**(Nintendo®)**

# Mobiclip Multicore Encoder

## User Manual

Version 2.0.2

> **The content of this document is highly confidential**
> **and should be handled accordingly.**

**Confidential**

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# 1  Introduction

The Mobiclip Multicore Encoder is a tool that transcodes your existing movie files into the required MoFlex file format, allowing playback using the Mobiclip SDK.

One way to display videos on Nintendo platforms is to use the Mobiclip SDK, which is a highly optimized library of APIs which allow you to play movie files within other applications, and to create movie playback controls which allow users to interact with the movie player.

In order to play a movie file, the Mobiclip SDK requires that your movie file is in the Mobiclip MoFlex file format.

## 1.1  About the Mobiclip Multicore Encoder

The Mobiclip Multicore Encoder (which will be referred to as the "tool" in the rest of this document) is a tool that accepts movie files as inputs, and then allows you to easily change many of the movie file properties during the transcoding process.

This tool was developed to make the video preparation process easier for both video experts and also video novices, by allowing very powerful features within an easy to use graphical application.

The tool also provides significant performance improvements over the single-core Mobiclip VFW Codec, as the tool supports dividing the encoding work across multiple CPU cores running in parallel, resulting in jobs that finish much faster.

The tool has several filters which allow modifications to your video and audio tracks within your movie file. These encoding settings are discussed in more detail in later chapters, and include features like crop and resize video dimensions, resample audio track, change video frame rate, rotate image, etc.

The tool can produce movie files with two possible container formats, which are AVI and MoFlex. AVI is used if an intermediate file is needed for analysis, but normally the goal when using the tool is to produce MoFlex files which are ready for playback on Nintendo platforms.

The output movie file must have at least one video track, which will be compressed using the Mobiclip video codec.   The output movie file can have between 0 and 8 audio tracks, which can be either uncompressed or compressed with Mobiclip's FastAudio codec or Nintendo's ADPCM-based codec.

Although this tool will process many types of movie files without issues, it is always recommended to test the output MoFlex movie files on the target platform and application, to ensure the visual and audio quality is acceptable.

## 1.2  About this Document

This document explains how to install this tool, the usage procedures and notes for use.

## 1.3  Terminology Used in this Tool

This section explains the key terms used within this tool and this document.

**Table 1-1 Terminology Glossary**

| Term | Definition |
|------|------------|
| Audio channels | One audio channel is known as "mono", and two channels are "stereo". If input files contain more than two audio channels, they must be converted to stereo or mono for the output movie file. |
| Audio track | A sequence of recorded sound within a movie file, which can contain multiple audio channels |
| Bitrate | The average number of bits (not bytes) required each second of playback for the video and/or audio tracks in a movie file. Measured in kilobits per second (kbps). |
| Dimensions | Width and height of a video track frame, measured in pixels. Often "resolution" is used instead, but technically resolution measures pixel density rather than pixel dimensions. |
| Filter | A specific treatment that is performed by this tool. Filters are connected sequentially to create graphs. |
| Frame | A unique visual image within a video track. |
| Frame rate | Number of frames per second in a video track, abbreviated as "FPS". |
| Graph (file) | A specific instance of a graph that has been saved to a file for later usage via the "Graph Editor" tab. The filename extension is .mograph. |
| Graph Editor (tab) | A tab in this tool's GUI, used to create and modify graphs. Clicking the "Job Queue" button on this tab creates a job based on the current graph. |
| Input movie file | An existing file containing video and/or audio tracks. |
| Job | A specific graph that has been added to the job queue. A job is run to produce one or more output movie files from one or more input movie files |
| Job Queue (tab) | A tab in this tool's GUI, which lists of all jobs that have been run or are waiting to run. Buttons on this tab are used to manage the order in which jobs will be run, or to stop and start the processing of the job queue. |
| Job Queue (file) | A specific instance of a job queue that has been saved to a file for later usage, which can contain one or more jobs. Job queue files are required as inputs for commandline operation of this tool, but for commandline operation your queue file can contain only one job. Queue files are saved via "Save queue" button on the "Job Queue" tab. The filename extension is .queue. |
| Output movie file | The output of this tool. It must contain at least one video track, and may or may not contain audio tracks. Audio tracks can be either mono or stereo. <br><br> The output movie file container is either AVI for testing and validation via PC playback, or MoFlex for playback on Nintendo devices. |
| Video track | A sequence of recorded images (frames) within a movie file, with a specific frame rate (FPS) and video dimensions (which are measured in pixels). |

# 2  Setup

This chapter describes the installation of the Mobiclip Multicore Encoder application and license file.

## 2.1  Software Requirements

This tool has been confirmed to work on the Windows operating systems below.

- Windows 7 64-bit, with Service Pack 1

Note that this produce requires the 64-bit version of Windows, and that 32-bit versions are not supported.

No other additional software needs to be installed to use the tool.

## 2.2  Installation of the Mobiclip Multicore Encoder

An installation program is provided for the tool, and a license file must be installed before the tool can be used to encode videos.

### 2.2.1  Installation of the Tool

After unzipping the release package, view the contents of the *tools* directory.

Launch *Mobiclip_Multicore_Encoder_Install_x64.exe*, and install it by following the instructions displayed on the dialog windows.

### 2.2.2  Installation of the License File

A Mobiclip license file is required, and must be installed to use the tool.

To install your license file, launch the tool, and then click on **Help** -> **Install license**

The license can be downloaded from the WarioWorld website if you have been granted rights to use the Mobiclip SDK. The license is a text file named *user.lic* by default.

For help obtaining a license file, please contact Nintendo technical support.

### 2.2.3  When the License has Expired

If the license has expired, you will need to obtain a new license and then install it to continue using this tool. For details on how to get a new license file, please contact Nintendo technical support.

### 2.2.4  Uninstall

Select "Mobiclip Multicore Encoder" from "Add/Remove Applications" window on the control panel to uninstall this tool.

## 2.3  Other Related Tools

Some movie files are incompatible with this tool, or may require additional processing to obtain an acceptable level of quality. In general, the input movie file should be minimally compressed and minimally processed, but in some cases it must be modified in order to be compatible with the Mobiclip Multicore Encoder.

Certain movie files are incompatible with this tool due to the video or audio codecs used, or because of the file container format. This tool uses FFMpeg to decode the audio and video tracks within input movie files, and if FFMpeg is unable to decode the input file then it cannot be used. The solution in this case is to re-encode the audio and/or video tracks in a different format which is supported by this tool.

From a video-quality perspective, some input movie files might require preprocessing that is not available in this tool, such as adjusting brightness or color saturation.

For both of these cases, additional video editing software from 3rd party vendors can be used for preprocessing the input movie file, in order to ensure the input movie file is compatible and high quality.

# 3  Getting Started

This chapter describes the tool's graphical user interface and general application settings.

## 3.1  Launching this Tool

Launch *Mobiclip_Multicore_Encoder.exe* from the Windows Start menu, or from the installation directory. By default, the 64-bit version is installed in *C:\Program Files\Nintendo\Mobiclip Multicore Encoder*.

You can also double-click on a graph file (.mograph), and the application will startup and load that file.

## 3.2  Usage Overview

This tool presents a graphical interface which allows you to create graphs that define encoding jobs.

The **Graph Editor** window is used to create and configure a graph. A graph captures the workflow of the encoding job. It is a visual representation of each action to be taken, as well as the sequential order of execution for each action. These actions are represented by filters, which are connected together with arrows. In order to add or configure a filter, double-click on it.

The **Job Queue** tab shows information about jobs that have been processed or are waiting to be processed. Once a graph is complete, you can start processing the encoding job by adding the graph to the encoding queue. When added to the queue, a "snapshot" of the graph (as it exists at that moment in time) is taken to define the job in the queue.

Once a job is in the queue, it cannot be changed. However, you can modify the original graph and then create a new job based on your updated encoding settings.

The **Job Queue** tab is also used to organize the order in which jobs are run, as the tool will sequentially execute all jobs in the queue in the order they appear from top to bottom.

The **Progress** tab is used when jobs are currently being run, and displays the current encoding stage and advancement.

## 3.3  User Interface of this Tool

The UI contains three main tabs:

- **Graph Editor** : create and modify graphs which define the encoding job
- **Job Queue** : view all jobs, manage the order jobs are processed, and start or stop processing
- **Progress** : view status of the current job that is running

The menu bar offers various functionalities which will be described later, most of which is also available in the right-click menu that appears within the application. Additional context-sensitive menus will also appear after a right-click on items within the **Graph Editor** and **Job Queue** tabs.

## 3.4  General Application Settings

Click **Options** > **Settings** in the menu bar to open the **Settings** dialog box.

**Figure 3-1 Settings Configuration**
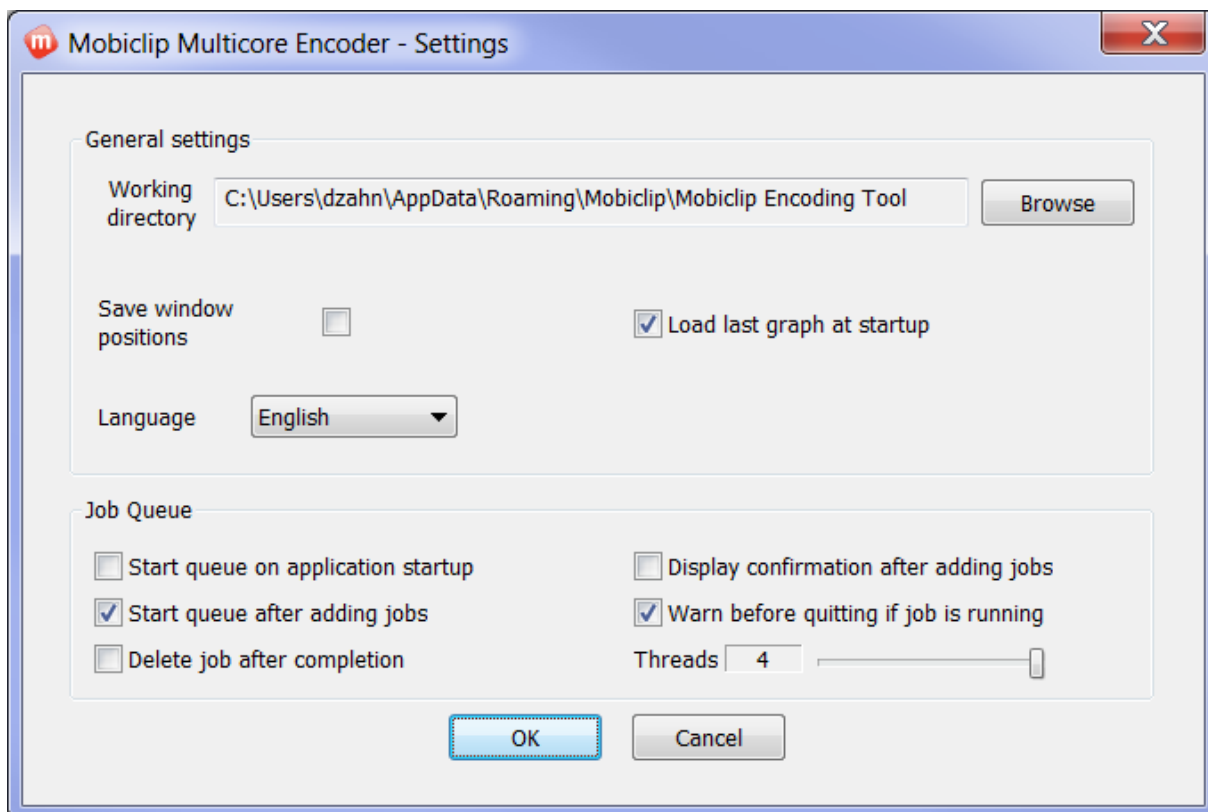


**Table 3-1 Settings Menu Details**

| Item | Details |
|---|---|
| Working directory | Where application stores temporary files during job execution. There must be enough free space available on this disk, which depends on the length and complexity of your video source. |
| Save window positions | Filter configuration windows open where you had previously moved them, rather than just in the middle of the screen. |
| Load last graph at startup | Loads the last graph in use when you launch the application. |
| Start queue on application startup | Start processing any remaining jobs to do in the job queue whenever the application is launched. |
| Start queue after adding jobs | Start processing a job right after it is added to the job queue. |
| Delete job after completion | Once done, a job will disappear from the job queue, but the output movie files are saved. |
| Display confirmation after adding jobs | A confirmation screen appears after adding jobs to the queue. |
| Warn before quitting if job is running | App will show a warning before shutting down if an encode job is underway. |
| Threads | Determines how many CPU cores to simultaneously use for encoding jobs. |

# 4  Create a Graph for an Encoding Job

Graphs are used to visually show each step within an encoding job. Each step is represented by a filter, and the order in which each step of the encoding process is done is determined by how the filters are connected together in sequence.

## 4.1  Add Filters to a Graph

With the tool running, click the **Graph Editor** tab. To start with a new graph, click **File** -> **New graph**.

Filters are grouped by functionality, and you can click the plus symbol to expand each group.

Within each filter group are the individual filters. Double-click a filter name (within the text) to add it to the **Graph Editor** tab.

**Figure 4-1 Graph Editor Tab**
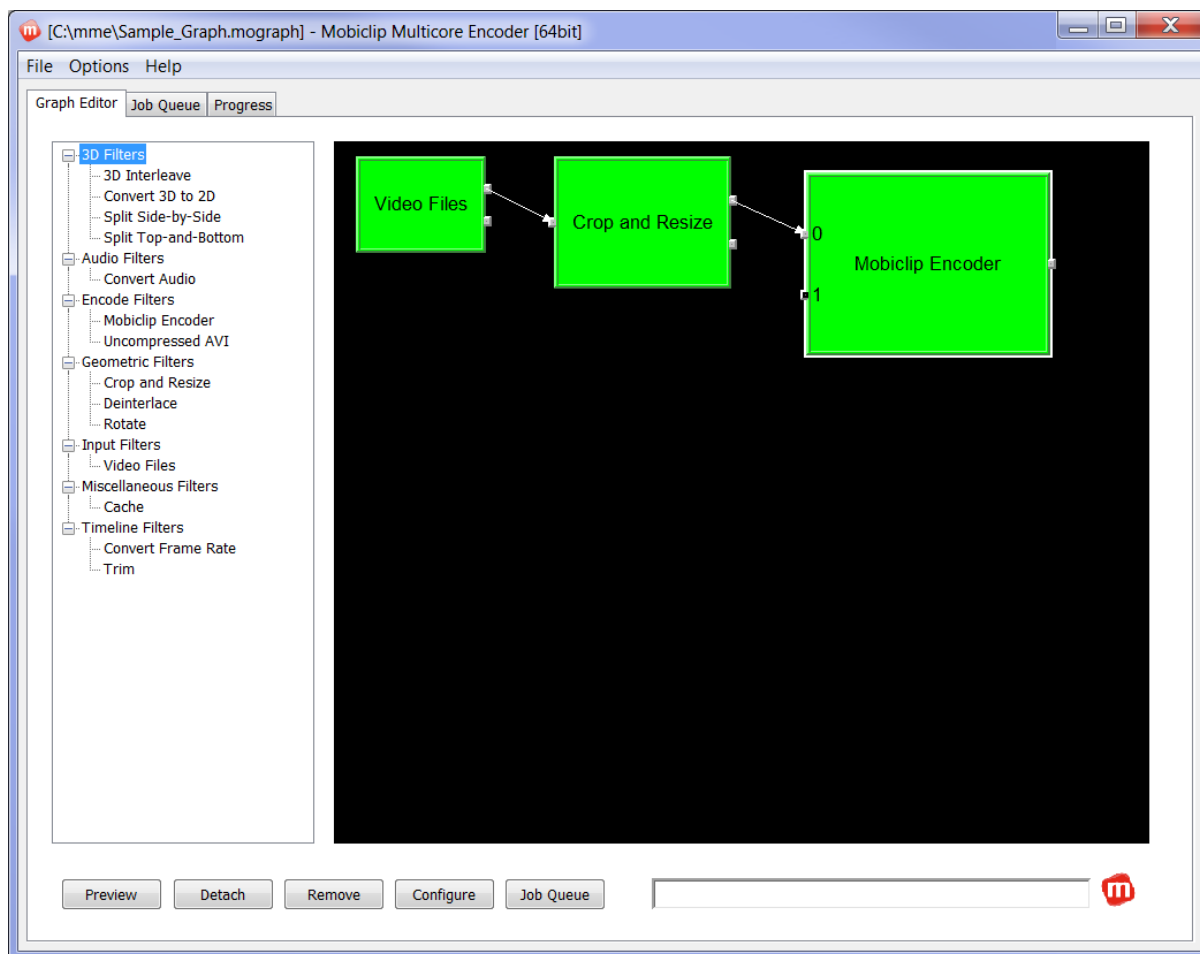
**Table 4-1 Graph Editor Controls**

| Button | Detail |
|---|---|
| **Preview** | Opens the Preview window to see video frames output by the selected filter. |
| **Detach** | Detaches the selected filter from the graph workflow. |
| **Remove** | Deletes selected filter. |
| **Configure** | Configures a filter. |
| **Job Queue** | Creates encoding job from the current graph and adds it to the job queue. |

The buttons apply to the filter that is currently selected, and only one filter can be selected at a time. Select a filter with a single-click of your mouse anywhere inside the filter box, and its border will appear highlighted.

## 4.2  Connect Filters to Establish the Processing Order

Filters have input and output "pins" (on the left and right side of each filter box), and are connected together with one-way arrows that indicate the order in which filters are processed.

Use a drag-and-drop operation to draw an arrow connecting one filter's output pin to the input pin of the next filter in the graph workflow. You can detach and reattach arrows to modify the graph by dragging the end of the arrow to a new location, but each filter must be connected to the others to form a complete graph. You can also right-click a filter box to detach it.

Filters are processed according to their order in the graph, so it is important to consider how you arrange the filters in sequence. Suggestions about this will be discussed in more detail within each filter configuration section later in this document.

 **Note:**  Filters that are not connected will be ignored by the tool, and will not be used when an encoding job is run.

## 4.3  Configure Filters

Double-click a filter box to open its configuration window to modify settings.

Before configuring a filter, it must be connected to other filters and have an input. You must also start the beginning of your graph with the **Video Files** input filter, and must have selected an input movie file.

Filters which are only partially configured or have errors appear as red boxes, while a green box indicates that the filter is properly configured.

See the next chapter for more details about configuring each type of filter.

 **Note:**  Some filters do not require any configuration, so double-clicking them has no effect.

## 4.4  Preview Filter Results

The preview features allows you to see the visual result of the actions taken by each filter. On each filter box, you can right-click and select **Preview**. This will load a preview window showing one full

frame from the video, and has a timeline slider bar at the bottom you can use to jump through the film.

Basic film metadata is also displayed in the top left of the preview window, allowing you to verify settings like the video frame rate or audio sampling rates.

## 4.5  Finish the Graph with the Mobiclip Encoder Filter

The first step in a graph is a **Video Files** input filter, and the last step within a graph is generally the **Mobiclip Encoder** filter, in order to produce output movie files in the required MoFlex file format. This filter performs the task of encoding the video tracks with the Mobiclip codec, and compressing the audio tracks with either the FastAudio or ADPCM codecs. An output MoFlex movie file can contain up to 8 video and/or audio tracks, and one MoFlex file is created by each **Mobiclip Encoder** filter.

If you need to create several output files from the same input file, you can add multiple Mobiclip Encoder filters to your graph. This can be useful if you would like to create output files with different encoding profiles (bitrates or dimensions or frame rates), in order to test which file gives you the best result.

See the later section on configuring this filter for more details.

 **Note:**  The **Mobiclip Encoder** filter requires that the input video track's height and width be exact multiples of 16 pixels. Use a **Crop and Resize** filter if your input video track does not meet this requirement. For example, dimensions of 1920x1072 pixels are acceptable, but 1920x1080 is not because 1080 is not an exact multiple of 16.

## 4.6  Validation of the Graph

The tool automatically checks the validity of a graph every time a filter is configured.

If improperly or incompletely configured, one or more filter boxes will be red. Sometimes several connected filters will be red, but this does not necessarily mean each one is incorrectly configured. This can happen if the first filter in the graph is not configured properly, because this often makes subsequent filters invalid as well.

If red items remain in the display, start out by checking the configuration of the first **Video Files** input filter and then go through the other filters sequentially from the start to the end.

 **Note:**  The error messages explaining why the filter is red will be displayed on the lower right corner of the **Graph Editor** tab.

## 4.7  Save and Load a Graph

It is recommended to save complex graphs, as this allows you to easily reuse them in the future.

Either use **File** -> **Save as**, or right-click within the black space in the **Graph Editor** tab and choose **Save as**. Reloading saved graphs is done the same way by clicking **File** -> **Open graph**.

 **Note:**  Select the **Settings** option **Load last graph at startup** if you want the most recently used

graph to be automatically loaded when you start the tool.

## 4.8  Create an Encoding Job from a Graph – Add to Queue

Once you have a valid graph (all filter boxes are green) click on the **Job Queue** button within the **Graph Editor** tab to add this encoding job to the job queue.

See a later chapter for information on controlling the **Job Queue** tab.

**Note:**  If you have unused filters which are not connected, they may appear in red within the **Graph Editor** tab, but this is irrelevant as they will be disregarded when the job is added to the queue.

# 5 Filter Configuration

Once you have added filters to a graph, and they have been connected in sequence, then you can configure each filter's settings.

## 5.1 Design Your Graph after Analyzing the Video Requirements

Before starting an encoding job, ensure the video requirements are clear. It is important to know if certain characteristics are required, such as a limited bitrate or file size.

Once this is defined, you will probably need to fine tune the configuration of some of the filters described in this chapter.

## 5.2 Organize the Filters in the Recommended Sequence

In general, it is recommended to setup your graphs with the filters connected sequentially in the order they are listed in this chapter. The goal is to finish jobs quickly while ensuring that the highest quality result can be obtained.

For instance, it is more efficient for the tool to perform a rotate filter after reducing the video dimensions with a crop and resize filter. This is because the rotate filter will have fewer pixels to manipulate, meaning the encoding job will finish faster for you without any loss in quality.

However, it is recommended to lengthen the encoding time if it will produce a higher quality video. For this reason it is recommended to modify your video's frame rate before applying a crop and resize filter, if adding/removing frames with the blend frames pixels option. This is because when the frames images are being blended together to produce new frames, the resulting quality will be higher if the original high definition images are blended together rather than downsized images. So it is better to reduce the video dimensions with a crop and resize filter after this blending has occurred, even though it might take more time overall to finish the job.

Graphs must start with one or more **Input Files** filters, and end with one or more **Encode Filters**.

## 5.3 Opening the Filter Configuration Window

Double-click a filter box in the **Graph Editor** tab to open its configuration window.

Some filters do not require any configuration, so double-clicking them does nothing.

**Note:** Certain filters must be connected to others to be configured. In general, it is good to add all your filters to the graph, and then connect them in the desired order using a drag-and-drop operation to connect filter output pins to filter input pins with arrows.

## 5.4 Input Filters

A graph begins with the **Video Files** input filter, which is used to select the one or more files to use as

your input source for video and audio.

## 5.4.1   Video Files: Select Input Movie Files

Double-click the **Video Files** filter box to open the configuration window.

Click **Browse**, and then navigate to the directory containing your input movie file(s).

After selecting your file, it appears in the configuration window with some details about the input file's first video track. Verify the video characteristics are what you expected.

**Note:**  If your source file is a 3D video that has the left-eye and right-eye video frames interleaved, then you should check the **3D-Interleaved** checkbox on the same line as the file.

**Figure 5-1 Video Files Filter Configuration**

| Video Files | | | | | | |
|---|---|---|---|---|---|---|
| C:\mme\robot | | | | | Browse | +/- |
| 3D-Interleaved | Filename | Dimensions | FPS | Duration | Audio channels | Sample rate |
| ☐ | Input_Movie_File.mp4 | 400x240 | 60.000 | 00:00:20 | 2 | 48000 |

OK    Cancel
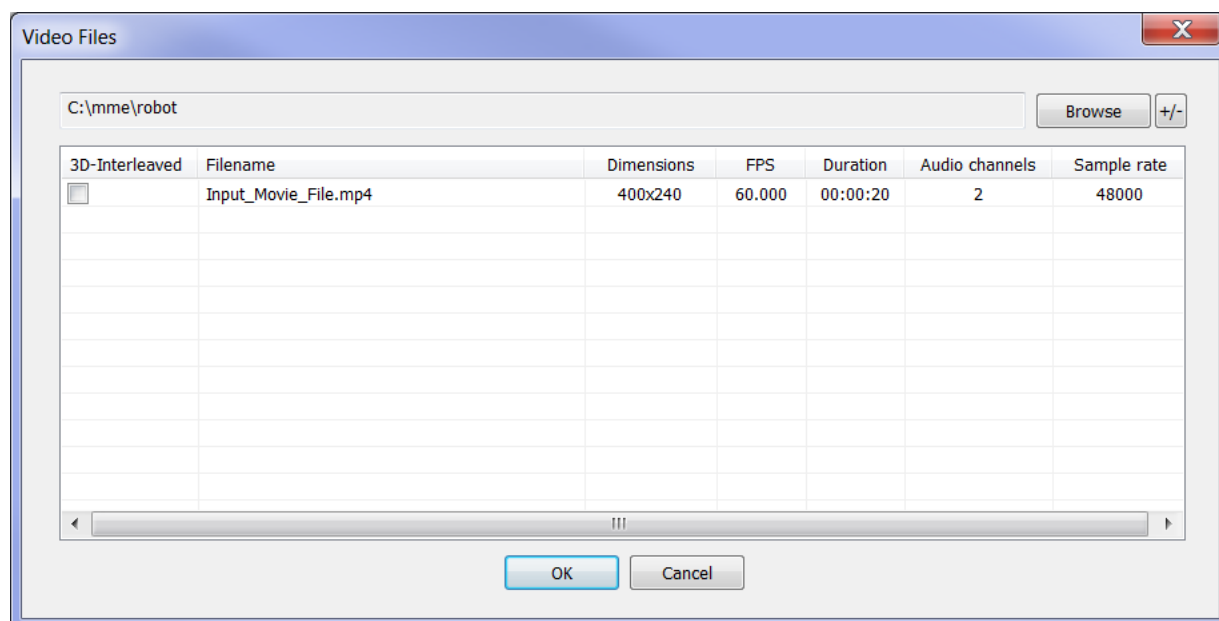
## 5.4.2   Batch Processing: Select Multiple Input Movie Files

Batch processing of multiple files within the same graph is possible with this tool, if you select multiple input files. This can be helpful if you have many input movie files to process with the same settings, as they all will use the same graph.

To select multiple input movie files, follow this procedure for the **Video Files** filter:

1. Double-click the **Video Files** filter box.

2. Click the **Browse** button, and select the directory where your source movie files are stored, then select one movie file, and click **open** to return to the **Video Files** configuration window.

3. Once at least one input movie file has been selected, you can add more files by clicking the "**+/-**" button to the right of the **Browse** button.

4. Select individual files by single-clicking the filenames in the list, or Click CTRL-A to select all the files in the directory.

**Figure 5-2 Video Files Filter Configuration – Select Multiple Input Movie Files**
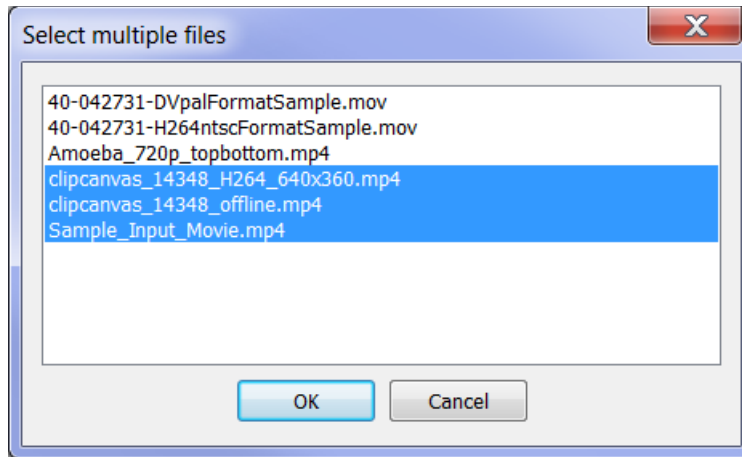


The following requirements must be met:

- All input files must be in the same directory

- All files can be processed using the same graph

If you would like to create multiple output movie files with different encoding settings, then you can add multiple **Mobiclip Encoder** filters to your graph. This is useful for cases where you would like to test different bitrates to see the difference in video quality.

## 5.5  3D Filters

There are several filters that are used when processing 3D stereoscopic movie files.

### 5.5.1  3D Interleave

This filter does not have a configuration window.

It requires two separate **Video Files** filters as inputs.

The first input file must be the "left-eye" perspective, and must be connected to the "**L**" input pin on the **3D Interleave** filter. The second input file must be the "right-eye" perspective, and is connected to the "**R**" pin. See the figure below.

**Figure 5-3 3D Interleave Filter**
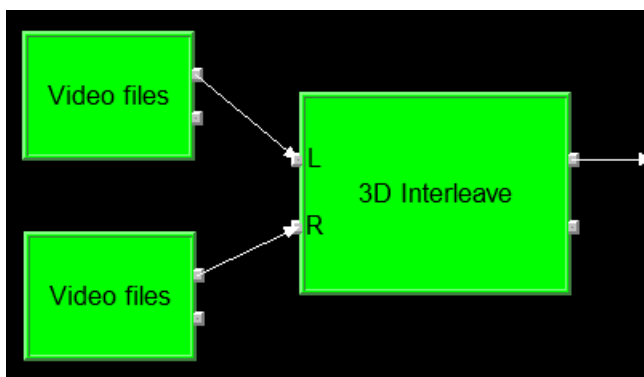


## 5.5.2  Split Side-by-Side

Double-click the **Split Side-by-Side** filter box to open the configuration window.

**Figure 5-4 Split Side-by-Side Filter Configuration**
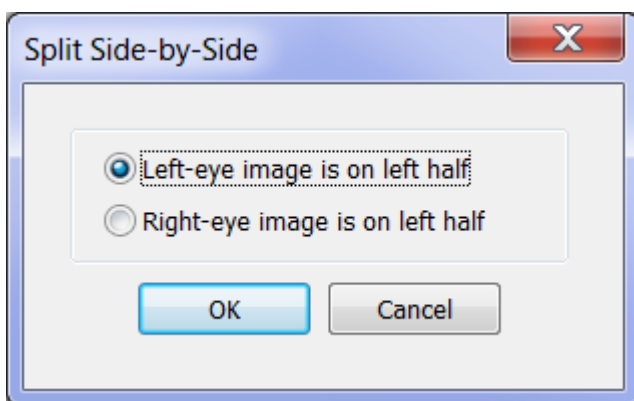


The filter will split the combined 3D side-by-side frames into separate left-eye and right-eye frames, and will then interleave them together in a left-right-left-right… sequence.

It requires one **Video Files** filter as input.

The input file must be in the 3D "side-by-side" format. This format requires that the left and right-eye images are positioned horizontally in each video frame of the input movie file. Use the radio button to specify which eye view is on the left half of the input video frames.

**Note:**  You do not need to add the **3D Interleave** filter in this case, as the interleaving of left-eye and right-eye images is done automatically by the **Split Side-by-Side** filter.

## 5.5.3  Split Top-and-Bottom

Double-click the **Split Top-and-Bottom** filter box to open the configuration window.

**Figure 5-5 Split Top-and-Bottom Filter Configuration**



The filter will split the combined top-and-bottom frames into separate left-eye and right-eye frames, and will then interleave them together in a left-right-left-right... sequence.

It requires one **Video files** filter as input.

The input file must be in the 3D "top-and-bottom" format. This format requires that the left-eye and right-eye images are stacked vertically in each video frame of the input movie file.

**Note:**  You do not need to add the **3D Interleave** filter, as the interleaving of left-eye and right-eye images is done automatically by the **Split Top-and-Bottom** filter.

## 5.5.4  Convert 3D to 2D

Double-click the filter box to open the configuration window.

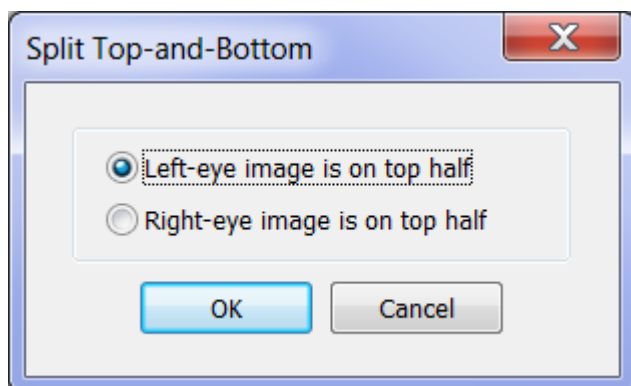**Figure 5-6 Convert 3D to 2D Filter Configuration**
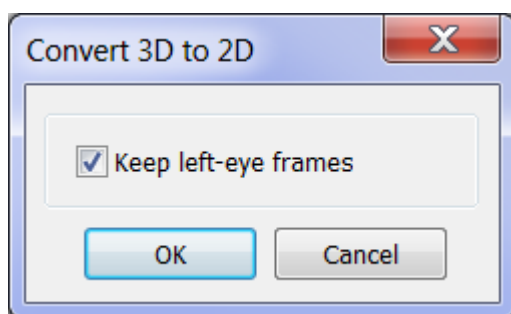


It requires one **Video Files** filter as input.

The input file must be in the 3D interleaved format.   This format requires that the left-eye frames are alternated with the right-eye frames, for instance L1-R1-L2-R2-L3-R3...

The filter will keep only the left-eye frames if **Keep left-eye frames** is checked, otherwise it will keep only the right-eye frames.

The filter output will have half the number of frames as the input file, but will be the same time duration.

## 5.6  Timeline Filters

Timeline filters are used for several purposes, and generally involve changes to the duration of your output movie file.

### 5.6.1  Convert Frame Rate

Double-click the filter box to open the configuration window.

**Figure 5-7 Convert Frame Rate Filter Configuration**
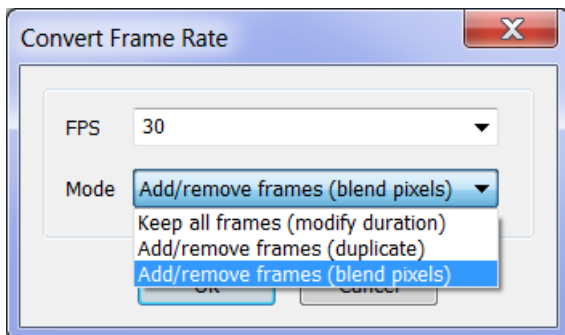


Select the desired FPS value from the dropdown list.    Select the blank line if you want to enter a custom value that is not listed.    At the top of the list you will see the original frame rate of the filter input.

Select the **Mode** to use from the dropdown list.

**Table 5-1 Convert Frame Rate Filter Modes**

| Button | Detail |
|---|---|
| **Keep all frames (modify duration)** | FPS will change, but no frames will be added nor removed. Resulting video will have same number of frames, but will have a shorter time duration if FPS has increased, as the output video will finish faster than the original. If the FPS was decreased, the output video will have a longer time duration. |
| **Add/Remove frames (duplicate)** | The output video time duration does not change. If FPS increases, then frames are copied and inserted into the video, so the overall frame count increases. If FPS decreases, then frames are deleted and the frame count decreases. A negative side effect is that the playback will be less smooth, and could have slightly jerky movement known as "judder". |
| **Add/Remove frames (blend pixels)** | Similar to Add/Remove frames (duplicate), but the added frames will be a blend of the two closest frames, which will provide a smoother playback experience. This is the recommended mode to use, but note that it does take longer to execute. |

### 5.6.2  Trim Filter for Extracting a Portion of a Movie

Double-click the filter box to open the configuration window.

**Figure 5-8 Trim Filter Configuration**
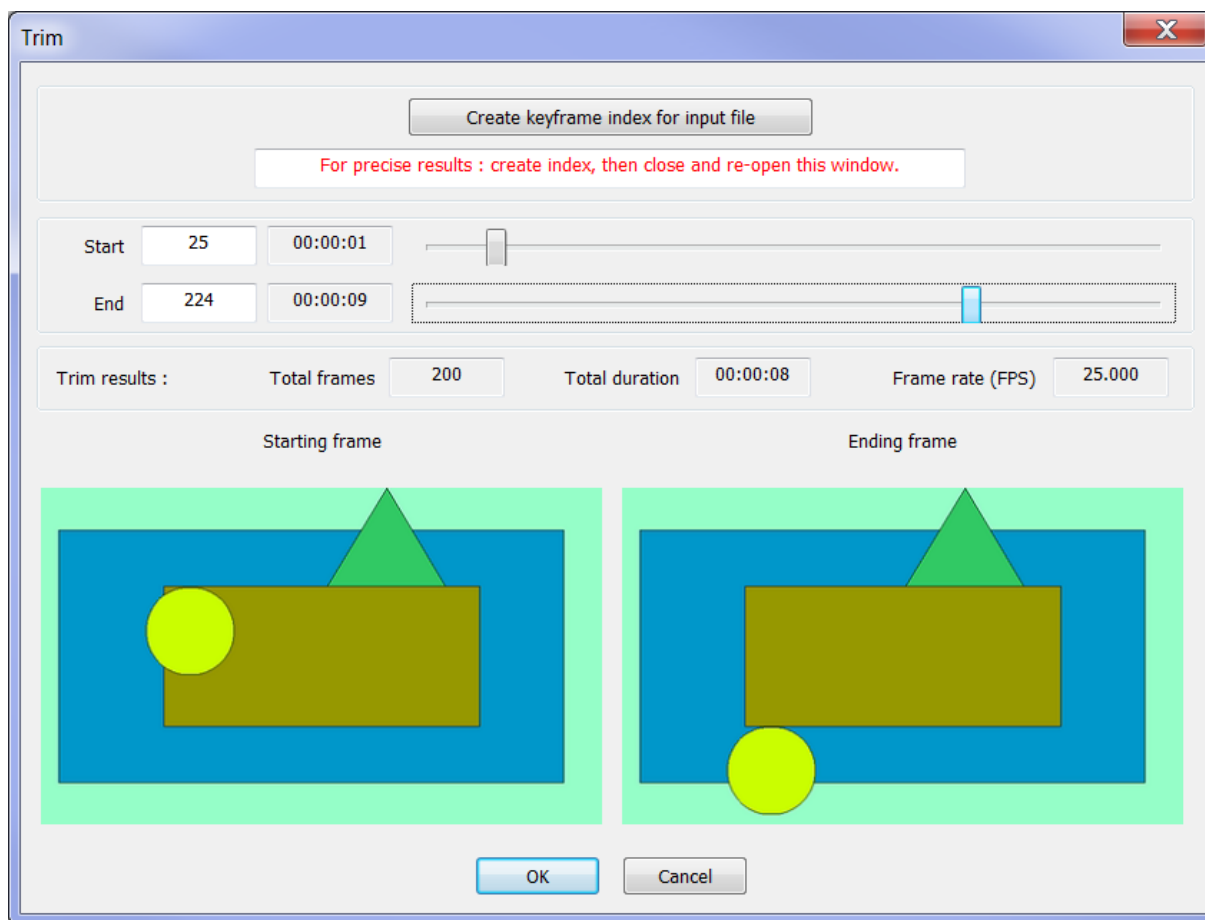


The **Trim** filter is used to extract a portion of the film, and will reduce the duration of your movie.

The first step is to click the **Create keyframe index for input file** button, as your input movie needs to be indexed to build a table of keyframes. This index will be used to determine the beginning frame of the extracted segment of video, as it must begin with a keyframe. You must then close and re-open this configuration window for the index file to be loaded. This step can be skipped, but the extracted segment might not begin exactly where you expected.

Select the **Start** and **End** values by entering a frame number in the white boxes, or by using the sliders. As you change these values, the corresponding images for the **Starting frame** and **Ending frame** are displayed in the preview windows. The corresponding time values are calculated automatically for you, based on the movie's frame rate.

The **Trim results** section shows the total frames and duration of the movie segment that will be output by this filter.

## 5.7  Audio Filters

Audio filters are used to resample an audio track, and also to convert multi-channel audio to either 1-

channel mono or 2-channel stereo.

## 5.7.1  Convert Audio Sampling Rate

Double-click the filter box to open the configuration window.

**Figure 5-9 Convert Audio Filter Configuration**



Select the desired **Sample** rate value from the dropdown list, and the audio track will be resampled at that rate. Select the blank line if you want to enter a custom value that is not listed. At the top of the list you will see the original sample rate of the filter input.
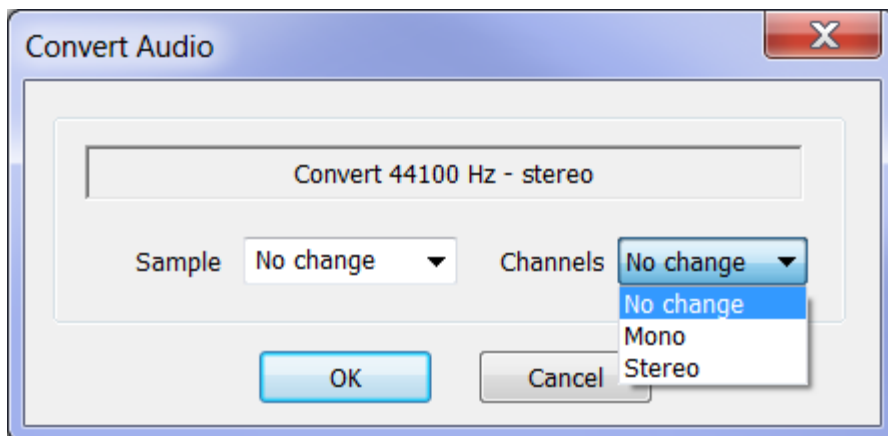
Use **Channels** to select between 1-channel mono and 2-channel stereo.

## 5.8  Geometric Filters

**Geometric Filters** are used for several purposes, and involve several different actions that are typically used together to create a video that is adapted to the target platforms screen dimensions and aspect ratio of horizontal to vertical pixels.

Crop and Resize is frequently used, as output MoFlex files must have video dimensions (in pixels) that are exact multiples of 16. For example, if your input movie is 420x240 pixels, you could crop 10 pixels of the left and right sides which results in a video dimension of 400x240 pixels, or you could resize the image to 400x224.

**Crop** removes lines of pixels from around the outside edges of the input video.

**Resize** change the video dimensions in pixels, but you should be careful to maintain the source movie's original aspect ratio of width to height. A resize can also change the aspect ratio if the video is stretched, but this is usually not recommended as the image becomes deformed. However, if the deformation is minor, then you might want to resize your video and change the aspect ratio in order to fill the entire display screen during playback.
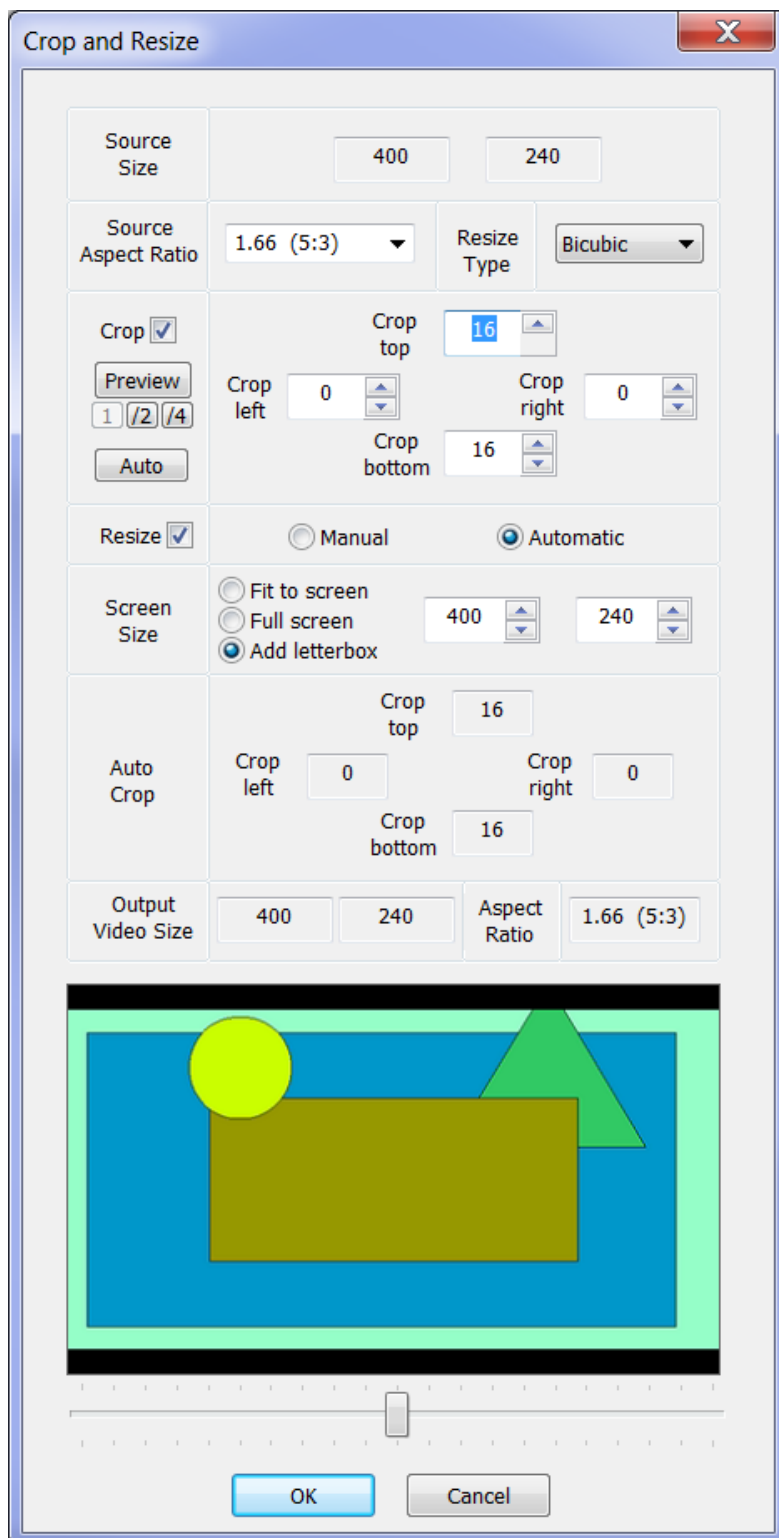
**Deinterlace** is used when the input movie file was interlaced, which is common with movies formatted for television

**Rotate** is used to pre-rotate your video images, as this might be required by your player application.

## 5.8.1  Crop and Resize

Double-click the filter box to open the configuration window.

**Figure 5-10 Crop and Resize Filter Configuration**

This is a more complex filter to configure, because the crop and resize can affect each other.

There are two "auto" modes, which can help make the configuration easier.

The automatic crop will attempt to identify if the input video is letterboxed, and then remove the "black bars" outside the video image, by cropping this dead space. To use the automatic crop, check the **Crop** checkbox to activate the crop, and then click the **Auto** button just below.

The **Automatic Resize** feature will resize the video to match the **Screen Size** values you enter. To activate this feature, check **Resize**, and then select the **Automatic** radio button, and then enter values for your target device's **Screen Size.**

You will then have the choice of three options: **Fit to Screen, Full Screen** and **Letterbox**. All three options maintain the original movie aspect ratio, but the difference is whether the image is cropped, and whether the video image is padded with black bands to increase the video dimensions to match a given display screen.

If you do not want the original image to be cropped, select the **Fit to Screen** radio button. The image will be enlarged or reduced until it perfectly fits inside the screen size. However, if your source movie and screen size do not have the same aspect ratio, then your output video dimensions might not be exactly the same dimensions as your **Screen Size** values.

If you do not want the original image to be cropped, but you need your output video dimensions to be the same dimensions as your **Screen Size**, select the **Letterbox** option.

**Letterbox** is almost the same as **Fit to Screen**, except that **Letterbox** will automatically add black bands to the top and bottom of your source video image, in order to create a video frame with the exact dimensions entered for **Screen Size**. The black bars will be included in each encoded video frame of the final output video.

If you prefer to fill the entire playback screen, and you accept to crop the original movie, then choose the **Full Screen** radio button. The image will be enlarged or reduced until it completely fills the **Screen Size** dimensions. You will see the automatically calculated crop values in the **Auto Crop** section just below the **Screen Size** section**.**

  **Example**: If you have a source video that is 400 pixels wide by 200 pixels high, and your target playback device has a 400x240 pixel screen, then enter 400 and 240 in the **Screen Size** section.

- If you need a 400x240 video frame, then check **Letterbox.** This will add black bars of 400x20 pixels on the top and bottom of your original video image. Output video frames will be 400x240 pixels.

- If you select **Fit to Screen** instead, your output video dimensions will remain the same as the original 400x200, because the video already perfectly fits your screen that is 400 pixels wide. Output video frames will be 400x200 pixels.

- If you select **Full Screen** instead, your output video will be enlarged to fill the whole device screen, because the movie source is only 200 pixels high and your screen is 240 pixels high. The image will be zoomed until it fits vertically, but this means that some of the left and right

side of the zoomed image must be cropped, as your screen can only display 400 pixels horizontally. Output video frames will be 400x240 pixels.

**Note:** If your input video has an aspect ratio other than the original video's aspect ratio, then it is important to select the correct original aspect ratio in the **Source Aspect Ratio** dropdown list when using **Resize** with the **Automatic** option selected. This can occur when your input video has already been resized without maintaining the original movie aspect ratio, which often occurs with 3D side-by-side or top-and-bottom movie source files.

You can also choose which type of resize algorithm to use in the **Resize Type** dropdown list.

You can also manually adjust the crop values, by adjusting the values in the top **Crop** section.

You can manually adjust the output dimensions by choosing the **Manual** radio button in the **Resize** section, but this can result in a stretched or deformed image if you do not respect the original video aspect ratio.

The **Show** button allows you to preview the areas being cropped, and if the image is bigger than your screen display, you can use the **/2** or **/4** buttons to show the image in half size or quarter size, so it fits on your monitor screen.

The video preview screen at the bottom shows the result of the **Crop** and **Resize** actions configured in the window, and allows you to scroll through the film to check different scenes.

Be carefully when cropping a movie if it includes subtitles, as the subtitles must remain visible on your target playback device's screen when longer sentences are displayed.

## 5.8.2  Deinterlace

This filter does not have a configuration window.

This filter should be used if your input movie files are interlaced for television broadcast.

It should be placed right after the **Video Files** input filter, before any other filters.

## 5.8.3  Rotate

Double-click the filter box to open the configuration window.

**Figure 5-11 Rotate Filter Configuration**
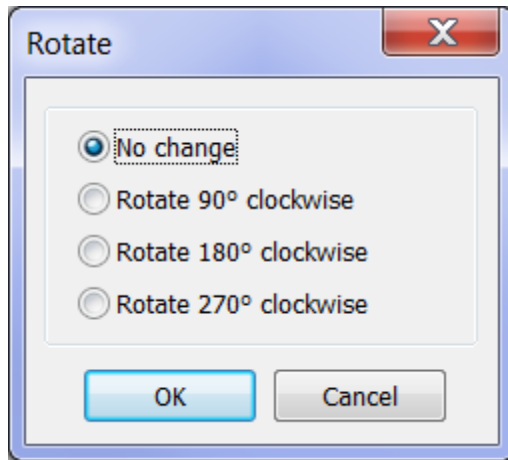


This filter is used to rotate the orientation of the video frames.

## 5.9  Encode Filters

**Encode filters** are used to create output movie files in either the MoFlex or AVI file container format.

The **Mobiclip Encoder** filter compresses the video and audio tracks, in order to produce a smaller output file. It can also be used to combine several different input movie files into multiple tracks within one output MoFlex file, as long as all inputs have the same frame rate and time duration.

The **Uncompressed AVI** filter is provided to help troubleshoot video quality, as the output file it creates is uncompressed. This can also be useful if you want to create samples of your film to review using the **Trim** filter, as they can be played with any standard media player on a PC or other device.

## 5.9.1  Mobiclip Encoder

Double-click the filter box to open the configuration window.

**Figure 5-12 Mobiclip Encoder Filter Configuration**
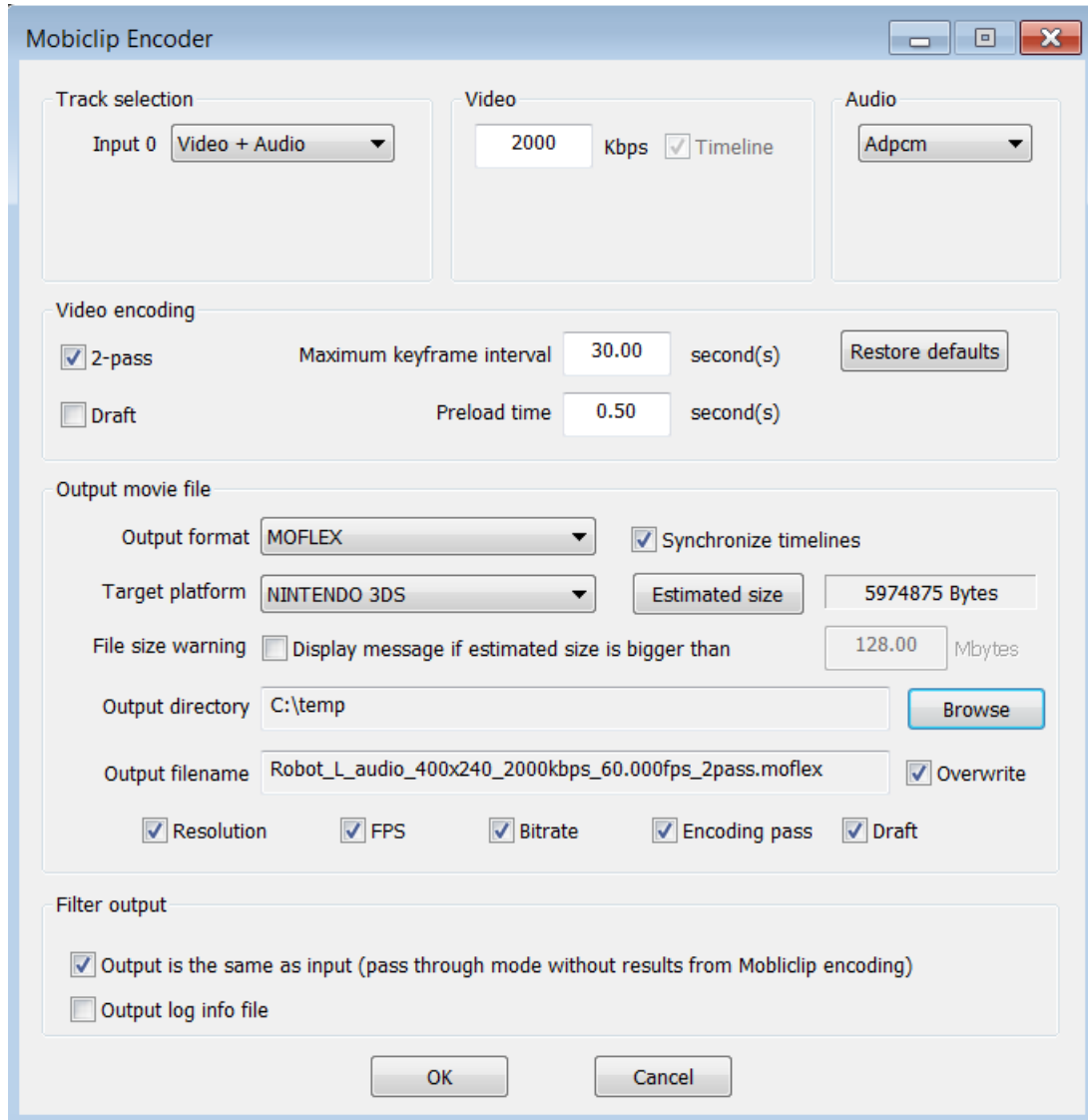


This configuration window is used to setup the encoding profiles to be used, and is the most important part of ensuring high quality output movie files.

If you need to create several output files from the same input file, you can add multiple Mobiclip Encoder filters to your graph. This can be useful if you would like to create multiple output files with different encoding profiles (bitrates or dimensions or frame rates), in order to test which file gives the best results.

**Note:**  Before the **Mobiclip Encoder** configuration window can be opened, you must have selected a source input movie. The source movie file is selected inside the **Video Files** input filter, and

this must be connected to the input pin on the Mobiclip Encoder filter (you can have other filters between them.)

### 5.9.1.1   Mobiclip Encoder – Mux Section

The **Mux** section is used to choose which tracks from your source input files will be selected and used to create your output movie file. The first Input 0 source must include a video track, and audio is optional. For additional tracks, you can choose **Video + Audio**, **Video** only, or **Audio** only. The connections to the input pins determine the numbering of the tracks in your output .MoFlex file, meaning that input pin 1 becomes track 1, pin 2 is track 2 etc. If you choose AVI as your output file container, you can have only 1 video track.

### 5.9.1.2   Mobiclip Encoder – Video Section

In the **Video** section, specify the desired bitrate value. Bitrates are measured in Kbps, which means kilobits per second (not kilobytes.) In general, it is recommended to use the highest bitrate that your target platform supports, as higher bitrates result in higher video quality. Using a high bitrate is recommended with visually complex video tracks that need the additional data to avoid seeing a "blocky" image.

**Note:**  The output MoFlex movie file will often have a lower overall average bitrate than the value entered. Simple video scenes do not require a very high bitrate, and the codec is designed to minimize the size of a movie file when possible, rather than padding the file with unneeded data.

The **Timeline** checkbox is used to determine whether to add keyframe timeline to the output movie file. It is recommended to check this box, as a timeline is required to "seek" within your movie file. Seeking includes fast-forward, rewind, or a jump to a specific point in a movie.   Adding a timeline requires a little more space, but the space required is usually very small compared to the overall file size.

In the **Audio** section, choose whether you want to compress the video with the **FastAudio** or **ADPCM** codec.

In the **Video encoding** section, it is recommended to choose 2-pass encoding, which is strongly recommended for the final output file. 2-pass encoding results in higher video quality compared to 1-pass, and results in less variability in the movie's bitrate between scenes.

The **Draft** option is only intended for preliminary tests, in cases when you just want to produce a test video as quickly as possible, but should not be used for final encoding profiles since it offers lower video quality.

The **Maximum keyframe interval** value (in seconds) specifies how often a keyframe must be created. This is important because keyframes are used when seeking during playback, when the user wants to fast forward or rewind, because playback can only be resumed from a keyframe. If you have short videos, you may want to use a smaller value like 10 seconds which permits more fine-tuned seeking.

Clicking the **Default** button will restore default encoding values.

The **Output format** is used to choose between the AVI and MoFlex container formats.   MoFlex is required for playback on Nintendo devices, but you might want to create intermediate AVI files for long

films, and then experiment with different settings when creating the final MoFlex file, as this can be faster than redoing the entire encoding process if you will be doing it several times.

**Estimated size** will show the estimated final file size, but note that this is only an estimate and can be inaccurate depending on the characteristics of your video. Repeatedly clicking the button will cycle through different ways of displaying the estimated file size, which can be measured in bytes, kilobytes or megabytes.

**Note:** The final output file size can only be determined after the file is encoded and created – this value is only an estimate.

**File size warning** is used if you are concerned about the size of your output file. Activate this feature using the checkbox, and enter a value in megabytes. If the estimated size exceeds the limit you entered, then a warning dialog is displayed after saving the Mobiclip encoder configuration. If you have a fixed file size limit that cannot be exceeded, we recommend encoding several copies of your movie, with different bitrates or audio compression methods. For the best results, use the file with the highest bitrate which does not exceed the file size limit.

**Note:** The **File size warning** value you enter is not used by the application to actually limit the output file size. This value only is only used as a check after the output file is created. If the output file exceeded the limit you entered, then the job status will show "Warning"

You will also need to choose the output directory for your movie file, by using the **Browse** button.

The **Output filename** checkboxes at the bottom allow you to include various characteristics of the encoding settings within the filename of the resulting movie file. The filename is automatically generated and cannot be modified.

If **Overwrite** is checked, then existing files with the same filename will be replaced and overwritten by newly encoded output files. If unchecked, an incrementing number will be added to the end of the filename and existing files will remain undisturbed.

The **Filter output** section is used to control the output from this filter, in the case that you connect other filters to the output pin within your graph sequence. If **Output is the same as input** is checked, then the output from this filter is exactly the same as the inputs, essentially acting as a pass thru. If this is unchecked, then the output is the result of the Mobiclip encoding, as your output will be the decoded version of the Mobiclip encoding.

**Note:** To preview the results of the Mobiclip encoding, uncheck **Output is the same as input**, and then add an **Uncompressed AVI** filter after your **Mobiclip Encoder** filter, and you will create an uncompressed AVI file that can be played on any PC, and you will see the same image that will be displayed on Nintendo devices playing your MoFlex file.

If **Output log info file** is checked, a log info file will be placed in the Output Directory.

## 5.9.2  Uncompressed AVI Output

Double-click the filter box to open the configuration window.

**Figure 5-13 Uncompressed AVI Filter Configuration**
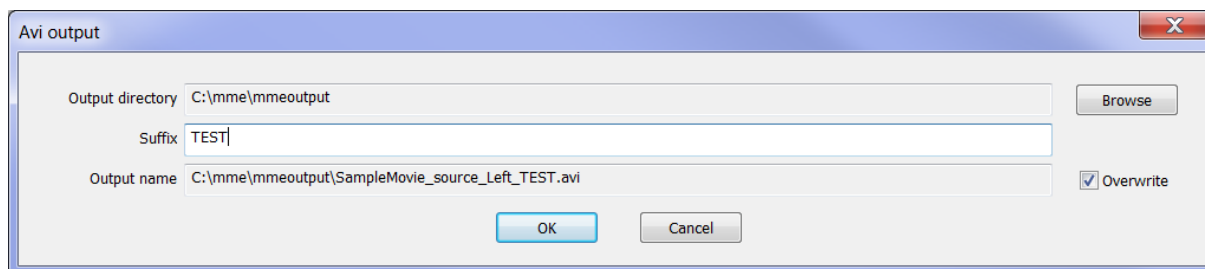


This filter will create and uncompressed AVI file, which can be useful for troubleshooting purposes. The uncompressed AVI file can be played on your PC, in order to preview the results of your encoding workflow. You can insert this filter at any point in your graph, in order to view the video track as it is at that specific point in the graph.

To preview the final output of your encoding graph on your PC, add an **Uncompressed AVI** filter after a **Mobiclip Encoder** filter at the end of your graph, so that you will output both .MoFlex and .avi files. But to capture the effect of the encoding with the Mobiclip codec, you must uncheck the **Filter output** checkbox with the text "Output is the same as input".

Click the **Browse** button to select the **Output directory** for your AVI file.

You can enter text in the **Suffix** field, and this will be appended to the input filename to create the output filename, which is shown at the bottom.

If **Overwrite** is checked, then existing files with the same filename will be replaced and overwritten by newly created output files. If unchecked, an incrementing number will be added to the end of the filename and existing files will remain undisturbed.

# 6  Encoding Job Queue

## 6.1  Job Queue User Interface

The tool allows you to add multiple jobs to the job queue, and to then control the order in which the jobs are executed.

Completed jobs remain in the queue for a historical record, but their status changes to **Finished**. You can choose to have completed jobs removed from the queue via the **Settings** menu option.

Jobs are automatically named "Job 1", "Job 2", etc. when added to the queue.

**Figure 6-1 Queue Tab Showing List of Encoding Jobs**
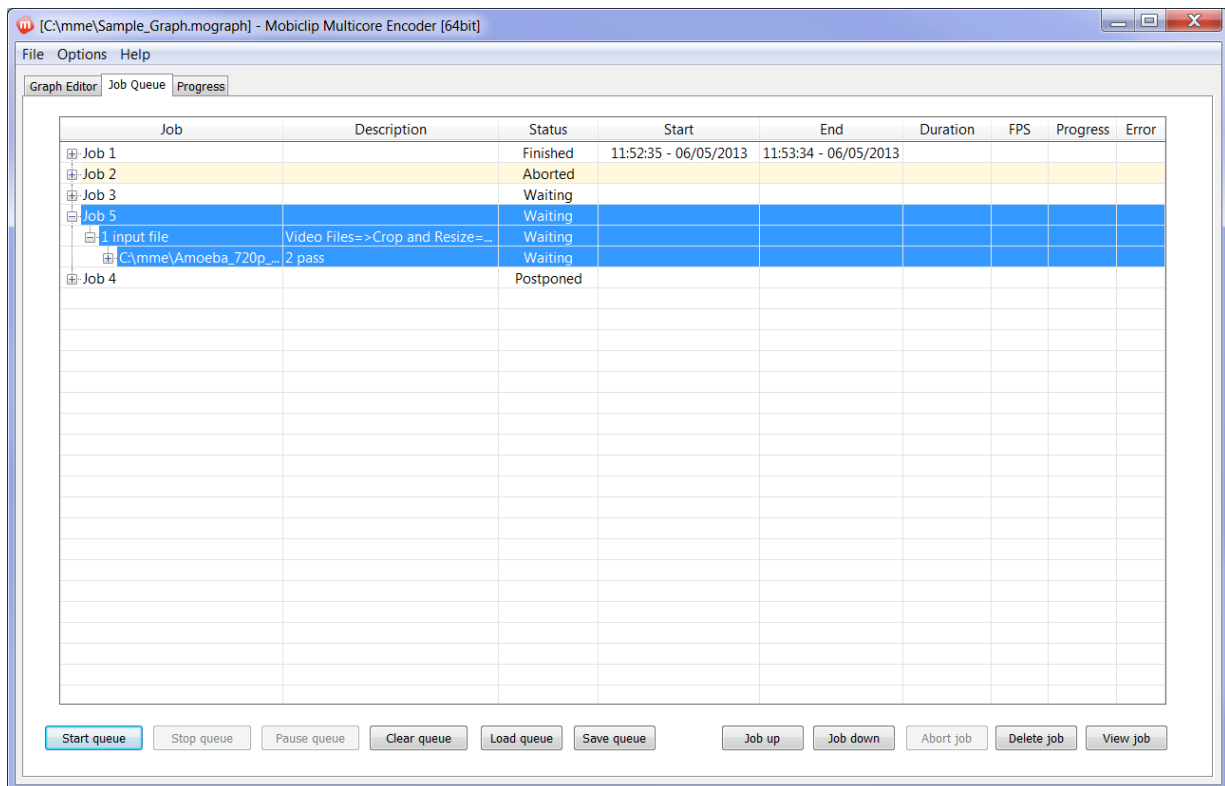


**Note:** Additional information for each job is displayed, and you can see more details for each job by clicking the plus sign beside it. There is also information about how much time the job took to complete.

## 6.2  Controlling the Job Queue

Multiple encoding jobs can be scheduled for sequential execution, which is done using the job queue.

### 6.2.1  Changing the Order of Scheduled Jobs

Jobs are run in the order displayed, starting from the top of the **Job Queue** tab.

You can change the order of the jobs in your queue, in case you want to run certain jobs before others.

Click within the **Job Queue** tab to select the job, which will appear highlighted, and then click on the buttons **Job up** or **Job down** to change the job's position in the queue.

 **Note:**  The job's number does not affect the order in which jobs are run.

### 6.2.2  Starting and Stopping the Job Queue

Click **Start queue** to start the job queue, and **Pause queue** or **Stop queue** to stop operation.

Via the **Settings** menu, you can choose to automatically start jobs after they are added to the queue, and also to automatically start processing the queue when you start the application.

### 6.2.3  Job Queue Status

Jobs start as **Waiting**, and then change to **In Progress** once started, and will change to **Finished** when successfully completed.

If a job was not completed successfully, the status will show **Error**, and additional information can be found under the **Error** column on the right side of the **Job Queue** tab. You might need to use the horizontal scrollbar to see the **Error** column, as it is hidden off-screen by default.

To change the status of a job, right-click on a job name and select **Change Status**.

 **Note:**  You can easily reprocess a finished job by changing the status to **Waiting**.

**Table 6-1 Job Queue Status Values**

| Button | Detail |
|---|---|
| **Waiting** | A job that will be run, once the tool reaches the file's position in the queue |
| **Postponed** | A job that has been put on hold, will not be run |
| **Aborted** | A job that has been stopped, will not be run |
| **In Progress** | A job currently being run |
| **Finished** | Completed job |
| **Warning** | The output file size exceeded the limit specified in the Mobiclip encoder File size warning option (See the **Mobiclip Encoder** filter configuration section) |
| **Error** | An error was encountered that blocked the job from successful completion |

### 6.2.4  Abort Job Compared to Delete Job

**Abort job** will cancel a job that is running, but the job will remain in the queue with a status of **Aborted**.

**Delete job** will cancel the job if it is in process, and will remove the job from the queue.

### 6.2.5  Clear Queue

**Clear queue** will stop the job in progress and remove everything from the queue.

## 6.3  Viewing or Modifying the Graph for a Job in the Queue

Once a job has been added to the job queue, you cannot change any encoding settings for that job.

If you want to modify the encoding settings, you need to edit the job, then delete the existing job in the queue, and then add your current graph to the queue as a new job.

Certain details are shown on the **Job Queue** tab, but if you want to verify the precise configuration being used for a job you need to examine that job's graph. This is necessary if you would like to view a filter configuration or verify other job settings.

To view a job's graph, select the job you desire with a mouse click, and click on the **View job** button.

Clicking **View job** will switch the view to the **Graph Editor** tab, and the graph corresponding to your selected job will be displayed. At this point you can examine or edit the graph, and then save it or add it to the queue (if you want to run the job again using the changes you made.)

## 6.4  Save and Load a Job Queue

Use the **Save queue** button to save all of the jobs that currently appear in your job queue, and use the **Load queue** button to reload a previously saved queue. It can be useful to save a queue if you need to repeatedly run several jobs when encoding videos.

You must also save a queue if you wish to run the tool in commandline mode, which is described in a later chapter.

**Note:** All of the encoding parameters, including the input movie filename, are defined within the each individual job in the queue. To process a new input file, you can rename it to match the input filename inside the graph. Alternatively, you can load the queue, and then use the **View job** button to open the **Graph Editor** window to reconfigure the **Video Files** input filter inside each job, and then add this new job to your queue.

# 7 Job Progress Display

## 7.1 Progress Tab Shows Job Advancement in Real Time

The **Progress** tab displays information about the job that is currently running.

During the analysis phase you will see small red lines appear on the progress bar, and during the actual encoding passes you will see the progress bar become filled with green segments.

Note that the time estimates are not accurate during the initial analysis pass, and are only accurate once an encoding pass has started.

**Note:** The remaining time displayed is a rough estimate, and generally only covers the current encoding pass of the job, so the overall time a job requires might be somewhat different from this estimate.

**Figure 7-1 Progress Tab**
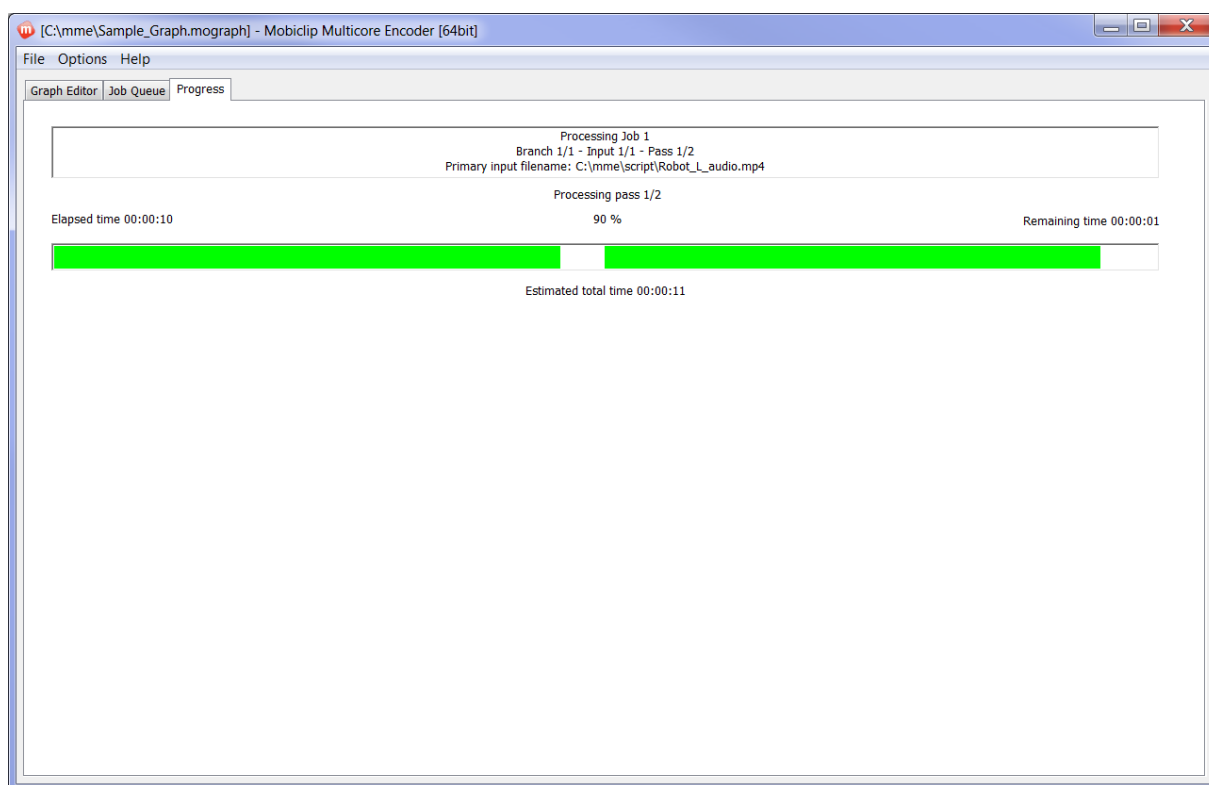


## 7.2 Multicore Operation and Thread Control

The encoding process will run much faster on PCs that have multiple CPUs, as the video is divided into many small segments that are then run across all available CPU cores in parallel.

The number of threads that is displayed represents how many CPU cores will be used by the tool

during the encoding phase.

**Note:** Hyper-threaded CPUs are considered to have 2 cores, while older CPUs will only appear to have 1 core per physical CPU. For instance, a new PC with a dual-CPU that is hyper-threaded will show 4 threads.

## 7.2.1   Changing the Number of Cores the Tool Uses

You can change the number of cores in use on the **Settings** menu. Click **Options** -> **Settings**, and then adjust the **Threads** slider to choose how many CPU cores to use.

You may want to do this if you are using your PC for other tasks while an encoding job runs, as if you use all available cores for the tool then your PC will appear to run very slowly or be unresponsive. Note that it is normal behavior when the application title bar displays "not responding" during certain CPU-intensive phases of the encoding job.

If a job is currently running, reducing the number of threads does not immediately free up CPU resources, as the current work being performed must finish before a core becomes idle.

In case you experience a crash during the encoding phase of a job (when the green bars are filling the progress bars), it is recommended that you limit the number of threads being used and run your encoding job again. This can rarely happen if you have a PC with many cores, but perhaps not enough memory, and are using a HD or higher dimension video for your input source.

# 8  General Encoding Recommendations

## 8.1  Source Input Movie Files Must be High Quality

The quality of the movie files that are output by this tool will never be higher than the quality of source input files, so this is why it is very important to ensure that your source files have been properly prepared and are of high quality.

Additionally, any time a movie file is transcoded with lossy codecs, there will be some loss of quality. So the source movie file should be close to the quality of the original master movie, and should not have been processed multiple times already.

To properly prepare your movie file, please ensure the following:

- Video frames are not interlaced, which is typical with videos broadcast on television. If your source movie file is interlaced, it must be de-interlaced with an appropriate 3$^{rd}$ party video editing tool.

- The video track's original aspect ratio has been maintained, and the image has not been cropped unnecessarily.

- Brightness levels and color saturation are acceptable.

- The audio track volume should be normalized with the correct loudness.

- If subtitles are used, care must be taken to ensure that they are easily readable in the source video and that the output video is of a high enough resolution for the subtitles to be easily readable.

A high quality movie file should have these characteristics:

- High pixel dimensions should be maintained in the source video track until you resize it using this tool. Input sources should be at least a magnitude higher than the output pixel dimensions. For example, the source should be 1080P for a 720P output, or 720P for a SD output.

- High bitrate is also required to ensure that the source is does not appear "blocky".

- Original video frame rate (FPS) should be maintained in the source input file so that movement is fluid. Modifying the frame rate often results in a negative visual effect during playback if frames are duplicated or removed.

## 8.2  Test Output Movie Files on the Target Platform Hardware

In general, it is recommended to use the highest video dimensions and bitrate that your playback device will support. However, you must balance the choice of bitrate with other constraints like file size limits or limited streaming bandwidth.

When choosing the encoding settings to be used for encoding jobs, it often requires some trial and

error during the process, to find the right balance between bitrate (which determines output movie file size) and quality, as they are inversely related.

In order to fine-tune your encoding profile selection, it is recommended to create several different output movie files with different bitrates and dimensions.

Then each encoding profile should be tested on the actual hardware it is intended to be used with, with the actual software player application that will be distributed, as this is the only way to have the real playback experience that end-users will see and hear.

# 9  If Input Movie Files are Incompatible

Some source movie files are incompatible with this tool, and this will result in an "Unable to open file…" error if you attempt to select these files with the **Video Files** filter

The solution in this case is to re-encode the movie file in a different format that is compatible with this tool.

## 9.1  Obtain a 3rd Party Video Editing Tool

If a source movie file is incompatible with this tool, a different video editing tool will be required to re-encode it.

VirtualDub is an effective tool that can be obtained for free, but only works with AVI movie files.

It can be downloaded from http://www.virtualdub.org/download.html

Install VirtualDub by following the instructions on the website.

If your source movie files are not AVI files, then see the section below about re-encoding the movie file.

## 9.2  Re-Save a Source Movie File (AVI)

If the problem is due to a problem with the AVI container format in your source movie file, an easy fix is to resave the file using VirtualDub:

- Open the file in VirtualDub (click File> Open video file…)

- Select Video/Direct Stream Copy

- Select Audio/Direct Stream Copy

- Save as AVI

The new AVI should be ready for use with the Multicore Encoder.

## 9.3  Re-Encode a Source Movie File

If the problem is due to an incompatible codec in the source movie file, then the movie file must be re-encoded with a 3$^{rd}$ party tool, using audio and video codecs that are compatible with FFMpeg (this is also known as transcoding).

The recommended format for source movie files is:

- AVI file container

- Lagarith video codec

- Uncompressed audio

As there are many different 3$^{rd}$ party video editing tools with varying procedures, please refer to your

tool's user manual for the procedures to follow.

# 10 Commandline Operation

To automate the processing of movie files, this tool can be launched from the commandline (the Windows Command Prompt).

## 10.1 Commandline Operation Requires a Predefined Queue File

Before executing this tool from the commandline, you must first create and save a queue file.

The queue file contains one or more encoding jobs. Each job defines the specific set of input movie files, encoding workflow, and output file settings. Please see the previous chapters for more information on creating and saving encoding jobs and saving a queue file.

## 10.2 Commandline Syntax

This tool accepts the following two parameters on the commandline:

-h          prints out the help

-q          used to provide the name of the queue file to use

Example :

Mobiclip_multicore_encoder.exe –q queuefilename.queue

# 11 Batch Processing for Multiple Movie Files

Use one of the following methods to automate the processing of several input movie files.

**Note:** Each input movie file is processed with the same encoding graph.

## 11.1 Select Multiple Files Manually

During manual operation of this tool, you can select multiple files within the same directory, and each file will then be processed sequentially when you add your job to the job queue.

Within the **Video Files** filter configuration, browse to the directory you want to use, and select a file.

Then click on the **"+/-"** button to select additional files. Click CTRL-A to select all files in the directory.

## 11.2 Sample Scripts for Batch Processing

Sample python scripts have been provided in the *scripts* directory of this installation package, which automatically scan a directory and process all the source movie files it finds.

Both scripts use commandline operation, and require a predefined queue file containing only 1 job.

One script allows you to encode a specific file, and the other will scan a directory and process all the movie files it finds.

Please view the *scripts* directory in the installation package to find the scripts.

Please refer to the readme.txt in the *scripts* directory for more detailed instructions on how to use these scripts.

# Revision History

| Version | Revision Date | Category | Description |
| --- | --- | --- | --- |
| 2.0.2 | 2014/08/06 | Additions | • Added Output log info file in Mobiclip Encoder |
| 2.0 | 2013/07/30 | Additions | • Added Trim, Rotate, Deinterlace and AVI Output filters<br>• Added chapters on incompatible source files, commandline operation, and batch processing. |
| 1.0 | 2012/10/31 | - | • Initial version. |

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