



USER GUIDE

VIRTUAL FILE SYSTEM (VFS)

REVISION 07.03.2013



Safety Warnings

Please observe any warnings and follow all instructions.

- Do not use this equipment near water and clean only with a dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
- Do not expose to excessive vibration, or drop this product.
- Do not defeat the safety purpose of the polarised or grounding-type plug. A polarised plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade, or the third prong, is provided for your safety.
- If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched, particularly at plug ends, convenience receptacles, and the point where they exit from the equipment.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the equipment.
- Unplug this equipment during lightning storms or when not in operation for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the equipment has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the equipment, has been exposed to rain or moisture, does not operate normally, or has been dropped.
- To reduce the risk of fire or electric shock, do not expose equipment to rain or moisture.
- To avoid electrical shock, do not attempt to open this equipment. Refer servicing to qualified personnel only.

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Codex does not assume responsibility for issues or losses due to misinterpretation of the information in this document, errors in this document, or incorrect configuration or installation of the equipment described herein.

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For servicing please contact service@codexdigital.com

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1. Introduction

This guide is written to provide information on how the Virtual File System (VFS) can be used to create files for post production.

After an introduction to the way the VFS works it will cover the preset configurations, what they can be used for, and how to access files. This is followed by a more in-depth look at the options within the VFS.

The VFS is a unique and very powerful tool for delivering files into post production, and is central to the workflow when using Codex systems. It allows the user to determine the file type(s), directory structure, and naming of deliverables resulting in a highly flexible workflow solution that can be customized to the needs of any production.

For material to be used with the VFS it must be stored on one of the range of Codex storage devices, e.g. Data Pack or Capture Drive.

The VFS makes files available either in:

- The 'Codex VFS' mounted drive on the desktop when using the Codex Transfer Station M or Capture Drive Dock (USB-3)
- The network share /codexvfs when using a Codex Digital Lab

This manual is intended to provide a thorough explanation of how to use the VFS and the features it provides. It is appreciated that most users will not require all this information immediately, and as such the manual will cover essential information and common usage scenarios first, followed by in-depth information on the full capabilities of the VFS.

Software updates and support

Register at <http://www.codexdigital.com/software> to access software updates and installation instructions.

Further documents on Codex systems can be found at <http://www.codexdigital.com/support>

For technical enquiries please email support@codexdigital.com

2. VFS Configuration Presets

In the Codex User Interface (UI) go to the SETUP tab and click the VFS button.

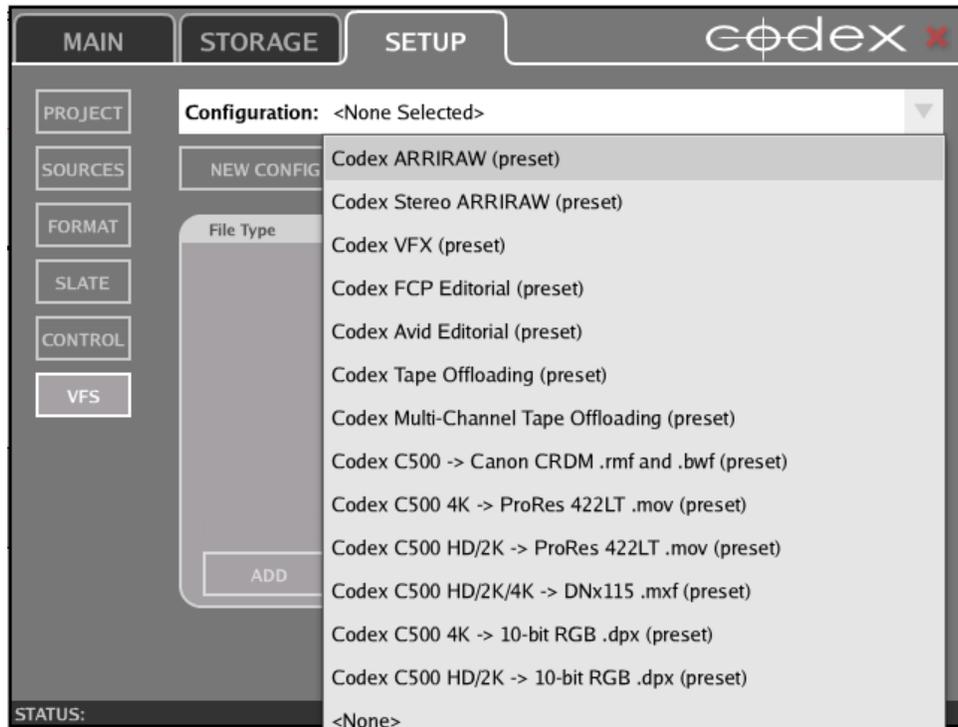


At the top of this screen the user can select which VFS Configuration to load. There is a range of preset VFS Configurations that can be copied and edited to be correct for your production, as detailed in the next section.

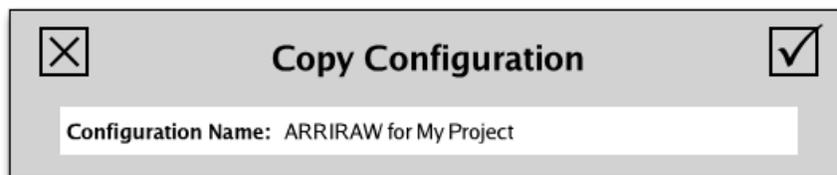
2.1. Setting the frame rate or timecode rate for VFS presets

It is important to set the VFS so that all files are at the correct frames-per-second/timecode rate for your project. The preset VFS Configurations need to be edited to be suitable for your project. An example of how to do this is shown below.

First click where it shows **<None Selected>** to select the VFS Preset, for example **Codex ARRIRAW (preset)**:

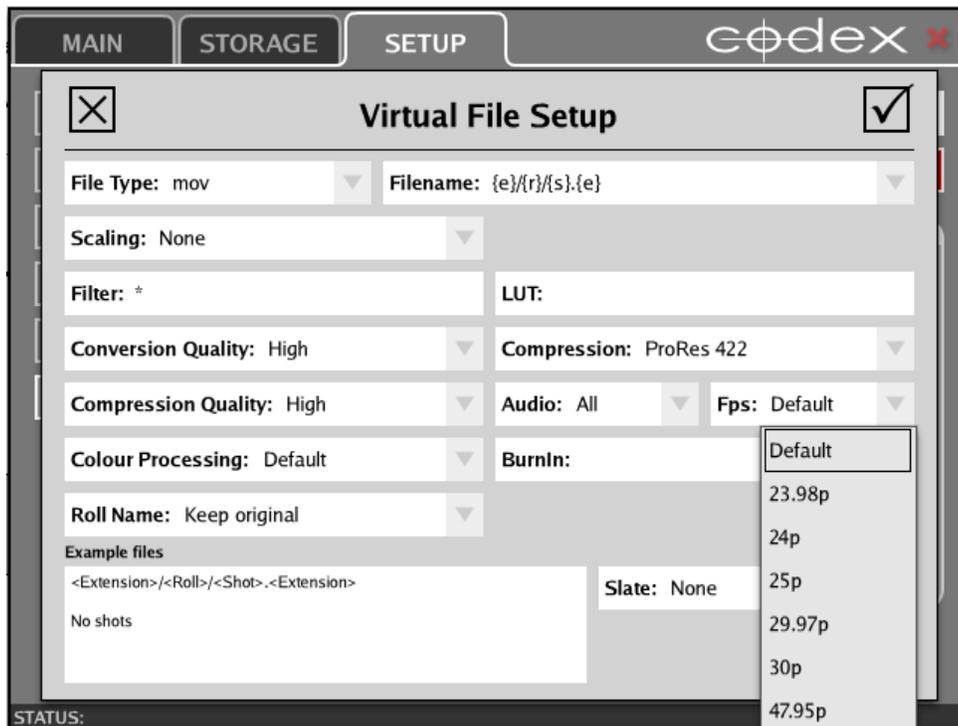
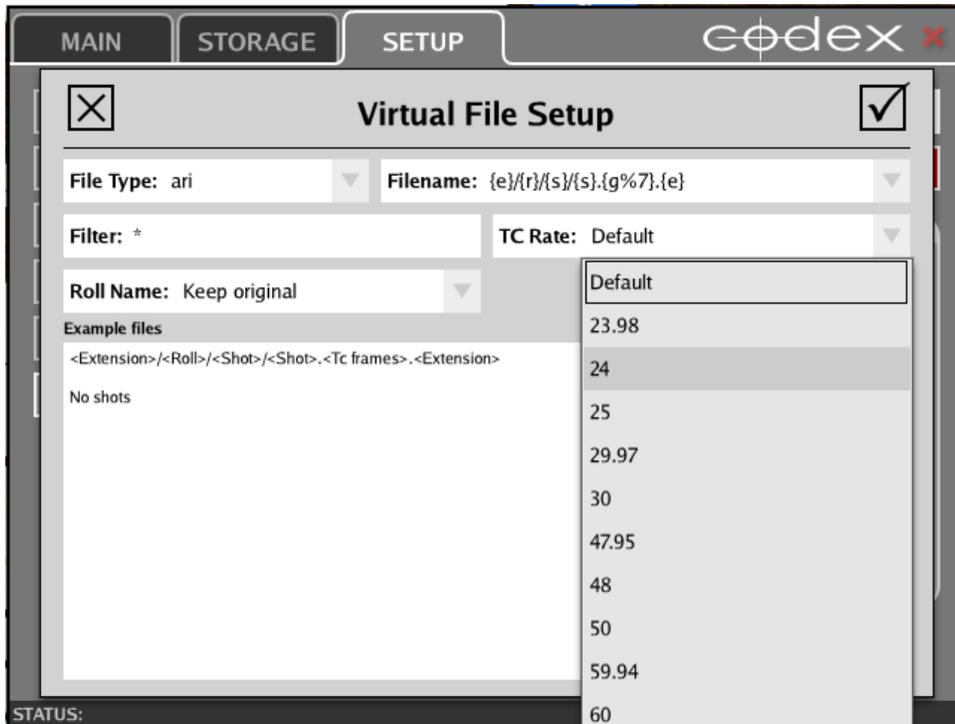


Then select **COPY CONFIG** and enter a name that is appropriate for your production:

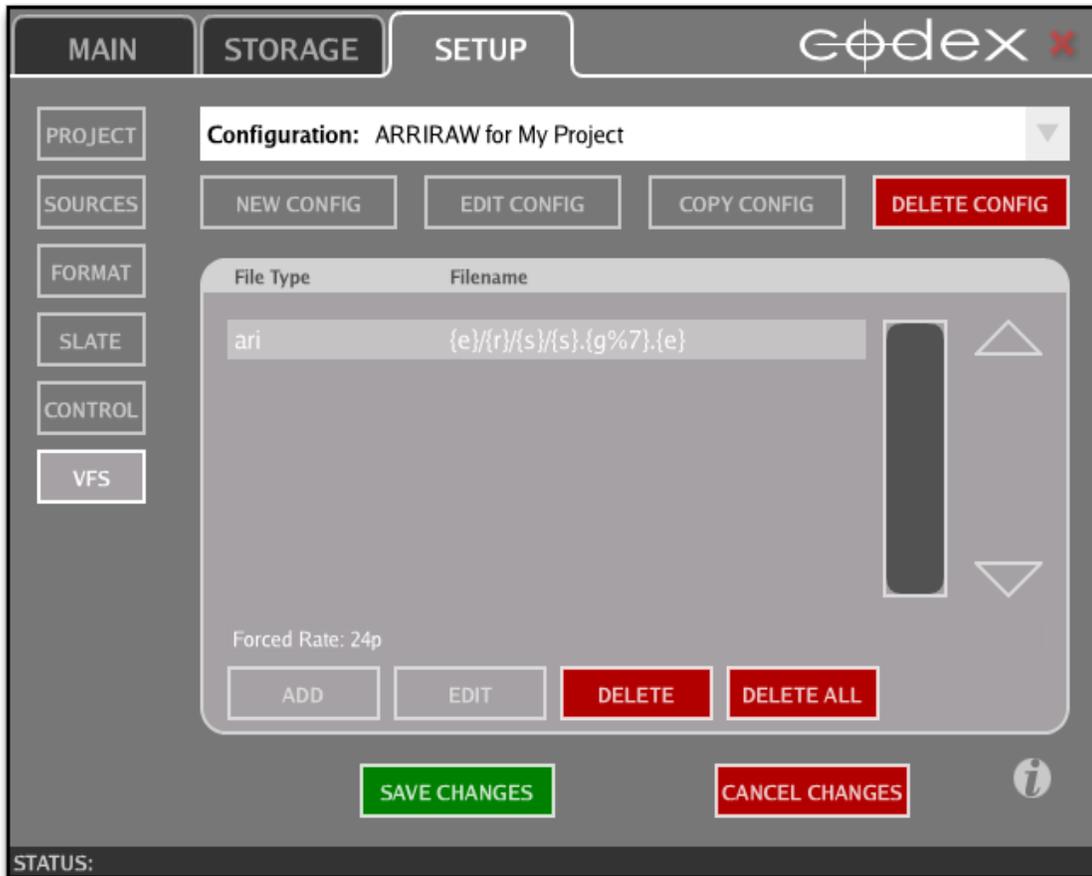


Now click on a File Type in the table and click **EDIT** to open the **Virtual File Setup** box. In here you can set the **Tc Rate** (timecode) or **Fps** (frames per second) of the file.

The images below shows where the rate can be set for .ari and .mov files:



Once you have set the Tc Rate/Fps click the checkbox icon. Then you must click **SAVE CHANGES** at the bottom of the screen:

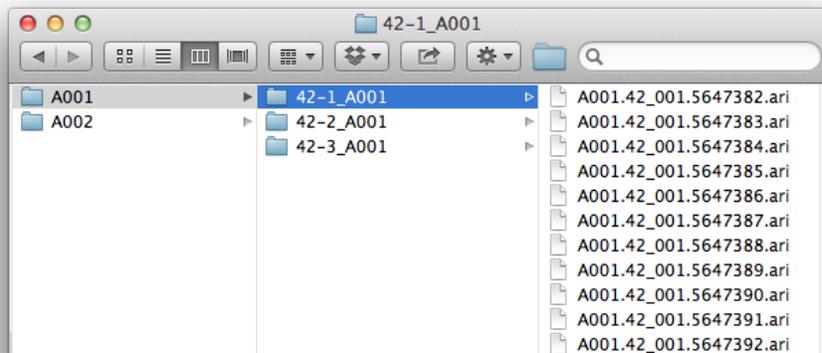


The preset configurations are detailed below.

Note: when using the Canon C500 there are specific presets available, all starting with the words **Codex C500**. Any other presets are not suitable as a basis for working with the Canon C500.

2.2 Codex ARRIRAW (preset)

This configuration can be used as the basis for delivering .ari files from ARRIRAW recordings. The arrangement of files is shown here:



It gives filenames that are easy to read, while the .ari file headers contain Roll and Timecode information allowing these files to be conformed.

There is continuous file numbering - based on timecode - which is a requirement of many DI and Finishing systems.

2.3 Codex Stereo ARRIRAW (preset)

This configuration can be used as the basis for delivering .ari files from stereo ARRIRAW recordings.

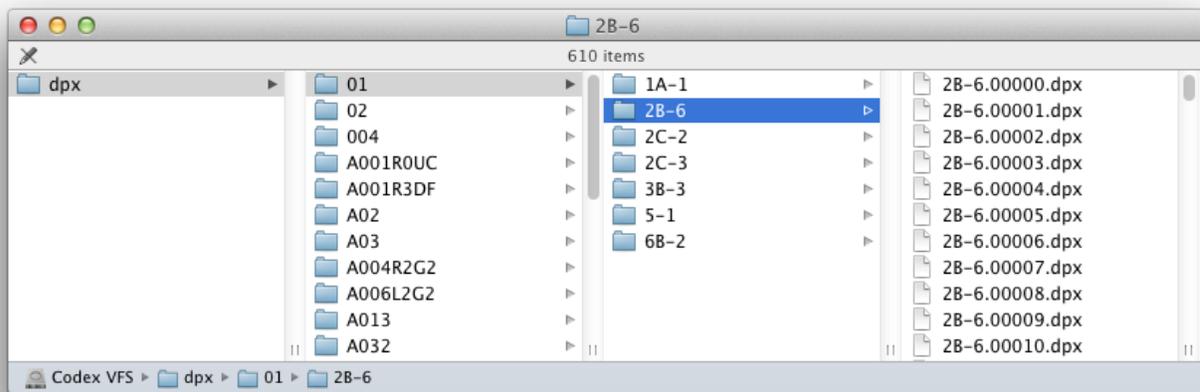
It is similar to the ARRIRAW configuration, but for use with shots that contain two video channels (left eye/right eye). Each video channel (eye) has a unique Channel ID (typically V1 and V2, or L and R).

The arrangement of files is the same as for the Codex ARRIRAW (preset) except there is a separate directory for the files from each eye.

The Roll Name option is set to Append Channel ID so that the correct Roll name is inserted into the .ari file header. For example, the left eye Roll would be A001L and the right eye would be A001R.

2.4 Codex VFX (preset)

This configuration can be used as the basis for delivering 10-bit RGB dpx files. The arrangement of files is shown here:



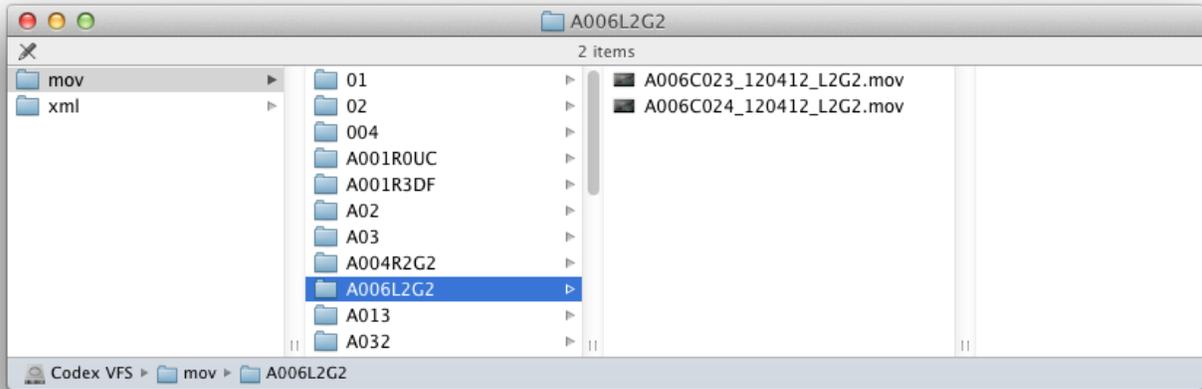
The resolution of the files will be the same as the recorded format – no scaling is applied.

The Conversion Quality is set to High. This means any de-bayering or scaling is done at the best quality.

The files will be numbered continuously, starting from 00000.dpx at the beginning of the shot.

2.5 Codex FCP Editorial (preset)

This configuration can be used as the basis for delivering Quicktime files using ProRes 422 LT compression for use in Final Cut Pro. The arrangement of files is shown here:



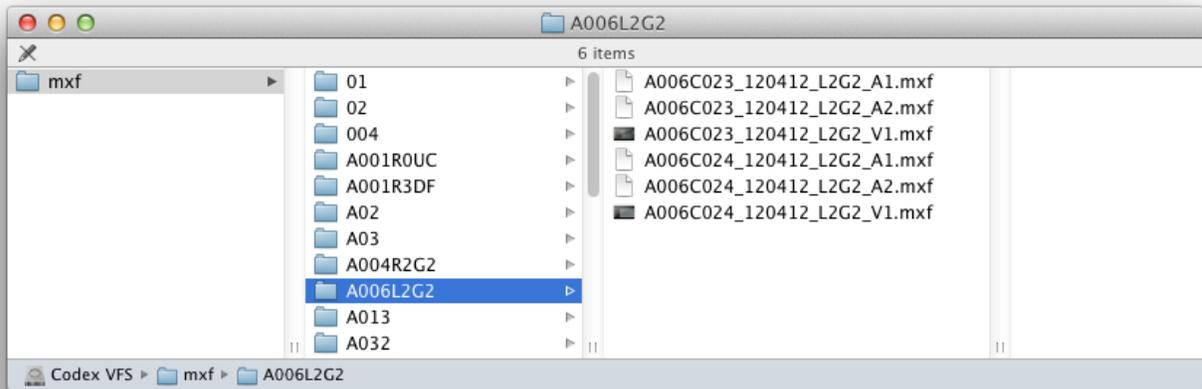
The resolution of the files will be the same as the recorded format – no scaling is applied.

The Compression Quality is Medium, which gives ProRes 422 LT. Change this to High for ProRes 422 HQ, or Low for ProRes 422 Proxy.

It also provides a FinalCut xml file for each shot – these contain additional metadata that cannot be inserted into the Quicktime file header, but can be re-linked to the files in Final Cut Pro.

2.6 Codex Avid Editorial (preset)

This configuration can be used as the basis for delivering mxf files for use in Avid. The arrangement of files is shown here:



The Compression Quality is Medium, which gives DNx115/120 files. Change this to High for DNx175/185/220, or Low for DNx36.

All files will be scaled to 1920x1080 resolution.

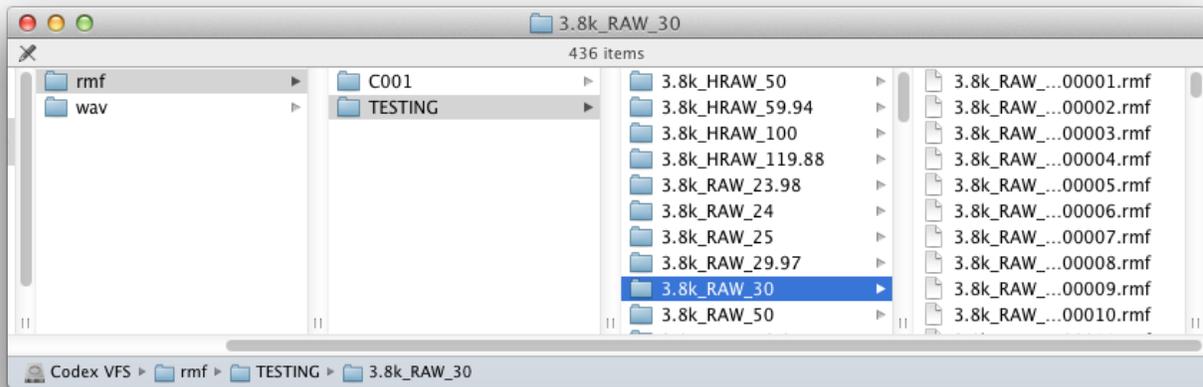
For Stereo Avid projects the Filetype can be changed to 3D DNxHD mxf, which by default will be in a side-by-side arrangement.

2.7 Codex Tape Offloading (preset)

This configuration can be used as the basis for archiving material to LTO tape or Disk. The arrangement of files is shown here:



The above image shows the VFS when ARRIRAW and HD material with audio is loaded. The ARRIRAW material is presented as .ari files, while the HD material is presented as .dpx files. Audio is presented as .wav files, and all metadata is contained in the .xml files.



The above image shows this configuration if only Canon Cinema RAW with audio is loaded. In this case the VFS contains .rmf files and .bwf files.

The file types in this configuration contain all video, audio, and metadata. It can be used for HD, 2K, ARRIRAW, or Canon Cinema RAW.

Material archived using this configuration can be imported using Codex software and restored as shots with all video, audio, and metadata as it was originally.

Note: The .dpx files will be 10-bit RGB. If the source material is recorded using a Codex Onboard with wavelet compression then it may be desirable to edit the **DPX Options** setting to **Keep Existing Format**. This will archive wavelet compressed .dpx files, reducing the file size. Wavelet compressed .dpx files are only readable by a Codex system, or alternatively can be decompressed to 10-bit RGB dpx files using a Codex command line tool available for Windows, Mac or Linux (licencing is required for this tool, please contact Codex for details).

2.8 Codex Multi-Channel Tape Offloading (preset)

This configuration can be used as the basis for archiving multi-channel shots to LTO tape or Disk.

The file types in the configuration contain all video, audio, and metadata. It can be used for HD, 2K, and ARRIRAW.

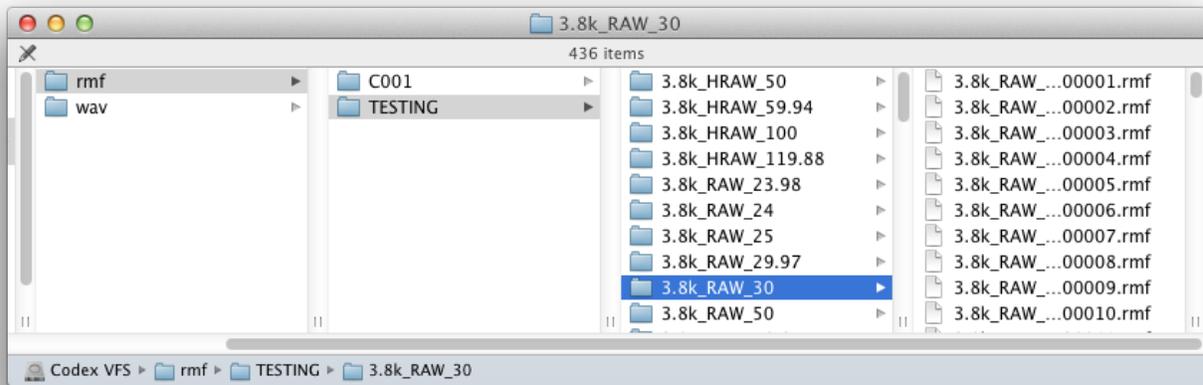
It is similar to the Tape Offloading preset but has a separate folder for each eye of .ari or .dpx files.

Refer to the section above on the Tape Offloading preset for additional information.

Note: this preset is not suitable for Canon Cinema RAW.

2.9 Codex C500 -> Canon CRDM .rmf and .bwf (preset)

This configuration can be used with Canon C500 Cinema RAW recordings as the basis for delivering .rmf (RAW Media Files) .bwf (broadcast wave audio files) for use with Canon Cinema RAW Development software. The arrangement of files is shown here:

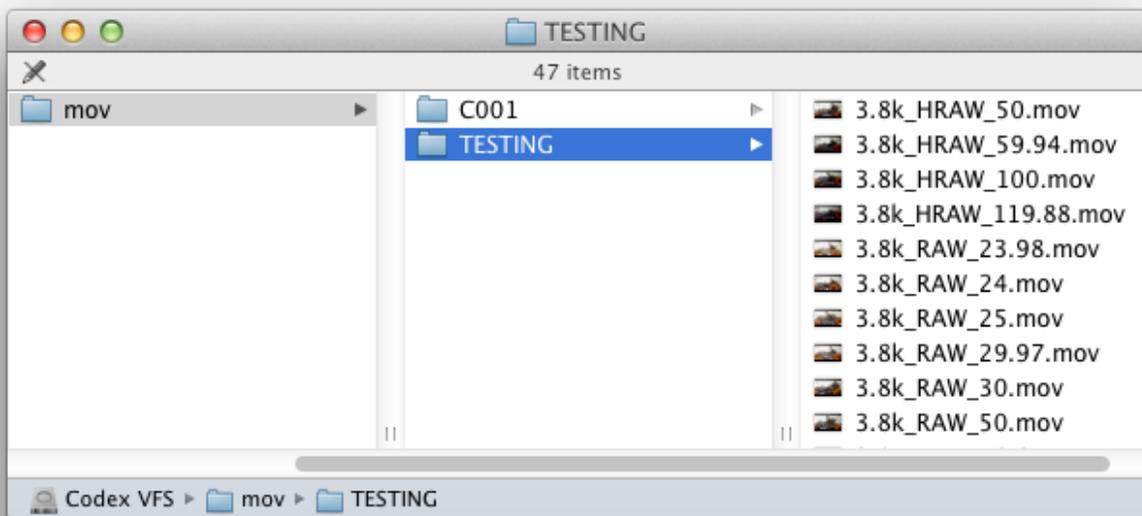


The .rmf file sequence is numbered continuously from the beginning of each clip, starting with 00000001.rmf. There is no scaling or debayering applied to .rmf files.

The .bwf files are stereo audio, containing Roll and Timecode metadata.

2.10 Codex C500 4K -> ProRes 422LT .mov (preset)

This configuration can be used with Canon C500 Cinema RAW recordings as the basis for delivering ProRes 422LT Quicktime files. The arrangement of files is shown here:



For 4096x2160 recordings the files are scaled to 2048x1080. For 3840x2160 recordings the files are scaled to 1920x1080.

A Canon 1D LUT is applied to the images to move them into standard video range.

The Compression Quality is Medium, which gives ProRes 422 LT. Change this to High for ProRes 422 HQ, or Low for ProRes 422 Proxy.

2.11 Codex C500 HD/2K -> ProRes 422LT .mov (preset)

This configuration can be used with Canon C500 HD and 2K recordings as the basis for delivering ProRes 422LT Quicktime files.

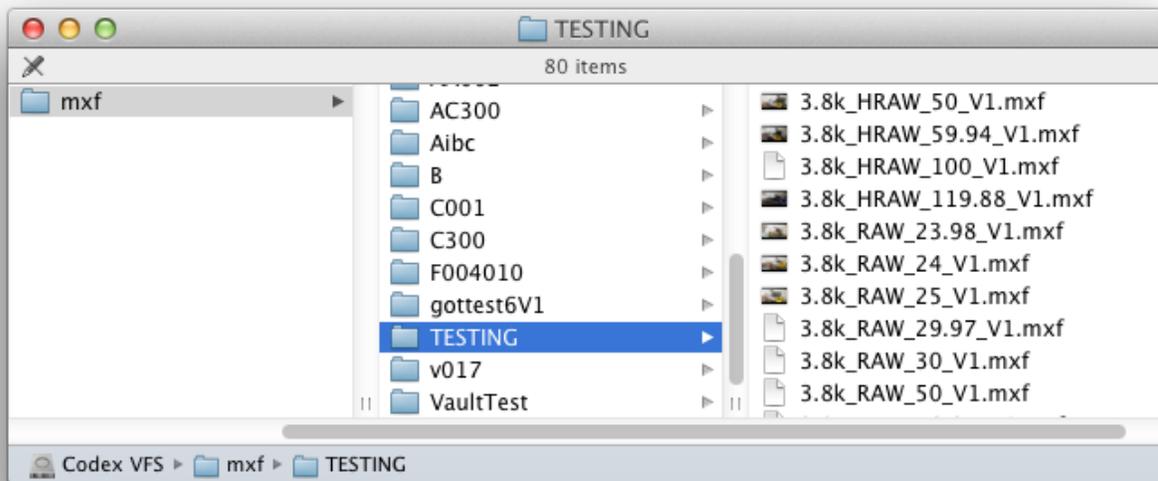
The arrangement of files is the same as for the previous configuration.

The resolution of the files will be the same as the recorded format – no scaling is applied.

The Compression Quality is Medium, which gives ProRes 422 LT. Change this to High for ProRes 422 HQ, or Low for ProRes 422 Proxy.

2.12 Codex C500 HD/2K/4K -> DNx115 .mxf (preset)

This configuration can be used with any Canon C500 recordings as the basis for delivering DNx 115 .mxf files. The arrangement of files is shown here:



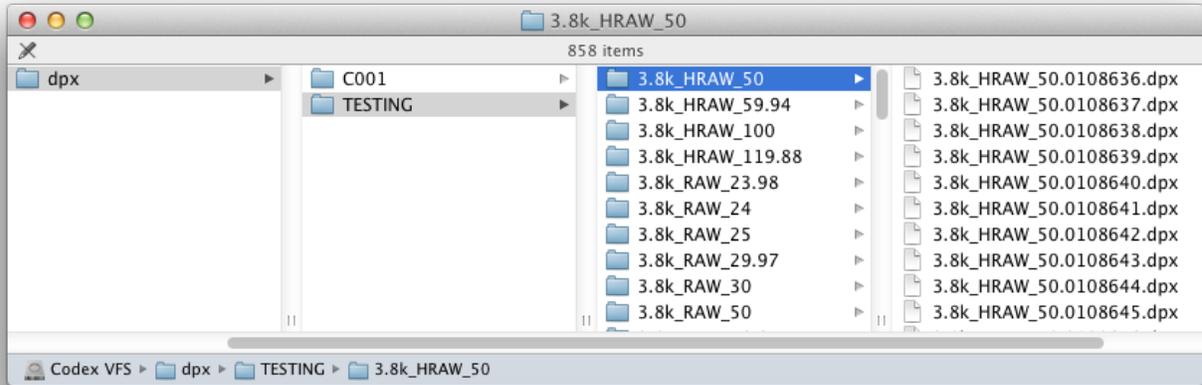
The Compression Quality is Medium, which gives DNx115/120 files. Change this to High for DNx175/185/220, or Low for DNx36.

All files will be scaled to 1920x1080 resolution.

A Canon 1D LUT is applied to the images to move them into legal video range.

2.13 Codex C500 4K -> 10-bit RGB .dpx (preset)

This configuration can be used with Canon Cinema RAW recordings as the basis for delivering 10-bit RGB .dpx files. The arrangement of files is shown here:



The preset is suitable for material recorded at 4096x2160 or 3840x2160 resolution, and the .dpx file will be full resolution.

De-bayering is done to the highest quality, and there is no LUT applied.

File numbering is continuous and based on timecode.

2.14 Codex C500 HD/2K -> 10-bit RGB .dpx (preset)

This configuration can be used with HD and 2K recordings as the basis for delivering 10-bit RGB .dpx files.

The arrangement of files is the same as for the previous configuration.

No scaling or LUTs are applied, and debayering is done to the highest quality.

3 Accessing files in the VFS

The way in which files are accessed from the VFS depends on the Codex system being used. Here are the common methods:

3.1 Transfer Station M or Capture Drive Dock (USB-3)

With the Codex software installed on a Mac there is a mounted drive called 'Codex VFS' on the desktop where files are located.

If this mounted drive is not visible on your Desktop check that in Finder Preferences the External disks settings is applied for "Show these items on the desktop:":



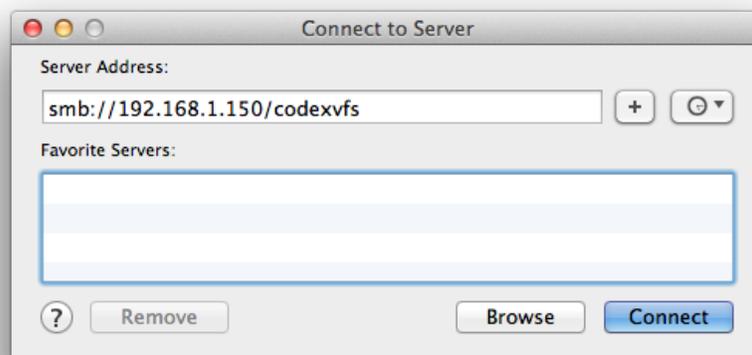
3.2 Digital Lab

The VFS on a Digital Lab can be accessed as a network shared folder. For the following sections we will use an example IP address of 192.168.1.150 for the Digital Lab. The computer from which you are connecting must have an IP address in the same range (e.g. 192.168.1.151) and a matching subnet mask to the Digital Lab. The IP address of the Digital Lab can be checked on the SETUP tab->CONTROL screen.

The VFS network shared folder can be connected to from either a Mac or Windows computer using the following methods:

3.2.1 Connecting from Mac OS X

Using Finder press cmd-K or select 'Go' and then 'Connect to Server' from the menu. In the Connect to Server box enter the following:



Click connect and when prompted enter user 'codex' and password 'codex' to complete the connection. A new Finder window will now open showing the VFS files on the Digital Lab.

To disconnect use Finder to eject the /codexvfs network share.

3.2.2 Connecting from Windows

Open 'My Computer' and from the 'Tools' menu select 'Map Network Drive'. In the box that appears, for the 'Folder:' enter:

```
\\192.168.1.150\codexvfs
```

When prompted enter user 'codex' and password 'codex' to complete the connection. A new Explorer window will now open showing the VFS files on the Digital Lab.

To disconnect open 'My Computer' and right-click on the /codexvfs network share, then click 'Disconnect'.

3.2.3 Accessing the VFS in the local file system

You may wish to access the files in the VFS locally on a Digital Lab. An example might be if you had connected and mounted an eSATA drive to copy files to. The VFS is located on the local file system in /mnt/codexvfs.

3.3 If the VFS appears to be empty

There are four possibilities:

1. There are no shots loaded.
2. The VFS configuration is set to <None Selected>.
3. There are filters set up in the VFS and no shots satisfy the filter conditions
4. There are no shots compatible with the file types in the VFS (e.g. if there was HD material loaded but only .ari in the VFS Configuration)

If the Codex UI shows that there are shots loaded, check the VFS configurations on the SETUP tab, VFS screen.

4 Setting up the Virtual File System (VFS)

It may be necessary to customise the setup of the VFS, either starting from the preset configurations or starting with a new configuration. The next sections will look at how to do this and the options available. All VFS setup is performed from the SETUP tab | VFS screen.

4.1 Setting-up VFS Configurations

The NEW CONFIG button creates a new VFS configuration, which will initially be empty:

Configuration Name:

Filename case: Upper or lower

Illegal chars: \V:<>*\?\"/>**Replace with:** -

Global Filter: *

No shots in system to show in filter example.

When creating a new VFS Configuration there are several global properties that can be set to ensure compatibility with post production software. These are:

Configuration Name: Set this to something appropriate, e.g. Editing files for My Project

Filename case – Either Upper and lower or Lower only, as required

Illegal chars – Either \V:<>*\?\"/>

Replace with – Either _ or – as required

Global Filter – this is covered in a later section

When these are set click the checkbox icon.

The EDIT CONFIG button allows you to edit the global properties of an existing configuration.

4.2 Adding or editing a File Type

Click the ADD button to add a new file type and choose the settings. This opens the default Virtual File Setup box:

The screenshot shows a 'Virtual File Setup' dialog box with the following fields and options:

- File Type:** dpx
- Filename:** {e}/{r}/{s}/{s}.{g%7}.{e}
- Scaling:** None
- Filter:** *
- LUT:**
- Conversion Quality:** High
- DPX Options:** Keep existing format
- TC Rate:** Default
- Colour Processing:** Default
- BurnIn:**
- Roll Name:** Keep original
- Example files:** <Extension>/<Roll>/<Shot>/<Shot>.<Tc frames>.<Extension>
No shots
- Slate:** None

This form fully defines the settings for a file type including file names and directory structure, scaling, compression, LUTs, burn-ins, etc.

Here are some further details on these options:

4.2.1 File Type

Click to open the drop-down list and select from a wide range of file types.

4.2.2 Filename

This is discussed in the later section - Naming Conventions.

4.2.3 Scaling

This controls the size of the output. It may be Relative, in which case you are given a list of standard scales such as ½ or ¼, or Fixed, in which case you specify the exact width and height.

4.2.4 Conversion Quality

This controls whether operations such as debayering, scaling, and colourspace conversion are optimised for quality (High) or speed (Low). If you want the best quality for use in post production choose High. If you want to preview files quickly choose Low.

4.2.5 Compression and Compression Quality

Some file types such as .mov and .mxf allow compression – ProRes and DNxHD are most common. After setting the Compression type, choose the Compression Quality:

ProRes 422:

Compression Quality	ProRes codec
High	ProRes 422 HQ
Medium	ProRes 422 LT
Low	ProRes 422 Proxy

DNxHD 422:

Compression Quality	Frames per second	DNxHD 422 codec
High*	23.98/24	DNx175/DNx175x
	25	DNx185/DNx185x
	29.97/30	DNx220/DNx220x
Medium	23.98/24	DNx115
	25	DNx120
	29.97/30	DNx145
Low	All	DNx36

4.2.6 LUTs and Burn-Ins

Each image file type specified in the VFS can optionally have a separate LUT(s) and/or burn-in applied to it, in order to optimise the quality for that type of file.

4.2.6.1 Supported LUT file types

Codex systems can apply three categories of LUT through the VFS – 1D, 3D, and CDL LUTs.

These LUTs are supported in the following types:

1D LUT – ASCII file formats which include Autodesk, Speedgrade, Quantel, Luther, Clipster, Davinci and Iridascube

3D LUT – cubes with dimensions from 16 to 64. Also supported are other 3D LUT ASCII file formats, which include Autodesk, Speedgrade, Quantel, Luther, Clipster, Davinci and Iridascube.

CDL LUT – this data can be captured on set or applied retrospectively from Filmlight's Truelight. See the document 'LUTs on Codex' for more details.

4.2.6.2 Loading LUTs and Burn-Ins onto the system

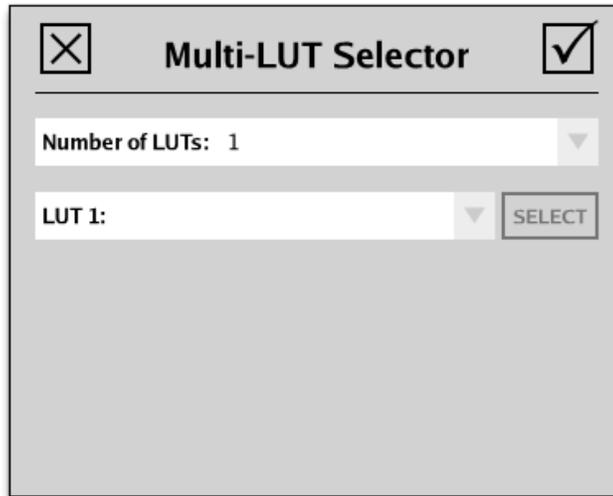
LUT and burn-in files should be placed in the following locations in order to be accessed through the software:

Transfer Station for Mac OS X or Capture Drive Dock – use Finder to navigate to /Library/Application Support/Codex and copy files to either /luts or /burnins directory

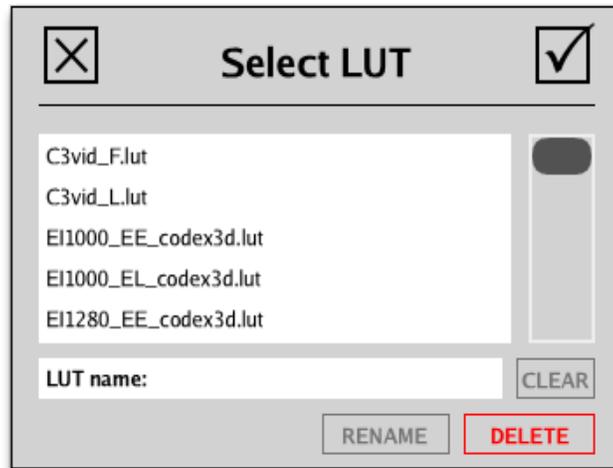
Digital Lab – access /codexsettings network share (user=codex, password=codex) and copy files to either /luts or /burnins directory

4.2.6.3 Selecting LUTs for a file type

To choose a LUT for a file type in the VFS first select the file type from the main VFS screen and then click EDIT. In the 'Virtual File Setup' box that appears click the 'LUT' field, which will bring up the 'Multi-LUT Selector':

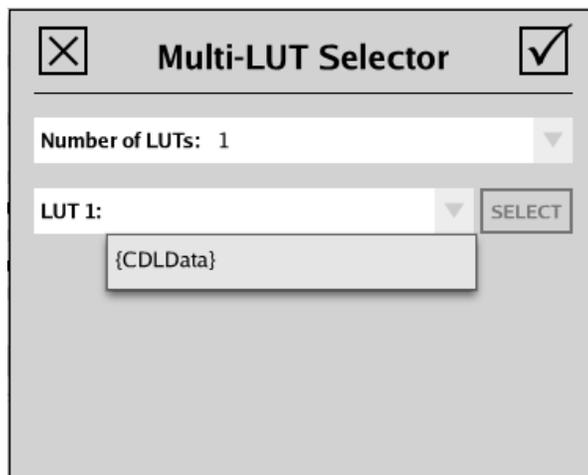


The 'Multi-LUT Selector' allows you to create a pipeline of up to 5 LUTs for each file type. The pipeline may consist of fixed LUTs and dynamic LUTs. Click SELECT to select a LUT that has been loaded on the system:



For dynamic LUT application on a per shot basis there are two options:

If shots have CDL Data then this will be applied when {CDLData} is selected in the 'Multi-LUT Selector' – this is available if you click the arrow to open the drop-down list for each LUT:



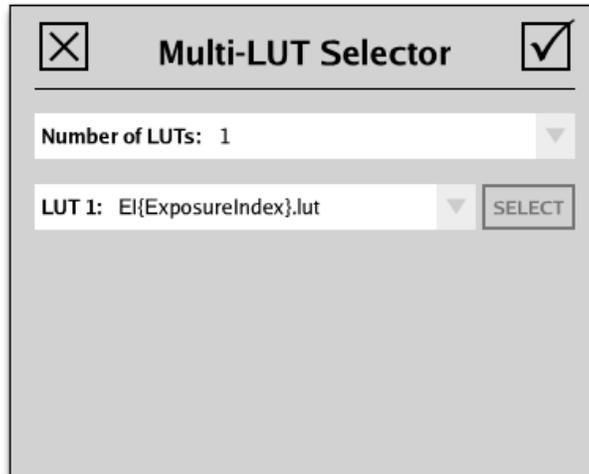
The other type of dynamic LUT application can be tied to a metadata property of the shots. For example, if a production knows it is going to use a fixed set of Exposure Index values, a range of LUTs can be loaded on the system each appropriate for a particular exposure index. These LUTs could be called:

EI200.lut
EI400.lut
EI800.lut

Etc...

When shots were recorded the correct Exposure Index value would be stored as a metadata property of the shot with the name {ExposureIndex}. In the VFS this value could then be used in the 'Multi-LUT Selector' by entering a LUT name of:

EI{ExposureIndex}.lut



The VFS would then apply the correct LUT to each shot based on the stored Exposure Index value.

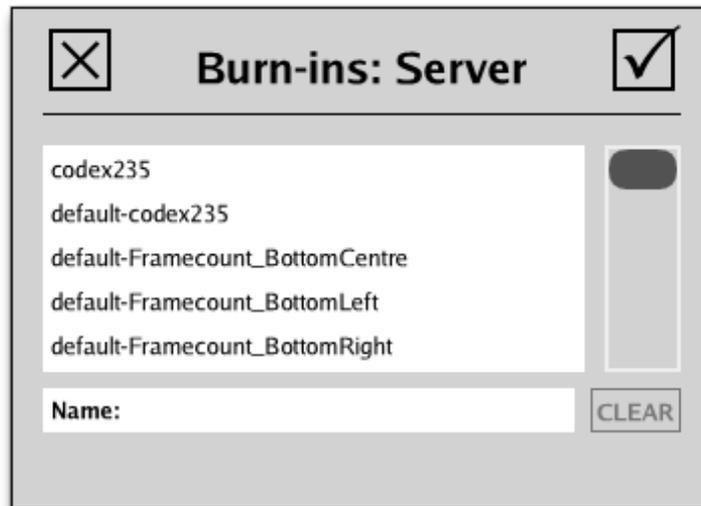
Note: VFS LUTs are cached for best performance, so if a LUT file is replaced with another of the same name, the system will need to be restarted for the new values to take effect. Therefore, if experimenting with VFS LUTs, it is best to use a different filename for each variant.

4.2.6.4 Selecting Burn-Ins

In the Virtual File Setup box, click in the BurnIn field to open the BurnIn selector:



Then click the ADD TEMPLATE button to choose from a selection of preset templates. You can do this multiple times to combine different templates:



Click the name of a template and then click the checkbox to add it:



If further customisation of burn-ins is required, refer to the Burn Ins Guide available from www.codexdigital.com/support/media-stations

4.2.7 DPX Options

This setting controls whether .dpx files are output in their existing format (Keep Existing Format) or converted to 10-bit, 12-bit, or 16-bit RGB dpx files.

While 10-bit RGB dpx files are a common path for post-production, if material has been recorded with wavelet compression on a Codex Onboard recorder you may choose 'Keep Existing Format' to store compressed dpx files. The 'Convert to 10-bit RGB' option will uncompress any wavelet material.

Wavelet compressed files will need to be decompressed in order to be viewed in another software. This can be done either by importing back to the Codex software and then re-exporting as uncompressed files, or by using the Codex command line utility (licence required).

4.2.8 Colour processing

Default colour processing uses RGB colourspace. There is an implementation of ACES colourspace in the software that should be used in communication with Codex support.

4.2.9 Roll Name

This setting should be used if two cameras have been recorded to the same Codex Onboard M or S recorder. For example, in the case of Left and Right stereo cameras, or A and B cameras.

In this case the shots will have two video channels, so this setting is used to give the files for each camera unique Roll metadata. If the shots were recorded to Roll 001 and the Channel ID V1/V2 on the recorder was set to L and R, then using the **Append Channel ID** setting would result in the files containing Roll metadata values of 001L and 001R respectively. Similarly, the **Prefix with Channel ID** settings would give Roll metadata of L001 and R001.

5 Naming conventions for VFS files

To customise the way the files are named and folders are organised in the VFS, you need to understand the file naming conventions.

For each file type in the VFS the user can specify a Filename string, e.g. {e}/{r}/{s}/{s}.{g%7}.{e}. This string defines a rule for how the file type is presented, i.e. the directory structure and individual file names. And this string is made of tokens.

Tokens in the VFS are often single letters enclosed in braces, like this {r}. These single letter tokens are a shorthand way of referring to a metadata value. The token {r} is shorthand for 'Roll', so when this token is used it gets substituted with a Roll value for a given shot. Tokens are designed to make it quick and easy to define Filenames.

There are a range of VFS tokens that can be used to determine the filenames for deliverables, with full details provided in the Appendix.

As an example, a user has two Rolls each containing several Shots. Roll 'A001' contains the Shots '42_001', '42_002', and '42_003'. Roll 'A002' contains the Shots '58_001' and '58_002'.

The user would like to configure the VFS to provide dpx files so that there is a directory for each Roll, and within this there is a directory for each Shot on the Roll, and within these are the individual dpx files for each shot.

The single letter tokens that would be used in the VFS are:

{r} = Roll
{s} = Shot name
{f%5} = Frame number in shot, zero-padded to 5 digits
{e} = Extension/Filetype

The filename for the dpx files in the VFS would be set up as: {r}/{s}/{s}.{f%5}.{e}

As per a normal Filepath, the forward slash '/' is used to denote a directory level.

There are standard predefined rules for all of this, available from drop-down lists in the Codex UI, but if you want to define your own rules, or more complex variants, the next sections give more details on Tokens and how to use them.

6 Tokens

The name of any metadata field (such as Roll, Scene, Take or any other field found on the Filecard or SETUP tab screens) can be turned into a token by using the name of the field enclosed in {braces} – for example {Scene}.

When the shot is named, these tokens are then replaced by the current value of that field. For example, if you describe the rule for shot names as follows:

Test {Scene}-{Take}

Then for each shot the words in braces will be replaced by the current Scene and Take value, and the rest used as written. If the Scene is 14 and the Take is 5, the shot name would become:

Test 14-5

The values don't have to be numbers, of course. Scene Freddy and Take t99B becomes:

Test Freddy-t99B

6.1 Rules for Token-Names

All of the metadata is described by internal property (prop) fieldnames, which are the ones used in the XML structures of the configuration files and within the database. These names are ultimately what the token-replacement system uses: the built-in ones are listed in the Appendix and have to be case-sensitive and without spaces, in order to conform to XML rules. Examples are ProductionName and CircleTake.

However, the user doesn't normally see these fieldnames, but the friendly labels or usernames on the Filecard and SETUP tab screens. All the common fieldnames can be described by these usernames, such as Production and Circle. These names are not case-sensitive and may contain spaces.

Note: If you invent new fieldnames in your filecard.xml they will not have friendly labels to match – you will have to assign a label as well.

There are also a number of single-letter tokens. Some of these are conveniences - for example {r} is the same as {OriginalRoll} – but they are mainly for special purposes within the setup of the VFS. For example, if you are generating dpx files - which are one-per-frame - {f} can be used to put the frame-number in each filename. There is a full list of all legal token-names in an Appendix.

Note: The rules for tokens in shot names and VFS names are slightly different. Generally speaking:

Labels (user friendly names) should be used as tokens in the Shot Naming Rule and Roll Naming Rule.

Metadata property (prop) names should be used as tokens in the VFS setup.

Some single-letter tokens, such as {f}, only work in the VFS, as they have no meaning in the context of shot naming. For a list of metadata labels and single letter tokens see the Appendix.

6.2 Naming VFS files

Now we have had an introduction to tokens and how they are used in the Filename, here are some further details.

The VFS Filename setting allows you to set up not only filenames, but also separate named sub-directories and even entire trees. This is very useful for presenting the same shots in different forms for different uses. Here's a simple example:

PHOTO OF VFS DIRECTORY STRUCTURE ON WINDOWS

In this case, all the shots appear together in various directories as Avid MXF files, Quicktime files, and so on. But the shots also appear as DPX files in their own individual sub-directories. The reason for this is that there is one DPX file for every frame, and shots need to be kept separate.

As with shot naming, there are preset choices for the VFS filenames, tailored to the file type in question, and you can also construct your own.

The bottom of the Virtual File Setup card shows you examples of the filenames you will get, including the full directory-path if specified.

In the example above, the Filetype is dpx and the Filename string is:

{s}/{e}{f%5}.{e} which expands to:

<Shot>/<Type>/<Frame>.<Type>

Notice the %5 in {f%5}. This defines the number of digits in the frame number – in this case 5, padded with zero's as necessary. Similarly, {f-5} limits this number to a maximum of 5 digits, while {f+1000} would add 1000 to any frame number. All these different options can be used at once to modify numeric values if required.

Another useful token is {g} which will insert a number value for frames-since-midnight. This can be useful for creating sequences of files that are numerically continuous, which is required by most DI and VFX systems. A common option to use is {g%7}, giving a frames-since-midnight value of 7 digits for all files.

The first example shot is named 1_1. The result is a directory named 1_1, with a sub-directory named dpx, containing one file per frame, each named with a 5-digit frame number and dpx. So:

1_1/dpx/00000.dpx
1_1/dpx/00001.dpx
And so on...

Here are some more filename examples, ranging from very simple to more complex:

{s}.{e} expands to <Shot name>.<Extension> (all shots in the codexvfs root directory, e.g. freddy.avi)

{r}/{s}.{e} expands to <Roll>/<Shot name>.<Extension> (separate subdirectory for each Roll, e.g. test/freddy.avi)

{e}/{r}/{s}{f%5}.dpx expands to <Extension>/<Roll>/<Shot name><'5-digit framenum'>

(sub-directory named dpx, Roll directory, one dpx file per shot, e.g. dpx/100/freddy00012.dpx)

Always check carefully the Example Files box to confirm that any custom filenames you have created are producing the desired result - if it looks wrong, it is wrong: check the tokens and the braces.

With the VFS, there is one further thing to look out for: if the specification is incomplete, you may produce duplicate filenames, which could cause major issues in post production and should be carefully avoided. For example, this specification:

```
{r}.{e}
```

This expands to <Roll>.<Extension> - for example test.avi - and if you used it, every single shot with the same Roll would get the same filename. The system will give each file a number – test.avi (2) etc - to avoid clashes, but this will affect the speed at which the VFS creates the list of files.

In the cases where there is one file-per-frame it is especially important to include something to define a different filename for each frame, such as the frame-number in the examples above, or timecode. Otherwise there would potentially be thousands of files all with the same name.

The system warns you if there may be duplicate filenames – do not ignore this warning!

7 Filtering: controlling contents of VFS Directories

Filters can be used to limit the contents of the VFS. You can apply a filter either across all file types in the VFS using the 'Global Filter' field (accessible when you create or edit a VFS Configuration), or to an individual file type using the 'Filter' field (accessible when you EDIT a file type).

All shots can appear in more than one directory of the VFS. The most usual reason for this is to present them in various formats – the shot will appear in a MOV directory, a DPX directory, different resolutions and so on.

But shots can also appear in multiple directories of exactly the same type. The reason why this is useful is that all directories can be filtered to contain only shots that have certain values for their metadata. For example, you can have directories of only Circle Takes, or from a particular Roll or Source – or any combinations of these.

All the metadata fields can be used, whether from the shot's Filecard or from the settings in the SETUP tab, such as PROJECT and SOURCE settings. However:

Note: Filter strings are Case Sensitive and use Internal Metadata and Single Letter Token Names (e.g. {r}, {s}, etc.), as per the rest of the VFS.

Apply filters by typing strings into the Global Filter or Filter field. An empty field or asterisk (*) means 'everything', which is set by default. The table below contains some example filters.

Filter:	Directories will contain:
{CircleTake} = "Yes"	only shots whose Filecard shows Yes in the Circle field
{OriginalRoll} = "A001"	only shots whose Filecard shows A001 in the Roll field
{ShootDate} = "20130307"	only shots whose Filecard shows 20130307 in the Date field

Note: The metadata tokens must be in {braces} and token values must be in "quotes".

You can also combine these expressions into complex statements. Operators include: =, != (means not-equal), and, or, not

and may be surrounded by brackets. For example:

```
{CircleTake}="Yes" and ({w}=4096 or {w}=1920)
```

i.e. only shots which have Yes in the Circle Field and whose width is 4096 or 1920.

If you need any help in constructing complex filters please contact Codex.

Note: The values for {w}= are not in quotes. This is because they are not strings like all the typed-in values, but are numeric values (in this case the Width of the picture).

8 Appendices

8.1 Metadata Property Names and Labels

User Friendly Label	Metadata Property Name	Synonym	Usage
Production	ProductionName		Setup -> Project
Production Company	ProductionCompany		Setup -> Project
Unit	ProductionUnit		Setup -> Project
Director	Director		Setup -> Project
DoP	DirectorOfPhotography		Setup -> Project
Camera Assistant	CameraAssistant		Setup -> Project
Codex Operator	CodexOperator		Setup -> Project
Sound Recordist	SoundRecordist		None by default
Name	ShotName	{s}	Filecard, Setup -> Slate -> Shot naming rule
Roll	OriginalRoll	{r}	Filecard
Scene	Scene		Filecard
Take	Take		Filecard
Shot	Shot		None by default
Slate	Slate		None by default
Circle Take	CircleTake		Filecard
Shot Type	ShotType		Filecard
Interior / Exterior	IntExt		Filecard
Day / Night	DayNight		Filecard
Comments	Comments		Filecard
T-Stop	Tstop		Filecard
Focus	Focus		Filecard
Lens	LensType		Filecard
Filter	Filter		Filecard
Source Type	SourceType		Setup -> Source
Source ID	SourceId		Setup -> Source
Source Name	SourceDevice		Setup -> Source, Filecard
Serial No	SourceSerial		Setup -> Source
Shutter Angle	ShutterAngle		Filecard
Snapshot	Snapshot		None by default
Date	Date		Filecard

8.1.1 Single-letter tokens applicable to VFS only

- {s} Synonym for {ShotName}
- {r} Synonym for {OriginalRoll}
- {d} Date shot was recorded (which is not the same as using {ShootDate})
- {D} Date and time shot was recorded
- {f} Frame number
- {e} Extension (file type)
- {c} Channel number (Video and Audio)
- {t} Timecode (as hhhmssff string)
- {T} Start timecode of shot
- {g} Timecode (as frame count from midnight)
- {G} Start timecode (as frame count from midnight)
- {n} Total number of frames in the shot
- {b} Userbit per frame
- {B} Start userbit for shot
- {L} Port description (i.e. where a Datapack is loaded)
- {I} Datapack GUID (unique hardware ID)

8.1.2 Single-letter tokens applicable to both VFS and Shot naming rule

{w} Width (VFS: after any scaling)
{h} Height (VFS: after any scaling)
{u} Uuid (128-bit unique identifier of every shot – xxxxxxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx)
{r} Synonym for {OriginalRoll}

Tokens can optionally have a minimum and/or maximum width specified for the expansion. This is most commonly used with tokens that produce numbers, but work with any single-letter token.

To specify a minimum width n add %n after the token. To specify a maximum width n, add -n after the token

Examples:

{f} Frame number 0-99999
{f%5} Frame number 00000 – 99999
{r} Roll (“A long name”)
{r-8} Roll (“A long n”)

8.2 The {Datapack} token for Roll Naming Rule

The {Datapack} token can be used only for the Roll Naming Rule. It refers to the Roll name on the STORAGE tab. When shooting multiple sources on a single Datapack (using a Codex Onboard) the Roll Naming Rule can be set to {Datapack}{Source ID} which ensures that shots will have unique Rolls – a requirement for some editing systems, particularly when working with stereoscopic material.

8.3 VFS Considerations

When using the VFS the following points should be considered:

1. It is common to set the rate for each file type to whatever the project timecode rate is for editorial.
2. If there are known problems with timecode on material then either the FIX TC feature should be used to restripe the primary timecode track of the shots in question, or the {f%5} token should be used to result in continuous file numbering for a shot.
3. For multi-channel shots the Roll Name setting for each file type would typically be either ‘Append Channel ID’ or ‘Prefix with Channel ID’. This is, however, dependent on the specific workflow. Some stereo workflows require that both left and right eye material have a common roll name. For example, when applying edits on a Quantel Pablo it is common to prep on the left eye, save an AAF file describing the work, and then apply the AAF file to the right eye. This does not work if the roll names are different. In this situation you would not augment the roll name *inside* the file metadata, but would make sure that the root directory split footage into left/right eye file name hierarchies.

E.g.
Roll Name: {r}
Filename: {r}{C}/...

