



**MediaEncoding Version 3.5**

## **Guideline**

# Table of Contents

1. Realtime Media Playback & Control .....	2
2. MediaEncoder.....	3
2.1. SD - PAL/NTSC Encoding .....	4
2.2. HD - PAL/NTSC Encoding .....	9
3. Defining Content resolution .....	11
3.1. Resolution optimization for onscreen design .....	11
3.2. HD or not HD .....	11
3.3. Multi-Resolution File Setup .....	11
4. Image Formats & Content Comparison Table .....	12
5. Output Resolution Table .....	13
5.1. Standard digital display sizes: .....	13
5.2. Standard television SD and HD image sizes: .....	13
6. File Formats & Performance .....	14
6.1. Video Formats .....	14
6.2. Image Formats .....	15
6.3. Audio Formats .....	15

# 1. Realtime Media Playback & Control

Pandoras Box MediaServer provides the essential tools for projection design, real-time motion graphics and live visual effects.

Pandoras Box is a real time compositing program. It translates DirectX commands into an intuitive user interface.

It is designed to edit 2D and 3D content of any kind. Its main goal is to make production of real time motion graphics as easy as drag and drop and allow you to combine various control protocols.

With an industry standard animation editor, non linear animations and a wide variety of control methods, Pandoras Box offers seamless integration of 3D, video, images and sounds with complete flexibility and interactivity.

Go beyond the limits of traditional projection to explore the new possibilities of interactive live image creation with a realtime system at your hands.

Realtime Media Control is the resulting technology term for a demand of customers, asking for flexible projection systems for years. With nowadays computer technology it is finally possible to offer realtime image processing for onsite production and end-users.

The history of this technology begins with the 3D animation and the film industry where high standards rule for image processing and editing. Times have changed since large arrays of computers had to be fed for generating one image. We are now at the beginning of a new age of screen- and projection design.

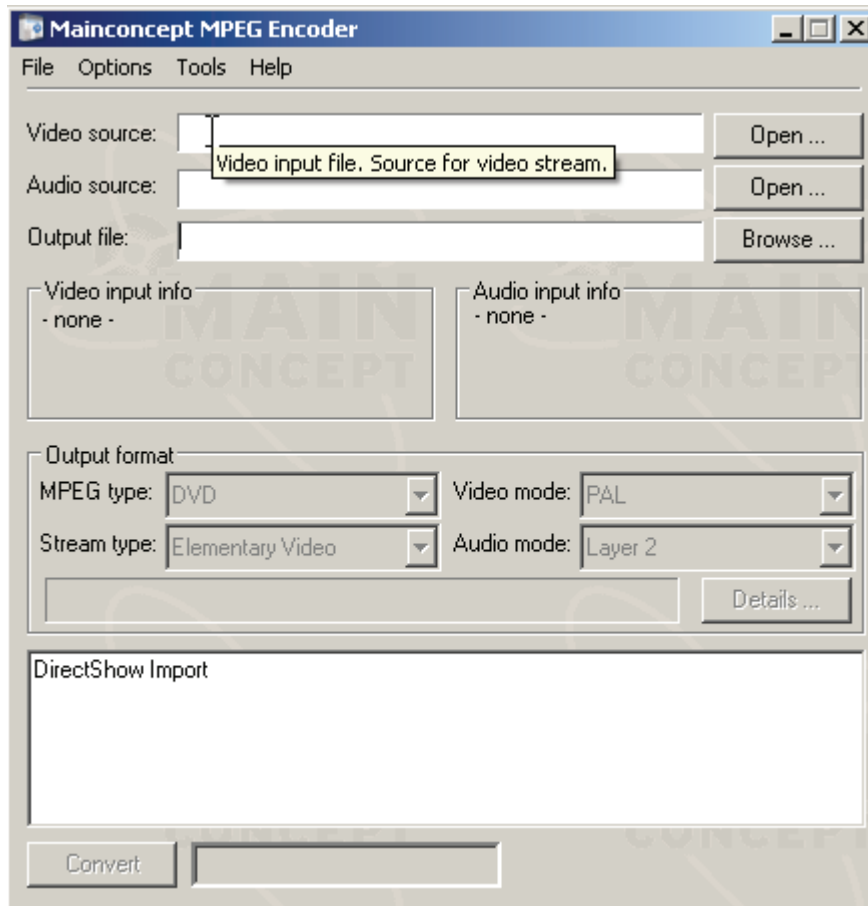
The Pandoras Box MediaServer series are professional solutions for digital video and lighting. With an advanced 3D feature set it can be learned fast and easy to have a quick integration into existing show setups.

Multiple layers enable you to crossfade and combine various images and movies to a fully customized design and look.

Additional features may be obtained to upgrade and grow with the system. Please check regularly our website [www.coolux.de](http://www.coolux.de).

## 2. MediaEncoder

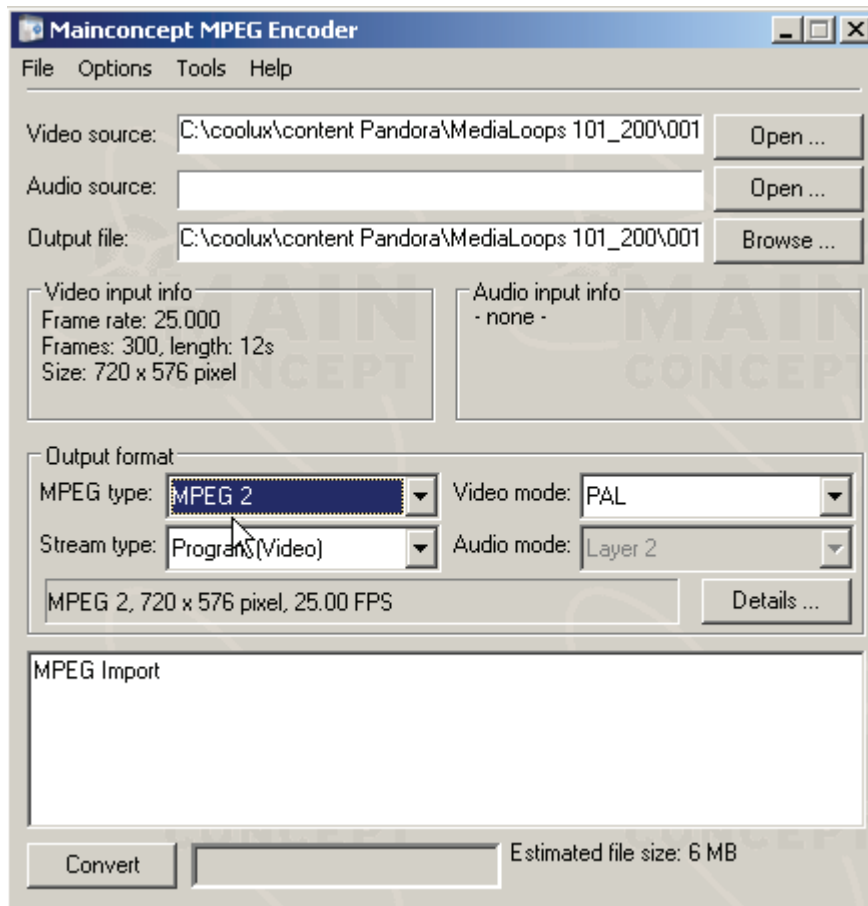
Pandoras Box MediaServer ships with the Mainconcept MPEG Encoder that allows to transcode most avi -and quicktime- as well as wmv files to Mpeg1 or 2 in both SD, HD or custom resolution.



An extensive help file is provided with the encoder. The easy steps to encode SD or HD files are explained on the following pages.

## 2.1. SD - PAL/NTSC Encoding

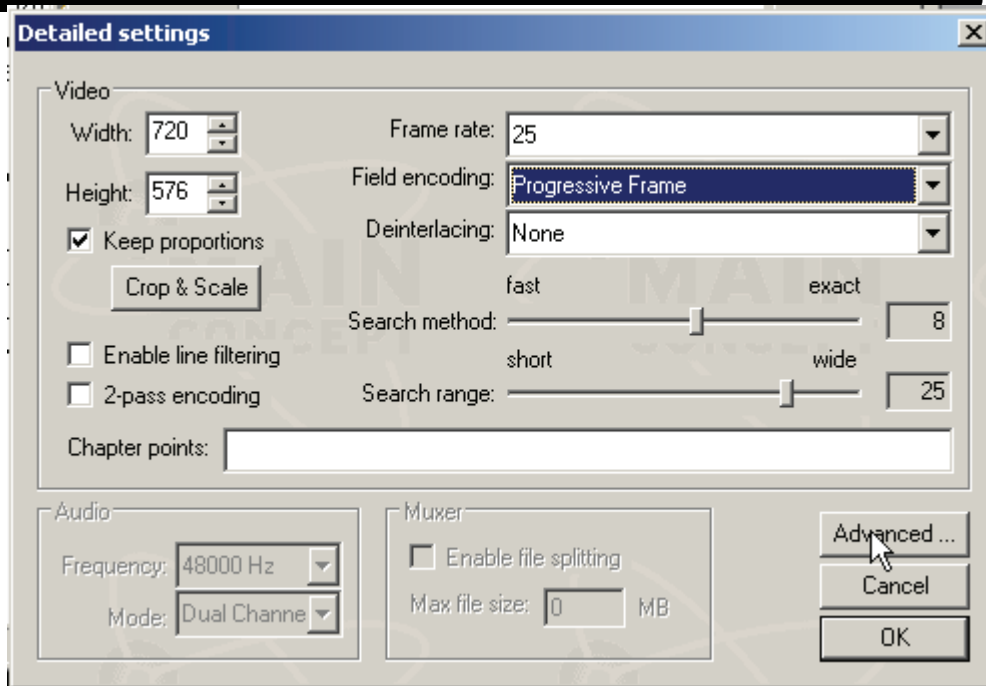
To start encoding please open the Mainconcept Encoder from the Start menu.



Click on the “Open...” button in the video source section to load your source file that you want to encode. You may also drag and drop a file from a directory directly into this section.

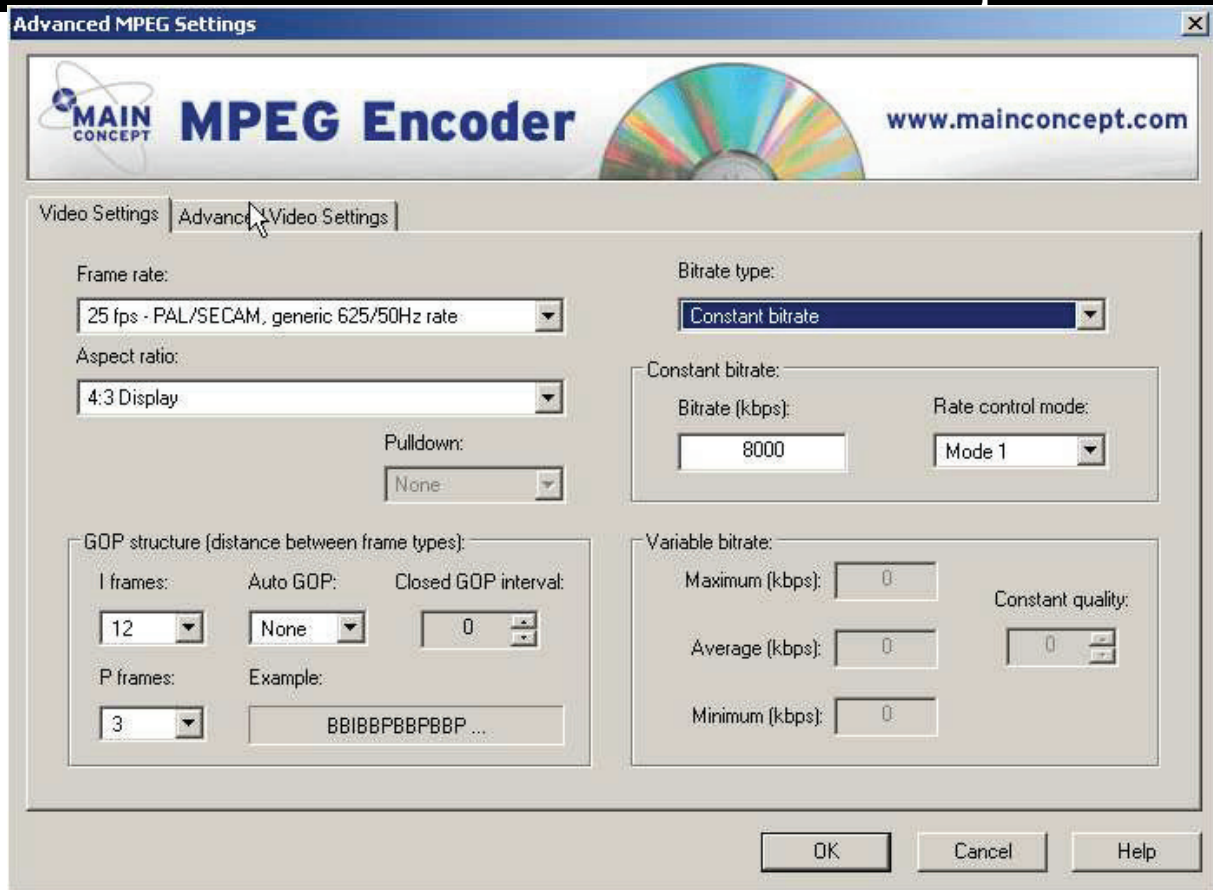
Choose “MPEG2” as MPEG type and - depending on the format - choose NTSC or PAL; and if your source file contains any audio that should be encoded, use Program (Audio and Video) or Elementary Video to encode Video only. For synchronized playback use elementary videos only.

Then click on details to set up the advanced features of the encoder.



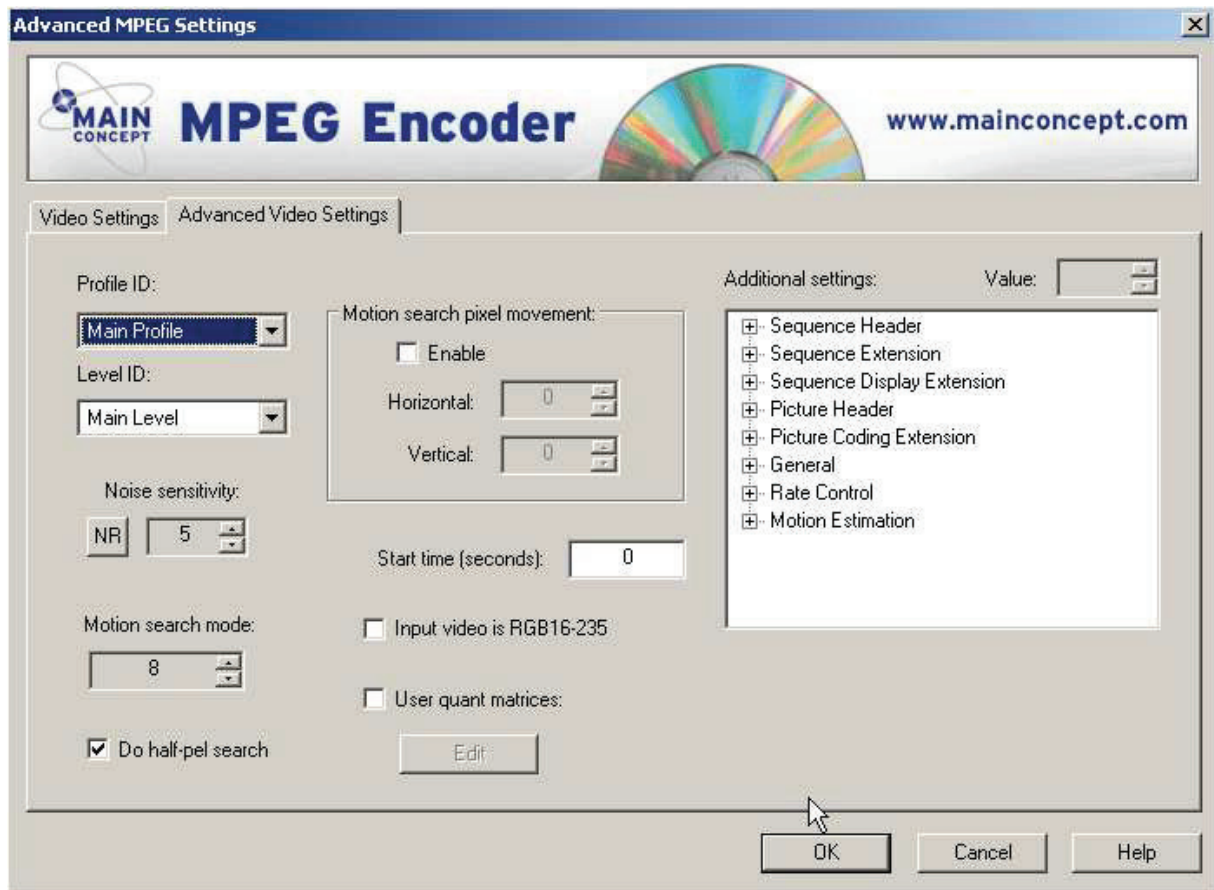
In the detailed settings you will need to set the field encoding to "Progressive Frame".

The video resolution can be set in width and height.



In the video settings tab of the advanced menu make sure to set the frame rate aspect-ratio according to the source file.

It is important to set the bit rate type to constant bit rate and choose a bit rate between 6000-8000 kbp/s.

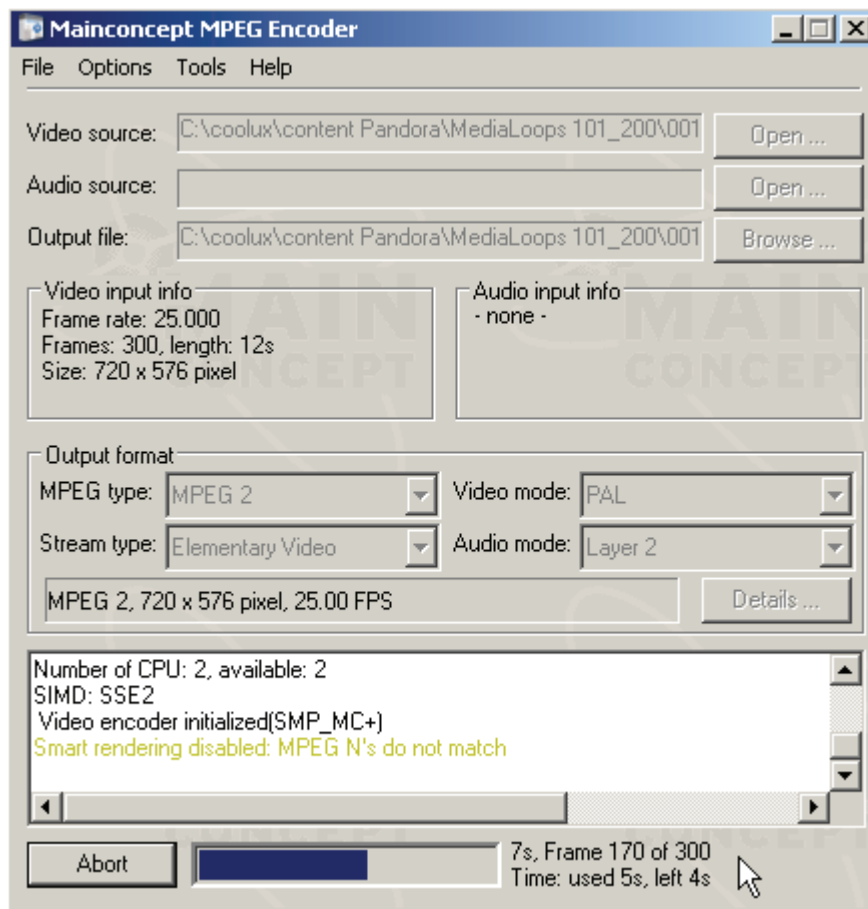


Click on the “Advanced Video Settings” tab and make sure that both profile and level ID are set to main, all other parameters should be set to default.

Now return to the main menu by clicking “OK”.

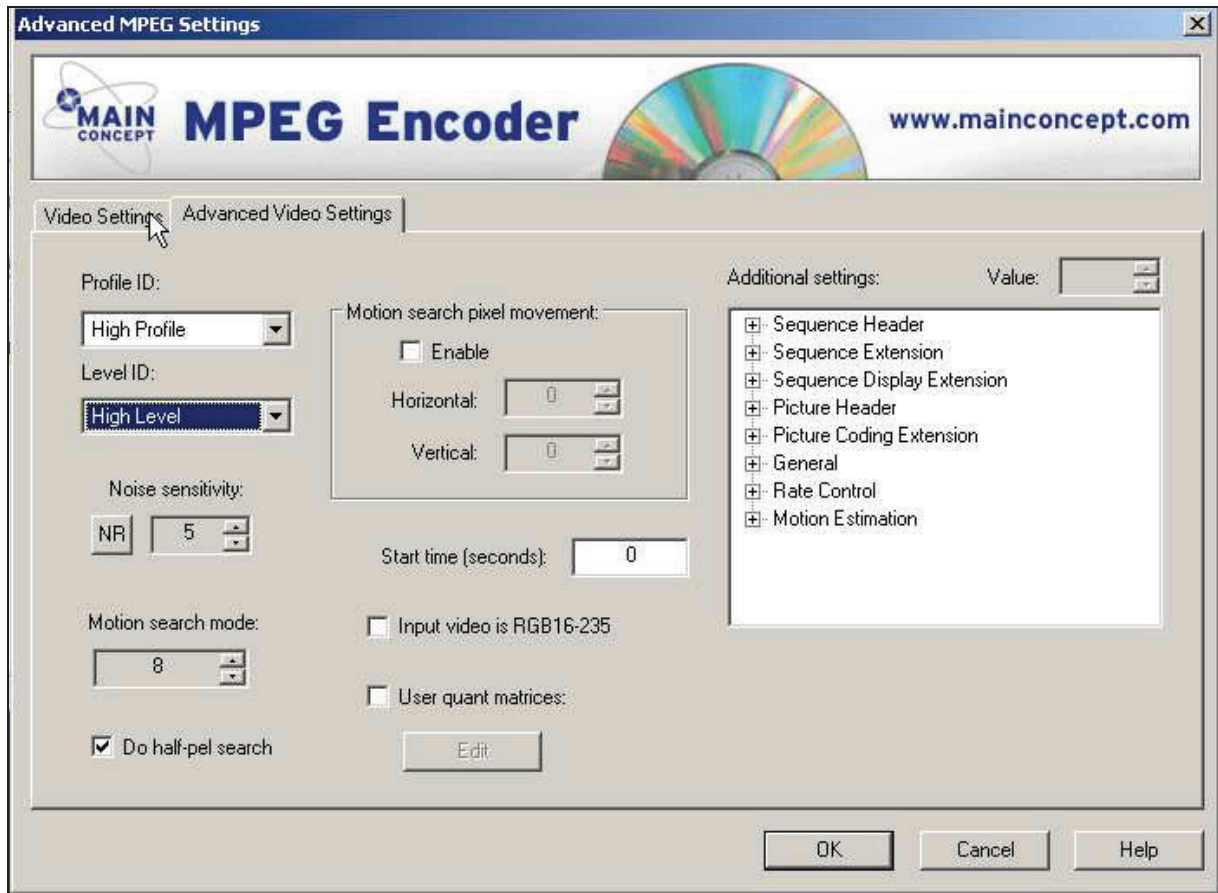


To launch the encoder, click in the main user interface on "Convert"



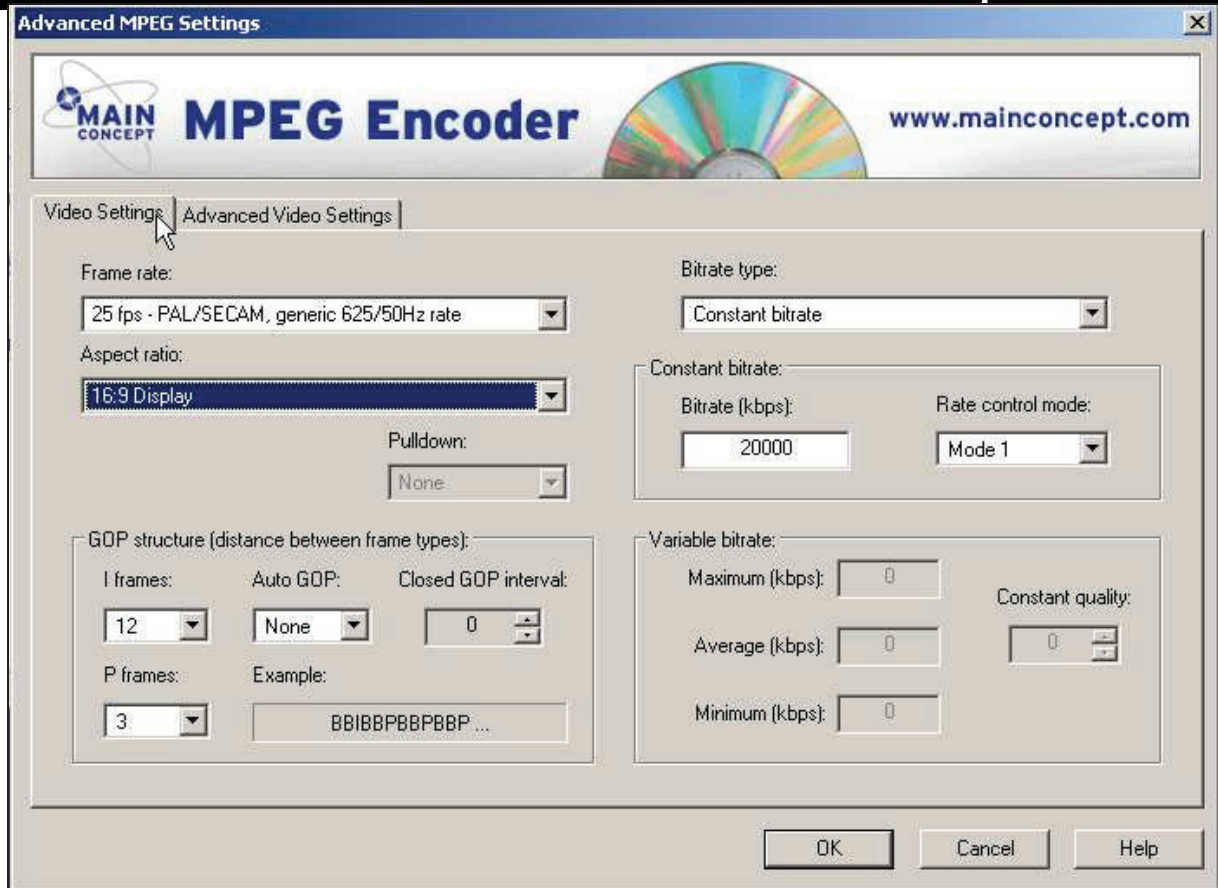
## 2.2. HD - PAL/NTSC Encoding

Compared to SD the HD, encoding requires both the profile and level ID to be set to high.

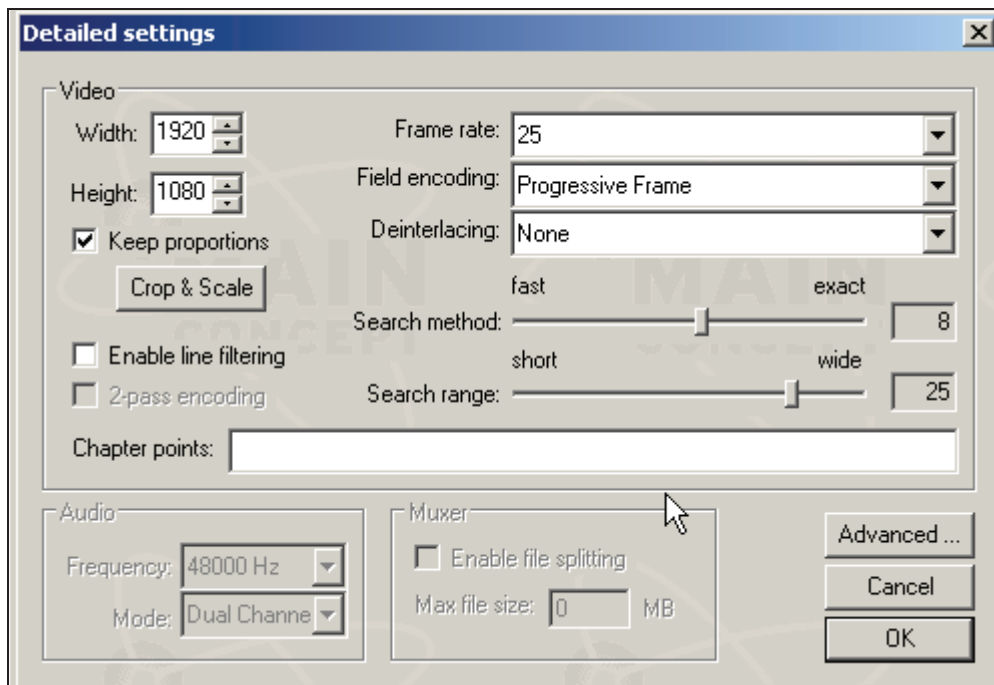


With these settings, resolutions above 768x520 can be accessed and configured.

It is recommended to start further reading in the Mainconcept Encoder Manual for more in depth details.



For HD playback, you may choose between a constant bit rate of 10000-20000 kbp/s



Before you leave the advanced mode, check the target resolution as well as field encoding and frame rate.

## **3. Defining Content resolution**

### **3.1. Resolution optimization for onscreen design**

Depending on the screen design, you may not always need a full Pal/Ntsc resolution for playback.

If your setup consists of a large background image with a smaller video insert window. Then the video resolution of the insert window does not necessarily need to be full Pal/Ntsc resolution.

Resizing a Pal/Ntsc window to a smaller output resolution may also lead to a bad image quality, therefore it can be more effective if the content has been created for the desired image size.

But in most cases you might stick with the full resolution file to be as flexible as possible.

### **3.2. HD or not HD**

Even though your screen might be large or wide, this does not immediately create the need for a High Definition video projection.

Creating content in HD is more expensive than SD and the decision should be taken upon the following considerations:

- How far or close will the audience get to the screen?
- Is the nature of the projected image more graphical background animation or real film footage?
- What kind of projection medium is used?
- What kind of aspect ratio is intended?
- What is the native resolution of the projector / display?

Based on these criteria you may want to take the decision, in which resolution your content needs to be created.

### **3.3. Multi-Resolution File Setup**

For a maximum of performance and image quality, the optimum case would be to have all video files in several resolutions. A standard case would be HD, SD and Video-CD format.

## 4. Image Formats & Content Comparison Table

Since the invention of film and the area of black & white as well as colour TV, a lot of image formats have been around and are still in use.

Three different fields have their specific image formats:

Film:	8mm, 16mm, 35mm, Imax
TV:	SD: Pal, Pal+, Ntsc HD : 720i/p, 1080i/p
Digital Displays:	VGA, SVGA, XGA, SXGA, SXGA+, QXGA

All these different image formats have different aspect ratios. The aspect ratio describes the relationship of the image width and height.

The most common aspect ratio that everybody knows is a 4:3 ratio, that is used by standard TV's and computer monitors.

Another - very common - aspect ratio is 1:1,85 which is used for widescreen cinema projection. In HD digital projection the common aspect ratio is 16:9.

On the other hand it is also useful to know the resolution differences. The big difference is between film and TV as well as digital displays. Film is an analog way of recording and projecting images, while TV and digital displays have specific resolutions.

When film is transferred to a digital medium it has to be scanned at a specific resolution, 2K and 4K are common. At this point, it is important to say that the resolution are superior to High Definition TV.

TV is today available through different standards the most common are Pal and Ntsc. These formats are also called SD: Standard Definition.

High Definition is an independent format from Pal or Ntsc, but it is subdivided into progressive scan and interlaced images.

Since most digital devices are optimized for progressive scan, this is important for digital projection and digital lighting.

High definition is known in two common standards 720i/p (1280x720pixel) and 1080i/p (1920x1080pixel)

Digital displays support multiple resolutions that reach from VGA (640x480pixel) to QXGA (2048x1536pixel).

The most common resolution for digital projectors is XGA (1024x768pixel). But new formats such as SXGA+ (1440x1050pixel) are entering the market as well.

No matter what resolution your display is running at, the aspect ratio is last but not least an important figure to consider since otherwise you may have undesired distortions in your images. So take care to produce your content for the desired aspect ratio or use Pandoras Box MediaServer's x&y scaling to compensate for that.

## 5. Output Resolution Table

### 5.1. Standard digital display sizes:

2048x1536 (4:3)
1600x1200 (4:3)
1280x1024 (5:4)
1024x768 (4:3)
800x600 (4:3)
640x480 (4:3)

### 5.2. Standard television SD and HD image sizes:

HD 1440x1080 (4:3)	HD 1920x1080 (16:9)
HD 960x720 (4:3)	HD 1280x720 (16:9)
SD 768x576 (4:3)	

## 6. File Formats & Performance

### 6.1. Video Formats

There are several video formats on the market. Pandoras Box MediaServer aims to support most of them. The most common video file types are:

.avi, .wmv, .mpg1, .mpg2, .mov

max supported SD format resolution is 768x576 pixels  
max supported HD format resolution is 1920x1080 pixels

An important thing about the AVI and Quicktime file format is it's kind of container format. This format may contain different video codecs. A video codec is a decompression method based on specific algorithm, optimized either for web CD or DVD use.

Pandoras Box MediaServer uses all available codecs that are currently installed on your windows system.

If a video file may not play in Pandoras Box MediaServer please check if the codec is installed by trying to playback the file in Windows mediaplayer.

Windows mediaplayer is able to display the properties and codecs of the loaded files. It will also check for updates to download the codec from the internet.

Some codecs are hardware related and can not be installed on your PC, since they are related to a hardware encoder that has been used to create the file.

You might need to re-encode the file in a codec that is supported by Pandoras Box MediaServer.

**For a proper playback we recommend either video files encoded with Microsoft DV codec (avi) or mpg 1/2 (.mpg).**

**To provide an optimum playback for mpg2 files please use a constant bit rate of up to 8000 kbits/s with a progressive scan in Pal or Ntsc resolution.**

Other codecs might be used, but it is recommended to test new codecs before using them on a show.

You may also install new codecs such as mpg4 to use in Pandoras Box MediaServer, but please make sure to check the playback performance.

## 6.2. Image Formats

Pandoras Box MediaServer supports the most common file types such as:

.bmp, .jpg, .tga, .png

At a max resolution of 1024x768 in the SD version and  
a max. resolution of 4096x4096pixels in the HD version

Bitmaps and Targa images provide uncompressed images; this means that there will be no loss of colour depth or resolution. Image formats like jpg or png do an image compression that leads to a lower image quality. The conversion of a jpg to a bmp does not enhance its quality it only maintains the quality. If you open a jpeg in a graphic program like Photoshop and save it again as jpeg, the quality will decrease due to the re-compression.

Even if Bitmaps are using more memory on the hard drive, don't be afraid to use them. Pandoras Box MediaServer needs to convert any image to an uncompressed format anyway to play it back in real time.

The big difference between Bitmaps and TGA's is that TGA files do support RGB +ALPHA while Bitmap only stores RGB information for each pixel.

Alpha is the transparent part of an image where you might always see thru and choose a different background.

So if you like to create see-through logos or transparent images, please use the tga file format.

PNG files do also support alpha, but just as jpeg files, they do an image compression that might not be desired.

If you need to convert any image file type that is not supported by Pandoras Box MediaServer, we recommend to use Photoshop to do either batch conversion or image adjustments.

## 6.3. Audio Formats

Audio files may be played back in two ways in Pandoras Box MediaServer. You may playback a video file with an embedded audio stream or play an .mp3 or .wav file directly.

Depending on the audio interface of your system wave file can be used as Stereo or 5.1 audio files.

To convert other audio formats for use in Pandoras Box, you might want to use Adobe Premiere or CleanerXL from Discreet.