The Arduino has the ability to generate a multitude of sounds and tones, and a combination of them can produce snippets of musical melodies. Creating sounds or tones is relatively easy using the `tone()` instruction along with its code library. This chapter will show how you can use the tone instruction and its library to generate sounds and melodies. This chapter will use the physical-computing techniques discussed in previous chapters in the creation of a human-interactive electronic music box. Figure 6-1 shows the parts required for the hands-on projects and experiments.

### Parts List

- Arduino Duemilanove or equivalent
- 10K potentiometer
- 470K resistor
- 4 10K resistors
- FlexiForce sensor
- CdS photocell
- 4-bit DIP switch
- 2 N3904 NPN transistor
- IFR630A N-channel MOSFET
- Keypad
- 8Ω speaker
- Piezo-buzzer
- Small solderless breadboard
- 22AWG solid wire
- Digital multimeter
- Oscilloscope (optional)
- Electronic tools
Remixing Physical-Computing and Driver Interface Circuits

Continuing with the technique of remixing, we'll use the following components for creating human interaction with the electronic music box: a FlexiForce sensor, a 4-bit DIP switch, a CdS photocell, a speaker, and a keypad. The BJT (bipolar junction transistor) and PMOSFET (power metal oxide semiconductor field effect transistor) electronic components will be used to drive a piezo-buzzer, and a speaker will be used to enhance the audible output of the Arduino by providing sufficient sourcing current to the audio output components. The Arduino will provide the audible sound based on the tone instruction and its associated software library components. Figures 6-2, 6-3, 6-4, and 6-5 show variations of system block diagrams for four physical-computing music box controllers. Also, the sketch used in the interactive electronic devices will allow audible tone control operation for the piezo-buzzer and speaker audio output components.

Note The original music boxes of the 19th and 20th centuries were musical instruments that produced sound by a set of pins placed on a revolving cylinder that plucked the tuned teeth of a steel comb. Today's music boxes produces sound with the help a microcontroller and embedded software. All hail to the mighty electron!