



# e-puck Mini Doc (Ver. 0.1)

EPFL educational and research mini mobile robot



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:

- [www.e-puck.org](http://www.e-puck.org)
- [www.gctronic.com/products/e-puck/](http://www.gctronic.com/products/e-puck/)



Important and useful programs to download (also listed in <http://www.gctronic.com/products/e-puck/links>):

## TUTORIALS

Tutorial for programming the e-puck robot using the Bootloader via Bluetooth [www.e-puck.org](http://www.e-puck.org) ->Download -> Documentation

## PROGRAMMING

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) ->Products ->Development Tools -> MPLAB IDE

The C compiler related to MPLAB is the MPLAB C30 (free student edition available to download):

[www.microchip.com](http://www.microchip.com) ->Products ->Development Tools -> MPLAB C30

The tiny downloader:

[www.etc.uqal.ro/cchiculita/software/picbootloader.htm](http://www.etc.uqal.ro/cchiculita/software/picbootloader.htm)

## SIMULATION

The STD version of Webots is intended to support fully the e-puck. From simulation, to compiling and download. In the near it will include future graphic programming as well.

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 STD version you can reprogram the simulated robot and remote control the real robot.

## EXAMPLE CODE

A nice demo to start with: (collection from SWIS, LIS and ASL labs): demoGCtronic.hex, , demoGCtronic.zip

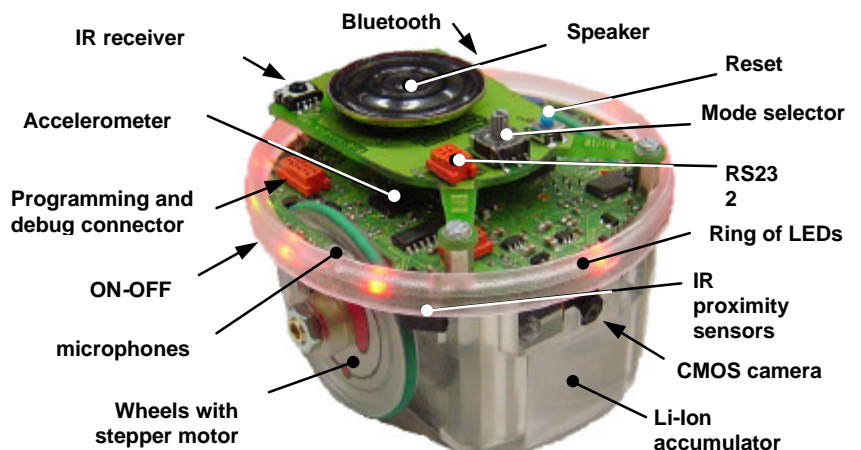
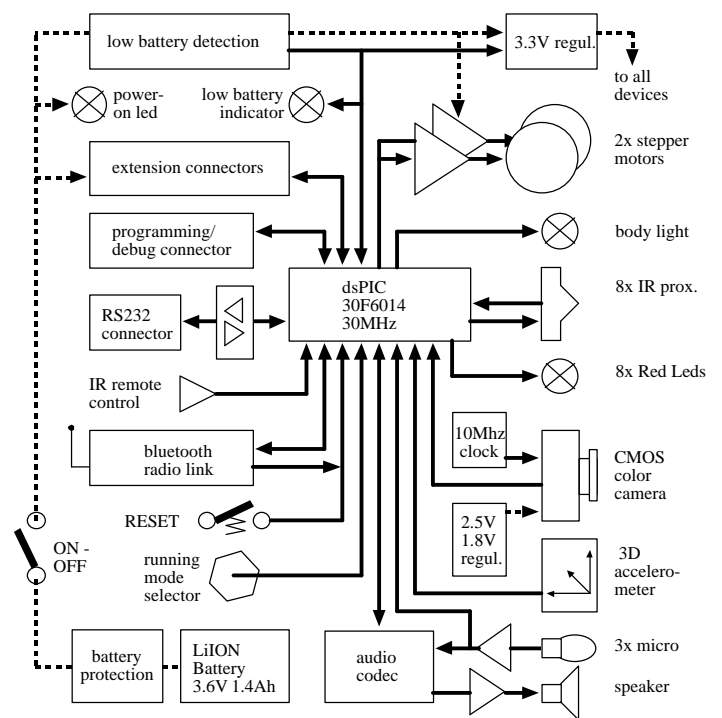
[www.gctronic.com/products/e-puck/links](http://www.gctronic.com/products/e-puck/links) ->

Example

With the mode selector it's possible to activate 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.

There are software examples also on [www.e-puck.org](http://www.e-puck.org):

[www.e-puck.org](http://www.e-puck.org) ->Download -> Software -> Library





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

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***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.

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"**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.

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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 ASL labs. This is called demoGCTronic and can also be found on the GCTronic web site

[www.gctronic.com/products/e-puck/links](http://www.gctronic.com/products/e-puck/links) -> 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) Obstacle avoidance

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 metallic plate under the speaker extension. On the nearby figure XXXX is 0202.

The steps are:

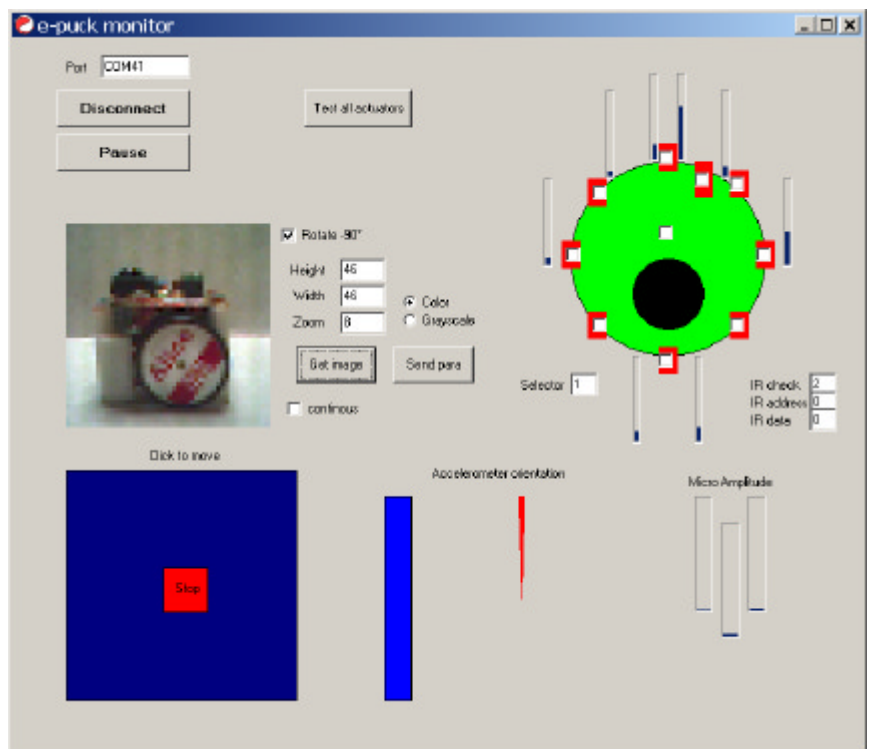
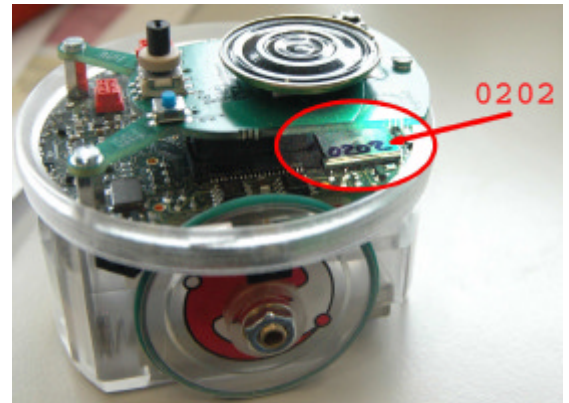
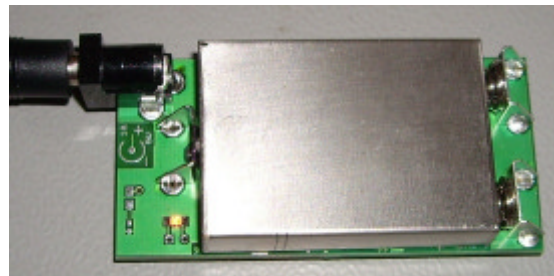
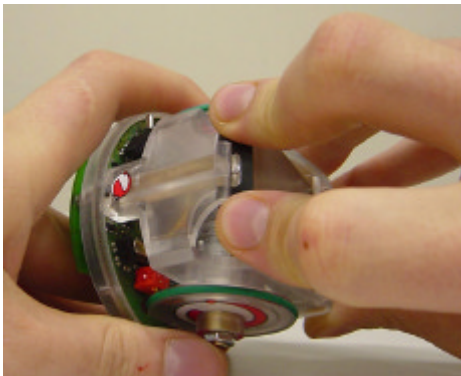
- power on the robot and run a search of new Bluetooth devices from the PC.
- choose the e-puck\_XXXX device where XXXX is the number of your e-puck.
- enter the pin code to access to your e-puck (same XXXX number)
- a com virtual serial port is created. You can change the COM port number.
- use that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

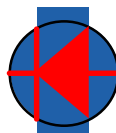
## Charging the battery

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.



## Contact Information

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