



# CECIL\_B

Convert BMP files to AVI movies

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## Introduction

Scientific and engineering programs (including our software) can generate large sequences of graphic files to illustrate physical processes. Programs for initial-value solutions may create snapshots at a sequence of simulation times. With boundary-value solutions, a graphics set may show the effects of parametric changes. **CECIL\_B** is a Windows utility to convert large sets of BMP graphics files to AVI movie format. The program has several advantages compared to options like video editors:

- The program is distributed at no cost to the scientific community as a service by Field Precision LLC.
- It takes only a few minutes to learn the program and only a few seconds to set up a conversion, even with thousands of graphic files.
- The program features high-speed, automatic operation.
- You can choose optimal video codecs to create high-quality, compact video files.

This manual describes everything you need to know to make movies. For those of you impatient to get started, here is a capsule description of the process:

- Collect a sequence of any number of BMP files in a working directory. The files must have names of the form LLLNNN.BMP, where LLL represents a non-numerical name and NNN represents numbers that define the sequence order.
- Make a choice from the list of installed codecs. To start, pick CVID if available.
- Set the number of frames per second (a number from 1-250).
- Set the *Working directory*, then choose one file in the sequence to set the *File series*.
- Click the *Make movie* button. **CECIL\_B** creates the file LLL.AVI.
- Click the *View movie* button to check the results.

The conversion procedure takes less than a minute.

## File names

The prerequisite is to create a sequence of **BMP** files with your technical program. For optimal compatibility with different codecs, choose pixel dimensions that are multiples of 16 (*e.g.*,  $640 \times 400$ ). The file names should be in the format

LLLNNN.BMP

where LLL represents any number of non-numerical ASCII characters and NNN represents any number of numerical characters (0,...,9). The total number of characters must be the same in all names and may not exceed 255. This is a valid series

HMAGNET\_001.BMP, HMAGNET\_002.BMP, HMAGNET\_003.BMP, ...

This is an invalid series

HMC1.BMP, HMC2.BMP, ..., HMC9.BMP, HMC10.BMP, HMC11.BMP, ...

The file name SIM9REV0003.BMP is invalid because the name part contains numerical characters. All files in a sequence must be available in one directory. A working directory may contain multiple file sequences.

## Program interface

Figure 1 shows the program interface. The four operations in the *Setup* group must be completed in order to make a movie. The *Codec* menu shows a list of **FOURCC** designations for codecs installed on your machine. The current choice is displayed. The next section briefly discusses choosing a codec. Set the number of frames per second in the *FPS* field. The allowed range is 1-250. For reference, the frame rate for television and motion pictures is about 50. If you need larger values, you have probably generated more data than is necessary.

Use the *Set directory* command to guide the program to the working directory. Click the *Set file series* button and pick any file in the desired sequence. **CECIL\_B** extracts the non-numerical prefix (LLL) and uses it to create the name of the output file, LLL.AVI. The program collects the full sequence and sorts them in order of NNN. The *Status* group displays the current settings. **CECIL\_B** saves information on the codec, frame rate, working directory and file series in the registry and restores the settings on the next startup.

The *Make movie* button is active when the setup is complete. If you check the *Erase BMP files* box, the program will erase all **BMP** files in the



Figure 1: **CECIL\_B** screen display

current sequence after generating the movie. The *View movie* command calls up the default program associated with AVI files on your computer (*e.g.*, Windows Media Player, VLC Media Player,...) and displays available files in the working directory. Searching in a different directory does not change the working directory. Note that Windows Media Player locks the AVI file. You must close the program if you want to regenerate the movie.

## Codecs

A codec is a method of encoding video or audio information for streaming formats like AVI or SVF. Recording the full information of each BMP file as a frame would result in a huge movie with a great deal of redundancy. In principle, it is only necessary to record information on pixels that change from one frame to another. A lossless codec records every pixel change, while other codecs may use averaging techniques with some loss of picture quality. Unfortunately, there are hundreds of available codecs, each with its own advantages and drawbacks. There is far more Internet information available on codecs than you would ever want to know.

This section covers the basics you need to get started. The list in the *Codec* menu is the total set available on your computer. Some were installed with the operating system, others were added over time. When a program like Windows Media Player encounters a graphics file created with an unavailable codec, it searches the Internet and installs the codec. Most of the entries in the list are not useful. Either they don't work at all, or they create movies with large file size or poor quality. The best choice to get started is CVID (CinePak Pro), installed by default on all Windows machines. This stalwart produces good movies with moderate loss of quality. An advantage is that you can assume that the codec is available for playback on every Windows machine. The newest version is included with the **CECIL\_B** package in the **RESOURCES** directory (a subdirectory of the installation directory). To upgrade, simply replace your existing file with **ICCVID.DLL**. In Windows XP, the current file is located in `\WINDOWS\SYSTEM32`.

A good all-around choice is the CamStudio Lossless Codec (also included in the installation directory). This codec combines excellent image quality with good compression. To install it, unzip the archive, right-click on **CAMCODEC.INF** and choose *Install*. There is one precaution if you are going to show the movie at a conference. If **CSCD** is not installed on the projection computer, Windows Media Player and other software may not download it. Be sure to test the movie in advance and bring a copy of the codec installation files.

## Troubleshooting

There are obvious sources of trouble, such as bad **BMP** file names or missing files in the installation directory. If a movie is not produced when you click the *Make movie* button, there are two possibilities:

- The output file **LLL.AVI** is open in Windows Media Player.
- The chosen codec was inappropriate for the task.

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The package employs executable routines written by G.M. Stover and distributed under the GNU public license. Source code for these routines is available at <http://cybertiggyr.com/vwu/>.