Communicating with Arduino

This article needs to be updated: If you found this article useful, please fix the problems below then delete the {{ArticleNeedsUpdate}} template from the article to remove this warning.

Reasons: hamishwillee
(28 Oct 2011)
This article is incomplete. It has links to a book that don't work, and is littered with poor English and placeholders for future work. Can we please get it updated to have links, remove all the placeholders (and spurious multiple exclamation marks)?
The technology does look interesting, if there is a cool real world example of interfacing with Phones.

This article explains how you can interface your phone with Arduino, the popular open-source robotics and automation platform. This is desirable because the phone provides access to many sensors, which Arduino provides motor control and automation.

Why interface with Arduino ?

Arduino (http://www.arduino.cc) is a popular open-source robotics and automation platform - see [Practical Arduino], etc.

[Jurgen] demonstrates interfacing S60 phone with robot via Bluetooth. Also !

We consider that interfacing a phone with Arduino brings a lot of benefit. The phone has a lot of sensors (camera, GPS), radios (3G, BT, WiFi), and Arduino is very good for controlling motors, adding other sensors (temperature, PIR, etc). A possible way of interfacing them is to have them form a one body system in which case using USB communication makes more sense than using Bluetooth.

The USB protocol

USB guest - maybe called slave!

USB host - acts like a PC!; requires 1! Mbps transfer rate

How?

All standard phones support USB guest mode. Only the newer phones, mostly from 2010 onwards, support USB host mode - e.g., Nokia N8, C7, some/all?? Maemo/Meego phones (N900). Therefore we want to have phones acting as USB guests and connect them to Arduino, which needs to act as a USB host.

One can buy an Arduino USB host shield from http://www.circuitsathome.com/. I personally bought it from a local retailer that got a compatible USB host shield from Sparkfun - see http://www.sparkfun.com/products/9947. Note: Another option which we did not try is the VDIP1 or VDIP2 USB host module used in [Practical Arduino], which can be found at http://www.ftdichip.com/Products/Modules/DevelopmentModules.htm .

We have experimented with Arduino Uno, but should work as well with Duemilanove, etc.

The Arduino USB host shield library can be found at https://github.com/felis/USB_Host_Shield. The first application to try is board_test found in examples. With board_test we tested phones, USB memory sticks, USB Bluetooth sticks and a Sony DSC camera - normally all should work.

Other interesting projects are https://github.com/felis/Arduino-Bluetooth (see http://www.circuitsathome.com/mcu/bluetooth-code-for-arduino-usb-host), https://github.com/felis/Arduino_Camera_Control (see http://www.circuitsathome.com/mcu/controlling-canon-powershot-cameras-to-arduino). Info about all the projects can be found at http://www.circuitsathome.com/category/mcu/arduino/usb-shield.

Sending data on a Symbian phone on the USB port can very easily be achieved by using the pys60usb module.

The sketch to be run on Arduino is: ...!!!!

Note: One can find on the Internet pages describing attempts of connecting USB port of phones directly to Digital IOs of Arduino. THIS IS NOT FEASIBLE! The USB protocol is much more complex than simple serial Tx/Rx data communication. You need to transform the Arduino in a USB host which is possible ONLY if attaching a USB host shield to it (the solution described in chapter 3!!!! of [Practical_Arduino] is, as far as we know, also not good since that transforms Arduno in a USB guest/slave and it is not possible to change the program to implement a USB host). We are open to informed comments.

References

[Practical_Arduino] book!; site with source code from the book http://www.practicalarduino.com/ [Jurgen]

(C) Copyright Nokia 2013. All rights reserved.

(C) Copyright Nokia 2013. All rights reserved.