Settings. **Ctrl + Shift + P**
  -  **Show User Interface Settings** Gives direct access to User-Interface Settings. **Ctrl + Shift + Alt + P**
  -  **Show Isis Settings** Gives direct access to the Isis Settings.
  -  **Show Encryption Settings** Gives direct access to the Encryption Settings. **Alt + K**
  -  **Show Media Settings** Gives direct access to the Media Settings.
  -  **Show Timeline Settings** Gives direct access to the Timeline Settings.
  -  **Show / Hide Transport Frame** Gives direct access to Transport Frame. **T**
  -  **Show Record Page** Gives direct access to Capture Page. **F12**
  -  **Show Timeline** Gives direct access to Timeline Page. **F11**
- 
-  **Show Clip Info** Gives direct access to Clip Info tab. **Ctrl + W**
  -  **Show Shortcuts** Gives direct access to Shortcuts tab. **Shift + W**
  -  **Show Workspaces** Gives direct access to Workspace tab. **Alt + W**
  -  **Show System Output** Gives direct access to System tab. **Ctrl + F8**
  -  **Show Buffers Output** Gives direct access to Buffers tab. **Ctrl + F9**
  -  **Show Playback Infos Output** Gives direct access to Playback Info tab. **Ctrl + F10**
  -  **Show Sync Status Output** Gives direct access to Sync Status tab. **Ctrl + F11**
















-  **Show Playback Monitor Output** Gives direct access to Playback Monitor tab. **Ctrl + F12**




-  **Show Locators Page** Gives direct access to Locators page. **F7**

-  **Toggle Show/Hide Settings** Toggles Settings pages. **F2**
-  **Toggle Fullscreen Preview** Toggles Full Screen. **F3**. **Double-click** in picture produces the same action.
-  **Toggle Floating Window** Toggles Floating Preview. **F4**

-  **Convert Media Files** Converts Media Files of selected Clips into .cube files. **Ctrl + Y**
-  **Render Composition** Renders Composition. **Ctrl + R**
-  **Convert Still Images** Displays the specific dialog to import numbered still images as a sequence. **Ctrl + I**

-  Fits the Composition in the Edit window. **Alt + 1**. If one or several Clips are selected Fit All becomes Fit Selected.
-  Returns to the previous zoom. **Alt + 2**
-  Zooms in. **Alt + 3**
-  Zooms out. **Alt + 4**.
- The zoom level can also be controlled with **Alt + Mouse wheel** or **Alt + Click** into the Time Ruler or **Right-click** into the Time Ruler.

-  Undo last action. **Ctrl + Z**
-  Redo last action. **Ctrl + Shift + Z**
-  Splits selected Clip(s) **Ctrl + T**
-  **Cut** Cut selection at TimeCode. **Ctrl + X**
-  **Cut & Ripple** Cut selection and Ripple. **Ctrl + Shift + X**
-  Copy selection. **Ctrl + C**
-  **Paste** Paste the Clipboard content. **Ctrl + V**
-  **Paste & Ripple** Paste the Clipboard content and ripple. **Ctrl + Shift + V**
-  **Paste at Previous TimeCode** Paste the Clipboard content at its last TimeCode in the Timeline. **Ctrl + M**

-  Add new Layer. **Ctrl + Shift + N**
-  **New Video Track** Add new video track. **Ctrl + Shift + T**
-  **New Audio Track** Add new audio track. **Ctrl + Alt + T**

- **T New Text Clip** Add Text produces a 5 seconds Clip for text in the Timeline at the current TimeCode. Text Properties dialog appears in the View tab. **Shift + T**
- **T New Sticky (Text Clip)** Add Note produces an overlayed text box of 5 seconds duration from the current cursor position. for text in the Timeline at the current TimeCode. Text Properties dialog appears in the **Alt + T**
- **Countdown Clip** creates a utility countdown clip (10 seconds) corresponding to the current Composition settings. The default duration is ajustable from the clip info panel.
- **W Wipe Clip** creates a utility wipe clip representing a remaining time to the end of the clip.
- **Test Patern Clip** creates a utility wipe clip according the current composition settings.
- **Sinus Audio Clip** creates a new ten seconds audio clip featuring a sine wave. Frequency and level can be adjusted from the clip info panel.


- **Move up selected layer up. UP.** Move selection up **UP + Ctrl**. With **Shift + Ctrl + UP** = nudge track
- **Move down selected layer down. DOWN.** Move selection down **DOWN + Ctrl**. With **Shift + Ctrl + DOWN** = nudge track
- **Nudge back play head back. LEFT.** Nudge selection back **LEFT + Ctrl**. With **Shift + LEFT** = override
- **Nudge play head forward. RIGHT.** Nudge forward selection **RIGHT + Ctrl**. With **Shift + RIGHT** = override

See in Control Pages, **View: Shortcuts** or **Shift + W** for a complete description of all nudge actions.

- **Set Range In. NUMPAD 7**
- **Set Range Out. NUMPAD 8**
- **Set locator point at TimeCode. NUMPAD 9**
- **Set selected locator at TimeCode DIVIDE**
- **Set Selection or Region to range RETURN**
- **Set Range to Region Ctrl + RETURN**

- **Go to Composition Start Ctrl + NUMPAD 0**
- **Go to Composition End Alt + NUMPAD 0**
- **Go to Range In. NUMPAD 4**
- **Go to Range Out. NUMPAD 5**
- **Go to Locator window. NUMPAD 6**
- **Go to Next Edit TAB**
- **Go to Previous Edit Shift + TAB**

- **Locks selected Clip. Ctrl + K**
- **Unlocks selected Clip. Ctrl + Shift + K**
- **Group selection Ctrl + G**
- **Ungroup all Ctrl + Alt + U**

-  Ungroup selected Groups **Ctrl + U**



Some Tool Icons have a small arrow on their right. This arrow indicates the presence of a Tool Picker. Click on the arrow or use **Right-click** on the current Tool Icon to access the complete **Tool Palette**.

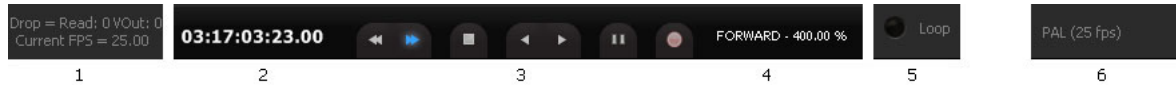
The last tool chosen will remain on the **Tool Bar**.



**Double-clicking** on the small separator bars will break away a new window. This feature enables you to organize your workspace on the computer screen(s). **Double-clicking** on the windows header restores the window to the default position.

## 6.2 Transport Bar

**Transport Bar** can be controlled with the mouse or the keyboard.



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 playback frame rate. If CPU, hard drive, or network is overloaded, playback screen refresh may slow down. When a Video I/O plug-in is enable 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 TC position. It can be edited (Double-click on the TC display).
3. Transport controls.
4. Current transport status and speed
5. Loop. **L**
6. If current incoming TC is different from the Composition frame rate, you will see this information.

### Rewind **NUMPAD 1**

- First action 400%
- Second action 1000%
- Third action 2000%
- Fourth action 5000%

### Forward **NUMPAD 2**

- First action 400%
- Second action 1000%
- Third action 2000%
- Fourth action 5000%

### Stop **NUMPAD 0**

Play Reverse **Ctrl + RETURN** or **Ctrl + SPACE**

Play **SPACE** (toggle Play / Stop) or **NUMPAD RETURN** (toggle Play / Pause)


Pause **NUMPAD 3**

Record **DECIMAL**



Note that Read Drop and Current FPS are useful tools to help trim Disk Cache and Playback Buffers.

- If some read drops occur during playback, Disk Cache must be adjusted in **Settings : Disk Cache and Playback Buffers > Disk Cache**. This value should be set around 64k for streaming from a local disk, and around 8k if streaming over a network. Those values may vary depending on the specific network or storage configuration and the video format.
- If Current FPS goes down, the number of frames should be increased in **Settings : Disk Cache and Playback Buffers > Playback Buffers**. With regular SD video formats and DV codec, 5 is a good choice. A subsequent press on the T key closes the Transport Frame.

 A Transport Frame **T** (VCR like) is also available from the Tool Bar. It brings together all the information and controls relating to Transport, incoming TimeCode and Chasing.



If Sony 9 Pin Remote Control is enabled **Settings: Composition**, "Remote On" is displayed. This means that the Internal Machine is controlled by the Sony 9 pin protocol coming from another device.

The RS-422 configurator switch must be set to "From Controller" if you use this port.

- **Set In NUMPAD 7**, **Set Out NUMPAD 8** are linked to the Range in the Timeline.
- **Goto In NUMPAD 4**, **Goto Out NUMPAD 5** are linked to Locator controls of the Timeline.
- **Loc NUMPAD 6** reaches the Goto Locator window.
- **Loop L** enables VCube to play in loop from In point to Out point
- **Chase Ctrl + F1**. This button can't be enabled when using the **Follow VT** mode in regular VCube or the **Slave to VT** mode for VCube SE.
- **Store** stores the chase offset.
- **EXT** should be selected to chase serial TimeCode from the Sony 9 pin. If EXT is not selected, the displayed TimeCode is the current Virtual Transport TimeCode.



If Sony 9 Pin Machine Control is enabled **Settings: Formats & Synchro**, VCube controls via Sony 9 pin protocol. (VCube is Master). The RS-422 configurator switch must be set to "To Machine" if you use this port



#### Rewind NUMPAD 1

- First action 400%
- Second action 1000%
- Third action 2000%
- Fourth action 5000%

#### Forward NUMPAD 2

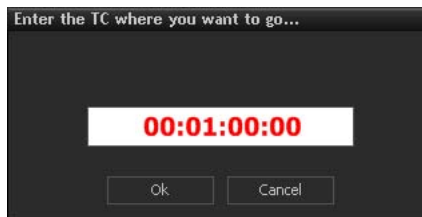
- First action 400%
- Second action 1000%
- Third action 2000%
- Fourth action 5000%

**Play SPACE** (toggle Play / stop) or **NUMPAD RETURN** (toggle play / pause)

**Ctrl** un-links the Transport Control from the Internal Machine. This allows the Sony 9 pin Machine Control to receive the control command directly from the VCube's keyboard.



Note that the Internal Machine and Sony 9 pin cannot use the same Serial Port.



The **Go To TC** function can be accessed by **Ctrl + NUMPAD 6**. This allows keyboard only operations to navigate into the Timeline.

# 7 Quick Settings for SD and HD Video Formats

These two dedicated settings panels enable single click setting of the video input format, the Composition format, the TC frame rate and the video output format:

 Gives direct access to Quick Settings for SD video formats. **Alt + F5**

 Gives direct access to Quick Settings for HD video formats. **Alt + F6**

When VCube is set in this manner, it behaves as a regular VCR in the selected video format.



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Quick Settings for SD and HD are also available from the Tool Bar

## 7.1 Quick Settings for SD

 Gives direct access to Quick Settings for SD video formats. **Alt + F5**



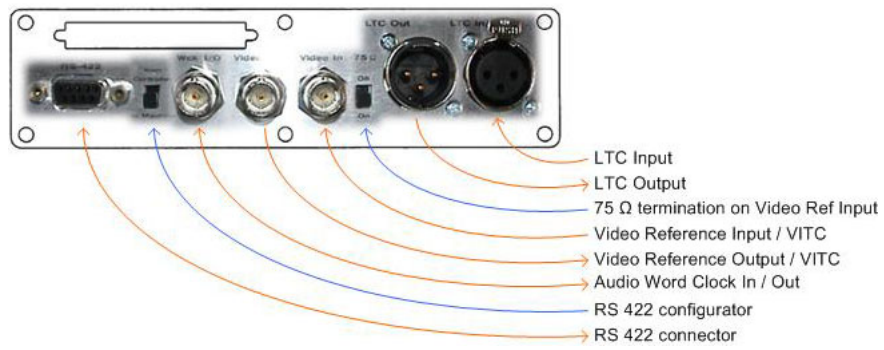
The Current Configuration Panel summarizes the state of VCube in terms of Video Size, Field Order, Pixel Aspect Ratio, Composition Frame Rate, TimeCode Frame Rate, Mykerinos Video Reference Format, Video I/O Format, and Audio Sampling Rate.

The Reference Source Panel features three drop-down lists:

The first is for selecting the Video Reference Source of the Video Card. (Where fitted)

The second is for selecting the Audio Reference Source of the Mykerinos Card (see Mykerinos connections below)

The last one is for selecting the TimeCode source of the Mykerinos' clock.



## 7.2 Quick Settings for HD

 Gives direct access to Quick Settings for HD video formats. **Alt + F6**



The Current Configuration Panel summarizes the state of the VCube in terms of Video Size, Field Order, Pixel Aspect Ratio, Composition Frame Rate, TimeCode Frame Rate, Mykerinos Video Reference Format, Video I/O Format, and Audio Sampling Rate.

The Reference Source Panel features three drop-down lists:

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The first is for selecting the Video Reference Source of the Video Card. (Where possible)

The second is for selecting the Audio Reference Source of the Mykerinos Card (see Mykerinos connections below)

The last one is for selecting the TimeCode source of the Mykerinos' clock.

Mode allows to optimize memory usage on the video card depending of the HD media recorded on the tape.

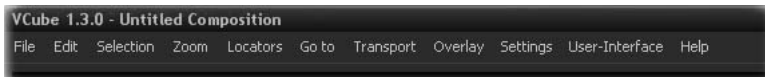
DVCPRO-HD and HDV require specific settings for maximum performances in record and playback.

All settings command instructions must be finished by the apply button before closing. This ensures that the selected frame size into the video cars is set according the codec specifications.

## 8 Control Pages

**Control Pages** allow you to adjust parameters of the VCube working environment.

These Pages can also be accessed via Menus. Even in Simple, Full Screen or Floating modes, all VCube' s functions can be accessed with a **Right-Click** on the preview area.



Note that:

- **F2** toggles Control Pages.
- **F3** toggles Preview Full Screen.
- **F4** makes the Preview window float and hides the User Interface except for the broken away windows.
- **F1** accesses the electronic version of this manual. (TopMost must be unchecked in **Settings: User-Interface > Display** or **Ctrl + Shift + Alt +P** to allow the help window to be displayed)
- **HOME / END** steps through the different pages.
- **Page UP / DOWN** steps through the different folders in each page.



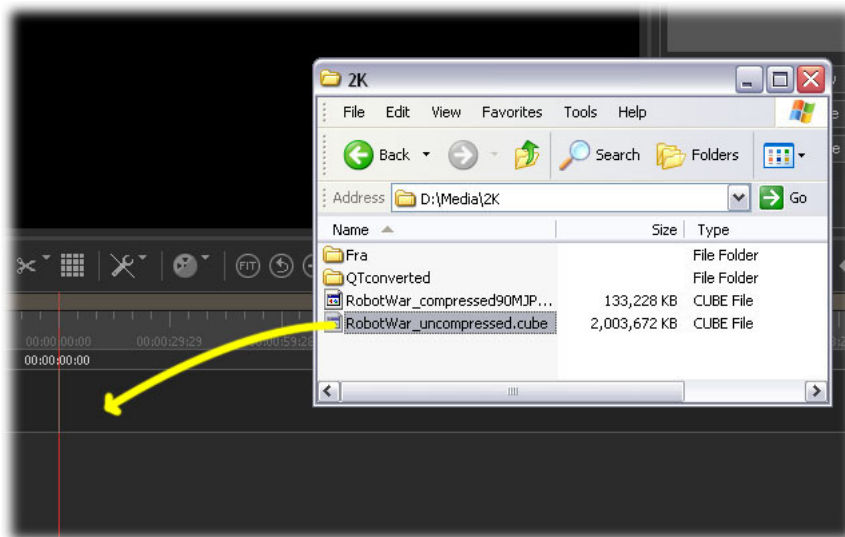
## 8.1 Files

**Files** page allows you to manage the media files and VCube Compositions you're working on. **F6**

From the **File** menu, the **Import** sub menu allows to reach:

- xChange Manager **Shift + O** witch is a specific window displaying properties of all media files used in a Composition.
- Media **Ctrl + Shift + O** witch is a specific window allowing to import a new media file into the current Composition or creating a new Composiytion from the imported media file.
- Composition (Create New) **Alt + O** allows to import a **OMF**, **AAF** or **Apple XML** Composition into the VCube Timeline.
- Composition (Add to Exsting) **Shift + Alt + O** allows to merge a new **OMF**, **AAF** or **Apple XML** Composition with the current Composition.
- Import Layer **Ctrl + Alt + L** allows to import a specific layer from a Composition into the current Composition.
- Convert Still Images **Ctrl + I** allows to create a video media file from a sequence of numbered still images.

Only one Project at a time may be loaded into the Timeline.The **Load Selective** feature allows you to Import Composition objects or properties into the currently loaded Composition.



VCube Composition files and Media Files can also be dropped directly onto an existing track of the Timeline from a Windows folder.

Supported file extensions are:

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 (own by Adobe, created by Aldus). It's a bitmap raster file format	
.tiff	Tagged Image File Format (own 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	Truevision: 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	
.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
.bmf	Broadcast wave	Yes
.pmf	Pyramix media file format	Yes
.ac3	AC3	
.sd2	Sound designer	
.sdii	Sound designer	



A single still image is imported as a 5 seconds Clip.

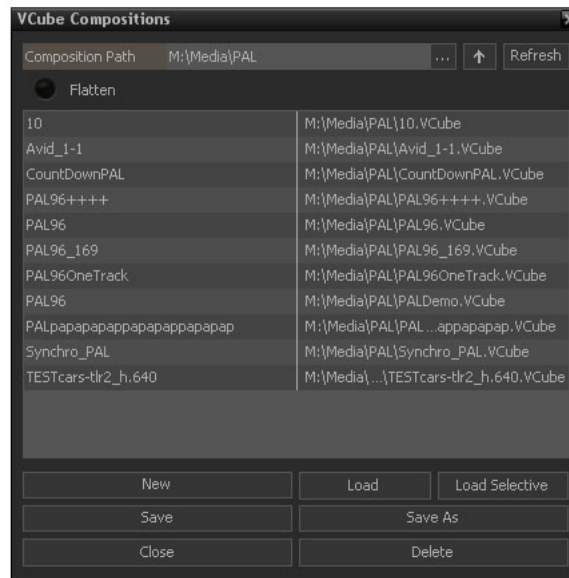
A sequence of numbered still image is imported one images per one video frame.

Imported still images are loaded in RAM.

\* Means optional feature.

## 8.1.1 VCube Compositions

 **VCube Compositions** allows you to manage VCube specific Compositions. **Ctrl + O**



... **Browser** 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.

- To open a Composition, **Double-click** on the selected Composition in the list or use the load button.

**Refresh** updates the list of Media Files in a specific location. **F5**

**Flatten** allows you to see all Media Files inside a specific folder even if they're inside sub-folders.

**New** opens a new empty Composition. **Ctrl + N**

**Load** opens a pre-existing Composition. **Ctrl + L**

**Save** saves the current Composition using the current Composition name. **Ctrl + S**

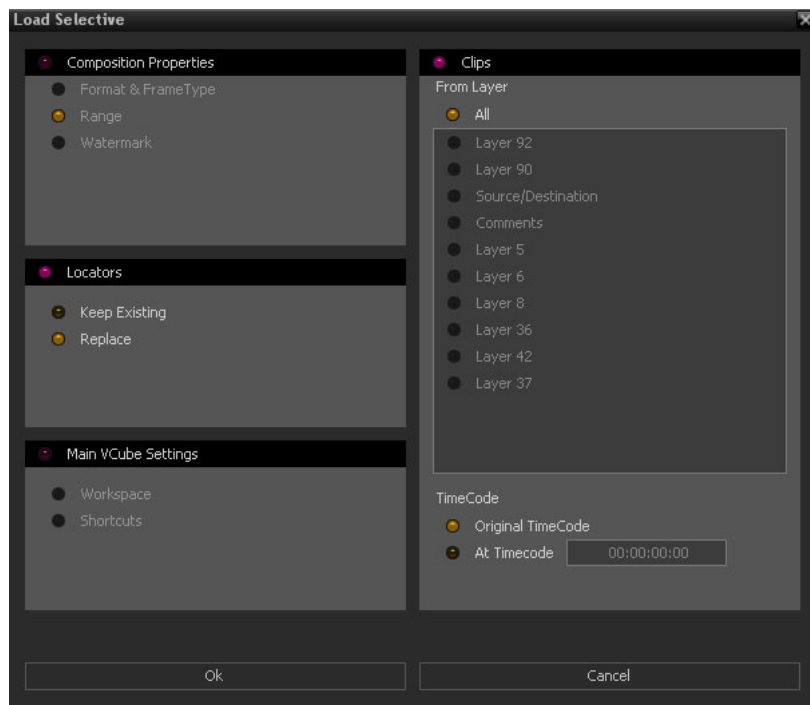
**Save As** saves the current Composition using a new name. This feature is useful since it enables you to save many versions of the same Composition with different names. **Ctrl + Shift + S**

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

**Delete** allows you to delete selected Composition from the hard drive. **Shift + DELETE**

The associated Media Files remain on the mass storage.

**Load Selective** allows you to import Composition objects or properties into the current one. A dialog box allows you to choose how the selected Composition will be imported into current one. **Ctrl + Shift + L**



**Composition Properties** must be highlighted in order to choose a specific property to be selected and imported.

**Locators:** If Keep Existing is selected, locators of both Compositions are merged. Replace will only keep the imported locators.

**Main VCube Settings** allows you to chose if Workspace or Shortcuts must be imported in the current composition.

**Clips** allows you to select specific Layers to be imported in the current Composition. If At TimeCode option is selected, imported locators will also be shifted.

Settings		Saved in Composition
Overlay		
TC Enable		X
Ext TC Enable		X
TC Pos & 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 FrameRate		X



This tab shows which settings are reloaded systematically with the composition **overriding current settings**. With the Load Selective feature it is also possible to reload a workspace, a shortcut list or synchronization settings from another composition (All other settings).

## 8.1.2 OMF Compositions

From the **File** menu, the **Import** sub menu allows to reach:

- Composition (Create New) **Alt + O** allows to import a **OMF** Composition into the VCube Timeline.
- Composition (Add to Existing) **Shift + Alt + O** allows to merge a new **OMF** Composition with the current Composition.



(Yellow) The Clip is a rendered effect.



(Green) VCube can render the effect in realtime.



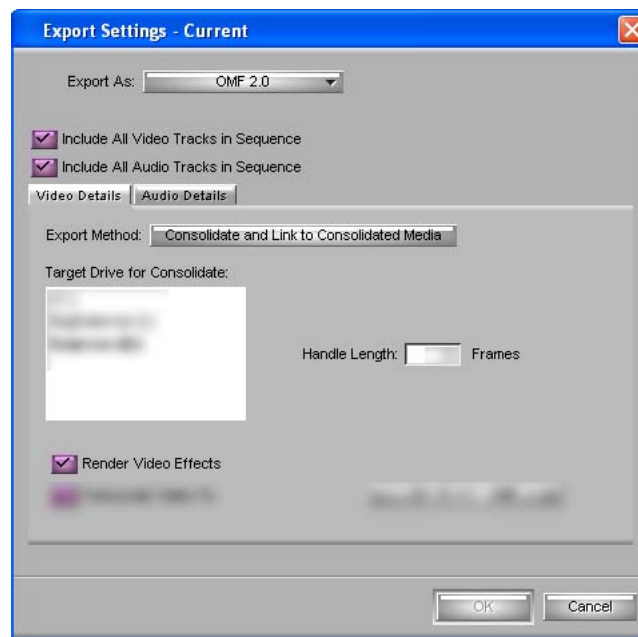
(Red) VCube does not support the effect.



VCube Composition files and VCube can render the effect in realtime. can also be dropped directly onto the Timeline from a Windows folder.

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 into the subfolders of the composition file location on the local storage.
3. Lastly VCube uses the data base 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.



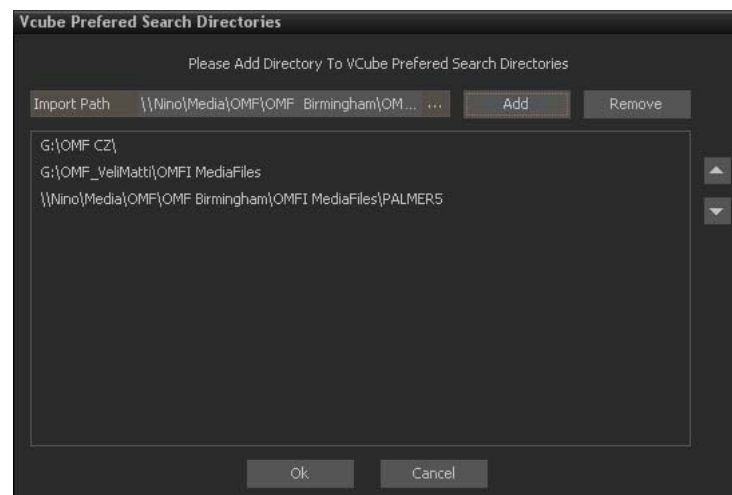
On Avid NLE, the Composition must be consolidated in OMF2 reflecting the above screen capture.

Embedded Compositions aren't currently supported by VCube.

VCube doesn't manage OMF Timeline for Audio.

OMF audio Media Files can only be used as regular Media Files into the VCube's Timeline that doesn't reflect the audio edit from an Avid system. Pyramix supports OMF audio edits from Avid systems.

If some media files can't be found by VCube a dedicated panel is displayed.



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

The vertical arrows move the selected path into the list. The scanning is done from top to bottom.

This feature can directly reached from the Settings menu. This enables VCube to relink media files spread over different workspaces or servers.



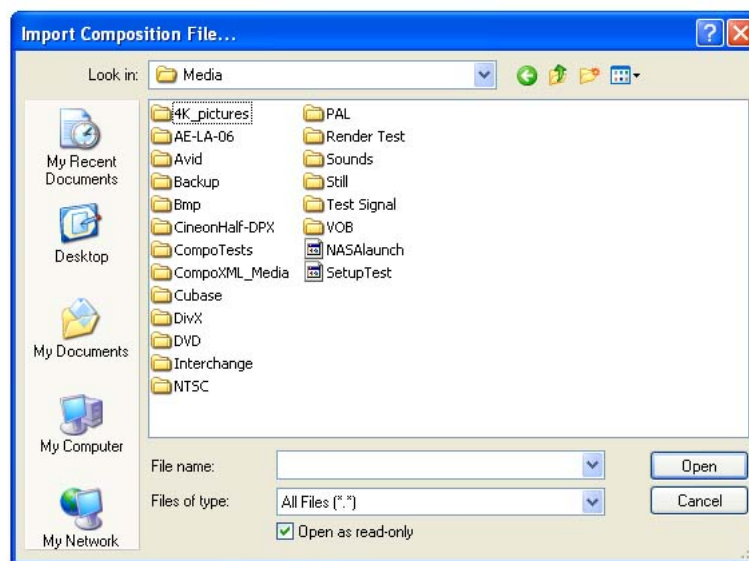
## 8.1.3 AAF and Apple XML Compositions

**AAF**, and **Apple XML** are optional features of the VCube software.

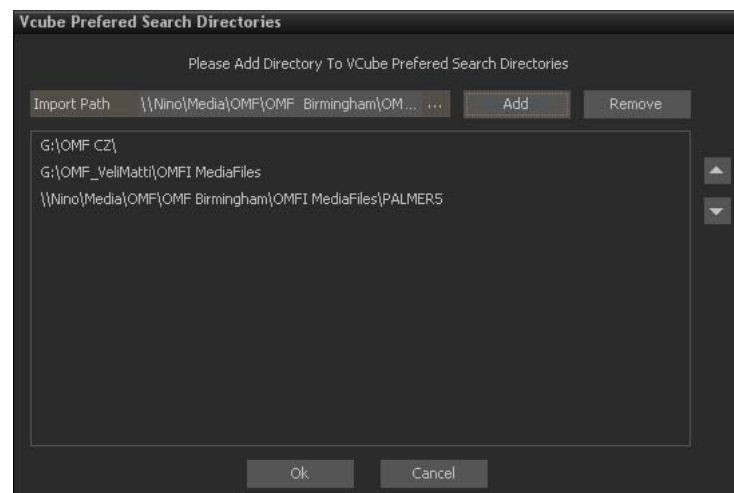
Those file formats can describe complex Timelines including many video and audio Clips on different tracks.

Using such files avoids the rendering step when exporting a project to the audio post production equipped with a VCube solution.

To import **AAF**, or **Apple XML** files press **Alt + O** on the keyboard to reach the Import Composition panel.



If some media files can't be found by VCube a dedicated panel is displayed.




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

---

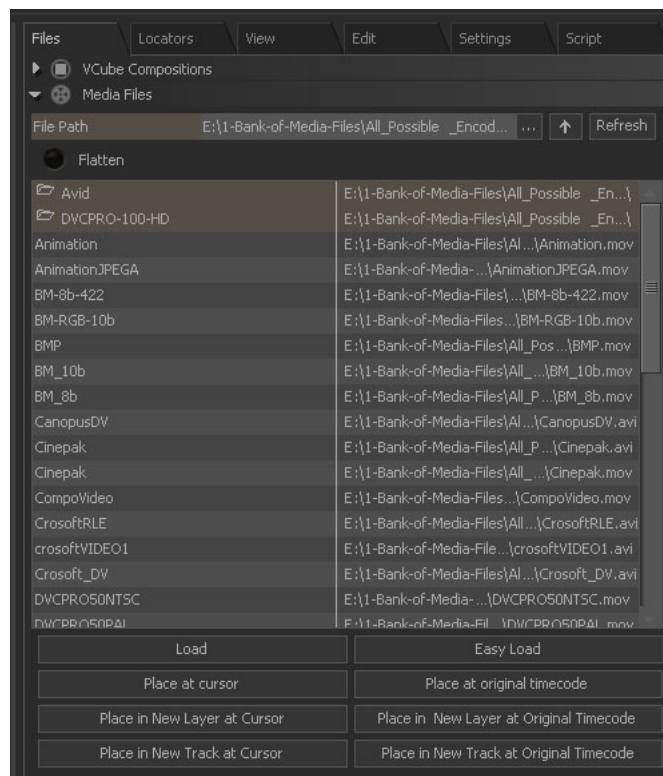
The vertical arrows move the selected path into the list. The scanning is done from top to bottom.

This feature can directly reached from the Settings menu. This enables VCube to re-link media files spread over different workspaces or servers.

## 8.1.4 Media Files

 **Media Files** allows you to select Media File to be added to your Composition. **Ctrl + Shift + O**

- 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 TimeCode in selected Layer: **Double-click**. If no Layer is selected a new one will be created.
- To add a Clip at the current TimeCode in a new Layer: **Control + Shift + Double-click**



VCube supports video only, video + audio, audio only and still image Media Files.

A 5 second Clip will be created from a single still image.



Use **Ctrl + I** to import a still images sequence.

... **Browser** allows you to select Media Files from local hard disks or via a network.

**Refresh** updates the list of Media Files in a specific location. **F5**

**Flatten** allows you to see all Media Files inside a specific folder even if they're inside sub-folders.

**Load** opens the selected Media File at current TC on the selected Layer. **Ctrl + L**

A dialog allows you to create a new Composition from this Media File.

**Easy Load** loads the selected Media File in a new Composition and sets Composition settings from the Media File properties. **Shift + L**

**Place at Cursor** pastes the Media File into the selected Layer at the cursor location.

**Place at Original TC** pastes the Media File into the selected Layer at its original TimeCode location.

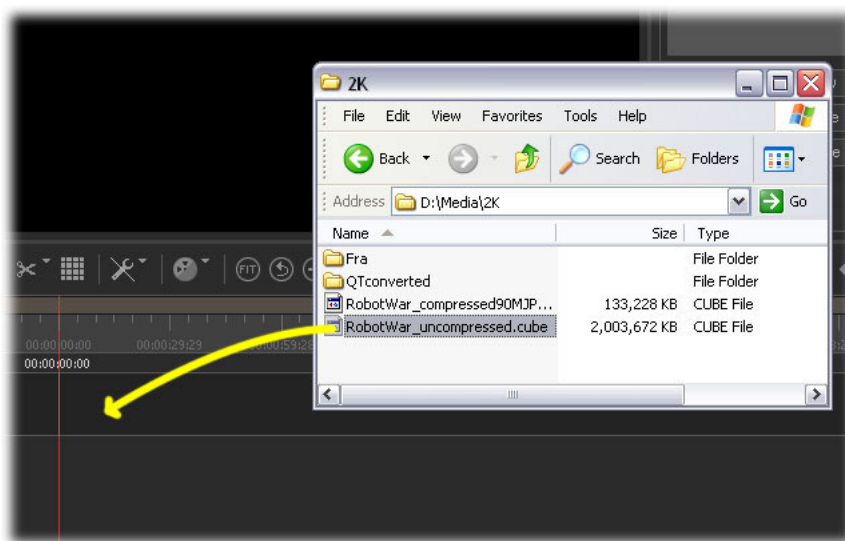
**Place at Cursor in New Layer** pastes a Media File into a new Layer at the cursor location with a single click.

**Place at Cursor in New Track** pastes a Media File into a new track at the cursor location with a single click.

**Place at Original TC in New Layer** pastes a Media File into a new Layer at the TimeCode location with a single click.

**Place at Original TC in New Track** pastes a Media File into a new track at the TimeCode location with a single click.

## Drag and Drop



VCube Composition files and Media Files can also be dropped directly onto the Timeline from a Windows folder.



Note that still images are stored in RAM when dropped in the Timeline. The Alpha channel is preserved .

The Convert Still Image feature **Ctrl + I** is the preferred option for numbered still images. The Alpha channel is not preserved when converted in a video Clip..

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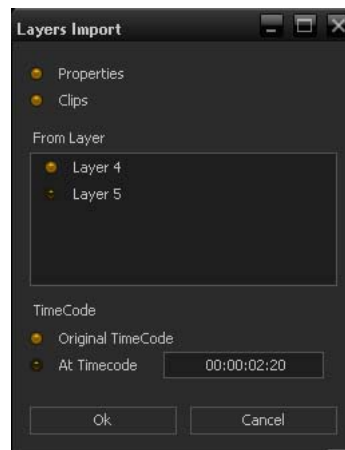
## 8.1.5 Import Composition and Export Changes

This feature allows to create an EDL reflecting the differences between two versions of a project.

A .EDL file is created into the composition folder.

## 8.1.6 Import Layer

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



Properties when checked, also imports the individual clips properties (Locked, Invert Fields, Invert Color...)

## 8.1.7 Convert Still Images

**Import Images Sequence** allows a Video Media File to be generated from a still image sequence. **Ctrl + I**



**Import Path** determines the source for images.

**File Format** selects the image format to be imported.

**Export Path** selects the destination of the created Media File.

**File Name** where the Media File is entered.

- **Video File Format** determines the type of the generated Media File for video. Cube, AVI2, QuickTime, MXF, or MPEG2 are possible.
  - When QuickTime and MJPEG codec are chosen, progressive scan must be selected for Fields Order to insure QuickTime player compatibility.
- **Frame Rate** must be set to the frame rate of the Composition where the generated media file is 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**.
- **Width** and **Height** determine the number of pixels used to display the frame.
- **Frame Layout** determines if and how the rendered frames will be interleaved or not.
- **Word Length** is currently limited to 8 bits.
- **Down Sampling** determines the color sub-sampling scheme. 4.2.2 (see Glossary section) is the default value
- **Convert Mode** can be Down or Up convert depending of the picture format selected for rendering.
  - Down Convert: Letterbox, Crop or Anamorphic are possible.

- Up Convert: Anamorphic, Pillarbox 4x3, Zoom 14x9, Letterbox or Wide are possible.
- **Resize Quality** allows the user to choose between different methods of computing the image in the desired format.
  - Nearest neighbour -> Fast and poor
  - Linear (Bi Linear) -> Fast and poor
  - Cubic -> Very Good but slow
  - Lanczos -> Very Good but very slow
  - Supersampling -> Very Good when reducing the picture a lot. Slow.
- **Compression Settings** are available for MJPEG and MPEG codecs.
  - For details on the **Mpeg Settings**, please refer to the dedicated section. We recommend using only regular "Format type" in the "Basic Settings" dialog for trouble free operations.
  - **MJPEG** codecA 100 value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20 compression ratio.



If you need to import a single still image (not a sequence) in the Timeline, use **Files: Media Files**. A 5 seconds Clip will be created from a single image. The alpha channel (transparency) is supported.



## 8.2 Locators

**Locators** window shows thumbnails **F7**. It is also possible to reach this window by **Double-clicking** on the **Locators Tray** in the Timeline window. (Above the TimeCode ruler) A **Double-click** on a thumbnail image locates the thumbnail frame in the Timeline and brings up details about the locator at the bottom of the Locators window.

You can also select a locator with **+ & - NUMPAD**.

TimeCode, Name, Shortcut, attached Color in the Timeline and a Comment can all be edited here.

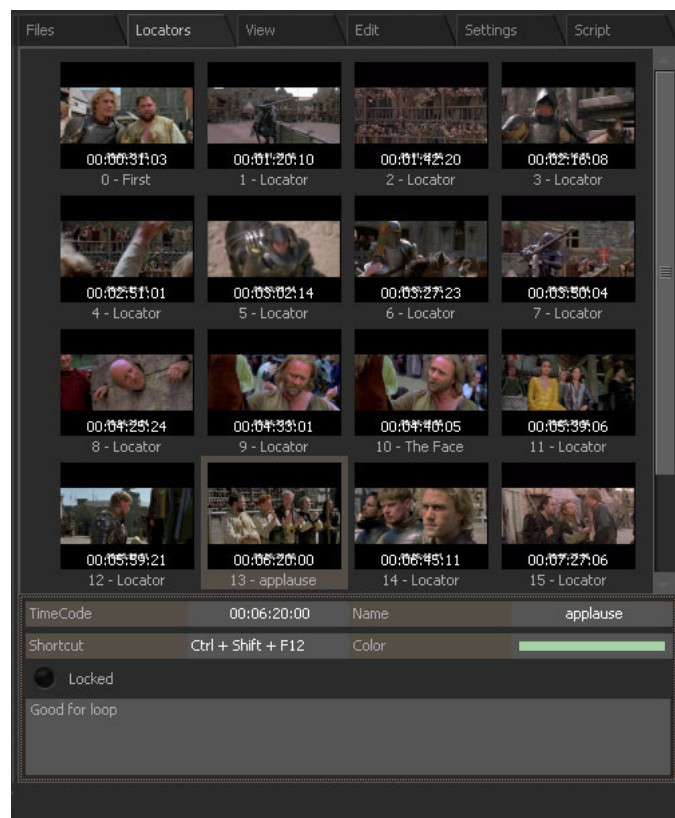
**Locked** switch protects the currently selected locator from any unwanted alterations.

**T** Set locator point at TimeCode. **NUMPAD 9**

**Ctrl + NUMPAD 9** automatically adds a locator to current ones at the beginning of every Clip in the selected Layer(s) whilst retaining the current locators.

**Alt + NUMPAD 9** automatically creates a locator at the beginning of every Clip in the selected Layer(s) overriding current ones.

**Ctrl + Alt + NUMPAD 9** automatically creates a locator at the beginning of every Clip in the Timeline.



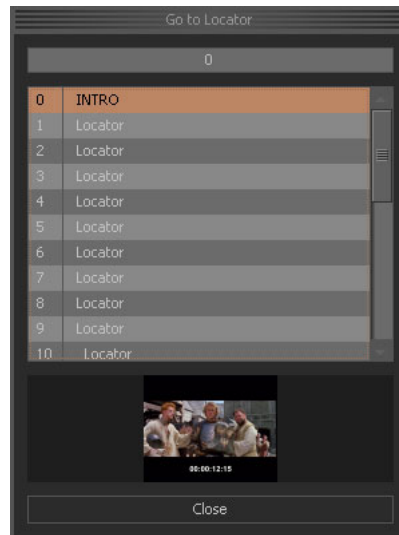
Any modification in the Timeline edit will update the locator pages thumbnails. Locators can be dragged with the mouse. Use

**Shift** for an instant, continuous update of the corresponding thumbnail.

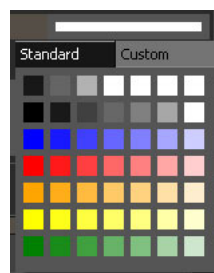
The Go To Locator window can be reached with **NUM PAD 6**.

**Double-clicking** an entry in the list moves the Play head cursor to the locator position.

You can also use **UP**, **DOWN** followed by **ENTER** to select the desired locator.



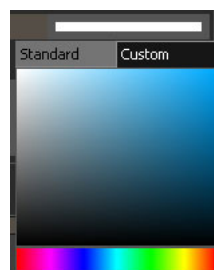
**Click** in the color window to open the Color Picker.



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

Then choose a **Hue** value at the bottom with a **Click**.

Finally, **Click** on the **Saturation** area to define the custom color..



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## 8.3 View

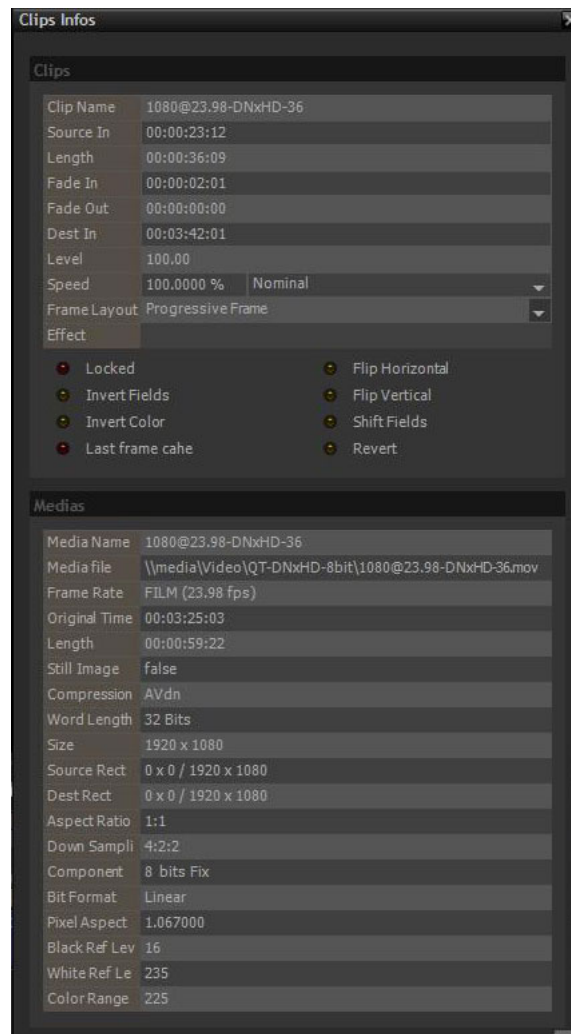
**View** page shows information about the workspace. **F8**

Note that:

- **F2** toggles Control Pages on and off.
- **F3** toggles Preview Full Screen.
- **F4** makes Preview window float and hides User Interface except for the broken away windows.
- **F1** accesses the electronic version of this manual. (TopMost must be unchecked in **Settings: User-Interface > Display** or **Ctrl + Shift + Alt + P** to allow the help window to be displayed)
- **HOME / END** steps through the Control Pages.
- **Page UP / DOWN** steps through the folders within each page.

## 8.3.1 Clips Information

**Clips Information** can be opened by **Double-clicking** on the clip in the Timeline. **Ctrl +W**



In the **Clip** part of the **Clips Information** window every information field can be edited by **Double-clicking** on the current value.

**Clip Name** shows the name used in the Timeline.

**Source In** is the original TimeCode in point for the Clip in the current Composition.

**Length** is the Clip's duration in the current Composition.

**Fade In** is the length of the Clip's fade in for the current Composition.

**Fade Out** is the length of the Clip's fade out in the current Composition.

**Destination In** shows the TimeCode for the first frame of the Clip used in the current Composition.


**Level** is the opacity ratio in percent of the Clip in the current Composition.


**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.


**Frame Layout** can be set for a particular clip in order to correct improper flag.


**Effect** indicates a particular effect name attached to OMF Composition.

 **Locked** prevents any editing actions on the selected Clip. A selection including a locked clip will also be locked.

 **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.

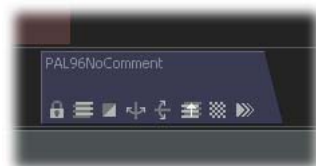
 **Speed** appears on the Clip when the Timeline playback speed is different to the original fps of the Media File.

 **Revert** displays the Clip's frames from the end to the beginning.

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

 **Gain** appears on the audio Clip when it isn't equal to 0 dB.

Note that all previous options for Clips will feature as a small icon inside the Clip in the Timeline.



**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.

Note that a Still Image File is always imported as a 5 Seconds Clip.

**Compression** shows the codec used with this Media File.

**Bit Count** shows the number of bits used for frame sampling.

**Size** shows the number of lines and samples per line used to scan in the picture.

**Source Rect** (Source Rectangle) displays Layers size and position settings.

**Dest Rect** (Destination Rectangle) displays Layers size and position settings.

**Frame Layout** shows if the media is interleaved or not.

**Settings: Preview > Deinterleave** enables the correct setting to be made for the preview.

**Aspect Ratio** shows the original pixel aspect ratio of the media.

**Horizontal Sub Sampling** shows how colors have been sampled horizontally.

If 1 indicates that all pixels of a line have been scanned to output the color value, 2 indicates that only one pixel in two has been used to output this value and so on.

**Vertical Sub Sampling** shows you how colors have been sampled vertically.

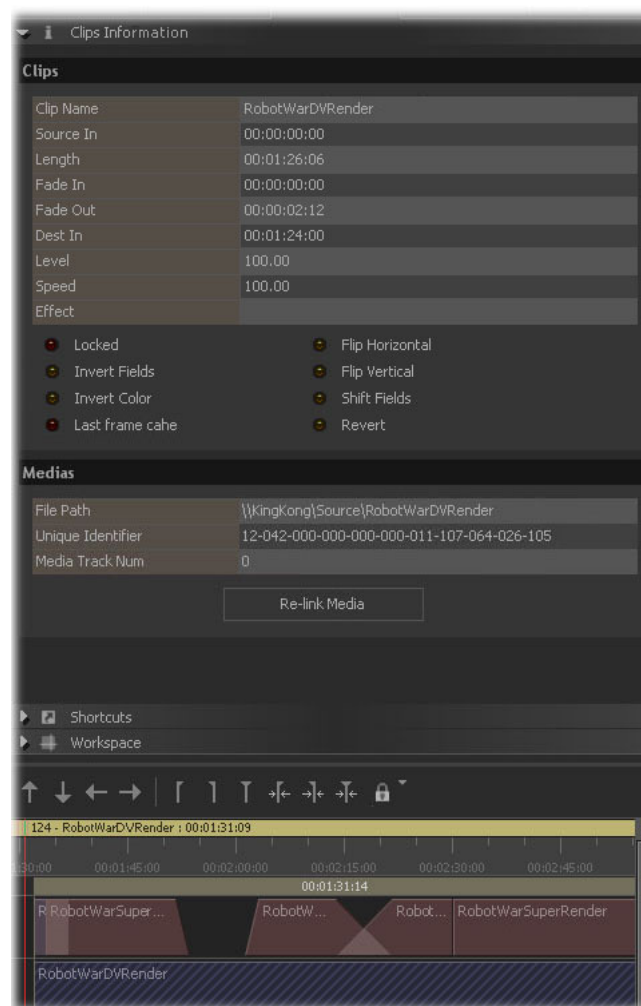
If 1 indicates that all pixels of a line have been scanned to output the color value, 2 indicates that only one pixel in two has been used to output this value and so on.

**Component Width** shows the precision of the sampling process for each component.

**Black Reference Level** is the digital value corresponding to the deepest black in the picture.

**White Reference 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.



A **Re-Link Media** button will appear if one or more Media Files are missing or offline (zebra Clips in the Timeline). This allows VCube to build a new path to the media.

Some specific information is displayed for Clips using MPEG encoded Media Files.

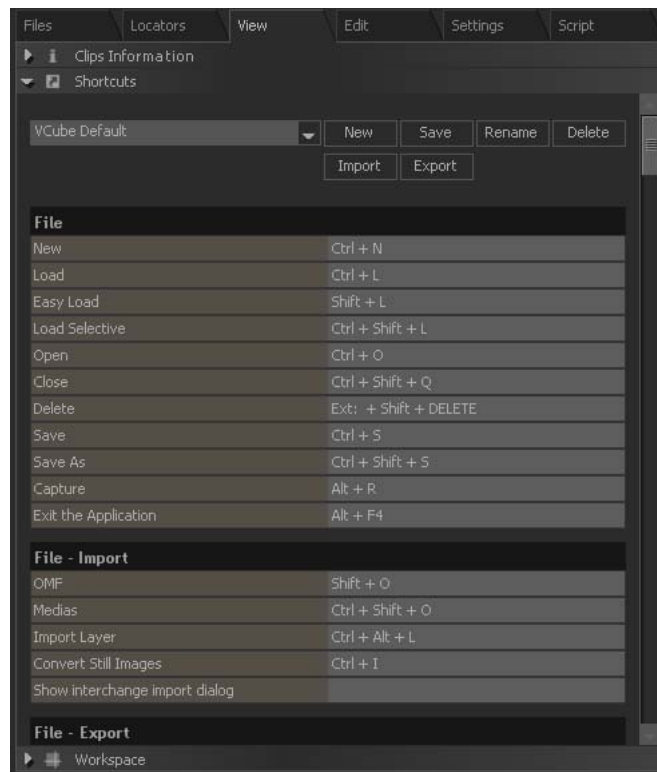
Compression	MPEG
Word Length	24 Bits
MPEG Video Type	MPEG-2 HDV HD2
MPEG Video Bit Rate	23.84 Mb/s
MPEG Chroma Format	4:2:0
MPEG Audio Type	ISO/IEC 11172-3 layer 2
MPEG Audio Layer	layer 2
MPEG Audio Bit Rate	375.00 Kb/s
Size	1440 x 1080

A red outline reflecting the whole Media File duration can be displayed while editing Clips at a non-nominal speed.<sup>2</sup> + **Pointer**  
Increasing the Clip's speed will reduce the Media File duration. Decreasing the Clip's speed will increase the Media File duration.



## 8.3.2 Shortcuts

**Shortcuts** shows default shortcuts and allows user defined ones to be created. **Shift + W**



When a Composition is saved, shortcuts are also saved inside this Composition so you can import specific shortcuts from any Composition.

**New** allows you to define new shortcut settings.

**Save** records current shortcut settings.

**Rename** allows you to change the name of the current preset.

**Delete** erases the current shortcut settings.

**Import** loads shortcut settings from a specific folder.

**Export** saves your shortcut settings in a specific folder.

Default shortcuts for VCube are in the Appendices.



## 8.3.3 Workspace

 **Workspace** enables customized workspaces to be saved and recalled. **Alt + W**



When a Composition is saved, the current Workspace is also saved inside the Composition. You can import a specific Workspace from any Composition.

- To generate a Workspace **Ctrl + Key number** corresponding to the Workspace's number.
- To load a Workspace **Shift + Key number** corresponding to the Workspace's number.
- A Generate and a Load button are available on the right for every Workspace.

**Delete All Workspaces** erases all saved Workspaces.

**Reset VCube User Interface** to its default settings (first launching).

VCube features two levels of Workspaces:

- **Simple Mode** can be password protected and edited from the Advanced Mode. The User Interface only displays what is

absolutely necessary for Simple Mode User. Timeline and Record are hidden. In this way sensitive settings and controls can remain hidden to casual or untrained users. **Alt + F1**

- **Advanced Mode** displays the full user interface. In this mode, it's possible to control and protect the Simple Mode. **Alt + F3**

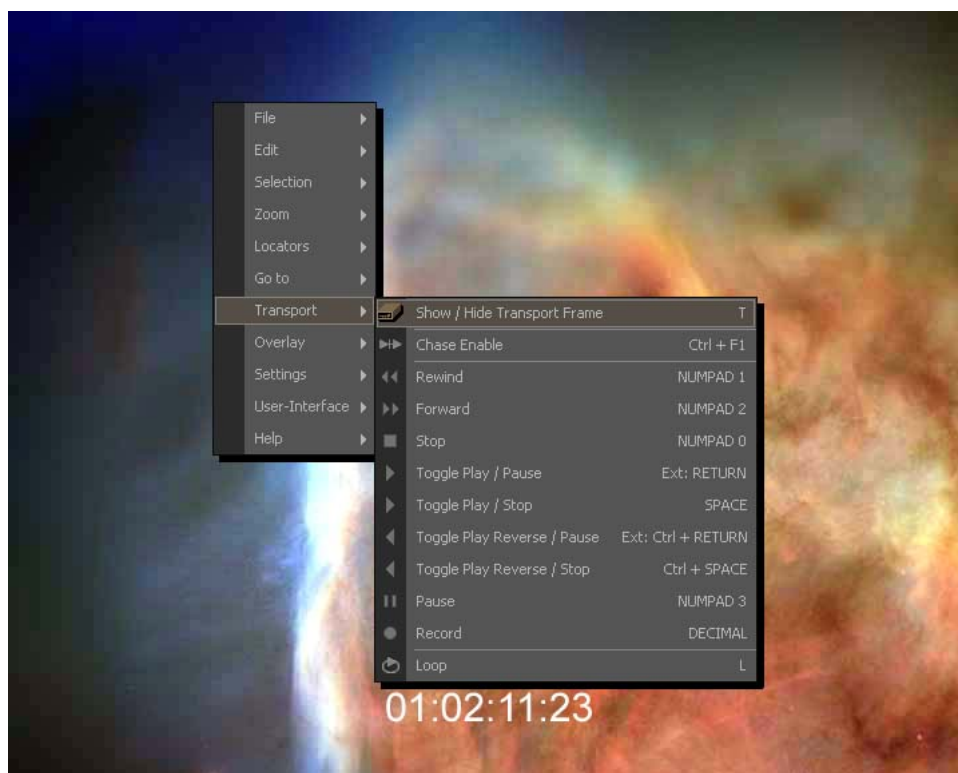


**Alt + F4** behaves as normal for a Windows OS application. (Closes VCube)

Note that the Simple Mode password is different from the Composition protection password.



Even in Simple, Full Screen or Floating modes, all VCube's functions can be accessed with a **Right-Click** on the preview area.



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## 8.4 Edit

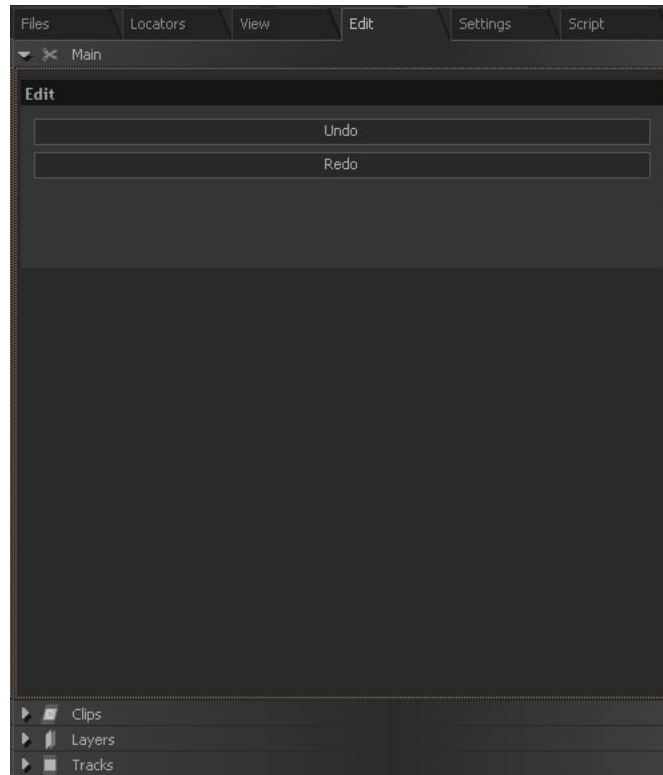
**Edit** page shows a range of editing tools. **F9**

Note that:

- **F2** toggles Control Pages.
- **F3** toggles Preview Full Screen.
- **F4** makes Preview window float and hides User Interface except for the broken away windows.
- **F1** accesses the electronic version of this manual. (TopMost must be unchecked in **Settings: User-Interface > Display** or **Ctrl + Shift + Alt +P** to allow the help window to be displayed)
- **HOME / END** steps through the different pages.
- **Page UP / DOWN** steps through the different folders.

## 8.4.1 Main

 **Main Edit** is the "tool palette" when you are editing in the Timeline. **Ctrl + D**

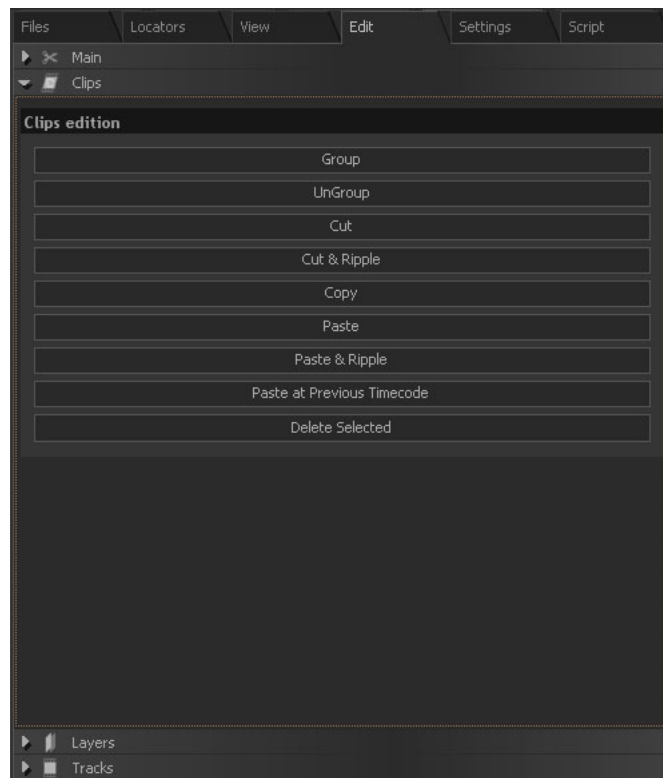


**Undo** cancels the last action in the Timeline. **Ctrl + Z**

**Redo** restores the last undone action in the Timeline. **Ctrl + Shift + Z**

## 8.4.2 Clips

 **Clips** shows tools for Clip editing. **Shift + D**



**Group** allows you to associate Clips in the Timeline. Select desired Clips with **Shift + Click** as usual in Windows; then use **Ctrl + G** to group the selection. Groups can be made from Groups and Clips.



- Note that a video Clip with embedded audio will appear in the Timeline as a Group with one video Layer and one audio Layer.
- Such a Group containing at least one audio Layer can only be moved horizontally in the Timeline until the grouped Clips have been ungrouped **Ctrl + U**.
- If the order of video clips has to be changed vertically for preview, Nudge Up / Down Layer must be used. Select the desired video Layer(s), then use **Ctrl + UP / Ctrl + DOWN**.
- A Clip remaining from a group on deleted Layer(s) is no longer included in remaining groups.

**Ungroup Ctrl + U** allows you to break links between grouped Clips.

**Cut** Copies the selected item to the Clipboard and removes it from its current position. **Ctrl + X**

**Cut & Ripple** copies the selected item to the Clipboard and removes it from its current position. It also moves all subsequent track content to the left (earlier) on the Timeline by an amount corresponding to the duration of the removed Clip. **Ctrl + Shift + X**

**Copy** saves the selected Clip to the Clipboard. **Ctrl + C**

---

**Paste** copies the Clipboard content into the selected track at the current TimeCode location. **Ctrl + V**


**Paste & Ripple** copies the Clipboard content into the selected track at the current TimeCode location. It also moves items on the right side of the Timeline to the right (later) by an amount corresponding to the duration of the inserted Clip. **Ctrl + Shift + V**

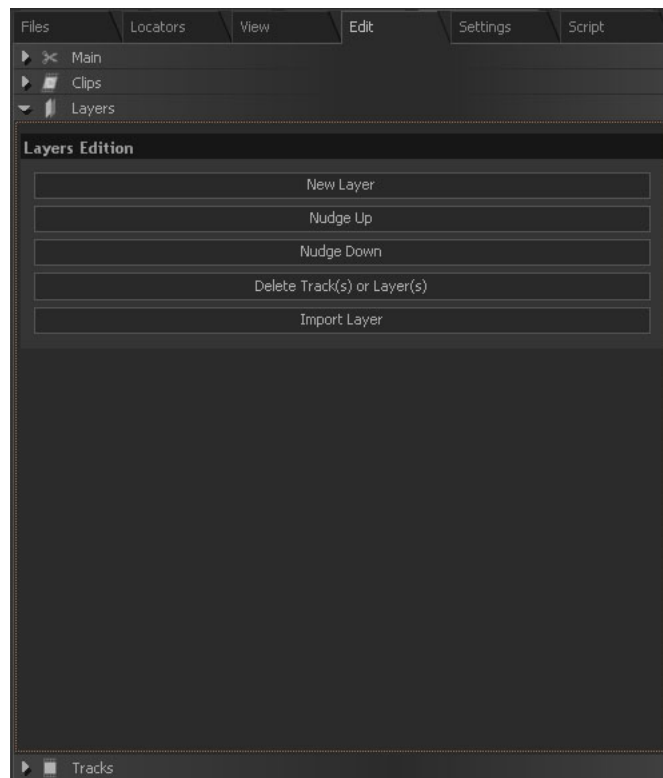
If no Layer is selected, a new Layer will be created. If Clipboard content includes both video and audio, both video and audio Layers have to be selected when no additional layers are needed.

**Paste at Previous TimeCode** pastes the Clipboard content at its last TimeCode (corresponding to its last TimeCode in the Composition). **Ctrl + M**

**Delete Selected** removes the selected item from the Timeline with no effect on the remaining Clips. **DELETE**

## 8.4.3 Layers

 **Layers** shows tools for Layer editing. **Alt + D**



**New Layer** creates a new Layer on the selected track. **Ctrl + Shift + N**

**Move Up Selected** brings 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 number of the Layer is not linked to a specific Layer but to its layout position.

**Move Down Selected** sends the selected item down a Layer. **Ctrl + DOWN**

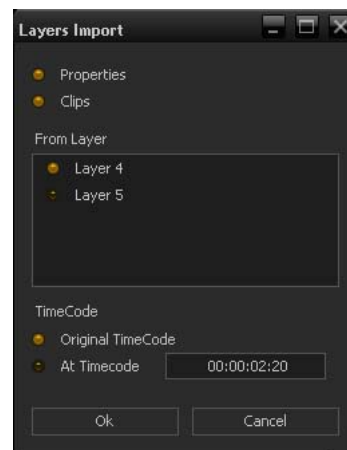
Note that moving a Layer to another track deletes the track if it has no remaining Layers.

Note also that the number of the Layer is not linked to a specific Layer but to its layout position.

**Delete Selected** Layer removes the selected Layered item from the track. **Ctrl + DELETE**

Note that a track with only one Layer will be deleted.


**Import Layer** allows you to import a Layer from another Composition. **Ctrl + Alt + L**

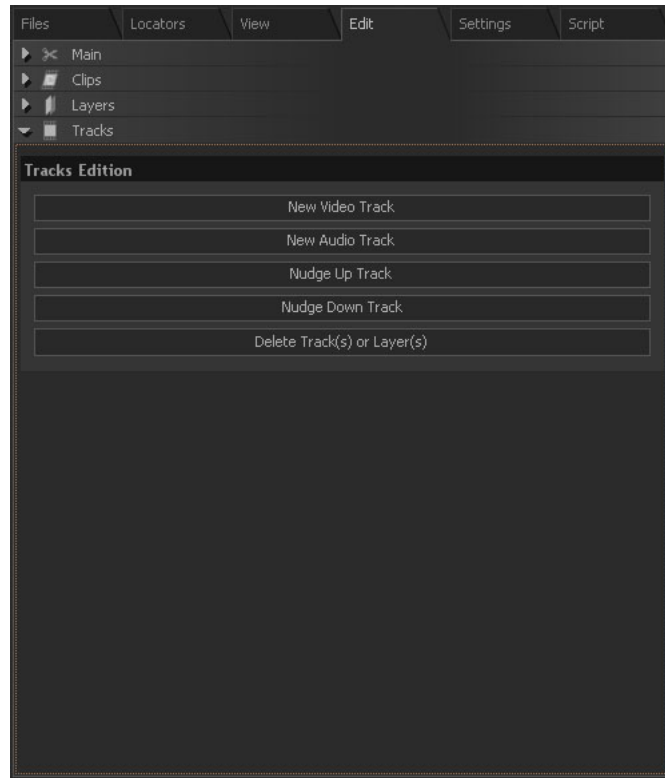


Layer properties, clips or both can be added to the current Composition at the original TimeCode or at a specific one for Clips.



## 8.4.4 Tracks

 **Tracks** shows tools for track editing. **Ctrl + Shift + D**



**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** changes track order. **Ctrl + Shift + UP**

**Move Down Selected** changes track order. **Ctrl + Shift + DOWN**

Note that the number of the track is not linked to a specific track but to its layout position.

**Delete Selected** removes the selected track from the Timeline. **Ctrl + DELETE**

---

## 8.5 Settings

**Settings** page allows you to adjust parameters of the working environment. **F10**

Note that:

- **F2** toggles Control Pages.
- **F3** toggles Preview Full Screen.
- **F4** makes Preview window float and hides User Interface except for the broken away windows.
- **F1** accesses the electronic version of this manual. (TopMost must be unchecked in **Settings: User-Interface > Display** or **Ctrl + Shift + Alt + P** to allow the help window to be displayed)
- **HOME / END** steps through the different pages.
- **Page UP / DOWN** steps through the different folders.



**System Display Properties** can directly be accessed with **D**. **TopMost** has to be disabled in **Settings: User-Interface > Display**



**Warning:** Changing the resolution setting (dpi) for Windows' display settings in **Settings > Advanced > General** can perturb the TimeCode display in the preview window. Default setting should be 96 dpi.

**Virtual Transport** panel can directly be accessed with **Alt + V**.

## 8.5.1 Presets

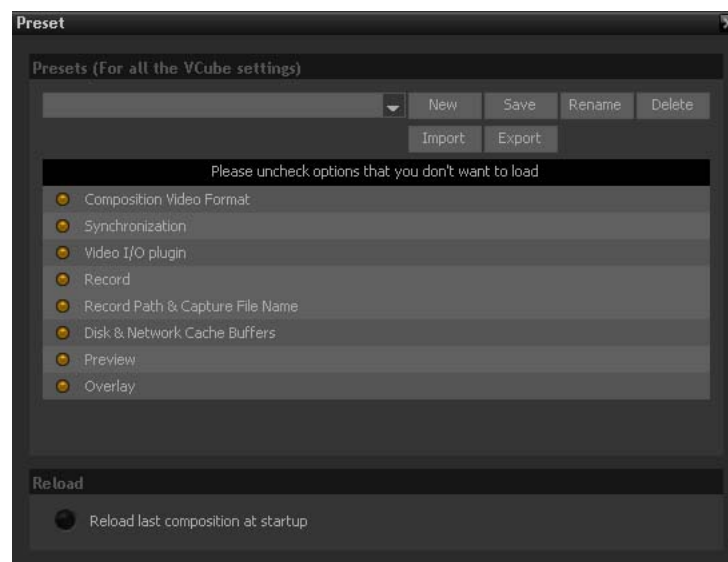
**Presets (For All The VCube Presets)** gathers together in a global preset all current settings . It acts as normal with **New, Save, Rename, Delete. Ctrl + P**



A global preset section **P** allows to create and recall a complete environment. The specific codec settings aren't included except for the "VCube MJPEG (standard)" codec. Only the codec type is included.

Here is the method to create useful global presets:

1. Choose a HD or SD video standard according to your requirements. The simplest manner is to use the Quick SD **Alt + F5** or Quick HD **Alt + F6**
2. Then set the video I/O **Shift + Alt + P** according to the previously chosen video standard and the SDI or analog connections you use.
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 different synchronization configurations..



A filter is available to uncheck the part of the global settings that won't be reloaded.

**Reload Last Composition at Startup** when enabled, allows VCube to automatically reload the last Composition when the application is started.

Settings		Vcube Config Preset	Format & Sync	
			Audio Ref	X
			Audio Sampling Rate	X
			Video Size	X
			Field Order	X
			Pixel Aspect Ratio	X
			Composition FrameRate	X
			Link Composition FR & Sync FR	X
			TC Frame Rate	X
Overlay				
TC Enable	X		TC Clock Ref	X
Ext TC Enable	X		TC Clock Ref Video Format	X
TC Pos & Size	X		Chase TC Source	X
TC Color	X		Chase Mode	X
TC Transparency Enable	X		Chase Enable	X
Mask Enable	X		Chase Offset	X
Mask Size	X		Graphic Card Delay Compensation	X
Preview			Video Card Delay Compensation	X
Engine	X		Sony 9Pin Remote Ctrl	X
Deinterleave	X		Sony 9Pin Machine Ctrl	X
Page Flipping	X		Ltc Gen Output Level	X
Size	X		Ltc GenOff When Stop	X
Video Frame	X		Vitc Reader Lines Settings	X
Safe Area	X		Vitc Generator Enable	X
			Vitc Generator Lines Settings	X
User Interface			Disk Cache & Playback Buffers	
Top Most	X		Number Of Frame	X
Display Task Bar	X			
Monitor Select	X			
Left Top Right Bottom	X		Multithread Seeking	X
Language	X			
Show Output View	X			
Show Script View	X		Cache Size	X
Shortcuts	X			



This tab shows which settings are reloaded **overriding current settings**.

The **Video I/O Settings** are also saved

## 8.5.2 Formats & Synchro

### Formats & Synchro **Alt + P**

**Audio Ref** allows you to choose the clock source for digital audio. This settings panel doesn't exist for VCube SE.

There are 3 different ways of clocking AES/EBU I/O:

1. VCube is Master (Audio Ref = Internal) and converters or digital console must be locked to AES/EBU output of VCube
2. The AES/EBU I/O can be clocked to external converters or a digital console. Audio Ref of VCube must be set to "Audio Input". The AES/EBU input of the dual card must be connected to the AES/EBU output of external converters or a digital console.
3. A single Word Clock can be used for all digital devices. Audio Ref of VCube must be set to "Word Clock Input"

**Sampling Rate** allows you to choose the Sampling Rate for.

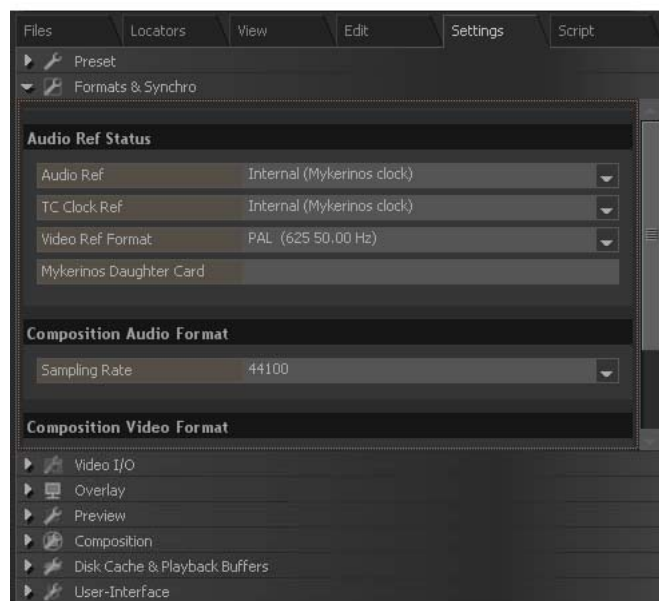


This setting is applied to captured, converted and rendered files. MPEG encoding only allows 48KHz.

**Mykerinos Daughter Card** displays the type and serial number for this card.

**Mykerinos Settings** accesses the daughter card specific settings control panel.

**Show I/O** shows the status for Input and Output ports for Audio Ref in the Mykerinos card. It's also useful for establishing the presence of Video and Word Clock signals.



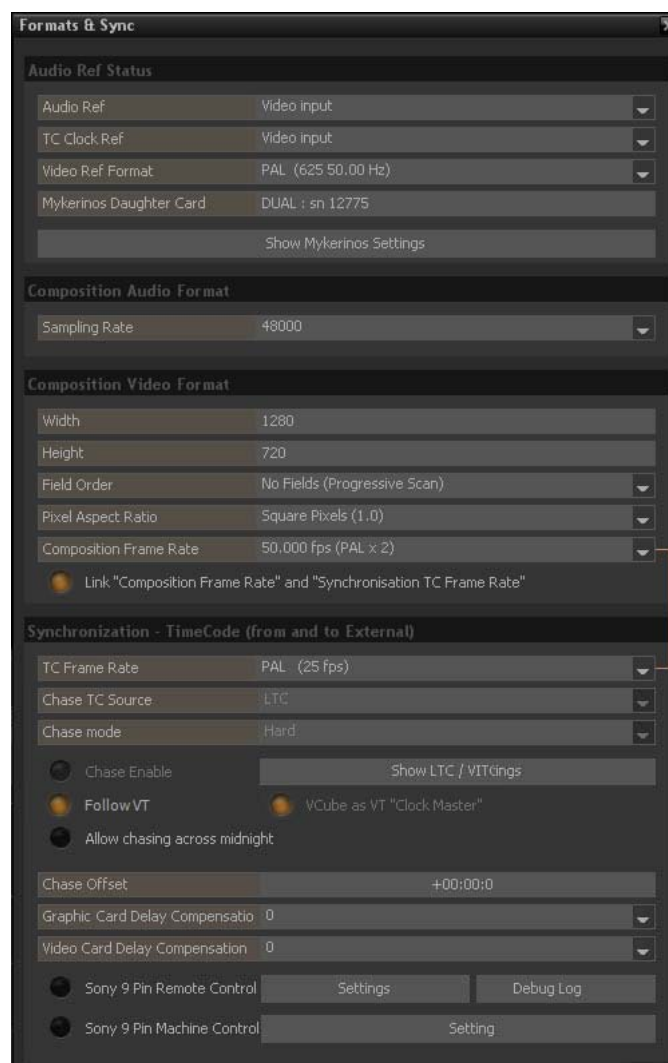


This tab shows which settings are reloaded **overriding current settings**.

**Video Format** gathers together relevant information about the manner in which the video signal is displayed.



- Note that the all the possible settings supported by the computer graphic card are not supported by the video card. If an unsupported setting is selected a warning message is displayed on the video output.
- See Supported Video Formats tab in Appendices to find the correct settings for your specific need.
- Any Format conversion is applied to the entire Composition including resized Layers on both preview and video outputs.



The Transport Panel T can also be used to select the TC source for chasing and to enable the chase function.



- Note that the video card does not support all the possible settings supported by the computer graphic card. If an unsupported setting is selected, a warning message is displayed on the video Output.
- See Supported Video Formats tab in Appendices to find the correct settings for your specific need.

**Size** allows you to trim Width and Height in pixels for your Composition.

**Field Order** offers the choice of whether the Upper or Lower Field is displayed First when interlaced or None if the media format is Progressive Scan.

**Pixel Aspect Ratio** gives a choice of pixel shape depending on the specific video format of the Composition.

**Composition Frame Rate** allows you to choose the frame rate of the Composition in number of frames per second.



Note that this frame rate (drop frame is never taken into account) will be used for render.

Drop frame only affects the TimeCode to ensures that one hour lasts one hour despite the second lasts 1001 ms for NTSC based video and sync formats.

When **Link Composition & Synchronization TC Frame Rate** is enabled, any change in Composition or TC Frame Rate is applied to the other. For Frame Rates (above SMPTE standard fps), this function enables integer ratio between Composition and TimeCode Frame Rates.

**TC Frame Rate** offers the choice of frame rate for the Composition in number of frames per second.

**TC Clock Ref** offers the choice between Internal (Mykerinos' clock) and video input.

If no valid TC Clock Ref is selected (missing Video Input), the Play Head will not appear in the Timeline.

**TC Clock Ref - Video Format** allows the matching format for synchronizing from the video signal to be chosen.

- It is disabled if TC Clock Ref is set to Internal (Mykerinos Card).

**Chase TC Source** allows the choice of TC Source used for Synchronization.

- LTC uses the Linear TimeCode.
- VITC uses code from the Vertical Interval TimeCode.
- Sony 9-Pin uses the Sony protocol as TC source. To select it from the Transport Panel **T**, enable EXT.

**Chase Mode** offers the choice between:

- Hard: VCube stops chasing is stops when the incoming TC is missing and starts again when the TC comes back.

- Soft: VCube continues to run in freewheel when the incoming TC is missing and remains in freewheel even if the TC returns.

**Chase Enable** activates Chasing for Internal Machine in Transport Frame. **Ctrl +F1**

**Follow VT** is a special mode allowing a VT controller (Pyramix) to totally control VCube about transport and loops. In this mode, VCube uses its internal Chase synchronizer to Chase Virtual Transport.



Note that in this mode, both machines still need to share the same video reference signal to guarantee a field accurate timing. The Chase button is also disabled in the transport panel.

**Allow Chasing Across Midnight** when engaged allows VCube to chase also before 00:00:00:00 TimeCode.

**Show LTC/VITC Settings** displays the corresponding panel.

**Chase Offset** allows you to introduce an offset when chasing TC. This setting is also active while recording. It's reflected in the **Chase Offset** display into the internal machine control panel **T**.

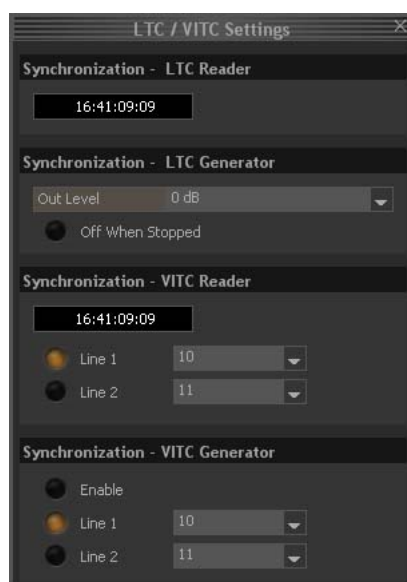
**Preview Delay Compensation** allows an offset delay to be inserted in the graphics card output in order to synchronize audio and video when a video device induces a delay on picture (e.g. Plasma Display and some LCD displays...). It's only active at nominal Playback speed. The compensation value can be set from -10 to +10 frames with one frame steps.

**Video Delay Compensation** allows an offset delay to be inserted in the video card outputs (including audio) in order to synchronize Mykerinos audio (mini jack or daughter card) and video when a video device induces a delay on picture (Time Base Corrector, Scaler, Plasma Display...). It's only active at nominal Playback speed. The compensation value can be set from -10 to +10 frames with one frame steps.

Note that at a distance of 14 meters from the loudspeakers (behind the screen), a one-frame error occurs between sound and picture due to the difference in velocity between light and sound.

**Sony 9 Pin Remote Control.** When activated, VCube receives machine control through the Sony 9 pin protocol. The RS-422 Configurator must be set to "From controller" position.

**Sony 9 Pin Machine Control.** When activated, VCube transmits machine control through the Sony 9 pin protocol. The RS-422 Configurator must be set to "To Machine" position.



**LTC Reader** Shows the current value of the Linear TimeCode (LTC) reader chip. I.e. the external LTC input.

**Output Level** shows the current LTC output level in dBV. The drop-down list offers a choice of output level from -24dBV to



+9dBV in 3dBV increments, or it can be switched off.

**Off When Stopped** When checked VCube mutes the LTC output when stopped. If not checked, it continues to output its current position. (static TimeCode) Certain video and audio machines cannot handle static TimeCode.

**VITC Reader** shows you the current vertical interval TimeCode. This TimeCode is embedded in two spare lines of each video frame.

**Video Input** buttons and combo boxes allow the choice of which of the two screen lines will be used for the VITC signal.

**Line Input** shows which lines will be decoded. Although VITC code fits into a single line it is normally duplicated to provide redundancy, thus reducing read errors. The drop-down lists allow any two lines to be chosen. Different pairs of lines often carry different code. E.g. Time-of-day and Absolute time.

**Enable** when checked the output of the VITC generator is On.

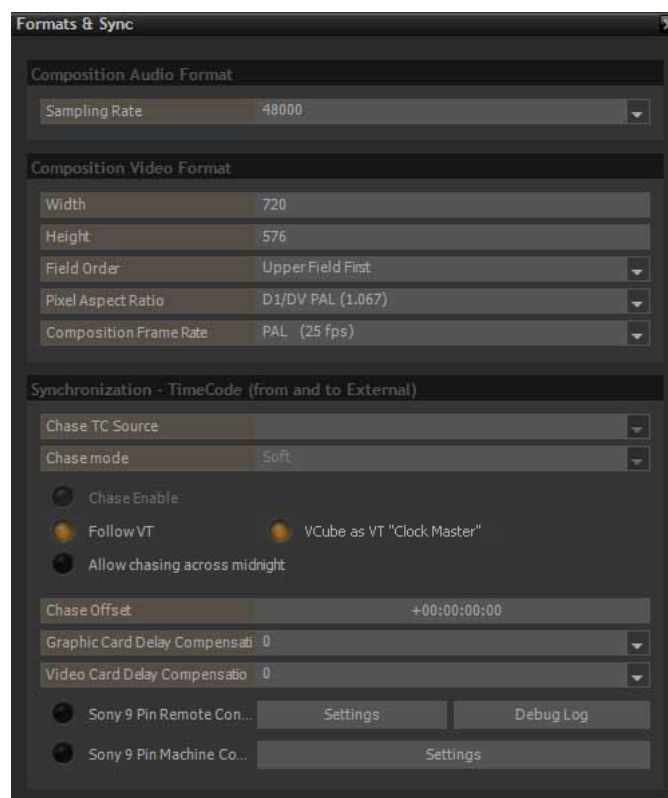
**Video Output** buttons and combo boxes allow the choice of which screen lines will be used for the VITC.

**Line Output** shows which line (BNC connector) will be used to output the VITC.



Note that the BNC 2 connection is only available from the sync breakout cable if directly plugged in the Mykerinos board. Note also that video signal is needed at the "Video In" input to allow the VITC to be included into the video signal.

VCube SE has only the following Settings:



In VCube SE, the VT as Clock Master button can be set only when the Follow VT mode is engaged if a Xena video card is activated on the VCube SE machine.

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## 8.5.3 Video I/O

### **Alt + Shift +P. Show Video I/O Settings**

VCube Players don't feature any video card. The video is monitored thru the graphic card on VGA or DVI output

Only VCube Recorders feature a Video card. The video can be monitored also from the video card output

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.

A SD VCube cannot be upgraded to an HD recorder.

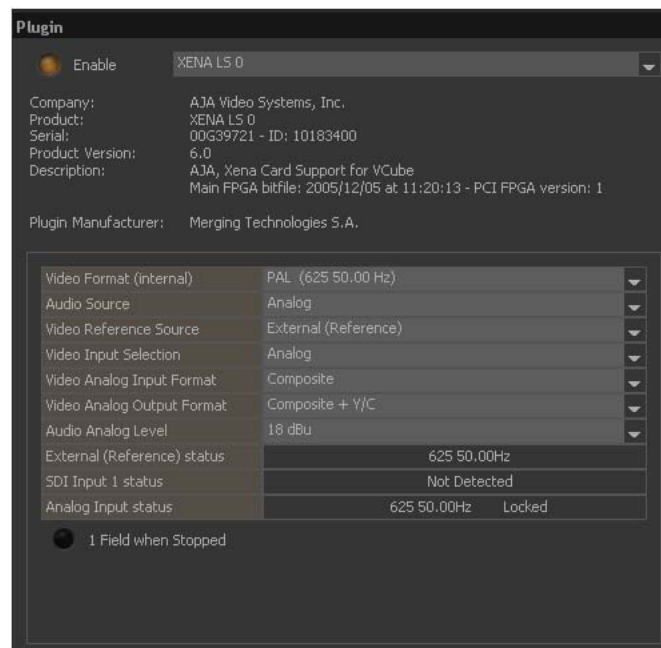
The plug-in corresponding to the installed video card must be chosen from the drop down menu.

Once selected it must be enabled in order to make it available for the VCube software.

### 8.5.3.1 Xena LS Plug-in

**Xena LS** is the AJA video capture optional hardware 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.



**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.

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**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.

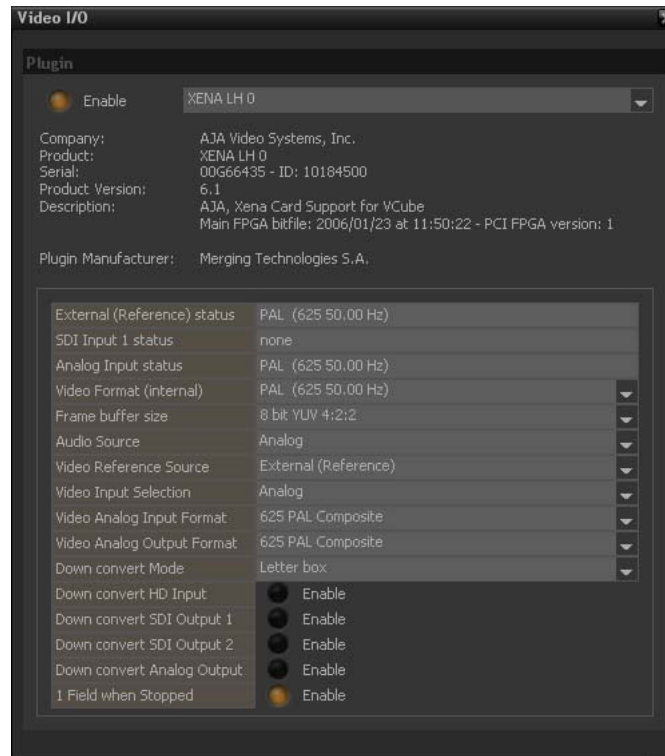
**External Status** displays the video format of the incoming genlock signal.

**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.

## 8.5.3.2 Xena LH Plug-in

**Xena LH** is the AJA video capture optional hardware inside your VCube station. It supports Analog Component / Composite and SDI video for both SD and HD formats.



**External (Reference) Status** displays the video format of the incoming genlock signal if present.

**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.

**Video Format (Internal)** switches the Xena video format SD, 720p or 1080i/p/sf.

**Buffer Frame Size** sets the buffer size regarding the used codec (YUV, DVCPRO-HD or HDV) to optimize video performances.

**Audio Source** can be analog, AES or SDI embedded.

**Video Reference Source** offers the choice of which source will be selected as reference. Free Run (internal), External (Genlock) or Analog Input (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 Output Format:** Composite, Component SMPTE, or Component Beta are possible.

**Down Convert Mode** can be Letter Box, Crop or Anamorphic for picture resize.

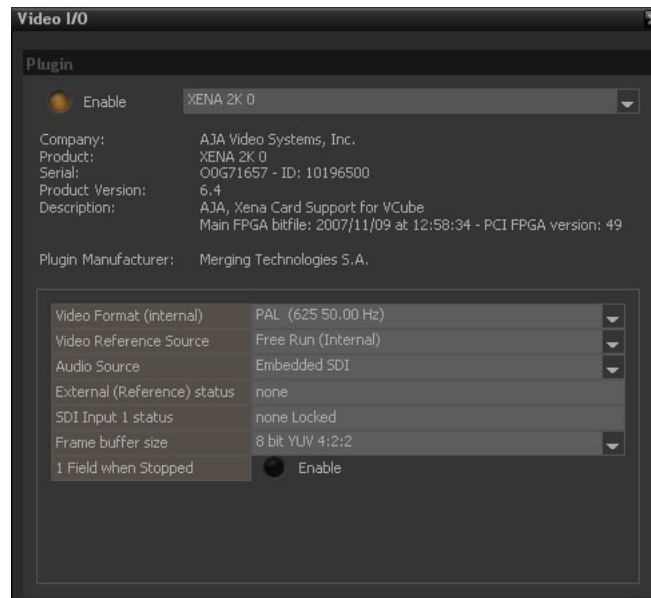
**Down Convert Input Selection:** Only the HD Input can be selected as convert source.

**Down Convert Output Selection:** SDI 2 or analog are possible.

**1 Field when Stopped** must be enable to allow a stable picture for interlaced video format on stop.

### 8.5.3.3 Xena 2 Plug-in

This particular plug-in must be used in conjunction with the Xena Router control panel located in C:\Program Files\Merging Technologies\VCube\Drivers\Aja\Tools.



**Video Format (Internal)** switches the Xena video format SD, 720p to 1556p.

**Video Reference Source** offers the choice of which source will be selected as reference. Free Run (internal), External (Genlock) are possible.

During capture the reference source is toggled to the active video input.

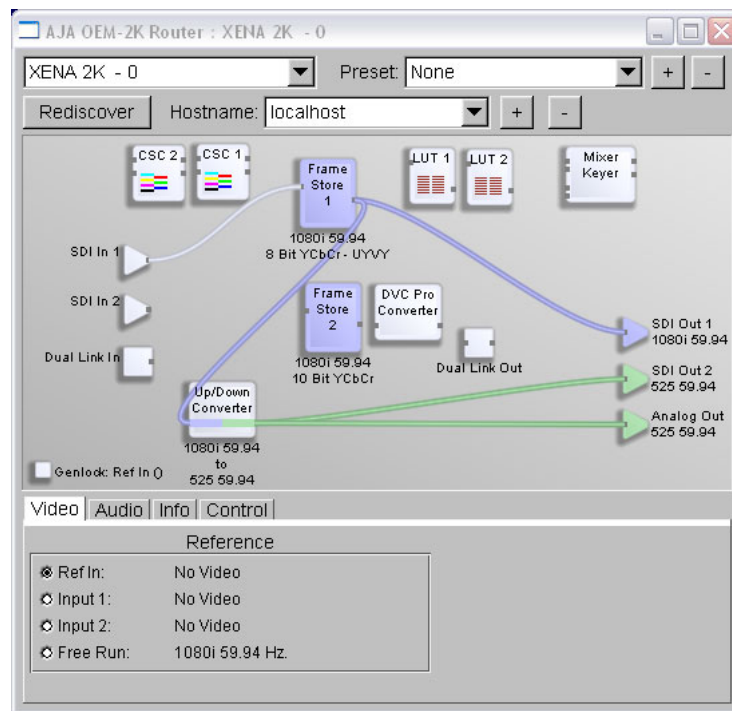
**Audio Source** can be AES or SDI embedded.

**External (Reference) Status** displays the video format of the incoming genlock signal if present.

**SDI Input 1 Status** displays the video format of the incoming digital video signal.

**Buffer Frame Size** sets the buffer size regarding the used codec (YUV, DVCPRO-HD or HDV) to optimize video performances.

**1 Field when Stopped** must be enable to allow a stable picture for interlaced video format on stop.



**Click-and-Drag** connects the different elements.

**Right-Click** access to a drop list settings for every element.

Specific configurations can be saved as presets.

The last used configuration is recalled at the machine startup.



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## 8.5.4 Overlay



**Enable TimeCode** button adds a TimeCode display to the picture monitor. **B**

**External TimeCode** allows you to display the incoming TimeCode. This feature is useful with a 24fps Composition synchronized to an external 25 fps TimeCode. A dot precedes the displayed TC when it's external. **Alt + B**

**Feet** allows to display feet instead of usual TimeCode.

**Nominal Play TC Format** allows you to choose the TC display Format when running at Nominal Play speed:

- Hours / Minutes / Seconds
- Hours / Minutes / Seconds / Frames
- Hours / Minutes / Seconds / Samples
- Hours / Minutes / Seconds / Frames / Hundredths of a Frame
- Hours / Minutes / Seconds / Frames / Thousandths of a Frame

**Other TC Format** allows you to choose the TC display Format when not running at Nominal Play speed:

- Hours / Minutes / Seconds
- Hours / Minutes / Seconds / Frames
- Hours / Minutes / Seconds / Samples
- Hours / Minutes / Seconds / Frames / Hundredths of a Frame
- Hours / Minutes / Seconds / Frames / Thousands of a Frame

**Presets** are standard positions for the TimeCode display on screen.

**X Offset** can be used to trim the horizontal TimeCode position on the screen.

**Y Offset** can be used to trim the vertical TimeCode position on the screen.

**TimeCode Color** allows you to choose the color of the TimeCode display. **Click** in the color window to open the preset Color Picker. **Click** on **Custom** to edit the colors in the first row of the Color Picker. Then choose a **Hue** value at the bottom with a **Click**. Finally, **Click** on the **Saturation** area to define a custom color.

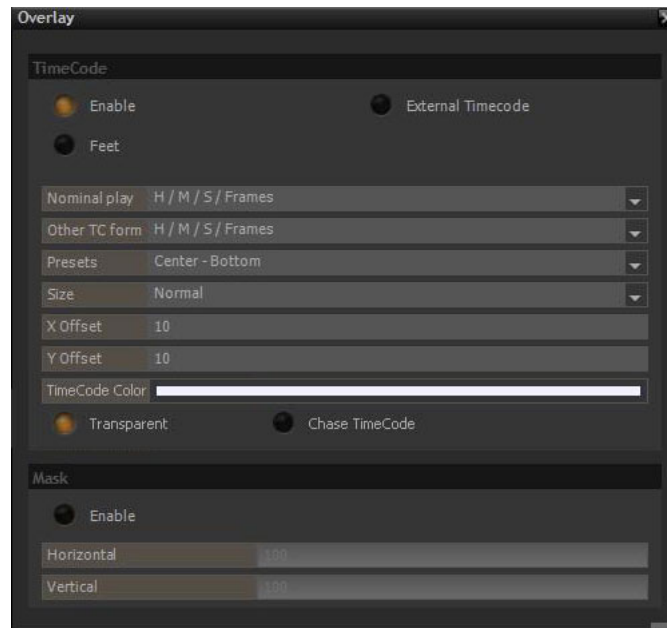
**Transparent** can be enabled to obtain a transparent background for the TimeCode display.

**Chase TimeCode** enables the sync status red message (Chasing, Locked...) on the preview screen.


**Mask** sliders allow you to manage Horizontal or Vertical masks. Drag the scroll bar to set the appropriate value.

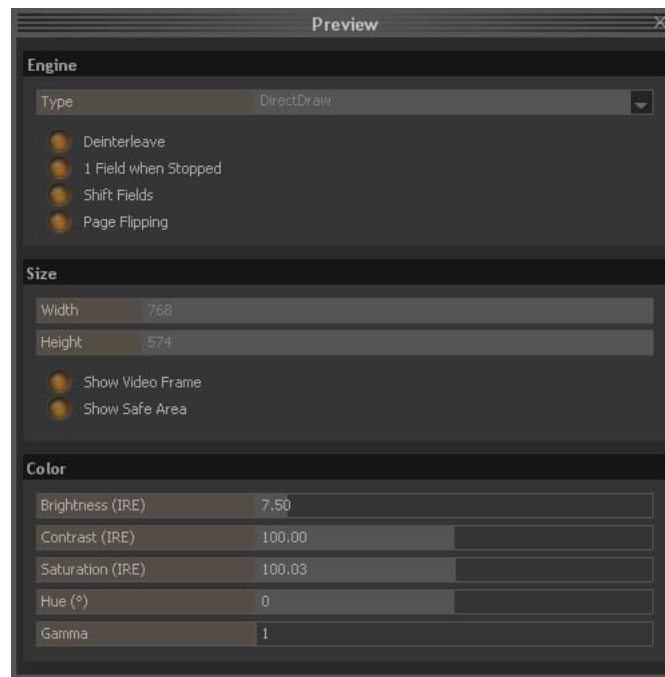
- **Horizontal** is the amount of displayed total vertical definition in per cent. It controls the letter box height.
- **Vertical** is the amount of displayed total horizontal definition in per cent. It controls the letter box width.

These settings are applied to the rendered Output.



## 8.5.5 Preview

 **Preview** shows all settings that will affect the way the Composition is to be displayed. **Alt + P**



Video **Engine** enables the appropriate engine to be selected. DirectDraw engine is the default setting for VCube.

**Deinterleave** is useful since a Clip may be interlaced and progressive scan selected as the output format.

Note that automatic video resize may produce some wave-like artifacts when an interlaced Media File has to be stretched to match the output format.

**1 Field When Stopped** allows the graphic card to output a perfectly stable picture on its video output when in Stop.

**Shift Fields** allows users to have a different field order for preview or video graphic card output, and Composition.

**Page Flipping** cancels split artifacts in slow progressive mode. Depending of the graphic card model, this function must be enabled or not to allow a correct refreshing of the preview area.

**Size** shows the size of the current image area on the computer screen.

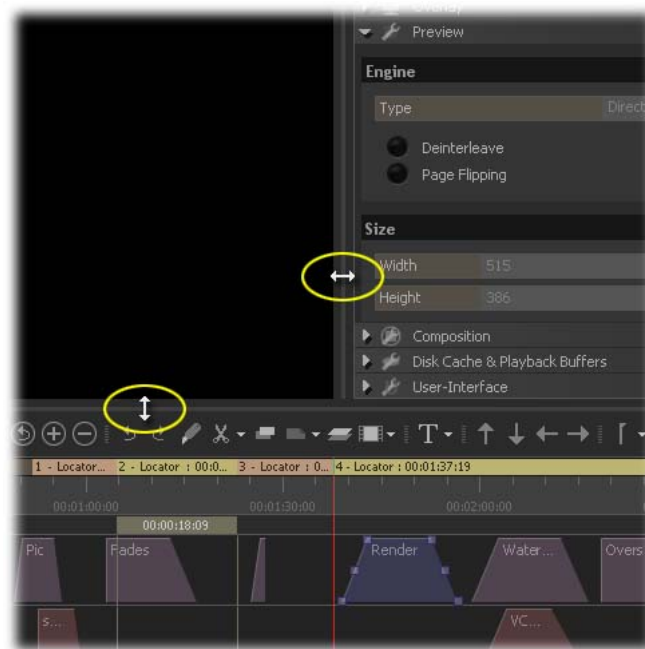
Width and Height are not editable. They depend on the User Interface settings.

**Show video Frame** displays edges of the scan format. I.e. the total area of the video format.

**Show Safe Area** displays the final consumer view on a regular TV.(Overscan limits or 'safe area')


**Color** settings are only applied to the preview screen number 1 (graphic card). They don't affect the video output.

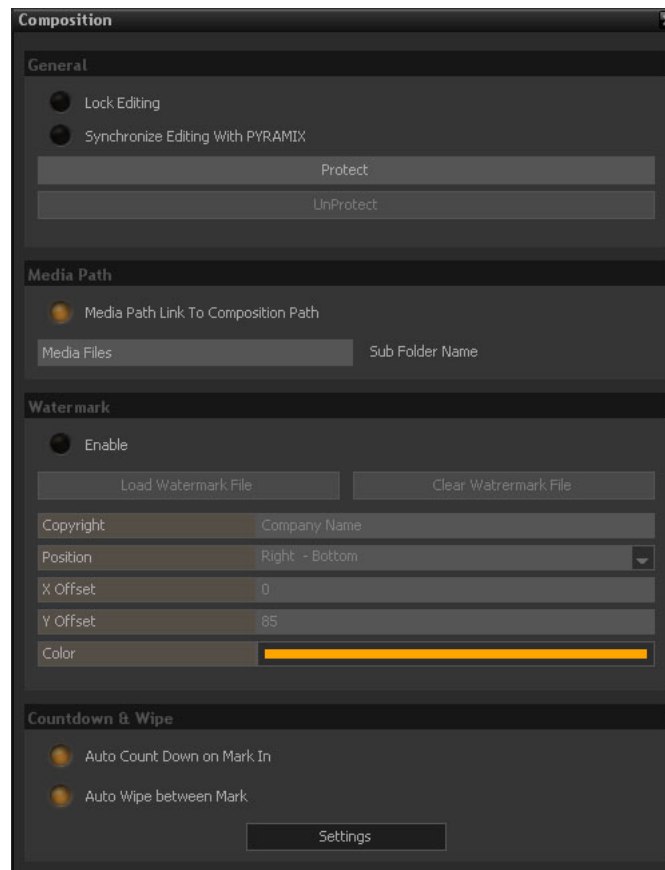
The default values are set by **Double-clicking** on the corresponding slider.



In advanced mode, vertical and horizontal splitters can be adjusted. A **Double-Click** resets their position to default values corresponding to the composition format.

## 8.5.6 Composition

 **Composition** gathers together all information about Synchronization and Formats settings used for the current Project.  
**Shift + P**



**Lock Editing** prevents unwanted modifications in the Composition. It includes each and every setting except the locators. The lock/unlock button is only available when the Composition is unprotected. It is password protected.

Editing Locators remains possible. Use **Save As** to preserve your personal locator settings.

**Synchronize Editing With PYRAMIX** enables synchronized editing between the two applications.

**Protect** and **Unprotect** allow you to control access to editing and settings operations once **Lock Editing** has been disabled. A protected, unlocked Composition is still editable. Only watermark and copyright settings remain protected.



**WARNING:** There is no way to unprotect a Composition if the password is lost. The XML file is encrypted.

Contact us for a Composition salvage ([www.merging.com](http://www.merging.com)).

**Media Path Link to Composition Path:** When enabled, a Media Files folder is created into the folder you have selected when Saving or Saving As the current composition. Then this Media Files folder is selected by default as destination folder for recording.

**Enable watermark** allows a watermark of your choice to be added, in real-time, to every video output. Both text and still image are possible.

**Load Watermark File** allows an Advanced Mode user to add a still image file with alpha channel support to all video outputs. Access is password protected. The reference pixel to adjust image content is top left of current video format.

**Copyright zone** allows one line of text to be added

**Position, X Offset, Y Offset** gives control over the position of the text in the picture.

**Color** accesses a color picker for text.

The **Countdown & Wipe** section allows to automatically create a countdown before the mark in if **Auto Countdown on Mark In** is engaged. A wipe from mark in to mark out is generated when **Auto Wipe between Marks** is enabled.

Dedicated settings are available from the settings button of this section.



Note that no specific Wipe or Countdown clips are visible in the Timeline when using Auto function for Wipe or Countdown clips.

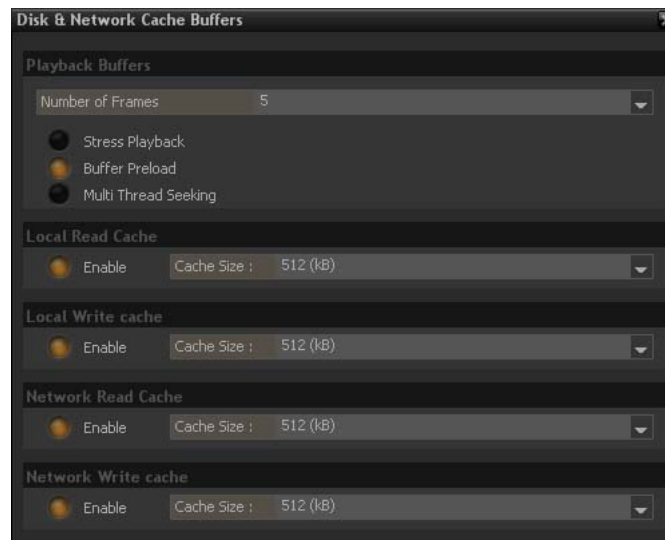
Settings		Saved in Composition
Overlay		
TC Enable		X
Ext TC Enable		X
TC Pos & Size		X
TC Color		X
TC Transparency Enable		X
Mask Enable		X
Mask Size		X
Preview		
Deinterleave		X
Video Frame		X
Safe Area		X
Composition		
Lock Editing		X
WaterMark Enable		X
Copyright		X
Position		X
Watermark Color		X
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 FrameRate		X



This tab shows which settings are reloaded systematically with the Composition **overriding current settings**. With the Load Selective feature it is also possible to reload a workspace, a shortcut list from another Composition.

## 8.5.7 Disk & Network Cache Buffers

 **Show Disk & Playback Buffer Settings Ctrl + Shift + P**



**Number of Frames** list allows you to choose the ideal number of frames to buffer for your specific configuration to run properly. The lower the number, the greater the demand will be on hard disk or network streaming performance. A setting of 3 is generally sufficient.

- Possible values: 3 to 20

**Stress Playback** can slightly improve video engine performance. The frame rate is no longer weighted by the playback engine.

**Buffer Preload** loads frames in advance for better playback start up.

**Multi-Thread Seeking** allows VCube to run several threads at the same time in order to decrease overall disk access time.

**Caches** are enabled by default.

**Cache Size** determines the amount of memory in bytes allocated to cache memory. The lower the number, the more CPU horsepower is consumed.


The settings effectiveness can be monitored using the dedicated Output View **Ctrl + F9** and **Ctrl + F 10**.

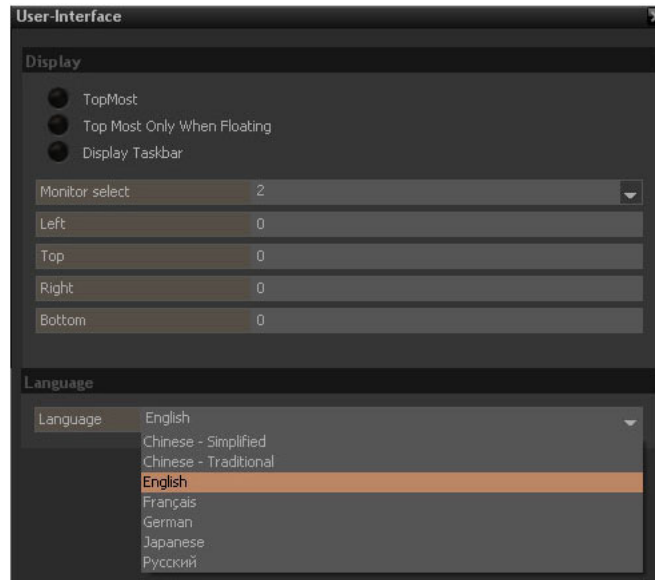


- Note that the optimum cache size for SD video steaming through a 1 Gb network is usually 8 kB. This setting produces the smoothest possible data flow. Scrolls in the Timeline can be improved by increasing this amount.
- For local Hard Disk streaming settings depend on the specific hardware used. 512 KB is generally a good choice.
- Possible values: 4kB to 8MB
- QuickTime files (mov or qt) are directly managed by the QuickTime support engine which sets the Read/Write Cache Size. Only the Number of Frames into the Playback Buffer is available to fine-tune playback performance.
- Windows Media Video files (wmv) are directly managed by the WMV support engine which sets the Read/Write Cache Size. Only the Number of Frames into the Playback Buffer is available to fine-tune playback performance.



## 8.5.8 User Interface

 **User Interface** offers a choice of which display mode to use. **Alt + P**



**TopMost** button ensures the VCube window is always on the top of all opened windows on the screen.



**TopMost** must be unchecked to allow the help window to be displayed with **F1**

**Display Status Bar** button makes the system Status Bar visible at all times in a single monitor configuration. The Status Bar or System Tray remains on the main monitor (number one) even in a double monitor configuration.

**Monitor Select** offers a choice of preview monitor. When 2 is chosen, preview will be displayed on the secondary monitor. Broken away windows can be displayed on both.

Note that only monitor 1 is available for preview when recording.

**X & Y Offsets** allows the complete VCube interface to fit in a specific screen format:

- **Left, Right** reduce the horizontal number of pixels used to display the interface.
- **Top, Bottom** reduce the vertical number of pixels used to display the interface.

Note that this feature can be useful with a video projector.

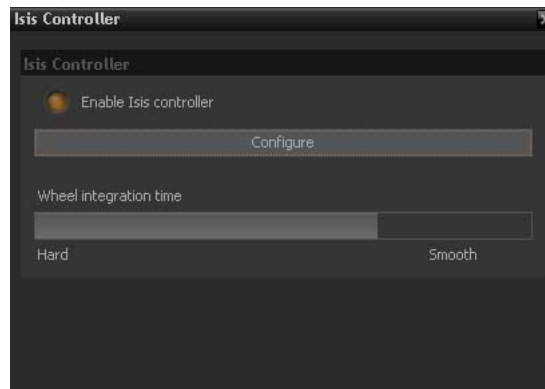
**Language** allows you to change the language that will be used in the VCube interface.

## 8.5.9 Isis

The Isis remote control from Merging Technologies is supported by VCube. This feature isn't available for VCube SE.

Please refer to the Isis User Manual for details on operations.

On the VCube side only the Wheel behavior can be set to produce the exact desired feeling when jogging.



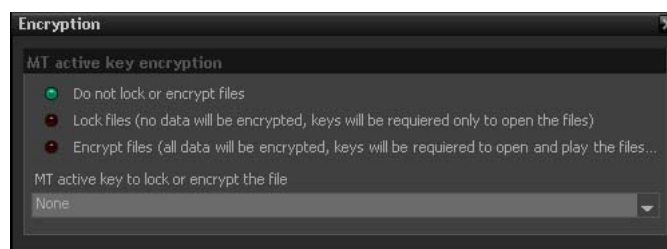
**Shift + Track arming** buttons recalls the Locators

## 8.5.10 Encryption

Encryption and decryption of video data can be performed in real time by VCube. This process is based on MTAK (Merging Technologies Active Key).

To setup this feature:

- Select the key holder folder from the MTActiveKey section of the MT Security Settings control panel. This folder contains the encryption and/or decryption keys for all users on the network.
- Then in the Settings pages of VCube **F2** go to the Encryption section. Only the first step is required for playback decryption.
- Select the needed key for data encryption.



### MT Active Key Privileges (MTAKP):

The following Active Directory groups are defined on the company domain:

#### MT Active Key Administrators: MTAKAdministrators

MTAKAdministrators are allowed to create, modify, delete and use any keys from anywhere on the network using the MTAKAdmin application.

#### MT Active Key Power Users: MTAKPowerUsers

MTAKPowerUsers are allowed to use any keys accessible by the MT Security Server running on their computer for encrypting and/or decrypting media files. They cannot create, modify or delete any keys.

#### MT Active Key Users: MTAKUsers

MTAKUsers are allowed to use for encrypting and/or decrypting media files those keys accessible by the MT Security Server running on their computer that have been given access privileges to them personally or to group they belong to. This means a standard user to use a key must follow to two following rules:

- The given user belongs to the MTAKUsers group

- The given MT Active Key grants access to the given user or to a group the user belongs to.

### **MT Active Key (MTAK):**

A MT Active Key is an object composed of the following elements:

- ? ID: A Unique Identifier
- ? Description: A humanly readable description of the key
- ? Comment: Some comments about the key
- ? Encrypt Active: A flag indicating if the key is active for encrypting
- ? Decrypt Active: A flag indicating if the key is active for decrypting
- ? Watermark Active: A flag indicating that any data decrypted with this key must be added a watermark with the name of the user decrypting the file.
- ? More private data encrypted in the key

A MT Active Key is implemented as an XML file named <ID>.mtak in a MT Active Key Holder folder.

MT Active Keys are managed by the MTAKAdmin application and are created by default with:

- ? MTAKAdministrators ownership and Full Control permission
- ? MTAKPowerUsers Read permission

No special permission is given by default to MTAKUsers. For standards MTAKUsers to be able to use a given key, this key must have been granted Read permission to the given user or a group it belongs to.

### **MT Active Key Holder (MTAKH):**

A MT Active Key Holder is a set of MT Active Keys. It is implemented as a standard folder (directory) with the following constraints:

- ? It must stand on a NTFS disk on any computer on the company network (strongly suggested to be a properly protected and regularly backed up server).
- ? It must be accessible on the domain network through a standard URL like \\ServerXYZ\xxx\...\zzz\<KeyHolderName>
- ? It must have Full Control permission for MTAKAdministrators
- ? It must have Read/List Contents permission for MTAKPowerUsers
- ? It must have Read/List Contents permission for MTAKUsers

Multiple MT Active Key Holders can coexist on a given domain to allow separating the management of keys for different

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departments (Audio Post-Production, Duplication, Marketing, etc...)

MT Active Keys can be moved from a Key Holder to another.

Important Note: MT Active Keys that have been deleted cannot be re-created and are lost forever. Files encrypted or locked with a deleted key will never be decrypted or unlocked again.

### **MT Security Server (MTSSrv):**

MT Security Server is a service installed on every computer running MTAK Enabled Applications requiring access to a MT Active Key or to a MT Active Key External Extension.

MTAKAdministrators must configure each computer through the MT Security Control Panel to list which MT Active Key Holder the local MTSSrv is allowed to contact to request MTAK keys and/or enable connection to hardware dongles for MTAKXX keys.

MT Active Keys are requested for the currently logged in user. The user must be either a member of the MTAKPowerUsers group or a member of the MTAKUsers group and a member of a group which permissions for the required key has been granted to.

### **MTAK Enabled Applications (MTAKApps):**

MTAK Enabled Applications are applications that install the MT Security Server on the computer during their installation process and that are able to request MT Active Keys for encrypting and/or decrypting media files they use - as well as locking/unlocking objects or application features.

Merging Technologies Pyramix Virtual 5.1 and VCube 2.0 are MTAK Enabled Applications.

### **Encrypting Media Files or locking objects**

When MTAKApps need to encrypt a media file - or lock an object - they request a key chosen by the user in a list of keys it has the permission to access and which keys are still Encrypt Active. This list is requested to and returned by the local MTSSrv which retrieves it from any MT Active Key Holders it has been configured to access.

Members of the MTAKPowerUsers group can use any Encrypt Active key listed by the local MTSSrv based on the MT Active Key Holders it has been configured to access.

Members of the MTAKUsers group can use only Encrypt Active keys listed by the local MTSSrv based on the MT Active Key Holders it has been configured to access and that grant access to a group the user belongs to.

## Decrypting Media Files or unlocking objects

When opening an MTAK encrypted media files - or need to unlock an object - MTAKApps request the proper key to the local MTSSrv that, with the currently logged user permissions try retrieving the proper MTAK key on all listed MT Active Key Holders. If the MTAK key is still Decrypt Active and the Active Directory permissions allow for accessing it, the key is returned to the application which therefore can decrypt the file - or unlock the object.

Members of the MTAKPowerUsers group can use any Decrypt Active key accessible by the local MTSSrv on MT Active Key Holders it has been configured to access.

Members of the MTAKUsers group can use only Decrypt Active keys accessible by the local MTSSrv on MT Active Key Holders it has been configured to access and that grant access to a group the user belongs to.

## VCube usage of MTAK

VCube offers two levels of data protection using MT Active Keys:

- Video media files locking: When enabled this option makes sure that any Video file created by VCube is locked with a MT Active Key chosen by the user and will then require the same key to be available and still Decrypt Active to be open for reading later in time. Data contained in the file can be binary extracted if the file is copied outside of the company network.
- Video media files encryption: When enabled this option makes sure that any Video file created by VCube is encrypted with a MT Active Key chosen by the user and will then require the same key to be available and still Decrypt Active to be read later in time. This therefore ensures that any data contained in these files cannot be binary extracted for reading, even if the file is copied outside of the company network.
- Video media files decrypted or unlocked by a MT Active Key having the Watermark Active option set will have the name of the currently logged in user automatically superimposed on the played back picture.

## Important Note on Decryption or Unlocking of a media file:

By "decrypting or unlocking a media file", Merging Technologies means playing back the media file to the MT Active Key Enabled Application physical outputs, being the digital audio outputs to the converters for Pyramix Virtual Studio and the computer monitor or video card for the VCube.

At no time the decrypted signal is stored on the computer disk or made available for copy to any external storage devices.

Therefore, to avoid media files authorized to be decrypted or unlocked to be exported and/or rendered to another non encrypted file format, all rendering and export functions of MTAK Enabled Applications can be either completely disabled or accessible only to MTAKPowerUsers by a standard Active Directory Administrator.

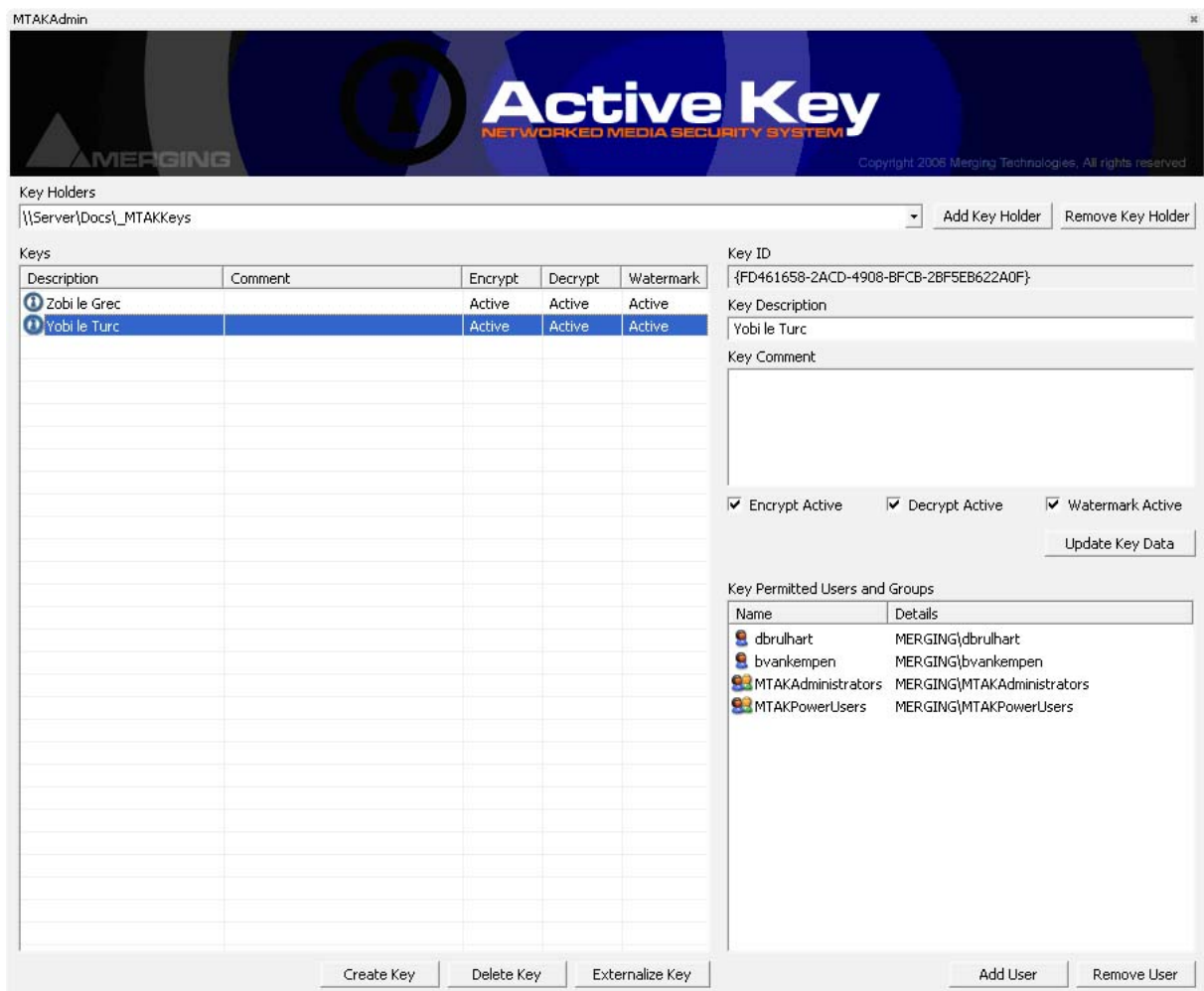
## MT Active Key Administration (MTAKAdmin):

MT Active Keys are managed and administrated from anywhere on the company network by a logged in member of the MTAKAdministrators group using the MTAKAdmin application.

This application allows creating, modifying and deleting MT Active Keys as well as granting access to users and groups to MT Active Keys.

Creating and deleting MT Active Key Holders is done by the company network standard Administrators.

Giving access to MT Active Key Holders to each individual MT Security Servers of computers running MT Active Key Enabled Applications is performed by the company network standard Administrators using the MT Security Control Panel.



## Setting up MT Active Key on a company network

1. A system administrator of the company domain must create the following group:

- 
- a. MTAKAdministrators
  - b. MTAKPowerUsers (optional)
  - c. MTAKUsers

2. A system administrator of the company domain must then create somewhere on the network, on a secured and regularly backed up server, one (or more) folder(s) that will be MT Active Key Holders and grant them the following permissions:

- a. MTAKAdministrators must be granted Full Control permission.
- b. MTAKPowerUsers must be granted Read and List Folder Contents permission.
- c. MTAKUsers must be granted Read and List Folder Contents permission.
- d. Note: Only the Name of the folder(s) will be published to MT Active Key Enabled Applications to identify the MT Active Key Holder. The rest of the path(s) will be kept hidden to MTAKPowerUsers and MTAKUsers.

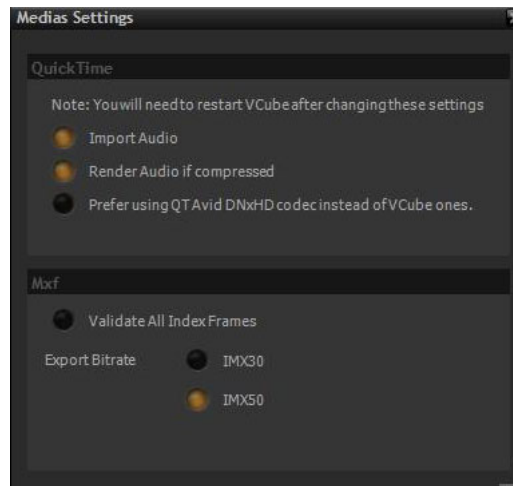
3. A system administrator of the company domain must then run the MT Security Control Panel on each computer on the company network requiring access to MT Active Keys and set in the MT Active Key page the path of the MT Active Key Holder(s) allowed to be contacted by the MT Security Service running on that computer.

4. A member of the MTAKAdministrators group can then run the MTAKAdmin application from anywhere on the network when logged in with MTAKAdministrators rights to administrate MT Active Keys.



## 8.5.11 Media Settings

The Media Settings panel manages the manner QuickTime and MXF files are handled by VCube.



**Import Audio:** Embedded audio from a QuickTime file can be imported or not.

**Render Audio if compressed:** create a new .araw file for audio allowing VCube to open large compressed audio files overriding the QuickTime memory constraint.

The new file is generated in the same folder as the original media files.

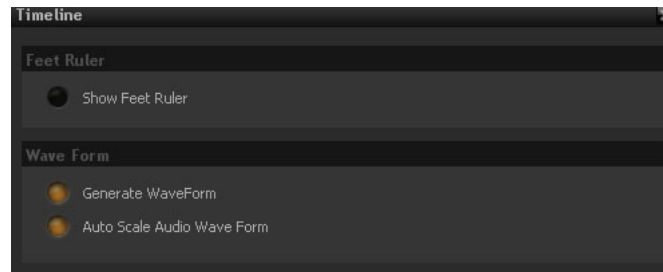
**Prefer using QT Avid DNxHD codec instead of the VCube ones.** This option can be checked to support 10 bit DNxHD.

**Validate All Index Frames** when disabled dramatically increase the parsing of MXF media files.

**Export Bit Rate** allows to select the data for MXF media files generated by VCube.

## 8.5.12 Timeline

This control panel allows to choose the way ruler and waves forms are displayed into the Timeline.



**Show Feet Ruler** : When engaged, a feet ruler is also displayed with the main Timeline ruler.

The **Feet Ruler Setting** can be accessed from the top **Settings Menu** or with **CTRL + F**

**Generate WaveForm** can be disabled if waveforms are useless in the Timeline or if no new file can be added to the audio media folder.

**Auto Scale Audio Wave Form**: When engaged, the wave form (not the audio) of the clips is "normalized".

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## 8.5.13 Video Engine

The VCube Video Engine allows different settings to face particular situations.

When a interlaced video format must be resized, VCube offers different algorithms to process the picture depending of the CPU or the visual quality requirements.


- Nearest neighbour -> Fast and poor
  - Linear (Bi Linear) -> Fast and poor
  - Cubic -> Very Good but slow
  - Lanczos -> Very Good but very slow
  - Supersampling -> Very Good when reducing the picture a lot. Slow.

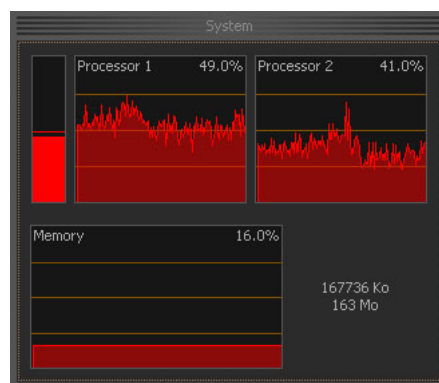
## 8.6 Output View

**Ctrl + F7** displays the Output page.

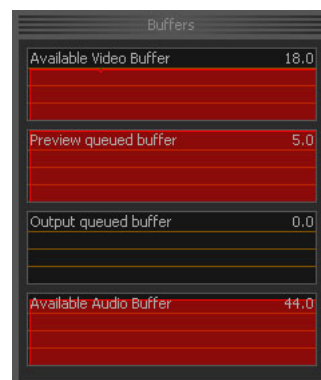
This page allows expert users to fine-tune their VCube configuration depending on the network or storage setup.


System performance for processors and memory, Buffers for audio and video, Playback info for audio and video, Synchro Status, script output and audio level meters for playback are displayed.

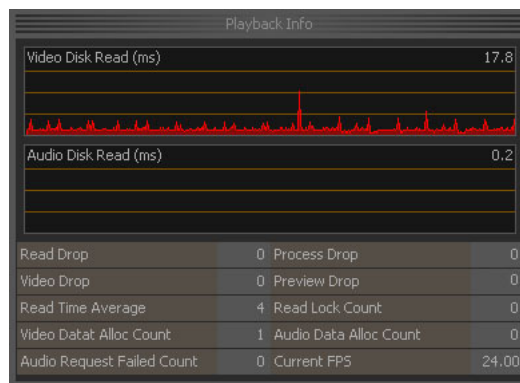
 **Ctrl + F8** displays processors and memory activity.



 **Ctrl + F9** displays Buffers activity.



 **Ctrl + F10** displays playback information.




The disk access performances are monitored here for both audio and video. The Buffers size must be set to ensure an Average Read Time lower than the frame display time. 40 ms for 24/25 fps and 30 ms for 30 fps.

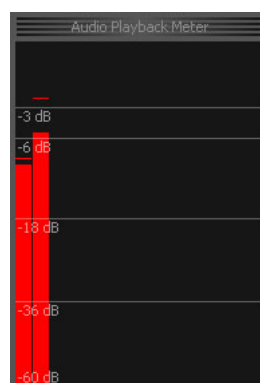
 **Ctrl + F11** displays all video, audio, synchronization and clock status.



This panel also appears when clock, format or synchro are inconsistent.

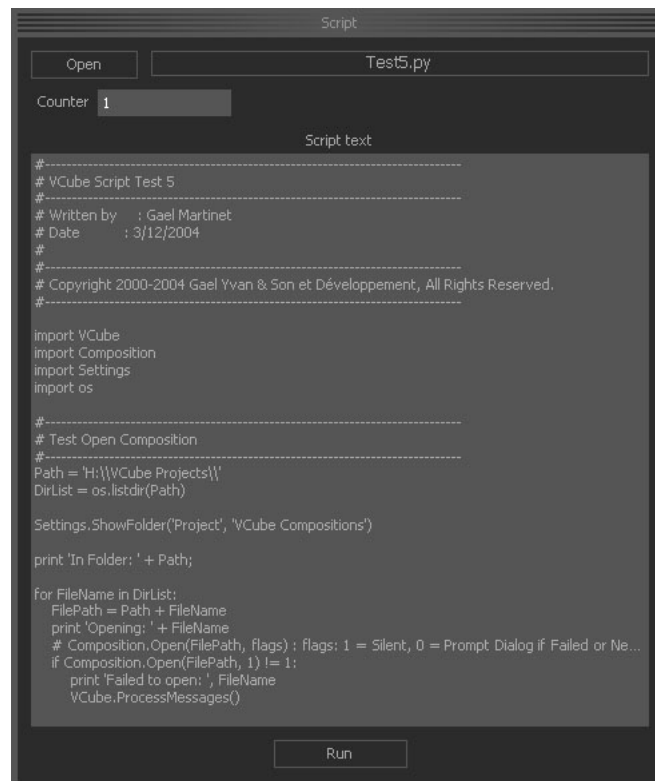
The mismatched parameter flashes red until a valid setting turns it to green.

 **Ctrl + F12** displays audio playback levels.

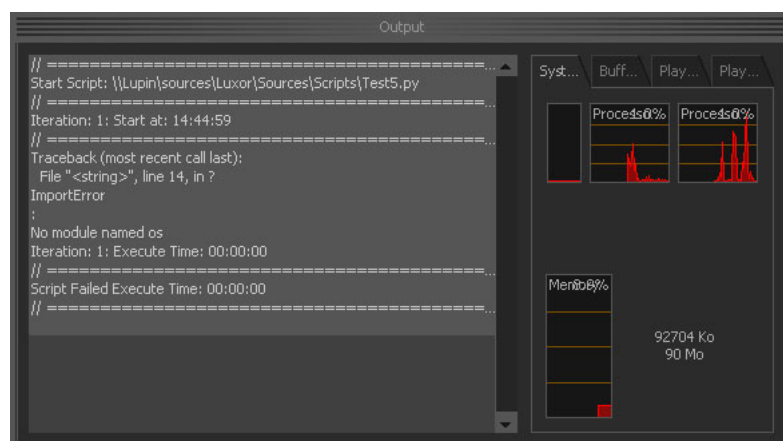


## 8.7 Script View

**Ctrl + F6** displays the script page.



Python is the language used to script VCube application. While running an output display is available in the Output View window.



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## 9 Recording and Editing

VCube is not only a universal player for Video. VCube is also capable of Recording (with an optional video card) and Editing.

## 9.1 Recording

**Record** page opens settings for capture. **F12**

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 in **Setting > Video I/O**.

### Supported SD Video Formats

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

### Supported HD Video Formats

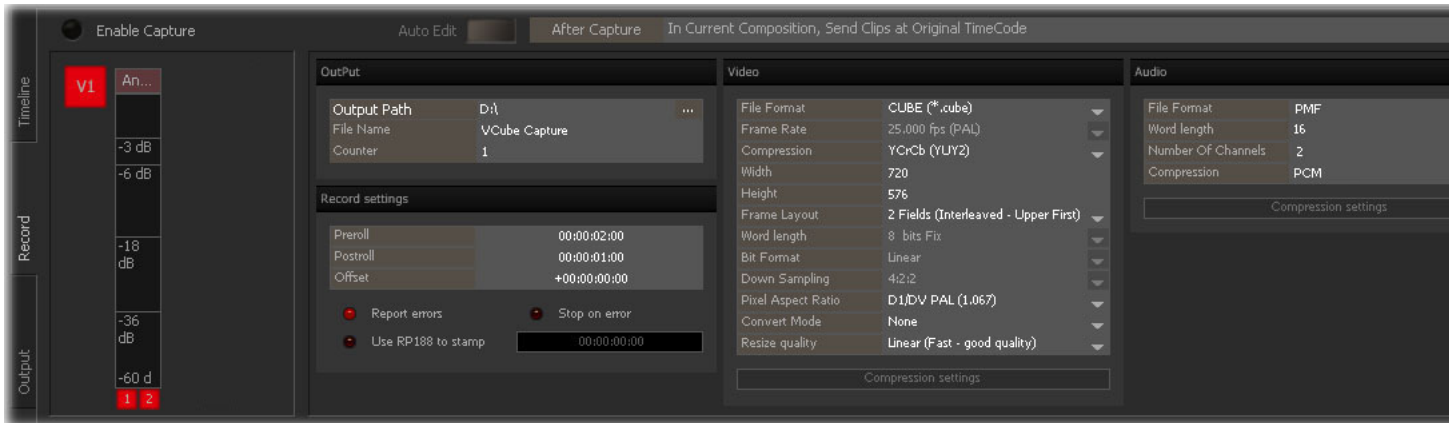
Dual-Link video cards are required to support 2048x1080 formats and above.

720p
720p 50.00 Hz
720p 59.94 Hz
720p 60.00 Hz
1080i
1080i 50.00 Hz
1080i 59.94 Hz
1080i 60.00 Hz
1080p sf
1080p sf 23.98 Hz
1080p sf 24.00 Hz
1080p
1080p 23.98 Hz
1080p 24.00 Hz
1080p 25.00 Hz
1080p 29.97 Hz
1080p 30.00 Hz
1080p / p sf - 2K
2048 x 1080p 23.98 Hz
2048 x 1080p 24.00 Hz
2048 x 1080p sf 23.98
2048 x 1080p sf 24.00





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 a precise timing for the video signal.



**Enable Capture** button activates the video card specific function. **Ctrl + R**

Uncheck Enable Capture to make the capture visible in the Timeline.

**Auto Edit** mode enables VCube to automatically control a VCR via a Sony 9 Pin protocol, and to record a range of the video tape from **In point** to **Out point** set in the Internal machine panel **T**.



During this process, VCube needs to be in chase mode. To bypass possible drop outs in the Reference TimeCode source, Soft Chasing can be used, in this case the video card must be referenced to an external reference signal

**Output Path** is a browser where you have to select the destination for the captured media. The destination folder for ingested Media Files should be on a local hard disk drive. The SD VCube 'D' hard disk drive has a 120 GB capacity for storing your Media Files.

**File Name** is a dialog where you can enter a generic name for future media captures.

**Counter** is a dialog where the start point of the incrementation process is set. All captured Media Files will have a generic name followed by an automatically incremented number.

**Preroll** is the time value to advance the VCR start up in **Auto Edit** mode.

**Postroll** is the time value to delay the VCR stop in **Auto Edit** mode.

**Offset** is a dialog where you can adjust offset between the incoming and the recorded TimeCode. Only the time stamp of the recorded Media File is affected by this setting.

**Report errors** when enabled, creates a list of errors and corresponding TimeCodes. The capture continues even if errors occur.

**Stop on errors** when enabled, stops the capture if an error occurs.

**RP 188** feature, when enabled uses the picture embedded TimeCode as incoming TimeCode for Timestamp.



This feature isn't available for Canopus and Xena LS video cards.

- **Video File Format** determines the type of the generated Media File for video. Cube, AVI2, QuickTime, MXF, or MPEG2 are possible.
  - When QuickTime and MJPEG codec are chosen, progressive scan must be selected for Fields Order to insure QuickTime player compatibility.
- **Frame Rate** is currently related to the current Composition frame rate.
- **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**.
- **Width** and **Height** determine the number of pixels used to record the frame. This picture format may differ from incoming video picture format. E.g. this feature allows to directly generate a low resolution file from a HD video signal.
- **Frame Layout** determines if and how the rendered frames will be interleaved or not.
- **Word Length** is currently limited to 8 bits.
- **Down Sampling** determines the color sub-sampling scheme. 4.2.2 (see Glossary section) is the default value
- **Convert Mode** can be Down or Up convert depending of the picture format selected for rendering.
  - Down Convert: Letterbox, or Anamorphic are possible.
  - Up Convert: Anamorphic, Pillarbox 4x3, Letterbox are possible.
- **Resize Quality** allows the user to choose between different methods of computing the image in the desired format.
  - Nearest neighbour -> Fast and poor
  - Linear (Bi Linear) -> Fast and poor
  - Cubic -> Very Good but slow
  - Lanczos -> Very Good but very slow
  - Supersampling -> Very Good when reducing the picture a lot. Slow.
- **Compression Settings** are available for MJPEG and MPEG codecs.
  - For details on the **Mpeg Settings**, please refer to the dedicated section. We recommend using only regular "Format type" in the "Basic Settings" dialog for trouble free operations.
  - **MJPEG** codecA 100 value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20 compression ratio.
- **Audio File Format** determines the type of the generated Media File for audio. If both video and audio are the same type, they are merged inside a single Media File.
- **Word Length** determines audio resolution.
- **Number of Channels** indicates the number of physical outputs fed by audio Layers in the Composition. Audio monitor settings (level & routing) are applied to the rendered audio files.
- **Compression** availability depends of the selected audio file format. QuickTime allows various solutions to compress

audio data.

- When using the Mykerinos card (Audio Option) Sampling rate is determined in **Settings: Formats & Synchro > Audio > Sampling Rate**
- When using the SDI (Optional SDI card) embedded audio or AES audio of the Video card, the sampling rate is 48000 Hz.



Audio from the Video Card and audio from the Mykerinos card cannot be recorded at the same time.

Audio inputs can only be monitored on the outputs of the corresponding card.

Items						
Name	Stamp	Length	Drop	Video	Audio	Path
Robot#12 #0000	00:59:59:23	00:00:09:06	0	Cube - Mjpeg - 50	Pmf - 16 Bits	D:\PAL\
Robot#12 #0004	01:00:12:19	00:00:03:20	0	Cube - Mjpeg - 50	Pmf - 16 Bits	D:\PAL\
Robot#12 #0005	01:00:16:14	00:00:01:24	0	Cube - Mjpeg - 50	Pmf - 16 Bits	D:\PAL\

**After Capture** is a combo dialog box where you can choose a destination for captured media from the following:

- None
- In current Composition, send Clips at original TimeCode.

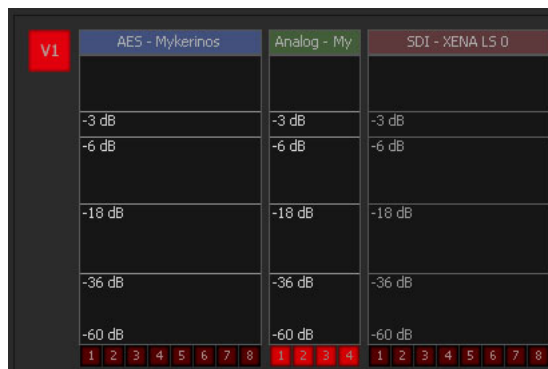
Clip name, Time Stamp, Length, number of Drop-outs, if any occur, and Path are automatically generated by VCube. Current recorded Clip is highlighted in red.

You can choose before or after capture what happens after capture.

If an "In current Composition..." option is selected and no track is selected in the Timeline, a new track featuring the recorded media will be created.



Note that you need to deactivate **Enable Capture** to see the captured media in the Timeline (except for **After Capture: None**)



The previous screen shot may vary according the video card model or settings (red) and the audio option presence on the

machine (blue & green).

A) With the SDI video card option. The track arming for embedded SDI audio is only available when video track arming is enabled and SDI video input is selected as video source. AES, analog (when available) or SDI audio channels of the video card can only be monitored through the video card's respective audio outputs during recording.

B) with the Audio option (DUAL daughter card for the Mykerinos)

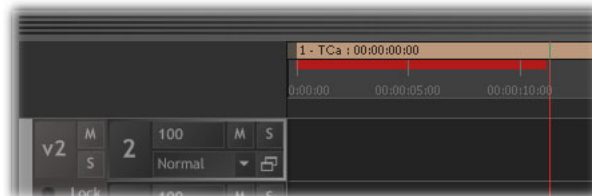
Audio inputs are recorded in a single track featuring the number of Layers corresponding to armed inputs. As usual audio Layers are created from top to bottom. The first audio input of the video card will be on the top audio Layer of the audio track in the Timeline if armed.



The video card audio inputs and the audio card video inputs can't be used at the same time to capture audio.

The audio monitoring must be done on the used card.

The audio track arming is done from left to right by a Sony 9 pin remote control



A progress bar is displayed in the Timeline when visible during recording.

Supported File Extensions	Direct Playback or Import for Numbered Still Images Sequences	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
.mov	Apple QuickTime	Yes
.mpg	Moving Pictures Experts Group	Yes*
.mpeg	Moving Pictures Experts Group	Yes*
.mxf	the Material eXchange Format	Yes* (D10) Render only
.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
.sd2	Sound designer	Yes



Note that if QuickTime is selected as file format for both video and audio a single file will be produced.

Custom (Media Handler Specific) must be selected in the compression drop list to access all QuickTime available compression settings.

Note that if AVI is selected as file format for both video and audio a single file will be produced.

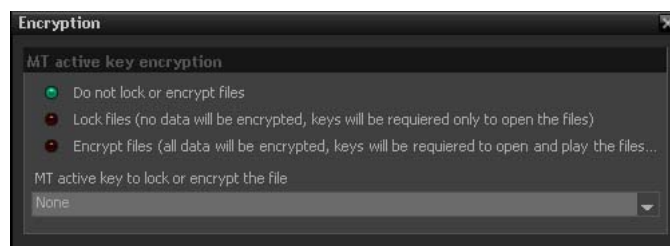
Note that if mpeg is selected as file format for both video and audio a single file will be produced.

Note that if mpg is selected as file format for both video and audio a single file will be produced.

Note that MXF must be selected as file format for both video to produce a MXF D10 compliant file. Audio isn't currently supported in record for MXF

Custom (Media Handler Specific) must be selected in the compression drop list for both audio and video. No specific compression settings are needed.

\* Means optional feature.



A real time video data encryption is available for recording. Please refer to dedicated topic for details on operations.

The dedicated control panel can be accessed from the Settings menu.

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## 9.2 Editing

**Editing** in this first version of VCube is basic. It is designed to give audio people some tools to edit video projects. The number of video tracks or video layers in a Composition is unlimited.



A password protected **Lock Editing** function prevents any unwanted action in the Timeline. **Settings: Composition > General**

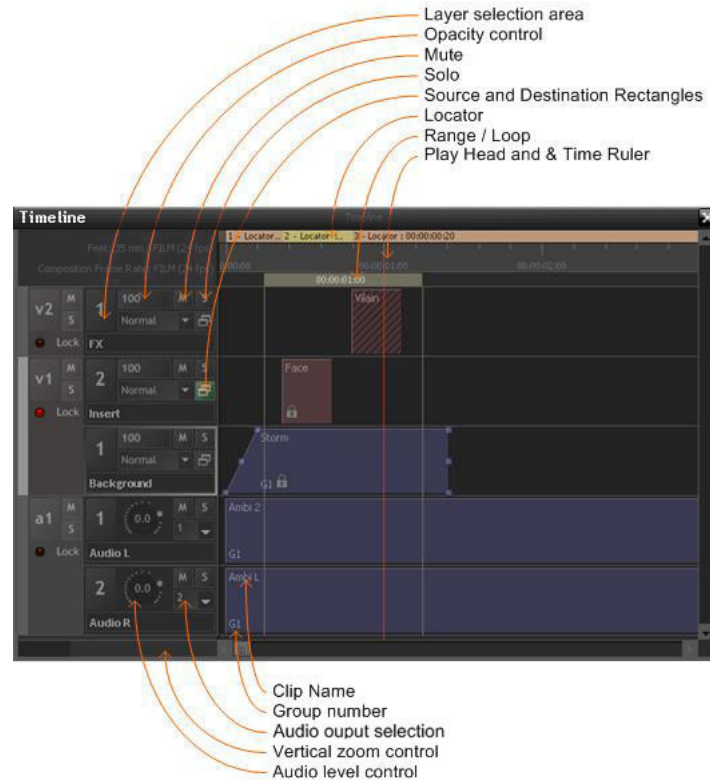


**WARNING:** There is no way to unprotect a **Composition** if the password is lost. The XML file is encrypted.

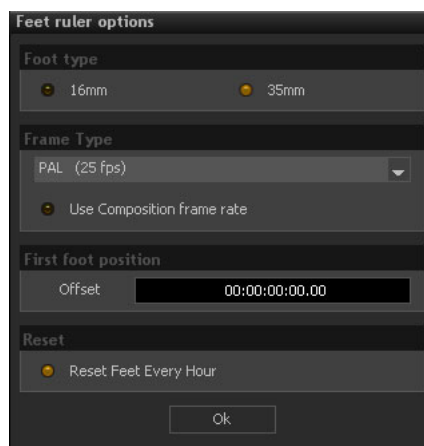
Contact us for a Composition salvage ([www.merging.com](http://www.merging.com)).

## 9.2.1 Timeline

**Timeline** tab opens the edit window. **F11**



- **Locators** are situated at the top of the Timeline. They can be dragged with the mouse. A **Double-click** in the locator tray will open the **Locators** page.
  - Next down is the **TimeCode** ruler. A **Double-click** in the **TimeCode** ruler acts as zoom fit **Alt + 1** and deselects all.
  - Then comes the **Range Selector**. This can be dragged and trimmed with the mouse. A **Double-click** in the range tray sets the range from the beginning to the end of the Composition.
  - Track one has two Layers and is locked, track two has only one Layer.
  - Layer one is selected in track one. Track one is also selected. Storm Clip is set for fade in.
  - Opacity of every Layer is set to full (100). Layer two in video track one has been modified in size or position
  - Red Blue (crosshatched or "zebra" striped) means the media is missing but despite this, the Clip can still be edited.
  - Audio Clips and video Clip "Storm" belong to the same group G1.
- A **Right-Click** inside the Timeline displays contextual menus.



The **Feet ruler options** can be accessed using **Ctrl + F**.

**Reset Feet Every Hour** when enabled feet ruler is reset to zero every hour.



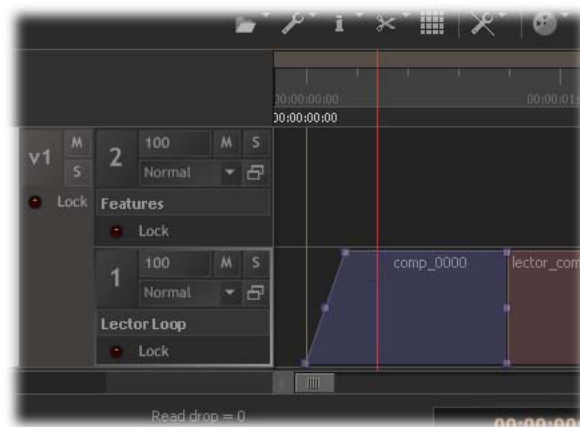
## 9.2.1.1 Editing Functions

**Editing Functions** are very similar to those in Pyramix software.

- To move a selection in a track or Layer just click on the selected element and drag it wherever you want, up, down, left, right.

Note that a group with both video and audio can only be moved horizontally in the Timeline. If the order of video Clips has to be changed vertically for preview, Nudge Up / Down Layer must be used. Select the desired video Layer(s), then use **Ctrl + UP / Ctrl + DOWN**.

- You can drop the selection in a track or Layer 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 Clip in the Layer.
- 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. It's also valid when you move a group. In audio Layers moves are restrained to a one frame grid.
- Use **Ctrl** with click-drag to create an automatic cross-fade between the moved Clip and adjacent Clip.
- To trim the **In** or **Out** points of a Clip, just use the six handles on the selected element.



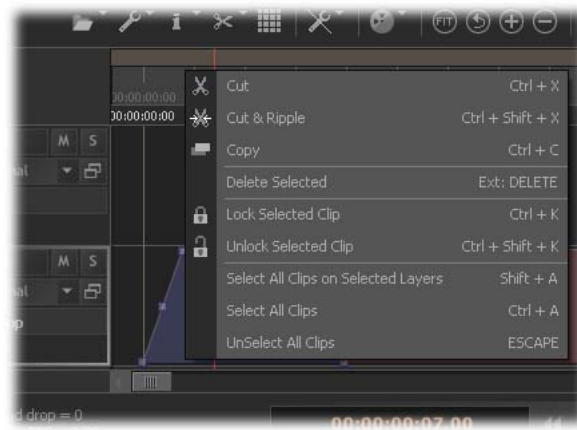
On the left:

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 allows 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.

- When Clips are selected and have the same Source In TC, actions on handles are shared. **Shift** should be used to temporarily unlink selected Clips and produce a fade action on one Clip only. After such operation, fade handles of selected clips re-link once they have been set back to the same TimeCode.

On the right:

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



A **Right-Click** on the selection displays a contextual menu featuring editing functions:

- 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)
- Delete Selected **DELETE**
- Group **Ctrl + G** (only available if more than one Clip is selected)
- Ungroup **Ctrl + U** (only available if more than one Clip is selected)
- Lock Selected Clip **Ctrl + L**
- Unlock Selected Clip **Ctrl + Shift + K**
- Select All Clips on Selected Layers **Shift + A**
- Select All Clips **Ctrl + A**
- UnSelect All Clips **ESCAPE**

Some editing actions are dependent on the mouse position:

- To split a Clip at the mouse position use **Ctrl + Right-Click + pointer**. When Clips are grouped or selected, every Clip present at the mouse position will be split.
- To move Clip content inside fixed in out points **Ctrl + Shift + pointer**. When Clips are grouped, contents of grouped clips are slipped.
- To drag the Timeline view use **Ctrl + pointer** in the time scale.

Some editing actions are depending of the cursor (play head) position:

- Paste **Ctrl + V**
- Paste & Ripple **Ctrl + Shift + V**
- To split a selection at locator position use **Ctrl + T**. When Clips are grouped, every Clip present at the locator position will be split.
- To add a locator at current TimeCode use **NUMPAD 9**

#### Selection, Range & Group:

- Clicking and dragging the mouse in the Timeline will select a range. Once the range is selected, it can be moved as a group even if the selected range includes already grouped Clips.

- **Shift + range selection** will select all Clips partially or totally included in this range.
- To select many Clips **Shift + Click** must be used.
- **RETURN** set the range from the beginning of the first selected Clip to the end of the last one.
- **Ctrl + ENTER** selects the range content.
- **Ctrl + Click Down** selects whole Clips.
- You can delete the selection with **Suppr.** A track is selected since one of its Layers is selected. If no clip is selected, the layer is selected. To delete a Layer, use **Ctrl + Suppr.**
- **Double-click** on the range tray will set the range from the beginning of the Composition to the end.
- **Double-click** on the time ruler acts as zoom all and deselect selected Clip(s).
- Selected Clips can be grouped with **Ctrl + G**. A letter G will appear on the grouped Clips in the Timeline. A **Double-click** on a grouped Clip will display information about this group.
- Use **Ctrl + U** to ungroup Clips.



VCube uses a multi-level grouping logic. The same clip can belong to many groups and a group can be made from group and clip. The ungroup command **Ctrl + U** only cancels the last created level of group. A multi-grouped clip has to be ungrouped as many times as it has been grouped in order to be totally ungrouped. Group numbers are displayed inside the clips in the Timeline.

A group including a video clip is constrained to a one-frame grid.

#### Zoom:

- To control the zoom level use **Alt + Mouse wheel** or **Alt + Click** into the Time Ruler or **Right-Click** into the Time Ruler.
- **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**
- **Alt + range selection** will act as horizontal zoom selection.

#### Nudge:

- **Ctrl + UP or DOWN** is also possible to move clip(s) inside existing clip(s) on other layer(s).
- **Ctrl + LEFT or RIGHT** nudges selection in the Timeline.
- **Shift + UP or DOWN**, invokes Nudge Override mode for clip(s). A moved clip will override an existing clip in a layer.
- **Shift + LEFT or RIGHT** nudges and overrides selection in the Timeline.
- **Ctrl + Shift + UP or DOWN** nudges selected track.

#### Locators:

- To add a locator at current TimeCode use **NUMPAD 9**
- To Create a Locator for Each and Every Clip use **Ctrl + Alt + NUMPAD 9**
- To Create Locators (override) for Every Clip in the Selected Layer(s) use **Alt + NUMPAD 9**
- To Create Locators (add) for Every Clip in the Selected Layer(s) use **Ctrl + NUMPAD 9**
- You can select a locator with **NUMPAD + & -**

- To send set Locator at Cursor use **DIVIDE**.
- The Go To Locator window can be accessed with **NUM PAD 6**.
- Locators can directly be adjusted in the Locator Tray.
- **Double-click** on the locators tray shows thumbnails. **F7** also opens this window. A **Double-click** on the thumbnail locates the thumbnail frame in the Timeline and brings up details about the locator at the bottom of the Locators window.

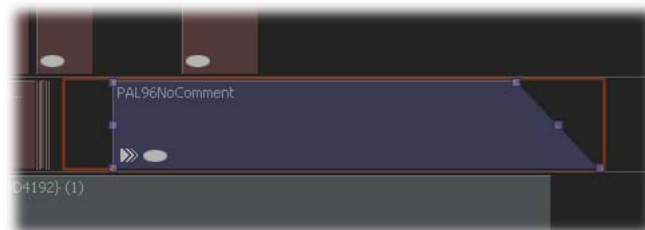
#### Miscellaneous:

- Paste at previous TimeCode **Ctrl + M**
- Import Layer **Ctrl + Alt + L**
- **Double-click** on a selection displays the Clips Information page. Here Clip properties and I/O destinations can be edited.

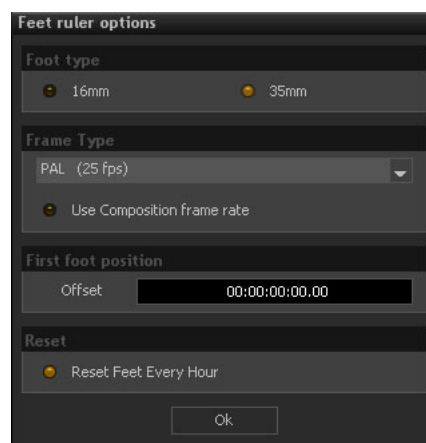


When moving audio and video Clips, preview displays only the current locator position. In fades editing, the preview displays only the selected video Clip at the current TimeCode without any other mixed layer or motion rectangle applied (no compositing).

Text Clips behave differently to video and audio Clips. When a text Clip is moved, the preview follows. In fades editing, the preview respects the compositing of the Composition at the current TimeCode.



A red outline reflecting the whole Media File duration can be displayed while editing Clips at a non-nominal speed.<sup>2</sup> + **Pointer** Increasing the Clip's speed will reduce the Media File duration. Decreasing the Clip's speed will increase the Media File duration.



The Timeline can also display a Feet Ruler for film style editing. This Ruler can be configured for 35 mm or 16 mm film format. The setting can be accessed using the top Settings Menu or the **Ctrl + F** shortcut.

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## 9.2.2 Layer Controls

There are four **Layer Controls**.

- M acts like a mute in the audio world (Hide for video people)
- S is a solo function.
- You can trim the opacity in the layer header.
- You can also choose source and destination rectangles.

Mute and Solo functions are also available for tracks.


### 9.2.2.1 Motion Rectangles (PiP)

 **Motion Rectangles** allow you to adjust the size and position of the Layer on screen. The control Interface is only present on the computer's screen. The video output only displays the result of the adjustment of the red rectangle.

- This feature is useful when you have to compare different versions of the same video or film project. Combined with the **Import Composition** function, 2 non-rendered versions of the same video or film project can be compared.

**Tab** selects the Layer you're working on from top to bottom.

**Shift + Tab** selects the Layer you're working on from bottom to top.

 Indicates that the Layer has been modified for size or position.

Source Rectangle sets the size and position of the selection.

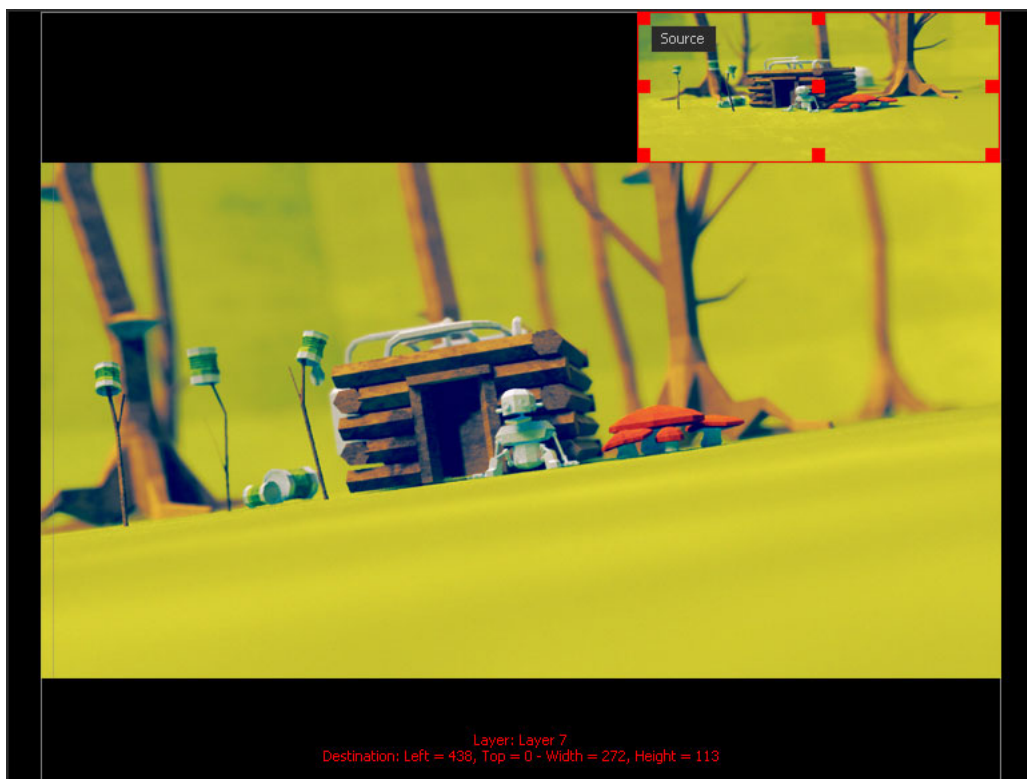
Destination Rectangle sets the size and position of the layer output.

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

**Both Source and Destination Rectangles** can be adjusted by using **Alt + Click and Drag** on resize handles. This feature permits selection of the useful part of the Layer while preserving the geometry and the field order if the selected window isn't moved (cropping).

#### Resize Destination Rectangle:

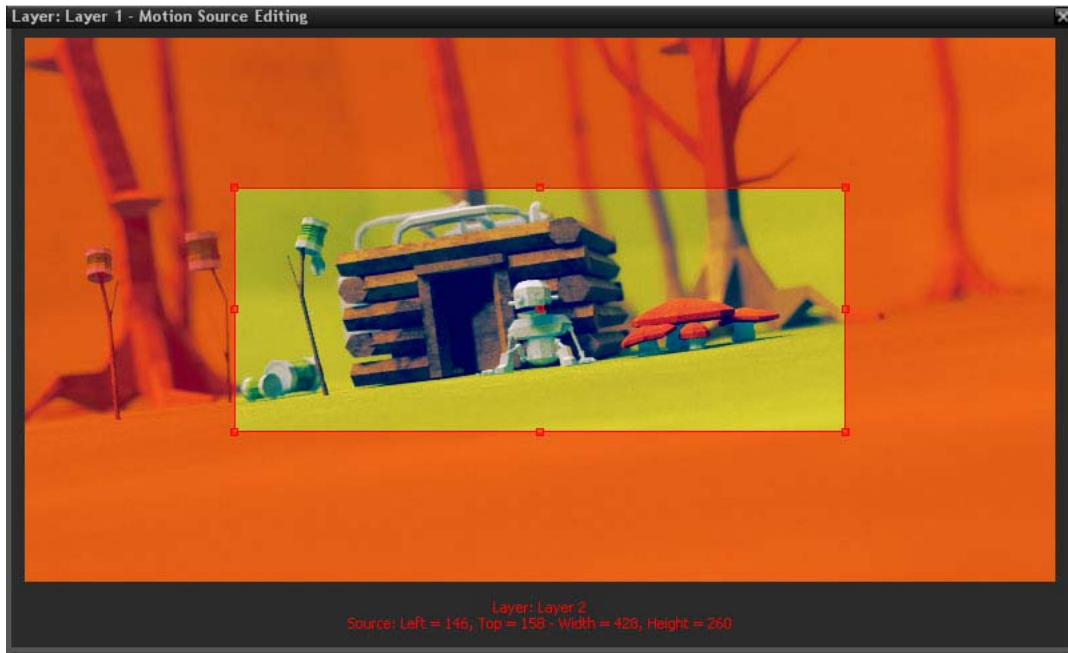
- The Twin Rectangles button in the layer header displays a setting rectangle on the preview screen. The mouse pointer now displays specific tools for resizing. Layer number, top left corner position horizontal and vertical size are displayed.
- **Click and Drag** the external handles to adjust rectangle size.
- **Shift + Click and Drag** preserves the aspect ratio.
- **Double-click** constrains the handle to the side edge of the screen.
- **Ctrl + Double-click** on the central handle restores the Layer to its original size.
- **UP DOWN LEFT RIGHT** keys can also be used to move the rectangle.
- **Ctrl + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the top left handle becomes the fixed reference point.
- **Shift + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the bottom right handle becomes the fixed reference point.
- **ENTER** validates Destination Rectangle settings.



The layer has been duplicated, resized and shifted by 16 frames or one foot of 35mm film. Any shifting value is possible. This feature allows sound mixers to have an advanced preview during mixing.

#### Move Destination Rectangle:

- **Click and Drag** the central handle to adjust rectangle position.
- **Double-click** constrains the handle to the center of the screen.
- **ENTER** validates Destination Rectangle settings.



### Resize Source Rectangle:

- A Source button is visible in the destination adjustment rectangle. Press this button to reach the settings dialog for the source rectangle.
- **Click and Drag** the external handles to adjust rectangle size.
- **Shift + click and Drag** preserves the aspect ratio.
- **Double-click** constrains the handle to the side edge of the screen.
- **Ctrl + Double-click** on the central handle restores the layer to its original size.
- **UP DOWN LEFT RIGHT** keys can also be used to move the rectangle.
- **Ctrl + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the top left handle becomes the fixed reference point.
- **Shift + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the bottom right handle becomes the fixed reference point.
- **ENTER** validates Source Rectangle settings and closes the window.

### Move Source Rectangle:

- **Click and Drag** the central handle to adjust rectangle position.
- **Double-click** constrains the handle to the center of the screen.
- **ENTER** validates Source Rectangle settings and closes the window.



## 9.2.3 Selections and Groups

A **Selection** can be made of Clip(s) or a range.

- Clicking and dragging the mouse in the Timeline will select a range. Once the range is selected, it can be moved as a group even if the selected range includes already grouped Clips. **Shift + Range Selection** will select all clips partially or totally included in this range. **Alt + Range Selection** will act as horizontal zoom selection.
- To select many Clips **Click + Shift** must be used.
- Selected Clips can be grouped with **Ctrl + G**. A letter G will appear on the grouped Clips in the Timeline. A **Double-click** on a grouped Clip will display information about this group.
- Use **Ctrl + U** to ungroup Clips.
- **RETURN** set the range from the beginning of the first selected clip to the end of the last one.
- **Shift + A** selects all Clips in the selected Layer.



VCube uses a multi-level grouping logic. The same Clip can belong to many groups and a group can be made from group and Clip. The ungroup command **Ctrl + U** only cancels the last created level of group. A multi-grouped clip has to be ungrouped as many times as it has been grouped in order to be totally ungrouped. Group numbers are displayed inside the Clips in the Timeline.

A group including a video Clip is constrained to a one-frame grid.

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## 9.2.4 Watermark and Text

Watermark, Copyright and Text Clips can be added to a Composition.

### 9.2.4.1 Watermark

**Watermark** allows you to add a picture or a Copyright Text to the current Composition. You just have to load a still image file (alpha channel supported) or enter and place the Copyright Text. The Watermark image file has to be of the same dimension as the desired output video format to avoid real-time stretching.

**Enable** activates those settings on screen. Watermark picture and copyright text are saved inside the Composition. So they can be protected or unprotected by password.

**Load Watermark File** allows you to superimpose a logo or tag picture on every video output.

**Clear Watermark File** allows you to remove this picture from the Composition.

**Copyright** allows you to enter a single line of text with a default style.

**Position** sets the place for this text on screen.

**X & Y Offset** allows you a fine adjustment of text position.



**Color** accesses a color picker for the text.



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

## 9.2.4.2 Text Clip

There are two ways to add text in a Composition:

-  Add Text use a default style. **Shift + T**
-  Add Sticky use a preset style. **Alt + T**

These styles can be edited and applied to the selected text Clip.

A 5 second text Clip is created on the selected Layer.

Once a Text Clip is created in the Timeline **Shift + T** or **Alt + T**, **Double-click** on it to reach the Text Properties panel in the **Clips Information** folder.

In the Timeline a text Clip behaves differently to video and audio Clips. When a text Clip is moved, the preview follows. In fades editing, the preview respects the compositing of the Project at the current TimeCode.

When moving audio and video Clips, preview only displays the current locator 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).

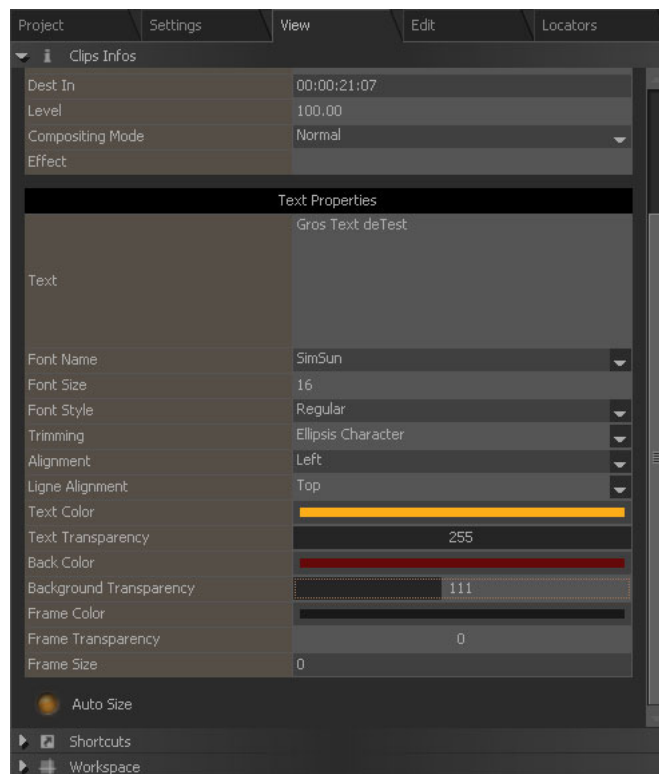
Layer motion and opacity are not applied to text Clips.

System fonts are 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 text.

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

**Auto Size** automatically adjusts the rectangle area to the text content. In Auto Size mode there are no external handles for the rectangle.

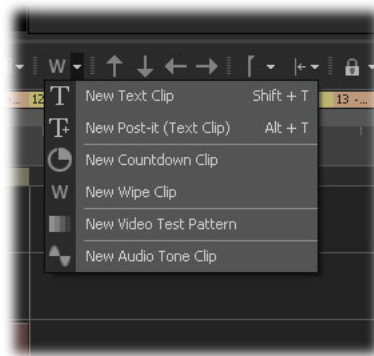


- **Click and Drag** the external handles to adjust rectangle size.
- **Shift + Click and Drag** preserves the aspect ratio.
- **Double-click** constrains the handle to the side edge of the screen.
- **Ctrl + Double-click** on the central handle restores the text at its original size.
- **UP DOWN LEFT RIGHT** keys can also be used to move the rectangle.
- **Ctrl + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the top left handle becomes the fixed reference point.
- **Shift + UP DOWN LEFT RIGHT** keys resize the rectangle. In this mode the bottom right handle becomes the fixed reference point.
- **Click and Drag** the central handle to adjust rectangle position.
- **Double-click** on the central handle centers the text box on X & Y axes.
- **Double-click + Alt** on the central handle centers the text box on the vertical axis.
- **Double-click + Shift** on the central handle centers the text box on the horizontal axis.
- **ENTER** validates text rectangle settings.

## 9.2.5 Utility Clips

Countdown clips, Wipe clips, Video Test Pattern clips, and Audio Tone clips can be generated by the VCube application from the tool bar.

The ADR capabilities of the Pyramix software allow to automatically create Wipe and Countdown clips into the VCube Timeline. This feature uses the network connection between Pyramix and VCube machines to send the corresponding information.




Note that dedicated shortcuts can be defined in the Shortcuts editor section **Shift + W**

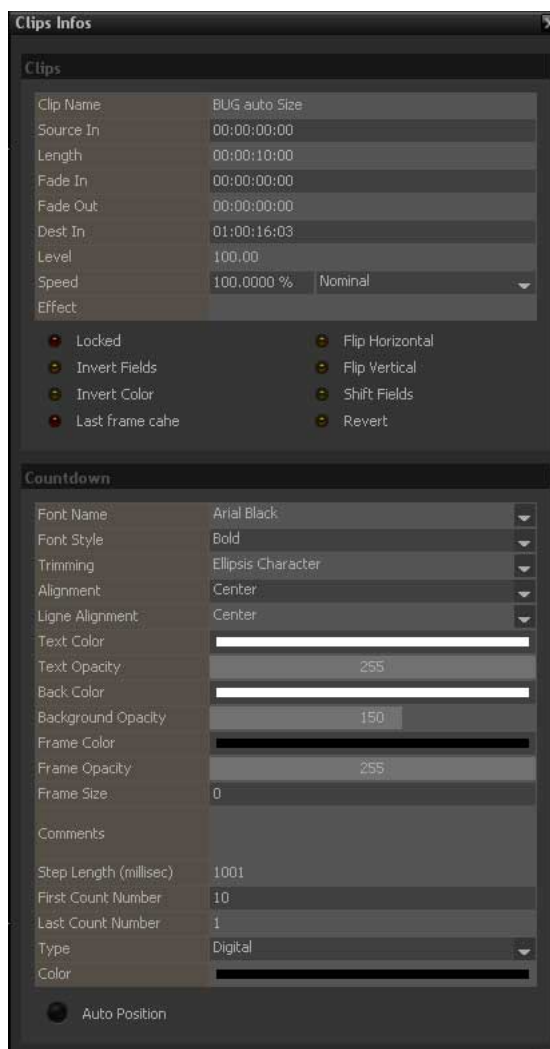


Here Auto Countdown and Auto Wipe are enabled.

## 9.2.5.1 Countdown Clip

 Countdown clips can be generated by VCube.

Once created in the Timeline, double-clicking on the clip accesses its settings.



Here are the default settings.

### Step Length (millisecond)

The step duration is set using milliseconds as unity.



NTSC based video standards require 1001 ms per second.

### First Count Number

Sets the number of steps for the countdown.

---

### Last Count Number

Sets the last step number for the countdown.



Some clip properties are not supported by the Countdown clips.

Note that Countdown clips aren't affected by the Source/Destination rectangle settings of the layer.

The countdown clip duration can't be directly edited from the Timeline by using clip handles. The clip settings must be used to change the countdown clip duration.



## 9.2.5.2 Wipe Clip

**W** Wipe clips can be generated by VCube.

Once created in the Timeline, double-clicking on the clip accesses its settings.



Here are the default settings.



Some clip properties are not supported by the Countdown clips.

Note that Wipe clips aren't affected by the Source/Destination rectangle settings of the layer.

---

### 9.2.5.3 Video Test Patern Clip

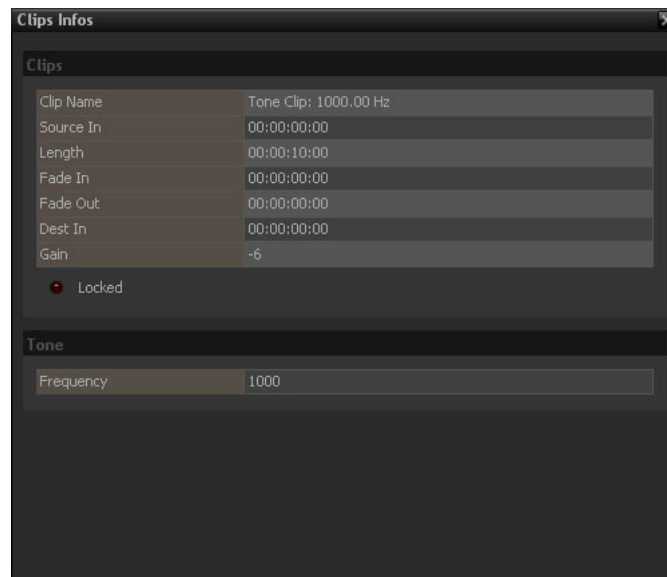
■ Video test patern clips can be generated by VCube.

Once created in the Timeline, double-clicking on the clip accesses its settings.

## 9.2.5.4 Audio Tone Clip

■ Audio Tone clips can be generated by VCube.

Once created in the Timeline, double-clicking on the clip accesses its settings.



Here are the default settings.

# 10 Conforming and Reconforming

## Conforming

- **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.
- **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.
- **Reconform** Pyramix can conform audio to match a several flavours of EDL and also reconform an existing project to match a CMX change EDL.

Pyramix can also reconform an audio project by importing two versions of a video project, original and new.

## CMX EDLs

CMX is one of the earliest types of EDL. The name comes from the company that developed it in the early 1970s **CBS Memorex eXperimental**. Over the intervening decades other companies have extended the original format to encompass, for example, more audio tracks. Although there are now several far more sophisticated alternatives, CMX remains the lingua franca of EDLs.

## Importing a CMX EDL

Select **Project > Import** choose **CMX EDL** in the **InterChange-Import** dialog then click on the **Import** button. Select the desired edl file in the **Open** file-browser window. The CMX EDL Import Options dialog opens:

If the EDL Frame Rate is correct, simply click the **OK** button. Otherwise, select the correct rate from the drop down list and click the **OK** button.

The CMX EDL Import Options main dialog opens.

## Common CMX Variants

The **Settings Presets** buttons at the bottom of the box set the options for a variety of common CMX variants. If the edl you wish to import matches one of these, simply click the appropriate Preset button. The settings are reflected in the rest of the dialog. Click the **OK** button to begin the Import.

If the EDL is not one of the common variants or the intention is to perform a partial or re-conform, make the appropriate choices in the dialog before clicking on the **OK** button to begin the Import.

## CMX EDL import Options

### General Options

- **Import EDL Edits as Clips**
- **Import EDL Edits as Markers**

**Edit/Clip Options** Choose to name created clips from either:

- **Using Tape/Reel Name**
- **Using Edit/Clip Name**

- **Using EDL Edit Number**
- **Using Scene & Take (if available)** of linked media file. (E.g. BWF PMF etc. files with information in the **Scene & Take** fields)

### Tracks Options

- **Import Track** Drop-down list offering a choice of importing All Tracks (default) or any individual track. Importing only the edits made on the first audio track. This can be useful with projects edited on a MediaComposer where the TimeCode of all audio tracks but the first one has been lost from files imported from a Deva recorder.
- **Extend Edits to more tracks** Offers the choice of extending the edits to more tracks than the original list by selecting the desired number of target tracks from the drop down list.

### Media Linking Options

- **Connect EDL edits:** Choose the way to relink the audio media to edits by either:
  - **Using Tape/Reel Name**
  - **Using Edit/Clip Name** from the EDL...
- **To Mounted Media:** ... and match it to either
  - **Matching Tape Name or FIXREEL pragma** (the media original)
  - **Matching Media Name** (the media original)
  - **Matching File Name** (the media original)
  - **By TimeCode in matching Folder name** (the media Timestamp in a folder whose name matches the Reel or Edit name)
  - **By TimeCode and prompting for location** (the media Timestamp in a given folder)
  - **By TimeCode in any media folder** (the media Timestamp in any mounted media folder)
  - **Ignore File Extension** When checked any file extension is ignored while comparing file names
  - **Match only X first characters** When checked only the given number of first characters in the filename are compared. (useful for matching files coming from Aaton Cantar or InDAW recorders)

### CMX EDL Format

CMX Edls are a set of statement lines which typically look like this:

*TITLE: An example of CMX EDL*

001 TEST AA C 00:00:24:24 00:00:25:00 00:59:58:00 00:59:58:01

AUD 3 4

*\* Sine on all tracks*

002 DAT12 AA C 20:18:18:07 20:18:21:13 01:02:40:02 01:02:43:08

*\* Introduction*

003 TAPE1 AA C 01:15:07:07 01:15:11:13 01:02:43:13 01:02:47:19

004 TAPE1 NONE C 01:15:14:02 01:15:16:04 01:02:47:19 01:02:49:21

AUD 3 4

005 TAPE1 NONE C 1000Hz 01:15:14:02 01:15:16:04 01:02:47:19 01:02:49:21

006 TAPE1 NONE C "A sound" 01:15:14:02 01:15:16:04 01:02:47:19 01:02:49:21

Pyramix will extract all the information regarding audio from these EDLs and then paste a set of clips into the current

composition's Timeline.

There are many CMX formats which differ in details, Pyramix should be tolerant enough to accept most of them as long as edit lines fields are well separated by spaces or TABs.

Any errors encountered while parsing an EDL file are stored and reported after loading as much of the file as possible. Any non valid lines, missing media or media sampling rate mismatches are reported.

### Media Reconnection

The major problem encountered while importing an EDL is reconnecting to referenced media. Pyramix needs all referenced media to be present (mounted) when the import occurs. After the import, the newly created composition **MUST** be saved as a Pyramix project to keep the connection between clips and media.

Media are searched while importing the EDL by Media Source name (or Reel name following the EDL terminology), and Source In and Source Out TimeCodes. So, to be reconnected, a clip needs to find in any media folder a media file with a Media Source name matching field #2 in the EDL, in the preceding example TEST, DAT12 or TAPE1, and where the original TimeCode and length match the Source In and Source Out field.

### Source Names - FIXREEL

It often happens that the media is generated with a different Source (Tape, Reel) name than the EDL referencing it. For this purpose we have added a special keyword to the CMX language which allows Pyramix to replace one Reel name with another while parsing the EDL.

FIXREEL: DAT12 DAT012 This preamble added at beginning of the file will replace all occurrences of the reel name DAT12 by DAT012. The preamble can be preceded by the comment asterisk (and a space or TAB) so the EDL remains compatible for import by other systems:

*\* FIXREEL: DAT12 DAT012*

It is also possible to add the keyword MEDIANAME, FILENAME or FOLDERNAME at the end of this line to tell Pyramix, instead of the Source (Tape, Reel) name, to search for the Media name or the Media Filename:

*\* FIXREEL: DAT12 Ambiance43b MEDIANAME*

*\* FIXREEL: DAT12 d:\pmxmedia\dat12\ambiance43b.wav FILENAME*

or to search by TimeCode in the given mounted media folder (this is kind of a conformation to existing digitized material):

*\* FIXREEL: DAT12 d:\pmxmedia\dat12 FOLDERNAME*

The keyword OFFSET followed by a TimeCode can be added at the end of the line to allow media without origin (original TimeCode, source TimeCode, time stamp) to be referenced, for example WAVE files.

*\* FIXREEL: DAT12 Ambiance43b MEDIANAME OFFSET 08:45:32:00*

*\* FIXREEL: DAT12 d:\pmxmedia\ambiance43b.wav FILENAME OFFSET 08:45:32:00*

This covers most cases of media reconnection and should help solve special cases of EDLs exported by exotic systems.

### Media Reconnection Failure

An imported clip whose media has not been retrieved or whose media is not at the same sampling rate as the current project will be associated a 'fake' media.

It **WILL NOT** be possible to retrieve its media file after the import, but it will be possible to associate a new media file in the standard way (Control key pressed while dragging a media file from a media folder).

## CMX Autoconform

When a CMX EDL is not accompanied by audio files on disk an **Autoconform** can be performed. A **Digitizing Session** is used to grab the audio referenced by the CMX EDL from an external machine (This may be operated under 9-pin control or simple time-code chase). The CMX EDL can then be imported into an **Editing Project** (as described above) to link to the digitized media.

## Reconform

### Introduction

**Reconform** enables tracks in an existing project to be conformed to take account of changes in the picture edit. **Reconform > Relink to new Media** can be used to link to new Media files when new Cues without previously associated Media files are produced by the Reconform.

In Pyramix there are three routes to Reconforming. The first two make use of a so-called **Change EDL**. This EDL is a standard CMX EDL generated from a "State 1 EDL" and a "State 2 EDL".

In the first case, **CMX Reconform**, the change EDL is generated by a third party application. This may be the video editing software, or a specialised EDL manager.

**Please see: Reconform Using Pyramix with an Existing Change EDL below.**

Where there is no existing Change EDL there are two possibilities:

For users with Pyramix and access to both the original and modified video EDLs Pyramix can load the original picture (**Version1** if not already part of the project) plus the new picture (**Version2**) and generate the necessary changes from these.

For users running VCube as well as Pyramix, VCube can be used to generate a Change EDL from the original (**Version1**) and revised (**Version2**) EDLs.

### Reconforming with an Existing Change EDL

The **Reconform** function allows picture edit changes to be applied to a project by loading a so-called "**Change EDL**". The **Reconform** function rearranges Cues within the current project where necessary to reflect the change from State 1 to State 2 by creating edits on all tracks of the project using the original material as sources and placing them to the new destination TimeCodes.

#### Step 1

With the Pyramix project you wish to conform open in Pyramix select:

**Project > Reconform > Load Change EDL & Reconform**

Opens the **Reconform...** dialog:

This **Warning**: gives good advice. It is good operational practice to retain the old Project (Version 1 in this case) and to reconform a copy, saving this copy with a suitable filename matching the new Video composition version. Assuming you have already done this, click on **OK** to close the dialog.

A file **Open** Browser Window opens:

Now, if necessary, navigate to the folder containing the **Change EDL**. In this case the required file is **Version1\_CHANGES\_Version2.EDL**. Select this and Click on **Open**.

The **CMX EDL Import Options, Confirm EDL Frame Rate** dialog opens:

Check that the EDL Frame Rate matches the Pyramix Project Frame Rate. If the Frame Rate is incorrect, choose the correct one from the drop-down list. Click on **OK**.

The **Reconform from Change EDL** dialog opens:

Select all tracks that will have to be reconformed (generally all tracks in the project).

Tick the **Create Changes Tracking Tracks** box if these are required.

Click on **OK** to perform the Reconform.

## Step 2

Pyramix automatically conforms **Version1** to **Version2** on all tracks:

As can be seen in the above screenshot two new 'fake' tracks have been created and added at the bottom of the Timeline to display the **Change Tracking**. These show in colour which sections of the **Version1** Timeline have been moved, sliced, diced and or squeezed etc. to become **Version2**

## Step 3

Selecting **Edit > Undo (Ctrl+Z)** once will remove the **Change Tracking** Tracks.

**Note:** Once the **Change Tracking** Tracks have been removed they are **NOT** retrievable.

Note: **Reconforming Using Pyramix for Picture Change Detection** You can use Pyramix to perform a Reconform from two Video Projects.

**Note:** The precise details of subsequent Dialog boxes may vary from those shown below depending on the specific format selected:

## Step 1

Open the Pyramix Project you wish to reconform.

## Step 2

Select **Project > Import** and choose the appropriate format. (in this case **OMF**)

Select the following options:

- Append the imported tracks at bottom of current project tracks
- Place the Video Clips in the Timeline
- Do not open them

Click on the **Import** button to open the **Open** File Browser Window:

If necessary, navigate to the folder containing the **Version1** Video Project file. Select the file and click on **Open**.

Notice that the **Version1** Video and Audio tracks have been added at the bottom of the Timeline.

## Step 3

Repeat **Step2** with the same options, substituting **Version2** when selecting the Video Project file.

Notice that the **Version2** Video and Audio tracks have been added below the **Version1** Video and Audio Tracks at the bottom of the Timeline.

## Step 4



Select, **Project > Reconform > Detect Picture Changes & Reconform (Ctrl+R)**:

The **Detect Picture Change & Reconform** dialog opens.

#### Step 5

Select all tracks that will have to be reconformed (generally all tracks in the project except those belonging to the Version2 Video project, but including Version1 Video and Audio tracks). Select the track that will be the **Version1** Reference track for the picture change detection (generally the **V1** track of the **Version1** Video Project), then Select the track that will be the **Version2** Reference track for the picture change detection (generally the **V1** track of the **Version2** Video Project).

Tick the Create Changes Tracking Tracks box if these are required.

When all the selections have been made click on **OK** to perform the Reconform:

#### Step 6

The Pyramix Project has now been Reconformed:

Verifications can be made with the **Change Tracking** tracks, as well as comparing the **Version1** Video tracks that should now match the **Version2** Video Tracks.

#### Step 7

Selecting **Edit > Undo (Ctrl+Z)** once will remove the **Change Tracking** Tracks.

**Note:** Once the **Change Tracking** Tracks have been removed they are **NOT** retrievable.

#### Step 8

The Video Reference Tracks (with their associated Audio Tracks) can be removed by right-clicking on the first Video Track Header and selecting **Delete To Last Track**. The original Pyramix Project is now reconformed and ready for you to continue working on **Version2**.

**Note:** Where the **Version2** project contains new material, it may well be appropriate to move the relevant audio from the **Version2** Audio Tracks up to the main Pyramix Project tracks before deleting. A future Pyramix version may contain an option to carry out this step automatically.

### Reconforming Using VCube for Picture Change Detection

For users with VCube a Pyramix Project can be reconformed to match a new version of a Video Project quickly and simply.

#### Step 1

Open the original version of the video in VCube and the Project with the matching audio in Pyramix:

#### Step 2

In VCube select: **File > Import > Import Composition and Export Changes**:

This opens a Browser Window.

If necessary, navigate to the folder containing the changed version of the Video Composition. Select this and Click on **Open**.

#### Step 3

The new video file, **Version 2** is now displayed in the VCube Timeline:

The changes between the two versions will have been exported to a **Change EDL** file which will be found in the same

source folder.

#### Step 4

Return to Pyramix, which is still displaying the original Version 1 audio Project:

Select **Project > Reconform > Load Change EDL**.

The **Reconform...** dialog opens:

This **Warning**: gives good advice. It is good operational practice to retain the old Project (**Version 1** in this case) and to reconform a copy, saving this copy with a suitable filename matching the new Video composition version.

Assuming you have already done this, click on **OK** to close the dialog.

A file **Open** Browser Window opens:

Now, if necessary, navigate to the folder containing the Change EDL.

**Note:** This automatically generated file will be named in the form:

**Original Composition name\_CHANGES\_New Composition name.EDL**.

In this case the required file is **Version1\_CHANGES\_Version2.EDL**. Select this and Click on **Open**.

The **CMX EDL Import Options, Confirm EDL Frame Rate** dialog opens:

Check that the EDL Frame Rate matches the Pyramix Project Frame Rate. If the Frame Rate is incorrect, choose the correct one from the drop-down list. Click on **OK** to confirm

The **Reconform Project** dialog opens proposing the creation of two new **Change Tracking Tracks**:

Select all tracks that will have to be reconformed (generally all tracks in the project).

Tick the **Create Changes Tracking Tracks** box if these are required.

Click on **OK** to perform the Reconform.

#### Step 5

Pyramix automatically conforms **Version1** to **Version2** on all tracks:

As can be seen in the above screenshot two new 'fake' tracks have been created and added at the bottom of the Timeline to display the **Change Tracking**. These show in colour which sections of the **Version1** Timeline have been moved, sliced, diced and or squeezed etc. to become **Version2**

#### Step 6

Selecting **Edit > Undo (Ctrl+Z)** once will remove the **Change Tracking** Tracks.

**Note:** Once the **Change Tracking** Tracks have been removed they are **NOT** retrievable.

Now you will have both Pyramix and VCube Version2 displayed in the respective applications:

VCube displays the 'real' **Version2** from the editing department and Pyramix displays Version2 Reconformed automatically from **Version1**.

**Note:** The above example used two VCube Projects for the Video. The procedure is identical when importing two AAF, OMF or Final Cut Pro Video Editing Projects.

## Relink to New Media

Opens a dialog offering various options similar to the Import CMX EDL function.

This allows relinking all or a selection of clips to new media. Typically, this is used for replacement of 16 bit versions of audio files with 24 bit versions based on the clip name, media name, Scene & Take information or original TimeCode.

**Relink Clips Media** Gives options to extract a string from the original clip:

- **Using current Media Tape Name**
- **Using current Media Name**
- **Using current Media File Name**
- **Using current Media Scene & Take**
- **Using Clip Name** With various options applicable to the above:
  - **Ignore characters after finding...** ignores the rest of the string after a given substring is found
  - **Ignore File Extension** ignores any characters after the last dot
  - **Match only ... first characters** ignores all characters after a given number
  - **Scene & Take Separators** gives a choice of characters to be used to separate a Scene name and a Take name from the string.

**Note:** this is relevant only for Tape, Media and Clip Name, as Scene & Take are already properly separated in a Media Scene & Take tag.

**To any other Media** gives options to find which information to use from the Media that will be searched:

- **Matching Media Tape Name**
- **Matching Media Name**
- **Matching Media File Name**
- **Matching Media Scene & Take**
  - **By TimeCode in matching Folder name** Any Media with overlapping TimeCode in a folder with a matching name
  - **By TimeCode and prompting for location** Any Media with overlapping TimeCode with prompting for the folder name/ location
  - **By TimeCode in any media folder** Any Media with overlapping TimeCode
- With various options:
  - **Ignore characters after finding...** ignores the rest of the string after a given substring is found
  - **Ignore File Extension** ignores any characters after the last dot
  - **Match only ... first characters** ignores all characters after a given number of them
  - **Search In** allows the choice of which Media Folder to search in
  - **Search sub-folders** When checked sub-folders are searched

**Match Options** Offers options for the matching algorithm:

- **Match exactly** both strings must be identical
- **Match only minimum common available characters** Take0001.new.01 will match with Take0001
- **Original contains new Media** Take0001 will match with 0001
- **New Media contains Original** 0001 will match with Take0001
- **Case insensitive** TAKE0001 will match with Take0001

- **Ignore characters...** if, for instance, /\_+- are specified then 12-A/0001 will match with 12/A\_0001
- **Ignore TimeCodes** no checks are made on Original TimeCodes (timestamps). This allows media with erroneous/lost timestamps to be replaced with the correct ones or vice-versa.

#### Other Options

- **Extend Edits to more tracks** When conforming a clip referencing multiple tracks to a clip referencing a mono media file adds a new clip (with the same fades, etc...) for all of these tracks as well.

**Note:** In the case of multiple passes for the conform operation, this function can be performed afterwards with the menu item **Tracks > Extend** This automatically extends the number of tracks to accommodate all the Media channels of each of the clips of one or more timeline track(s)

- **Color Clips that successfully relinked in Green** Re-colors successfully linked clips in Green
- **Color Clips that failed relinking in Red** Re-colors Clips that failed to re-link in Red

# 11 Conversions

**VCube** is able to convert Media, Clips or Compositions in order to fulfill your needs:

- Media Files can be converted to another File Format or Video Format **Ctrl + Y**
- A Composition can be rendered into a single Media File **Ctrl + R**
- A Still Images Sequence can be converted to a Video Media File. **Ctrl + I**
- A Still Image can be placed in a composition as a five seconds Clip. **Project: Media Files**




When still images are dropped directly from a Windows folder to the Timeline, a single frame is created per imported image and images are loaded in RAM.

---

## 11.1 Export

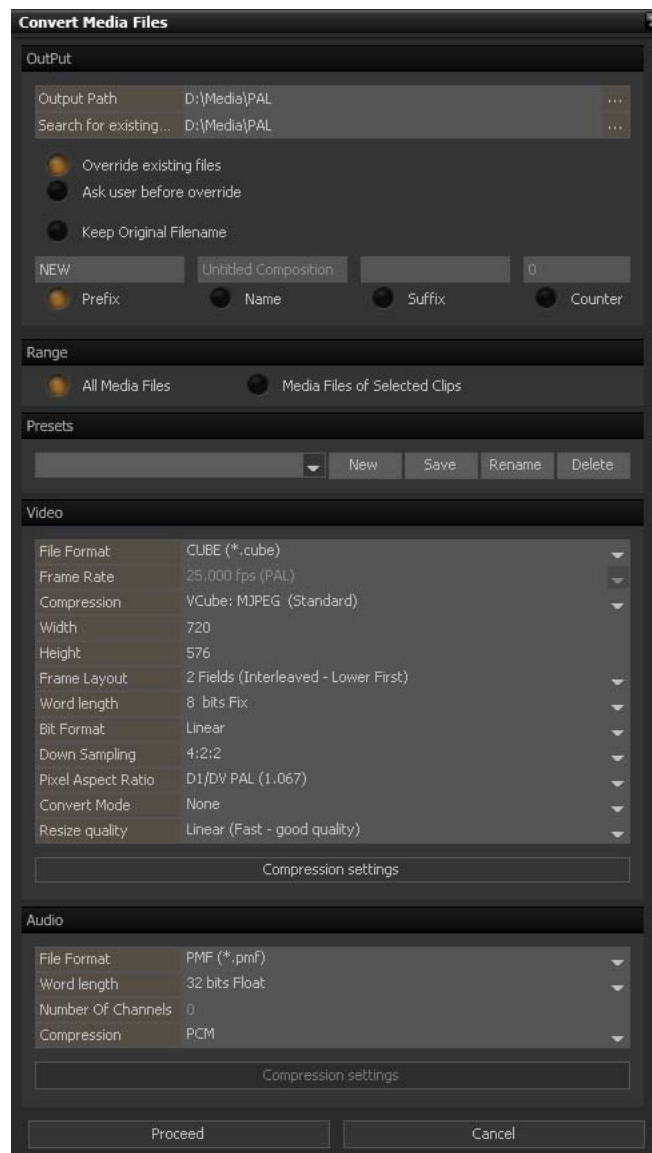
VCube Compositions can be exported as .xml files. This feature ensures Timeline exchanges between the last generation of Merging Technologies softwares (Pyramix or Ovation).

## 11.2 Convert Media Files

 **Convert Media** allows selected Media Files to be converted into .cube file(s). This file format is optimized for the VCube's playback engine. **Ctrl + Y**

Media Files can also be converted to AVI, MPEG2 or QuickTime files if compatibility is needed.

For Convert or Render processes, VCube uses the current Composition frame rate.



- **All Media Files** of the current Composition or only **Media Files of Selected Clips** can be converted.
- **Delete Original Media** permanently removes the original file(s) from mass storage.
- **Output Path** enables the location of newly created Media Files to be defined.
- **Search for Existing Media Path** allows you to choose a specific location when overriding existing Media Files.

- **Override Existing Files** allows you to permanently erase the source files.
  - **Ask User Before Override** when enabled, a dialog will appear for each source file erasure.
  - **Keep Original File Name** uses the same name for the newly created Media File.
  - **Prefix** allows a prefix to be added to the Media File's name.
  - **Name** allows Media Files to be renamed when required.
  - **Suffix** allows a suffix to be added to the Media File's name.
  - **Count** is a dialog where the start point of the incrementation process is set. All converted Media Files will have the chosen name followed by an automatically incremented number.
  - **Output Path** allows you to choose the storage location for the created media.
  - **File Name** allows you to change the default name proposed by VCube.
- 
- **New, Save, Rename, Delete** act as usual in VCube.
    - Compression settings aren't included into the presets
- 
- **Video File Format** determines the type of the generated Media File for video. Cube, AVI2, QuickTime, or MPEG2 are possible.
    - When QuickTime and MJPEG codec are chosen, progressive scan must be selected for Fields Order to insure QuickTime player compatibility.
  - **Frame Rate** is currently related to the current Composition frame rate.
  - **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**.
  - **Width** and **Height** determine the number of pixels used to display the frame.
  - **Frame Layout** determines if and how the rendered frames will be interleaved or not.
  - **Word Length** is currently limited to 8 bits.
  - **Down Sampling** determines the color sub-sampling scheme. 4.2.2 (see Glossary section) is the default value
  - **Convert Mode** can be Down or Up convert depending of the picture format selected for rendering.
    - Down Convert: Letterbox, or Anamorphic are possible.
    - Up Convert: Anamorphic, Pillarbox 4x3, Letterbox are possible.
  - **Resize Quality** allows the user to choose between different methods of computing the image in the desired format.
    - Nearest neighbour -> Fast and poor
    - Linear (Bi Linear) -> Fast and poor
    - Cubic -> Very Good but slow
    - Lanczos -> Very Good but very slow
    - Supersampling -> Very Good when reducing the picture a lot. Slow.
  - **Compression Settings** are available for MJPEG and MPEG codecs.
    - For details on the **Mpeg Settings**, please refer to the dedicated section. We recommend using only regular "Format type" in the "Basic Settings" dialog for trouble free operations.
    - **MJPEG** codec A 100 quality value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20 compression ratio.
- 
- **Audio File Format** determines the type of the generated Media File for audio. If both video and audio are the same type, they are merged inside a single Media File.



- **Word Length** determines audio resolution.
- **Number of Channels** indicates the number of physical outputs fed by audio Layers in the Composition. Audio monitor settings (level & routing) are applied to the rendered audio files.
- **Compression** availability depends of the selected audio file format. QuickTime allows various solutions to compress audio data.



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, every channel is considered 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 channels file into a stereo mix of the 4 mono channels.

Using video files with embedded audio decreases playback performance. For Composition 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 as converted file to retrieve both video and audio once converted.


MJPEG Compression	
MJPEG Compression Level (Quality)	Average Compression Ratio (Size)
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



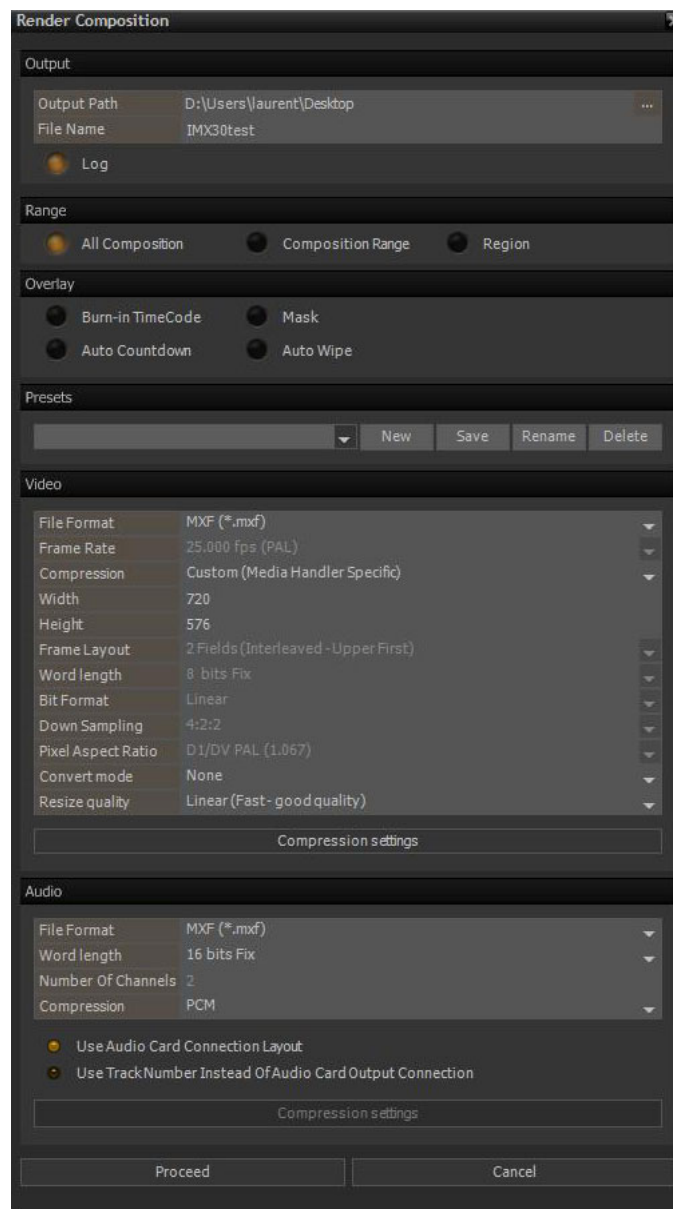
Note that previous compression ratio values are only indicative. The MJPEG compression effectiveness may vary with the picture content. The more detail or noise present, the lower the compression ratio achieved.

Supported File Extensions	Direct Playback or Import for Numbered Still Images Sequences	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
.mov	Apple QuickTime	Yes
.mpg	Moving Pictures Experts Group	Yes*
.mpeg	Moving Pictures Experts Group	Yes*
.mxl	the Material eXchange Format	Yes* (D10) Render only
.aif	Audio Interchange File	Yes
.mpa	MPEG Audio Stream, Layer II	Yes*
.wav	WAVE File Format	Yes
.bwl	Broadcast wave	Yes
.pmf	Pyramix media file format	Yes
.sd2	Sound designer	Yes

## 11.3 Render

 **Render** computes the Composition in the Timeline as a single Media File. **Ctrl + R**

For Convert or Render processes, VCube uses the current Composition frame rate.



- **Output Path** allows you to choose the storage location for the created media.
- **File Name** allows you to change the default name proposed by VCube.
- **All Composition** or only a **Composition Range** can be rendered.
- **Region** Use this if you only want to render from region In to region Out.

- **Mask, TimeCode, Auto Countdown, and Auto Wipe** can be included in the rendered file.
- **New, Save, Rename, Delete** act as usual in VCube.
  - Compression settings aren't included into the presets.
- **Video File Format** determines the type of the generated Media File for video. Cube, AVI2, QuickTime, MXF, or MPEG2 are possible.
  - When QuickTime and MJPEG codec are chosen, progressive scan must be selected for Fields Order to insure QuickTime player compatibility.
- **Frame Rate** is currently related to the current Composition frame rate.
- **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**.
- **Width** and **Height** determine the number of pixels used to display the frame.
- **Frame Layout** determines if and how the rendered frames will be interleaved or not.
- **Word Length** is currently limited to 8 bits.
- **Down Sampling** determines the color sub-sampling scheme. 4.2.2 (see Glossary section) is the default value
- **Convert Mode** can be Down or Up convert depending of the picture format selected for rendering.
  - Down Convert: Letterbox, or Anamorphic are possible.
  - Up Convert: Anamorphic, Pillarbox 4x3, Letterbox are possible.
- **Resize Quality** allows the user to choose between different methods of computing the image in the desired format.
  - Nearest neighbour -> Fast and poor
  - Linear (Bi Linear) -> Fast and poor
  - Cubic -> Very Good but slow
  - Lanczos -> Very Good but very slow
  - Supersampling -> Very Good when reducing the picture a lot. Slow.
- **Compression Settings** are available for MJPEG and MPEG codecs.
  - For details on the **Mpeg Settings**, please refer to the dedicated section. We recommend using only regular "Format type" in the "Basic Settings" dialog for trouble free operations.
  - **MJPEG** codec: A 100 quality value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20 compression ratio.
- **Audio File Format** determines the type of the generated Media File for audio. If both video and audio are the same type, they are merged inside a single Media File.
- **Word Length** determines audio resolution.
- **Number of Channels** indicates the number of physical outputs fed by audio Layers in the Composition. Audio monitor settings (level & routing) are applied to the rendered audio files. Muted audio Layers aren't included into the render track count.
- **Compression** availability depends of the selected audio file format. QuickTime allows various solutions to compress audio data.
- **Use Audio Card Connection Layout** takes account of the routing to the physical audio output done in the Timeline. This routing may include audio outputs of both video and audio cards.
- **Use Track Number Instead of Audio Card Output Connection** reflect only the number of audio tracks of the Timeline with no reference to the physical outputs.



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, every channel is considered 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 channels file into a stereo mix of the 4 mono channels.

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

MJPEG Compression	
MJPEG Compression Level (Quality)	Average Compression Ratio (Size)
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



Note that previous compression ratio values are only indicative. The MJPEG compression effectiveness may vary with the picture content. The more detail or noise present, the lower the compression ratio achieved.

Supported File Extensions	Direct Playback or Import for Numbered Still Images Sequences	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
.mov	Apple QuickTime	Yes
.mpg	Moving Pictures Experts Group	Yes*

.mpeg	Moving Pictures Experts Group	Yes*
.mxf	the Material eXchange Format	Yes* (D10) Render only
.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
.sd2	Sound designer	Yes



When rendering to produce a MXF media file:

Custom (Media Handler Specific) must be selected in the compression drop list for both video and audio file formats to produce D10/IMX compliant media file. Currently only "Custom (Media Handler Specific)" must be used to produce MXF files.

\* Means optional feature.

## 11.4 Import Images Sequence

**Import Images Sequence** allows a Video Media File to be generated from a still image sequence. **Ctrl + I**



**Import Path** determines the source for images.

**File Format** selects the image format to be imported.

**Export Path** selects the destination of the created Media File.

**File Name** where the Media File is entered.

- **Video File Format** determines the type of the generated Media File for video. Cube, AVI2, QuickTime, MXF, or MPEG2 are possible.
  - When QuickTime and MJPEG codec are chosen, progressive scan must be selected for Fields Order to insure QuickTime player compatibility.
- **Frame Rate** must be set to the frame rate of the Composition where the generated media file is 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**.
- **Width** and **Height** determine the number of pixels used to display the frame.
- **Frame Layout** determines if and how the rendered frames will be interleaved or not.
- **Word Length** is currently limited to 8 bits.
- **Down Sampling** determines the color sub-sampling scheme. 4.2.2 (see Glossary section) is the default value
- **Convert Mode** can be Down or Up convert depending of the picture format selected for rendering.


- Down Convert: Letterbox, Crop or Anamorphic are possible.
- Up Convert: Anamorphic, Pillarbox 4x3, Zoom 14x9, Letterbox or Wide are possible.
- **Resize Quality** allows the user to choose between different methods of computing the image in the desired format.
  - Nearest neighbour -> Fast and poor
  - Linear (Bi Linear) -> Fast and poor
  - Cubic -> Very Good but slow
  - Lanczos -> Very Good but very slow
  - Supersampling -> Very Good when reducing the picture a lot. Slow.
- **Compression Settings** are available for MJPEG and MPEG codecs.
  - For details on the **Mpeg Settings**, please refer to the dedicated section. We recommend using only regular "Format type" in the "Basic Settings" dialog for trouble free operations.
  - **MJPEG** codecA 100 value corresponds to an average 1/3 compression ratio, and a 50 one to an average 1/20 compression ratio.



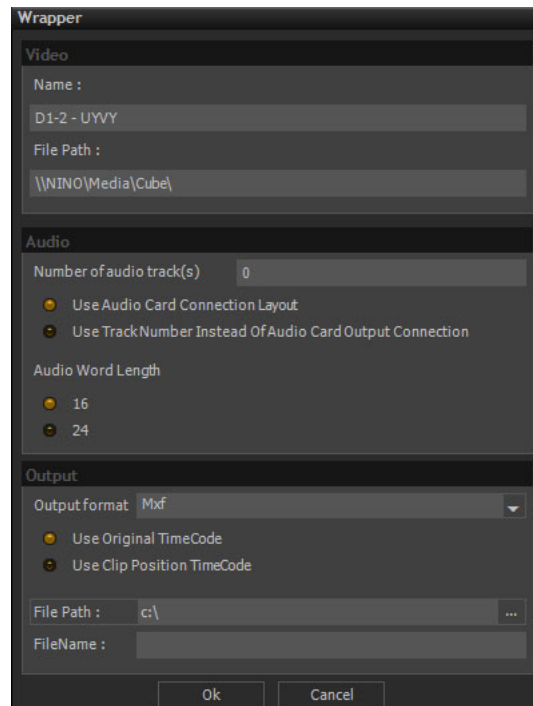
If you need to import a still image (not a sequence) in the Timeline, use **Files: Media Files**. A 5 seconds Clip will be created from a single image. The alpha channel (transparency) is supported.



## 11.5 Media Wrapper

 The Media Wrapper features allows to embed external audio files into a new file without decoding and re-encoding the video of the original file. A new media file embedding audio will be created.

The media files to wrap correspond to the clips (1 video, x audio) selected in the Timeline.



The Media Wrapper generate a new single file from the video and audio tracks into the timeline.

- **Use Audio Card Connection Layout** takes account of the routing to the physical audio output done in the Timeline. This routing may include audio outputs of both video and audio cards.
- **Use Track Number Instead of Audio Card Output Connection** reflect only the number of audio tracks of the Timeline with no reference to the physical outputs.
- **Output Format** must correspond to the original video file format to be wrapped with the new audio tracks. AVI, QuickTime and MXF files can embed audio tracks imported into the Timeline.
- **Use Original TimeCode** keeps the original time stamp of the video file for the wrapped file.
- **Use Clip Position TimeCode** uses the current TimeCode of the video clip into the Timeline for the wrapped file.

The feature allows to create the final media file on the play out server including the finalized audio tracks.

## 11.6 Frame Rate Management

The VCube application can manage different frame rates for Media Files, Composition, and TimeCode.

For Convert or Render processes, VCube uses the current Composition frame rate.

### What happens if the Media Files' frame rate is different from the Composition's frame rate?

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

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

The video engine will playback the Media File preserving its original duration.

The playback duration can be changed if needed by changing the speed of the Clip into the Timeline with a Double-click on the Clip. **Ctrl + W**

Only Composition frame rates of the NTSC family, using a expanded time (one second lasts 1001 mS) need the Clips to be pulled-down to 99.9 % to preserve their original duration. Then the Clip needs to be manually expanded on its layers to reflect its new duration.

### What happens if the Composition's frame rate is different from the incoming TimeCode's frame rate?

The Timeline will display the external and the current Composition frame in the right bottom corner of the Timeline.

The Overlay Settings allow to choose between external or internal (Composition) for Burn In TimeCode.

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



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 Composition produces video drops out on a 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.



If the output of the graphic card is used, the Composition's frame rate doesn't have to match any SD video standard. 24 fps can be used as frame rate for Composition.

Only HD video formats allow film frame rates for Composition on HD video cards.

# 12 Using the QuickTime File Format

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.**

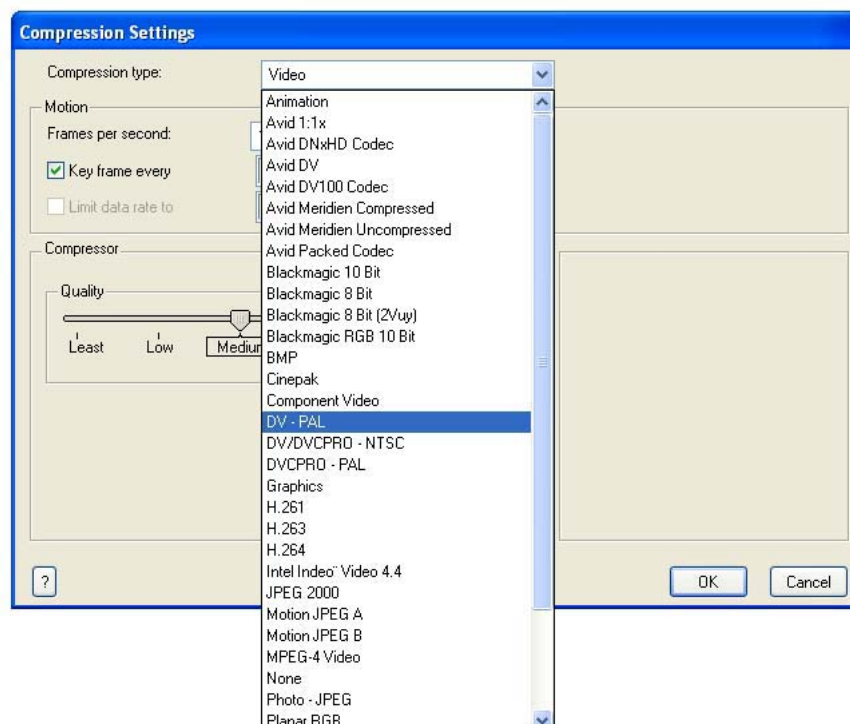
VCube features a complete support of QuickTime for both playback and Record/Render/Convert Media Files.

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

Avid provides such codec at <http://www.avid.com/onlineSupport/supportcontent.asp?browse=&productID=0&contentID=7952>

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

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



**Standard definition recording capable codec for QuickTime:**

- Animation
- Animation JPEG A
- MJJPEG A
- MJPEG B
- BMP
- Component Video
- DV PAL
- DV/DVCPRO NTSC
- DVCPRO PAL
- H 261
- H 263
- Photo JPEG
- Planar RGB
- None
- TGA
- TIFF
- Video



Please refer to the specific codec documentation for particular settings.

Note also that some QuickTime codec are not real time capable for recording or playback (especially third-party codec for QuickTime)

Selecting QuickTime as file format for both video and audio generates a single QuickTime file featuring both video and audio.



When using the H264 codec for rendering or convert, the **Keyframe and Data Rate limitation must be unchecked.**

Please check also that the frame rate reflects the used Composition frame rate.

The VCube also features some codec (DVCPRO / DVCPRO-HD / MJPEG / YUY2) that may also be used to produce QuickTime files. In this case, directly select the desired codec from the record/render/convert panels and double check that the picture format, the field order and the pixel aspect ratio match the specific codec requirements. Otherwise record/render/convert may abort.

# 13 Using the MXF File Format

VCube supports standard definition (NTSC or PAL) MXF file format for playback. Files must be encoded with UYVY, DV, MJPEG, or D-10 codec.

VCube can render or wrap MXF files using only the D-10 codec only. Other codec support is under development.

To render **(Ctrl + R)** a MXF file in VCube:

- Select MXF as file format for both video and audio.
- Select "Custom (Media Handler Specific)" for compression.

The produced file will be encoded with the D-10 codec for both rendering and wrapping

The Media Setting panel allows to choose between IMX 30 and IMX 50 setting for data rate of the generated MXF media files.



VCube can't record both video and audio in the MXF file format. The produced files only feature the video. Audio tracks are silent even if "Custom (Media Handler Specific)" is selected for compression for both video and audio.

# 14 Using the MPEG Codec

**MPEG is both a compression codec and a file format (.mpeg,.mpg)**

## MPEG Types

In this topic we want to give a brief overview of the different MPEG types, which are available as output formats for the Encoder. The glossary 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.

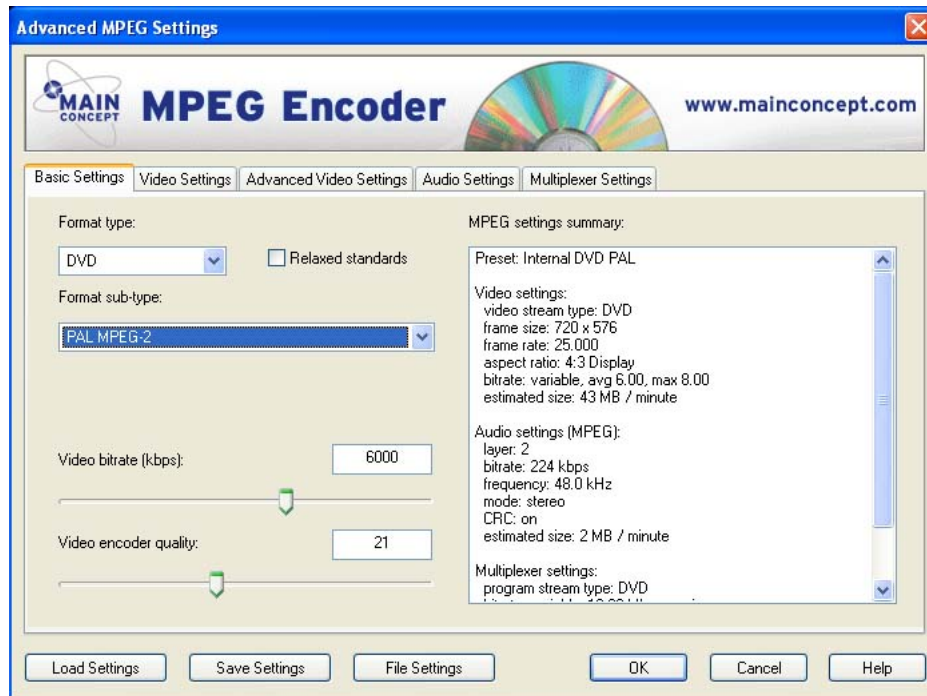
**XDCAM HD** — Is the HD version of the XDCAM IMX. It uses GOP to fit into almost the same bitrate as SD. Embedded AC3 audio isn't supported by VCube for this format.



- Inconsistent settings are highlighted in red in the MPEG settings summary. Render settings or codec settings must be adjusted to match.
- Mpeg settings using long GOP must be avoid to ensure a responsive seeking.
- MJPEG or DV codec must be preferred because of their intra-frame compression

## 14.1 Basic Settings

In this window you can change the settings for standard MPEG encoding depending on use.



This Basic Settings panel is sufficient to allow MPEG2 files complying with the standard to be produced using only the **Format type** and **Format sub-type** combo boxes.

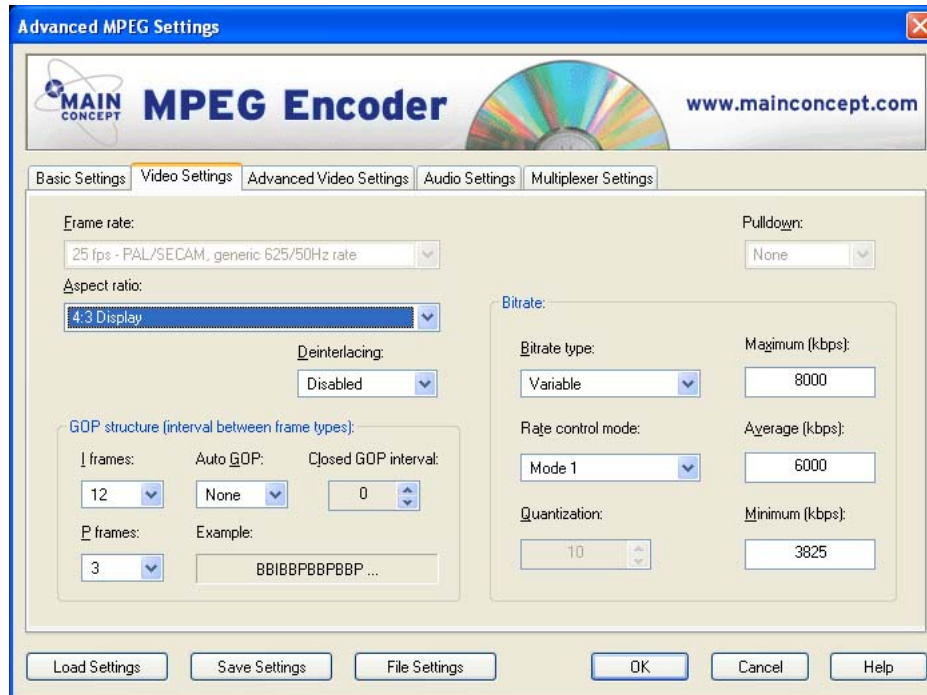
**Video bitrate (kps)** increases the video quality but also the file's size.

**Video encoder quality** increases the video quality but also the encoding duration.



## 14.2 Video Settings

In this window you can change the settings for Frame rate, Aspect ratio and GOP (Group of Pictures) structure. You can also make various adjustments to the bitrate.



Under **Aspect ratio** you have different options:

- Square Pixels: Square resolution (used for PC monitors) 4:3: Standard format (TV)
- 16:9: Widescreen format (16:9 TV, cinema)
- 2.21:1: Aspect ratio

### Pulldown:

The parameters under Pulldown convert 23.976 fps (frames per second) to 29.97 fps, or 24 fps to 30 fps. This should only be done to progressive frame video (like film). The movie studios slow their films from 24 fps to 23.976 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 (Group of Pictures) structure:**

**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 every:** 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 type:**

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.

#### **Rate Control Mode:**

---

Fast: An older mode, not normally used today. Mode 1: Standard mode (recommended)

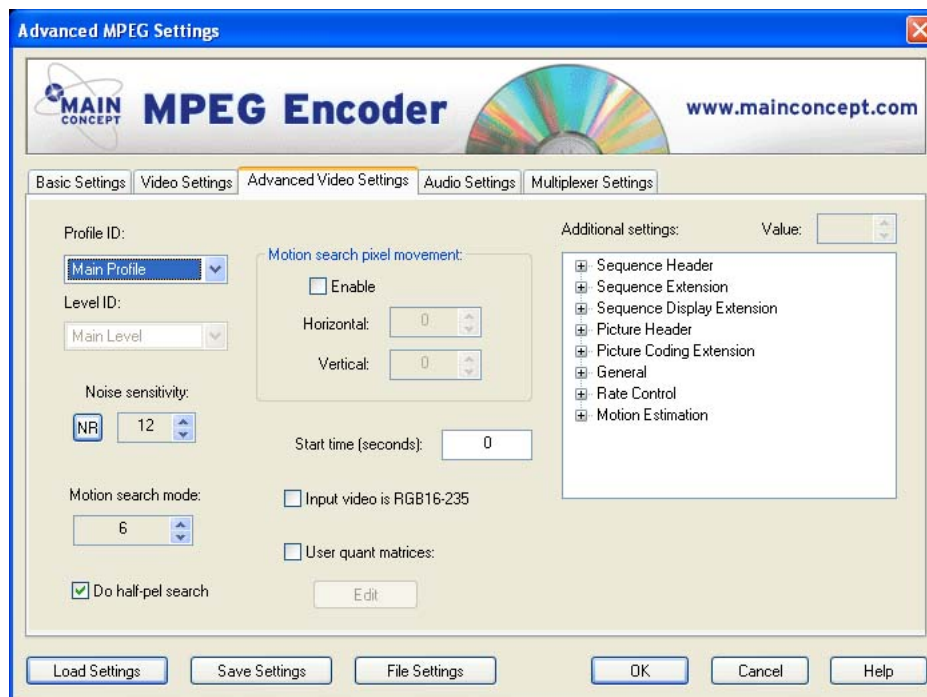
Mode 128: Experimental (will probably cause problems; it should only be used for testing)

**Variable Bitrate:**

The Constant quantization affects the macroblock quantization value, sort of 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. You have to set the average and the minimum bitrate to zero in order to make the Constant quantization option active.

## 14.3 Advanced Video Settings

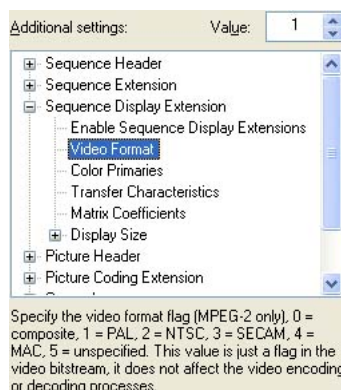
This pane offers professional settings which should not be changed if you are creating MPEG streams for VCD, SVCD or DVD. These adjustments are designed for specific, highly technical environments.



The box on the right side of this pane contains many more parameters for professional users. If you click on an option, details are listed under the box.



**NOTE:** We highly recommend that these changes are only performed by professional users.



We will explain the Advanced Video Settings in detail now:

### Profile ID:

You have five different options here: High Profile, Main Profile (standard setting), Simple Profile, 4:2:2 Profile and Multiview

Profile.

#### Level ID:

You can choose between 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  $2^{14} \times 2^{14}$ . 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  $2^{14} \times 2^{14}$  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:

You switch between the two options by clicking the NR button. Use the controls to define the desired 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 strictly based on the state 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 too 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:

The 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.

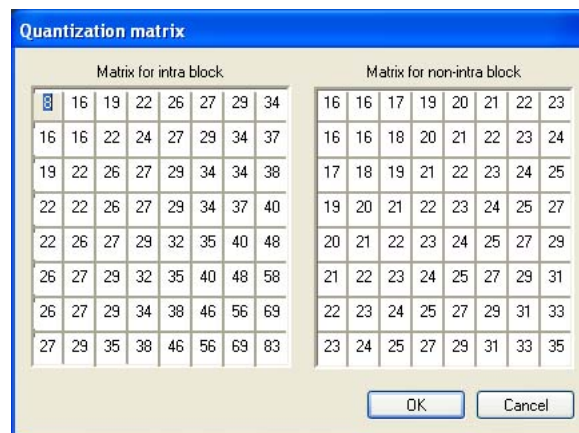
**Input video is RGB 16-235:**

Ticking the checkbox Input video is RGB 16-235, 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 Quantization Matrices:**

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 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 Tree:

Now we want to introduce the various parameters in the Additional Settings tree. 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

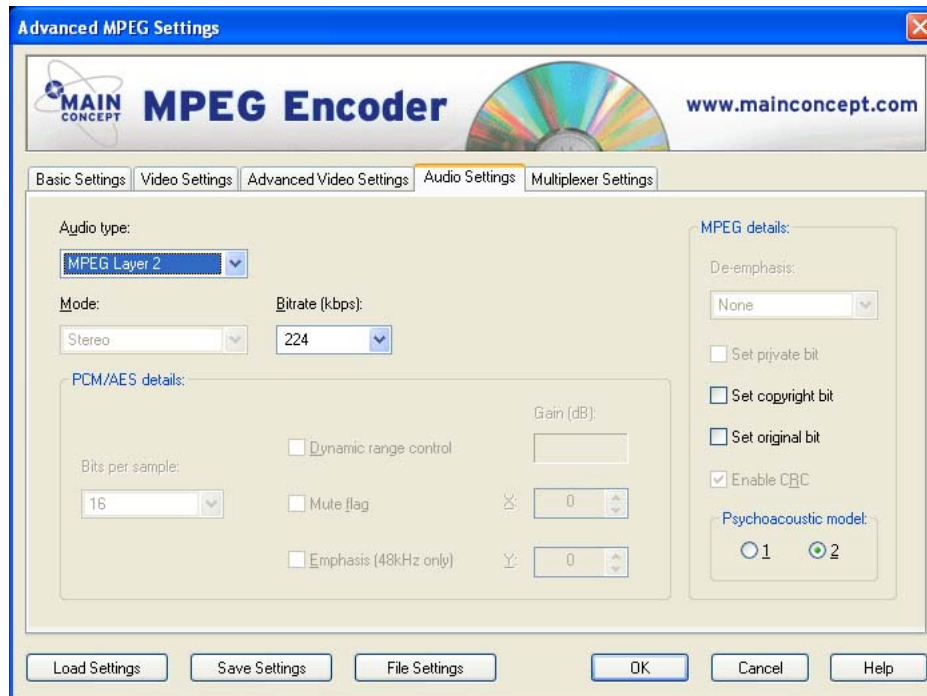
Forward	Horizontal	Vertical	Backward	Horizontal	Vertical
I > B1	10	5	B1 > P	20	10
I > B2	20	10	B2 > P	10	5
I > P	30	15			

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.

## 14.4 Audio Settings

This pane offers professional adjustments for audio export.



The Audio Settings include the following options and parameters:

### Audio type:

None: If you do not want to encode audio, select none here. MPEG-1 Layer 1: Normally not used

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:

Under De-Emphasis you find three options: None, 50/15 uS and 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:**

**Stereo:** Standard stereo

**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 noiselevel".

**PCM:**

**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.

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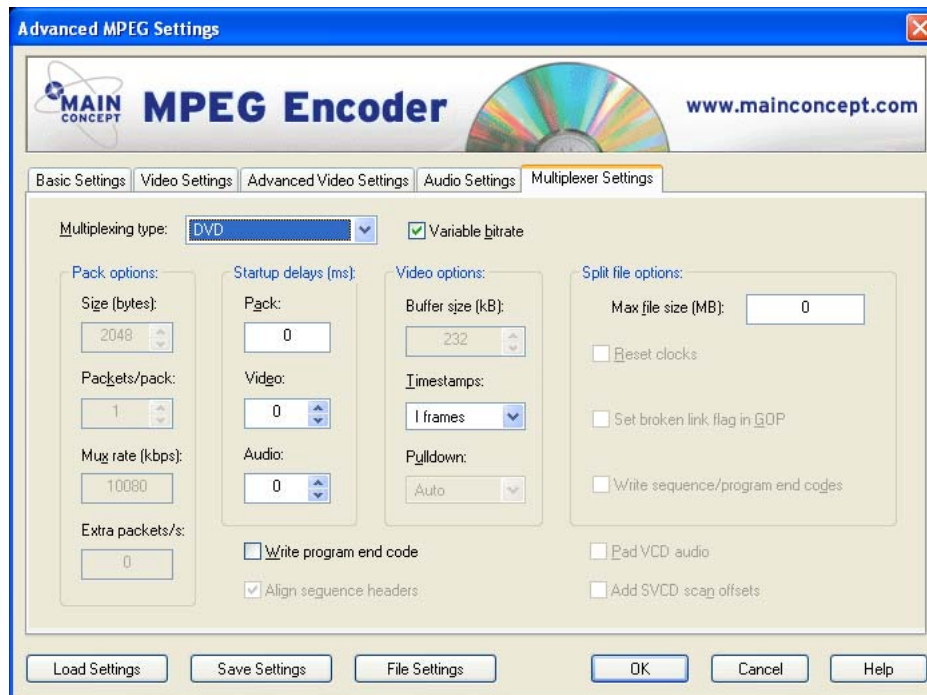
**Dynamic range control:** The option is a recommended gain value which can be applied to all audio samples decoded from the first access unit. Ticking the checkbox enables the the Dynamic range control. The setting does not affect the encoding of the audio at all. It is simply a value decoders may use when playing the audio.

Gain (dB): The Gain value (X and Y) is a recommended gain value to be applied to all audio samples by the player, where:  
 $\text{Gain} = 24.082 - 6.0206 * X - 0.2007 * Y.$

## 14.5 Multiplexer Settings

In this pane 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 pane also offers some more professional settings for muxing.

**This pane is only available when the number of embedded audio tracks exceeds two.**



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 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:

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.

**Startup delays (ms):**

The Pack value specifies the starting TimeCode of the muxed stream (this can be different than the starting TimeCode 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 synchronize 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 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 overflows, 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).

**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.

**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



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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.

# 15 Synchronization

All relevant settings for synchronization are gathered together in **Settings: Formats & Synchro**.

To be synchronized, VCube needs the following signals:

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

There are four ways to feed VCube with TimeCode from other equipment:

- Sony 9 pin protocol (422 serial port). RS-232 on COM1 port is also possible.
- VITC (VCube's Video Reference In BNC connector)
- LTC (VCube's XLR connector)
- Network (Ethernet connector).

Note that the Ethernet connection is also able to feed VCube with an SD stream from a Video Server at the same time.

## What VCube can do:

"Follow VT" mode has been implemented to allow VCube following VT, and Pyramix also, without using the Chase functionality which is slow. It's a kind of build-in internal "Chase Synchronizer" for VCube.

Here are all the possible configurations of the "Follow VT" mode depending of your hardware setup:

## Normal Mode (Regular VCube with Mykerinos):

- VCube is always "Clock Master"
- VCube can Chase on LTC
- VCube can Chase on VITC
- VCube can Chase on Sony 9 Pin Machine
- VCube can Follow VT

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

Clock Master ON:

- VCube can Chase on LTC
- VCube can Chase on Sony 9 Pin Machine
- 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 on Sony 9 Pin Machine
- 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 the clock and time code is given by VT.

**To Help setting up VCube, in SE Mode, now will perform a certain amount of task automatically:**

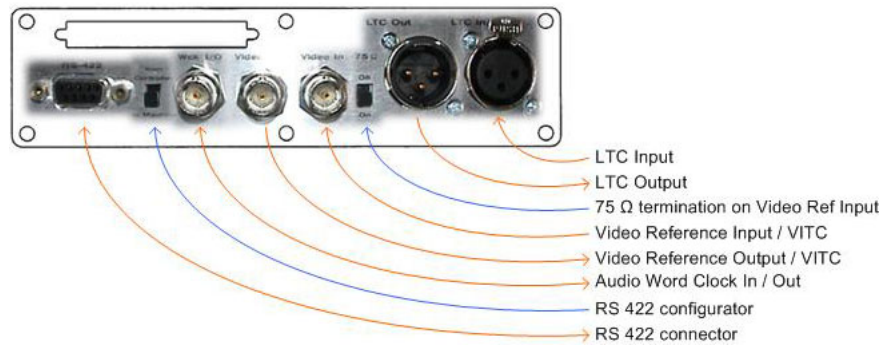
- When enabling "Follow VT" mode, VCube disables the VT "TC Master" and vice versa
- When enabling Chase, VCube will enable "VCube as VT Clock Master"
- When enabling AJA Card or starting with AJA card enabled, VCube will enable "VCube as VT Clock Master" if no Pyramix is detected (running) on the VT instance (on the same computer) and, it will disable "VCube as VT Clock Master" if Pyramix is running (PyraCube Setup)
- When enabling AJA Card or starting with AJA card enabled, VCube will enable "Follow VT" if Pyramix is running on the VT instance (on the same computer for PyraCube Setup)
- When enabling "Follow VT" VCube will make unavailable the Chase function
- When No AJA Card is enabled, VCube will disable the Clock and TC Master capabilities and make unavailable the Chase and will follow VT function.



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\* To guaranty a perfect sync; Mykerinos, AJA and USBSync cards have to be locked on Video Reference.

## 15.1 Connections for synchronization



### RS-422

A switch labelled “To Machine” and “From Controller” helps to configure correctly this port depending on what is connected to.

“To Machine” means that VCube will control an external Machine and “From Controller” means that an external controller will control VCube.

This connection is used by the Sony 9 pin protocol.

COM 3 (COM 2 on early VCubes) is the denomination of this port in settings dialogs of the Sony 9 pin Machine Control and Sony 9 pin Remote Control.

### 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 signal, software controlled directly by VCube. Please, be careful not to connect a word clock to this rear connector and to the breakout cable at the same time.

This new I/O brings a more reliable word clock signal capable of driving longer 75 Ohm cables. It has been tested on cable runs of up to 50 m length.

### Video Reference Out and Video Reference In

A switch enables/disables the 75 Ohms termination for the incoming video signal.



A Video Reference should be present on the Video Reference Input to allow the VCube to generate a VITC output on the Video Ref Output connector.

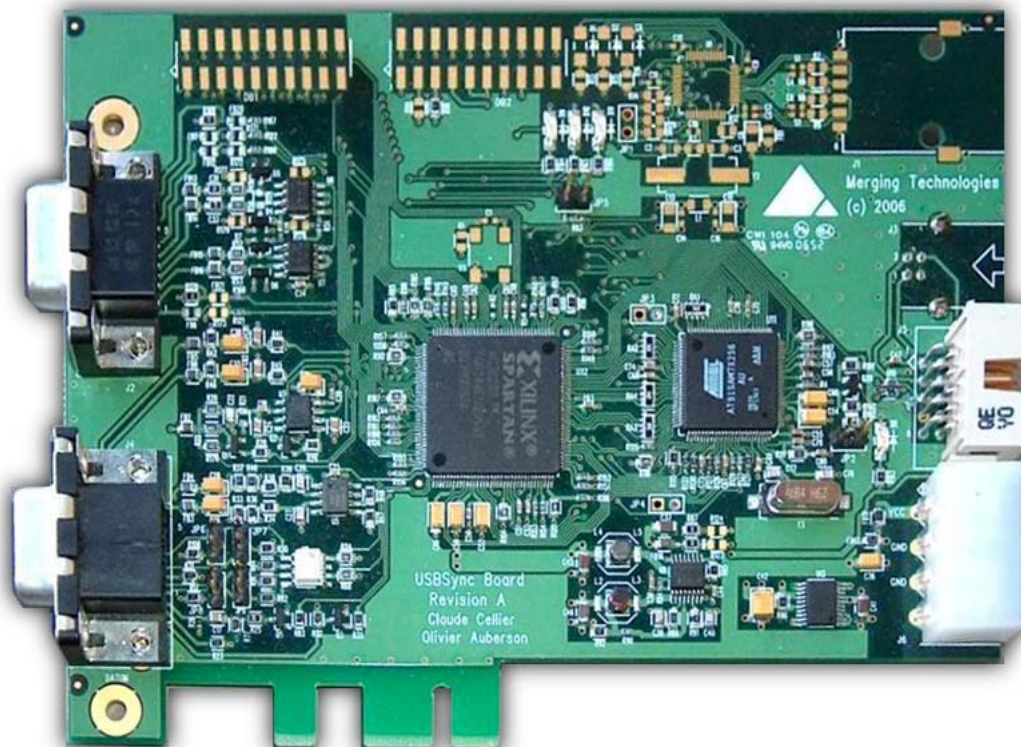
### LTC Out and LTC In

The LTC In accepts balanced signals as well as unbalanced signals. The LTC Out offers a fully balanced output signal, whose gain can be remote controlled by VCube.

## 15.2 The USB Sync Board Option

VCube SE, XE, and LE require a dedicated hardware (PRO Option) to support RS-422, LTC, MIDI or optional Bi Phase synchronization.

This Bi-Phase option is also supported by VCube turnkey systems.



This card can be insert in PCI or PCIe slot. The internal USB ensures the electrical connection to the mother board.

### DB9 connector:

RS422 (Sony 9p)

### DB15 (VGA) on breakout cable:

- 1 x Video reference Input - BNC
- 2 x Biphas I/O (4 connectors) - DIN 5p 180°
- 2 x MIDI I/O - (uses the Biphas connectors)
- 1 x LTC I/O - 2 XLR.

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## 15.2.1 USB Sync Board Installation

The dedicated drivers are installed by the VCube installer.

## 15.2.2 Specific Control Panels

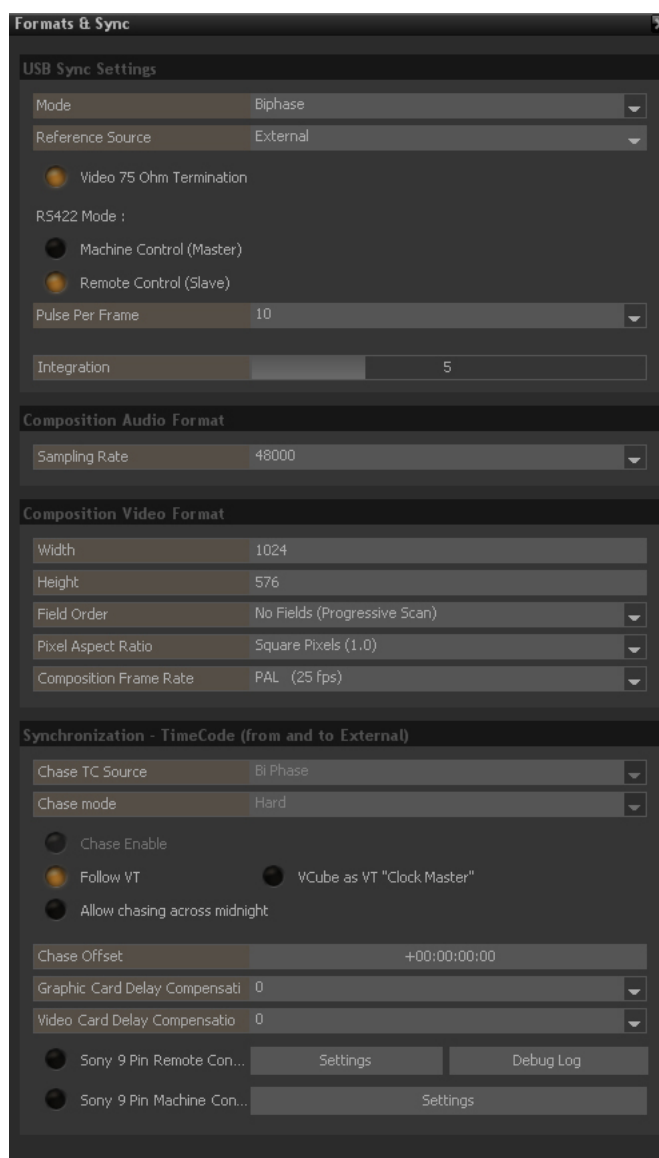
When using the USB Sync Board, many control panels are changing to reflect particular settings for this board.

### Quick SD / HD Settings

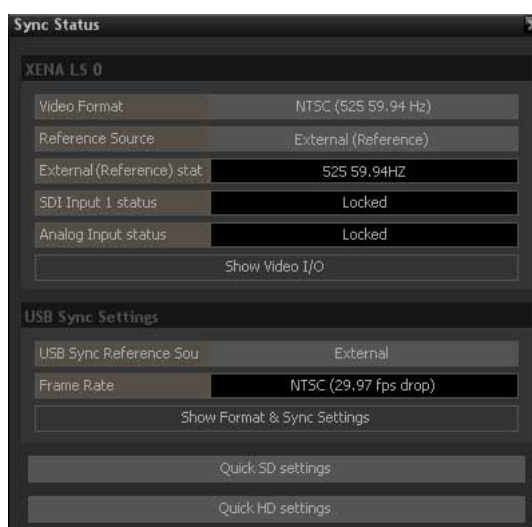


### Formats & Sync





## Sync Status



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**What is allowed by the Sync Board:****Normal Mode (Regular VCube with Mykerinos):**

- VCube is always "Clock Master"
- VCube can Chase on LTC (Mykerinos)
- VCube can Chase on Sony 9 Pin Machine (Mykerinos)
- VCube can Follow VT
- Bi-Phase (USB Sync Board)

**VCube SE with AJA Card and with USB Sync card:**

- Clock Master ON:
- VCube can Chase on LTC (USB Sync Board)
- VCube can Chase on Sony 9 Pin Machine (USB Sync Board)
- VCube can Follow VT ("PyraCube" Setup)
- Bi-Phase (USB Sync Board)

**To Help setting up VCube, in SE Mode, know will perform a certain amount of task automatically:**

- When enabling "Follow VT" mode, VCube disable the VT "TC Master" and vice versa
- When enabling Chase VCube will enable "VCube as VT Clock Master"
- When enabling AJA Card or Starting with AJA card enabled, VCube will enable "VCube as VT Clock Master" if no Pyramix is detected (running) on the VT instance (on the same computer) and disable it if Pyramix is running (PyraCube Setup)
- When enabling AJA Card or Starting with AJA card enabled, VCube will enable "Follow VT" if Pyramix is running on the VT instance (on the same computer) (PyraCube Setup)
- When enabling "Follow VT" VCube will make unavailable the Chase function
- When No AJA Card is enabled VCube will disable the Clock and TC Master capabilities and make unavailable the Chase and follow VT function



\* To guaranty a perfect sync; Mykerinos, AJA and USBSync card has to be locked on Video Reference.

## 15.3 Virtual Transport

**Virtual Transport** Server is the synchronization engine for VCube. It controls clients. Virtual transport brings all transport control and synchronization information to and from any client.

In normal VCube operation you should only use Virtual-Transport to enable a network if needed. All functions of the VCube client can directly be controlled from the VCube software. No network setting is required for VCube SE running on a Pyramix machine.

The Virtual Transport icon appears in the system tray when you launch VCube. Double-clicking on the icon will display the Master Transport bar.

**Alt + V** displays Virtual Transport in VCube. (Useful when the System Tray is hidden by VCube window)



### What is Virtual Transport?

Virtual Transport is a Client-Server architecture, which allows various applications to communicate together through a common interface and to be synchronized to the same TimeCode. The applications can be running on the same machine or over the network on different computers. These processes are transparent for the user and independent of the Client applications locations.

### Virtual Transport design

The heart of Virtual Transport is the **VT Server** Application, from this you can launch and setup **Clients**. The TimeCode format, the **Play Mode** and the **Speed** can also be set from VT server. All programs compatible with VT implement an interface, which enables them to communicate with the main VT Server program. Each machine running VT has its own server application. The server makes the link between client applications so they can communicate together and be synchronized. The server determines whether the client is on the same machine or on a remote computer and sends commands accordingly. Servers communicate through Ethernet. A VT server can work with other VT servers through a network, or in stand-alone mode, only communicating and synchronizing with local client applications.

### Virtual Transport clients

Currently, only a few applications using VT are available. For information about how to use VT inside Pyramix, please refer to the latest Pyramix documentation.

Other applications running under VT are:

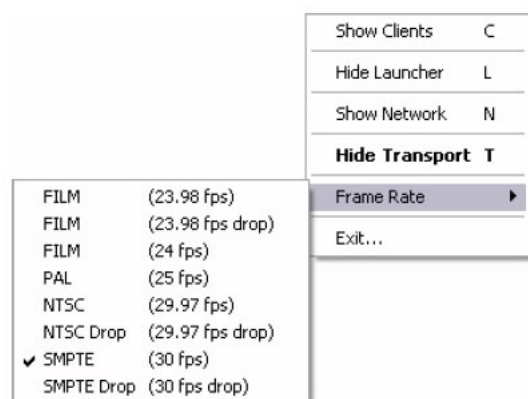
- TC Player is an application that shows the current TimeCode and play mode
- MIDI Sync allows VT to send commands and TimeCodes to a MIDI device
- Pyramix client
- VCube client ...

### Context Menu

Right-clicking anywhere on the Main Window opens the main popup menu. Right-clicking on the Task Bar icon has the same effect. From here the following actions can be initiated:

The functions toggle between Show and Hide E.g. if the Launcher Frame is already visible, the menu will offer Hide Launcher.

- **Show Clients** displays the **Clients** Frame.
- **Show Launcher** displays the **Launcher** view.
- **Show Network** displays the Network view.
- **Hide Transport** hides the **VirtualTransport** main window.
- **Select Frame Rate**, leads to the sub-menu as seen in the next picture.
- **Exit** exits VirtualTransport.



Frame Rate set sub-menu pop-up



Apart from providing all the transport settings common to VT clients, the VCube client offers Track Arming commands reflecting the number of tracks currently available in the VCube edit window. It is also possible to set VCube into Record Mode in the Client frame.

Typically VCube should act as the Clock Master and this can be set either here in the Client frame or in the VCube Application in the **Settings : Formats & Sync (Alt + P)**

**Audio Ref Status:** Video Input must be selected for both Audio Ref and TC Clock Ref

The previous panel isn't available for VCube SE that uses the video card reference signal

**Synchronization -TimeCode :** Virtual Transport must be selected as Chase TC Source and the Chase button must be

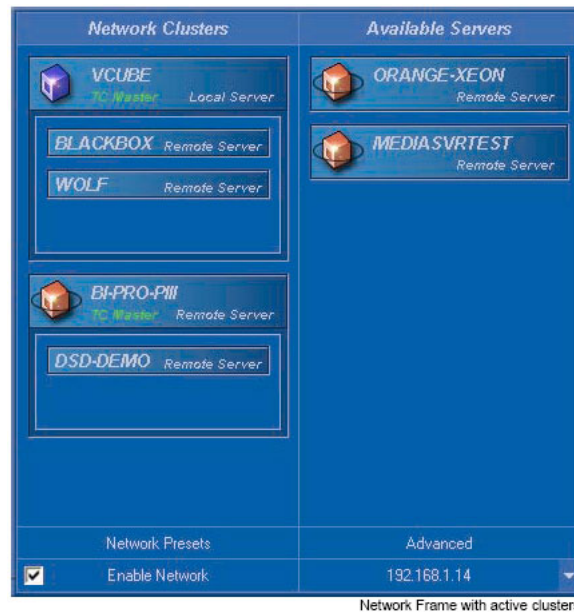


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engaged.

This can also be done from the Vcube Transport Panel (T) by enabling the Chase button

## 15.3.1 Network



Network Frame with active clusters

The Network Setup Frame allows you to configure how VT Servers running on machines on the local network will interact. They can be setup to run in stand-alone mode by disabling the network. This is the default configuration.

When working together with the other VT Servers on the local network, you can configure each server to be a **TC Master**, a **Slave** or as the **Available Servers**. This is achieved by dragging machines between the Available Server Window on the right side, to the **Network Clusters** Window on the left. Dragging a server into another one will create a cluster, where the "container" server will act as TC Master and the contained Server will be slave. A TC Master Server can have many Slaves, but a Slave can have only one Master. An Available Server acts like a Server without the network enabled. As seen in figures below, more than one cluster can be created.

When a change of **Play Mode** or **Speed** is made on a Client or a Server of the Cluster, all Clients and Servers in this Cluster are affected by this change. Servers and Clients outside the Cluster are not affected by the changes.

The settings current before the application is quit are saved and restored the next time you launch the program.

At the bottom of the frame, on the left-hand side, a check box allows the network to be activated. When this check box is disabled, the Server runs in stand-alone mode and communicates only with the Clients on the local machine.

At the bottom of the frame, on the right-hand side, there is a combo box that allows the user to choose an IP address on a computer with multiple IP addresses. If the machine has only one IP address, this address is selected by default and no other choice is available. This address is used only when the network is enabled. If you change the IP address while the network is enabled, this will disable the network for a short time and enable it again. This will cause the loss of the current network configuration.

The state of the network (enabled or disabled) and the IP address of the computer are saved on exit and restored on start-up.



Network settings and information boxes

Above the **Enable Network** box, there is a **Network Presets** button. This button calls the **Network Configuration Preset** window.



Preset Configuration dialog

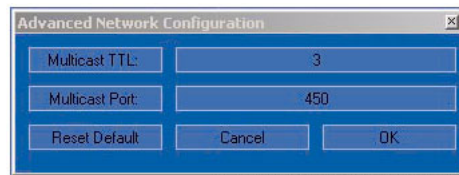
At the top, a multi-choice combo box displays the current preset name. If the preset list is not empty you can click at the right to expand it and select a desired preset. After an existing preset has been selected, clicking on the Load button activates it.

Clicking on **New Config** creates a new preset. This opens a new window where a name can be set for the new preset. Choices have to be confirmed or cancelled. If confirmed, the new preset is added to the preset list and the name is displayed.

When editing an existing preset, clicking the **Store** button will save the latest changes. Clicking on the **Suppress** button (Protected by an "are you sure?" dialog) will suppress the current loaded preset. Clicking on the **Close** button will close the network configuration window.

The **Network Presets** button is deactivated when the network is disabled.

Above the IP Address box is an **Advanced button**. This button calls the **Advanced Network Configuration** window.



Advanced Network Configuration dialog

The **Advanced Network** Setup Frame enables you to choose the TTL value of the multicast messages used to find every VT Server running on the network. A value of 1 or 2 typically allows every VT Server running on the same local area network (LAN) to see each other. The multicast port can also be set. This allows you to set this VT Server to work without seeing another VT Server using a different multicast port.



It is possible to isolate a couple or a group of merging Working Stations (Pyramix or VCube) to allow communications between some of them or to forbid this communication.

To do so, the following registry key must be entered:

**HKEY\_LOCAL\_MACHINE\SOFTWARE\Merging Technologies\VT1\Server\Network\McastAddr = "xxx.xxx.xxx.xxx"**

Each group must own a different IP address. This address must be included in the range from 224.0.0.0 to 239.255.255.255

Typically 227.0.0.1 for machines of studio 1, and 227.0.0.2 for machines of the studio 2 and so one.

Virtual Transport must be restarted after this changing.

**This is especially useful long IP scanning, when a lot of working stations are connected on the same network.**

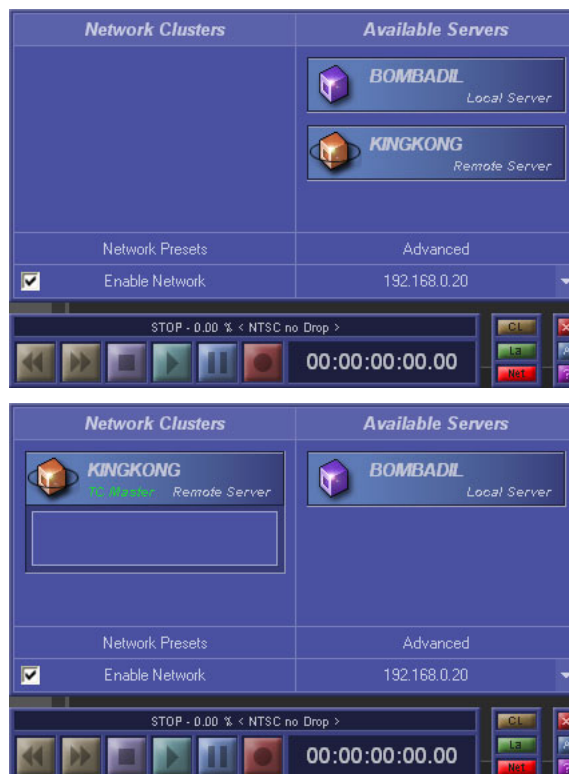
## 15.4 VCube Chasing Pyramix through Virtual Transport.

VCube can chase a Pyramix through Virtual Transport. It's the **Follow VT** mode.

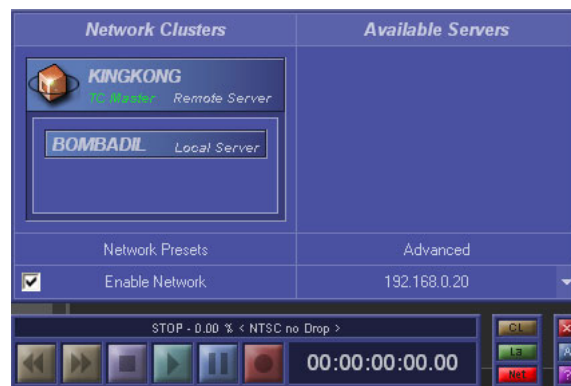
Every Clip handle move in Pyramix will be visible in the VCube outputs. The displayed frame is at the TC position of the handle moved in Pyramix. Network must be enabled in Virtual-Transport. No network setting is required for VCube SE running on a Pyramix machine.

**Alt + V** accesses Virtual-Transport. Then activate the red net button, enable network and create a network cluster. Just drag the workstations from one column to another as described below.

KINGKONG is the name of the Pyramix workstation, and BOMBADIL is the name of the VCube workstation.

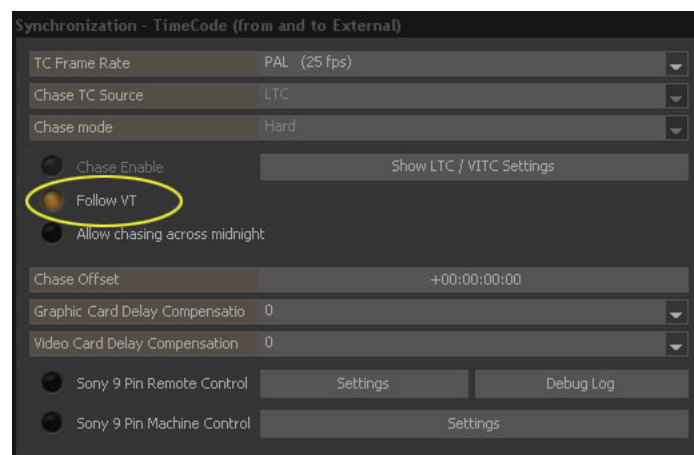






In **Settings: Formats & Sync**, configure the control panel as below.

Note that Virtual-Transport is a protocol (send / return) between two machines or applications, chase need not to be enabled to be effective.



Edit in VCube can be linked with edit in a Pyramix with Virtual-Transport (TCP/IP connection). To synchronize editing, you just have to enable the **Auto Ripple Mode (!)** in Pyramix' **Edit** menu. A cut or a paste edited in Pyramix will be reflected in VCube's Timeline.

Synchronization with Pyramix Editing should be enabled (**Edit: Main > Synchronize Editing With PYRAMIX**).



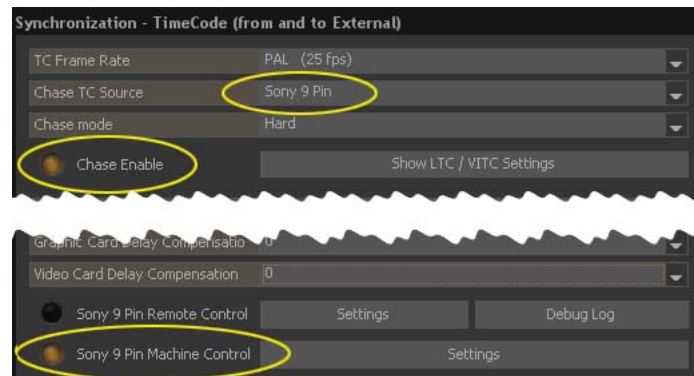
If VCube SE is running on a Pyramix machine, the **Slave to VT Mode** must be selected from the Settings menu.

## 15.5 VCube Controlling & Chasing a Sony 9-pin

VCube can remote control a Sony 9-pin compatible device and chase it through RS-422 or RS-232.

This configuration can also be used during capture.

In **Settings: Formats & Sync**, configure the control panel as below.



The RS-422 configurator switch must be set to "To Machine" if you use this port. This port is named COM3 in settings specific panel. This port is named COM2 in settings specific panel for early VCubes featuring an ASUS mother board.

The RS-232 port is named COM1

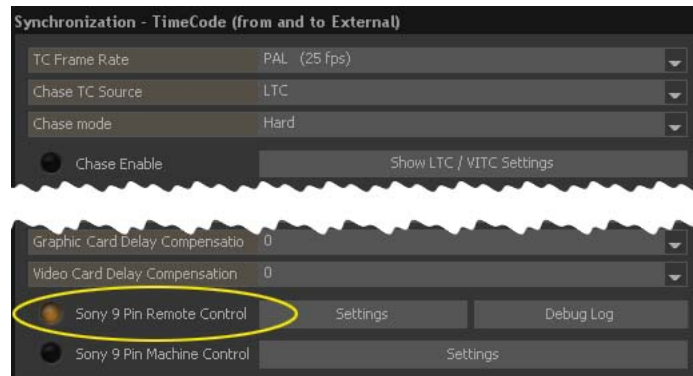


From the VCube you can control from the VCube keyboard the transport of the Sony 9 pin compatible device while the VCube is chasing it.

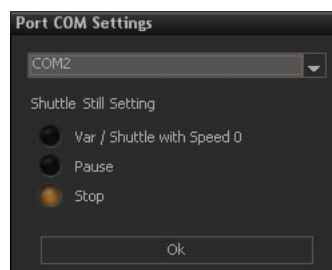
## 15.6 Remote Control VCube with a Sony 9-pin Controller

VCube can be remote controlled by a Sony 9-pin compatible device.

In **Settings: Formats & Sync**, configure the control panel as below.



Sony 9-pin Remote control must also be set as below. By default the Serial Port should be set to COM3. This port is named COM2 in settings specific panel for early VCubes featuring an ASUS mother board. **Stop** empties audio buffers. **Pause** keeps audio data in buffers



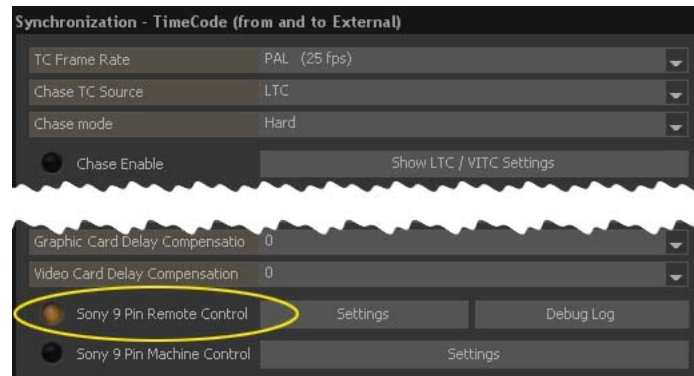
The RS-422 configurator switch must be set to "From Controller" if you use this port.

In this configuration, Video and Audio References can be used or not.

## 15.7 Synchronizing VCube to a Sony 9-pin Chase Synchronizer

VCube can chase a Sony 9-pin Chase Synchronizer.

In **Settings: Formats & Sync**, configure the control panel as below.



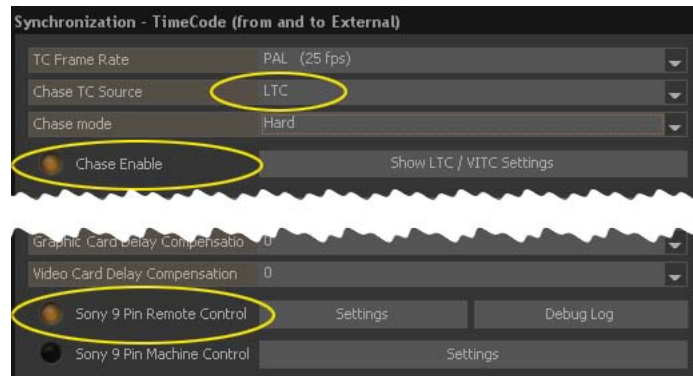
The RS-422 configurator switch must be set to "From Controller" if you use this port.

In this configuration, an Audio Reference and a Video Reference should be used. Both Video Reference or WordClock are possible for Audio.

## 15.8 VCube Controlled by Sony 9-pin, Chasing a LTC

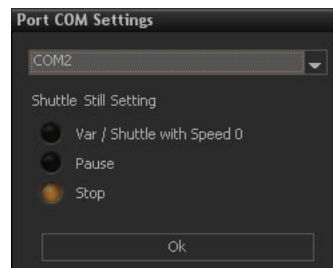
VCube can be controlled by Sony 9-pin while chasing an LTC.

In **Settings: Formats & Sync**, configure the control panel as below.



Sony 9-pin Remote control must also be set as below. The **Serial Port** must be set to COM3. This port is named COM2 in settings specific panel for early VCubes featuring an ASUS mother board.

The RS-422 configurator switch must be set to "From Controller" if you use this port.



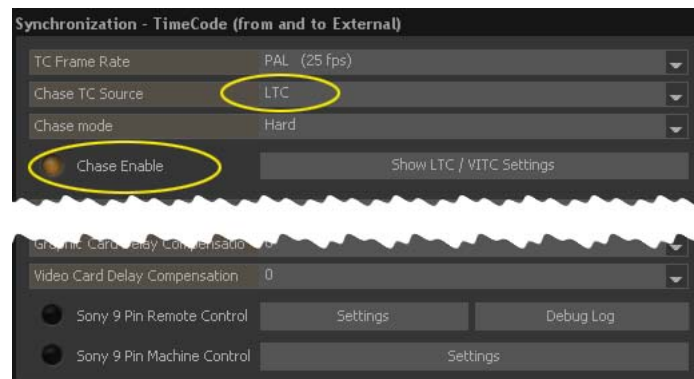
**Stop** empties audio buffers. **Pause** keeps audio data in buffers.

In this configuration, Video and Audio References can be used or not.

## 15.9 Synchronize VCube with a LTC

VCube can chase a LTC.

In **Settings: Formats & Sync**, configure the control panel as below.



or from the Transport Panel T

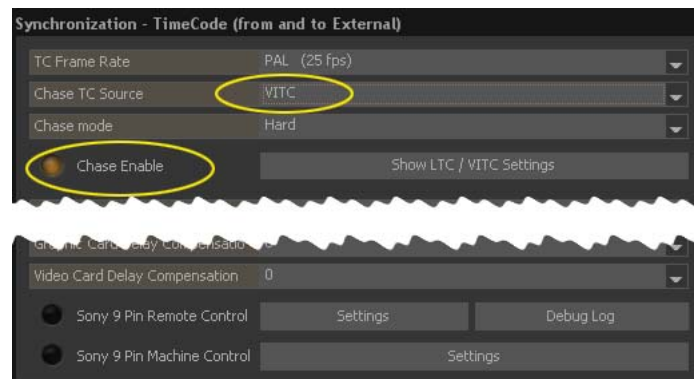


In this configuration, Video and Audio References can be used or not.

## 15.10 Synchronize VCube with a VITC

VCube can chase a VITC.

In **Settings: Formats & Sync**, configure the control panel as below.



or from the Transport Panel T



In this configuration, Video and Audio References can be used or not.

# 16 Audio

**Audio** Tracks and Layers are integral parts of a VCube Composition. The number of audio tracks or audio Layers in a Composition is unlimited.

Unlike Video Tracks or Video Layers, Audio Tracks and Audio Layers will be created in the Timeline from the top to the bottom.

VCube can playback 8, 16, 20, 24, 32 bit audio files. Only 16, 24, 32 bit are possible for capture. Possible sampling rates are 44 KHz and 48 KHz.

For audio capture and playback, an optional DUAL daughter card is available from Merging technologies. This card has 2 phantom powered mic/line inputs + 2 analog line inputs, 4 line outputs at +4dBv, and 8 digital AES/EBU I/O. The VCube manages those 4 analog inputs as regular +4 dB line inputs. AES/EBU channels are only available for playback.

Audio capture and playback are also possible from the SDI Video cards. 6 SDI embedded, 2 AES and 2 analog (Xena LS/LH only) audio channels are available if this option is present. The track arming for embedded SDI audio is only available when video track arming is enabled and the SDI video input selected.

Audio monitoring is available on the mini-jack plug of the Mykerinos card even without the optional DUAL daughter card. Video card audio channels are not available for monitoring on the Merging Technologies' audio card. Audio channels of the video card can only be monitored during capture through the corresponding audio outputs of the video card.

There are 3 different ways for clocking AES/EBU I/O:

1. VCube is Master (Audio Ref = Internal) and converters or a digital console must be locked to the AES/EBU output of VCube
2. The AES/EBU I/O can be clocked by external converters or a digital console. Audio Ref of VCube must be set to "Audio Input". The AES/EBU input of the dual card must be connected to the AES/EBU output of converters or digital console.
3. A single Word Clock can be used for all digital devices. Audio Ref of VCube must be set to "Word Clock Input"



- The Composition sampling rate must be set to 48 KHz when video cards' audio channels are used to capture or playback audio.
- During capture the monitoring must be done from the card where audio inputs are connected.



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## 16.1 Audio Track

An **Audio Track** can count from one to n Layers.

**Solo**, **Mute** and **Lock** can be applied to a track.

Since a track can include many Layers, a mute or lock action can be applied to many Layers.

The number of audio tracks is unlimited.

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## 16.2 Audio Layer

An Audio Layer is a part of an audio track.

**Solo**, **Mute**, **Level** and **Lock** can be applied to a Layer. Like video layer, it can be named, but has to be routed to VCube physical audio outputs. The number of outputs used is reflected in the render settings dialog. This number is also the number of rendered audio tracks.

Audio Layer headers feature routing to physical audio outputs. The number of audio Layers is unlimited.

Audio Layer headers also feature a level control. It's only available during playback. When in record the audio monitor is set to 0 dB.

**Ctrl + level control** constrains the level control to 6 dB increments.

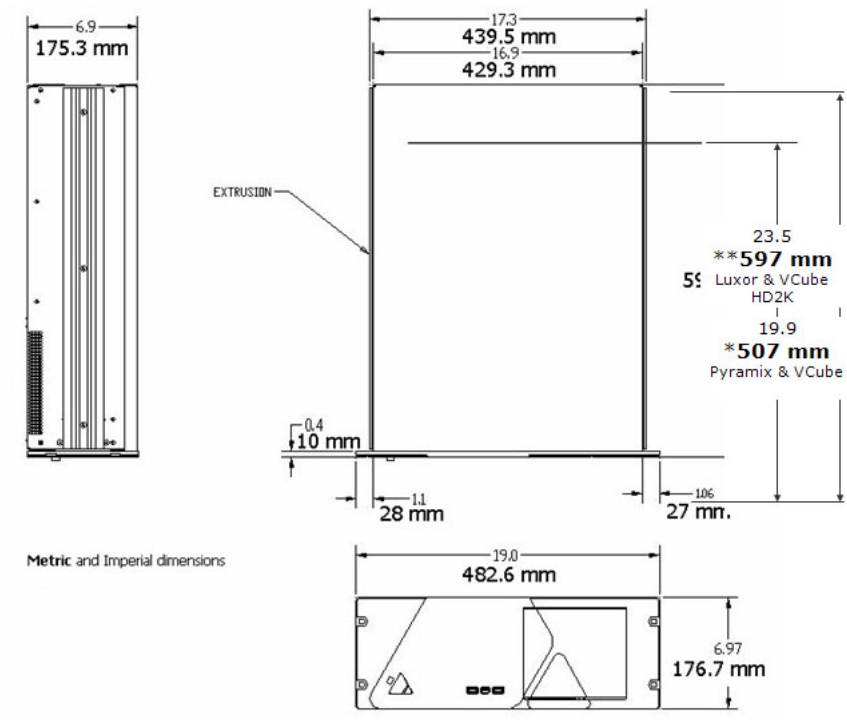
**Double-click** on the level control sets it to 0 dB.

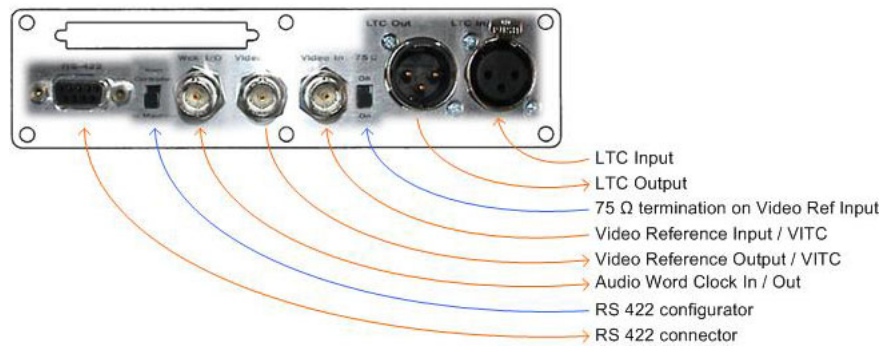
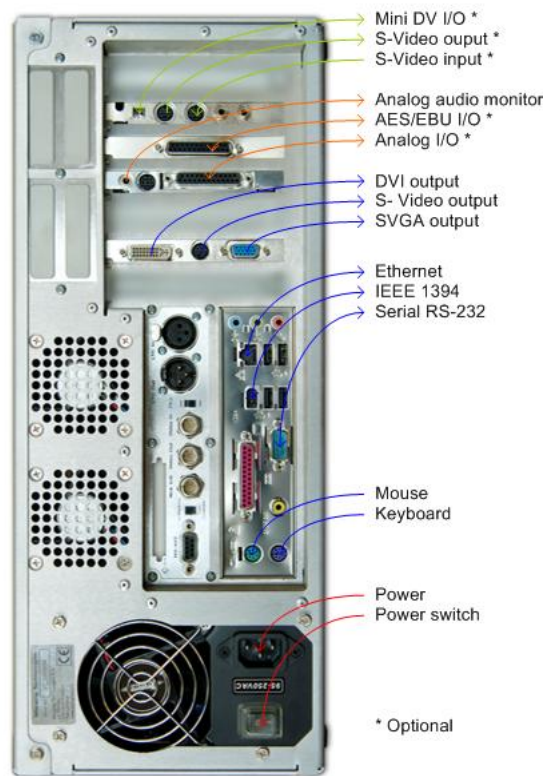
All previous settings are applied to the render process.



AES, analog (when available) or SDI audio channels of the video card can only be monitored through video card's respective audio outputs during recording.

# 17 Hardware



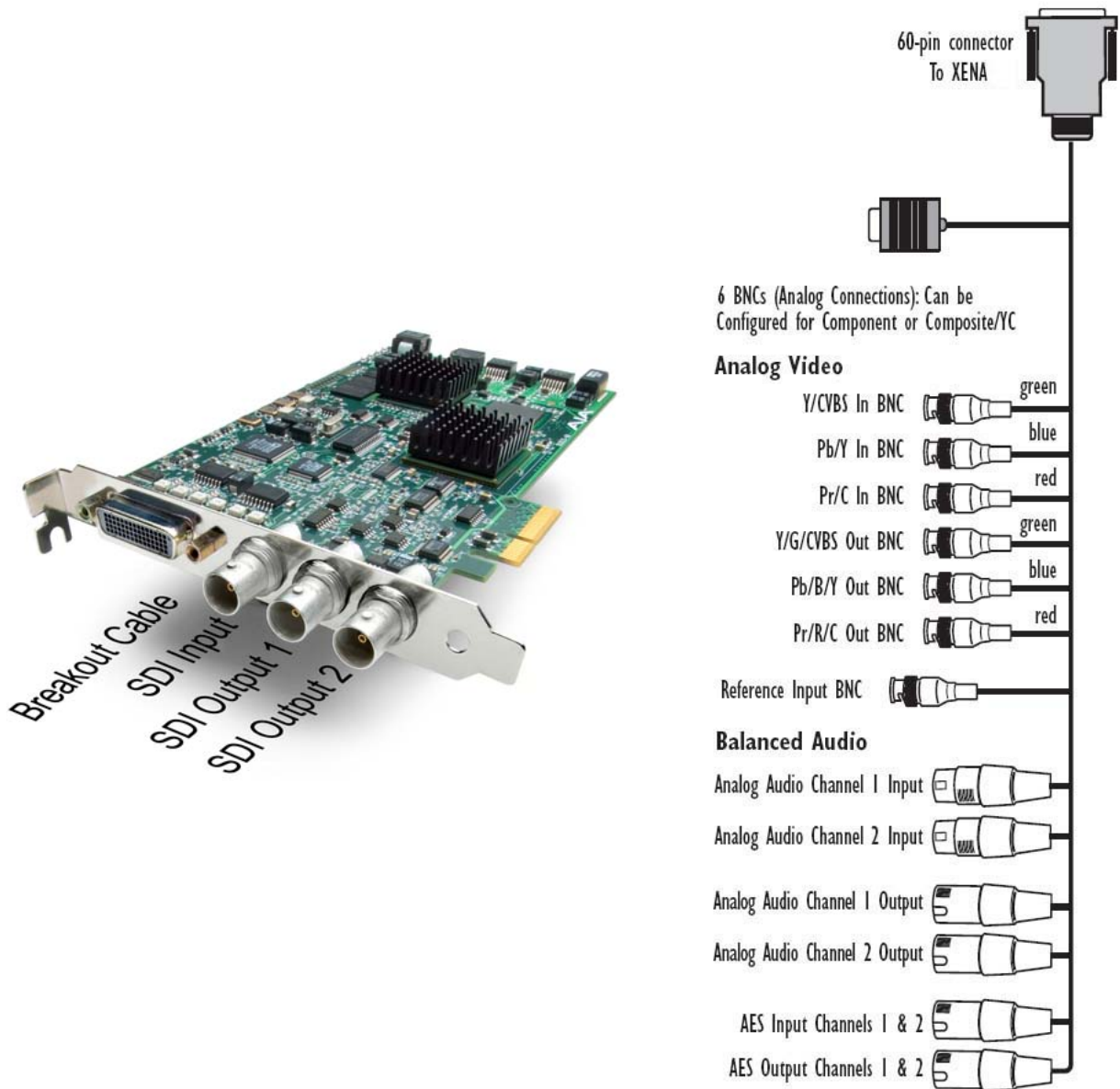


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## 17.1 Video Cards

## 17.1.1 SD-SDI/Analog Xena LSe



- 1 Input + 2 Outputs
- PAL and NTSC complying to SMPTE 259M (SDI)
- Genlock (BNC)
- Component/Composite/S Video Input (3x BNC)
- Component/Composite/S Video Output (3x BNC)
- Balanced Audio In (2x 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)

### Supported SD Video Formats



The SDI embedded audio is not available for capture if the analog video input is selected for recording.



The video card video reference input isn't internally connected to the synchronization video reference input. Both need to be fed by the same video reference signal.

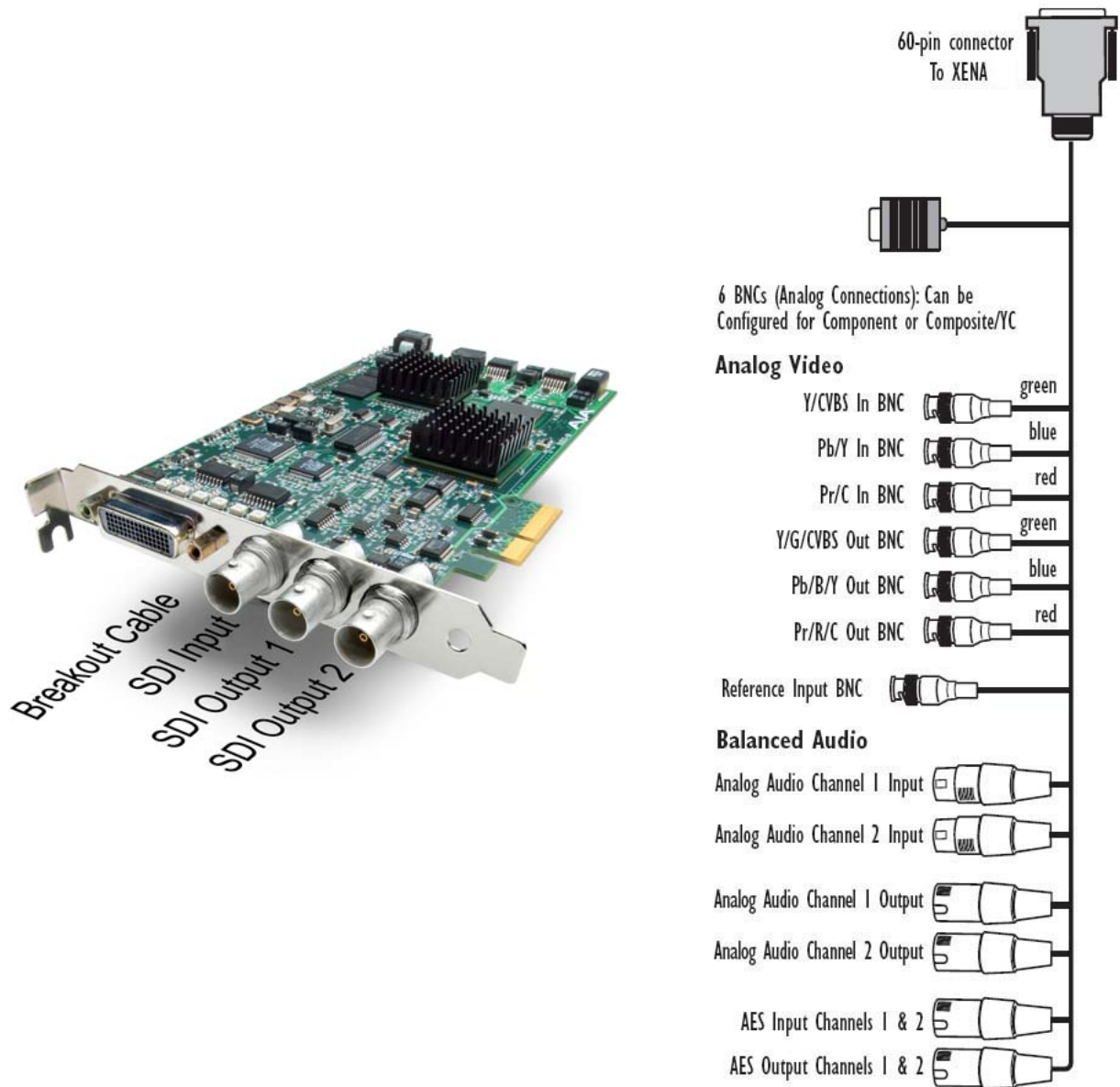
### Reference Input (video card):

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.



- The composition sampling rate must be set to 48 KHz when video cards' audio channels are used to capture or playback audio.

## 17.1.2 SD/HD-SDI/Analog XenaLHe



- 1 SDI Input + 2 SDI Outputs PAL, NTSC, HD complying to SMPTE 259/292/296
- Genlock (BNC)
- Analog Input (3x BNC) Component (HD/SD)/Composite (SD)/S Video (SD)
- Analog Output (3x BNC) Component (HD/SD)/Composite (SD)/S Video (SD)
- Balanced Audio In (2x XLR)
- Balanced Audio Out (2x XLR)



- 6 channels 24 Bit/48Khz of embedded audio (SDI)
- 2 AES audio channels

### Supported SD Video Formats

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

### Supported HD Video Formats

720p
720p 50.00 Hz
720p 59.94 Hz
720p 60.00 Hz
1080i
1080i 50.00 Hz
1080i 59.94 Hz
1080i 60.00 Hz
1080p sf
1080p sf 23.98 Hz
1080p sf 24.00 Hz
1080p
1080p 23.98 Hz
1080p 24.00 Hz
1080p 25.00 Hz
1080p 29.97 Hz
1080p 30.00 Hz



SDI embedded audio and Merging Technologies' audio option cannot be used at the same time to capture audio. The SDI embedded audio is not available for capture if the analog video input is selected for recording.



The video card video reference input isn't internally connected to the synchronization video reference input. Both need 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 “color black.”

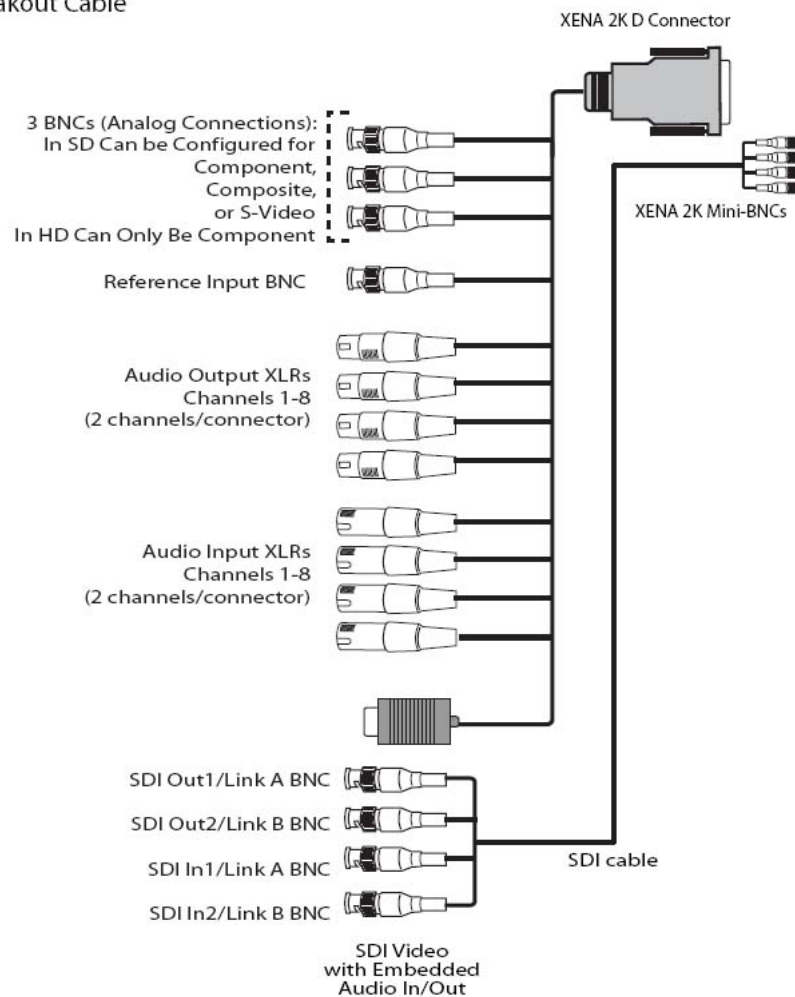


- The composition sampling rate must be set to 48 KHz when video cards' audio channels are used to capture or playback audio.
- During capture the monitoring must be done from the card where audio inputs are connected.

### 17.1.3 Xena 2Ke



## 2K/2Ke Breakout Cable



- 2 Inputs + 2 Outputs (only one video signal for 4:4:4\*)
- PAL and NTSC complying to SMPTE 259M (SDI) / 1080i 50>59.94>60, 1080p 23.98>24, complying with SMPTE 292/296 and SMPTE 372M
- 720p 50, 59.94, 60 fps
- Genlock
- 8 channels 24 Bit/48Khz of embedded audio (SDI).
- PCI-Express x4
- 4:4:4\*

### Supported SD Video Formats



## Supported HD Video Formats



The video card audio channels and Merging Technologies' audio option cannot be used at the same time to capture audio. VCube does not use the RS-422 connector on the cable (yet).



The video card video reference input isn't internally connected to the synchronization video reference input. Both need 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 HD reference, use Tri-level Sync as defined in SMPTE 274M. For 1080 modes only, you may also use analog 525 or 625 “color black.”

This card needs a HD 2K VCube because of the PCI-Express architecture. SD or early HD VCube cannot be updated with this card.

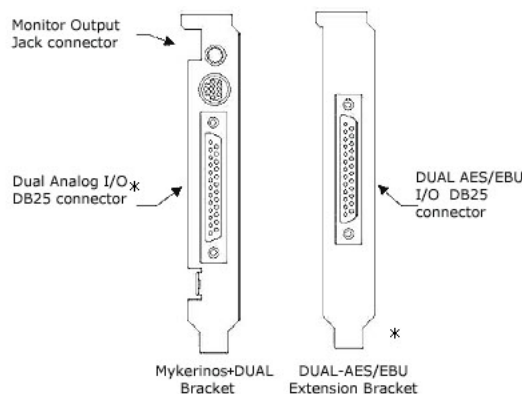


- The composition sampling rate must be set to 48 KHz when video cards' audio channels are used to capture or playback audio.
- During capture the monitoring must be done from the card where audio inputs are connected.

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## 17.2 Merging Technologies Cards

## 17.2.1 DUAL I/O



Up to 12 inputs and 12 outputs on a single board:

- 4 CH Analog Line inputs
- 4 CH Analog Line outputs
- 8 CH AES/EBU inputs
- 8 CH AES/EBU outputs

For connection to XLR there are optional DB-25 to XLR octal break-out cables available.

High common mode rejection balanced input circuitry on all analog inputs, for optimum rejection of power line hum, RF interference, voltage drops and other externally generated noise commonly encountered with long audio cable runs.

High quality balanced output circuitry on all analog outputs, for maximum output / signal balance ratio performance, even under adverse asymmetrical loads.

Support for sampling rates 32 kHz, 44.1 kHz or 48 kHz. (48Khz in capture)

High quality 24 bit A/D and D/A using the latest generation converter technology.



The Monitor Output can be used as an audio output even without the additional DUAL audio option.

AES, analog (when available) or SDI audio channels of the video card can only be monitored through video card's respective audio outputs during recording.

There are 3 different ways of clocking AES/EBU I/O:

1. VCube is Master (Audio Ref = Internal) and external converters or a digital console must be locked to the AES/EBU output of VCube
2. The AES/EBU I/O can be clocked by external converters or a digital console. Audio Ref of VCube must be set to "Audio Input". The AES/EBU input of the dual card must be connected to the AES/EBU output of external converters or a digital



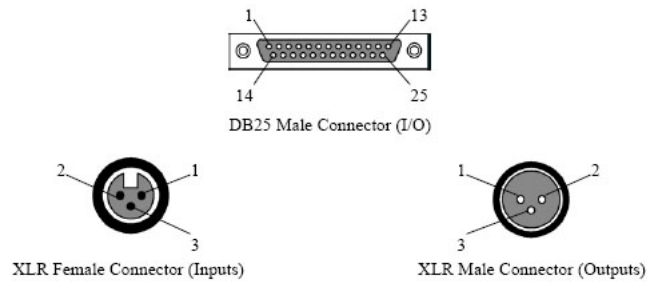
console.

3. A single Word Clock can be used for all digital devices. VCube Audio Ref must be set to "Word Clock Input"



Those DB25 to XLR breakout cables must be ordered separately.

### Breakout cables connectors



### Analog I/O breakout cable

XLR Label	XLR Color	Signal	XLR-F	DB25-M	XLR Label	Cable Color	Signal	XLR-M	DB25-M
ANALOG IN 1	BROWN	AGND	1	9	ANALOG OUT 1	GREEN	AGND	1	5
		AIN1	2	13			AOUT	2	1
		AIN1	3	25			AOUT	3	14
ANALOG IN 2	RED	AGND	1	21	ANALOG OUT 2	BLUE	AGND	1	18
		AIN2	2	12			AOUT	2	2
		AIN2	3	24			AOUT	3	15
ANALOG IN 3	ORANGE	AGND	1	8	ANALOG OUT 3	PURPLE	AGND	1	6
		AIN3	2	11			AOUT	2	3
		AIN3	3	23			AOUT	3	16
ANALOG IN 4	YELLOW	AGND	1	20	ANALOG OUT 4	GRAY	AGND	1	19
		AIN4	2	10			AOUT	2	4
		AIN4	3	22			AOUT	3	17

Note: The DB25 pin 7 is connected to AGND.

### AES/EBU I/O breakout cable

XLR Label	XLR Color	Signal	XLR-F	DB25-M	XLR Label	XLR Color	Signal	XLR-M	DB25-M
AES/EBU IN 1/2	BROWN	DGND	1	9	AES/EBU OUT 1/2	GREEN	DGND	1	5
		DIN1/2+	2	13			DOUT1/2+	2	1
		DIN1/2-	3	25			DOUT1/2-	3	14
AES/EBU IN 3/4	RED	DGND	1	21	AES/EBU OUT 3/4	BLUE	DGND	1	18
		DIN3/4+	2	12			DOUT3/4+	2	2
		DIN3/4-	3	24			DOUT3/4-	3	15
AES/EBU IN 5/6	ORANGE	DGND	1	8	AES/EBU OUT 5/6	PURPLE	DGND	1	6
		DIN5/6+	2	11			DOUT5/6+	2	3
		DIN5/6-	3	23			DOUT5/6-	3	16
AES/EBU IN 7/8	YELLOW	DGND	1	20	AES/EBU OUT 7/8	GRAY	DGND	1	19
		DIN7/8+	2	10			DOUT7/8+	2	4
		DIN7/8-	3	22			DOUT7/8-	3	17

Note: The DB25 pin 7 is connected to DGND.

### Analog Line Inputs

Parameter	Conditions	Value	Unit
Resolution		24	Bits
Max. Sample Rate		48	KHz
Min. Full Scale Input Level		-4	dBu
Max. Full Scale Input Level		+20	dBu
Dynamic Range	A-weighted	102	dB(A)
	20Hz-20kHz	98	dB
THD+N	1 kHz @ -1 dBFS = +17 dBu	-93	dB
Frequency Response	20Hz-20kHz	± 0.1	dB
Input Impedance	Differential	>13	KOhms
Common Mode Rejection		>40	dB
Interchannel Isolation (Crosstalk)	1kHz	>100	dB

### Microphone Preamplifiers

Parameter	Conditions	Value	Unit
Dynamic Range	Gain = 0 dB (A-weighted)	102	dB(A)
(Including A/D converter)	Gain = +20 dB (A-weighted)	96	dB(A)
	Gain = +40 dB (A-weighted)	77	dB(A)
Phantom Power selection		+48	V
Input Impedance	Differential	>3	KOhms

### Analog Line Outputs

Parameter	Conditions	Value	Unit
Resolution		24	Bits
Max. Sample Rate		48	KHz
Min. Full Scale Output Level		-6	dBu
Max. Full Scale Output Level		+18	dBu
Dynamic Range	A-weighted	97	dB(A)
	Unweighted	95	dB
THD+N	1 kHz @ -1 dBFS = +17 dBu	-93	dB
Frequency Response	20Hz-20kHz	± 0.1	dB
Output Impedance	Differential	<50	Ohms
Output Balance Ratio		>40	dB
Interchannel Isolation (Crosstalk)	1kHz	>100	dB

### AES/EBU Inputs

Parameter	Conditions	Value	Unit
Resolution		24	Bit
Max. Sample Rate		48	KHz
Input Impedance	Differential	110	Ohms

### AES/EBU Outputs

Parameter	Conditions	Value	Unit
Resolution		24	Bit
Max. Sample Rate		48	KHz
Output Impedance	Differential	110	Ohms

Note: All specifications subject to change without notice.

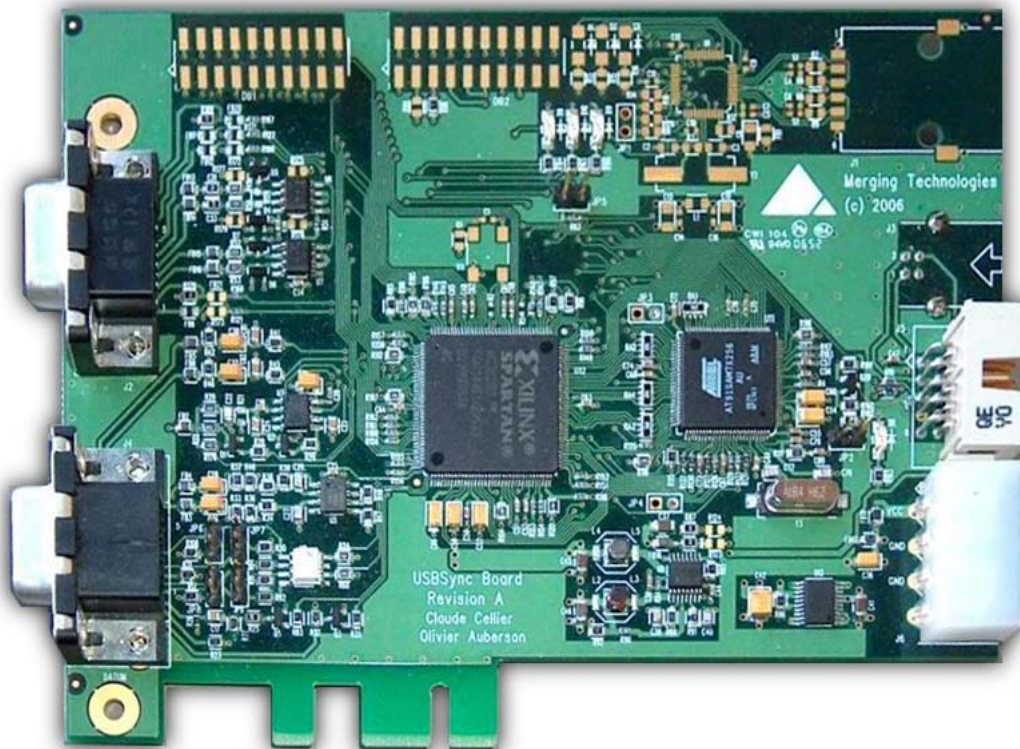


- During capture the monitoring must be done from the card where audio inputs are connected.
- The VCube software doesn't support the microphone preamplifier section. The 4 analog inputs are set to line level with a 0 dB gain.

## 17.2.2 USB Sync Board

VCube SE, Xe and LE require a dedicated hardware (PRO-Option) to support RS-422, LTC, MIDI or Optional Bi-Phase synchronization.

This Bi-Phase option is also supported by VCube turnkey systems.



This card can be insert in PCI or PCIe slot. The internal USB ensures the electrical connection to the mother board.

### DB9 connector:

#### RS422 (Sony 9p)

The DB9 connector present on the bracket of the board is a standard RS-422 port. A software control enables the switch between the "To machine" and "From controller" function of the port. The signals assigned to the pins of the DB9 differ depending on the chosen mode.

In "To machine" configuration:

- Pin 3: RX+
- pin 8: RX+
- pin 7: TX+
- pin 2: TX-

In "From controller" configuration:

- pin 3: TX+
- pin 8: TX-
- pin 7: RX+
- pin 2: RX-

#### DB15 (VGA) on breakout cable:

1 x Video reference Input - BNC coax 75 Ohm

This input accepts a composite PAL/NTSC or Tri-level HDTV video signal that can be used by the USB Sync board to generate LTC or Bi-phase signals synchronous to a reference video signal. This BNC input should be used for the main "house sync" or "black-burst" reference video signal. A 75 Ohm termination can be applied on the input signal via a software configuration.

2 x Biphase I/O (4 connectors) - DIN 5p 180°

The Bi-phase input offers the capability to receive position/speed indications from another device.

The Bi-phase output permits to control some devices that accept bi-phase signals on their input.

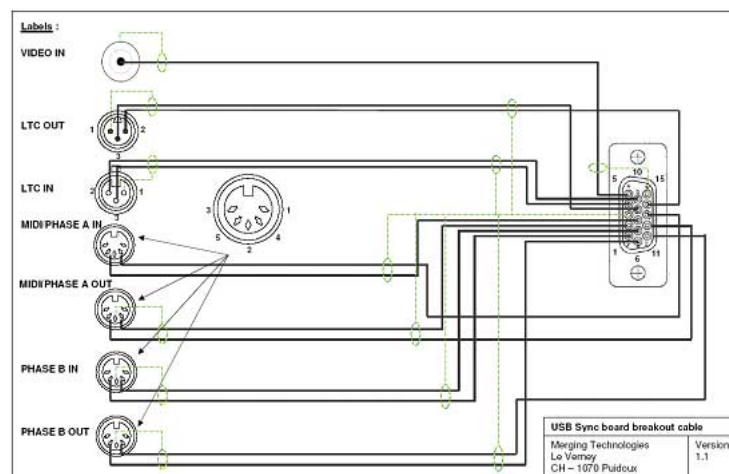
2 x MIDI I/O - (uses the Biphase connectors)

MIDI communication between the USB Sync board and an external device is available through two DIN female connectors. The pin-out of the connectors matches standard MIDI connections.

1 x LTC I/O - 2 XLR.

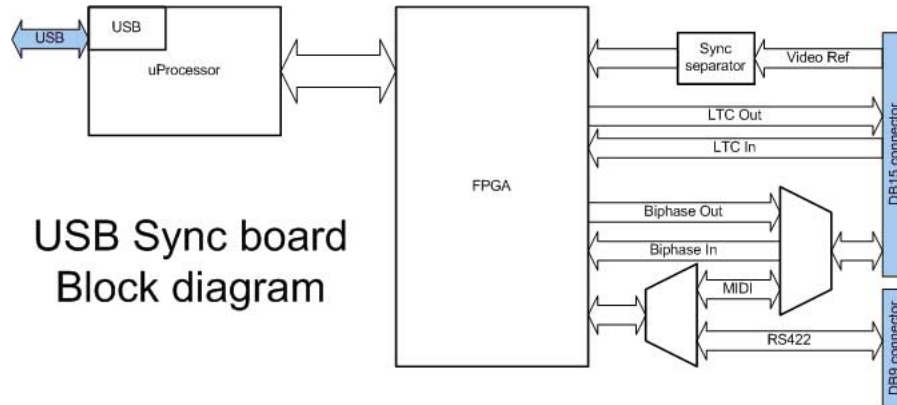
LTC IN is a symmetrical input signal. It accepts an external SMPTE/EBU timecode signal between 0.2 and 5 Vp-p.

LTC OUT is a symmetrical output signal. The signal generated has a maximum output level of 3.3 Vp-p.



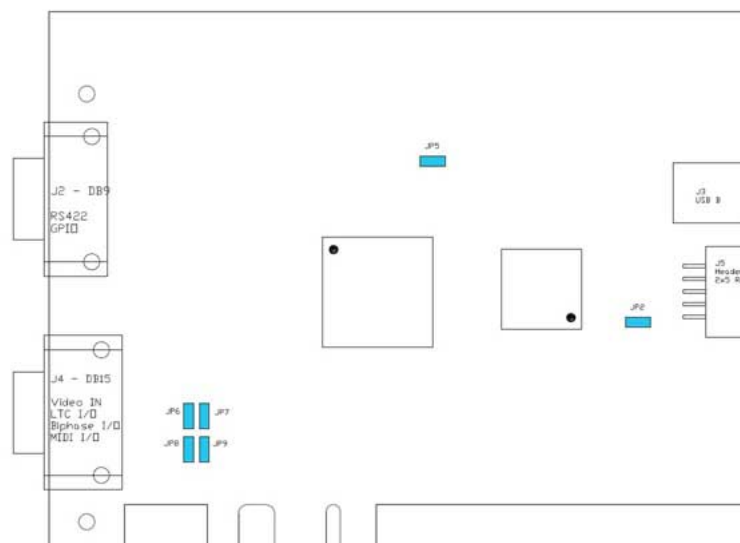
## 17.2.2.1 How to install a USB Sync Board?

This is a PCI form factor board that is intended to be plugged into a PCI slot.



The connectors and jumpers implemented on the USBSync board are as follow:

- J2: DB9 connector, for RS422 communication
- J3: USB connector type B, not soldered on production boards
- J4: DB15 connector, for breakout cable
- J5: USB connector, for internal connection to motherboard
- JP2: Erase flash, do not short this jumper
- JP5: Atmel microprocessor manual reset
- JP6: 56 Ohm pull-up on bi-phase phase A positive pin
- JP7: 56 Ohm pull-down on bi-phase phase A negative pin
- JP8: 56 Ohm pull-up on bi-phase phase B positive pin
- JP9: 56 Ohm pull-down on bi-phase phase B negative pin



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## 17.3 Mother Boards

Here is a short description of the slot assignment for particular Merging Technologies' hardware.

## 17.3.1 Luxor

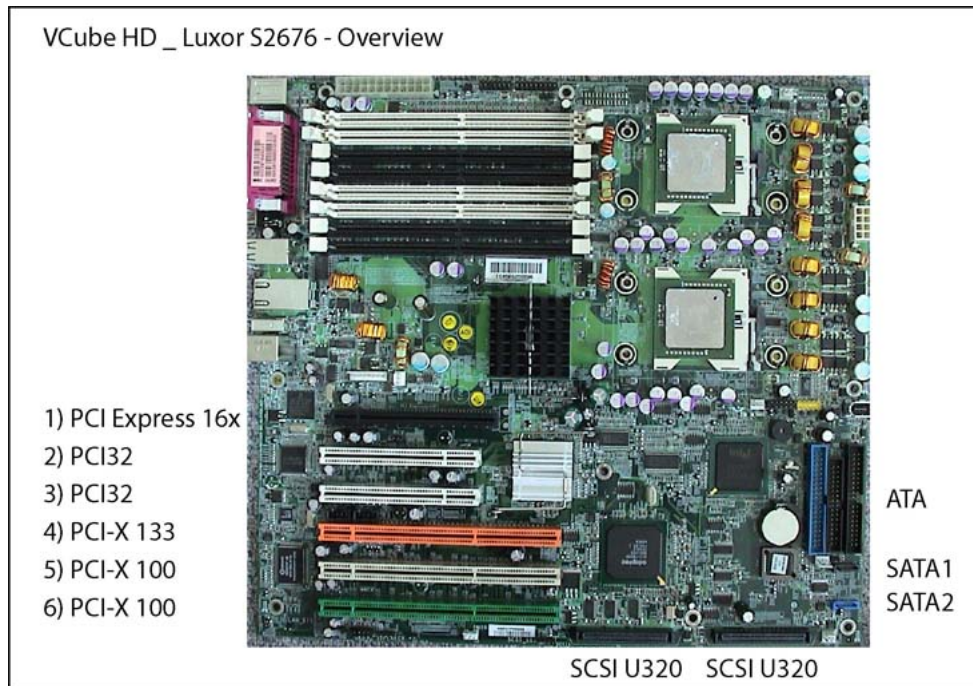
### Luxor Server

Luxor - Recommended Extension slot configuration				
Slot	Bus	Luxor SATA	Luxor SCSI	Luxor Fiber
1	16x PCIe	Graphics Card	Graphics Card	Graphics Card
2	PCI32			
3	PCI32			
4	PCI-X 133	Network Card	Network Card	Network Card
5	PCI-X 100			
6	PCI-X 100	SATA Raid Card		Fiber Card
on board	SCSI U320 A		used	
on board	SCSI U320 B		used	



## 17.3.2 HD-2K

### HD-2K



slot 1 - PCIe Graphic Card

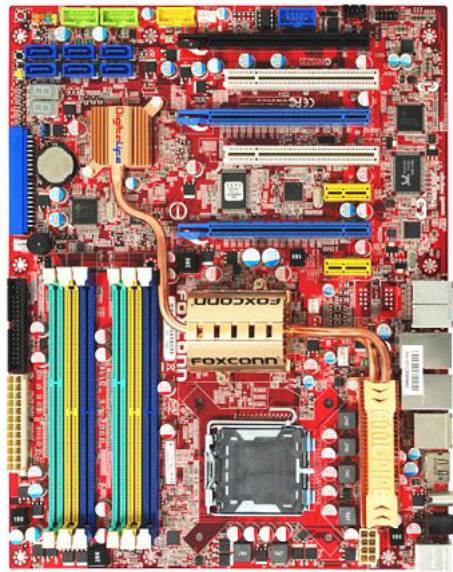
slot 2 - PCI/32 empty

slot 3 - PCI/32 Mykerinos

slot 4 - PCIx/133 RAID (Optional)

slot 5 - PCIx/100 empty

slot 6 - PCIx/100 XENA



NC Limited to x2  
NC  
Video Card  
NC  
Mykerinos  
Graphic Card  
NC

Modern VCube hardware use a Foxconn X38A mother board.

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# 18 In The Field

This section is dedicated to case studies.

## 18.1 Connecting Ethernet for Virtual Transport



Note: Direct Ethernet connection of Workstations (i.e.: 1x VCube and 1x Pyramix) with standard factory default DHCP\* settings and without a proper DHCP server available in the network may lead to unexpected behaviour, E.g. software or system freezes. (ISIS controller will default to a fixed IP address, if no DHCP server is available).

At all times proper, individual TCP-IP addresses for each machine, assigned either automatically (DHCP, if available) or manually (Fixed IP) are required, as described below.

This caution is not relevant for machines operating without network connection.

### Ethernet Connection & Settings

1) Create an Ethernet connection between the machines, via an Ethernet switch or using a direct, cross-wired, Ethernet cable. (100Mbit for Sync/Control, 1000Mbit for file sharing recommended)

2)) If, on your existing network, an Admin DHCP server is assigning TCP/IP addresses to all connected clients, leave all Pyramix, Isis and VCube machines with the default "DHCP" settings ("Obtain IP address automatically" in the Local Area Connection Properties / Internet Protocol (TCP/IP) properties. (If you are connected to an existing network with no active DHCP server, please contact the (human) server administrator to obtain a range of available IP addresses, and enter these as shown below in c).

3) If no admin DHCP server is available, manually give each of your machines a unique TCP/IP number, in the Local Area Connection Properties / Internet Protocol (TCP/IP) properties. Typically, IP addresses can be, respectively: 192.168.0.3 (PMX) 192.168.0.4 (VCube) and 192.168.0.5 (Isis), with a common Subnet mask being 255.255.255.0. No default gateway is necessary.

**Set-up Windows OS for Pyramix & VCube in:** Control Panel > Network Connections > Local Area Connection > Properties / Internet Protocol TCP/IP / Properties.

Set-up for ISIS: Press STOP key for 5 seconds during power up. Set-up address with left/right cursor and Track keys 1 to 10, then Set key. See also ISIS User Manual page 14.

### Fixed IP address range, examples:

Choice A*	Choice B*	Typical use
192.168.0.1	10.0.0.1	Usually reserved (for Gateway or Server)
192.168.0.2	10.0.0.2	Usually reserved
192.168.0.3	10.0.0.3	Pyramix A
192.168.0.4	10.0.0.4	VCube A
192.168.0.5	10.0.0.5	ISIS A
192.168.0.6	10.0.0.6	Pyramix B

192.168.0.7	10.0.0.7	VCube B
192.168.0.8	10.0.0.8	ISIS B
192.168.0.9	10.0.0.9	Pyramix C
etc.	etc.	Increase only rightmost number (up to 254)

\*Use an address from column A or B, then stick to the selected range for all machines connected on a single network.

Set subnet mask to 255.255.255.0

## Checking IP Configuration

To check the IP Configuration of the machine you are working on do the following:

Open a Command Prompt window. (Start > All programs > Accessories > Command Prompt) then type in the following command:

IPCONFIG **followed by** Enter

## Checking Network Connections

### Using “Ping”

To check that the connections you have set up are operational do the following:

**Open a Command Prompt window.** (Start > All programs > Accessories > Command Prompt) then **type in the following command:**

PING 192.168.0.3 (or whatever TCP/IP address is currently assigned to the workstation or device you wish to check) followed by Enter then wait for the machine to reply. Repeat the process for all other connected workstations / controllers.

### Using Windows Explorer

In a Windows Explorer window, right-click on My Network Places and choose Explore > Entire Network / Microsoft Windows Network / Workgroup or Domain (choose whichever is appropriate) then verify that all Pyramix and VCube workstations can search/see each other on the network, including shared hard drives and folders. (Having all machines in the same “Workgroup” (default workgroup is “**WORKGROUP**”) helps.

With Windows XP, it may take some time for the TCP/IP lists to be appropriately updated to reflect the complete network topology on all machines. (Particularly when additional computers are added to a large existing network). Please allow for time for these operations to be properly carried out in the background. It may in fact take something like 10 to 50 minutes depending on the size of the network. (In certain situations, E.g. a small 2 machine peer-to-peer network, rebooting both machines may speed up the process).

## Synchronization with Virtual Transport

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Open an authorized Virtual Transport, (versions **MUST** be identical version) on both machines and enable the **VT Network**.

Create a **VT Cluster** by dragging a first machine from the right-hand column to the left-hand column, then, drag a second or further machines onto the first one to finalize the cluster.

That's it, machines are now synchronized. However, in some situations you may find that the graphics in Virtual Transport's Network page are not being updated properly and you might face difficulties dragging a machine from the right-hand column to the left-hand column. If this occurs, please just sit back and relax, there is nothing else you can do but wait till all the TCP/IP lists are updated at OS level, then all will be fine.

Nothing is wrong with the software, it just is a matter of taking and enjoying a short break while every network list is being properly updated.

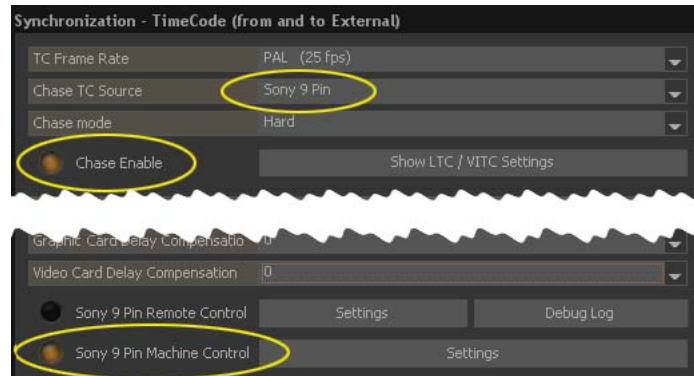


Merging highly recommends installing and regularly updating anti-virus protection software on each Pyramix and/or VCube system that is expected to be connected to the outside world via an Internet connection or that otherwise might be subjected to subsequent external contamination during its normal usage.

## 18.2 Recording while chasing & Sony 9-pin

VCube can remote control a Sony 9-pin compatible device and chase it through RS-422 or RS-232.

In **Settings: Format & Synchro**, configure the control panel as below.



The RS-422 configurator switch on the rear panel of the VCube must be set to "to Machine" if you use this port. This port is named COM3 in settings specific panel. This port is named COM2 in settings specific panel for early VCubes featuring an ASUS mother board.

The RS-232 port is named COM1



From the VCube you can control the transport of the Sony 9 pin compatible device while the VCube is chasing it. The Ctrl button must be highlighted in the Sony 9-Pin control panel.

The Record button in the Internal Machine control panel must be enabled only once **"Chasing..."** is no longer displayed in the preview.



Be sure that the reference video input on the synchronization panel of the VCube, and the video card reference input are referenced on the same genlock, blackburst, or video signal. This is the only way to ensure a precise timing for video signal.



This configuration must be used also in **Auto Edit** mode.



## 18.3 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 audio processing.

After a regular PAL capture, the Composition must be set to 24 fps. The fps info embedded in the Media File can't be changed from 24 fps to 25 fps to ensure correct playback. But from VCube's Timeline, it's possible to change the playback speed of the Clip

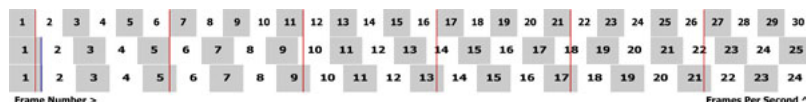
- Changing Composition frame rate: **Settings:Formats & Synchro>Composition Video Format>Composition Frame Rate**
- Changing the Clip playback speed: **Double-click** on the corresponding clip in the Timeline to display Clips Information. Then in **Clips>Speed**, set Playback to 96% (24/25).



1. VCube can still be synchronized to a 25 fps houseclock.
2. Both external (25fps) or internal (24fps) TimeCodes can be displayed.



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 that in nominal playback, such artefacts will only appear if clips with mismatched frame rate are included in the Composition. The playback speed can be edited in Clips Information, allowing perfect playback. This feature is very useful at 25 fps for uncompensated telecine (frame per frame capture on a PAL video).

---

## 18.4 Using the S-Video Output of the Graphic Card

The baseline VCube doesn't feature any video card. But it's possible to use the S-Video output of the 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, uncheck "Hide modes that this monitor cannot display". In the Displays page 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 of your video monitor.

Now the S-Video output only displays the VCube overlay content without any graphic user interface.



1. You can also use this feature to directly generate a regular PAL or NTSC video output from a 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 insufficient to use it for both monitoring and software control.
3. The quality of this S-Video output cannot be compared to that of a dedicated video card except for the Matrox Parhelia equipped VCube.



For Canopus video card users:

The two S-Video/Composite adapters (small cables featuring a RCA plug and a mini Din plug) can't be used to convert the graphic card's S Video output to composite because of a special pin out. The third adapter that doesn't feature a cable must be used to do this conversion.

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## 18.5 Trouble shooting

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## 18.5.1 Flickering Video Output

### Problem:

The video output (video card) displayed on a CRT monitor is flickering during playback.

### Solution:

The Field order on the Media Files doesn't match the Field Order of the Composition's video format. Go to **Settings:Formats & Synchro>Video Formats** and set the correct Field Order.

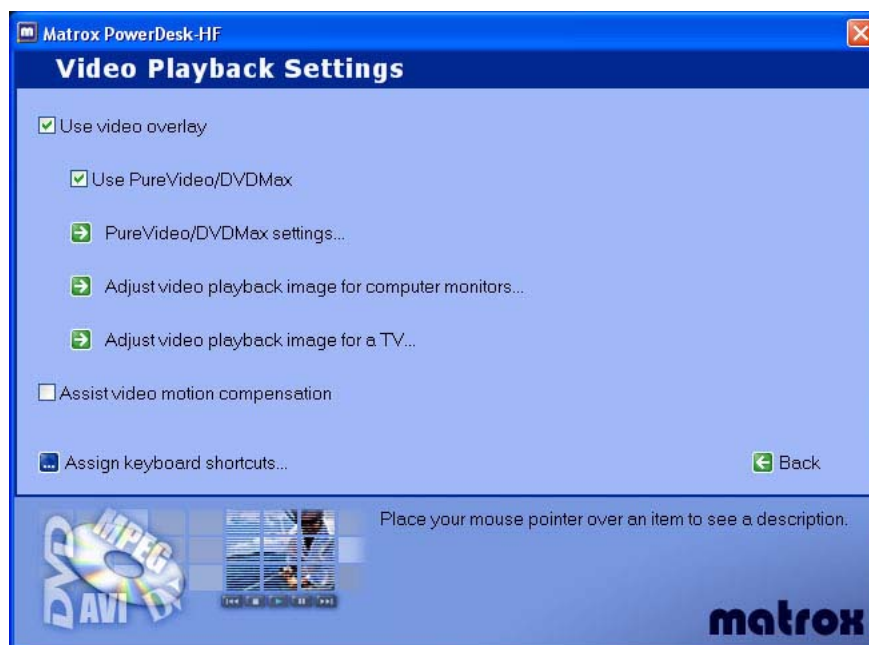
## 18.5.2 Matrox Parhelia Settings

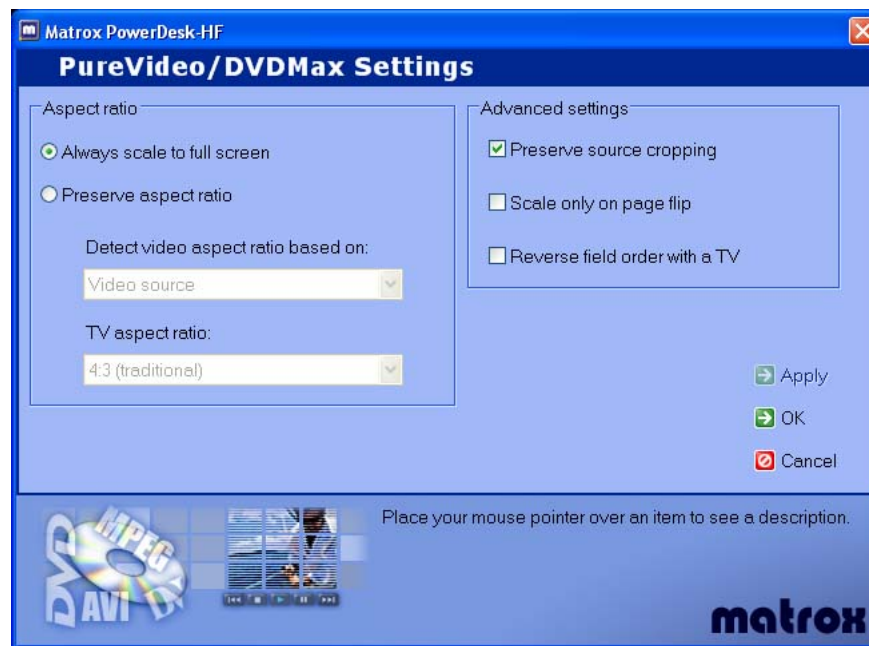
At user requirement, the VCube hardware can feature a Matrox graphic card instead of the regular ATI.

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 of your specific screen configuration, please refer to the Matrox instructions.

If you plan to use the video output to feed an additional monitor, some particular settings must be adjusted according the following screen shots.



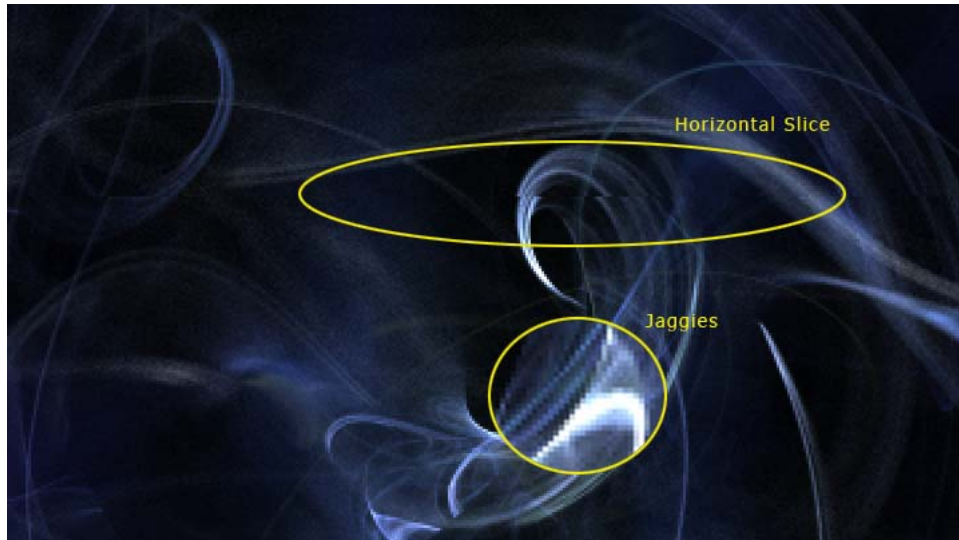


Depending of the BIOS version of the Matrox graphic card, "Preverve source cropping" may be disabled to ensure a correct video output.

## 18.5.3 Poor Image Quality on HD

### Problem:

When using an HD video projector plugged into the graphic card output, the picture on the screen doesn't match the expected quality. Images are stepped on diagonals and curves (Jaggies). They also features a random horizontal slice on rapid movements.



### Solution:

Be sure your Composition settings correspond to the HD format used. Double-click on the video clip in the Timeline to display Clips info including 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), VCube features a "Page flipping" function in Settings> Preview.

---

## 18.5.4 Frame Shifting with Virtual Transport

### Problem:

Your VCube is controlled by a Pyramix through the Virtual Transport protocol. The transport controls on the Pyramix are actually transmitted to the VCube. But you experiment with some shifting when you're using a jog command on the Pyramix. 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 is frame accurate when you are jogging in Pyramix.



## 18.5.5 The Sony 9-pin Can't Control VCube

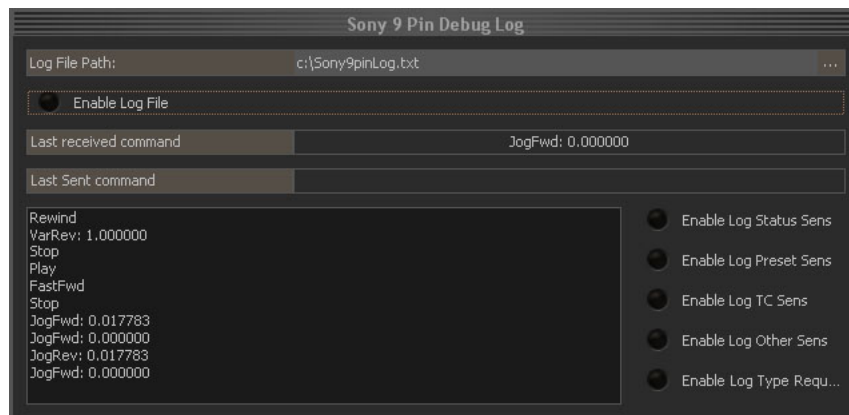
### Problem:

The RS-422 configurator is set to "From Controller". In **Settings: Format & Synchro > Synchronization - TimeCode (from and to External)**, 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 & Synchro > Synchronization - TimeCode (from and to External)**, activate the debug Log. This feature displays all incoming commands or requests from the external controller. It's a powerful tool to analyze and remedy incorrect controller settings or hardware problems.



Log File Path

Enable Record Log

Last Received Command

Last Sent Command

Enable Log File

Enable Log Status Sens

Enable Log Preset Sens

Enable Log Other Sens

Enable Log Type Request

---

## 18.5.6 Recorded Media Files have a wrong Timestamp

### **Problem:**

The capture is OK except that Media Files are not correctly stamped with Time Code. A one-frame shift appears randomly despite the fact that VCube is chasing the VCR TimeCode.

### **Solution:**

Be sure that both reference video input on the synchronization panel of the VCube, and the video card reference input are referenced on the same genlock, blackburst, or video signal. It is the only way to ensure a precise timing for video signal.

---

## 18.5.7 The Video Playback is shifted

### Problem:

VCube displays the correct image at the correct TimeCode. But the video output is not perfectly synchronized. A shift of one or more frames seems to be present on the output of the video card.

### Solution:

1. Be sure that both reference video input on the synchronization panel of the VCube, and the video card reference input are referenced on the same genlock, black & burst, or video signal. This is the only way to ensure precise timing for video signal.
2. Be sure that the specification of the video display you use, does not feature some latency. This is usually the case for all plasma displays and some LCD displays. If this is the case VCube features independent compensation offset for graphic and video cards. **Settings: Formats & Synchro> Synchronization - TimeCode > Graphic Delay Video Card Compensation**
3. The previous remark for computer the monitor (graphic card output).

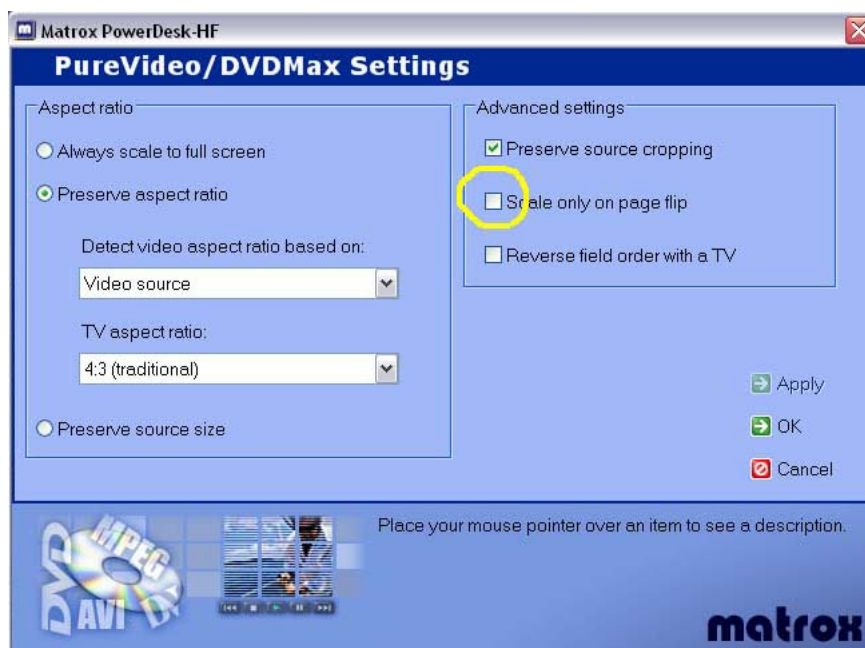
## 18.5.8 Frozen Picture on the Video Output of a Matrox Graphic Card

### Problem:

The video output of the Matrox Parhelia graphic card is frozen and the preview display is OK in VCube.

### Solution:

Be sure that the settings of the graphic card are set according this screen shot.



If "Scale only on page flip is enable" the Composition needs to use the "Page Flipping feature" (Settings: Preview) to play on the video output of the Matrox graphic card.

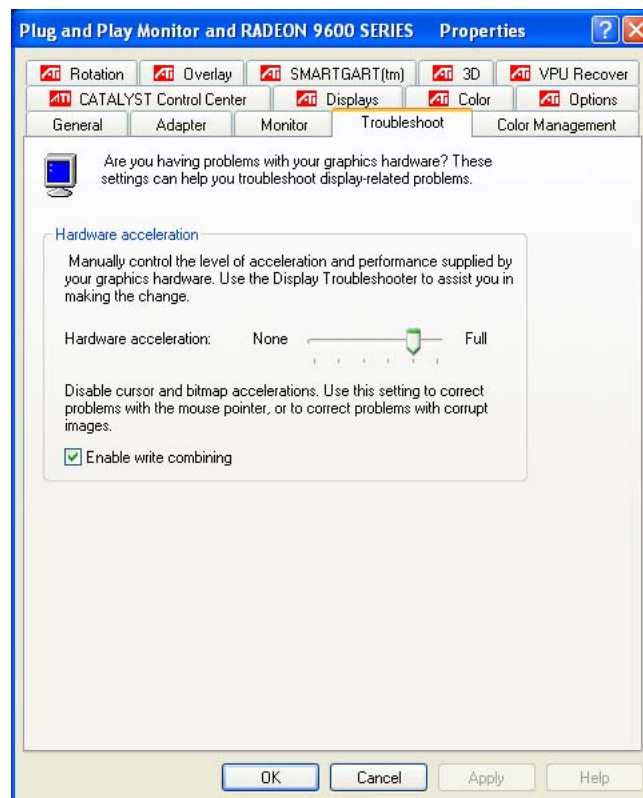
## 18.5.9 User Interface and ATI Graphic Card

### Problem:

The User Interface of the VCube software doesn't refresh correctly. Some labels are missing or looks disabled.

### Solution:

In Windows Advanced Display Properties, be sure that the ATI Troubleshoot Control Panel is set as on the screen shot below.



---

## 18.5.10 The NTSC Video Output Features Some Dropped Frames With PAL Media Files

### Problem:

I've loaded a PAL Composition or a PAL Media File using the Easy Load function into the Timeline. I need a NTSC video output. This output features some dropped frames (bottom left corner of the User Interface).

### Solution:

If the Composition is set at 25 fps, then, the VCube's video engine only produces 25 frames per second and the video card needs 29.97. We have here 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 fps is smaller 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 manner, the Media File duration won't be changed when played at a higher frame rate.



Note that VCube does not interpolate missing pictures to achieve the frame rate management. It only duplicates or omits some frames to match the Composition frame that must reflect the frame rate of the used video standard.

In all cases the VCube video engine gives you the exact image number you need, at the time you need.

---

## 18.5.11 Apple compatibility 2 GB limitation

**Problem:**

QuickTime files generated by Apple Final Cut copied on DVD can't be read once transferred on VCube. Why?

**Solution:**

Only DVD-ROM complying to 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 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.

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# 19 Appendices



## 19.1 Default Shortcuts

File	Shortcut
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
<b>Import</b>	
Media Files	Ctrl + Shift + O
OMF, MXF, AAF, Apple XML Import (Create New)	Alt + O
OMF, MXF, AAF, Apple XML Import (Add to Existing)	Shift + Alt + O
Import Composition & Export Changes	
Import Layer	Ctrl + Alt + L
Convert Still Images	Ctrl + I
<b>Export</b>	
Export Composition	
Convert Media Files	Ctrl + Y
Render Composition	Ctrl + R
Wrapper	
<b>Edit</b>	
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
<b>Add</b>	
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	
<b>Nudge</b>	
Nudge to Left	Ext: Ctrl + LEFT
Nudge to Right	Ext: Ctrl + RIGHT
Nudge Up	Ext: Ctrl + UP
Nudge Down	Ext: Ctrl + DOWN
<b>Nudge Override</b>	
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
<b>Tracks</b>	
Nudge Up Track	Ext: Ctrl + Shift + UP
Nudge Down Track	Ext: Ctrl + Shift + DOWN
<b>Selection</b>	
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	ESCAPE
<b>Zoom</b>	
Zoom In	Alt + 3
Zoom Out	Alt + 4

Zoom All	Alt + 1
Zoom Undo	Alt + 2
<b>Locators</b>	
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
<b>Add</b>	
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
<b>Go to</b>	
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
<b>Step</b>	
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
<b>Transport</b>	
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
<b>Overlay</b>	
Toggle Burn In Timecode	B
Toggle External TC	Alt + B
Toggle Mask On/Off	M
<b>Settings</b>	
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	
<b>User-Interface</b>	
Refresh	F5
Simple Mode	Alt + F1
Advanced Mode	Alt + F3
Show / Hide Transport Frame	T
Show Timeline	F11
Show Record Page	F12

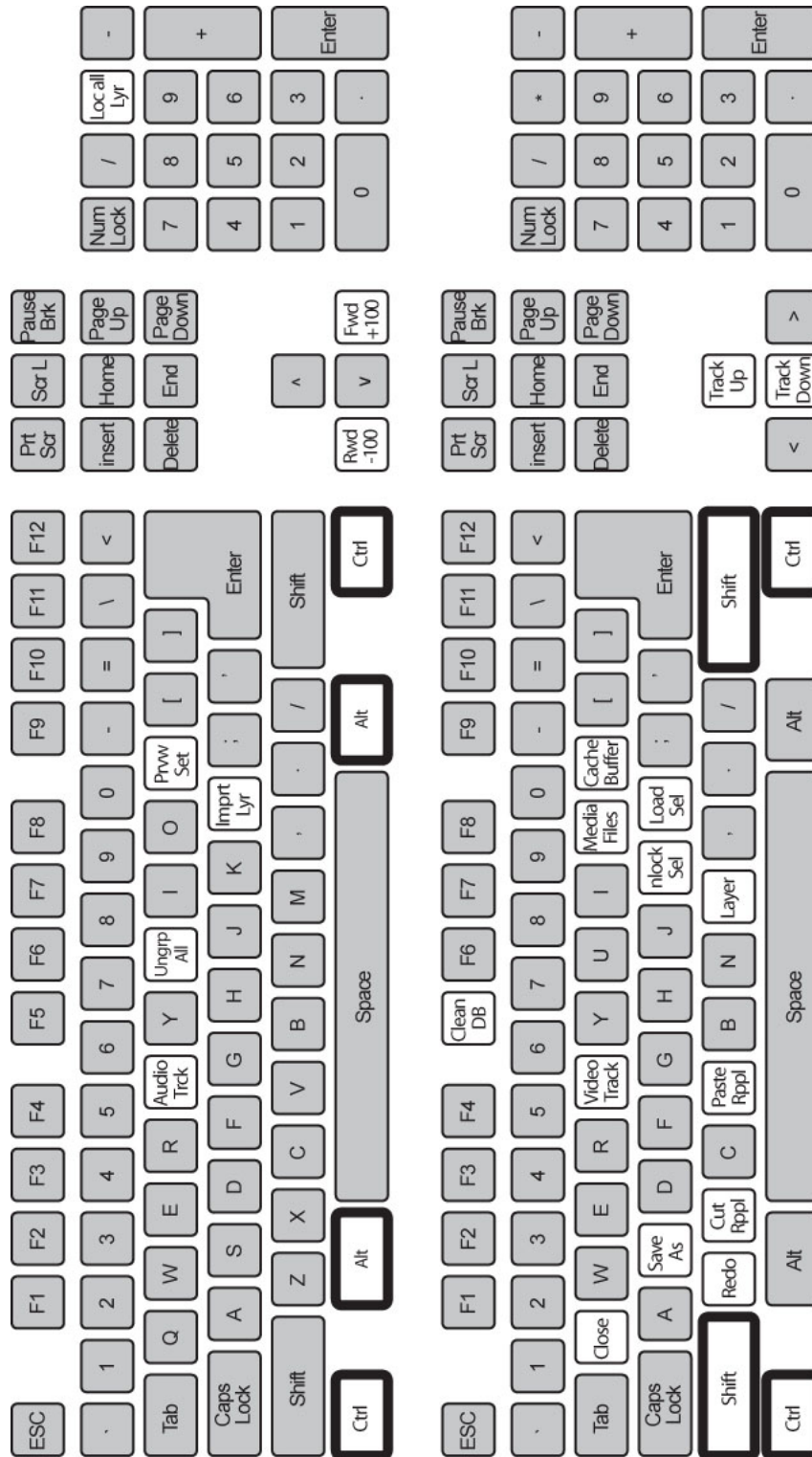
<b>Page</b>	
Previous Page	Ext: HOME
Next Page	Ext: END
Show Files Page	F6
Show Locators Page	F7
Show View Page	F8
Show Edit Page	F9
Show Settings Page	F10
<b>Folder</b>	
Show Prior Folder	Ext: PRIOR
Show Next Folder	Ext: NEXT
<b>File</b>	
Show VCube Files	Ctrl + O
Show OMF Import	Shift + O
Show Media Files	Ctrl + Shift + O
<b>View</b>	
Show Clip Info	Ctrl + W
Show Shortcuts	Shift + W
Show Workspaces	Alt + W
<b>Edit</b>	
Show Edit Main	Ctrl + D
Show Clip Edit	Shift + D
Show Layer Edit	Alt + D
Show Track Edit	Ctrl + Shift + D
<b>Settings</b>	
Show Settings Preset	P
Show Format & Synchro 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
<b>System</b>	
Show Windows Display Settings Dialog	D
Show Virtual Transport	Alt + V
<b>Mykerinos</b>	
Show Mykerinos I/O	I
Mykerinos Settings	Alt + I
<b>Output</b>	

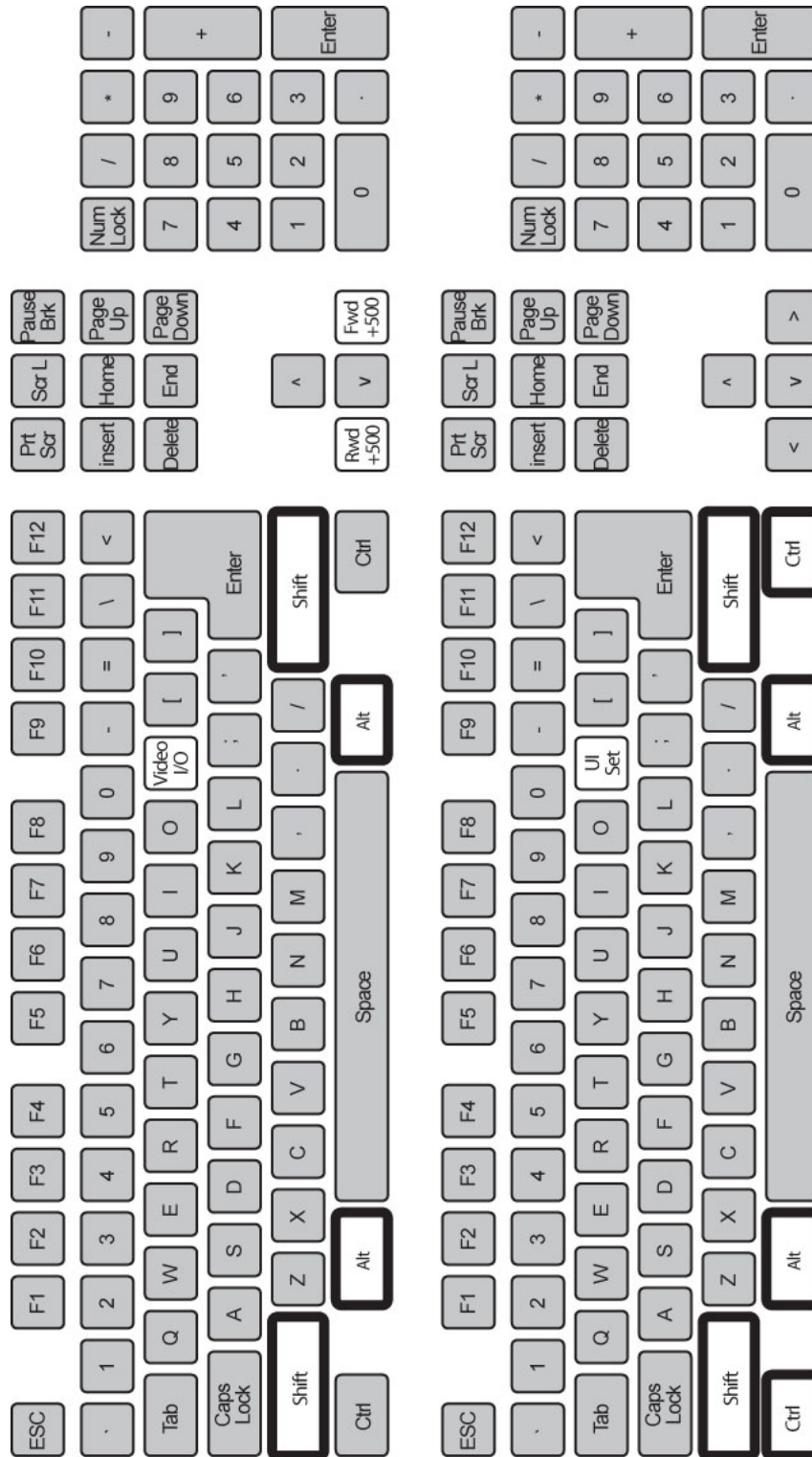
Show Output Page	Ctrl + F7
Show System Output	Ctrl + F8
Show Buffers Output	Ctrl + F9
Show Playback Infos Output	Ctrl + F10
Show Sync Status Output	Ctrl + F11
Show Playback Monitor Output	Ctrl + F12
<b>Script</b>	
Show Script Page	Ctrl + F6
Toggle Fullscreen Preview	F3
Toggle Floating Window	F4
Toggle Show/Hide Settings	F2
Show Shortcuts	Shift + W
<b>UIWorkSpacesGroup</b>	
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
<b>Help</b>	
Show Help	F1
Credits...	C











## 19.2 HDTV Recorded Media

HDTV Recording Standards			
	D9-HD	DVCPR0-HD	HDCAM
<b>Tape</b>	1/2"	1/4"	1/2"
<b>Video Rate</b>	100 Mbps	100 Mbps	140 Mbps
<b>Audio</b>	8x( 48 Khz, 16bits)	8x( 48 Khz, 16bits)	12x( 48 Khz, 24bits)
<b>Tape Durations S/L</b>	62 min	46min	40/124 min
<b>Disk Requirements</b>	45 Gbytes	33.7 Gbytes	41.1/127.2 Gbytes
<b>CODEC</b>	DV 6.7:1	DV 6.7:1	M-JPEG 4.4:1
<b>Scan</b>	720p/1080i	720p/1080i 24&25p	1080i 24&25p
	HDCAM-SR	D5-HD	D6 VooDoo
<b>Tape</b>	1/2"	1/2"	3/4"
<b>Video Rate</b>	600 Mbps	235 Mbps	920 Mbps
<b>Audio</b>	12x( 48 Khz, 24bits)	8x(48 Khz, 16bits)	12x( 48 Khz, 24bits)
<b>Tape Durations S/L</b>	40/124 min	124 min	64 min
<b>Disk Requirements</b>	175/545 Gbytes	213.5 Gbytes	431.2 Gbytes
<b>CODEC</b>	MPEG-4 2.7:1	M-JPEG 4:1	none
<b>Scan</b>	1080i 24&25p	720p/1080i 24p	1080i 24p

## 19.3 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	

## 19.4 Video Formats & Bandwidth

Video formats are not only defined by the number of pixels on the screen. This chapter gives you all the keys 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. From analog to digital worlds, this value is critical.

Let's examine how 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 start point of our 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:

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 needs 22,096,303 points per second transmission and a 1080 HD video at 29.97 fps needs a 62,145,792 points per second transmission.

#### - Pixel Aspect Ratio:

This is the shape of the pixel.

HD video systems mainly use a square pixel with aspect ratio equal to 1.

NTSC uses an aspect ratio of 0.9 resulting in a 648 x 480 display.

NTSC wide uses an aspect ratio of 1.2 resulting in a 864 x 483 display.

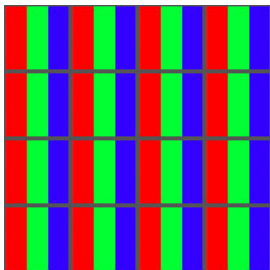
PAL uses an aspect ratio of 1.07 resulting in a 768 x 576 display.

PAL wide uses an aspect ratio of 1.42 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 means Red, Green, Blue. Every pixel is sampled for those three value representing Chroma and Luma.

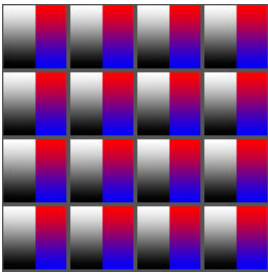


- 4.4.4 means that every pixel is sampled for Chroma and Luma value.

The two Chroma values are the result of:

Luma minus red value

Luma minus Blue value

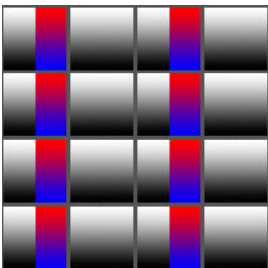


Those two previous color sampling systems lead to an high bandwidth requirement while preserving the color definition. They are used by graphic, and special effects designers. The maximum Chroma information is required to avoid artefacts when the picture is processed. We have 3 values per pixel.

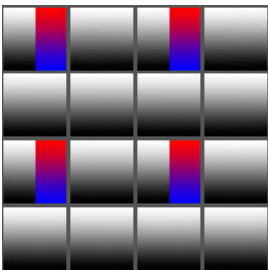
Since high bandwidth requirement means expensive equipment, video engineers have looked for craftiness to reduce this requirements in an invisible manner. Fortunately, the human vision is less accurate for color than for luminosity. That's why the color sampling can be done at lower resolution than the luminance sampling in order to reduce overall bandwidth requirement with no visible impact.

- 4.2.2 has been widely adopted by the video industry and broadcasters because of its good quality, bandwidth ratio.

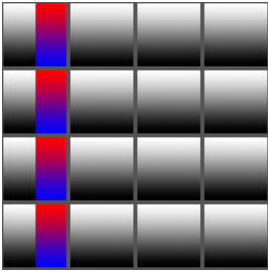
Here, for every four luminance samples, there are two samples of each color difference channel. We have 4 values for 2 pixels leading to 2 for computation purpose.



- 4.2.0 Is the color sampling mode used in DV PAL. It's also used for HD video broadcast. We have 6 values for 4 pixels leading to 1.5 for computation purpose.



- 4.1.1 Is the color sampling mode used in DV NTSC. We have 6 values for 4 pixels leading to 1.5 for computation purpose.



- 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 for the digital conversion of a value, 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 heavy computing processes.
- Linear scale means that the input value is reflected with no change to the output
- Logarithmic scale is a scale of measurement that gives the logarithm of a physical quantity instead of the quantity itself. This is often done 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 the 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

From the beginning, we're using "frames", but most used video formats use 2 fields per frames since they're interleaved. That means that a frame is made of 2 fields (one for odd lines, one for even lines) displayed at twice the fps of the video standard. To simplify the bandwidth computation, "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

Those are the absolute minimal sustained performances required for network and storage.

This data rate can be reduced by using a data compression codec.

#### Compression Codec:

The previous computations show that video is a bit glutton. This bandwidth requirement has its price. That's why a data compression is often applied in order to reduce the data flow.

- Loss-less Loss-less are mathematical solutions to regenerate the compressed data exactly. The compression ratio is often lower than 3.

- Lossy are also mathematical solutions. But this is a compromise between efficiency and quality. The compression ratio can vary from 3 (the quality is almost the same as the original) to more than 100 with visible visual artefacts.

- Intra Frame: DV, MJPEG, IMX. Every frame is processed individually.

- Inter Frame: MPEG with groups of pictures (GOP). The use of GOP is a very efficient way to compress video. But for post production purposes, intra frame codecs must be preferred since every frame is individually decoded, allowing instant access and lower computing 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

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needed during capture or render processes.

**Audio:**

Since a video media can also feature a sound track, audio data flow must be added to the video streaming requirements.

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## 19.5 PullUp PullDown

One of the key feature of VCube is its capability of changing Clips' playback speed.

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 a 29.97 fps one:** In the Timeline (29.97 fps) select the Clip(s) you need to adjust about fps properties. Double-click on the selection to display Clips Information page. The speed can be set here 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 theClips duration reflecting their new fps value.
- **Film production in the NTSC zone uses the 24 to 23.98 fps conversion.** 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 telecineme. This telecineme technique is called the 3:2 pulldown. There are 4 frames of film for every 5 frames of NTSC video.

### **PullUp:**

It is the reciprocal process. 1001 mS become one second.

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## 19.6 Drop Frame

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.

VCube displays "drop frame" TimeCode in this form **00:00:00;00**

## 19.7 Supported Video Codec

Video Codec			Playback	Capture
Uncompressed	YUV	YUY2: 4:2:2 (16 bits)	X	X
		YUYVY: 4:2:2 (16 bits)	X	
	RGB	24 bits (8 bits per Channel)	X	X
		30 bits (10 bits per Channel)		
	RGBA	32 bits (8 bits per Channel)	X	
		40 bits (10 bits per Channel)		
Compressed	MJPEG		X	X
	AVID MJPEG AVRn		X	X
	OMF DV		X	
	DV25		X	X
	DV50		X	
	DVCPRO <b>DVCPRO-HD</b>		0	0
	All VFW Codec... include MPG2-MPG4		X	
	QuickTime Codecs		X	X
	QT Sorenson Video 1 SVQ1		X	
	QT Sorenson Video 3 SVQ3		X	
	Windows Media Video		X	
	H.261		X	
	H.263		X	
	IMX (D10)	<b>MXF</b>	0	0

For DV video in QuickTime files we recommend using standard sizes like 720x576 for PAL in order to use the Windows DV codec which is better optimized than the QuickTime DV codec. The Windows DV codec doesn't support non-standard sizes.



Note that VCube is currently supplied with DV and MJPEG codecs. DVCPRO is available as an option.

MJPEG Compression	
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

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80	15.5
75	17
70	18.4
60	21
50	23

## 19.8 Supported Files

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.

Supported File Extensions	Direct Playback or Import for Numbered Still Images Sequences	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 (own by Adobe, created by Aldus). It's a bitmap raster file format	
.tiff	Tagged Image File Format (own by Adobe, created by Aldus). It's a bitmap raster file format	
.png	Portable Network Graphics A Turbo-Study Image Format with Lossless Compression	
.gif	CompuServe graphics interchange format	
.emf	Microsoft Enhanced Metafile	
.tga	Truevision: 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	
.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
.bmf	Broadcast wave	Yes
.pmf	Pyramix media file format	Yes
.ac3	AC3	
.sd2	Sound designer	Yes
.sdii	Sound designer	



A single still image is imported as a 5 seconds Clip.

A sequence of numbered still image is imported 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 isn't t used by this conversion.

\* Means optional feature.



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## 19.9 AVI 1, AVI 2, AVI ref

AVI 1, AVI 2, & AVI ref are typical 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 sure that the path to files will remain exactly the same. 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, fast 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 freely seek in such an AVI 2 file.

## 19.10 Video Files and Disk Requirements

	Name	MB per second	GB per minute	GB per Hour	Recommended Capacity GB per Hour
<b>Generic</b>	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
<b>Apple FCP</b>	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
<b>Avid</b>	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
<b>Incite</b>	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
<b>Media100</b>	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
<b>Pinnacle</b>	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

You will find no specific information for VCube in this tab because it supports almost all SD and HD standards and codecs. (DVCPRO and IMX are available as options)

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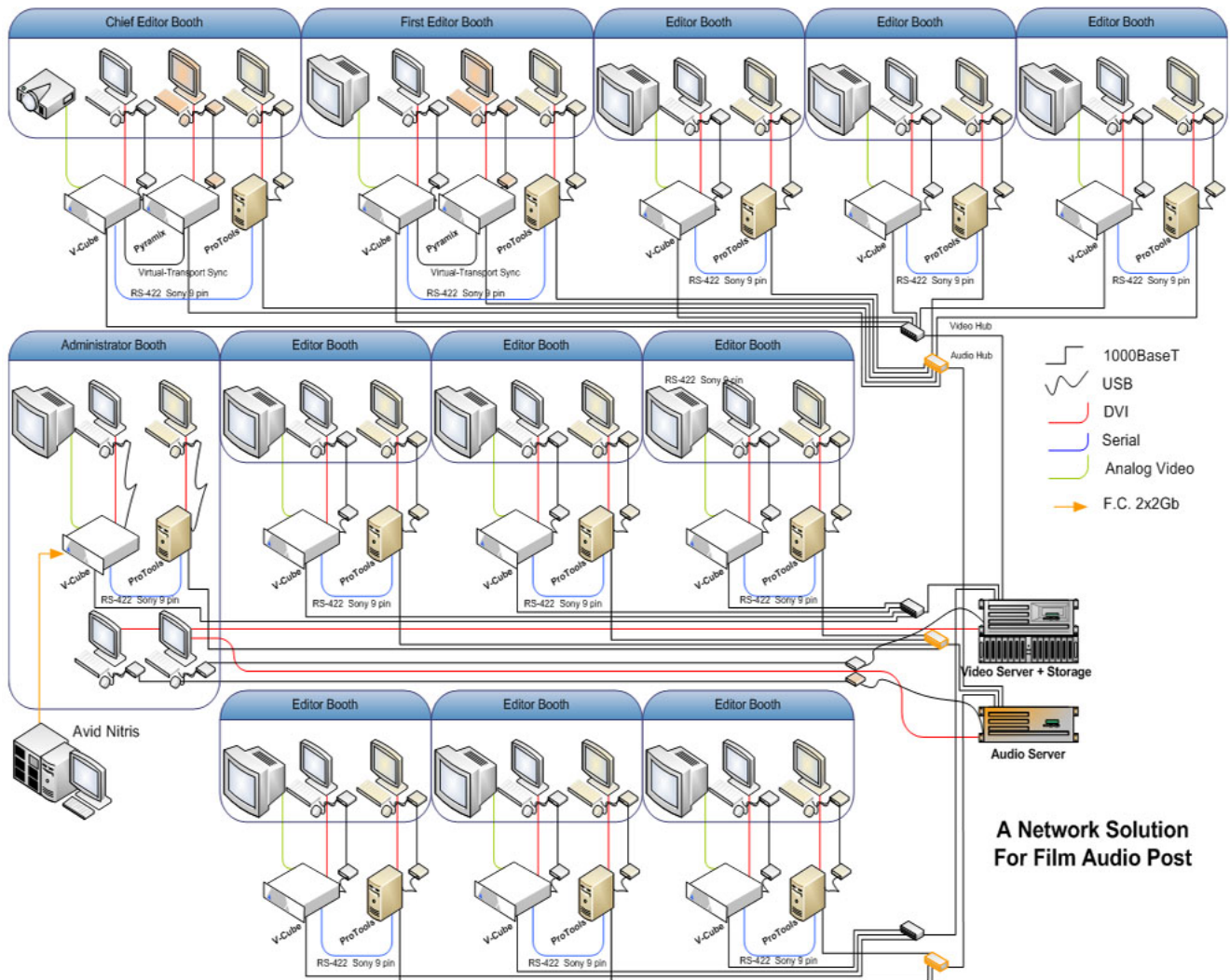
## 19.11 Installation Examples

## 19.11.1 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).

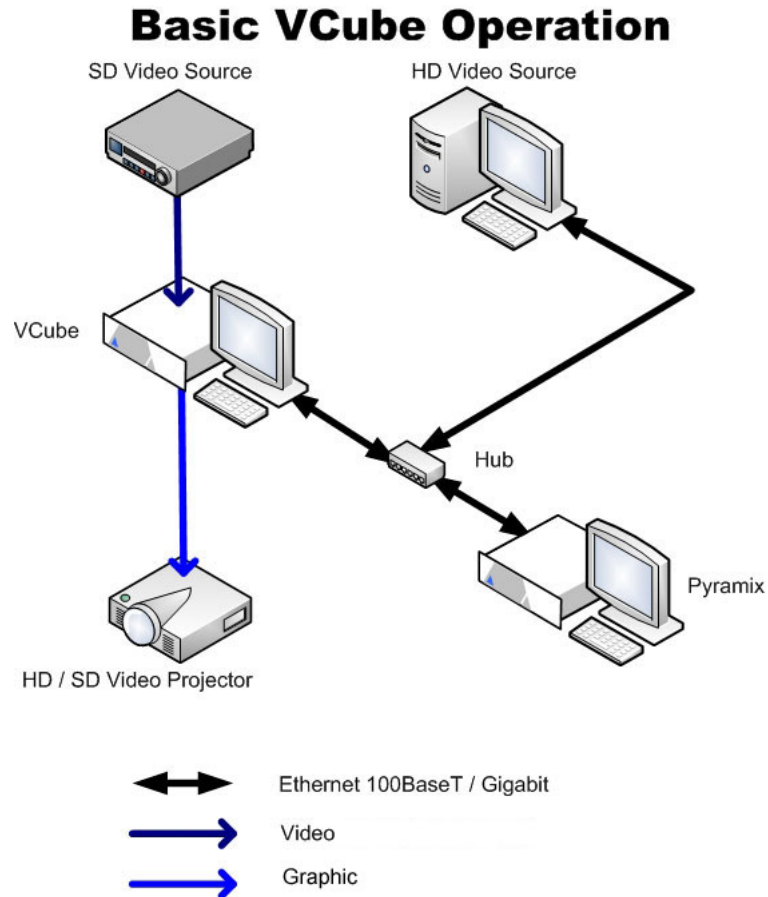
Note that one VCube can be controlled by two editing workstations.



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.

## 19.11.2 Basic VCube Operation



This is a typical VCube set up:

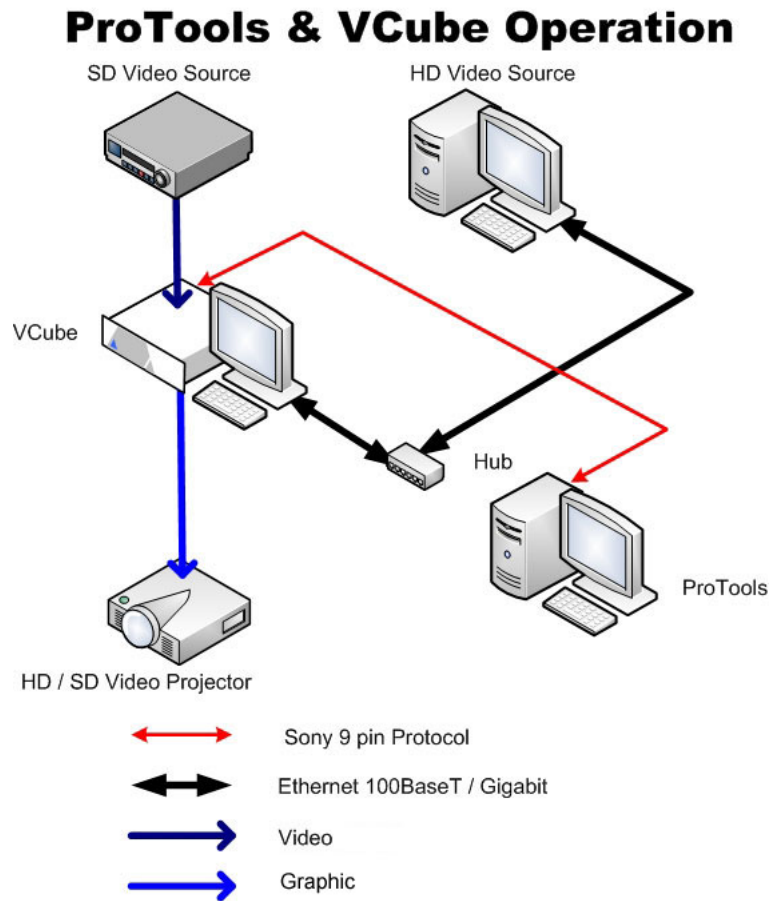
- The network is used to synchronize VCube and Pyramix DAW. It's also used to transfer HD or SD material on the VCube's local hard disk.
- A SD VCR is connected to the video input allowing SD capture.
- The graphic output is connected to an HD video projector allowing compressed HD to be displayed (authorization key required) at full resolution.



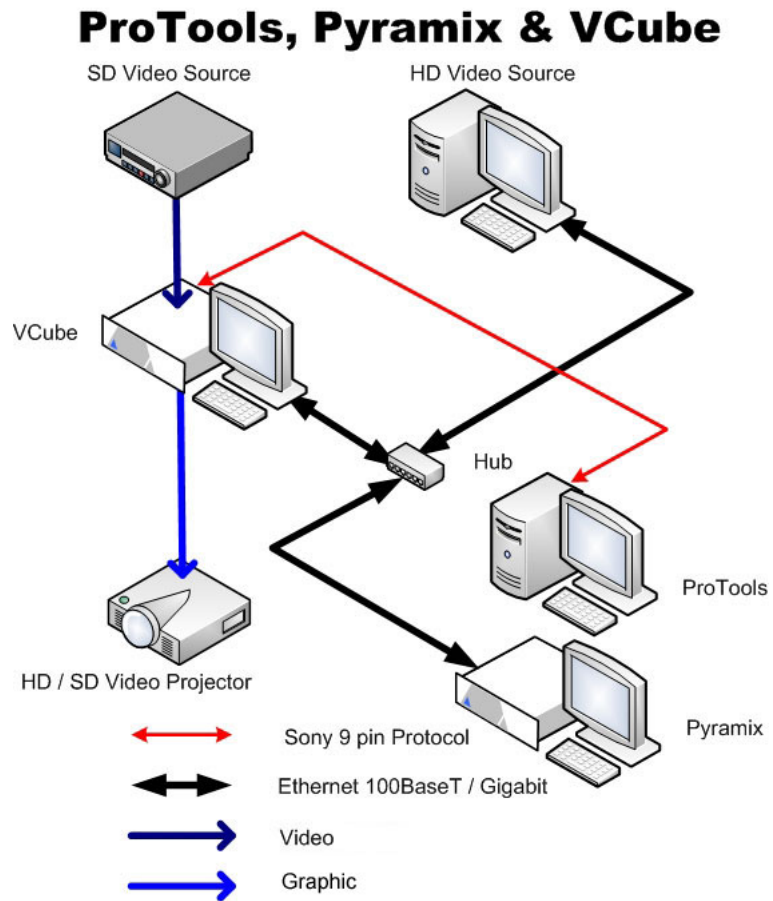
Due to the storage transfer speed limitation of the single SATA disk, only MJPEG 1/10 (90% quality) compressed 2K HD can be used. You also need the 2K (for Composition) software authorization. Uncompressed 2K HD can be converted to 1/10 compressed by VCube render feature.

HD Media Files can be used into a SD Vcomposition without this authorization key.

## 19.11.3 ProTools & VCube Operation



## 19.11.4 Protools, Pyramix & VCube





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## 19.12 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.

Important 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.

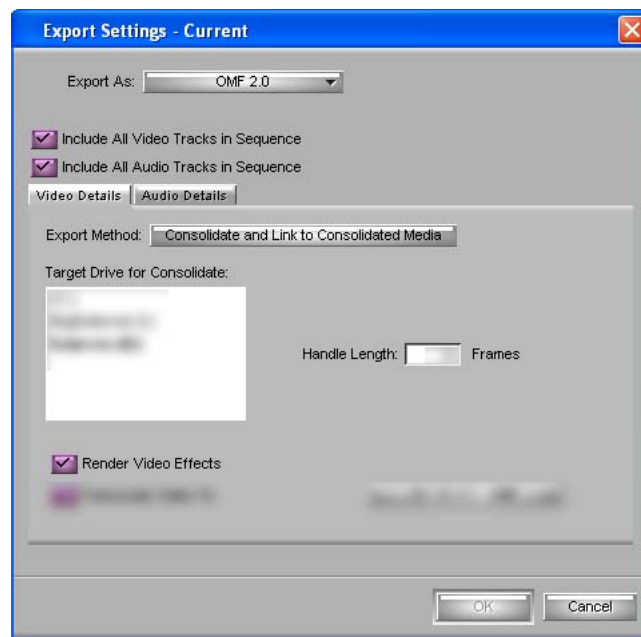
When directly connecting to the Unity server with a Fiber Channel Adapter, some settings can be adjusted to optimize the streaming performances in a multi-user environment. On the VCube side go to **Settings: Disk Cache & Playback Buffers > Read Cache**. There are two ways of adjusting the cache size:

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 best cache size will then be automatically adjusted.

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 Avid NLE, the Composition must be consolidated in OMF2 reflecting the above screen capture. Embedded Compositions aren't currently supported by VCube.

---

## 19.13 Fairlight Controlling a VCube

### Fairlight DREAM/MFX3

#### *Jogsh*

The jogsh modifier is used to modify the behaviour 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 TimeCode. 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 1 or 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 @SETENV ALT\_JOG entry in tcs\_cfg.

Additional tcs\_cfg settings required for control of VCube via 9-pin are:

RETRY\_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 a correct behavior of VCube with the **FFW** and **REW** commands from the Fairlight station, on the MFX3 **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.

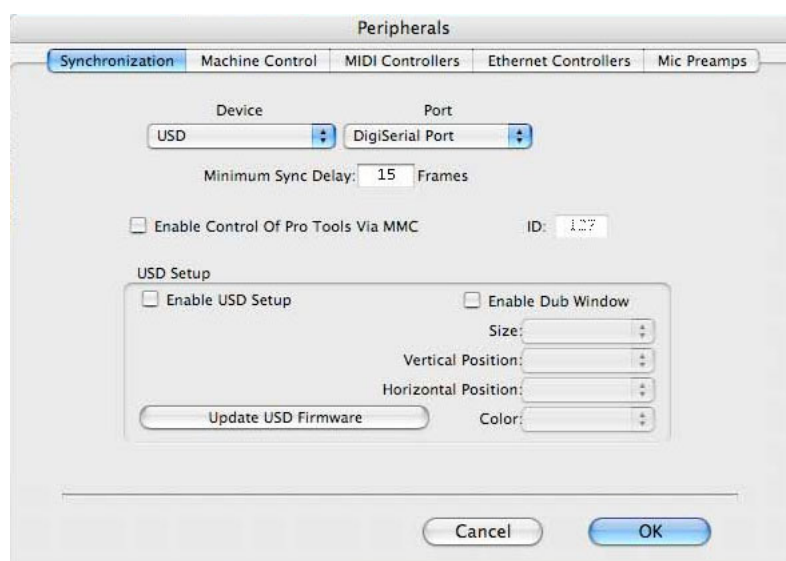
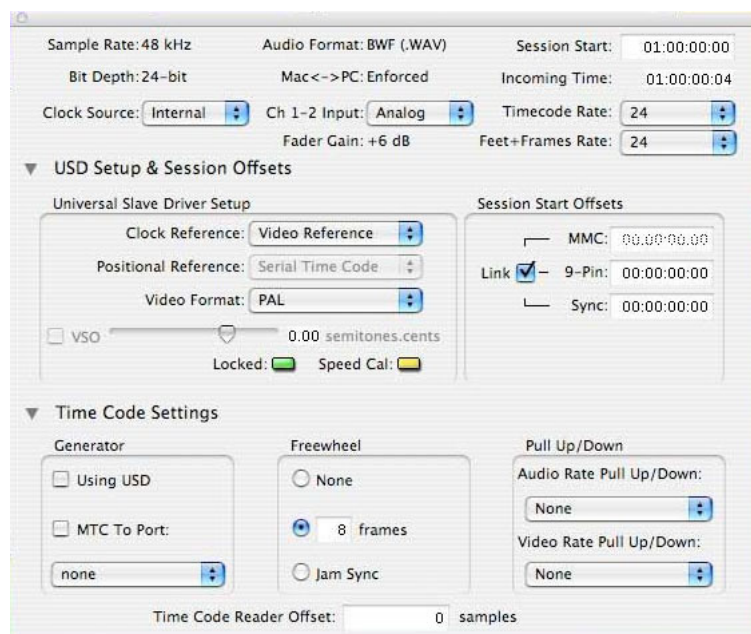
Press GEN to toggle the generator on or off.

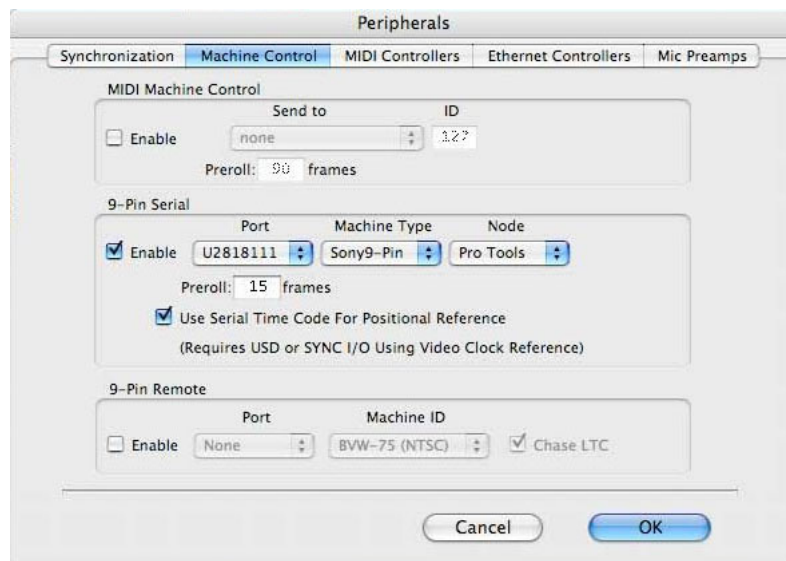
## 19.14 Protools and VCube

### ProTools 6.4.1, Mac OS 10.3 and a KeySpan

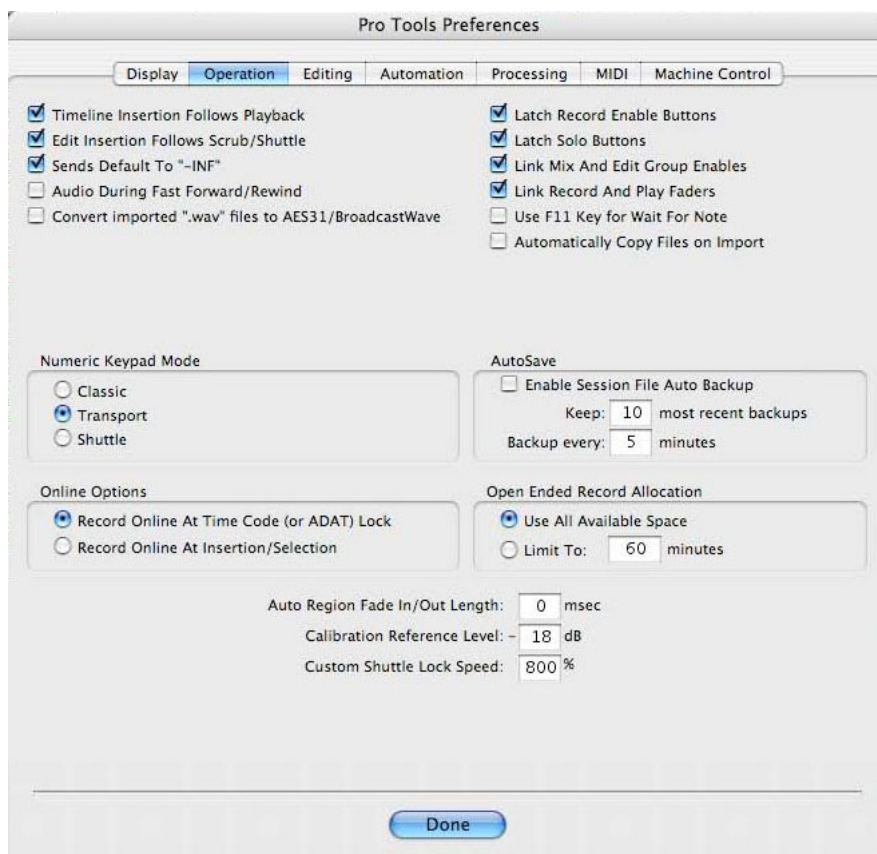
ProTools cannot generate a TimeCode when it's in chase mode or using Sony 9-pin. Of course your transport control should be set to "On Line" in Protools.

You absolutely must disable all the generate TimeCode options in the "Session Setup" window as shown in the "Peripheral - Machine Control" screen shot.





- Min sync delay should be as small as possible (works with 15 on mixplus)
- Enable machine control. Select the good Keyspan port, 9 pin mode, node: If your VCube is configured correctly, ProTools should see it in the node list (as a generic2). Set ProTools film or PAL or NTSC (depending on your project).
- Enable use serial TimeCode. ProTools must be supplied with video reference signal.





#### Preferences/machine control:

- Disable machine cue intelligently.
- Enable stop at shuttle speed zero.

#### In Session setup :

- Be sure that serial TimeCode is used as incoming time And video ref is set Choose the correct fps setting.

#### VCube configuration:

- Verify that you have not enabled the "Chase Enable" properties in VCube. To be more precise; the VCube Configuration should be ( in "Settings" Page, "Composition" folder):
- Audio Ref: "Video Input" if you have connected the Video ref to VCube; otherwise it should be "Internal". To verify if the Video reference is properly supplied to the VCube, click on the "Show Mykerinos I/O" button and you should see 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 you wish.
- 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: OffChase 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 Stil Settings: "Stop"
- Serial Port: "COM 2"
- Sony 9 Pin Machine Control: Off

## 19.15 Sony 9 pin Wiring Chart

### 1) RS232 to/from RS422 acting as a Slave Port

RS422 → RS232

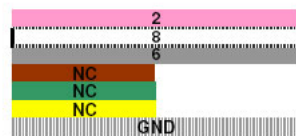
VCube Slave from Controller Master

FONCTION (RS 422)	RS422 SUB-D 9P MALE	→	RS232 SUB-D 9P FEMALE	FONCTION (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:

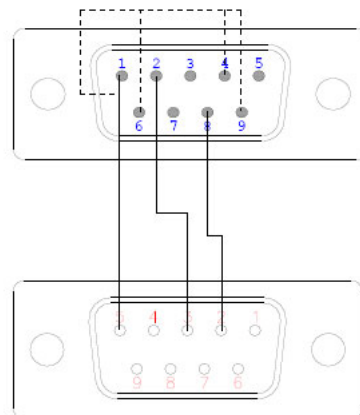
NC = NOT CONNECTED

#### 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

FONCTION (RS 232)	RS232 SUB-D 9P FEMALE	→	RS422 SUB-D 9P MALE	FONCTION (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:

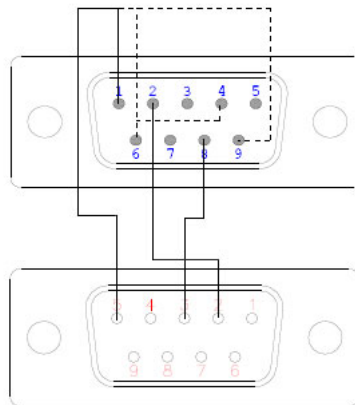
NC = NOT CONNECTED

### CABLE COLOUR CODE

2
3
5
NC
NC
NC
GND

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

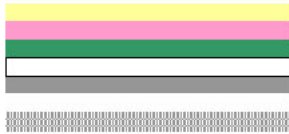
Adapter → RS422 VCube Slave from Controller Master

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	

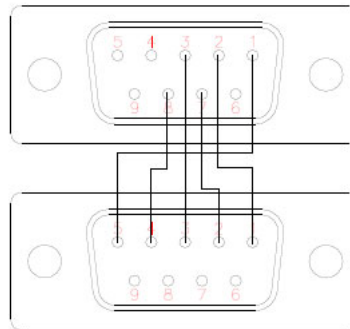
NOTE:

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

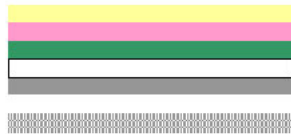
VCube Master to External Machine Slave

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	

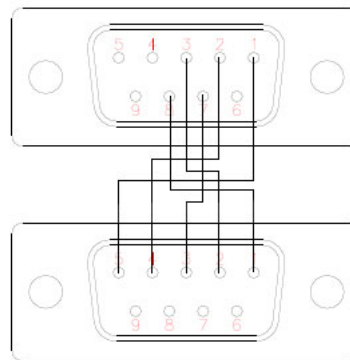
NOTE:

NC = NOT CONNECTED

#### CABLE COLOUR CODE



**SUB-D 9P FEMALE**  
**RS422 (Sony 9pin)**

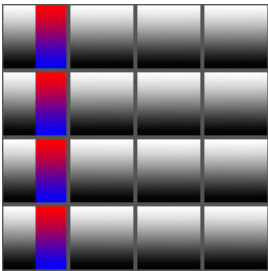


**SUB-D 9P FEMALE**  
**RS 422 (Industrial)**

## 19.16 Glossary

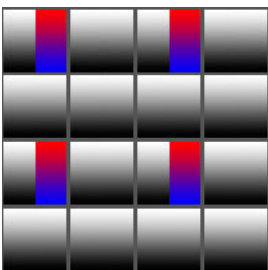
### 4:1:1

- Is the color sampling mode used in DV NTSC.



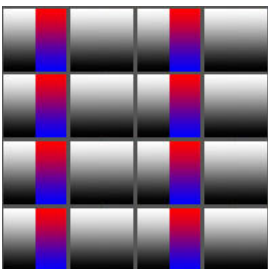
### 4:2:0

- Is the color sampling mode used in DV PAL.



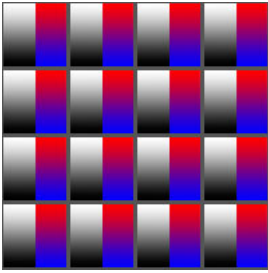
### 4:2:2

- 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).
- **conforming:** Transferring 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 and

8-channel AES3 audio streams. These AES3 audio usually contain 24bit PCM audio samples. It is possible to find video bitrates of 50, 40 and 30 MBits/s.

- **DV** uses DCT intraframe compression, which is similar to MJPEG, at a fixed bitrate 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 tradeoff 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, 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 "wrapper" 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.
- **free-run:** Condition in which a sync generator is not locked to any outside source but is providing sync on the basis of 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:** Television sync 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 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.

## 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 still.
- **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 videogames) 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.

## 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.

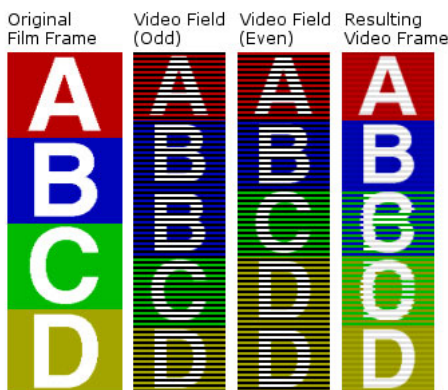
## P

- **PAL** signal The most common composite video signal used in Europe. 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:



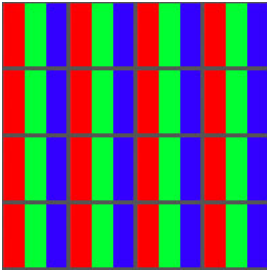
## Q

- **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 the units are times.

## 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:**
  1. 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.
  2. 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

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