The easiest way to extend the reach of your NXT inventions is to use the motors that came with it to operate the electronic controls of appliances and other equipment. The motor simply needs to be mechanically arranged to push the buttons, turn the knobs, or flip the switches on the external device to control it. The NXT motor makes it easy because it has a lot of torque and has built-in position feedback.

Another easy way to extend the NXT is to use other LEGO motors. LEGO makes several other motors that are designed for use with less sophisticated sets. The shape and size of these motors may allow you to build creations that would be impossible with the NXT motors. Adapter cables are available that enable you to connect them directly to the NXT, but we’ll show you how to make your own.

The Clapper

Buttons are common controls, and you can arrange the NXT motor to push them instead of you doing it. The exact mechanical design will vary from device to device, but you can operate anything from expensive laboratory equipment to disposable cameras this way. When you push buttons on a remote control, the NXT can practically control the world—at least anything plugged into the wall.

For example, Radio Shack sells a little handheld remote control that transmits to a base station with an electrical outlet in it. All kinds of lights and appliances can be plugged into it. In fact, this is the safest way to control this kind of power, and we highly recommend it. Figure 11-1 shows the handheld remote control and the mechanism used to push the on and off ends of the channel one button. The gears are being used only for their peg holes, not their teeth. The top gear acts as a driver, and the lower one acts as a guide. When the motor turns forward, the linkage pushes the on-end of the button; when the motor reverses, it pushes the off-end.
Figure 11-2 is an NXT-G program to reproduce a simple remote-control product called the Clapper. The Clapper turns something on or off when it hears a loud sound. The program waits till the Sound Sensor picks up a noise louder than 25; then it pulses the motor forward with the Motor block. This pushes the on-end of the remote control button. It then waits for a second loud sound. This time it pulses the motor in reverse, which pushes the off-end of the button. The program loops back and waits for another sound.