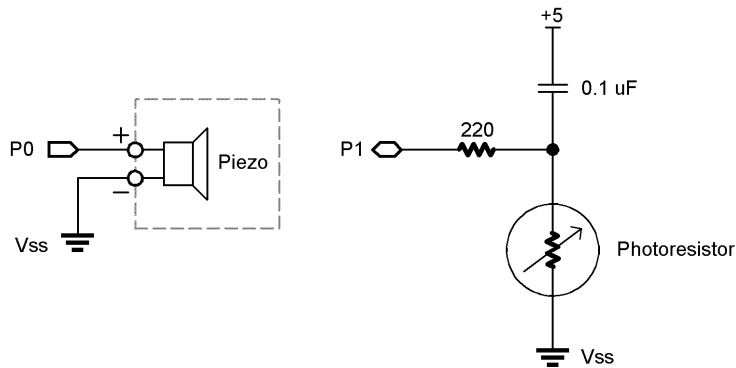




Experiment #19 A Light-Controlled Theremin

This experiment demonstrates **FREQOUT** by creating a light-controlled Theremin (the first electronic musical instrument ever produced).

Building The Circuit



Note: Later versions of the StampWorks lab board come with a built-in audio amplifier. Attach an 8-ohm speaker to the output of the amplifier to get the best sound from this project.

```
'-----  
'  
' File..... Ex19 - Theremin.BS2  
' Purpose... Simple Digital Theremin  
' Author... Parallax  
' E-mail... stamptech@parallaxinc.com  
' Started...  
' Updated... 01 MAY 2002  
'  
' {$STAMP BS2}  
'-----  
'  
'-----  
' Program Description  
'-----
```

Experiment #19: A Light-Controlled Theremin

```
' This program uses RCTIME with a photocell to create a light-controlled
' theremin.

' -----
' I/O Definitions
' -----

Speaker          CON      0          ' piezo speaker output
PitchCtrl        CON      1          ' pitch control (RCTIME) input

' -----
' Constants
' -----

Scale            CON      $0100      ' divider for BS2/BS2e
'Scale           CON      $0066      ' divider for BS2sx
'Scale           CON      $0073      ' divider for BS2p

Threshold        CON      200        ' cutoff frequency to play

' -----
' Variables
' -----

tone             VAR      Word        ' frequency output

' -----
' Program Code
' -----

Main:
HIGH PitchCtrl   ' discharge cap
PAUSE 1          ' for 1 ms
RCTIME PitchCtrl, 1, tone ' read the light sensor
tone = tone */ Scale ' scale input

IF (tone < Threshold) THEN Main ' skip for ambient light
FREQOUT Speaker, 25, tone ' output the tone
GOTO Main

END
```

Experiment #19: A Light-Controlled Theremin

Behind The Scenes

A Theremin is an interesting musical device used to create those weird, haunting sounds often heard in old horror movies. This version uses the light falling onto a photocell to create the output tone.

Since the photocell is a resistive device, `RCTIME` can be used to read its value. `FREQOUT` is used to play the note. The constant, `Threshold`, is used to control the cutoff point of the Theremin. When the photocell reading falls below this value, no sound is played. This value should be adjusted to the point where the Theremin stops playing when the photocell is not covered in ambient light.

Challenge

Add a second RC circuit using a 10K pot instead of a photocell. Use this circuit to adjust the threshold value to varying light conditions.