Kicad StepUp starter Guide

Maurice <https://launchpad.net/~easyw>

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kicad StepUp: a new approach to export kicad board and modules in STEP AP214 (with colors). With kicad StepUp it is possible to export the 3D board and modules in STEP for MCAD interchange and create the 3D wrl libraries.

kicadStepUp at sourceforge[1]
kicadStepUp at lauchpad[2]
YouTube Kicad StepUp demo video[3]

[1] http://sourceforge.net/projects/kicadstepup/
[2] http://bazaar.launchpad.net/~easyw/kicad-stepup/trunk/files/
[3] http://youtu.be/Ukd47VXYzQU

OverView

to run the demo:

in Linux: change dir to the folder in which you have extracted the demo
`./launch-kicad_StepUp-demo.sh`

in windows: change dir to the folder in which you have extracted the demo
`launch-kicad_StepUp-demo.bat`

the demo comes with a kicad project, along with all needed STEP and wrl modules, just to be used just out of the box
(**NB** use the script from inside the dir)
to see the kicad board, change dir to the folder in which you have extracted the demo
in windows:
`launch-kicad-demo-project.bat`
in linux:
`./launch-kicad-demo-project.bat`

requirements: kicad 2015 stable or latest dev release, freecad 0.15

1. Introduction

Kicad StepUp allows the user to modeling the 3D modules starting from FreeCAD (instead of using Wings3D), creating models in STEP AP214 and rendering the pcb board and components in native STEP AP214.

Designing in kicad native 3d-viewer will produce a fully aligned STEP version with the same view of kicad 3d render.
Now you will have the two words with the same appearance; one can design in kicad EDA and transfer the artwork to MCAD (FreeCAD) smoothly

WYSIWYG from EDA to MCAD

WYSIWYG from EDA to MCAD

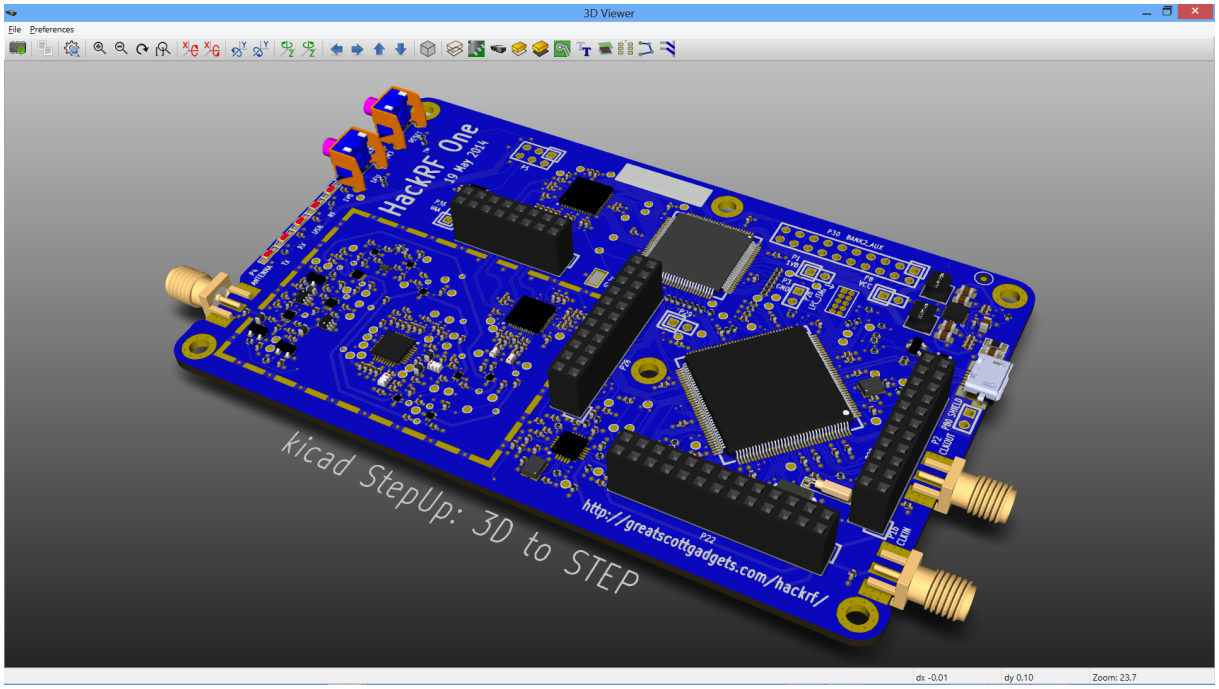

Figure 1. kicad StepUp in Kicad 3d-viewer

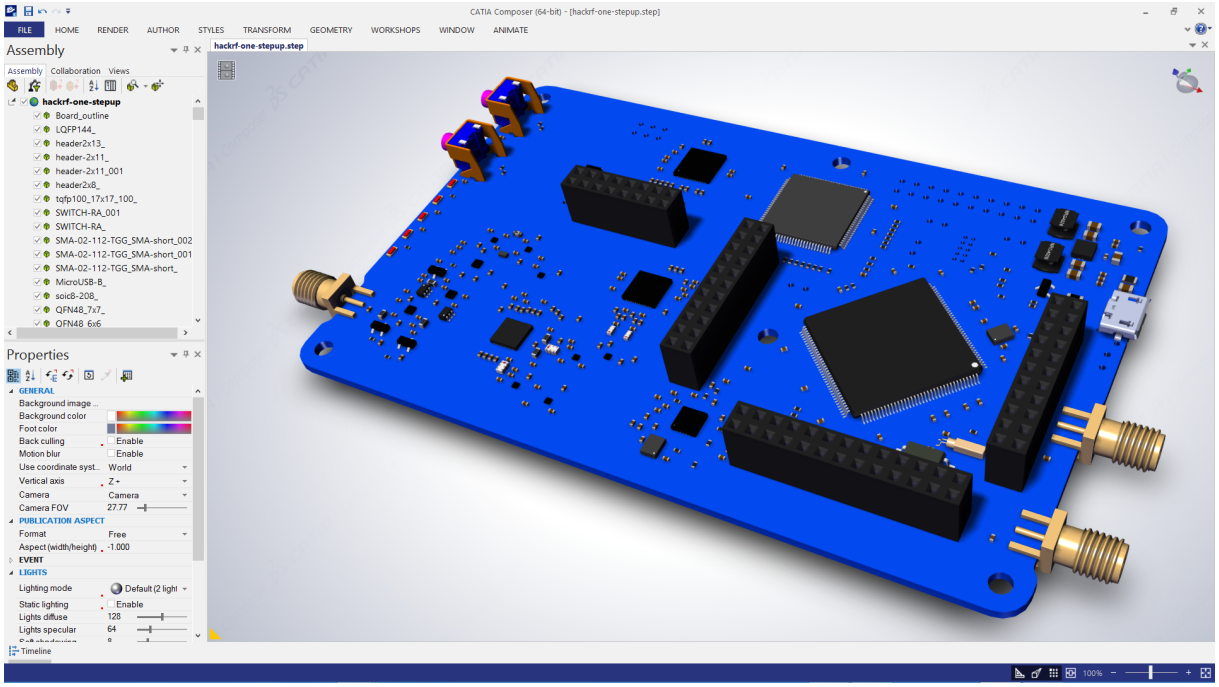

Figure 2. kicad StepUp in MCAD Catia

2. Basic How To *(using kicad StepUp the easiest way)*

(not changing the way you use kicad)

1. just copy the STEP 3d models in the same folder in which there are your wrl 3d models and use the same name of the wrl model name (e.g. r_0603.wrl # r_0603.step)
2. go to your board folder and copy the script kicad_StepUp.FCMacro and the config file ksu-config.cfg inside that folder, edit the config file ksu-config.cfg with e.g. notepad changing your model prefix to your KISYS3DMOD path
3. export from kicad pcbnew the IDF model of the board **NB** export at **Xref=0;Yref=0**
4. run the script from command line or from a bash/batch file
<path to Freecad executable file>/freecad <kicad_pcb_name.emn> ksu-config.cfg kicad_StepUp.FCMacro
(e.g. freecad mypcb.emn ksu-config.cfg kicad_StepUp.FCMacro)
just watch the script assembly your 3D board with 3D models :)

3. How To *(using kicad StepUp the best way)*

(getting the best from STEP models)

1. just copy the STEP 3d models in the same folder in which there are your wrl 3d models
2. export the STEP models, scaled 1/2.54 to wrl with the same name of the STEP model (e.g. r_0603.wrl # r_0603.step); in this way your 3D board in kicad pcbnew 3d-viewer and in FreeCAD workbench will look perfectly aligned
3. go to your board folder and copy the script kicad_StepUp.FCMacro and the config file ksu-config.cfg inside that folder, edit the config file ksu-config.cfg with e.g. notepad changing your model prefix to your KISYS3DMOD path
4. export from kicad pcbnew the IDF model of the board **NB** export at **Xref=0;Yref=0**
5. run the script from command line or from a bash/batch file
<path to Freecad executable file>/freecad <kicad_pcb_name.emn> ksu-config.cfg kicad_StepUp.FCMacro
(e.g. freecad mypcb.emn ksu-config.cfg kicad_StepUp.FCMacro)
just watch the script assembly your 3D board with 3D models :)

4. Create your own Library

The way to build a STEP models library to be easily used by the script is:

1. start modeling your 3d object in scale 1:1 in mm (which is the way in which mechanical stuff are used to be)
2. convert your model to STEP in scale 1:1
3. assure that your STEP module **is fused to just one solid object**
4. convert the model to wrl in scale 1/2.54 (0.3937001)
   (which is the scale used by kicad 3d-viewer or maintain 1:1 scale in exporting and apply the scale 1/2.54 to the wrl model in 3d-viewer)
5. use the same name to wrl and STEP model
6. put the STEP model and VRML model in the same place
7. check if your vrml model is aligned to the kicad pcb footprint in pcbnew 3d-viewer
8. launch the script and check if the FreeCAD model and the kicad 3D viewer are aligned
9. in case of misalignment just verify your model;
   use the **move-rotate-scale.FCMacro** to easily align the 3D model to the footprint

Tip.

import the reference block[4] in your FC doc beside the model you are designing to check the correct orientation

(**NB Import Ctrl+I**, *not Open Ctrl+O*)

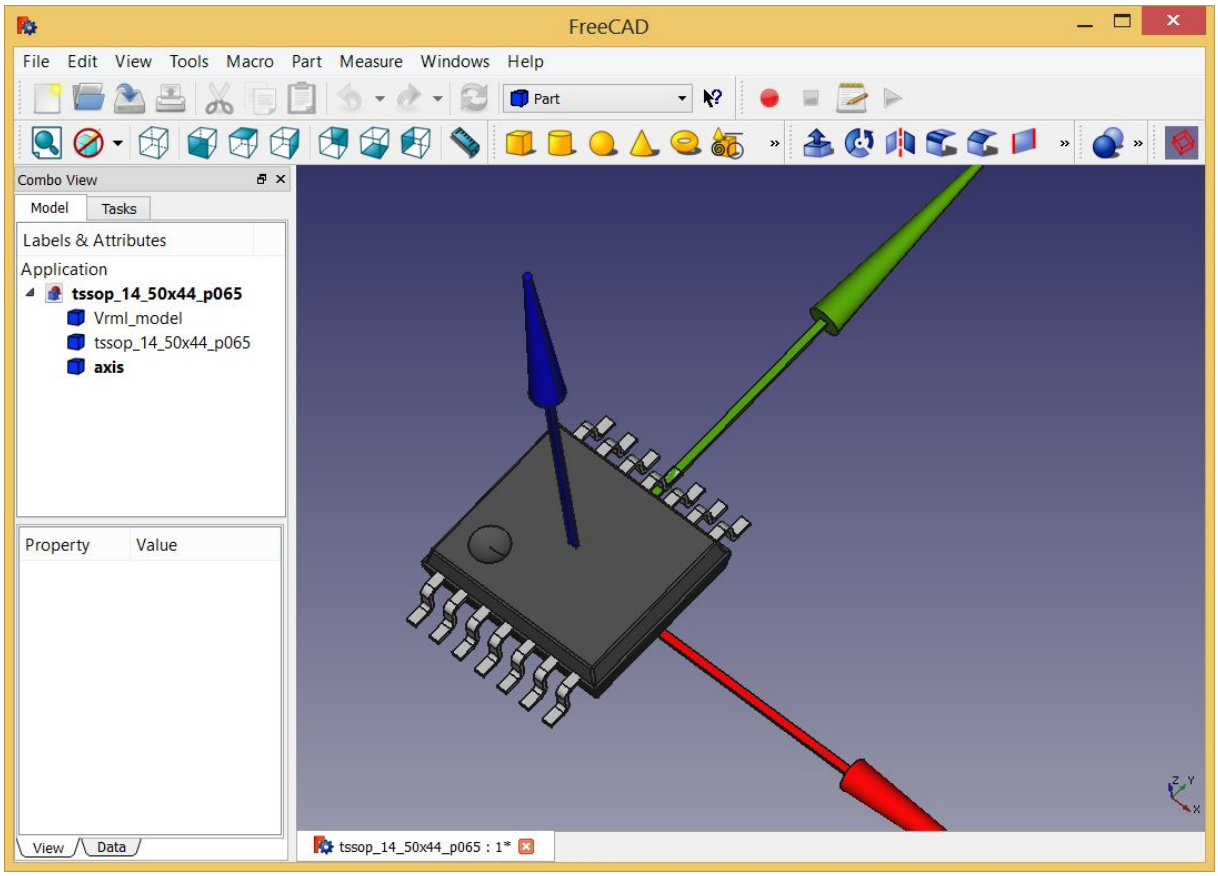

Figure 3. reference block imported

[4] https://raw.githubusercontent.com/easyw/kicad-3d-models-in-freecad/master/reference-block.step

Tip.

use the **move-rotate-scale.FCMacro** to easily align the 3D model to the reference block (then it will be aligned to the footprint)

the macro can be launched with:

`./launch-kicad_StepUp-Move-Rotate-Scale.sh`

or with

`launch-kicad_StepUp-Move-Rotate-Scale.bat`

or just open the macro in FreeCAD and run it

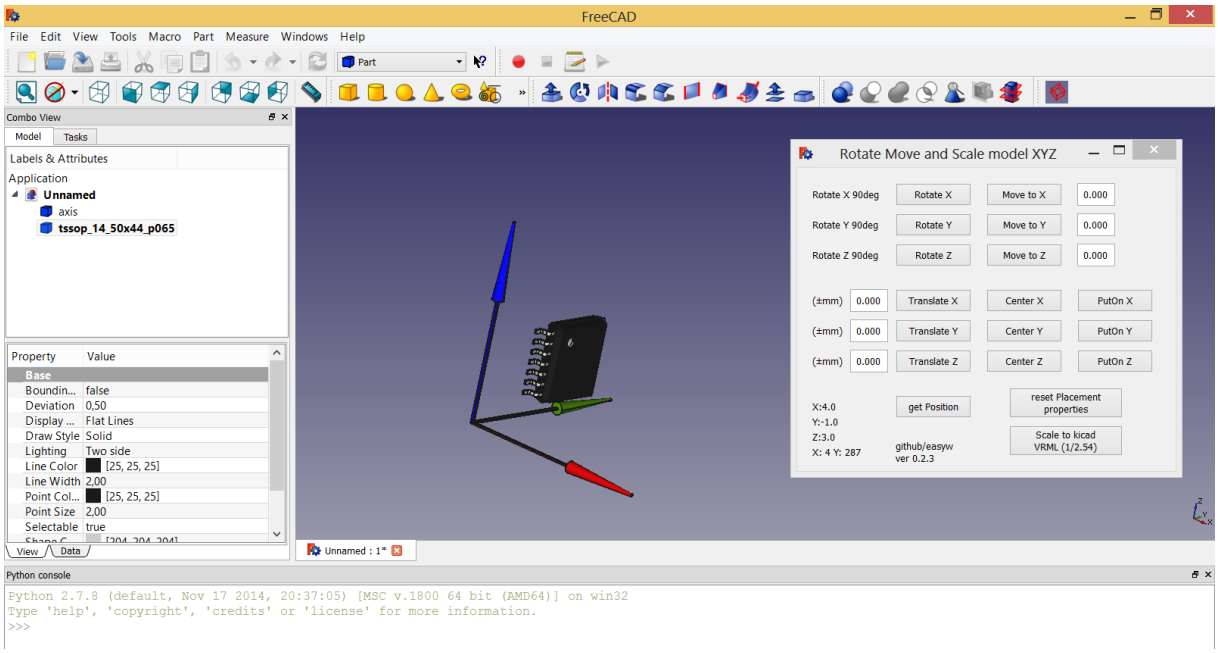

Figure 4. move rotate and scale Macro

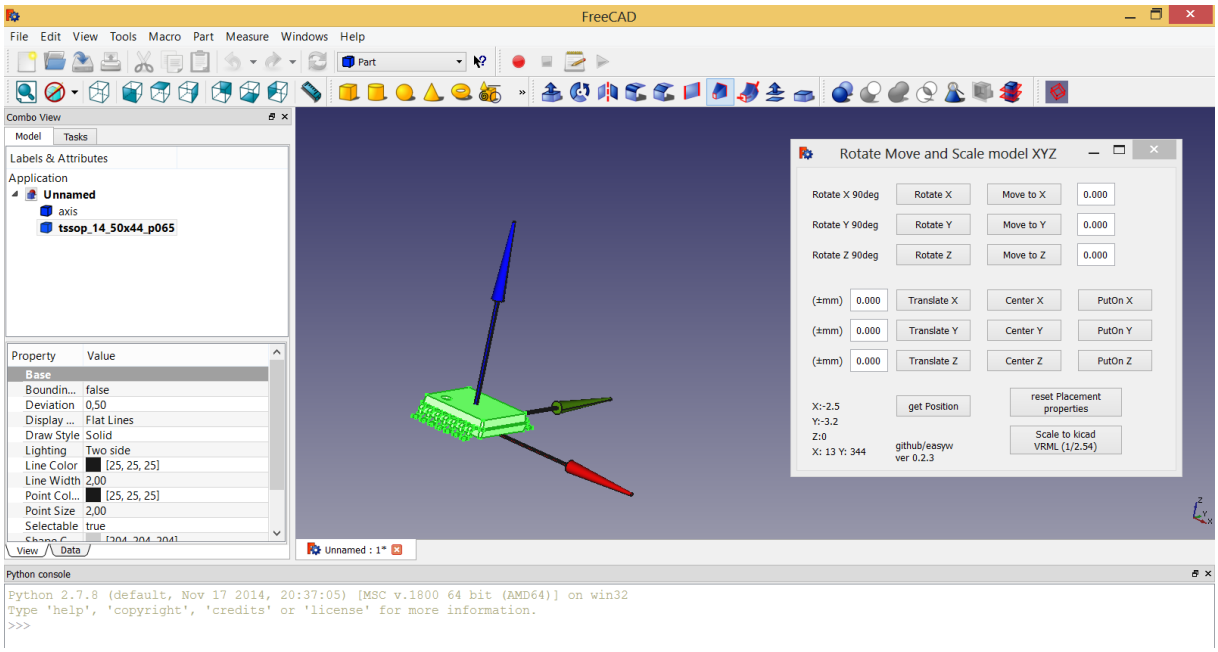

Figure 5. move rotate and scale Macro: 3D model aligned

Note: here FreeCAD forum fusion howto[5] some tips to fuse correctly objects in FreeCAD

5. STEP AP214 and VRML FreeCAD scripted repository ready to kicad StepUp

repository of 3D STEP models:[6]

there is a repository of many electronic components **STEP AP214** and **VRML** models, with a nice script to build parametric models for

SOIC, SSOP, TSSOP, SOT, QFP, QFN ICs, *DIP* ICs, *Chip Resistors, Chip Capacitors, Pin Headers*

just compiling a parametric text file with dimensions from component data sheet

3D-script-generator and 3D models[7]

more is coming …

[5] http://forum.freecadweb.org/viewtopic.php?t=8451#p69489

[6] https://github.com/easyw/kicad-3d-models-in-freecad

[7] https://github.com/easyw/kicad-3d-models-in-freecad/tree/master/cadquery/FCAD_script_generator

6. List of files

kicad_StepUp.FCMacro = *kicad StepUp* script
ksu-config.cfg = configuration file
kicad_StepUp_vrml_export.FCMacro = STEP to scaled VRML script
move-rotate-scale.FCMacro = Move, Rotate, Scale script to easily manage manufacturers STEP modules
kicadStepUp-starter-Guide.pdf = *kicad StepUp* starter Guide

7. credits

kicad StepUp script author is Maurice easyw@launchpad[8]
Guide Doc Version is 1.3.2

kicad EDA[9]
- IDF export for kicad (Cirilo Bernardo)

FreeCAD[10]

IDF import for FreeCAD
- Milos Koutny (milos.koutny@gmail.com[11])

CadQuery module[12]
- CadQuery FreeCAD module

hyOzd freecad macros[13]
- hyOzd parametric script

FreeCAD-PCB
- marmni <marmni@onet.eu[14]>

[8] https://launchpad.net/~easyw/
[9] http://www.kicad-pcb.org/display/KICAD/KiCad+EDA+Software+Suite
[10] http://freecadweb.org/
[11] mailto:milos.koutny@gmail.com
[12] https://github.com/jmwright/cadquery-freecad-module/archive/master.zip/
[13] https://bitbucket.org/hyOzd/freecad-macros
[14] mailto:marmni@onet.eu

8. Copyright

9. Risk disclaimer

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