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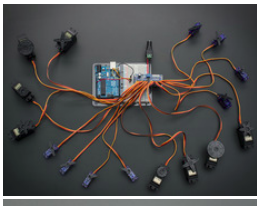
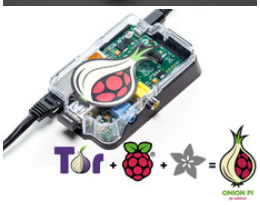
-  Adafruit 16-Channel 12-bit PWM/Servo Driver - I2C interface$14.95
-  Adafruit Assembled Data Logging shield for Arduino$19.95
- 

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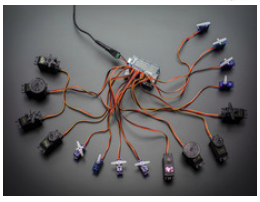
-  Adafruit 16-Channel 12-bit PWM/Servo Shield - I2C interface$17.50

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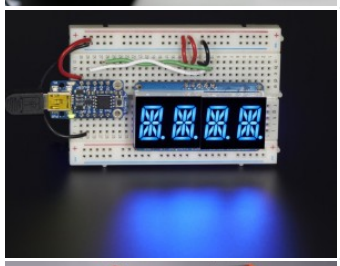
- 
June 6, 2014 at 3:40 pm Tutorial: 0.54″ Alphanumeric Adafruit LED...
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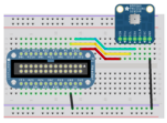
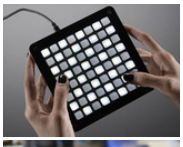
-  USING THE BMP085/180 WITH RASPBERRY PI OR BEAGLEBONE BLACK
-  ADAFRUIT POWERBOOST 500 + CHARGER
-  OONTZ: A TRELLIS MIDI INSTRUMENT
-  FLORA MIDI DRUM GLOVE

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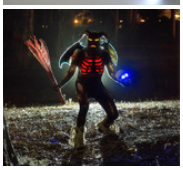
-  LED BICYCLE HANDLEBARS
-  ELECTRONIC DEMON COSTUME
-  ONION PI
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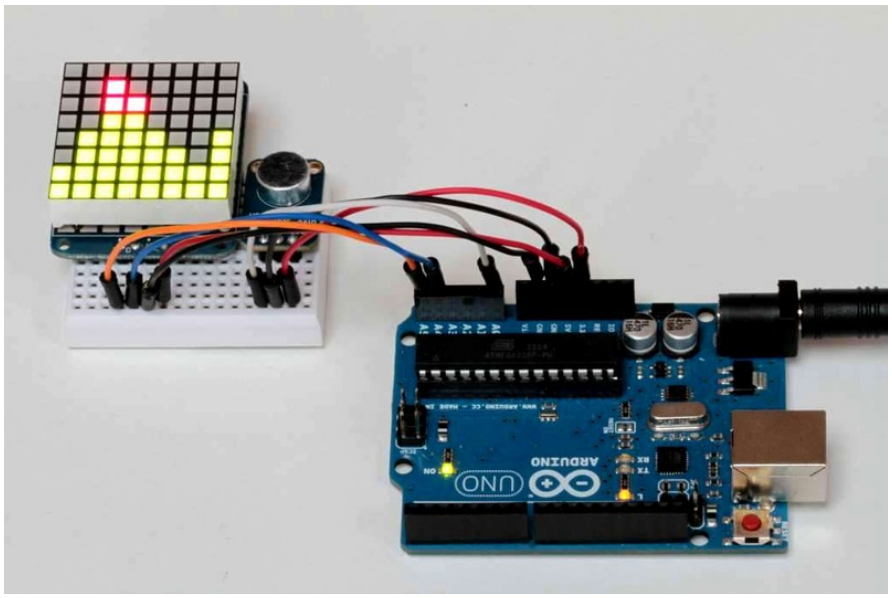
SENSORS



Adafruit Microphone Amplifier Breakout

Measure Sound Levels with the Adafruit Microphone Amplifier

Feedback? Corrections?

Measuring Sound Levels

BILL EARL

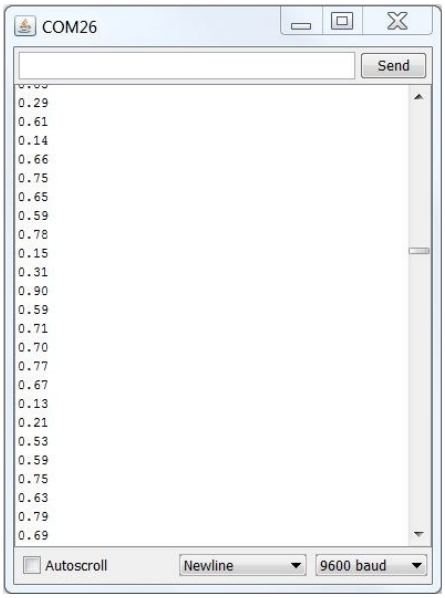
The Audio signal from the output of the amplifier is a varying voltage. To measure the sound level, we need to take multiple measurements to find the minimum and maximum extents or "peak to peak amplitude" of the signal.

In the example below, we choose a sample window of 50 milliseconds. That is sufficient to measure sound levels of frequencies as low as 20 Hz - the lower limit of human hearing.

After finding the minimum and maximum samples, we compute the difference and convert it to volts and the output is printed to the serial monitor.

```
/*****************************************
Example Sound Level Sketch for the
Adafruit Microphone Amplifier
*****************************************/

const int sampleWindow = 50; // Sample window width in mS (50 mS = 20Hz)
unsigned int sample;

void setup()
{
   Serial.begin(9600);
}


void loop()
{
   unsigned long startMillis= millis();  // Start of sample window
   unsigned int peakToPeak = 0;   // peak-to-peak level

   unsigned int signalMax = 0;
   unsigned int signalMin = 1024;

   // collect data for 50 mS
   while (millis() - startMillis < sampleWindow)
   {
      sample = analogRead(0);
      if (sample < 1024)  // toss out spurious readings
      {
```

```
29.          if (sample > signalMax)
30.          {
31.             signalMax = sample;  // save just the max levels
32.          }
33.          else if (sample < signalMin)
34.          {
35.             signalMin = sample;  // save just the min levels
36.          }
37.       }
38.    }
39.    peakToPeak = signalMax - signalMin;  // max - min = peak-peak amplitude
40.    double volts = (peakToPeak * 3.3) / 1024;  // convert to volts
41.
42.    Serial.println(volts);
43. }
```

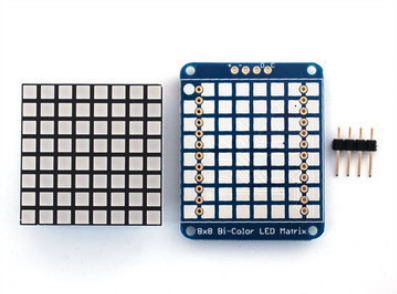


OK, so that's not very exciting. What else can you do with it?

Scrolling Sound Level Meter

So now we will take the peak-to-peak measurement and use it to drive a Bicolor LED Matrix to display the sound level. To make it more interesting, we will scroll the display so that the last 8 measurements are graphed in real-time.

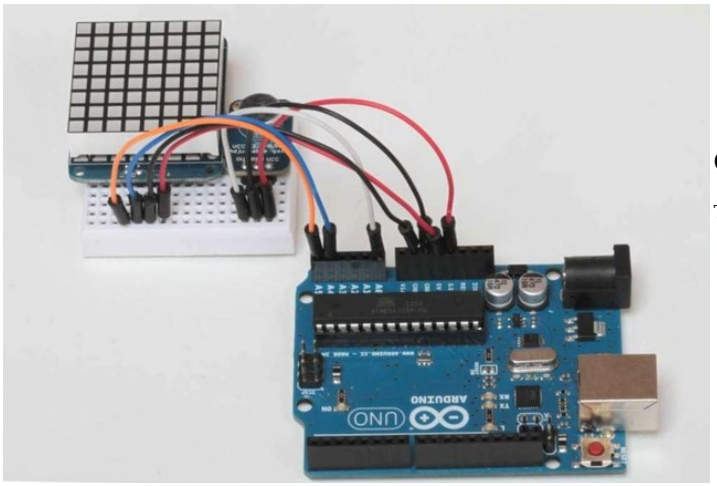
To do this you will need to download the Adafruit GFX Library and LED Backpack Library. The Wire Library is included in the Arduino IDE installation.



-

Assemble the Matrix

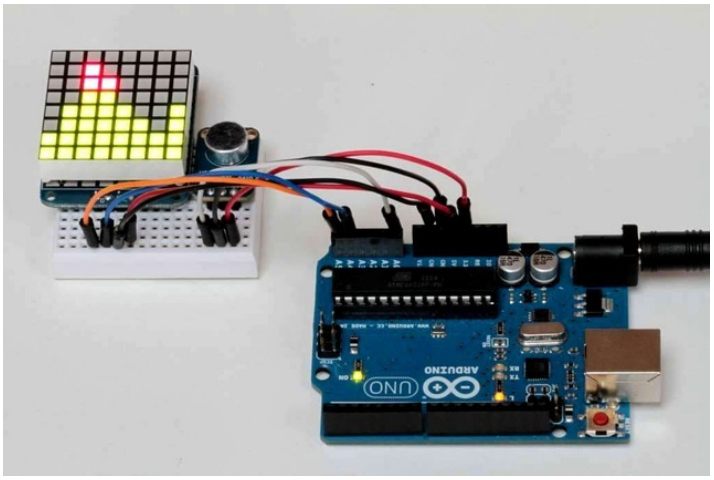
Follow the tutorial here:

- 

Connect the Matrix

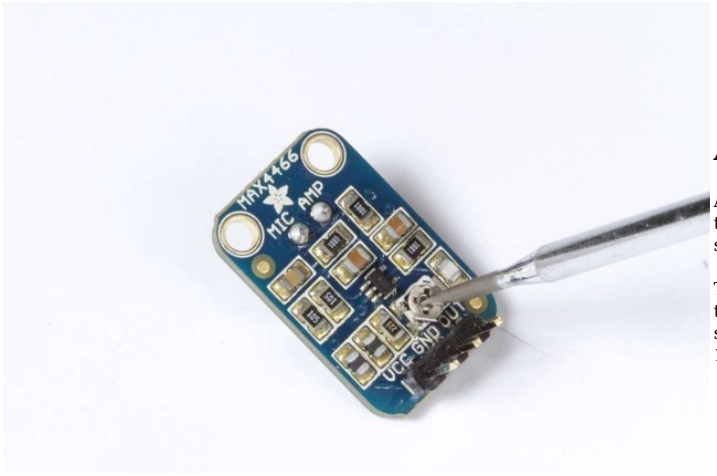
The Matrix backpack has 4 pins, connected as follows:

1. '+' -> 5v
2. '-' -> GND
3. D -> SDA (Analog Pin 4)
4. C -> SCL (Analog Pin 5)

- 

Upload the Code

Paste the code below into the Arduino IDE and upload it. Speak in a normal voice about 6-8 inches from the microphone and the sound level meter matrix display should start scrolling.

- 

Adjust the Gain

Although the amplifier is capable of a rail-to-rail signal (3.3v in this case), the code maps a 1v peak-to-peak signal to the full scale of the display.

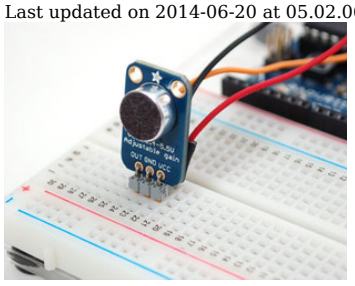
This can be changed in the code. Or you can adjust the gain trimmer-pot of the amplifier with a small straight-bladed screwdriver. The amplifier gain is adjustable from 25x to 125x.

Make all gain adjustments gently. If you feel resistance, stop. The tiny trim pot is delicate and it is easy to damage by turning past the stop.

```
/****************************************
Scrolling Sound Meter Sketch for the
Adafruit Microphone Amplifier
****************************************/

#include <Wire.h>
#include "Adafruit_LEDBackpack.h"
#include "Adafruit_GFX.h"

// Include the Matrix code for display
```

```
Adafruit_BicolorMatrix matrix = Adafruit_BicolorMatrix();

const int maxScale = 8;
const int redZone = 5;

const int sampleWindow = 50; // Sample window width in mS (50 mS = 20Hz)
unsigned int sample;

void setup()
{
   Serial.begin(9600);

   matrix.begin(0x70);  // pass in the address
}


void loop()
{
   unsigned long startMillis= millis();  // Start of sample window
   unsigned int peakToPeak = 0;   // peak-to-peak level

   unsigned int signalMax = 0;
   unsigned int signalMin = 1024;

   while (millis() - startMillis < sampleWindow)
   {
      sample = analogRead(0);
      if (sample < 1024)  // toss out spurious readings
      {
         if (sample > signalMax)
         {
            signalMax = sample;  // save just the max levels
         }
         else if (sample < signalMin)
         {
            signalMin = sample;  // save just the min levels
         }
      }
   }
   peakToPeak = signalMax - signalMin;

   // map 1v p-p level to the max scale of the display
   int displayPeak = map(peakToPeak, 0, 1023, 0, maxScale);

   // Update the display:
   for (int i = 0; i < 7; i++)  // shift the display left
   {
      matrix.displaybuffer[i] = matrix.displaybuffer[i+1];
   }

   // draw the new sample
   for (int i = 0; i <= maxScale; i++)
   {
      if (i >= displayPeak)  // blank these pixels
      {
         matrix.drawPixel(i, 7, 0);
      }
      else if (i < redZone) // draw in green
      {
         matrix.drawPixel(i, 7, LED_GREEN);
      }
      else // Red Alert!  Red Alert!
      {
         matrix.drawPixel(i, 7, LED_RED);
      }
   }
   matrix.writeDisplay();  // write the changes we just made to the display
}
```

ASSEMBLY AND WIRING MORE COOL PROJECTS!
Last updated on 2014-06-20 at 05.02.06 PM Published on 2013-01-13 at 09.43.18 PM



$6.95
Electret Microphone Amplifier - MAX4466 with Adjustable Gain
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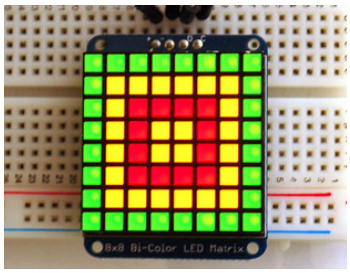

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Adafruit Bicolor LED Square Pixel Matrix with I2C Backpack
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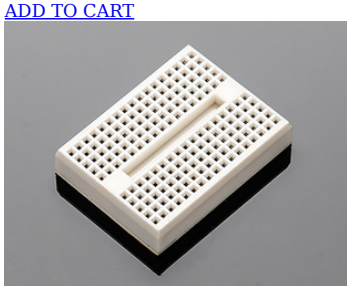

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Tiny breadboard
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Build it for testing, build it for keeping.
Follow along with Collin & learn how to bring a circuit from schematic to reality using a solderless breadboard - then make it permanent by reincarnating your circuit on sturdy perfboard.

C. CUNNINGHAM

- 3D PRINTING

3D Printed LED Microphone Flag

Build a sound reactive LED microphone flag
Want to wow the audience at your next gig? Light up those parties with a 3D Printed, LED sound reactive microphone flag. This project uses a microphone sensor to illuminate a custom 3d printed mic flag. You can design yours, or use our STLs to print and make your own!

NOE RUIZ

- PROJECTS

FEATURED

Electronic Demon Costume

RAAAAAWR!
Spark the demon is a costume featuring an Arduino-based voice changer, an animated LED matrix face and glowing EL wire wings. This short guide answers some common questions and collects links to the relevant tutorials and videos that may be helpful in your own Halloween creations.
PHILLIP BURGESS

- ADAFRUIT PRODUCTS / FLORA

LED Ampli-Tie

Wearable VU meter necktie with Flora
Make your necktie light up like a VU meter! This Flora project uses the Electret Microphone Amplifier to trigger 16 Flora NeoPixels sewn with conductive thread along the length of the tie.
BECKY STERN
×

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"In order to change an existing paradigm you do not struggle to try and change the problematic model. You create a new model and make the old one obsolete" - R. Buckminster Fuller