

Smart Open-Source Electronics

Presenter(s):

Mr. Stephen Clemmet CEng MSc BEng

sclemmet@atom.ltd

Brief description:

Open-Source is a modern-day format for disseminating information that people can use and add to. Open-Source Electronics came into existence circa 2005. Since that time there has been numerous electronics advancements and technologists has added devices and software in abundance to the available platforms. One of the most popular platform formats is Arduino and those that share its daughterboard connectivity format. The challenge now is how to efficiently connect multiple daughterboards together when it is evident that the connectivity format invariably has pin I/O conflicts. A situation that has come about as a result of the *free for all* approach to product pin assignments. This poses a significant problem when using Open-Source Electronics platforms for IoT, where there are two, or more daughterboards. The first being a WiFi, Ethernet, or Bluetooth. Further boards being to control devices and collect data. This tutorial proposes a way to solve that challenge.

Outline:

The first consideration to solving the connectivity issue in Open-Source Electronics is an understanding of how the problem has come about and a topography that works for all motherboards and daughterboards. Said topography requires communication protocols for inter-integrated circuit (I²C) and serial peripheral interface (SPI). I²C is a two-wire floating wire digital bus invented by Philips in 1982. SPI is a three-wire digital bus. Both are standard and are on thousands of electronic chips. Understanding the protocol is the first step.

The second consideration electronic hardware for the communication protocol to work. I²C and SPI are board level communications. To take these off board, differential data lines are required and electrostatic discharge protection. With regards to I²C, which is a floating data bus, measures are required to guard against spurious noise that would otherwise corrupt the data. Control measures are also required to aid the developer debugging their project.

The final part of this tutorial will conclude with a practical demonstration of I²C and SPI in an Open-Source platform application (application to be decided).

Presenter's biography:

Chartered electronics engineer with over twenty-five years experience in electronics systems design. MSc and BEng in electronics.

First business as an entrepreneur was Polymertronics, a company developing ultra-violet curable organic LEDs, organic FETs and conductive polymers. Technology resulted in several patent applications.

Present business is Atom Electronics, an electronics company developing smart Open-Source Electronics development platforms, using ARM core technology. There are over 90M users of Open-Source each and every day across the world. Atom's aim is to simplify the connectivity between electronics platforms.