

ATLAS.ti 6

Using Video Data



atlas.ti
the knowledge workbench



Software for qualitative data analysis,
management, and model building.

ATLAS.ti 6 – Using Video Data

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Introduction

ATLAS.ti supports a wide range of video formats. But there are so many formats out there that you may still run into a situation once in a while that a video cannot be loaded or will not play properly. In a situation like that it helps to understand the basics of videos, video file formats, video containers, and codecs.

This paper gives you a brief introduction to video formats and codecs, and helps you understand which formats are supported by ATLAS.ti. It also describes what to do if your video refuses to load or causes problems when playing. You learn how to identify video file formats and how to convert them into a format supported by ATLAS.ti.

In addition, we provide some recommendations for codec packs and utilities that help you identify and convert video files.

Video File Formats

The amount of video formats available today is staggering. As of this writing, FileInfo.com (<http://www.fileinfo.com/filetypes/video>) lists more than 300 different types of known video formats and codecs (we get to codecs later in this paper; for now it is sufficient to know that codecs are small programs that “read” the videos).

Why are there so many? The answer is that practically all of these formats available for use on a computer actually represent different types of compression. Uncompressed (“raw”) video is simply too “big,” i.e. requires an enormous amount of storage space. For example, a one-hour standard PAL TV video (720 x 576 by 25 frames per second) would require as much as 103 GB or 22 DVDs (!) to store.

Here are some examples of a one-minute standard PAL TV video at different compression rates:

Format	Size (one hour standard PAL)
Uncompressed	2400 MB
AVI DV (=SD camcorder)	222 MB
MPEG (=DVD)	45 MB
DIVX (=Internet)	9 MB
MP4 (=Internet)	7 MB

Table 1: Compressed and uncompressed Sizes of one hour standard PAL TV video

High Definition Videos depend mainly on the dimension as most use H264 video compression. There is no uncompressed HD video. It would be too big. Here are some examples of one-minute HD videos with different dimensions.

Format	Size (one minute HD)
uncompressed 1080p (not real - just to give you an idea)	8899 MB
1080p (1920 x 1080 by 25 frames per second - HD camcorder)	118 MB
720p (1280 x 720 by 25 frames per second - digital cameras)	59 MB
360p (640 x 360 by 25 frames per second - YouTube)	15 MB

Table 2: Compressed and uncompressed Sizes of one minute HD video

Video quality is not a real issue in spite of the frequently massive compression, i.e., you most likely won't see any difference when playing them on your computer. All formats are designed to create good quality video for their intended usage (such as DVD, Blue Ray, internet download, internet streaming, etc.) while reducing size

There are many formats you may come across. Not all of these formats are suitable for ATLAS.ti. All may be playable but we recommend using on of the following formats:

- MPEG-2, MPG
- Windows Media Video File (WMV)
- Advanced Systems Format File (ASF)
- Audio Video Interleave File (AVI)
- DivX-Encoded Movie File (DIVX)
- MPEG-4 Video File (MP4)

Video Dimensions

The width and height of a video are collectively termed as its " dimensions." They are usually measured in pixels.

Thus, if a video is 320 pixels wide and 240 pixels in height, it is said to have dimensions of 320 x 240 pixels. Videos that are meant to play over the internet usually have lower dimension like 320 x 240 pixels. On the other hand, videos that are meant to play on the desktop have higher dimension like 640 x 480 pixels. High Definition Television (HDTV) videos have an even higher dimensions as high as 1920x 1080 pixels. For use in ATLAS.ti, a dimension of 640 x 460 or 720 x 576 is usually sufficient.

Playing Videos

Two factors are important when playing a video: The codec and the performance of your computer.

Codecs

There are so many different file formats out there that it is not possible for a player to support all. To facilitate matters somewhat, Microsoft created a layer that uses small programs called *codecs* (for “**c**oding and **d**ecoding”). They read the video and audio data and provide the frames to the player. The player only has to use the codec to be able to play the video..

ATLAS.ti uses the same layer to play videos as the Windows Media Player. A video that plays in the Windows Media Player can most likely also be played in ATLAS.ti. Only at very rare occasions this does not work—for example, depending on what else is installed on a computer, one software may interfere with another. Therefore it is difficult to cover 100 % of all possible situations.

In case you do experience a problem, please contact the help desk:
<http://support.atlasti.com>

Windows 7

If you are working with Windows 7, all of the most popular codecs are already installed by default.

Windows XP and Windows 2000

Windows XP and Windows 2000 provide only codecs for Microsoft Windows Media File Format (WMV) by default.

Other Windows versions

If you are working with older versions of Windows you may need to install the necessary codecs. Some programs like DVD-players or video editing software install codecs. Thus there may be codecs already installed.

To test, whether a video is likely to play in ATLAS.ti, try to play it in the Windows Media Player. If it doesn't, see *Trouble Shooting* and *Utilities for identifying video formats*.

Performance

Two of the main issues with playing videos are related to CPU and GPU power (i.e. the CPU on the graphics adapter) and the size and format of the videos. Standard definition videos (AVI, WMV or AVI up to 720 x 576) can normally be played on any PC. High definition videos and internet formats need much more processing power.

If you are working in a team providing videos to team members you have to keep in mind that videos that play smoothly on your machine may not automatically play on other machines. You have to provide videos that play on the slowest computer in your team.

Trouble Shooting

When a video won't play in ATLAS.ti, or it is not playing smoothly, or you can see the video but do not hear the audio, or the video and audio file are not running in sync, then this is most likely related to a missing codec or less-than-optimal performance of the computer.

The solution is to:

- Get a codec pack for your platform and install it (or ask your administrator to do it).
- Convert the video (or ask a knowledgeable person to convert it for you).

Team Projects: Remember when you work in a team, the slowest computer is your bottleneck. Just because a video plays on your computer, it does not necessarily mean it will play on another. You should agree on a format that can be played on all computers used by the team members.

Utilities for identifying video formats

When there is a problem, the first thing you need to find out is the exact video format you are dealing with. A missing codec is frequently the culprit. If you know the format, you can look for the missing codec and install it.

If you don't know the exact format, there are freely available utilities that can help you to identify it. The following two are explained below:

- MediaInfo: <http://mediainfo.sourceforge.net/> (for the 64bit version, see http://www.afterdawn.com/software/audio_video/ID3/mediainfo_64bit.cfm)
- Gspot: <http://www.headbands.com/gspot/>

Both utilities provide you with the information you need to know:

- the **container format**
- **the video codec and the audio codec**, and the
- **dimension of the video**.

It is not important which utility you are using. Both utilities suggested here give you the needed information. Choose the one that suits you most.

MediaInfo

MediaInfo is a simple utility that shows you the basic information for your video. It embeds itself into the pop up menu of the Windows Explorer.

- After you have installed the utility, start the software once via the Window's Start button. Accept the default settings or adapt them to your personal preferences. You can always change the settings later as well.
- Select the video file in the File Manager.

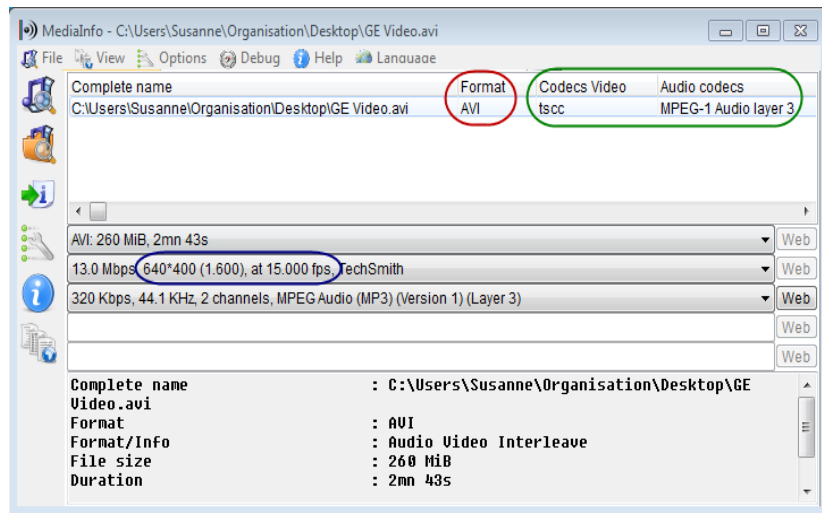


Figure 1: MediaInfo start screen

- Click the right mouse button and select the menu entry MEDIAINFO.

The above example shows the basic information for the selected video: The file "GE Video.avi" is an **AVI container** with **tscc (TechSmith Screen Capture) video data** and **MPEG-1 audio data**. The video has a dimension of **640 x 400** with **15 frames per second**.

The View menu offers different output formats. Try for example the HTML option. It provides a clearly arranged overview of all information available for your video file.

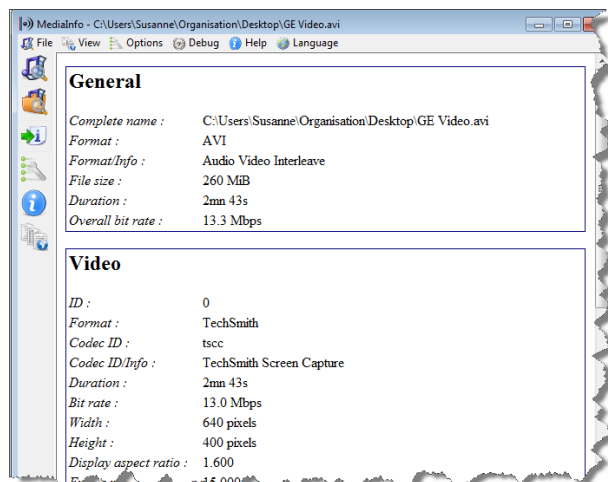
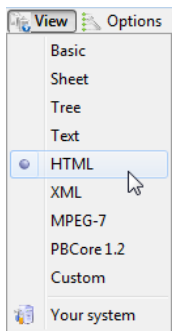


Figure 2: MediaInfo: information provided as HTML

GSpot

Gspot is another utility for getting information about video files. It is provided in form of a zip file that you need to download and unzip. Then double click on the exe file to open Gspot. Next you need load the video file that should be examined into the PATH field at the top left of the window:

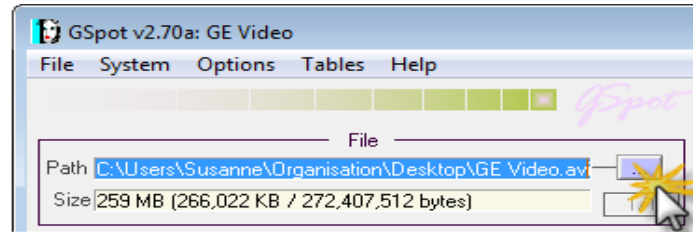


Figure 3: Loading a file into GSpot

In Figure 4: GSpot analysis screen below you see the information of the same video file that was used to demonstrate the MediInfo utility: Gspot, too, shows that it is an **AVI container** with **tsc (TechSmith Screen Capture) video data** and **MPEG-1 audio data**. The video has a dimension of **640 x 400** with **15 frames per second**.

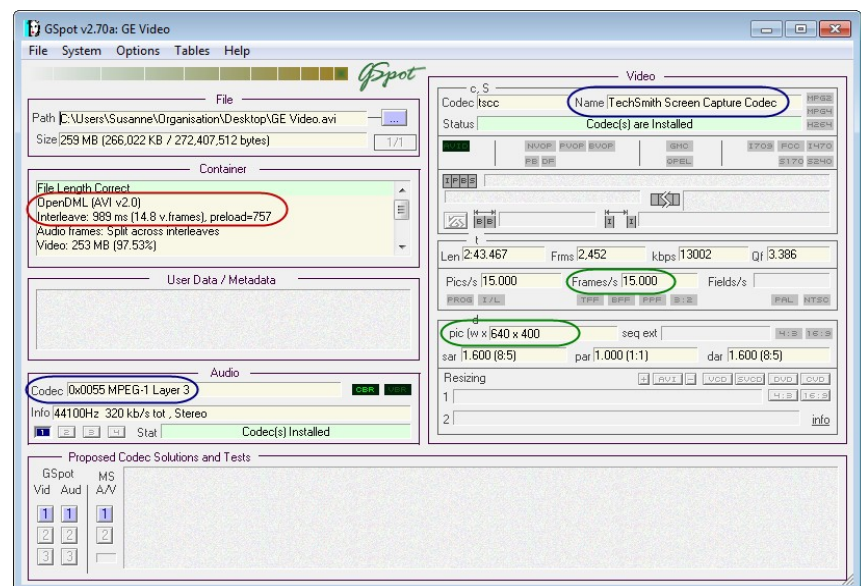


Figure 4: GSpot analysis screen

Further detailed information is available on the Gspot website:
http://www.headbands.com/gspot/v26x/quick_start.html

Find out what video formats are supported on your computer

If you want to convert a video into another format, you have to know what formats are supported on your computer. This means finding out which codecs are already installed. The Windows Media Player (version 11 or 12) will tell you:

- Open the Windows Media Player.

- Right click on the title area and select HELP \ INFO.

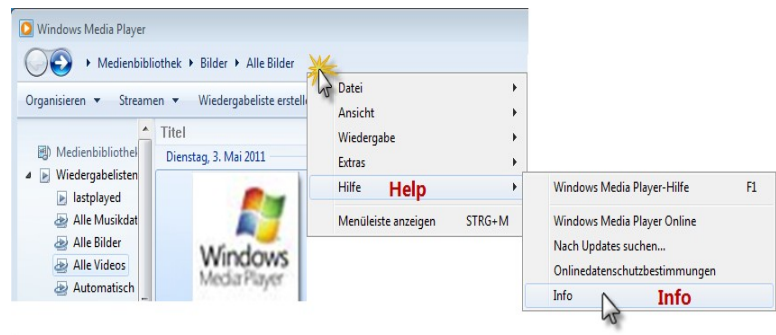


Figure 5: Using the Windows Media Player to find out which formats are supported on your computer

This opens the info dialog. At the bottom left of the dialog there is a link TECHNICAL SUPPORT. Click on the link, and a browser will open, showing you a list of supported video and audio codecs (see below).

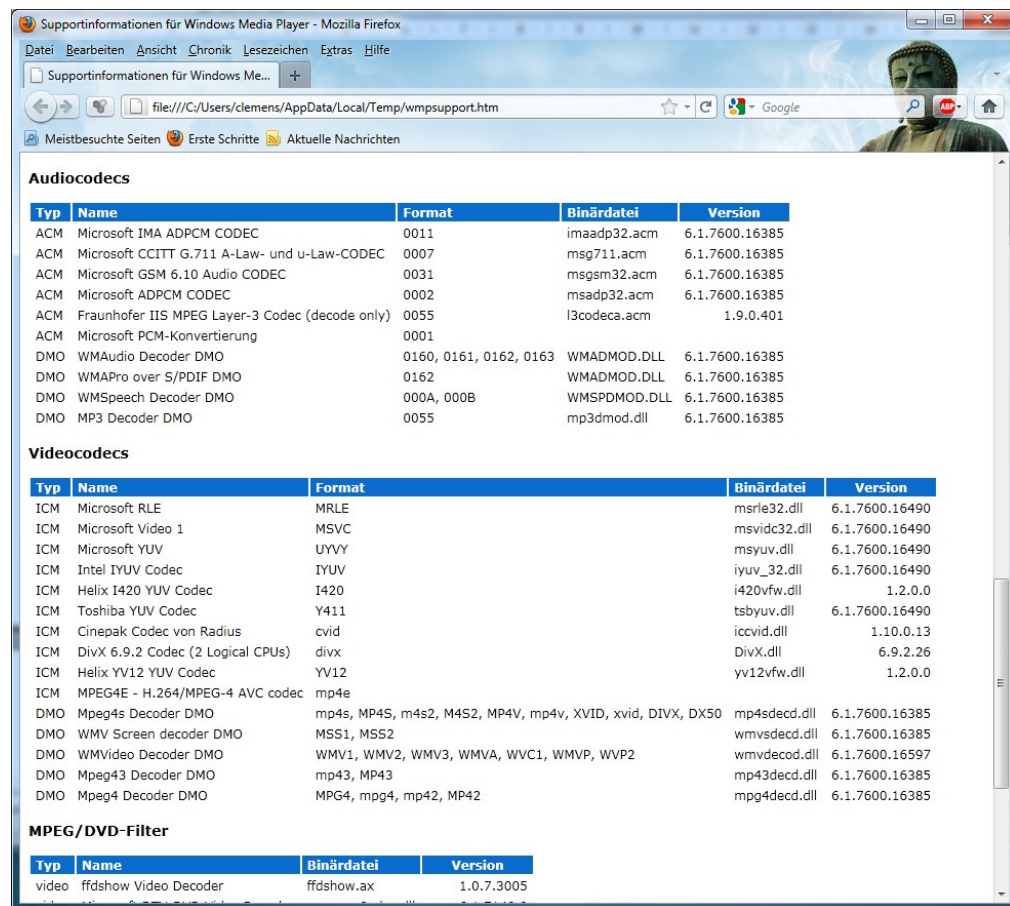


Figure 6: Codecs information provided by the Windows Media Player

Obtaining and installing the correct codec

Nearly all codecs can be downloaded free from the internet. You can either find out which specific codec is missing (see Utilities for identifying video formats) or search for a full codec pack. Various people and organizations

have compiled the most common codecs into bundles called codec packs. Installing such a codec pack usually solves the problem. (If it doesn't, you need to go a step further and find out which specific codec is needed.)

Codec packs for Windows XP and Windows Vista can for example be downloaded from <http://shark007.net/>. Alternatively, you can simply enter the search term "codec pack" into your favorite Web search engine. Vista codec packs also work for Windows XP. As mentioned above, when using Windows 7, you very likely won't need a codec pack.

Converting videos

Video converter programs allow converting videos into many different formats. For use in an ATLAS.ti project, you best convert your video files to one of the recommended formats: MPEG-2, MPG, WMV, ASF, AVI, DIVX, MP4.

There are many utilities available for converting videos. Most are built by video professionals for video professionals and offer a lot of settings in order to get the most out of the video. But these programmes are complex and sometimes difficult to use without specific knowledge. In most cases, the simpler and free conversion tools are sufficient. They often also offer good default settings so that you don't need to mess around with cryptic settings. Two of them are explained in more detail further below.

Here are a few things to pay attention to when converting video:

- Set the parameter for **size** and **aspect** to "no change" or "default". Then the converted video has the same **dimension** as the original video.
- **Don't change the frame rates** (fps). This always leads to lower quality. Use the frame rate of the original video.
- In case your computer is not powerful enough to play the video smoothly you will have to modify the dimension. Videos with smaller dimension need less CPU power. Good values for smaller videos are common TV dimensions or the commonly used internet dimensions:

720 x 576	PAL TV
720 x 480	NTSC TV
640 x 360	360p internet format
1280 x 720	720p internet format

Free Converter Tools

FormatFactory

FormatFactory is a free utility that can be downloaded from the authors' home page at <http://www.pcfreetime.com/>.

The first step is to define the format you want the videos to be converted into by clicking on one of the buttons on the left hand side of the window (e.g., ALL TO AVI or ALL TO WMV).

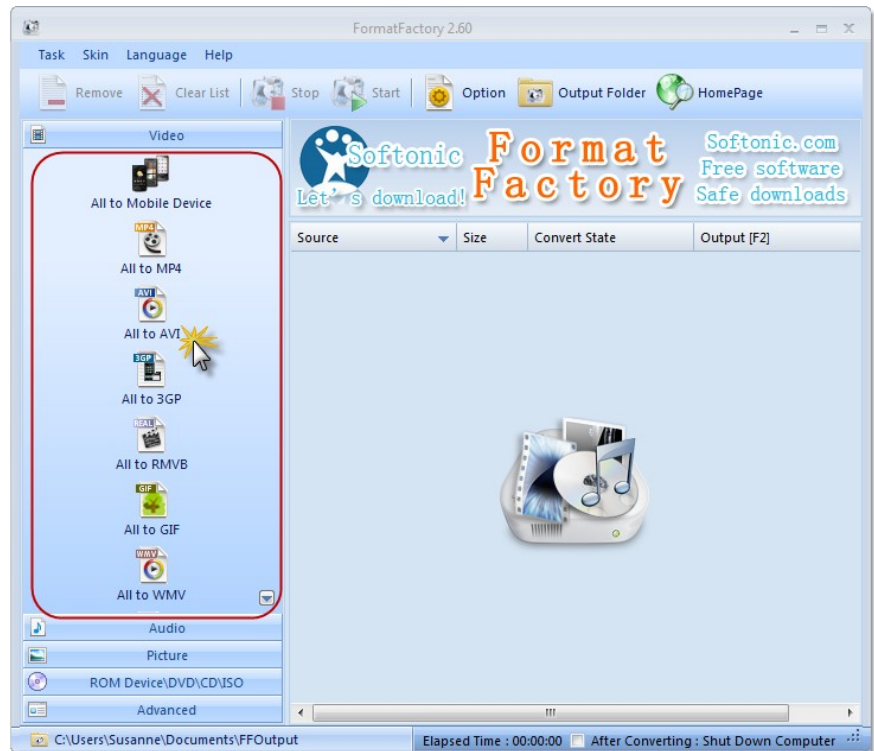


Figure 7: Select a format

This opens a dialog where you select the files to be converted, the output destination, and the output setting:

If you only want to convert one file, click on the **ADD FILE** button at the top of the window.

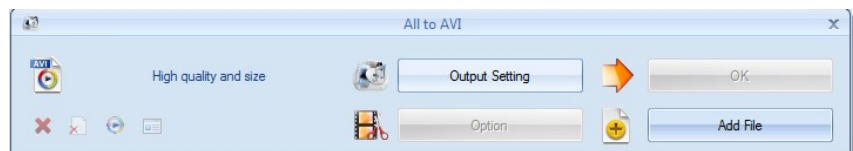


Figure 8: Select output settings and file to be converted

If you want to convert more than one file, click on the **ADD FOLDER** at the bottom right hand side of the window.

Click on the **BROWSE** button, to select an output destination, or use the default location.

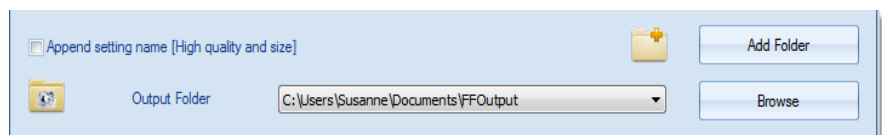


Figure 9: Add multiple files from a folder and select the output destination

Next, click the button **OUTPUT SETTING** to set the parameters for converting the files.

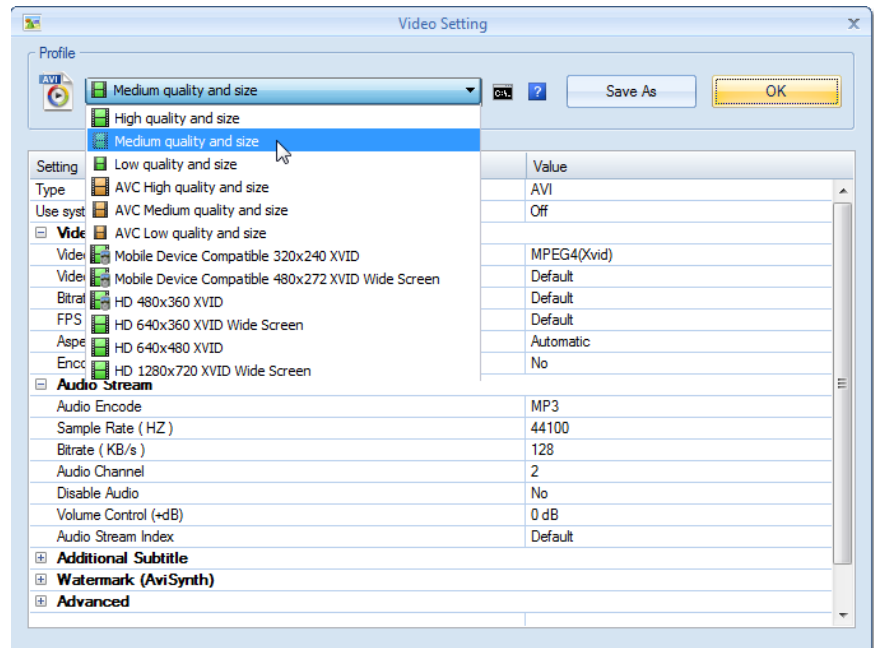


Figure 10: Video settings in FormatFactory

The OK button closes the window. In the file and settings selection window, click on the OK button again. This takes you back to the main window.

Click START to start the conversion.



Figure 11: File conversion in progress

After the conversion is completed, click on the button OUTPUT FOLDER to view the converted file(s).

XMedia Recode

Another free and commonly used utility for converting videos into other formats and dimensions is XMedia Recode. You can download the software from the author's home page <http://www.xmedia-recode.de/>.

For English websites, click:

http://www.videohelp.com/tools/XMedia_Recode

<http://www.softpedia.com/get/Multimedia/Video/Encoders-Converter-DIVX-Related/XMedia-Recode.shtml>

After starting the software, simply drag the videos you want to convert into the program window or add them using the button OPEN FILE.

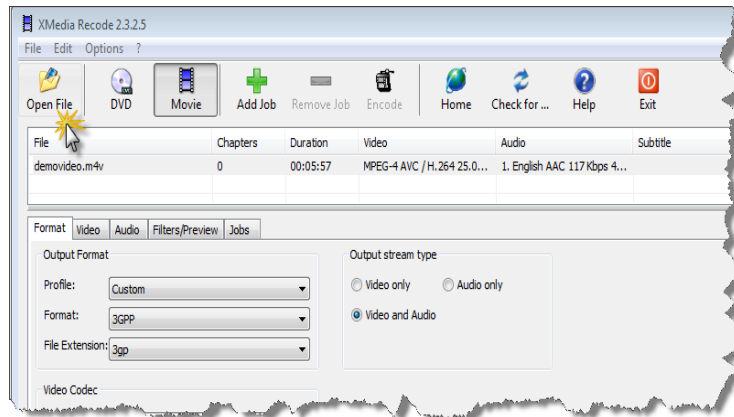


Figure 12: Add file(s) to XMedia Recode

Next, set the output destination by clicking the **BROWSE** button at the bottom right-hand side of the window (or stick with the default location).

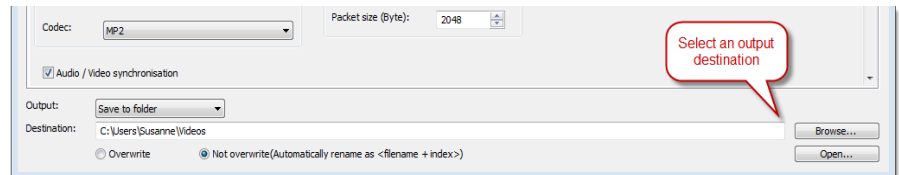


Figure 13: Selecting an output destination

Then select the output format: Highlight a video file and select the options provided by the various tabs.

In the main tab, set the format and codec. In the video tab, configure the video codec and in the audio tab, configure the audio codec. The filter allows you to change size and aspect.

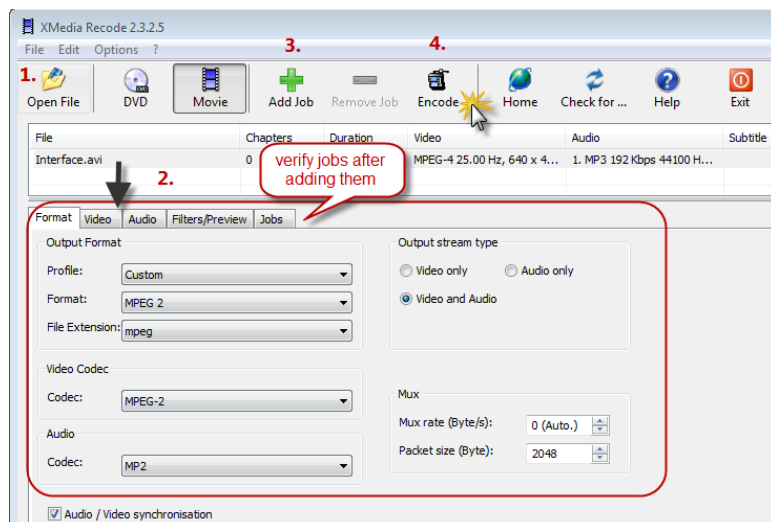


Figure 14: Click sequence in XMedia Recode

After you have made your selections, click on the button **ADD JOB** in the main tool bar. To verify the job, click on the **JOB**s tab.

Click on the button **ENCODE** to start the conversion.

To get to the converted files, click on the button **OPEN** at the bottom left of the window.

Technical Details

The following presents a technical excursion into video formats and the files that store them. Even though it is not essential to know these details about video formats, for some readers it may be interesting nonetheless.

Compression

There are two ways to compress a video. Generally a video is a sequence of pictures which are called frames.

Single Frame Compression

One option is to compress each individual frame in the video. This is the format for older versions of QuickTime videos and videos from standard definition video cameras (i.e., SD camcorders).

It is also the format that is the most suitable for preparing video files for analysis in ATLAS.ti because the position of each frame is known and it is easy to navigate the video.

Differential Compression

The second possibility for compressing a video is to store differences between frames. This technique starts with compressing a frame (called I-frame). Next, the differences between the next frames (called P- and B-frames) to its predecessor are stored up until the point when too much data is needed to reconstruct the frame. Then a new I-frame is created.

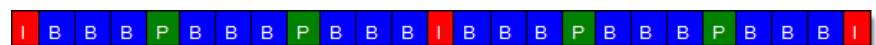


Figure 15: Frames for an MPEG 2 video on a DVD

The advantage of videos using a differential compression is that they are much smaller than single frame compressed videos. The disadvantage is that it is more difficult and time consuming to load and view a specific frame and to navigate to a given frame. In order for an application to do this, it has to find the suitable I-frame, decompress it and compute the selected frame with the data stored for the frames between the I-frame and the selected frame.

File formats that use differential compression can be played and used in ATLAS.ti but require more CPU power to play them and to navigate to a given position.

Video File Formats

Videos are stored in files. This is either a plain video file (e.g. WMV, MPG), or a container file containing a video, its audio data and some optional information about the video and even sub titles, chapter information and the like. Most common container file are AVI, MOV and MP4.

Plain video file formats

Plain video files contain the video itself and some properties that describe the video (size, width, height).

- **MPEG** is a common file format containing MPEG-1 or MPEG-2 videos. The format is standardized by the Moving Picture Experts Group. MPEG-2 is also used for DVDs. Its file extension is MPG, MPEG, or M2V.
- **Windows Media Video File** is a file format developed by Microsoft. It is widely used for downloadable videos. It is supported by all Windows versions since it comes from Microsoft. Its file extension is WMV.
- **Real Media** is a file format developed from RealNetworks mainly for streaming multi media formats from the internet. The file extension is RM.

Container file formats

Most actual video files use a container file format. The most popular container files are Audio Video Interleave File (AVI) and MPEG-4 (MP4).

- **3GPP Multimedia File** is a file format for high-speed wireless networks defined by the 3rd Generation Partnership Project and mainly used on smart phones. The file extension is 3GP & 3G2
- **Advanced Systems Format File** is a container for Windows Media Videos defined by Microsoft mainly for streaming data from the internet. The file extension is ASF
- **Apple QuickTime Movie** is a container format defined by Apple for its Macintosh platform. It combines video and audio data with chapters, sub titles and images. Since 1994 Apple QuickTime is supported by Windows. The file extension is MOV.
- **Audio Video Interleave File** is one of the most common containers defined by Microsoft. This format is wide spread and most likely already playable on your machine. Audio Video Interleave Files contain videos in different formats. The file extension is AVI.
- **AVI DV2** is a format created by SD (standard definition) camcorders. It is a single frame compressed format and very suitable for ATLAS.ti.
- **DivX & XviD** are file formats based on the MPEG4 standard. They are widely used for downloadable videos. DivX is created and managed by DivX Inc. XviD is an open source implementation of the same base as DivX. DivX & XviD are used for SD (standard definition) and HD (high definition) videos.
- **H264** is a format defined by the Video Coding Experts Group and the Moving Picture Experts Group for managing high definition videos. It is now the most commonly used format for high definition videos, HD camcorders, digital cameras and Blue Ray discs.

- **AVCHD Video File** is the raw data from HD camcorders. It is normally used as input to video editing programs. The file extension is MTS.
- **DivX-Encoded Movie File** is a container format for DIVX defined by DivX Inc. It combines DIVX or Matroska video and audio data with chapter and subtitle data. The file extension are DIVX and DVX.
- **Flash Video File** is a video format developed by Adobe Systems for providing streaming video using the Adobe Flash Player. The file extensions are FLV and F4V.
- **Matroska Video File** is a container that may contain several video and audio tracks together with images, sub titles and chapters. Since 2009 DivX Inc is using it as its container format. The file extension is MKV.
- **MPEG-4 Video File** is a container defined from the Moving Picture Experts Group for MPEG-4 video and audio data. It also may contain sub titles and images. The file extensions are MP4 and MPEG4
- **Ogg Media File** is a free open source container format defined by Xiph. Org Foundation. It is mainly used for downloadable videos. The file extension is OGG.