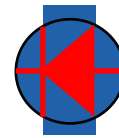




# e-puck Mini Doc (Ver. 1.0)

EPFL educational and research mini mobile robot



**GCtronic**  
Electronics & Mechatronics

e-puck is the latest mini mobile robot developed at the Swiss Federal Institute of Technology in Lausanne (EPFL) for teaching purposes. Already in use in many research and educational institutes, it is now also commercially available from GCtronic.

e-puck is powered by a dsPIC processor and features a large number of sensors in its standard configuration (IR proximity, sound, accelerometer, camera). The e-puck hardware and software is fully open source giving low-level access to every electronic device and offering unlimited extension possibilities. A flourishing user community provides software, documentation and discussion groups.

The use of e-puck documents coming from EPFL is submitted to a license. The license is reported in the next pages.

Websites where to find documentation and SW:

[www.e-puck.org](http://www.e-puck.org)  
[www.gctrionic.com/e-puck.php](http://www.gctrionic.com/e-puck.php)  
<https://gna.org/projects/e-puck/>



## WARNING !

!! Forcing the wheel to spin will damage the motor !!

Important and useful programs to download (also listed in [www.gctrionic.com/e-puck\\_links.php](http://www.gctrionic.com/e-puck_links.php)) :

## PROGRAMMING 编程：需要集成开发环境，C编译器 and 下载器

To program in C the robot you can use the integrated development environment (IDE) of the microcontroller of e-puck.

Basically you need 3 parts: the IDE for editing, the C compiler, and the downloader.

- MPLAB IDE: [www.microchip.com](http://www.microchip.com) -> Design -> Development Tools -> MPLAB IDE
- The **C compiler** related to MPLAB is the MPLAB C30 (free student edition to download): [www.microchip.com](http://www.microchip.com) -> Design -> Development Tools -> MPLAB C Compiler for DSPic
- The tiny **downloader**: [www.etc.ugal.ro/cchiculita/software/picbootloader.htm](http://www.etc.ugal.ro/cchiculita/software/picbootloader.htm)

## TUTORIALS 教程

引导装载程序

Tutorial to program e-puck using Bootloader via Bluetooth: [www.e-puck.org](http://www.e-puck.org) -> Download -> Documentation

## SIMULATION

The simulator Webots is intended to support fully the e-puck: from simulation, to compiling and download. It includes some graphic programming; it is 3D and simulates physics.

For the first demos, you can download the evaluation version (free) of Webots:

[www.cyberbotics.com/products/webots/download.html](http://www.cyberbotics.com/products/webots/download.html)

Purchasing the EDU version (~320 CHF) you can reprogram the simulated robot and remote control the real robot.

## EXAMPLE CODE

示例代码

A nice set of demos to start with is a collection from SWIS, LIS and MOBOTS labs at EPFL assembled by GCtronic: *demoGCtronic* is the software on the robot at delivery and you can download it at [www.gctrionic.com/e-puck\\_links.php](http://www.gctrionic.com/e-puck_links.php) -> Example.

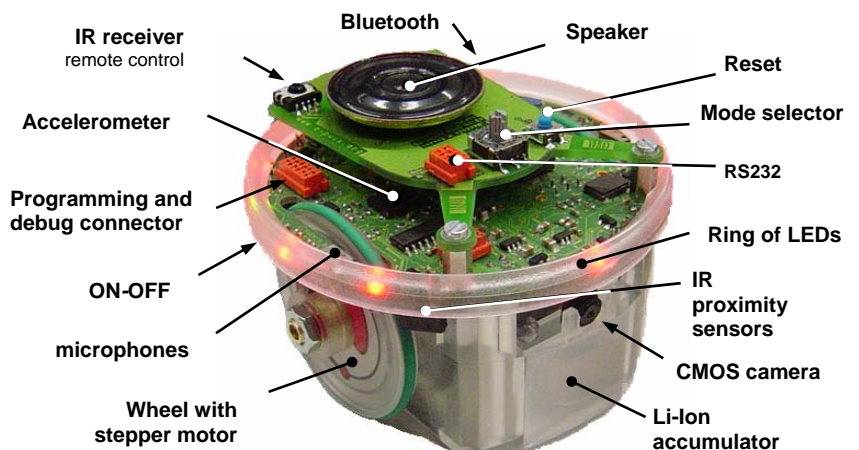
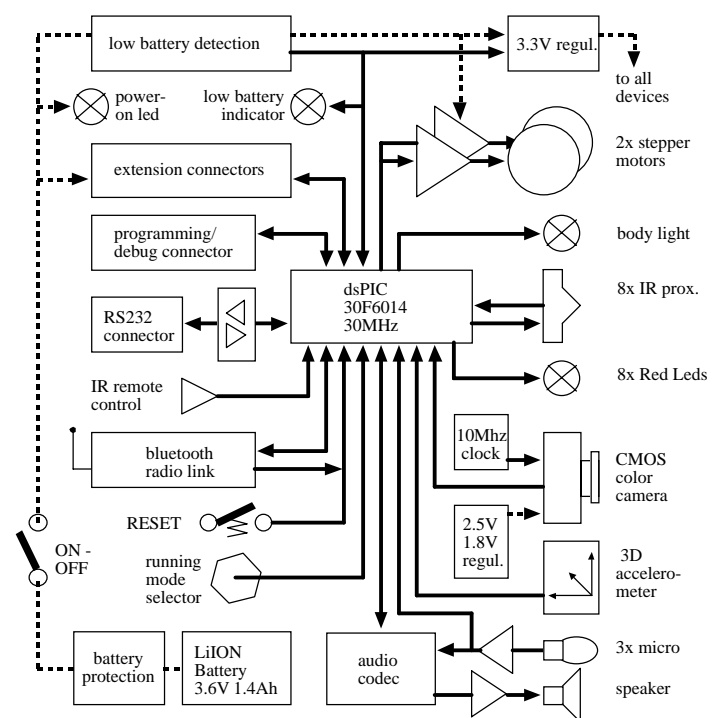
Move the mode selector and push reset to start several demos, activating reactions from acceleration or sound; run obstacle avoidance or wall follow; communicate with a host PC to show all the sensors data including VGA camera.

嵌入式软件

The embedded software running on the e-puck is continuously extended and managed under GNA <https://gna.org/projects/e-puck/> using Subversion (SVN).

## ROBOT VERSIONS

A new production of June 2008 includes a newer camera which is slightly different and need a new driver. The latest software support both old and new camera. There are no other changes influencing the software of the robot.





***e-puck Robot***  
***Open Source Hardware License Version 1.0***

August 2005  
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 Switzerland

***Preamble***

This Open Source Hardware License aims at the dissemination of the specifications necessary to build the e-puck robot, a mobile robot developed by the Ecole Polytechnique Fédérale de Lausanne ( "EPFL"), Switzerland.

***1. Definitions***

"**License**" shall mean this Open Source Hardware License.

"**Specifications**" shall mean the hardware specifications, printed circuit board designs, drawings, CAO files, list of components and other artwork for building an e-puck mobile robot as released by EPFL and published on its web site ([www.e-puck.org](http://www.e-puck.org)), from time to time.

"**Robot**" or "**Robots**" shall mean the e-puck mobile robot(s) built using the Specifications or any modification or derivation thereof.

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When referring to the Robot in any scientific publication, you shall make a clear reference to the e-puck Robot pages on EPFL's Web site : [www.e-puck.org](http://www.e-puck.org).

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END OF LICENSE



## First test after unpacking

The e-puck robot comes with a set of demos preinstalled. It is an adaptation of demos from SWIS, LIS and MOBOTS labs. This is called demoGCTronic and can also be found on the GCTronic web site

[www.gctronic.com/e-puck\\_links.php](http://www.gctronic.com/e-puck_links.php) -> Example

Moving the mode selector and pushing on the blue reset button, it's possible to activate different sub programs:

- 0) Reactions from acceleration and free fall
- 1) Turning toward a clapping hand sound
- 2) Wall following
- 3) Communicate using Bluetooth with a host PC to show all the sensors data including VGA camera.
- 4-15) Others including obstacle avoidance and following

Apart the Bluetooth demo (3), the others do not require any else than the robot itself and make use of most of the sensors and actuators on the robot base.

To communicate via **Bluetooth** the computer and the robot must be "paired". Each e-puck has a name (e-puck\_XXXX) and a pin code (XXXX). XXXX is the number written on the back right side under the speaker extension. On the nearby figure XXXX is 0202.

The steps are:

- power on the robot and run a search of new Bluetooth devices from the PC.
- choose the e-puck\_XXXX device where XXXX is the number of your e-puck.
- enter the pin code to access to your e-puck (same XXXX number)
- a com virtual serial port is created. You could change the COM port number if needed.
- use that COM port number for any program accessing to e-puck via Bluetooth.

Any terminal program can be used and typing 'H' 'enter' the help menu is written on the screen.

The **e-puck monitor** (also on [www.gctronic.com](http://www.gctronic.com)) is an example interface (see snapshot) using the communication protocol to access all the sensors and actuators of the robot.

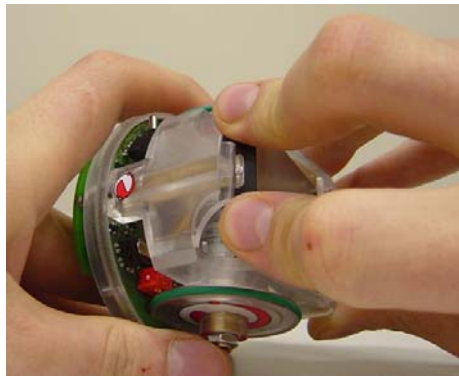
## Charging the battery

To charge the Lilon battery, pull it out from the robot frame and install it on the charger board. During the charge the red LED is on and turns off when the battery is fully charged. A complete charging sequence takes up to 4 hours.

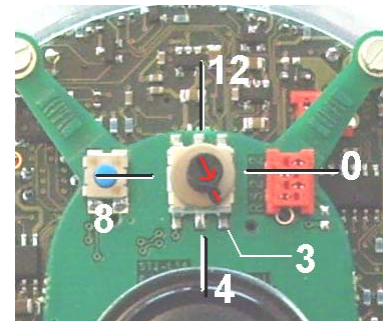
Be careful with the positive terminal of the battery (the one with the black plastic). Avoid scratching it. Instead, fully compress the springs on the opposite side while managing it.



Battery in the charger



Compress the springs managing the battery



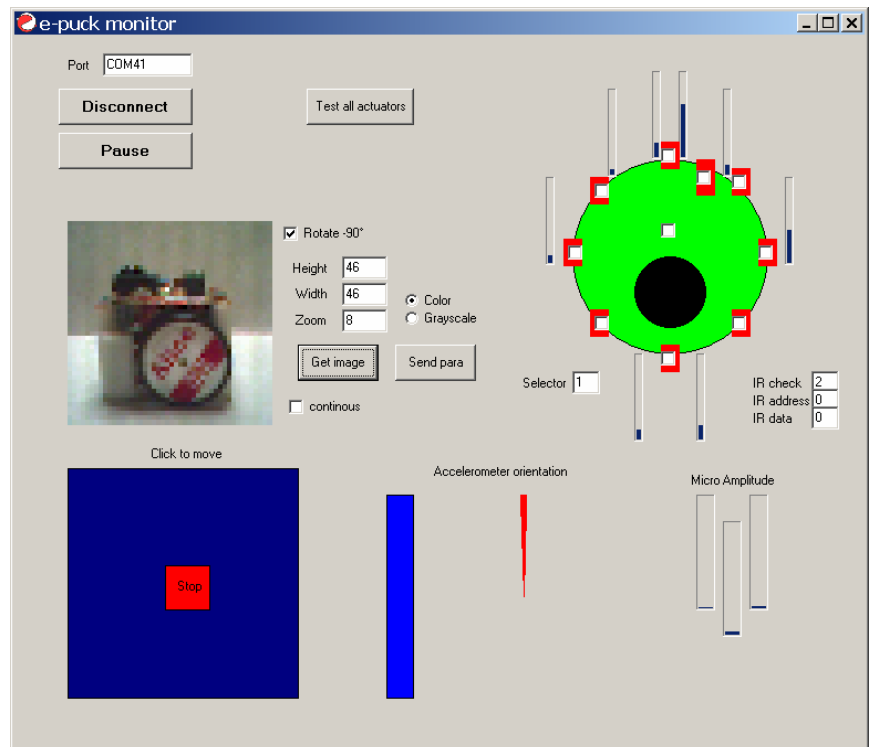
Mode selector with 16 positions

## Contact Information

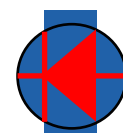
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The serial number is the same as the BT code



Monitor interface on PC showing all sensors and allowing control of actuators



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