

A photograph of a modern office interior with large windows. Outside the windows, a curved building with a grid-like facade is visible. The office has a polished floor and a curved desk in the foreground.

Open Licensing & Three Dimensional Printing

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L A W F I R M

What Makes Software Special?

- Easy to compile
- Easy to distribute
- Easy to contribute
- Licensing structures

Three Dimensional Printing

Additive Manufacturing

- Extrusion
- Granular Binding
- Photopolymers

Three Dimensional Printing

- CAD software (Computer Aided Design)
- CAM software (Computer Aided Manufacturing)
- Printing Process

Computer Aided Design

- Constructive Solid Geometry (STEP/IGES files)
- 3D Polygon Mesh (STL files)
- Examples: OpenSCAD (GPLv3), Google Sketchup (Free as in “Free Beer”), AutoCAD (Closed)
- Protected by copyright

Computer Aided Manufacturing

- Converting the CAD model into printing instructions
- Creates horizontal slices; generates toolpaths; calculates amount of material
- Result is “G-Code”
- Examples: Slic3r (AGPL), Cura (AGPL), Skeinforge (AGPL), KISSlicer (Closed)
- Protected by copyright

G-Code

G28; home all axes

M109 S200; wait to reach temperature

G90; set to absolute positioning

G21; set units to millimeters

G92 E0; set position

G1 Z0.400 F7800.00

G1 X86.070 Y85.520 F540.000 E1.01518

G1 X86.270 Y85.350 E1.02290

How do we create open licensing regimes in hardware?

Goals of Open Licensing

Open Source Definition, §2

- The program must include source code

Rationale: We require access to unobfuscated source code because you can't evolve programs without modifying them.

Goals of Open Licensing

OSHWA Definition, §1:

“The hardware must be released with documentation including design files, and must allow modification and distribution of the design files. Where documentation is not furnished with the physical product, there must be a well-publicized means of obtaining this documentation...”

How do we create open licensing regimes in hardware?

Solution?

- Printed article is a product of the digital design.
- Focus on the design, which is protected by copyright.
- Insert directions to source information in the design file.
- Make the direction to source information accessible on the object.



THANK YOU!

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