

ImageConverter

Introduction

The ImageConverter program can be used to convert and scale in a single run multiple images with a file format common to electron microscope software applications. The image files can be converted into more widespread pixel image formats or (if information is to be conserved) into a binary file format with a fixed length header.

Installation and Program Start

Binary packages are supplied for Mac OS X and Windows. Make sure that you have a valid installation of the IDL virtual machine. The latter can be downloaded freely from <http://www.itvis.com>. On Mac OS X you will need to have Apple's X11 installed. It is part of the additional packages on the OS X installation DVD's.

Windows

- Simply unpack the archive 'ImageConverter.zip'. This will create a folder named 'ImageConverter' containing the program file 'ImageConverter.sav' and this documentation file with images. Drag the folder to the 'Programs' directory.
- Start the program by double-clicking on the icon of the ImageCoverter.sav.

Mac OS X

- Simply unpack the archive 'ImageConverter.zip'. This will create a folder named 'ImageConverter' containing the program file 'ImageConverter.sav', a launcher 'ImageConverter.app' and this documentation file with images. Drag the folder to the 'Applications' directory.
- Start the program by double-clicking on the icon for ImageCoverter.app. (Note: this should work in OS X 10.5-, if not the start IDLVirtualMachine.app and load the ImageConverter.sav file)

License

ImageConverter uses a machine based license consisting of two hexadecimal codes. License codes are available from the author. Start ImageConverter on the installation computer and note the MAC address displayed. Send this address in an e-mail with the subject 'ImageConverter license request' to l.houben@fz-juelich.de.

Once you have the license code and number create an empty file called 'ImageConverter.pref' in the installation directory (Unix systems: in your home directory) and start ImageConverter. Enter the license information in the '**Preferences** → **License**' dialog

Using the Program

Multiple file conversion requires only a few program steps:

- Select file formats for input and output
- Select files to convert
- Select output directory
- Choose scale factor
- For output to png, ppm, and tiff: choose contrast range
- Start conversion

Selecting File Formats for Input and Output

In the Selection box 'Input format' you can choose one of the following file formats:

- Tietz (tvips): image format of Tietz CCD systems (default file ending .dat)
- DM 2.x: Gatan Digital Micrograph, version 2.x (default file ending .dm2)
- DM 3.x: Gatan Digital Micrograph, version 3.x (default file ending .dm3)
- Emispec 3.x: Emispec 2D image data (default file ending .ser)
- Raw Data: raw binary data

Upon selection the suffix will change to the default file ending, You can however overwrite the file suffix *after* selecting the format from the selection box

If you select 'Raw Data' an additional dialog (see below) will open, asking you about the size of the images, the byte offset (header size) and the data type.

Note that there is no automatic endian detection for the raw data format. You may first want to test whether you need to swap the endian with a limited number of files. You probably need to swap the endian if your converted image looks 'scrambled'.

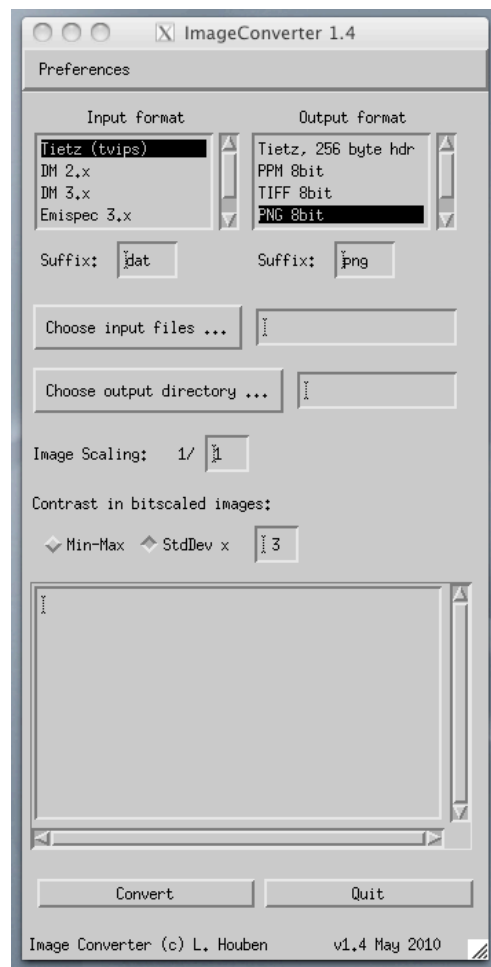


Figure: The main program dialog.

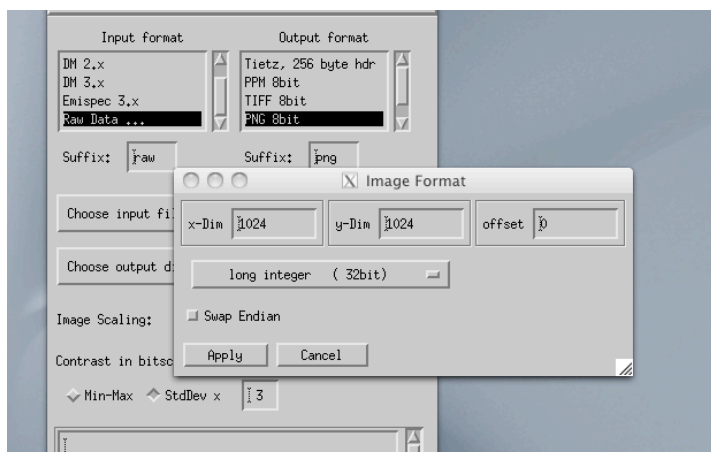


Figure: The raw data dialog

Then select the output format:

- Tietz: image format of Tietz CCD systems, binary format, lossless, old format with 256 byte header (default file ending .dat)
- PPM: PortablePixMap format, 8 bit format, usually only useful for subsequent conversion with other programs (default file ending .ppm)
- TIFF: TaggedImageFileFormat, 8-bit format, highly portable(default file ending .dm3)
- PNG: PortableNetworkGraphics, 8-bit format, highly portable, lossless compression (default file ending .png)
- GIF: GraphicsImageFormat, 8-bit format, highly portable, lossless compression (default file ending .gif)

Note: Only the choice of Tietz format will conserve the information in the images, the other formats are most probably of reduced pixel colour depth!

Like for the suffix of the input file format you may overwrite the default file suffix *after* selecting the format from the selection box.

Selecting the files to convert

Click on the "Input files ..." button. A file dialog will open. Navigate by clicking in the "Directories"

selection box. You can select single or multiple files from the list under "Files". Mark a range of files by pressing the Shift key while selecting with the left mouse button. Add or deselect single files to the selection by holding the Cntrl key pressed. Press the "OK" button when you are finished with your selection.

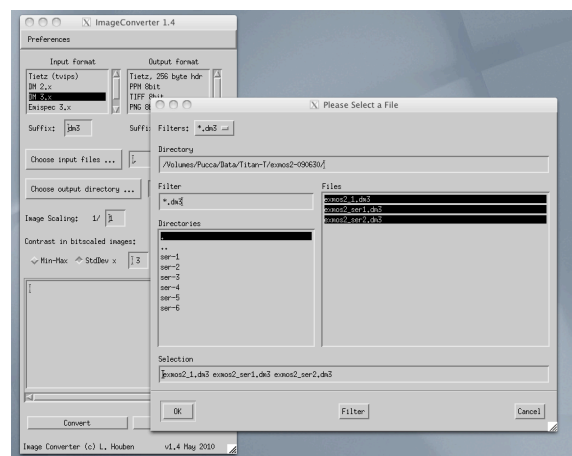


Figure: The input file dialog window.

Now select the output directory. Click on "Output directory" and select the according directory, navigating in the "Directories" selection box until the right directory name appears under "Directory" in the top of the dialog window. Then press the "Ok" button.

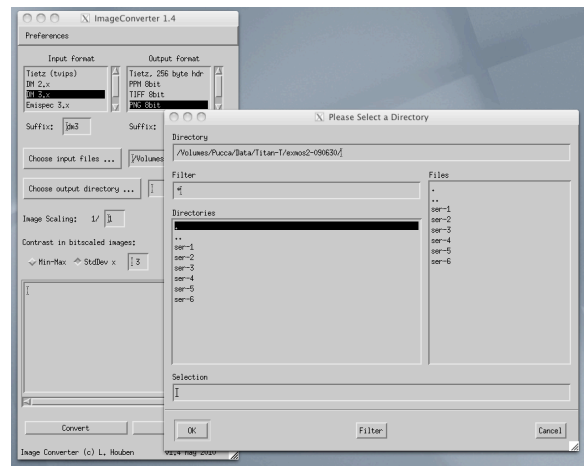


Figure: The output directory selection dialog.

Choose scale factor

For any output format you may want to bin the image, reducing its size thereby. Specifying a number of 4 e.g. in the "Scale factor" edit field will create an image upon output that is $4 \times 4 = 16$ times smaller than the input image.

For output to png, ppm, and tiff: choose a contrast range

Png, ppm and tiff images will have a pixel depth of 8 bit. In the general case the pixel count in the original image can be up to 16 bit, meaning that the greyscale values have to be transformed. ImageConverter does this automatically.

Choosing the "stddev" mode will produce results that are sufficiently good for images with a gaussian intensity distribution. For the stddev mode the cut off values for the image histogram data can be scaled in multiples of the standard deviation around the mean value. This scaling value can be specified in the edit field. The default is 3. You can choose any floating point number here. The smaller the number is the more the contrast will be pronounced, but information will be cut out eventually.

Another option is the contrast scaling to the range between image minimum and image maximum "min-max". This is usually the better option when the image intensity distribution is far from gaussian.

Start conversion

Click on the "Convert" button. The progress will be indicated in the log window at the bottom of the program interface.