

Free to Measure!

Georges Khaznadar <georgesk@debian.org>

Lycée Jean Bart – association WIMSÉDU – association OFSET – Debian member

November 2013



Acknowledgments

Thanks to INRIA and FING for the opportunity to give this short talk.

I thank particularly Ajith Kumar, and Jithin BP who made this project possible.



Contents

- 1 The expEYES box
 - An oscillographe as cheap as a book
 - Freedom: does it matter ?
- 2 Next step : a self-contained appliance
 - Limiting factors
 - Ongoing experiments
 - What about telephones?
- 3 Links



About the author, and collaborations



Ajith KUMAR is the inventor of expEYES-Junior box, which is part of a series of free/libre and unexpensive hardware created for the project PHOENIX: **Physics with Home-made Equipment** and **Innovative Experiments**. This project aims to develop teaching of experimental science in India.



Georges Khaznadar is a teacher of physics and chemistry in Lycée Jean Bart, Dunkirk, France. He maintains the package expeyes for the distribution Debian and its derivatives (Ubuntu, etc.)

They met recently at “Rencontres Mondiales des Logiciels Libres” in Brussels, in July 2013.



An oscillographe as cheap as a book



Between years 2006 and 2010, high-level sportive students of Lycée Jean Bart were allowed to attend a distance training for an option named "Mesures Physiques et Informatique" (Physical measurement and Computer Science). An expEYES box was lent to each one of them.



Costs



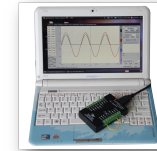
Ajith Kumar targets Indian students and teachers first. If this project succeeds, the world will be next... Can educational institutions be considered as the only target?

ExpEYES-Jr is sold 2000 RH (unit price). So the computer to use it is much more expensive.

Hence the ongoing work: create a single board featuring a low-power computer and the components of expEYES.



Software is free, as well as the design of the box



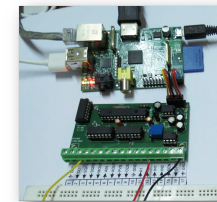
The schematics, the printed board design, and the micro-controller's firmware are all published under free/libre licenses. Every competitor willing to manufacture the box can do it¹.

The software driving the box in under GNU GPL-3 License; a library in C and another in Python are available. User-level programs, either for general purpose or more specialized use, are easy to customize, provided you have some minimal skill.

¹The author reserves the right to use the name expEYES, if a sample of good quality is sent to him.



ExpEYES with existing miniature boards



Among first tries, expEYES was connected to a Raspberry PI. It does work, and with a few extra components, one can access the measurement box by a WIFI connection.

The main idea was to use expEYES with a popular low-cost computer; another successful example is with the

[Aakash tablet.](#)



First tries, this summer

Last August, Jithin BP, a son of Ajith Kumar hacked on top of a few source code authored during "RMLL 2013", to access features of expEYES via a small web service powered by CherryPy.



... remote measurement made easy for all!







Useful links



- [expEYES](#) as a keyword is useful in every web search engine.
- The project in India: expeyes.in
- Mailing list: phoenix-project@freelists.org
- Find this speech, and other ones, at <http://georges.khaznadar.fr/docs/speeches/...>







Credits



 (c) 2011 G. Khaznadar, license: [CC-BY-SA](#) 


 (c) 2012 wavicles
(<http://beta.metastudio.org/objects/authors/wavicles>) license:
[CC-BY-SA](#) 

 (c) 2006 G. Khaznadar, license: [CC-BY-SA](#) 

 (c) 2009 G. Khaznadar, license: [CC-BY-SA](#) 

 (c) 2011 Ajith Kumar, license: [CC-BY-SA](#) 



 (c) 2013 G. Khaznadar, license: [CC-BY-SA](#) 


 part of a photograph from www.raspberrypi.org, Unknown license. We shall use the French [right for short quotes](#).



Credits

 (c) 2013 Jithin BP, license: [CC-BY-SA](#) 

 (c) 2013 Jithin BP, license: [CC-BY-SA](#) 

 (c) 2013 Jithin BP, license: [CC-BY-SA](#) 