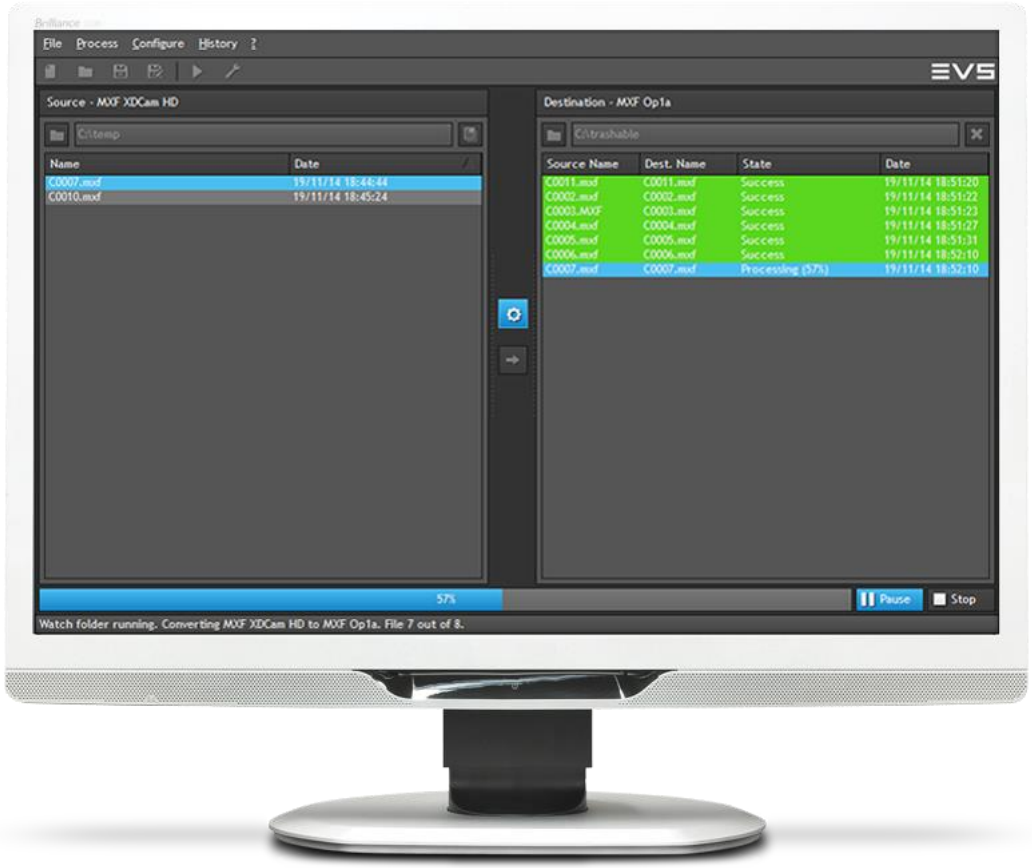
USER MANUAL
OPENCUBE XFCONVERTER

Version 2.0 – December 2014



XFConverter

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Table of Contents

What's New?

In the XFConverter user manual, the icon NEW ! has been added on the left margin to highlight information on new and updated features.

The changes linked to new features in version 2.0 are listed below.

A new skin has been applied.

A new MP4 plug-in has been added.

- See section "4.5 MP4 Plug-in" on page "22".

Transcoding capabilities.

- See section "6 Transcoding" on page "47".

Two new profiles have been added to the MXF plug-in: ARD ZDF HDF (support of AVC-Intra only) and AS-10 "High HD" shim.

- See section "4.7 MXF Plug-in" on page "24".

A Class parameter has been added to the VC-3 stream configuration dialog box.

- See section "5.4 VC-3 Stream" on page "39".

1. Introduction

1.1 Purpose of the Application

OpenCube XFConverter is a gateway solution between non-interoperable video systems. It enables users to wrap, unwrap and convert a wide range of video and audio wrapper formats (AVI, GXF, MOV, MP4 and MXF). OpenCube XFConverter also allows to transcode certain input streams during the conversion process. The conversions can be automated with the watch folder module, creating a seamless workflow in your networked environment.

1.2 Minimum Hardware Requirements

1.2.1 For Simple Rewrapping

The minimum hardware requirements for simple rewrapping are:

- Intel Core 2 Duo 2.2 GHz
- 2 GB RAM

The recommended hardware requirements for simple rewrapping are:

- Intel Core i5 2GHz
- 4 GB RAM

1.2.2 For Transcoding

The minimum hardware requirements for transcoding are:

- Intel Core i7-860 2.80GHz
- 6 GB RAM

The recommended hardware requirements for transcoding are:

- Intel® Xeon® E5-2670 2.60 GHz
- 8 GB RAM

1.3 Minimum Software Requirements

OpenCube XFConverter runs under the following Microsoft Windows operating systems:

- Windows XP-SP3
- Windows Vista
- Windows 7
- Windows 8

OpenCube XFConverter is a 32-bit application that can be installed on both 32- and 64-bit OS.

For transcoding, it is recommended to install XFConverter on a 64-bit operating system.

It can be executed without administrative rights.

To use the OpenCube XFConverter QuickTime plug-in, the QuickTime Player from Apple must be installed on the computer.

1.4 Installation

To install OpenCube XFConverter, run `XFConverter-Setup.exe` from the `OCPackage\Windows` folder.

During the installation procedure, your antivirus software may warn you about the execution of Windows scripts. You may safely ignore these warnings.

If you encounter any problem with the installation, do not hesitate to contact the OpenCube XFConverter support team (support.opencube@evs.com).

1.5 License Activation

OpenCube XFConverter is a plug-in based application. Each plug-in requires a special license file in order to be activated. Temporary license keys for evaluation purposes are available from the EVS OpenCube website (http://www.evs-opencube.com). After you create an account, you are given access to a download area where you can retrieve a one-month license key file.

If you purchased OpenCube XFConverter, you will have received a permanent license key file (`*.lcs`). The full license must be activated over the Internet. If the computer does not have an Internet connection or uses a proxy, please contact the OpenCube XFConverter support team (support.opencube@evs.com).

The first time you launch the program, OpenCube XFConverter will open the About dialog box so that you can load your license file.

Figure 1: About dialog box (without license)

The plug-ins listed in red are not activated and require a valid license. You must provide a license for each of the plug-ins so that the corresponding formats can be supported by XFConverter. In order to activate the plug-ins, click on the button located at the bottom of the dialog box and select a valid .lcs file. After you load a license, the display will change, showing the new status of the plug-in.

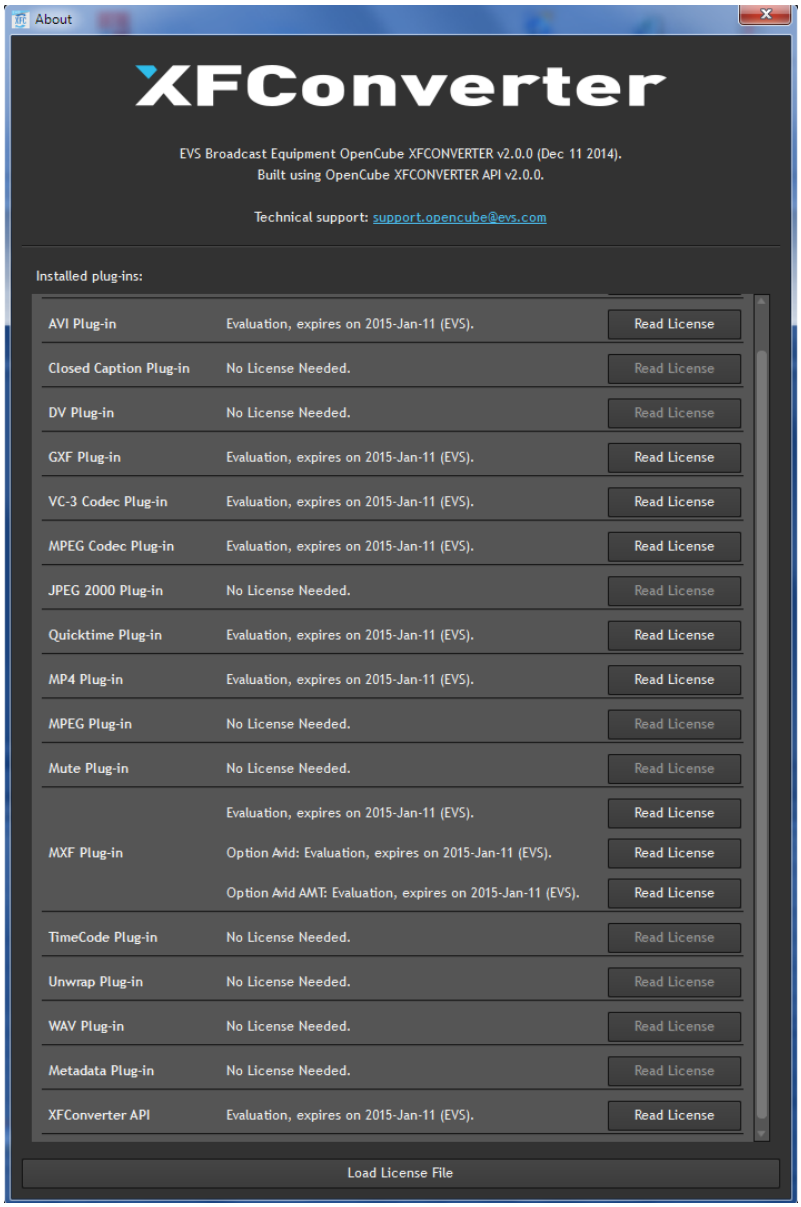


Figure 2 About dialog box (evaluation license file)

Note

Please note that a copy of your license is available in the OpenCube XFConverter ProgramData directory if you happen to lose it.

1.6 Uninstallation

You can uninstall OpenCube XFConverter using the configuration panel.

1.7 Transferring a License

Each OpenCube XFConverter license is linked to a single computer, identified by its MAC address.

To transfer the license to another system, you have to:

1. Uninstall OpenCube XFConverter.
2. Send an e-mail to support.opencube@evs.com with:
   a) The purchase order number.
   b) The confirmation that OpenCube XFConverter has been uninstalled.
   c) MAC addresses of the old and new systems.

Note

According to the EULA, the number of transfers is limited.

2. OpenCube XFConverter in Practice

2.1 Overview

Illustration

The XFConverter main window contains the areas highlighted on the screenshot below.

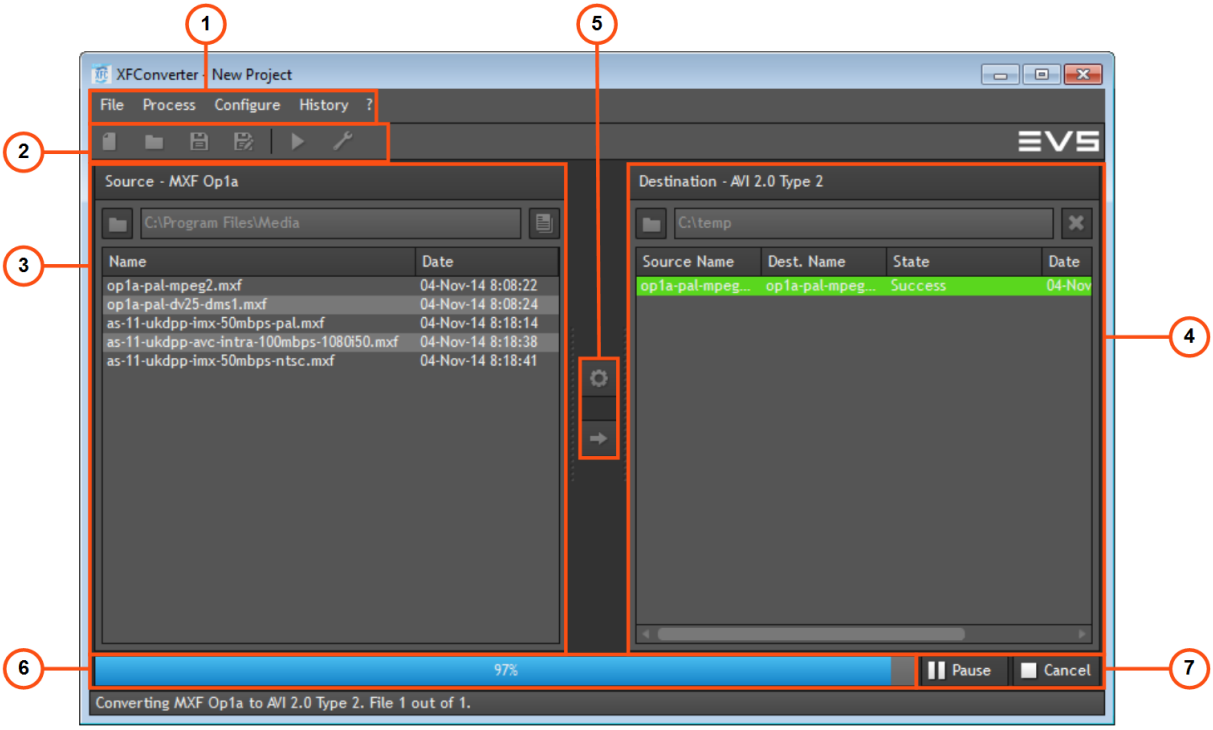


Figure 3 XFConverter main window

Area Description

The table below describes the various parts of the main window.

Part	Name	Description
1.	Menu	The menu can be used to load and save projects as well as to configure OpenCube XFConverter.
2.	Toolbar	The toolbar offers easy access to the most commonly used actions.
3.	Source Directory pane	The Source Directory pane is used to configure and display the source directory, i.e. the directory in which the media files are located that are ready for conversion.

Part	Name	Description
4.	Destination Directory pane	The Destination Directory pane displays the past, current and scheduled conversions as well as their status.
5.	Convert Selected Files and Start Watch Folder button	The **Convert Select Files** button allows you to manually add files to the Destination Directory pane and to start the conversion process. The **Start Watch Folder** button allows you to start the watch folder process and the automatic conversion of source files.
6.	Progress bar	The progress bar shows the current progress.
7.	Pause and Cancel buttons	The **Pause** and **Cancel** buttons can be used to control the process.

Playing Back Files

To play back a source or a destination file in a third-party application, select it in the Source or Destination Directory pane and do one of the following:

- Click the **Play** button in the toolbar, or
- Right-click the selected file and select **Play** from the shortcut menu.

The playback will start only if you have installed the appropriate player.

To play back MXF and GXF files you can download the OpenCube XFReader application from www.evs-opencube.com.

Apple's QuickTime Player can be downloaded at www.quicktime.com.

Most AVI files will play directly with Microsoft's Windows Media Player; however you may have to install third-party codecs.

2.2 Source Directory Pane

Illustration

The Source Directory pane contains the areas highlighted on the screenshot below.

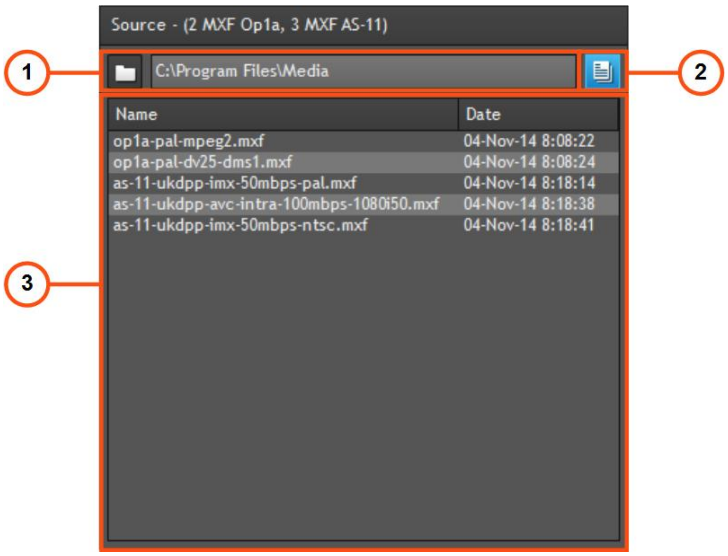


Figure 4 OpenCube XFConverter main window - Source Directory pane

Area Description

The table below describes the various parts of the Source Directory pane:

Part	Name	Description
1.	Source path	If you click on the folder button, it will open a browser window where you can select a directory containing the media files you want to convert. After you select the directory, the Source File list is automatically refreshed to reflect the content of the directory.
2.	Multi-selection button	It will disable the pattern-matching feature and display each file individually. **Note:** By using that mode, you can select several files to convert even if they do not share the same pattern naming convention.

Part	Name	Description
3.	Source File list	Only the files matching the input plug-in's settings will be displayed; other files will be filtered. When multiple input files following a source filename pattern are required (Wrap plug-in, see section 4.9), a single entry for the entire set is displayed. **Note:** If one or several files is (are) missing or do not have a name following the pattern, the whole set of files will not be displayed. **Note:** If an entry on the list appears with an orange background, it means that the corresponding file is currently opened in another application or being copied or created.

2.3 Destination Directory Pane

Illustration

The Destination Directory pane contains the areas highlighted on the screenshot below.

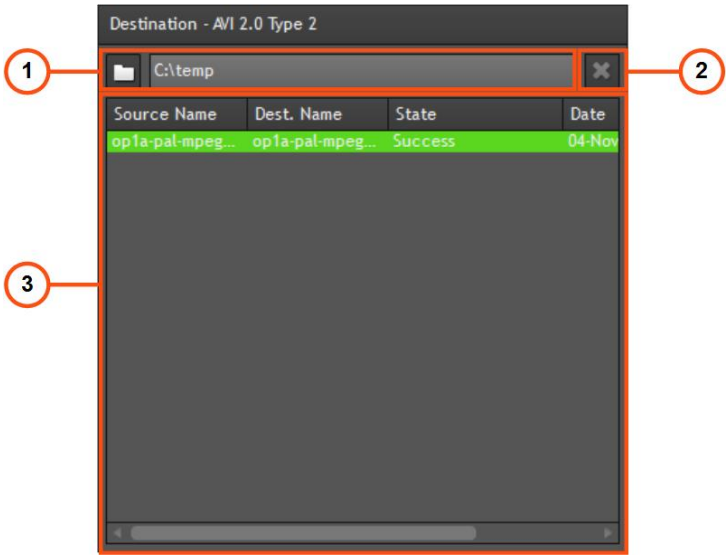


Figure 5 OpenCube XFConverter main window - Destination Directory pane

Area Description

The table below describes the various parts of the Destination Directory pane:

Part	Name	Description
1.	Destination path	If you click on the folder button, a browser window will open enabling you to select a directory in which to create the files.

Part	Name	Description
2.	Log view	The log view will contain the list of past, current and future conversion processes. Past conversions are listed in green if successful or in red if an error occurred (usually when the source file(s) do(es) not match the current configuration).
3.	Remove Item button	The Remove Item button is used to remove a process from the log view.

2.4 Launching the Conversion Process

Starting the Conversion of a Selection of Files

To manually start the conversion of one or more source files, select them in the source list and do one of the following:

- Drag and drop them in the log view of the Destination Directory pane, or
- Right-click the file(s) and select **Convert Selected** from the shortcut menu, or
- Click on the **Convert Selected Files** button  .

All the files will be queued and the conversion of the first file will start.

Starting the Watch Folder Process

To start the watch folder process and the automatic conversion of source files, click on the **Start Watch Folder** button  . Files from the source list will be processed one by one starting from the oldest to the most recent one.

As soon as the conversion of a file is completed it is removed from the list and can no longer be converted. The conversion status of each file is stored with the project so that when you restart the application the files that still exist but that were converted earlier will no longer be processed. These files will not appear in the interface.

If you wish to clear the history and enable the conversion of older files, you can select **Clear Current Directory** or **Clear All Directories** in the **History** menu.

The watch folder process can be paused, resumed or stopped at any time by clicking on the corresponding buttons.

2.5 Projects

You can save the history of the conversions as well as the current conversion graph in a project file. Project management features are accessible through the **File** menu.

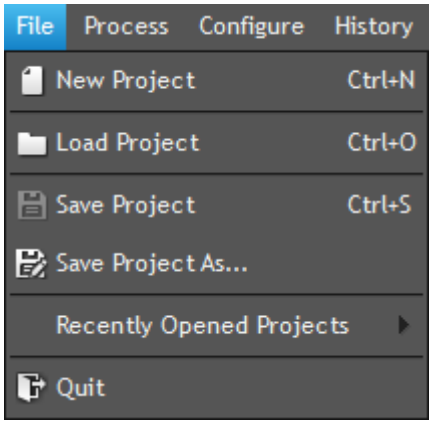


Figure 6 File menu

The **File** menu contains the following commands:

Command	Description
New Project	Close the current project and create a new empty one (with an empty graph).
Load Project	Open an existing project.
Save Project	Save the current project under the same project file name.
Save Project As	Save the current project as a new project file.
Recently Opened Projects	Shortcuts to the most recently used projects.
Quit	Quit the application.

3. Configuring OpenCube XFConverter

3.1 Overview Configure Conversion Dialog Box

Opening the Configure Conversion Dialog Box

You can open the Configure Conversion dialog box in two ways:

- Click on the wrench icon located in the toolbar of the main window.
- Open the **Configure** menu and select **Configure Conversion**.

It will open a graph view where you can define the conversion process in detail.

Illustration

The Configure Conversion dialog box contains the areas highlighted on the screenshot below.

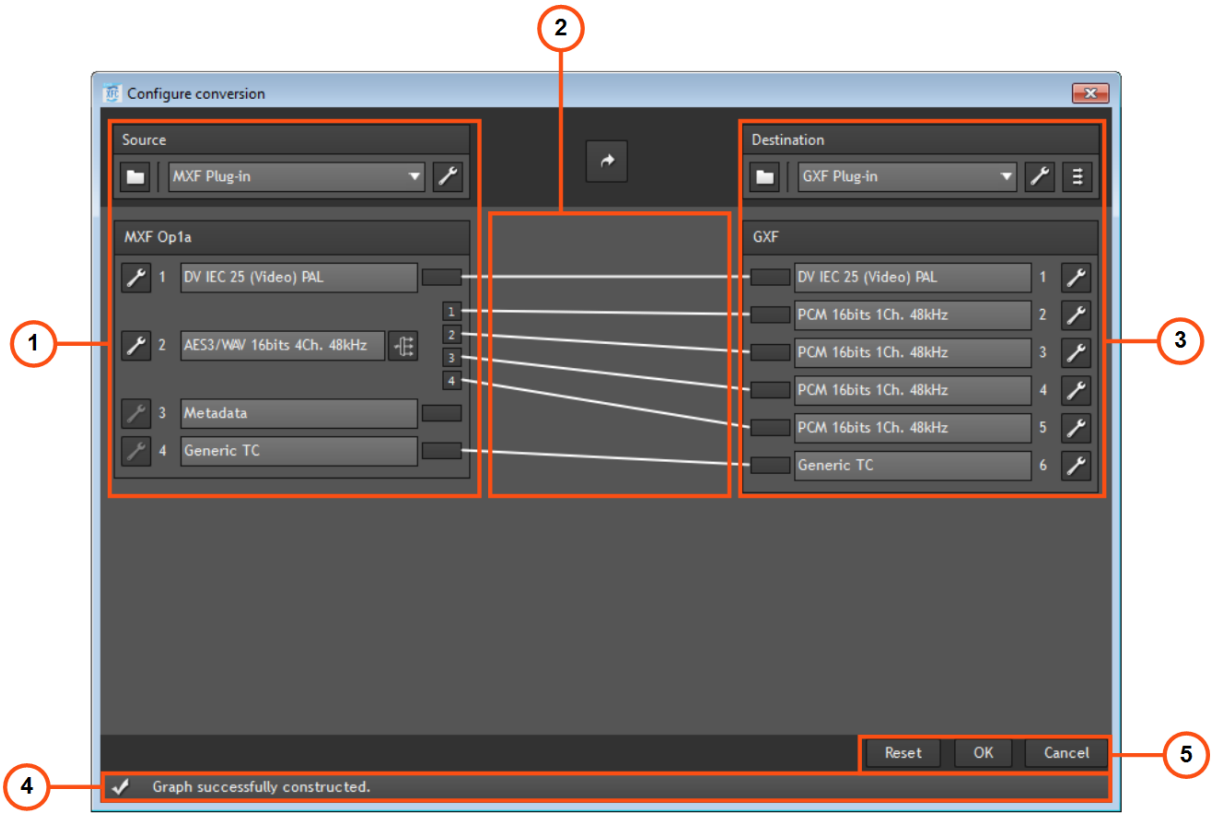


Figure 7 Configure Conversion dialog box

Area Description

The table below describes the various parts of the Configure Conversion dialog box:

Part	Name	Description
1.	Input Plug-in Configuration area	Define the source file (see section “3.2 Input Plug-in Configuration”).
2.	Output Plug-in Configuration area	Define the destination file (see section “3.3 Output Plug-in Configuration”).
3.	Connections	Connections between source and destination (see section “3.4 Plug-in Connections”).
4.	Graph validation	The status bar indicates the current validity of the graph. OpenCube XFConverter will not be able to process conversions unless the status is set to ‘Graph successfully constructed’. A graph is valid when all its output plug-in pins are connected; however please note that all the input plug-in pins do not necessarily have to be connected.
5.	OK, Cancel and Reset Buttons	The **Ok** button saves the graph. The **Cancel** button closes the graph without saving it. The **Reset** button clears the windows.

3.2 Input Plug-in Configuration

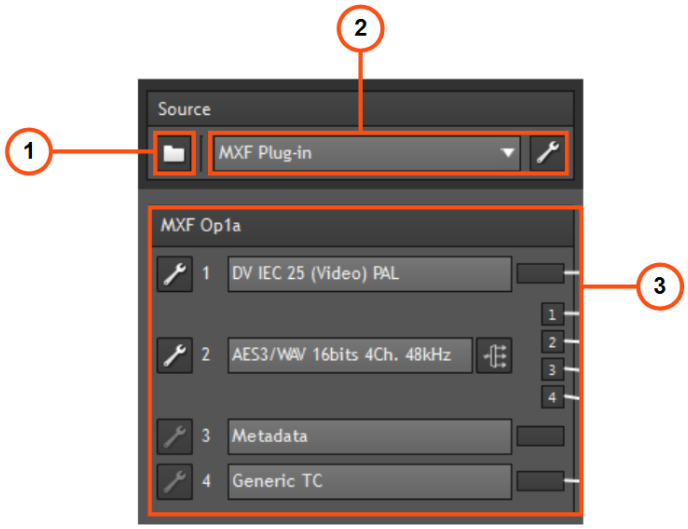


Figure 8 Configure Conversion dialog box - Input plug-in configuration area

The first step consists in defining the input plug-in(s) either through an automatic or manual configuration:

- **Automatic Configuration:** Click on the folder button located in (1). This will open a browser window where you can select one or more files. These files should be in MPEG (Elementary, Program and Transport Stream), DV, WAV, AIFF, JPEG 2000, MCC, SCC, AVI, GXF, MOV, MP4 or MXF format. If the files are recognized by OpenCube XFConverter, the graph view will be initialized in (3) to reflect the content of the file(s) you selected. If the files are not recognized or you do not have a valid license to use the corresponding plug-in(s), an error message will be displayed.
- **Manual Configuration:** From the drop-down list (2), select the input plug-in corresponding to the format of your source file. If your conversion requires several source files, you should select **Wrap** from the drop-down box. Once you have selected the input format, you can access the plug-in's settings by clicking on the wrench button located in (2). Note that some of the plug-ins are not configurable; in that case the wrench icon will be disabled. Refer to the individual plug-in documentation in Section 4 for a more detailed description of these settings.

The input plug-in view shows the current plug-in(s) configuration. In the case of wrapper formats embedding several streams, the input plug-in view (3) will display a brief description for each embedded video, audio, metadata or timecode stream. Each stream can be individually configured with the corresponding wrench icon. If you click on this button, it will open a new dialog box whose content will vary depending on the format. Refer to the Section 4 for a more detailed description of these settings.

3.3 Output Plug-in Configuration

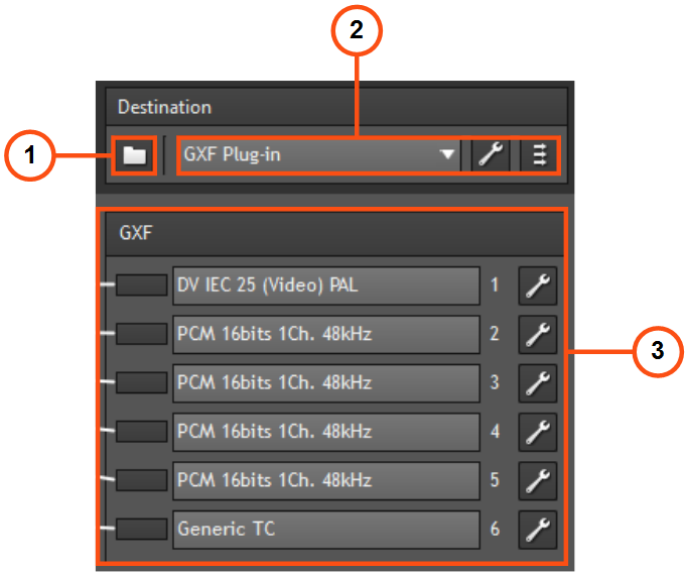


Figure 9 Configure Conversion dialog box – Output plug-in configuration area

When the input plug-in(s) is (are) configured, you have to define the outcome of the conversion by defining the output plug-in.

There are three ways to perform this task:

- **Automatic Configuration:** This is similar to the automatic input plug-in configuration. Click on the folder icon located in (1). This will open a browser window where you can select one or several files. These files should be in MPEG Elementary, DV, WAV, AIFF, JPEG 2000, MCC, SCC, AVI, GXF, MOV or MXF format. If the files are recognized by OpenCube XFConverter, the graph view will be initialized in (3) to reflect the content of the files you selected. If the files are not recognized or you do not have a valid license to use the corresponding plug-in(s), an error message will be displayed.
- **Semi-automatic Configuration:** From the drop-down list (2), select the output plug-in corresponding to the format of your target output file format. Click on the three-arrow icon to launch the semi-automatic configuration. OpenCube XFConverter will try to match the settings of your output plug-in with the settings of your input plug-in. However, this default configuration may not correspond to the exact format you want to output. In that case you can continue to adjust the settings of the plug-in or individual output streams.
- **Manual Configuration:** From the drop-down list (2), select the output plug-in corresponding to the format of your destination file(s). If your conversion requires the unwrapping of several files, you should select **Unwrap Plug-in** from the drop-down list. Once you have selected the output format, you can access the plug-in's settings by clicking on the wrench icon located in (2). Please note that some of the plug-ins are not configurable; in that case the wrench icon will be disabled. Refer to the individual plug-in documentation in section 4 for a more detailed description of these settings.

The output plug-in view shows the current plug-in(s) configuration. In the case of wrapper formats embedding several streams, the output plug-in view (3) will display a brief description for each embedded video, audio, metadata or timecode stream. Each stream can be individually configured with the corresponding wrench icon. If you click on this button, it will open a new dialog box whose content will vary depending on the format. Refer to the section 4 for a more detailed description of these settings.

3.4 Plug-in Connections

After you configure the input and output plug-in(s), each of the individual media streams has to be connected. Each stream is represented by a pin ( ) and a connection is represented by a segment from an input plug-in's pin to an output plug-in's pin. You can dynamically change the connections by clicking on a pin and holding the mouse button down. Then draw a rubber band towards another pin and release the mouse. If the pins can indeed be connected, then a new line will be drawn between them. Note that if two pins cannot be connected, the mouse cursor will switch to a forbidden signal icon. More information on the reason for this incompatibility can be obtained by checking the message displayed on the status bar.

Note

You can connect one input pin to more than one output pin. The input pin will be duplicated.

Track duplication is only supported for audio tracks.

OpenCube XFConverter includes a tool to help you connect the input and output plug-in pins automatically. If you click on the **Auto Connect** button , OpenCube XFConverter will find the pins that are the most compatible and then connect them.

OpenCube XFConverter also permits DV and audio streams (de)multiplexing. When manipulating a DV stream with embedded audio or an audio stream with multiple channels, you are given the opportunity of splitting each individual channel into separate ones (the most common case is to switch from a single stereo channel to two mono channels, for example). In order to activate the multiplexing/demultiplexing feature, click on the button . If you click repeatedly on this button, it will cycle through all the demultiplexing options. When you demultiplex a plug-in pin, it will be split into several smaller pins containing the channel index(es) or **v** if it is a video channel.

Figure 10 Demultiplexed plug-in pin

The status bar indicates the current validity of the graph. OpenCube XFConverter will not be able to process conversions unless the status is set to 'Graph successfully constructed'. A graph is valid when all its output plug-in pins are connected.

Note

All the input plug-in pins do not necessarily have to be connected.

4. Plug-in Configuration

4.1 Overview

This section contains a brief summary of the settings for the main plug-ins of OpenCube XFConverter.

4.2 AVI Plug-in

The AVI plug-in supports the wrapping and unwrapping of AVI files.

The AVI plug-in supports, in reading mode:

- DV 25/50/100 Mbps
- IMX
- PCM

The AVI plug-in supports, in writing mode:

- DV 25/50/100 Mbps
- PCM

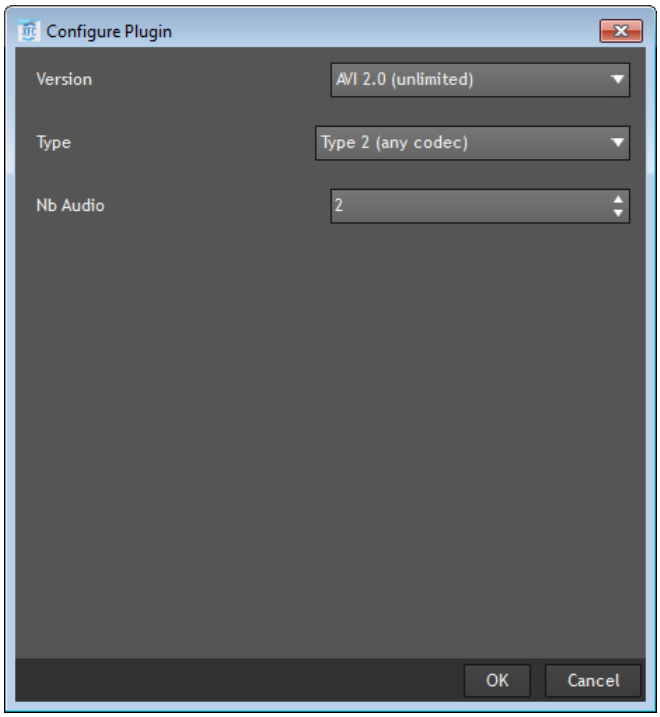


Figure 11 AVI plug-in settings

The AVI plug-in settings are:

Parameter	Description
Version	AVI version 1.0 is limited to 1 GB media data size while version 2.0 is unlimited.
Type	Type 1 contains a single DV track with audio embedded in the DV chunks. Type 2 stores the audio channels into separate AVI tracks.
Nb Audio	If AVI type 2 is selected, this parameter defines the number of PCM audio tracks.

4.3 GXF Plug-in

The GXF plug-in supports DV 25 Mbps, IMX, MPEG LongGop, PCM and Dolby streams in reading and writing mode.

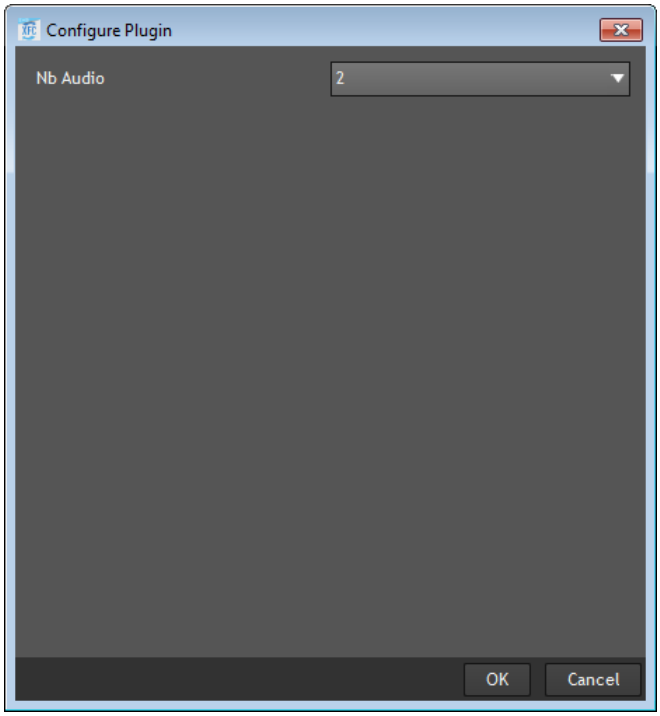


Figure 12: GXF plug-in settings

The GXF plug-in settings are:

Parameter	Description
Nb Audio	This parameter defines the number of PCM tracks embedded in the GXF file. Note that GXF format only allows 48 kHz mono channels.

4.4 QUICKTIME (MOV) Plug-in

The QuickTime plug-in supports the wrapping and unwrapping of QuickTime or MP4 files.

The QuickTime plug-in supports in reading mode:

- MPEG-2 LongGop (XDCAM HD422 50/XDCAM HD420 35 Mbps)
- AVC/H.264 LongGop
- AVC-Intra 50/100/200 Mbps
- DV 25/50/100 Mbps
- IMX 30/40/50 Mbps
- VC-3
- PCM big and little endian
- AAC

The QuickTime plug-in supports in writing mode:

- IMX 30/40/50 Mbps
- XDCAM HD422 50 Mbps
- DV 25/50/100 Mbps
- VC-3
- PCM big and little endian

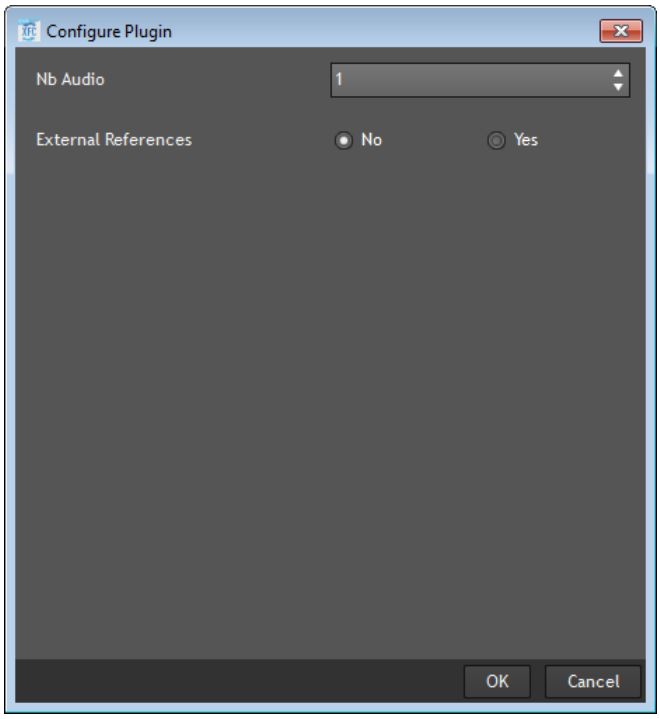


Figure 13: QuickTime plug-in settings

The QuickTime (MOV) plug-in settings are:

Parameter	Description
Nb Audio	This parameter defines the number of audio tracks embedded in the QuickTime file.
External References	If set to **Yes**, this parameter indicates that the QuickTime file will not embed the media streams but will reference external raw media files. XFConverter currently does not support the creation of QuickTime files with external references so this feature is only supported in the input plug-in.

4.5 MP4 Plug-in

NEW !

The MP4 plug-in supports the unwrapping of MP4 files.

The MP4 plug-in supports in reading mode:

- AVC/H.264 LongGop
- AAC

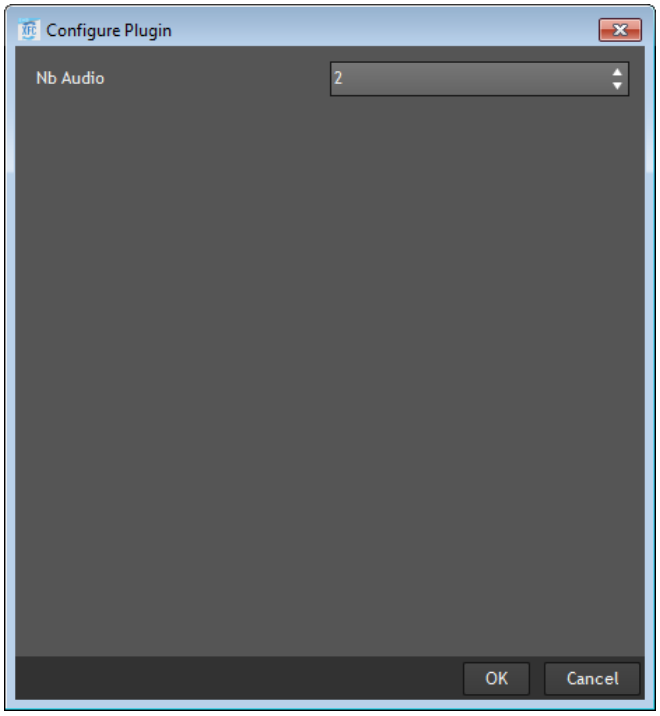


Figure 14 MP4 plug-in settings

The MP4 plug-in settings are:

Parameter	Description
Nb Audio	This parameter defines the number of audio tracks embedded in the MP4 file.

Note

It is possible to transcode certain video streams in MP4 files to another codec. See section 6 for more information.

4.6 MPEG Plug-in

The MPEG plug-in supports MPEG Program Stream, Transport Stream and Elementary Stream files in reading mode. The following elementary streams are supported:

- MPEG-1 video
- MPEG-2 video
- MPEG-1 audio
- MPEG-2 audio

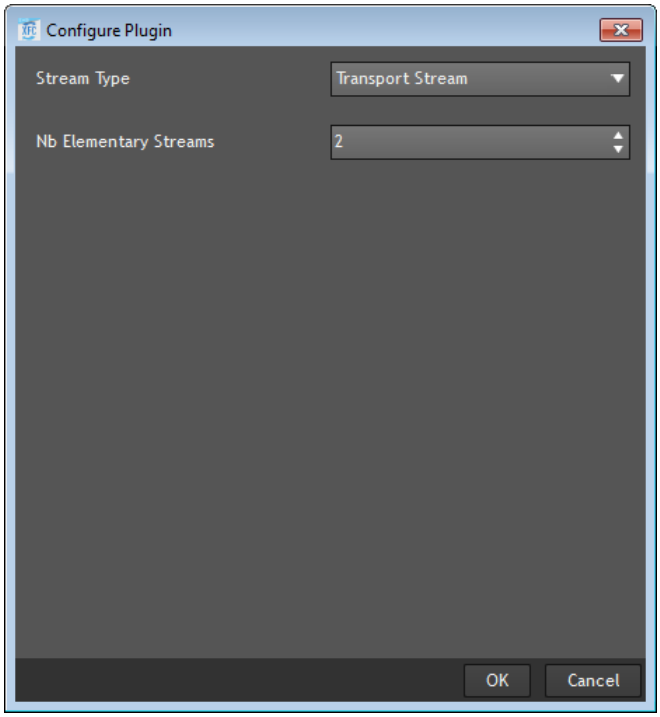


Figure 15: MPEG plug-in settings

The MPEG plug-in settings are:

Parameter	Description
Stream Type	The stream type can be a Transport, a Program or an Elementary Stream. If you select Transport or Program Stream each individual elementary stream will be outputted. Note that OpenCube XFConverter currently does not support MPEG multiplexing and therefore only supports Transport and Program streams in the input plug-in.
Nb Elementary Streams	This parameter indicates the number of video and audio elementary streams when the stream type is set to Transport or Program. It will create a pin for each elementary stream.

4.7 MXF Plug-in

The MXF plug-in supports a wide range of operational patterns in reading and writing mode.

The following essences are supported:

- DV 25/50/100 Mbps
- MPEG-1 video
- MPEG-2 video (IMX, XDCAM HD)
- MPEG-4
- AVC/H.264 LongGop
- AVC-Intra 50/100/200
- JPEG 2000
- VC-3
- WAVE (PCM/Dolby)
- A_Law
- AIFF
- AES3
- MPEG-1 audio
- MPEG-2 audio
- AAC
- Ancillary Data – VBI

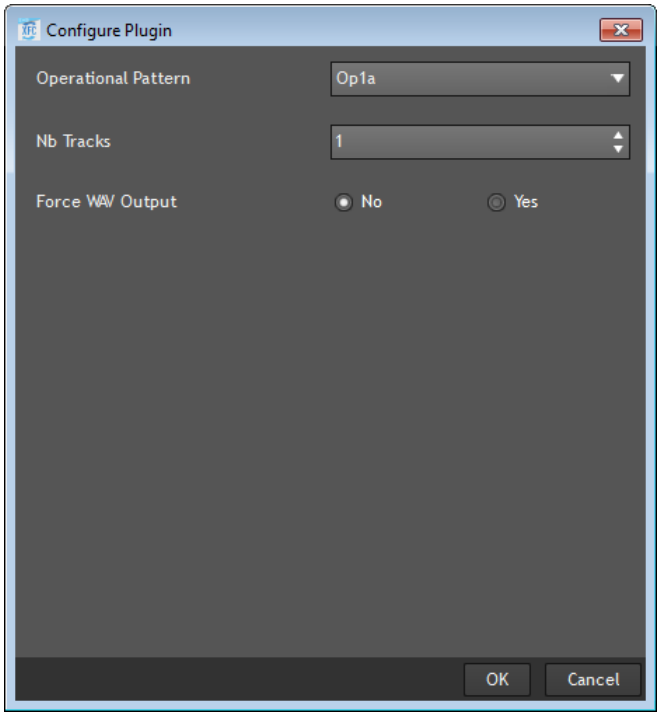


Figure 16: MXF plug-in settings

The MXF plug-in settings are:

Parameter	Description
Operational Pattern	This parameter defines the operational pattern of the MXF file.
Nb Tracks	This parameter defines the number of video and audio tracks in the MXF file. Note that the number of tracks may be constrained by the operational pattern.

Parameter	Description
Force WAV Output	This parameter is available only on the input MXF plug-in. You can set its value to **Yes** to force the AIFF and AES tracks to be extracted as WAV files. On the output MXF plug-in, this parameter is replaced by **Convert WAV to AES** to force the conversion of PCM and WAV streams into AES streams.

Possible values for the Operational Pattern are:

- **Op1a:** This is the most commonly used pattern. It corresponds to a set of video and audio tracks played simultaneously. This operational pattern does not impose any restrictions on the media that can be embedded in the MXF file.
- **Op1a D10:** Restricted to the standard Op1a containing a video track with IMX and a single audio track with 8-channel AES audio.
- **OpAtom:** This pattern corresponds to a set of atomic MXF files containing a single video or audio track. Although the media is stored in separate MXF files, they are linked and should be decoded together. Note that when you want to perform automatic configuration of the input or output plug-in when working with OpAtom files, you have to select an entire set of MXF files for your configuration to be successful.
- **Panasonic P2:** Use this pattern if you want to convert/produce MXF files similar to the ones that a P2 camcorder would generate. P2 format includes a DV track (IEC or SMPTE) or an AVC-Intra track with 2,4 or 8 mono AES channels. When you select this pattern, you can also choose between a **P2 tree** and **P2 flat** mode. The P2 tree corresponds to the Contents directory structure produced by the camcorder while P2 flat flattens the directory structure. Note that when you perform automatic configuration of the plug-in, you only have to select the video essence file in a P2 tree. However, when working with a flat structure you have to select the entire set of MXF files.
- **Sony XDCam DV:** Use this pattern if you want to convert/produce MXF files similar to the ones that an XDCam camcorder would generate. This format includes a DV IEC track with 4 mono AES audio tracks. It supports XDCam SxS and XDCam optical MXF files.
- **Sony XDCam IMX:** Use this pattern if you want to convert/produce MXF files similar to the ones that an XDCam camcorder would generate. This format includes an IMX track and an 8-channel AES audio track (D10). It supports XDCam SxS and XDCam optical MXF files.
- **Sony eVTR:** Use this pattern if you want to convert/produce MXF files similar to the ones that an eVTR tape recorder would generate. This format includes an IMX track and an 8-channel AES audio track (D10).
- **Sony XDCamHD:** Use this pattern if you want to convert/produce MXF files similar to the ones that an XDCam HD camcorder would generate. This format includes an MPEG Long-GOP track (15, 25 or 35 Mbits/s) together with 2 or 4 mono AES tracks. It supports XDCam SxS and XDCam optical MXF files.
- **MXF Ext. Ref:** Use this pattern if you want to convert/produce an Op1b file referencing atomic OpZero MXF files. The Op1b file will not embed any media. Note that when you perform automatic configuration of the plug-in you only need to select the Op1b file.
- **Raw Ext. Ref:** Use this pattern if you want to convert/produce an Op1b file referencing raw media essence files. The Op1b file will not embed any media. Note that when you perform automatic configuration of the plug-in you only need to select the Op1b file.
- **AS-02:** Use this pattern if you want to convert/produce an AMWA AS-02 file.

- **AS-03:** Use this pattern if you want to convert/produce an AMWA AS-03 file.

NEW !

- **AS-10:** Use this pattern if you want to convert/produce an AMWA AS-10 file compliant with the shim “High HD”.
- **AS-11:** Use this pattern if you want to convert/produce an AMWA AS-11 file. You can set your own UK metadata using an xml file (See section “4.8 Metadata (XML) Plug-in”).

NEW !

- **ARD ZDF HDF:** Use this pattern if you want to convert/produce a file compliant with the ARD/ZDF HDF profile defined by the Institut für Rundfunktechnik (Germany – Munich). The following profiles are supported:
  - ARD ZDF HDF02a: MXF Profile with AVC-I 100, 1080i/25 and 8 mono AES3 audio tracks,
  - ARD ZDF HDF02b: MXF Profile with AVC-I 100, 1080i/25 and 16 mono AES3 audio tracks,
  - ARD ZDF HDF03a: MXF Profile with AVC-I 100, 720p/50 and 8 mono AES3 audio tracks,
  - ARD ZDF HDF03b MXF Profile with AVC-I 100, 720p/50 and 16 mono AES3 audio tracks.
- **IMF – Essence Components:** This pattern only converts/produces the essence component files of an IMF package. No CPL will be created.
- **Avid OpAtom (available as an option):** This pattern converts/produces an MXF OpAtom file which can be natively imported in the Avid Editing System. This format includes DV, IMX, VC-3 track and some mono WAV audio tracks.
- **Avid OpAtom AMT (available as an option):** This pattern converts/produces an MXF OpAtom file which can be natively imported in the Avid Editing System using the Avid Media Toolkit (AMT). This format includes DV, IMX, VC-3, XDCAM HD422, XDCAM HD420 35Mbps, AVC-Intra track (50 and 100Mbps) and some mono WAV audio tracks.

If the destination is an Avid OpAtom MXF file (available as an option), two additional settings are available (Figure 17: MXF Avid OpAtom settings):

Parameter	Description
Check-in Interplay	The master clips can be checked-in in Interplay.
Create Output Directory as Avid System	If this parameter is set to true, the destination file will be created in a subfolder called `computername.x`. The maximum number of files for each directory is 10,000. When this maximum is reached, a new subdirectory is created (‘x’ is incremented).

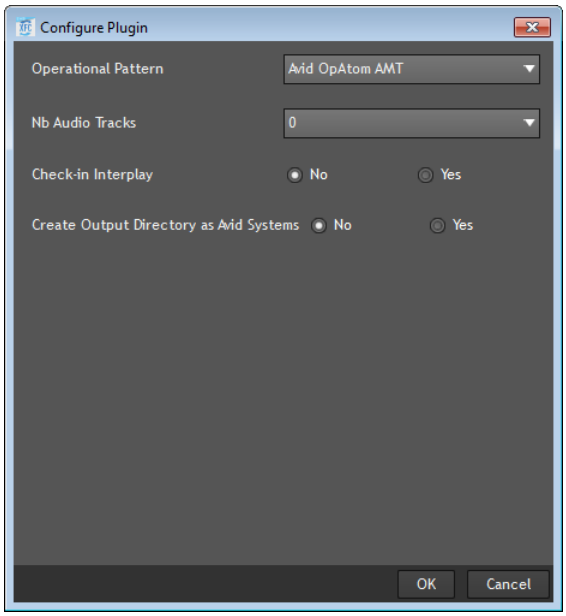


Figure 17: MXF Avid OpAtom settings

4.8 Metadata (XML) Plug-in

This plug-in can be used to wrap AS-11 UK Metadata in an MXF AS-11 file. The metadata must be stored in an XML file. The XML file containing the AS-11 Metadata is represented by the box 2 in the Figure 18: How to define AS-11 Metadata.

Note

You will find an XML schema and an XML sample file in the installation directory.

To configure the input as shown in the screen below, simply click on the button located in box 1 and then select your MXF and XML files.

To configure the output as shown in the screen below, please see section “3 Configuring OpenCube XFConverter”.

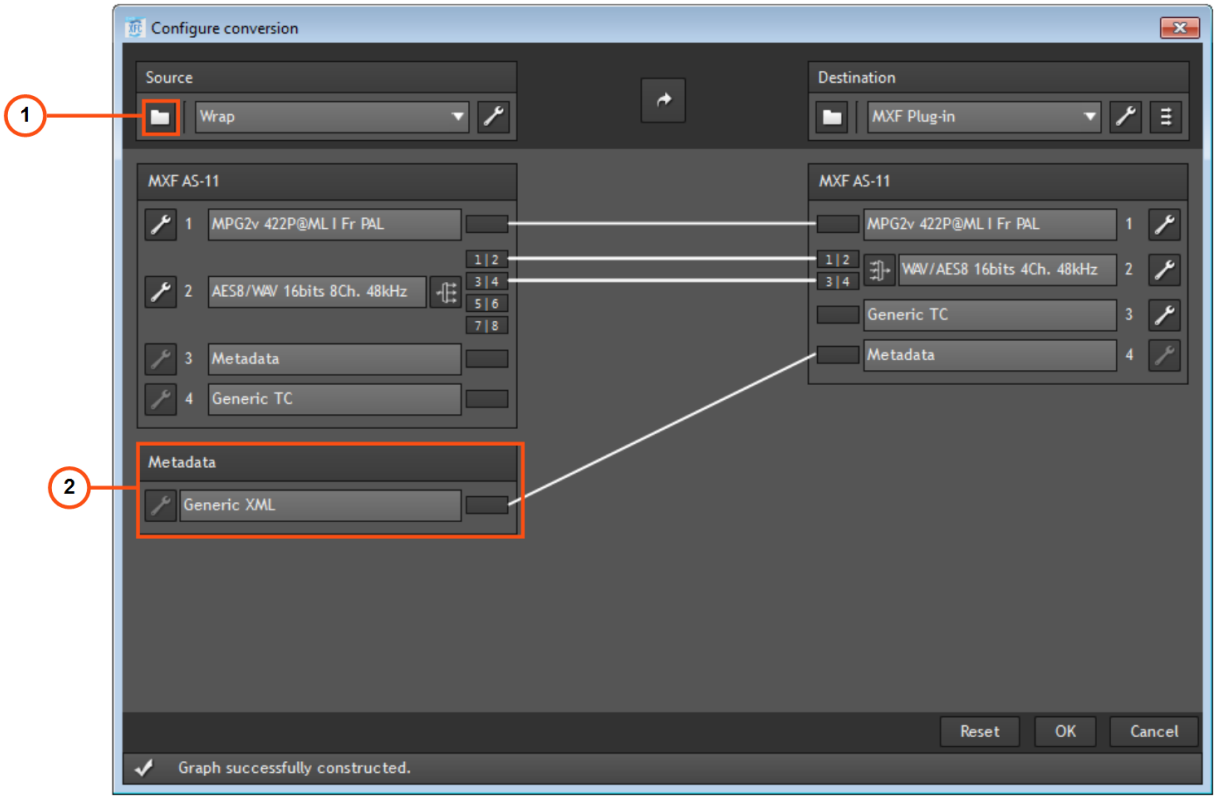


Figure 18: How to define AS-11 Metadata

4.9 Wrap Plug-in

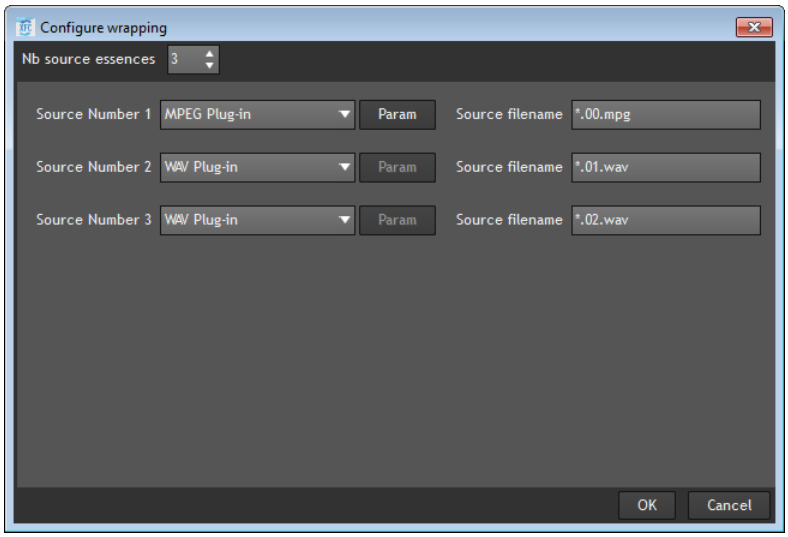


Figure 19: Wrap plug-in settings

This plug-in should be used when multiple input source files have to be wrapped together in a single wrapper format. It can construct a graph when multiple input plug-ins are required. The Configuration Wrapping dialog box allows you select the number of source files and their type using the combo boxes. The **Param** button can be clicked to open the configuration dialog box for each plug-in. Finally, the **Source Filename** field contains the pattern of the filename. This field is required in order to define the set of files that are to be processed together. The star ***** stands for a variable name. For instance, the Figure 18 defines a set of 4 files (1 DV, 2 WAV and 1 MXF) whose names could be `myfile.00.dv`, `myfile.01.wav`, `myfile.02.wav`, `myfile.03.mxf`. Note that only the set of files following this pattern will be available for conversion in the main window. However, if the feature Enable Multi-Selection is activated in the main window (see section “2.2 Source Directory Pane”), the source filename patterns are ignored and you can freely select a set of files to be wrapped together.

If you need to add mute track in the output file, you can select **Mute Plug-in** in the wrap plug-in.

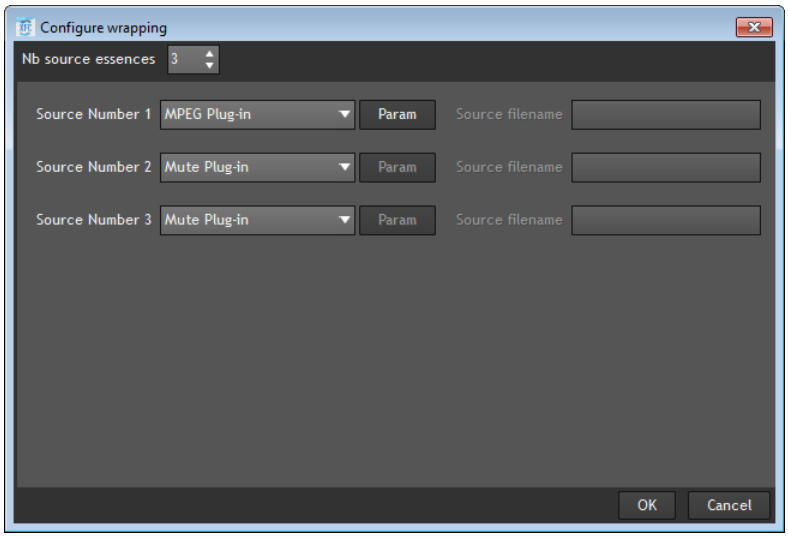


Figure 20: Mute plug-in settings

4.10 Unwrap Plug-in

This plug-in should be used to unwrap essences from a single wrapper format. It can construct a graph when multiple output plug-ins are required.

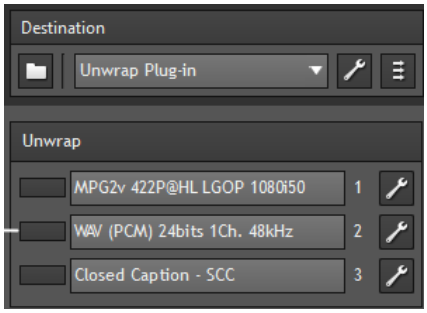


Figure 21: Unwrap plug-in

You can configure each output plug-in by clicking on the corresponding wrench icon or by selecting a file .

5. Video and Audio Stream Configuration

5.1 DV Stream

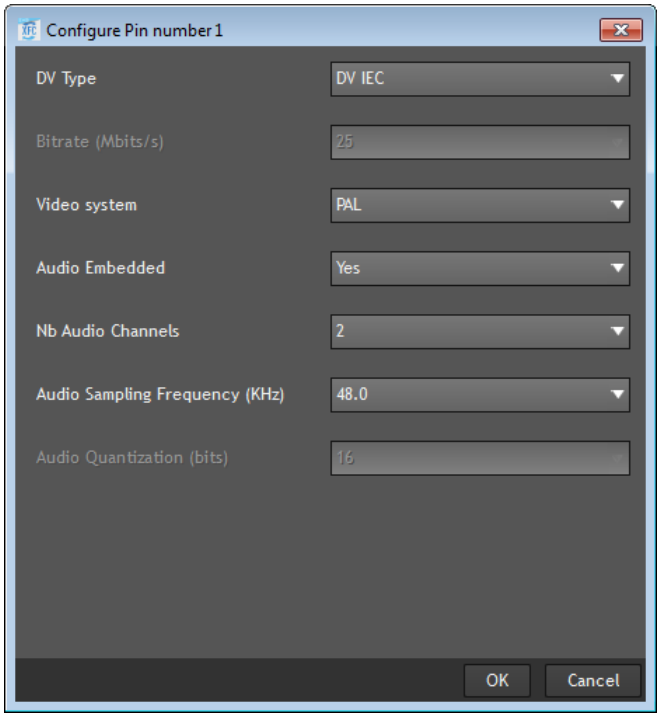


Figure 22: DV stream settings

The DV stream settings are:

Parameter	Description
DV Type	Use this setting to change your DV type: DV IEC or DV SMPTE.
Bitrate	DV IEC bit rate is always 25 Mbps, while the DV SMPTE bit rate can be 25, 50 or 100 Mbps.
Video System	It can be PAL or NTSC (25 and 50 Mbps bit rates). DV SMPTE at 100 Mbits/s (DVCProHD) can be 720 progressive lines at 50 or 59.94 frames per second; 1080 interlaced lines at 50 or 59.94 fields per second.
Audio Embedded	Use this setting to define the status of the audio channels embedded in the DV stream. The **Undefined** setting should be used when you want a plug-in to be able to process DV streams whether or not they contain audio.
Nb Audio Channels	The number of audio channels embedded in the DV stream is usually constrained by your DV type and bit rate. However, DV IEC allows 2 or 4 audio channels.

Parameter	Description
Audio Sampling Frequency	The audio sampling frequency can be set to 32, 44.1 or 48 kHz depending on the DV type and number of audio channels.
Audio Quantization	The audio quantization is automatically configured to 12 or 16 bits depending on the previous settings.

When creating MXF with DV SD essence, it is possible to change the aspect ratio of the DV codec and MXF wrapping layer using the option **Fix Aspect Ratio in Video Stream and Wrapper**. The option fixes the field **Aspect Ratio** in the DV VAUX source control pack and the field **Aspect Ratio** in the MXF CDCI Picture Essence Descriptor.

The option can take three values:

- **No change:** The aspect ratio is not changed.
- **Force 4/3:** The aspect ratio will be set to 4/3.
- **Force 16/9:** The aspect ratio will be set to 16/9.

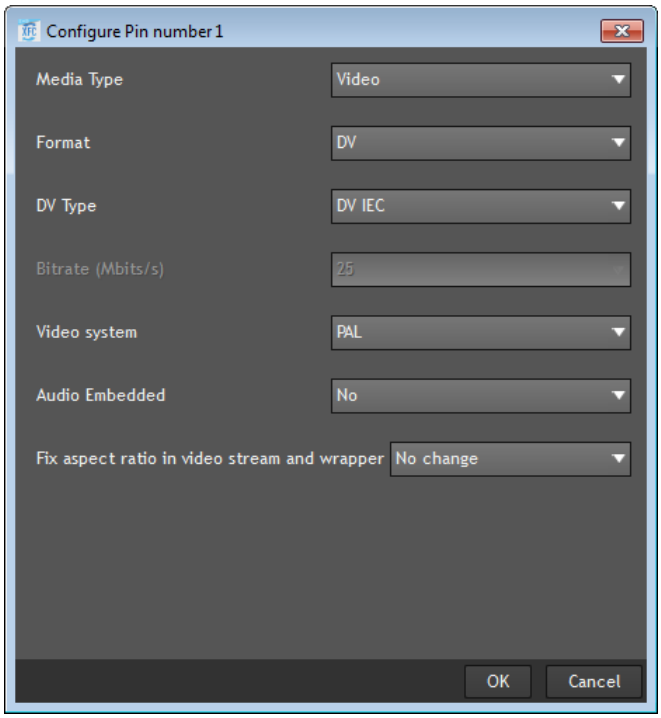


Figure 23: Force Aspect Ratio in DV stream

5.2 MPEG Elementary Stream

5.2.1 MPEG 1&2 Video Elementary Stream

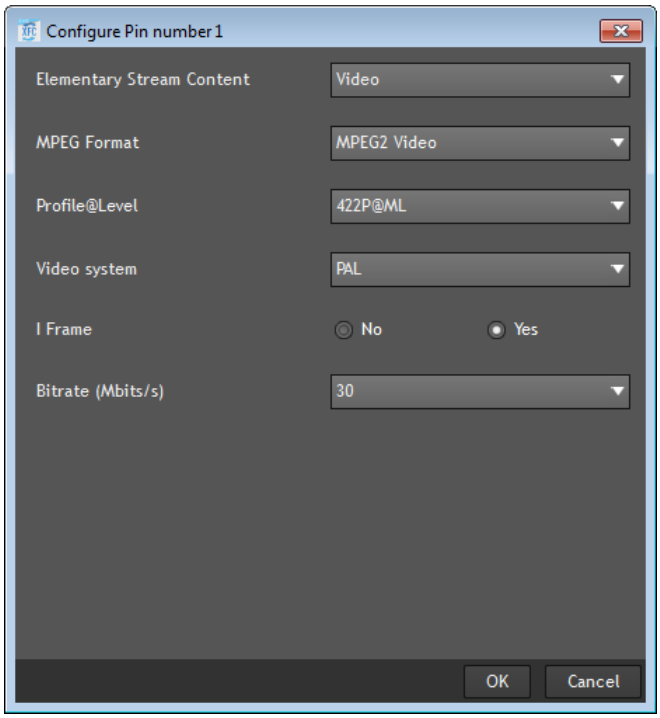


Figure 24: MPEG 1&2 video elementary stream settings

The MPEG 1&2 video elementary stream settings are:

Parameter	Description
Elementary Stream Content	Defines a video or audio stream.
MPEG Format	Defines a MPEG1 or MPEG2 stream.
Profile@Level	Defines the Profile and Level of the video stream. You should set this entry to **MPEG COMPRESSION** if you do not want to constrain the Profile and Level.
Video System	Depending on the selected Profile and Level, the video system can be set to Half-PAL, Half-NTSC, PAL, NTSC or HD (720/1080 i/p 50/59.94 Hz).
I-Frame	This parameter should be set to **Yes** if the MPEG stream contains only I frames (no B or P frames).
Bit rate	This parameter defines the video bit rate in Mbps when configuring MPEG I-Frame-only streams. The entry **Every** should be set when you do not want to constrain the video bit rate.

Note

MPEG2 30/40/50 Mbps I-Frame only 422P@ML is also known as MPEG IMX (D10).

When creating MXF D10 files (Op1aD10, XDCAM IMX, e-VTR), it is possible to change the aspect ratio of the MPEG codec and MXF wrapping layer using the option Fix Aspect Ratio in Video Stream and Wrapper. The option fixes the field **Aspect Ratio** in the MPEG sequence header and the field **Aspect Ratio** in the MXF MPEG Descriptor.

The option can take three values:

- **No change:** The aspect ratio is not changed.
- **Force 4/3:** The aspect ratio will be set to 4/3.
- **Force 16/9:** The aspect ratio will be set to 16/9.

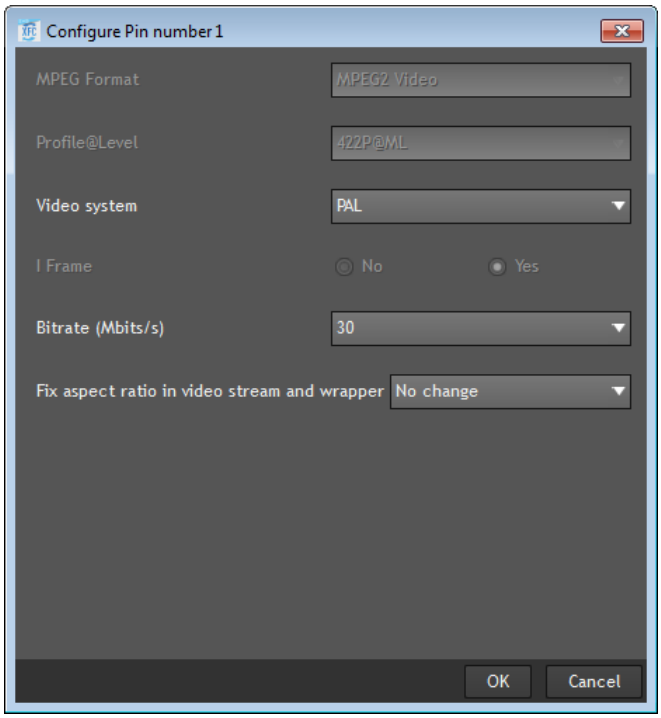


Figure 25: Force Aspect Ratio in MPEG video elementary stream

5.2.2 AVC-Intra Elementary Stream

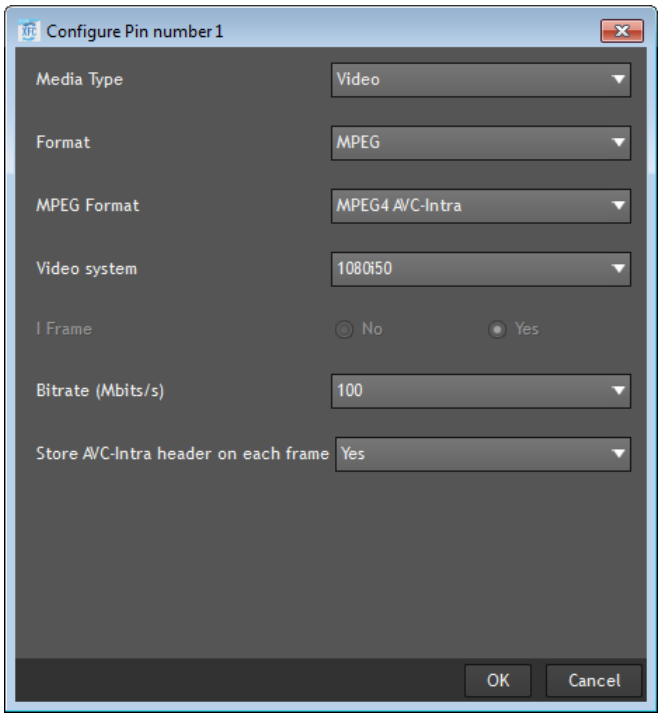


Figure 26: AVC-Intra elementary stream settings

The AVC-Intra elementary stream settings are:

Parameter	Description
Video System	The video system can be set to: • 720/1080 p 50/59.94/29.97/23.98. • 1080i 50/59.94.
Bit rate	This parameter defines the video bit rate in Mbps; it can be equal to 50, 100 or 200 Mbps.
Store AVC-Intra header on each frame	This parameter is only available on the MXF output plug-in. Some AVC-Intra streams have the 'Sequence Parameters Set' (SPS) and the 'Picture Parameter Set' (PPS) repeated on each frame, others only have them on the first frame. This option allows you to control how the SPS and the PPS are stored in the AVC-Intra stream. • **Yes:** OpenCube XFConverter is repeating the SPS and the PPS found on the first frame on each frame. It is the default value when MXF Op1a is created. • **No:** OpenCube XFConverter only keeps the SPS and PPS on the first frame. This value is mandatory when creating MXF Panasonic P2. • **Keep As Original:** OpenCube XFConverter does not modify the AVC-Intra stream.

5.2.3 AVC/H.264 Elementary Stream

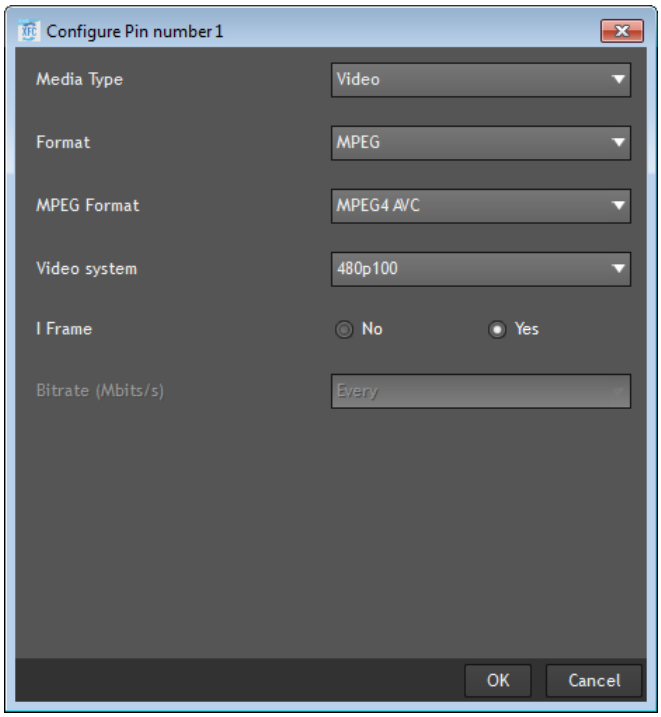


Figure 27: AVC/H.264 elementary stream settings

The AVC/H.264 elementary stream settings are:

Parameter	Description
Video System	Many video systems are supported.
I-Frame	This parameter should be set to “Yes” if the stream contains only I frames.

5.2.4 MPEG 1/2/AAC Audio Elementary Stream

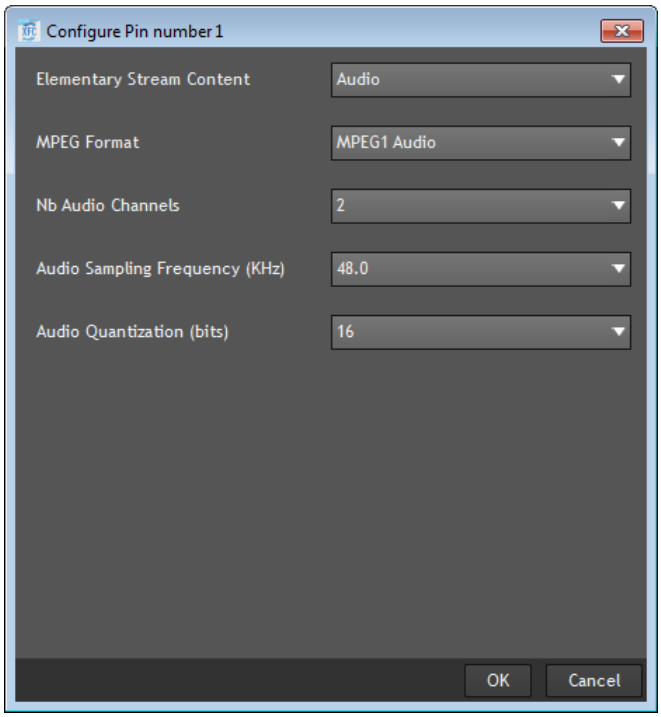


Figure 28: MPEG-1, MPEG-2 and AAC audio elementary stream settings

The MPEG 1/2/AAC audio elementary stream settings are:

Parameter	Description
MPEG Format	It can be set to MPEG1 Audio, MPEG2 Audio or AAC.
Nb Audio Channels	Use this parameter to define the number of audio channels in the audio stream.
Audio Sampling Frequency	Use this parameter to define the sampling frequency of the audio MPEG stream (32.0, 44.1 or 48 kHz).
Audio Quantization	Use this parameter to define the quantization of the audio MPEG stream (8, 16, 24 or 32 bits/s).

5.3 JPEG 2000 Stream

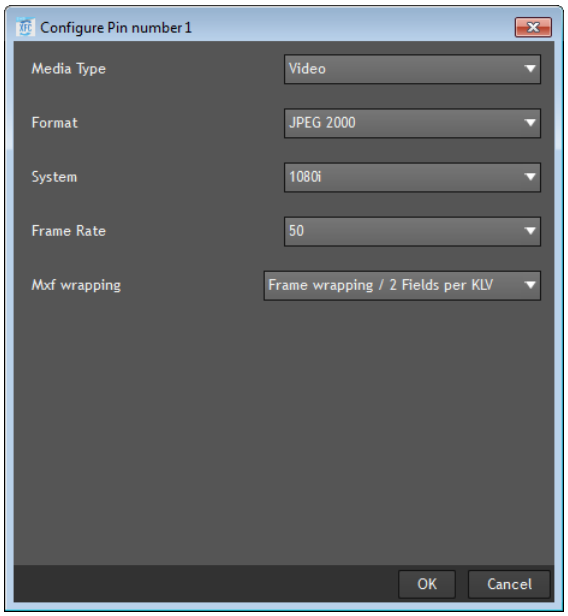


Figure 29: JPEG 2000 stream settings

The JPEG 2000 stream settings are:

Parameter	Description
System	Use this parameter to define the video system. Values available are: PAL, NTSC, 720p, 1080p, 1080i, 2k and 4k.
Frame Rate	Use this parameter to define the frame rate depending on the selected system.
MXF wrapping	Use this parameter to define the MXF wrapping, frame or field wrapping (i.e. the number of fields by KLV). This option is available only on the MXF output plug-in and for interlaced files.

To be recognized by the OpenCube XFConverter watch folder, filenames of a series of JPEG 2000 still images must have the basename and an index (example: `my_file_basename.000.jp2`). The watch folder will display only one file for all JPEG 2000 files matching the same pattern. The name displayed by the watch folder will be `my_file_basename.#[a,b,c,d].jp2`, with:

- `a` representing the number of digits for the JPEG 2000 index
- `b` the index of the first JPEG 2000 file
- `c` the index of the last JPEG 2000 file
- and `d` the step to find the index of the next file

During the unwrapping operation, OpenCube XFConverter will create files matching this naming rule.

Note

If the MXF wrapping is changed between the source and the destination, OpenCube XFConverter will not support wrapping with a SMPTE ST 436 ancillary data track (Closed Caption or others).

5.4 VC-3 Stream

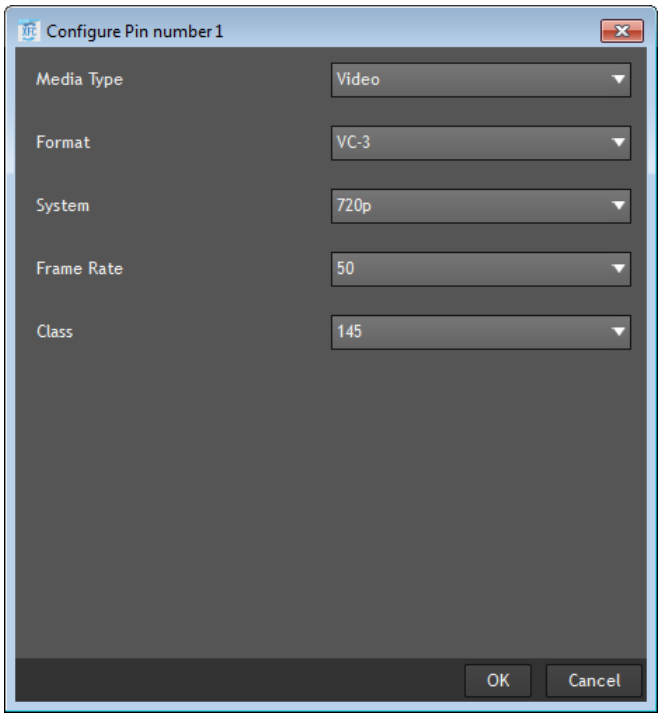


Figure 30: VC-3 stream settings

The VC-3 stream settings are:

Parameter	Description
System	Use this parameter to define the video system. Values available are: 720p, 1080p and 1080i.
Frame Rate	Use this parameter to define the frame rate depending on the selected system.
NEW ! Class	Use this parameter to configure the bitrate class of the VC-3 stream. Values available are: 145, 220 and 220x.

Note

VC-3 stream configurations created with an older version of XFConverter can no longer be used.

5.5 AIFF, WAV and PCM Streams

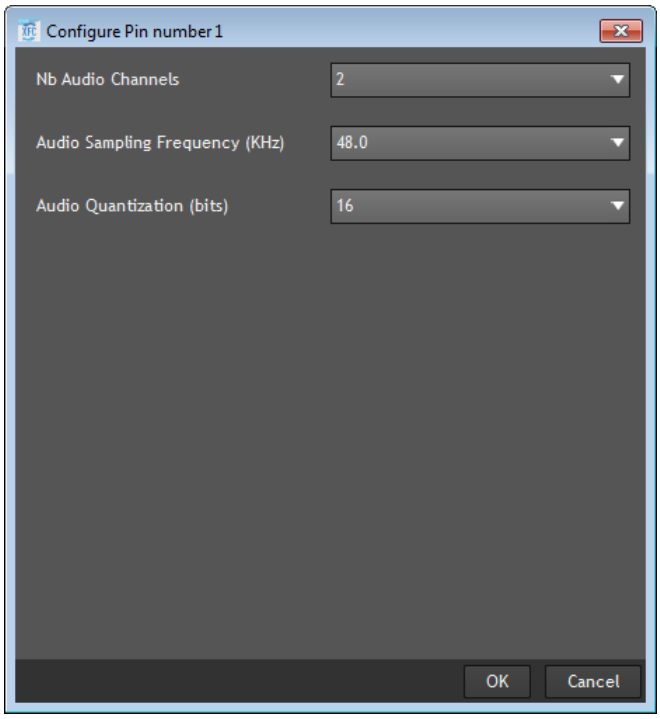


Figure 31: Uncompressed audio (AIFF, WAV and PCM) stream settings

The AIFF, WAV and PCM stream settings are:

Parameter	Description
Nb Audio Channels	Use this parameter to define the number of channels in the audio stream.
Audio Sampling Frequency	Use this parameter to define the sampling frequency of the audio stream.
Audio Quantization	Use this parameter to define the quantization of the audio stream (8, 16, 24 or 32 bps).

5.6 Dolby Audio Stream

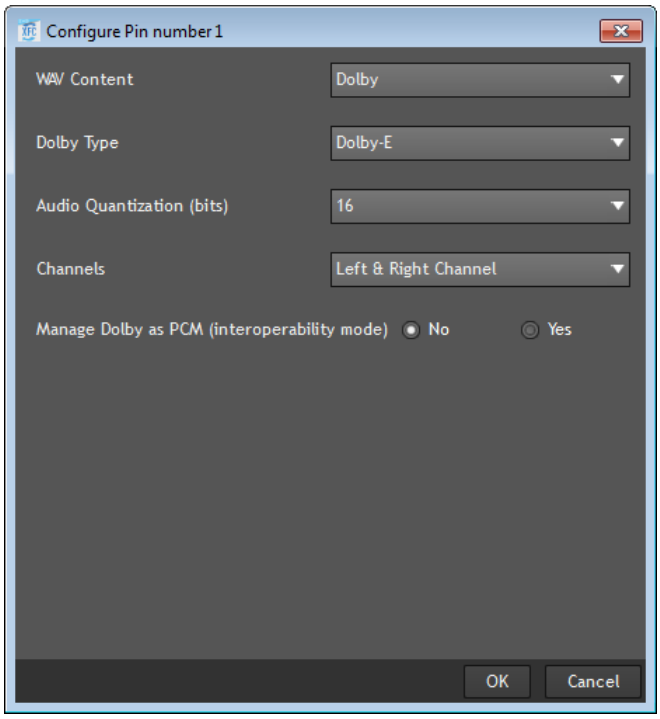


Figure 32: Dolby stream settings

OpenCube XFConverter can detect if Dolby is present on audio tracks.

The Dolby audio stream settings are:

Parameter	Description
Dolby Type	It can be Dolby-E or AC-3.
Audio Quantization	Use this parameter to define the quantization of the audio stream (16, 20 or 24 bps).
Channels	Use this parameter to define if the stream contains the left, the right or both channels.
Manage Dolby as PCM	Use this parameter if you want to have OpenCube XFConverter manage Dolby as PCM. If this option is set to **True**, OpenCube XFConverter will wrap Dolby as PCM.

5.7 Timecode Stream

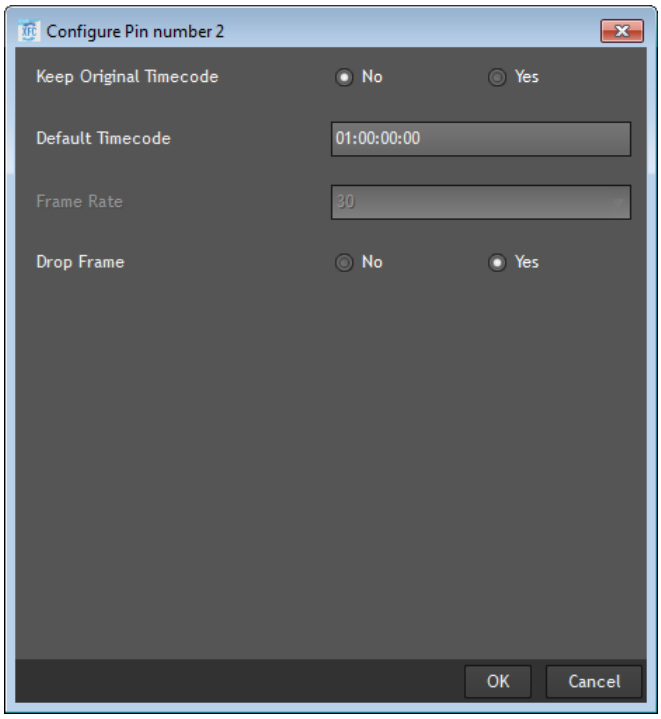


Figure 33:Timecode stream settings

The output plug-in timecode pin is supported for GXF, MXF and MOV formats. It is an easy and convenient way to manually set a start timecode or to convey the timecode information from the input plug-in. OpenCube XFConverter currently supports continuous timecodes but not discontinuous ones.

Parameter	Description
Keep Original Timecode	Set this parameter to **Yes** if you want to preserve the timecode originating from the input plug-in. Set it to **No** if you want to manually define the start timecode.
Default Timecode	Use this parameter to define the start timecode.
Frame Rate	This parameter is useful when the frame rate is not constrained by the video system. However the frame rate can be changed if the output plug-in embeds only audio streams.
Drop Frame	Use this parameter to define whether the timecode is drop frame or not. Note that this parameter is not available with 24, 25 and 50 frames per second timecode.

5.8 Metadata (XML) Stream

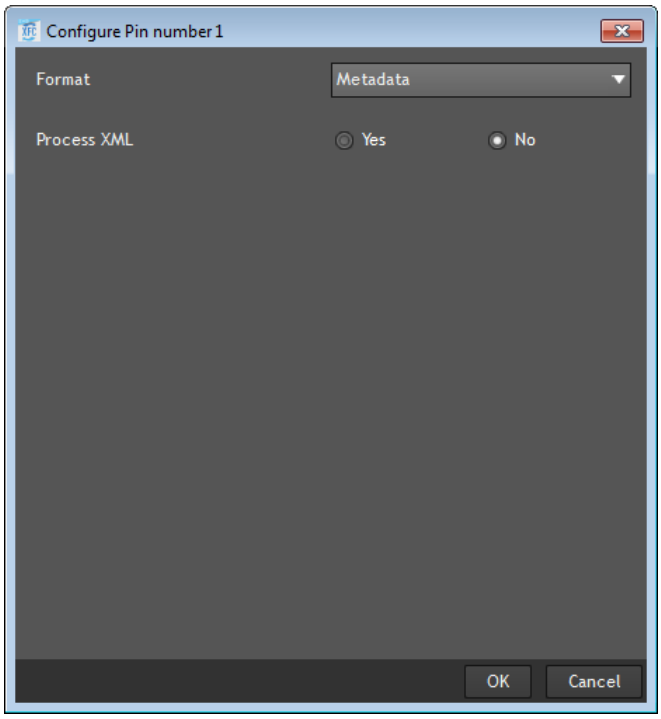


Figure 34: Metadata stream settings

During the MXF files extraction process, you have the option of outputting the file's metadata as an XML file. In order to do so you have to connect metadata pins from the input MXF file to the output Unwrap plug-in. Note that metadata wrapping is currently not supported.

Parameter	Description
Process XML	This parameter is set to **No** by default to generate an XML. When you set this parameter to **No** you can also create your own metadata file format according to your own scheme. Please contact the support team if you wish to activate this feature.

5.9 Ancillary Data – VBI Stream

The ancillary-VBI stream is available in wrapping and unwrapping modes in the MXF plug-in. It allows you to extract and wrap a SMPTE ST 436 track from and to an MXF file.

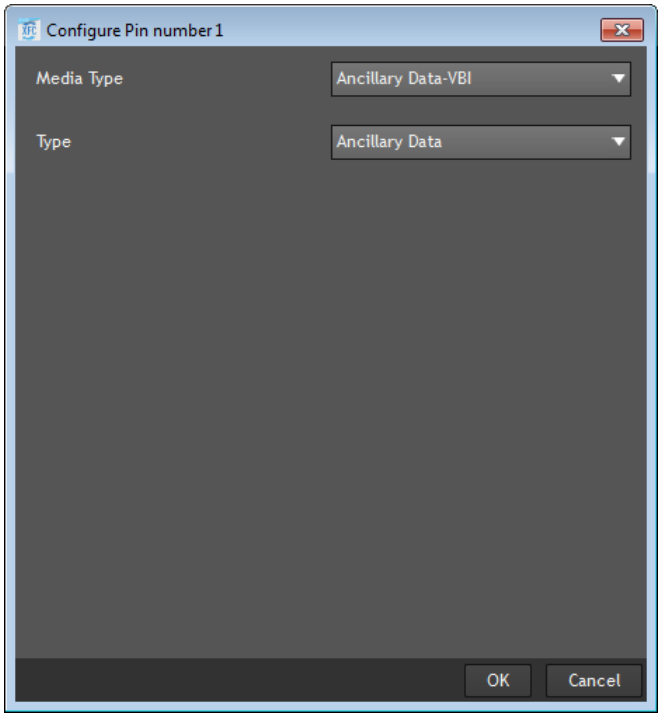


Figure 35: Ancillary Data – VBI stream settings

5.10 Closed Caption Stream

The closed caption stream is supported in wrapping mode in a SMPTE ST 436 ancillary data track.

It is also supported the unwrapping from an MXF ancillary data track to SCC or MCC. OpenCube XFConverter will create MCC V2 files in the case of a MCC destination. And it will create a double SCC file (one by field) for a SCC destination.

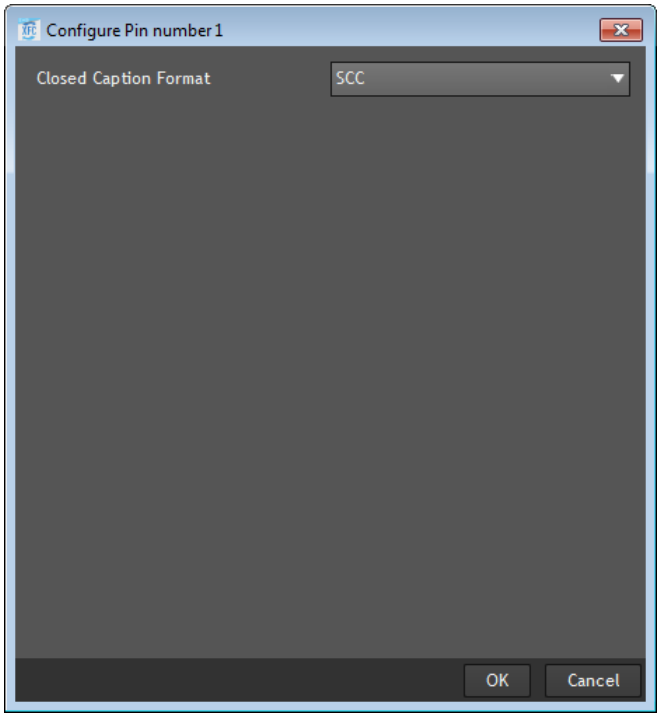


Figure 36: Closed Caption plug-in settings

The closed caption stream settings are:

Parameter	Description
Closed Caption Format	Type of caption files (SCC or MCC).

Note

OpenCube XFConverter supports unique and double SCC files.

6. Transcoding

6.1 Introduction

NEW ! XFConverter is capable of transcoding certain types of video and audio stream contained in an MP4 wrapper to other types of video and audio stream. Transcoding can also be requested through the XFConverter API.

6.2 Supported Formats

The following video and audio streams can be transcoded:

Input Format	Output Format
AVC/H.264 (1080p25, 1080p29.97, 720p50 and 720p59.94)	• XDCAM HD422 50 Mbps • VC-3 (Class 145, 220, 200x) • AVC-Intra 100 Mbps **Note:** The supported video systems for the three destinations are: 1080i50, 1080i59.94, 1080p25, 1080p29.97, 720p50, 720p59.94. OpenCube XFConverter does not support resize and frame rate conversion.
AAC	• PCM • WAV

6.3 Configuring Transcoding

To configure the transcoding of a video and/or audio stream contained in an MP4 wrapper, proceed as follows:

1. In the main window, open the **Configure** menu and select **Configure Conversion**.

   The Configure Conversion dialog box opens.
2. In the Source part, select the input plug-in MP4 from the drop-down list.
3. Click the wrench icon to access the input plug-in's settings.
4. If necessary, specify the number of audio tracks and then click **OK**.

   The input plug-in view will show the current MP4 plug-in configuration. It will display a brief description for each embedded video and audio stream. Each stream can be individually configured with the corresponding wrench icon.
5. In the Destination part, select the MXF or QuickTime output plug-in from the drop-down list, depending on the format of your target output file.
6. Click the wrench icon to access the output plug-in's settings.

7. Configure the output plug-in and click **OK**.

   The output plug-in view will show the current configuration of the plug-in. It will display a brief description for each embedded video and audio stream.

8. Open the settings of the video and or audio stream and select one of the supported transcoding video or audio formats.

   The pin of the input video or audio stream will have to be connected manually with the pin of the output video or audio stream.

9. Click **OK** to close the Configure Conversion dialog box.

6.4 Starting Transcoding

The transcoding of a particular video or audio stream will start as soon as you start the conversion process in the main window. See section 2.4 for more information.

7. OpenCube XFConverter Configuration

7.1 Overview

To open the Options dialog box, open the **Configure** menu in the main window and then select **Options**.

Note

All of these settings will be common to all OpenCube XFConverter instances on the same computer.

7.2 File Management

The first tab from the Options dialog box allows you to configure the destination file naming convention used during the conversion process.

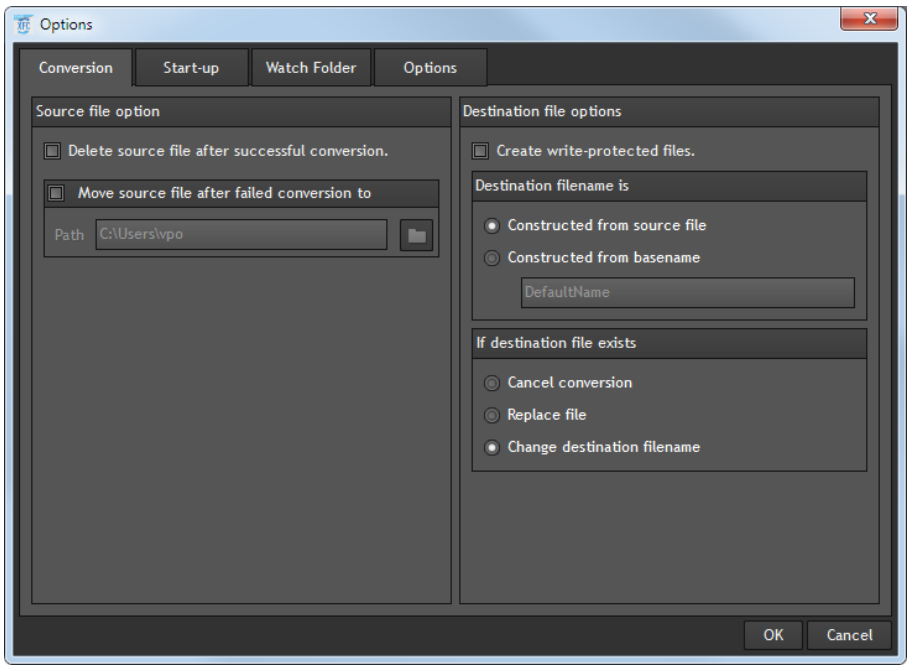


Figure 37: File management options

- Converted input files can be deleted by checking the corresponding box in the Source File Option group box.
- The input files can be moved to another directory if the conversion failed using the **Move Source File After Failed Conversion To** setting.
- You can also force the creation of write-protected files by checking the first box in the Destination File Options group box.

- If the destination filename is constructed from a source file, OpenCube XFConverter will extract the source filename, remove its extension and use this basename to figure out the output filename. For instance, when you convert `myfile.mxf` into an AVI file, the resulting file will be named `myfile.avi`.
- If the destination file already exists, you can configure OpenCube XFConverter to cancel the conversion, force the deletion of the destination or have it generate a new destination filename that will include the source file name followed by a number.
- If the destination filename is constructed from a basename, you will have to set the desired name and OpenCube XFConverter will use it as the output filename base. When you select this option, consecutive conversions of MXF into AVI files will produce the following file series: `DefaultName_0000000.avi`, `DefaultName_0000001.avi`, `DefaultName_0000002.avi`, `DefaultName_0000003.avi`, etc.

Note

Please note that when you are creating Panasonic P2 files, these settings do not apply because of the naming convention inherent to this particular format.

7.3 Application Start-up and Shutdown

The second tab in the Options dialog box enables you to configure the application's behavior during start-up and shutdown.

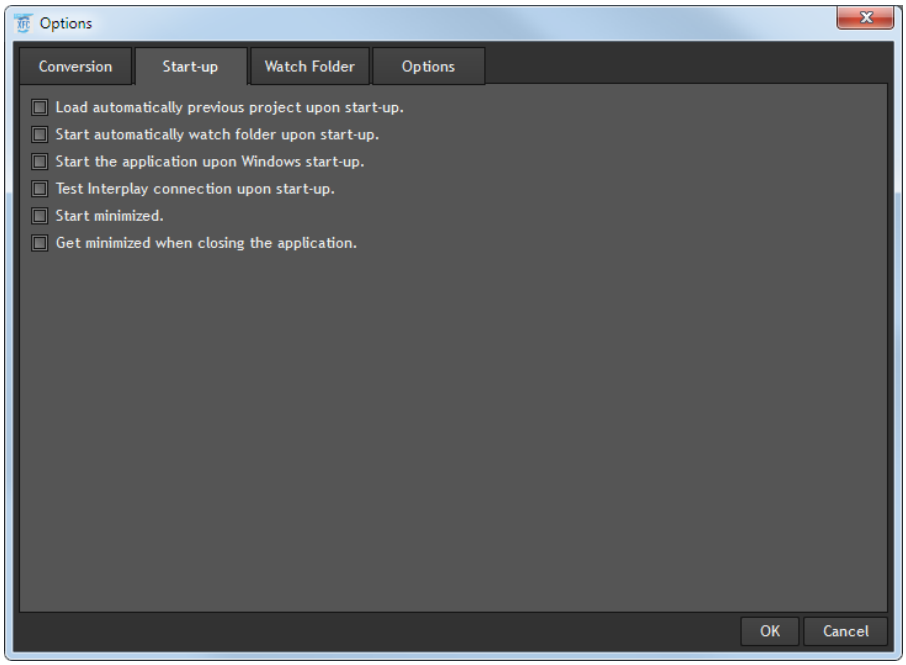
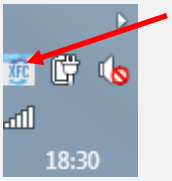


Figure 38: Application start-up and shutdown options

Option	Description
Load automatically previous project upon start-up	If this option is enabled, the project that was opened during the last session will be automatically loaded. However, the watch folder will be launched only if the next option is also enabled.
Start automatically the watch folder upon start-up	If this option is enabled, OpenCube XFConverter will load the previous project file and start the watch folder.
Start the application upon Windows start-up	If this option is enabled, the next time Windows is started, OpenCube XFConverter will be launched automatically and will load the project that was opened during the previous session. The watch folder will also be automatically started.
Test Interplay connection upon start-up	If this option is enabled, OpenCube XFConverter will check upon start-up to see if the Interplay connection is available.
Start minimized	OpenCube XFConverter can be minimized in Windows' tray task bar and can continue to run without its graphical user interface. If this option is enabled, OpenCube XFConverter will start in the tray task bar; you can then open it by double-clicking on the GUI icon: 
Get minimized when closing the application	When this option is activated and you click on the Windows' exit icon  , OpenCube XFConverter will go in the tray task bar and hide the user interface. To exit the application in this mode, you can right-click on its icon and select **Quit**. 

7.4 Watch Folder Configuration

The third tab in the Options dialog box allows you to configure the watch folder.

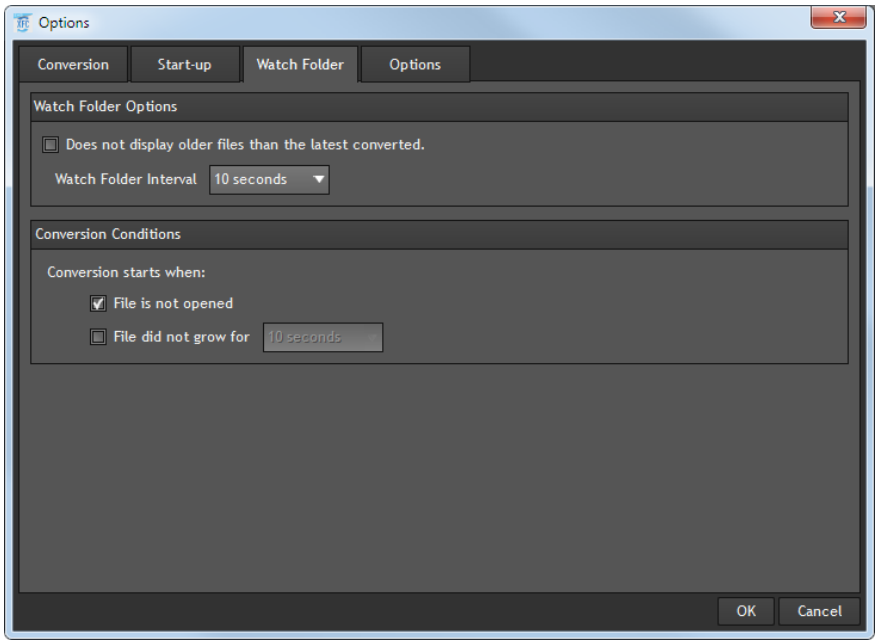


Figure 39: Watch folder options

Option	Description
Does not display older files than the latest converted	If this option is enabled, the watch folder will not display files older than the latest converted. Some file systems do not modify the file creation/modification dates when files are moved. In this case, it would be advisable to disable the option.
Watch Folder Interval	Allows you to specify the watch folder scanning interval.
File is not opened	If this option is enabled, the conversion is started if the source files are not opened. **Note:** This option will deactivate the **File Did Not Grow For** option. These two options are exclusive.
File did not grow for	If this option is enabled, the conversion is started if the source files did not grow. **Note:** This option will deactivate the **File Is Not Opened option**. These two options are exclusive.

7.5 Options

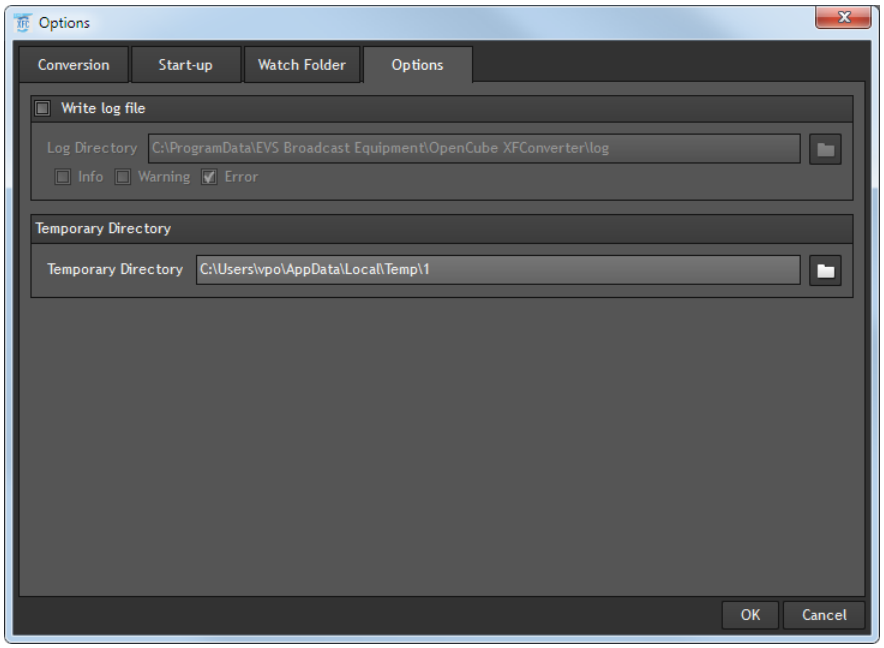


Figure 40: OpenCube XFConverter global options

Option	Description
Write log file	This option enables log file writing. You select a directory and OpenCube XFConverter will automatically create a new log file per day in the directory selected. You can specify the log level.
Temporary directory	If OpenCube XFConverter has to create some temporary files, it will use this directory.

7.6 Interplay Configuration

The interplay configuration is available as an option. It requires the Avid OpAtom or the Avid OpAtom AMT license.

The following window contains the Interplay connection settings. These settings are used for master clip check-in in Interplay.

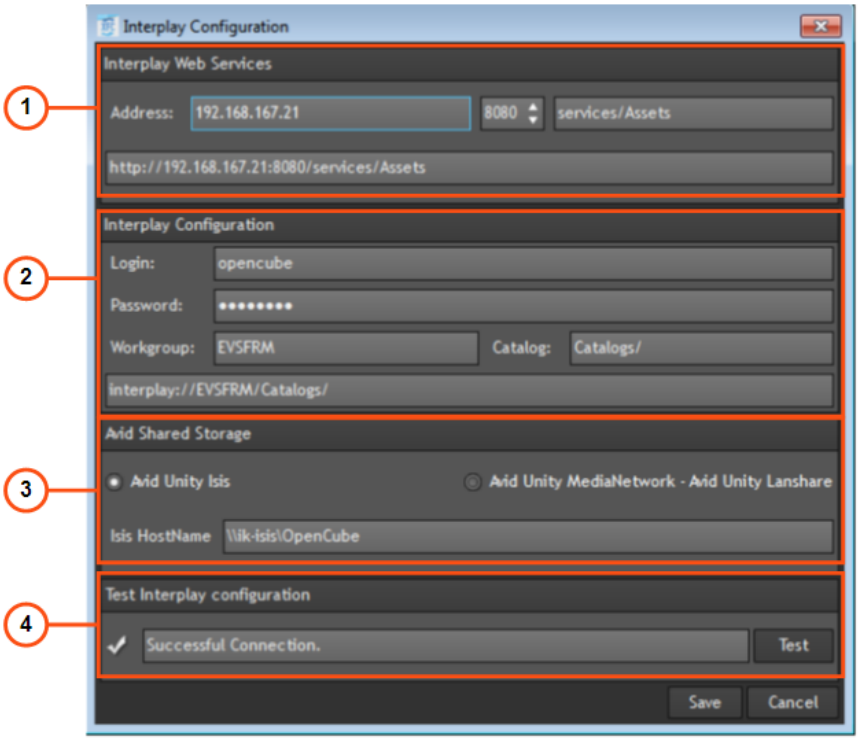


Figure 41: Interplay configuration

The window is divided into 4 parts:

Part	Name	Description
1.	Interplay Web Services	OpenCube XFConverter used Interplay web services to check-in master clips.
2.	Interplay Configuration	This group contains the login and password and the check-in root catalog.
3.	Storage	This group contains information about the Interplay storage. If these fields are incorrectly filled in, the check-in will succeed but the master clip will be Offline in Interplay. • If you used an Isis: key-in the host name of the Isis Storage. • If you used a Lanshare: choose the local mount point to the Lanshare and key-in the equivalent of the local mount on the Interplay server.

Part	Name	Description
4.	Test Interplay Configuration	This group is used to test the configuration. The “Save” button will be disabled until the connection test is successful. Warning: this test cannot detect whether the storage settings are correct or not.

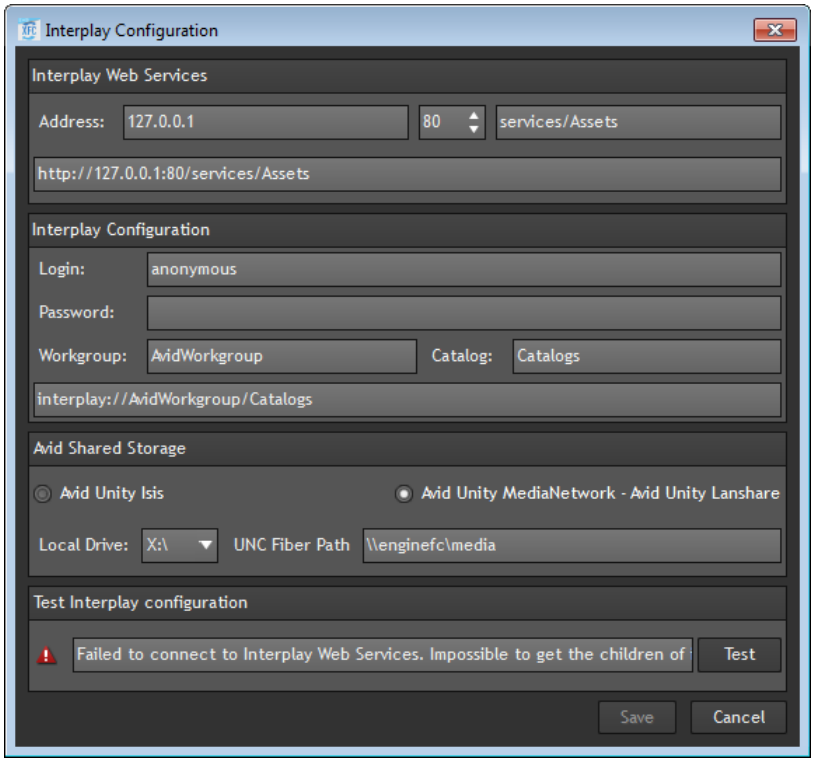


Figure 42: Lanshare settings

Interplay catalogs can be browsed from the main window.

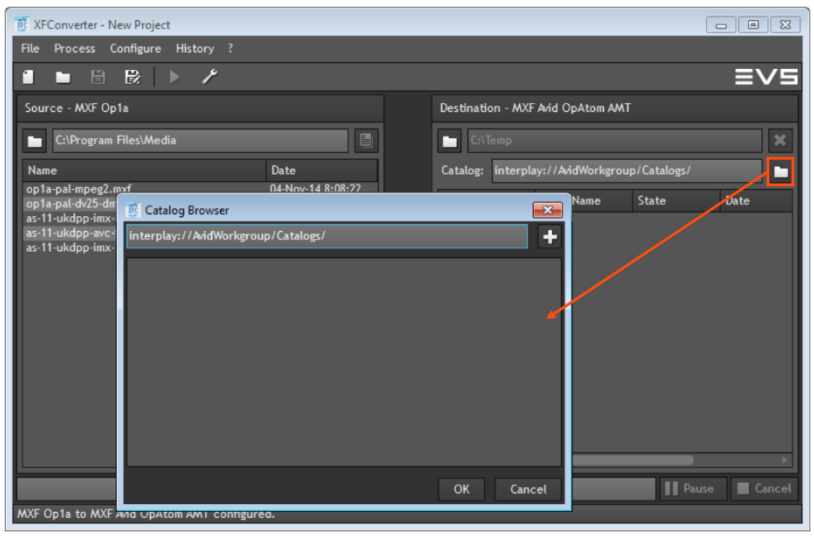


Figure 43: Browsing Interplay catalog

New catalogs can be created from the Catalog Browser windows.

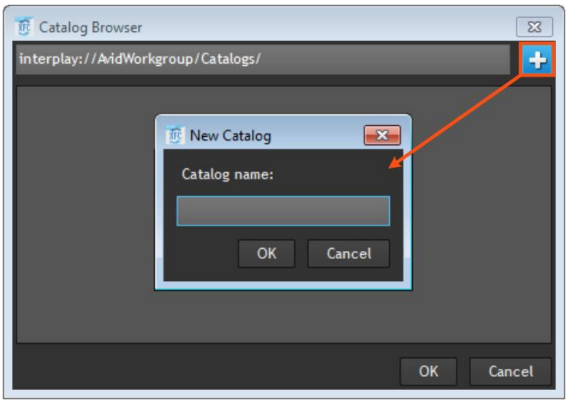


Figure 44: Create new Interplay catalog

8. OpenCube XFConverter API

OpenCube XFConverter includes a C++ API (Application Programming Interface) as an option for developers who want to integrate OpenCube XFConverter features in their applications. The API can be used as a local dll or as an RPC server/client using SOAP protocol. This server can be used to automate the conversion processes scheduled by an automation server.

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