Slicing Software

This printer creates 3D objects by printing layer-by-layer. Each layer is created when the LC4500-UV displays a unique PNG file corresponding to the appropriate cross-section of the object, curing resin in that specific pattern. These PNG files can be created by slicing an STL file using free slicing software available from FreeSteel. The resulting images can then be organized in a pattern sequence which the LC4500-UV will display in sync with the printer hardware.

To create the requisite PNG files to use in the printer, first download and install these programs:

- Slic3r - http://slic3r.org/download
- Slicing software from FreeSteel – http://www.freesteel.co.uk/wpblog/slicer/
- Python 2 – https://www.python.org/downloads/release/python-2712/

After installing Python 2, the install directory must be added to the path. From My Computer, open properties, then Advanced System Settings, then Environmental Variables. Edit the PATH variable to include the path to the directory where Python was installed.

For each print, first create an STL file containing the design to be printed. This STL file must then be flipped along the Y-axis because the slicing software also performs a Y-flip. Open Slic3r and click Add.. in the upper left corner. Browse for your STL file and open it. When it appears in the main window, right click on the object and select Flip -> Along Y-Axis. Then right click on it again and select Export Object as STL to save the flipped object as a new STL. This is the STL which will be sliced into PNG files. Once the STL is ready, run slicer.py, a script provided by Keynote which runs the FreeSteel slicing program. This script must be run from the command line with the following arguments, space-separated:

- The name of the STL file to be sliced (required)
- The location of the STL file to be sliced
- The directory where the resulting PNG files will be placed

Only the first argument is required. The two path arguments are optional; if left blank, the current directory is used. Note that because the command-line interface is space-delimited, no filename or path may contain spaces. To avoid the tedious process of typing these arguments each time the slicer is run, Keynote has also created a batch file (slicer.bat) as a wrapper for slicer.py, which contains variables corresponding to the python script's arguments. These variables can be set using a text editor before running the batch file. The batch file contains one extra variable which is used to specify the location of slicer.py. Like the other path variables, if this is left blank, the current directory is used. Again, no filename or path may contain spaces.

Once slicer.py starts running (either from command line or using slicer.bat), a progress bar is displayed in the run window. Depending on the size and complexity of the source STL file, the slicing process may take several minutes. At its conclusion, a new directory with the same name as the STL source file is created in the specified output location. This directory contains all of the resulting PNG slice files, sorted by their Z-position from low to high. These images are now ready to use in the pattern sequence which will run during the print.