

Abstract

The Programmable System on Chip (PSoC), made by Cypress Semiconductor, is a configurable piece of hardware which contains a CPU and programmable hardware. It is used by numerous companies to build embedded systems. Arduino is a hardware platform for hobbyists, students, and Android

developers. Arduino includes a CPU and can be connected to one or more daughterboards, known as shields. The purpose of this design project is to provide a means to connect the PSoC to Arduino shields, in order to help Cypress penetrate the growing Arduino market with PSoC.

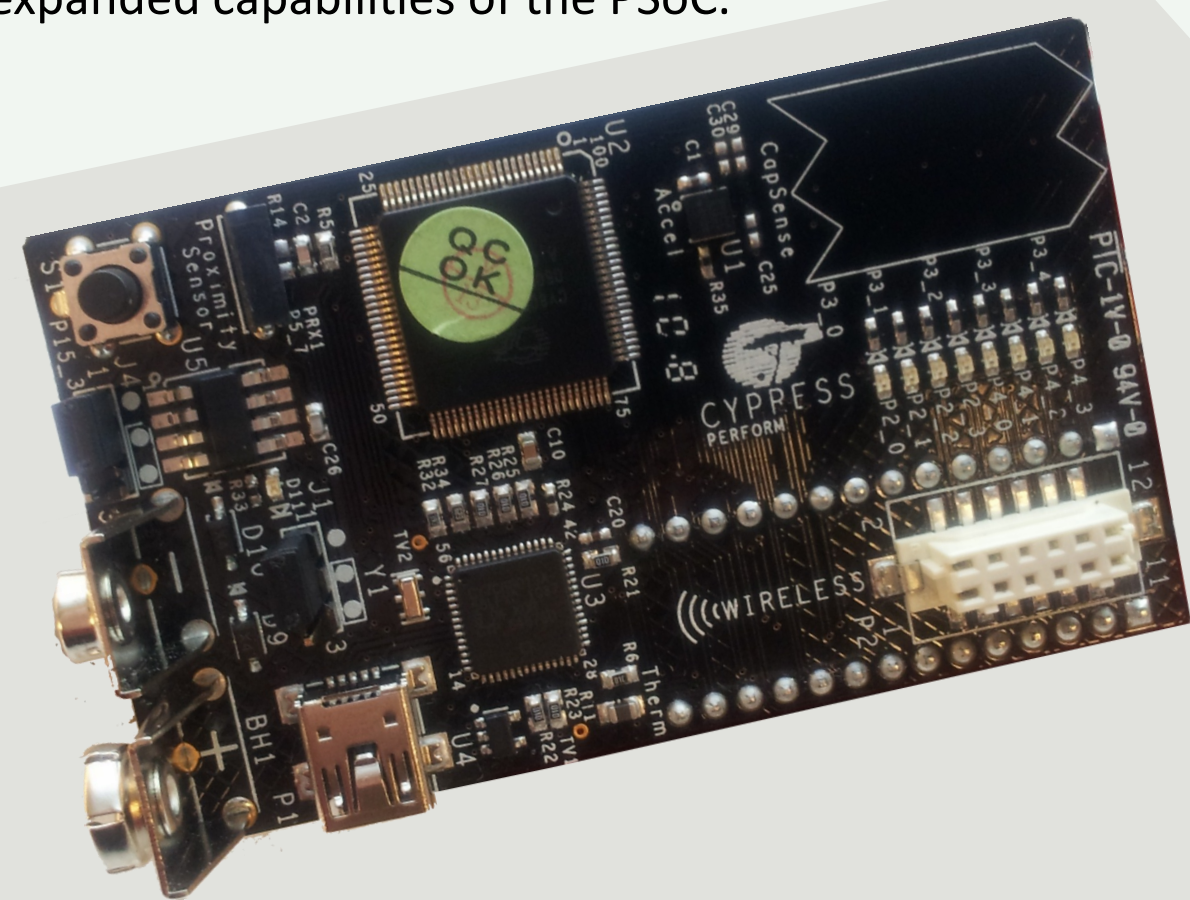
Introduction

Problem

Guarantee compatibility between PSoC and Arduino Shields to capture Arduino market

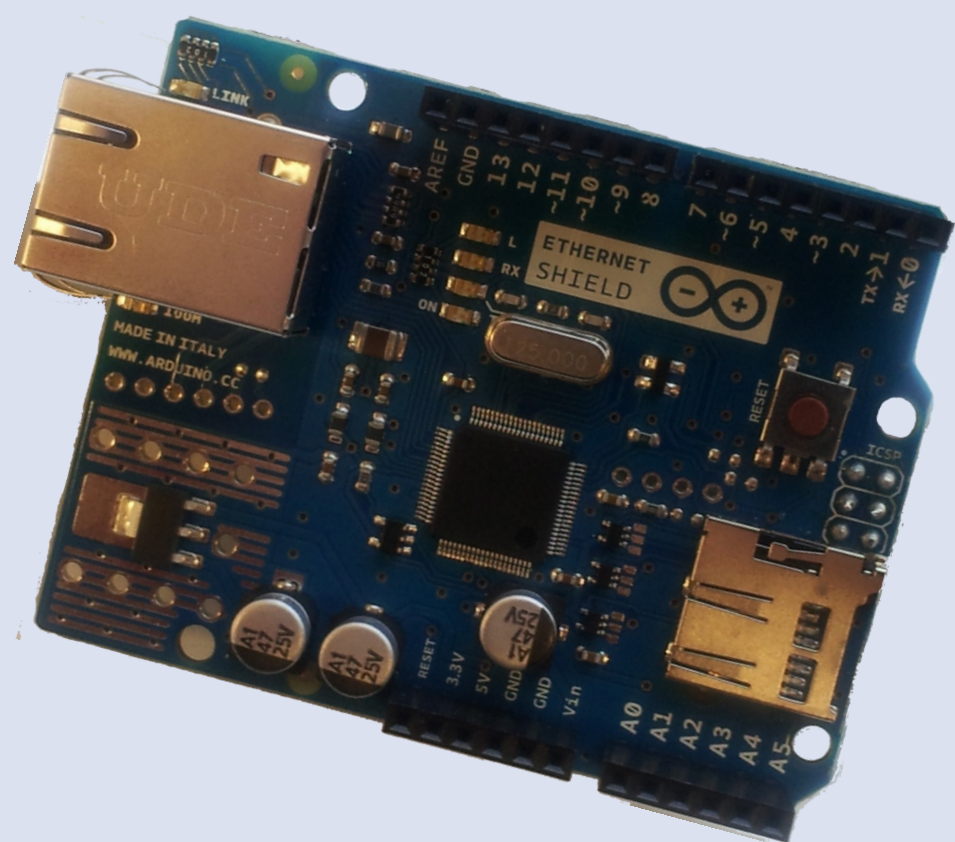
Intended Users and Applications

Current Arduino users (students, hobbyists, and Android developers) . Used for projects similar to Arduino but with the expanded capabilities of the PSoC.



PSoC 5 First Touch

- Programmable System on Chip (PSoC)
- ARM Cortex M3 Processor
- Software configurable virtual components
- General-Purpose I/O Pins
- CapSense touch sensor, Accelerometer, Proximity Sensor, Thermistor



Arduino Ethernet Shield

- Connects to standard Ethernet
- Includes WIZnet W5100 Ethernet controller with full TCP/IP stack (including UDP)
- Communication via serial peripheral interface (SPI)
- Includes a microSD Card reader/writer

Design Requirements

Objectives

- Interface the Cypress PSoC with Arduino Ethernet Shield
- Build a reusable library component for PSoC Creator
- Demonstrate the working PSoC to Ethernet Shield connectivity with an application

Constraints

- Work with the PSoC Creator environment
- Utilize existing hardware with minimal modification



Applications

Home Automation

Control your lights or appliances from a web browser (Demo application built to turn LEDs on, off, or dim)

Remote Monitoring

Get an alert when your oven pre-heats (Demo application sending sensor data to web service called Pachube and to send alerts via email or Twitter)

Other Arduino Shields

Demo application uses the Motor Shield

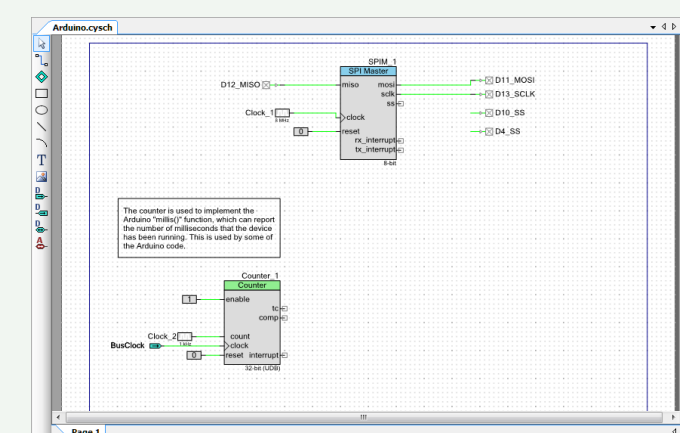
Android Sensor Interface

Control a PSoC with your Android device

Software

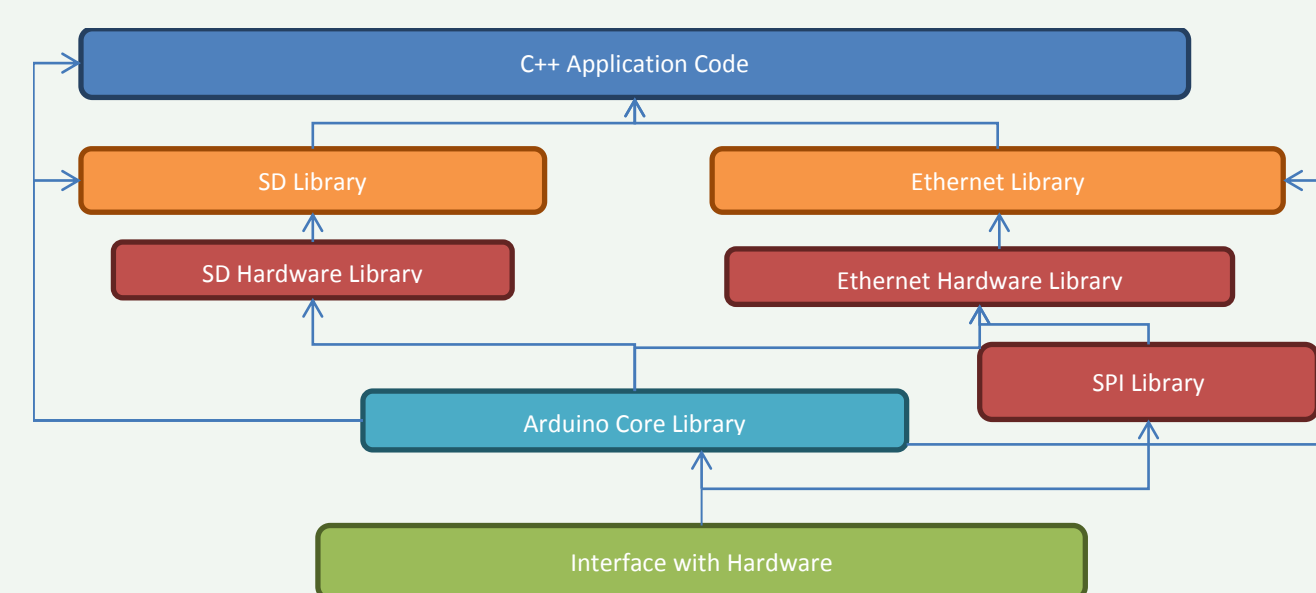
PSoC Creator

- Integrated development environment (IDE)
- Schematic layout tool for virtual components
- C programming compiler tool sets



Arduino Library

- Open source software to write code for Arduino
- Includes libraries for shields, such as the Ethernet shield



High level overview of Arduino library as used in this project

Final Product

The PSoC and Arduino Shields are connected with a custom PCB design. Each device is connected to the PCB using its existing header pins. The PCB is mounted in a custom milled package.

A PSoC Creator library component is available to handle writing software which uses the Ethernet Shield. End users can reuse existing Arduino application code with minimal modification.

Further work could be done to ensure the final design is compatible with all Arduino shields. The current hardware should work but the software may need additional modification.

Budget

Item	Cost
Arduino Ethernet Shield	\$46.72
Sparkfun Arduino ProtoShield Kit	\$20.51
PCB Fabrication	\$133.42
Arduino Motor Shield	\$19.80
Additional Hardware (Headers, etc.)	\$40.84
Packaging (Approx.)	\$12.00
TOTAL:	\$273.29

* All costs include shipping (if applicable)



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