

Oscad: An open source EDA tool for circuit design, simulation, analysis and PCB design



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Using open source software software, such as KiCad, Ngspice and Scilab, we have built an integrated open source EDA tool, Oscad. One may draw a circuit using KiCad, create a netlist and simulate it using Ngspice. One may also do PCB design and generate Gerber files. One may add models and subcircuits. One may also generate differential equations of analog circuits and solve them through Scilab. Oscad runs on Linux (Desktop, laptop and Aakash), and MS Windows. Oscad can be freely downloaded from [1]. We have written a book that explains the use of Oscad [2]. An e-version of this book can be freely downloaded from [1]. We now explain some activities around Oscad that are designed to help the college students, faculty and practising professionals.

1. SELF Workshops through Spoken Tutorials

Spoken Tutorials are instructional material created for self-learning [3]. The modalities of conducting a workshop on Oscad are explained below:

- As Oscad is open source, the Oscad installers for Linux and MS Windows are available at [1]. One may download these free of cost, and install them.
- At the same URL, spoken tutorials for self-learning of Oscad are available for free download.
- Using the material mentioned above, one can get effective training through SELF workshops of two hour duration.
- A college that wants to organise a SELF workshop should provide the following: (1) A volunteer, who can be a faculty member or a student (2) One computer (desktop or laptop) per participant with audio output capability (3) One head phone per participant - a low cost head phone will do.
- Although not compulsory, one (only one) Skype connection will make the SELF workshops effective as it provides a mechanism for interaction between the participants and the Oscad Team at IIT Bombay.
- There is no lower or upper limit on the number of participants. This just depends on the number of computers available.

We hope to offer on on-line test and provide Certificates from the Spoken Tutorial Project, IIT Bombay, for participants who pass the test. The on-line test is typically held two weeks after SELF workshops. Every computer should have Internet for On-line tests.

The current mandate of our funding agency NMEICT [4] is that SELF workshops and on-line certificates are offered free of cost.

Useful links for conducting SELF workshops are [3], [1] and SELF-workshop@oscad.in or contact@spoken-tutorial.org.

2. Textbook Companion on Oscad

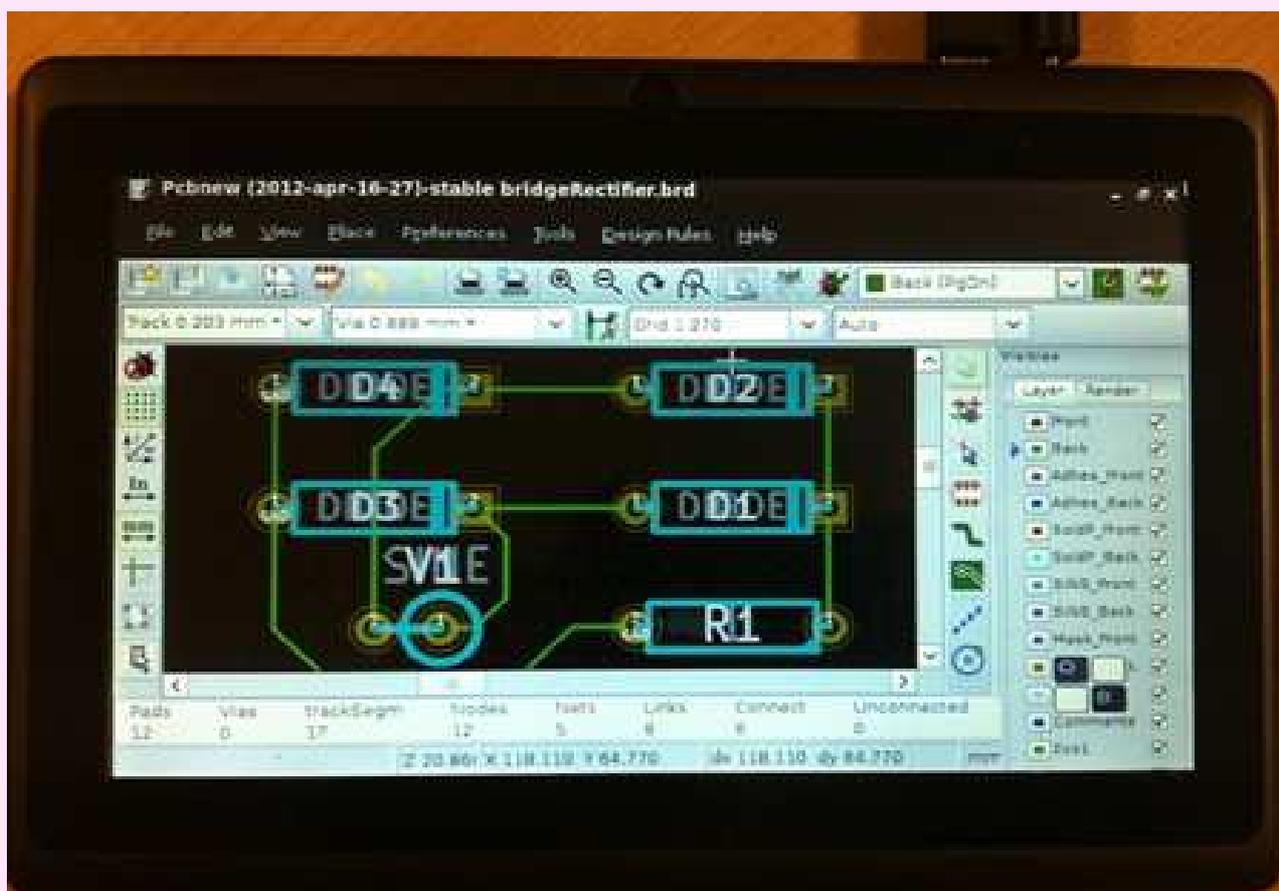
An Oscad Textbook Companion (OTC) has the Oscad code for the solved problems of standard textbooks on circuit design and simulation. We have already created OTCs for [5] and [6], which will shortly be available for free download from [1]. All OTCs have only code and no documentation. For example, to understand the code given in OTC of [5], one needs a copy of [5] and to understand the theory explained therein. We invite students, teachers and professionals to create OTCs for other standard textbooks as well.

The latest list of completed and in-progress OTCs will be available at [1]. An enthusiast who is interested in creating an OTC should code the solved examples of a book that is not completed nor in-progress and upload them on to [1].

As per the recommendations of NMEICT, the person who creates an OTC will be given an honorarium of Rs. 10,000 and their teacher will be given an honorarium of Rs. 5,000. The teacher's honorarium is for reviewing the OTC and for certifying its correctness. Teachers and Professionals can also create OTCs.

3. Oscad on Aakash

We have successfully ported OScad to Aakash, on the Linux side. To use it comfortably on Aakash, one needs to attach an external keyboard and a mouse. The cost of all of these, including Aakash, is less than Rs. 2,500. Thus, we are in a position to give a complete EDA Tool Set, including the hardware, for less than Rs. 2,500. This has the potential to unleash creativity and entrepreneurship from the electronics enthusiasts and professionals. A few screenshots of Aakash are given below. These show (1) a bridge rectifier circuit schematic (2) hardware configuration showing the keyboard and mouse, with Ngspice simulation output and (3) PCB design.



4. Other Oscad Activities

Lab Migration: This service is provided for all educational institutions that are interested in shifting their proprietary EDA tool based circuit design labs to OScad. The interested college could contact us expressing their intent and a statement of their lab experiments. The OScad Team at IIT Bombay will provide the equivalent OScad code to help conduct the experiments. The required coding will be done by our team and student/teacher volunteers from colleges. Thanks to NMEICT funds, we are in a position to give honorarium for those who do this coding. This code will be available free of cost from [1] for everyone.

Circuit Creation: We will provide a mechanism for students who do their projects on circuit design using OScad to upload on to [1]. We will provide a forum based help service to clear conceptual questions. We will also provide a ranking and a feedback mechanism for the uploaded circuits.

Expanding OScad's Capabilities: We invite participation from the public to expand OScad's capabilities. We are also establishing processes to support student projects in this area. To participate in this activity, one needs IT skills and a knowledge of electronic design. These services will also be coordinated through [1].

References

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