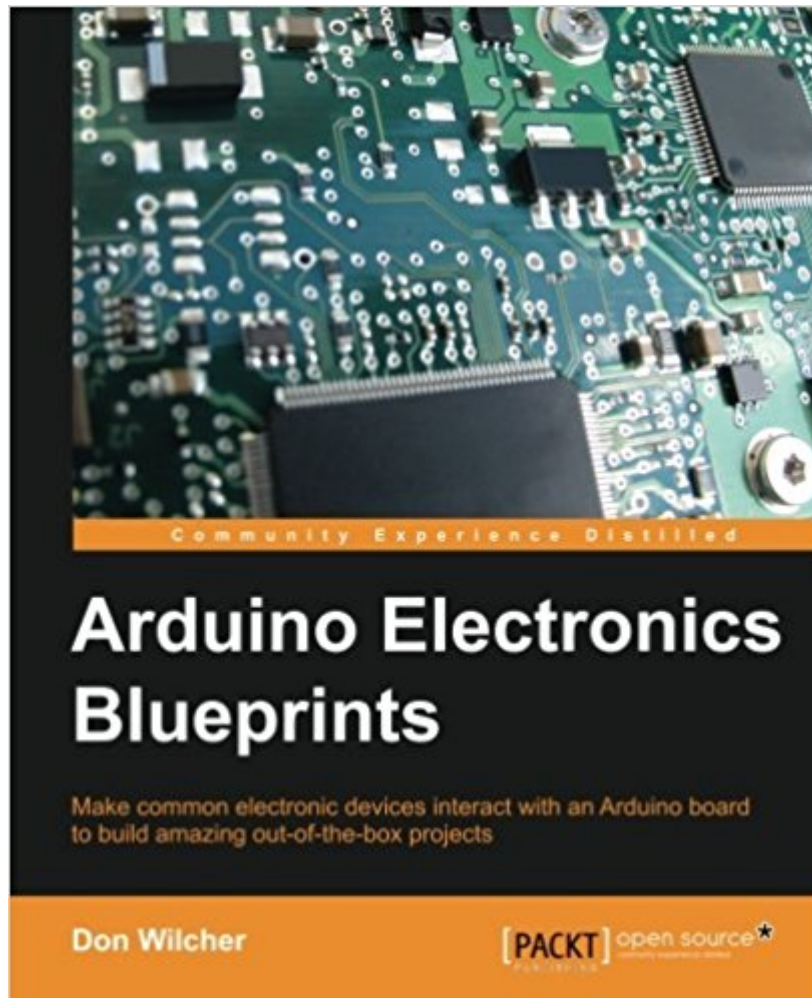




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Arduino Electronics Blueprints



Synopsis

Make common electronic devices interact with an Arduino board to build amazing out-of-the-box projects
About This Book
Build interactive electronic devices using the Arduino
Learn about web page, touch sensor, Bluetooth, and infrared controls
A project-based guide to create smartly interactive electronic devices with the Arduino
Who This Book Is For
This book is intended for those who want to learn about electronics and coding by building amazing devices and gadgets with Arduino. If you are an experienced developer who understands the basics of electronics, then you can quickly learn how to build smart devices using Arduino. The only experience needed is a desire to learn about electronics, circuit breadboarding, and coding.
What You Will Learn
Add SD and wave-file libraries to your Arduino code
Get to grips with SD card SPI communications
Interface an IR detection circuit to Arduino
Wire an OLED LCD to Arduino
Install the Nordic nRF8001 Bluetooth Low Energy code to Arduino
Build an HMI (Human Machine Interface) from a web page using JavaScript
Connect Arduino to a virtual server (Breakout.js)
Wire a small DC motor driver to Arduino with a transistor and diode circuit
In Detail
Arduino is an open source electronics prototyping platform for building a multitude of smart devices and gadgets. Developers can benefit from using Arduino in their projects because of the ease of coding, allowing you to build cool and amazing devices supported by numerous hardware resources such as shields in no time at all. Whether you're a seasoned developer or brand new to Arduino, this book will provide you with the knowledge and skill to build amazing smart electronic devices and gadgets. First, you will learn how to build a sound effects generator using recorded audio-wave files you've made or obtained from the Internet. Next, you will build DC motor controllers operated by a web page, a slide switch, or a touch sensor. Finally, the book will explain how to build an electronic operating status display for an FM radio circuit using Arduino.

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Customer Reviews

Don Wilcher Don Wilcher is a passionate educator of electronics and robotics technology and an electrical engineer with 26 years of experience. He has authored several books on Lego Robotics and Arduinos. His latest book published by Maker Media, titled *Make: Basic Arduino Projects*, has been approved by the Alabama State Department of Education to be on their reading list. He's also a Certified Electronics Technician (CETa) and Exam Administrator (CA) with ETA International as well as State Certified Teacher for Career Technical Education (CTE) as a Level 2 Specialist in electronics technology. He has worked on industrial robotic systems, automotive electronic modules/systems, and embedded wireless controls for small consumer appliances. While at the Chrysler Corporation, Don developed a weekend enrichment pre-engineering program for inner city kids. He's a contributing writer and webinar lecturer for Design News Magazine. He is also an electronics and robotics technologist who has developed 21st century educational products and training materials for Makers, hardware start-up entrepreneurs, and educators.

There are stacks of books on the Arduino these days and as time goes by they become more and more advanced with host of sophisticated projects. Gone are the days of "lets flash an LED" style project books, these days the availability of quality interface boards and better quality code with them has driven the hobby and commercial embedded controller market to new highs and this has led to a new interest in real world device control. This book aims to provide a small subset of real world interfacing solutions. Its suitable for use as a reference on a small range of devices which puts it in the more advanced interfacing books category and an ideal book for those looking to build projects that connect to the real world. "Arduino Electronics Blueprints" provides 10 chapters of simple projects that build on earlier chapters, although not highly sophisticated projects, there is room to utilize the concepts in real-world applications. Each project incorporates electronic modules that are themselves usable in a range of other projects. The book's authors have made reuse of "off the shelf components" a high priority and anything that needs to be crafted by hand is laid out in a simple fashion so that basic skills are needed to assemble most projects. When I started reading

each chapter I was impressed at the extent of theory provided on the various components that the project would incorporate but there should have been more emphasis on controlling power devices rather than small DC motors. As an example, the Simple Chat server integrates the LCD module (simple in itself) but then incorporates the ability to use the Nordic nRF8001 Bluetooth IC with details of its internal workings, interfacing and coding, the project then extends with an off the shelf module. Finally it ends with an interface to an Android Smart phone. Ideally, this should have also included connecting some solid state relays to control AC power but it can be adapted if needed. In each chapter the Theory of Operation is outlined very well. There does seem to be a leaning for DC servo motor projects but there is also InfrRed, Bluetooth, driving a range of other devices like SD cards, LCD modules, MOSFET driving, 7-segment displays, USB interfacing and interfacing to a web server. Along the way interfaces like SPI are detailed, basic electronic interfacing is explained and incorporated in many projects. A quick analysis of the chapters:

Chapter 1: A Sound Effects Machine uses the SD card to store WAV (sound) files and an LED bar graph driven randomly to the audio output. The chapter introduced SPI concepts and adds know how into adding third part libraries (the TMRpcm library from GITHUB).

Chapter 2: Programmable DC Motor Controller with an LCD - introduces transistor motor drive circuits as well as driving MOSFETs. It also covers driving an LCD, using it as the main User Interface.

Chapter 3: A Talking Logic Probe - This is a strange project but the chip that is used for speech synthesis (the EMIC 2 Text to Speech module) can be used in a host of other applications.

Chapter 4: Human Machine Interface yet another motor drive project but with a twist, the control code is via a web page hwich you build and deploy then use the USB interface to talk to the Arduino that provided the motor control.

Chapter 5: IR Remote Control Tester - The chapter title sums this project up but along the way the IR signals and communication protocols are detailed and with it driving the commonly used Arduiono LCD module.

Chapter 6: A Simple Chat Device with LCD - Two chat devices are built, the first using serial the second using the Nordic nRF8001 Bluetooth device and incorporating an Android Smartphone.

Chapter 7: Bluetooth Low Energy Controller is another example with a motor drive circuit (using a TPS2812C controller IC) but controlled using the BlueTooth communications from the previous chapter. In addition a 7-Segment display is incorporated. Control is performed via the Smartphone.

Chapter 8: Capacitive Touch Sensing - Using a capacitive touch plate you build, a circuit drives a 555 timer which is interfaced to an Arduino that then drives a servo motor.

Chapter 9: Arduino-SNAP Circuit AM Radio - I'm not sure how much use an AM radio is these days but the project incorporates a number of different components from the other projects. In over all terms this project does not add much in the way of new interfacing techniques.

Chapter 10: Arduino Scrolling Marquee - OLED displays are

becoming popular and this project uses one for output. It incorporates a good theory of operation of a typical OLED device. What's missing? There is a lot missing from this book, no discussion on ethernet or WiFi, no Arduino web server integration and facing with devices like relays and other sensors. While there are some electronics outlined in the book, there is little in the way of real power control for controlling average household devices. Perhaps that's content for another book. If your into building projects then this book will give you some new ideas.

It's a great book. I've learned a lot of new stuff, while reading it. And it gave me inspiration for some new projects using a web HMI. There are good and numerous graphics as well as interesting background information that usually aren't covered in similar books. I clearly noticed the educational and the industrial background of the author. It's suitable for beginners but the presentation of the content gets you quickly in advanced topics, if you are interested.

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