Living Architecture: Responsive Kinetic Systems Lab
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PROTOTYPE 2: Input + Processing + Output

PROJECT DURATION 1 week

DUE Pinup at 9:30 AM on 6 February 2008

FORMAT Your functioning prototype and clear documentation of your project should be presented on two 17" x 17" panels. It is essential to document each step of your work with digital photos, videos, drawings and diagrams.

ASSIGNMENT In this week-long project, you will integrate the Input component with the existing Processing and Output components of Prototype 1. You will also begin to move from a process that involves a single source of project instructions to a process that involves your own problem-solving and research through multiple self-guided sources of reference. In the following weeks, you will continue building prototypes and experiment with swapping one or more of the components and begin advanced research on a topic of your choosing.

MATERIALS
Same as Prototype 2
Photoresistor*
Resistor (220 Ω)**
Capacitor (0.01 μF)**

BUILDING THE PROTOTYPE

Continue working with your team for Prototype 1.

To create this functioning prototype, you will start with the following references and also look for your own references.

The goal is to integrate the photoresistor into your functioning prototype so that you have a system that senses light, runs a simple script on a microcontroller, and triggers movement of a wire as corresponding output.

You will have to revise the electrical circuit on your microcontroller, as well as the code on your microcontroller.

* Provided by instructor
** Carried by Radio Shack (call in advance to confirm availability)

SENSOR

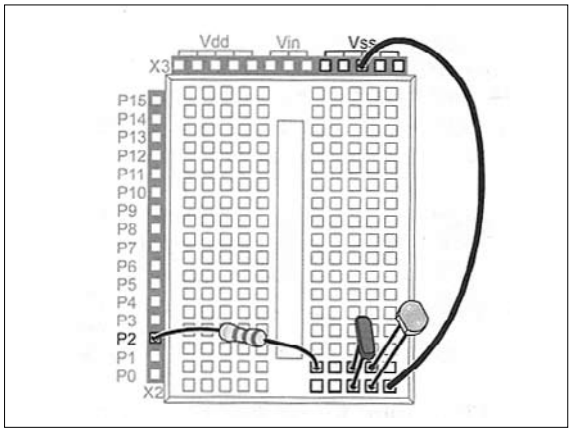
01: Revise microcontroller code

In the Basic Stamp Editor, create a new file with the following code and save it as “Prototype 1”. Attach the microcontroller to your computer via the USB cable. Run the code to transfer it to the microcontroller.

```
‘ {$STAMP BS2}
‘ {$PBASIC 2.5}

TIME VAR Word
DEBUG “Prototype 1”, CR

DO

HIGH 14
PAUSE 100
RCTIME 14, 2, TIME
DEBUG DEC TIME, CR
IF TIME=1 THEN
HIGH 2
DEBUG “TRIPPED”, CR
PAUSE 4000
ENDIF
PAUSE 1000
LOW 2

LOOP
```

02: Revise the circuit

On the microcontroller breadboard, add additional wiring to connect the sensor to the circuit. Here, you will add the photoresistor, the resistor, and the capacitor. You should not change any of the wiring you already created for the actuator output. You are just adding new wiring for the input.

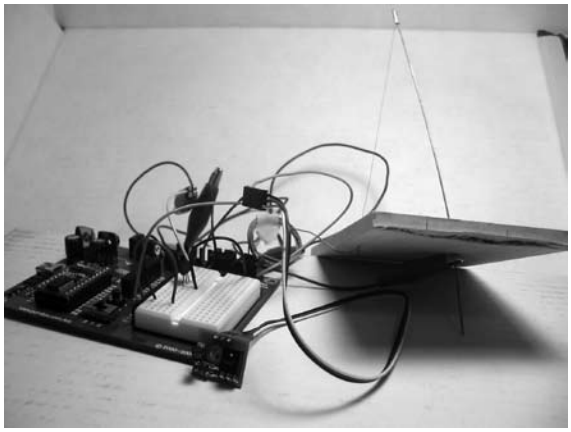


For reference, see “What Is a Microcontroller?” (http://www.parallax.com/dl/docs/books/edu/wamv2_2.pdf), pp. 185-89.

See the circuit diagram at right, but note that we are using shifting each of the components of the the photoresistor circuit up 12 rows, from P2 to P14.

FINAL ASSEMBLY

03: Connect the full system



At this point, with the new code running on the microcontroller and the sensor integrated into the system, you should re-connect the signal and ground wires to the Flexinol actuator.

Your new system should respond to input from the sensor and correspondingly trigger the actuator. The photoresistor may need to be provided with light from a lamp to be in its non-triggered state. Then, the photoresistor can be triggered by covering it with a finger.

This system now has Input, Processing, and Output.

(Photo at right shows system the completed system with an infrared sensor rather than a photoresistor.)

04: Troubleshoot