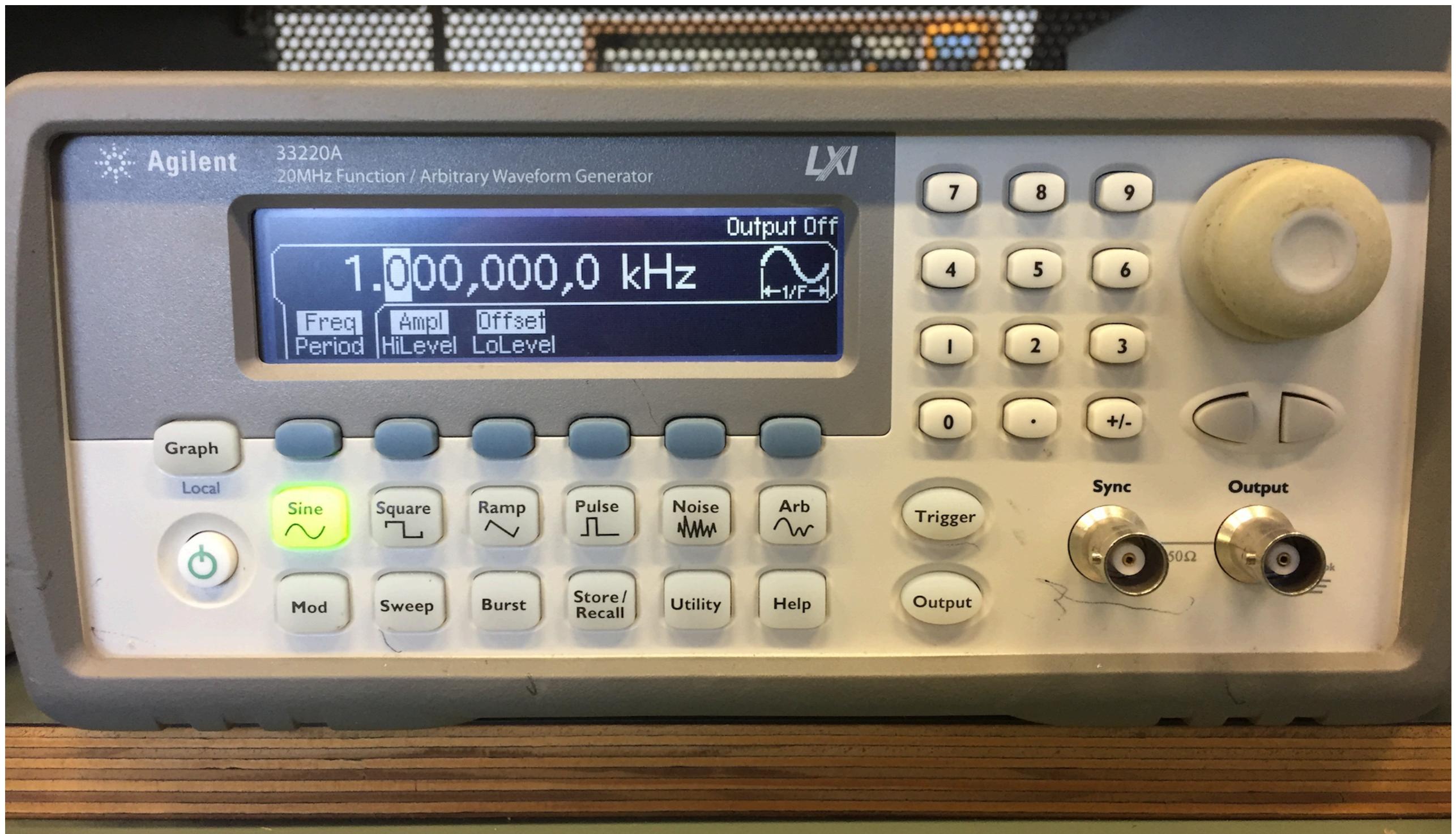
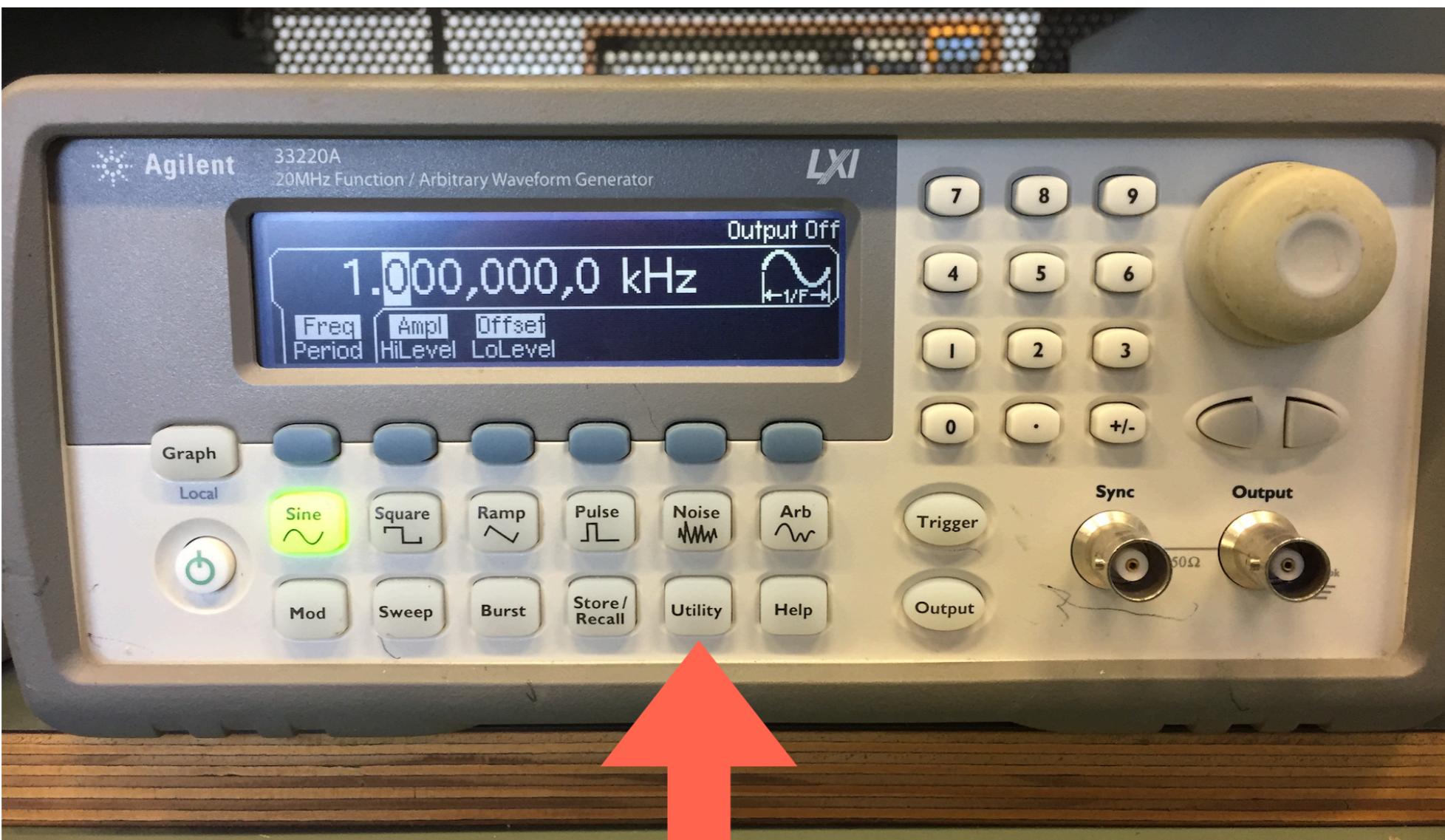


**Set up your function generator to generate a sine wave at 100 Hz,
5.000 Vpp with +2.500 VDC offset.**





Note: you need to put your function generator into High Z mode. This way, the voltage that appears at the output will be the same as what you enter.

Utility -> Output Setup -> High Z

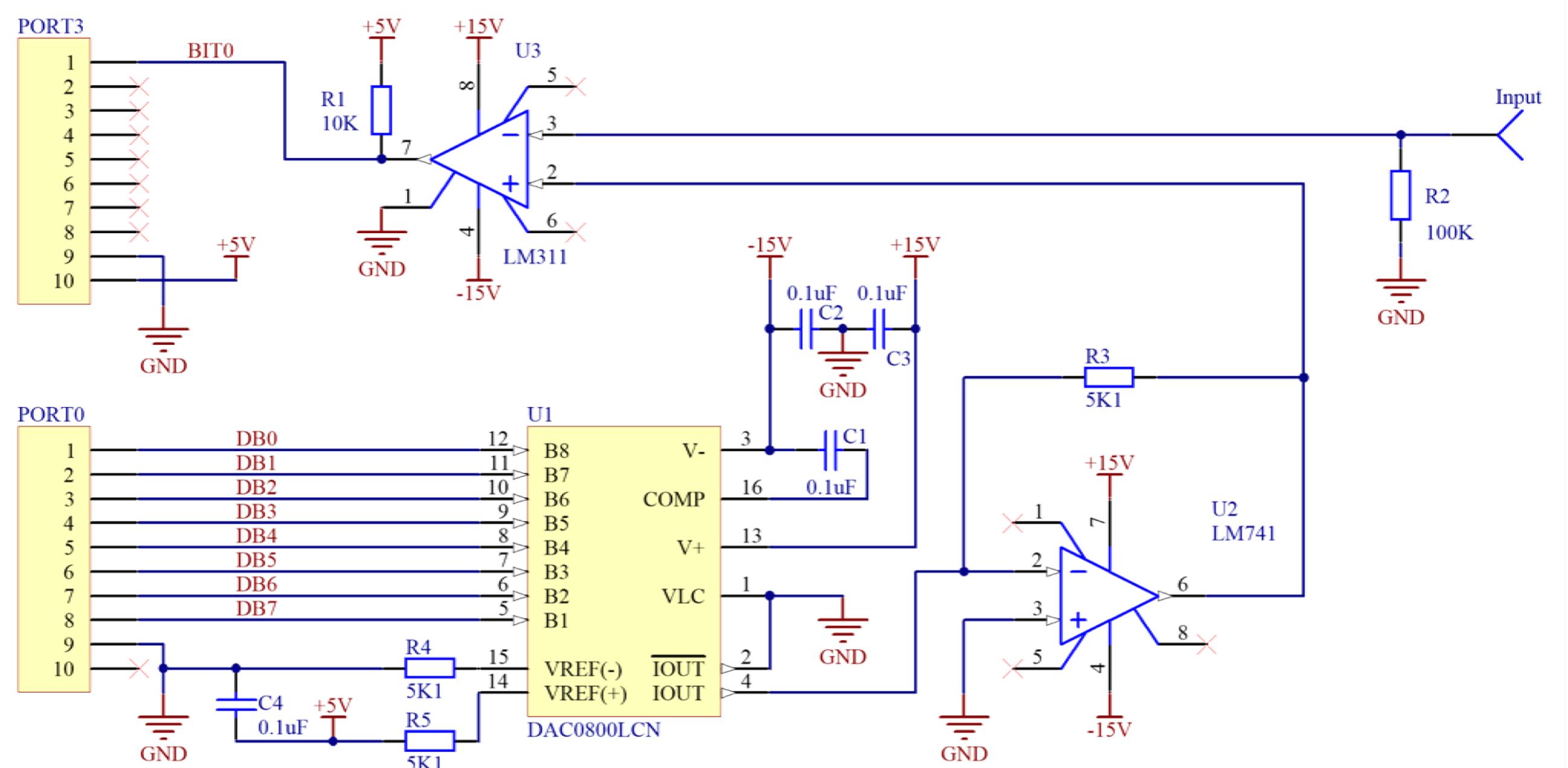
<https://web.sonoma.edu/esee/manuals/33220-90002.pdf>



**Use breadboard workstations'
onboard power supplies.**



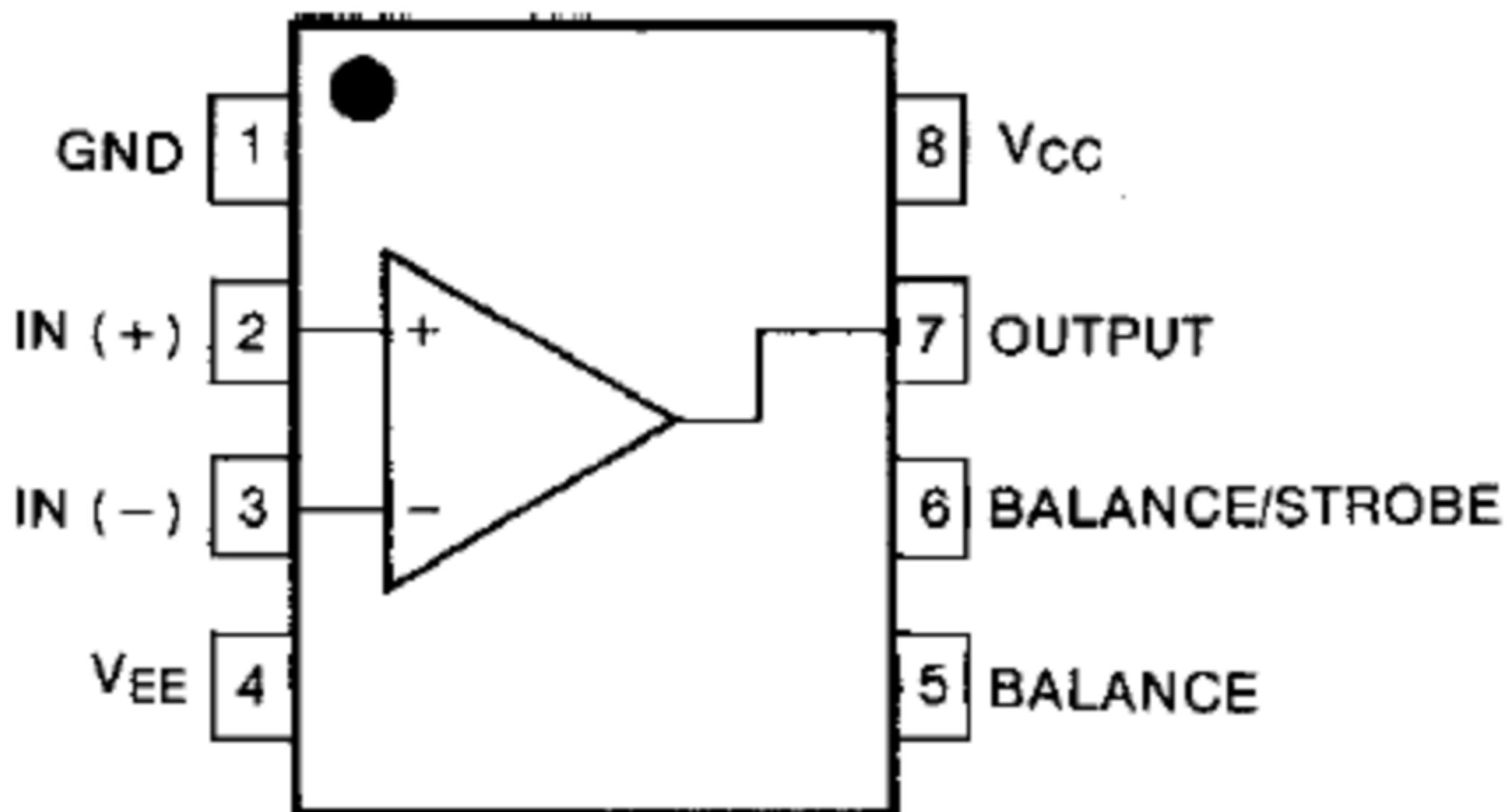
**Probe banana
connectors here**



**Use a
4.7 K
5.6 K
Instead of 5.1 K**

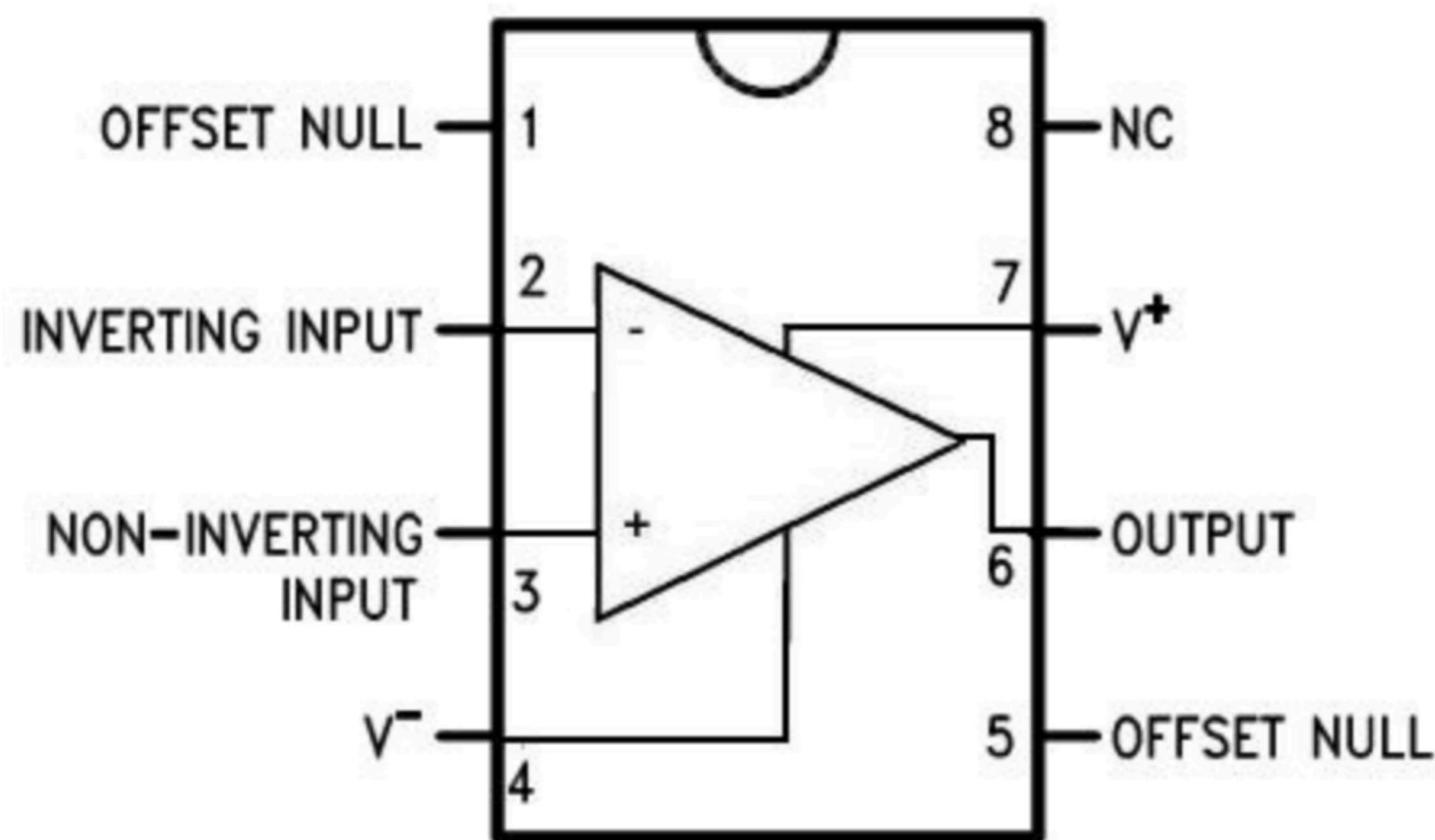
LM311 Differential Comparator

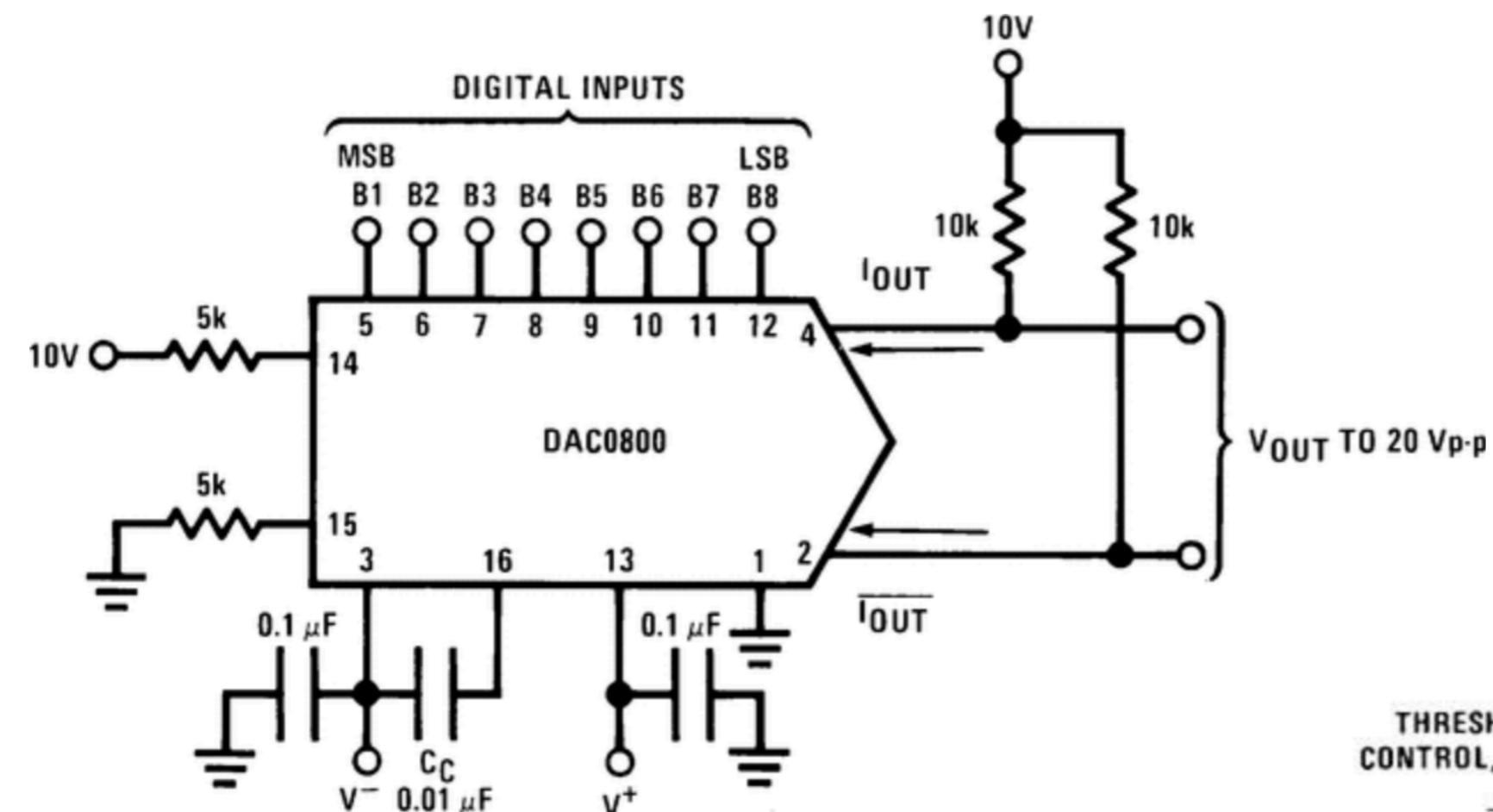
LM311 Pinout



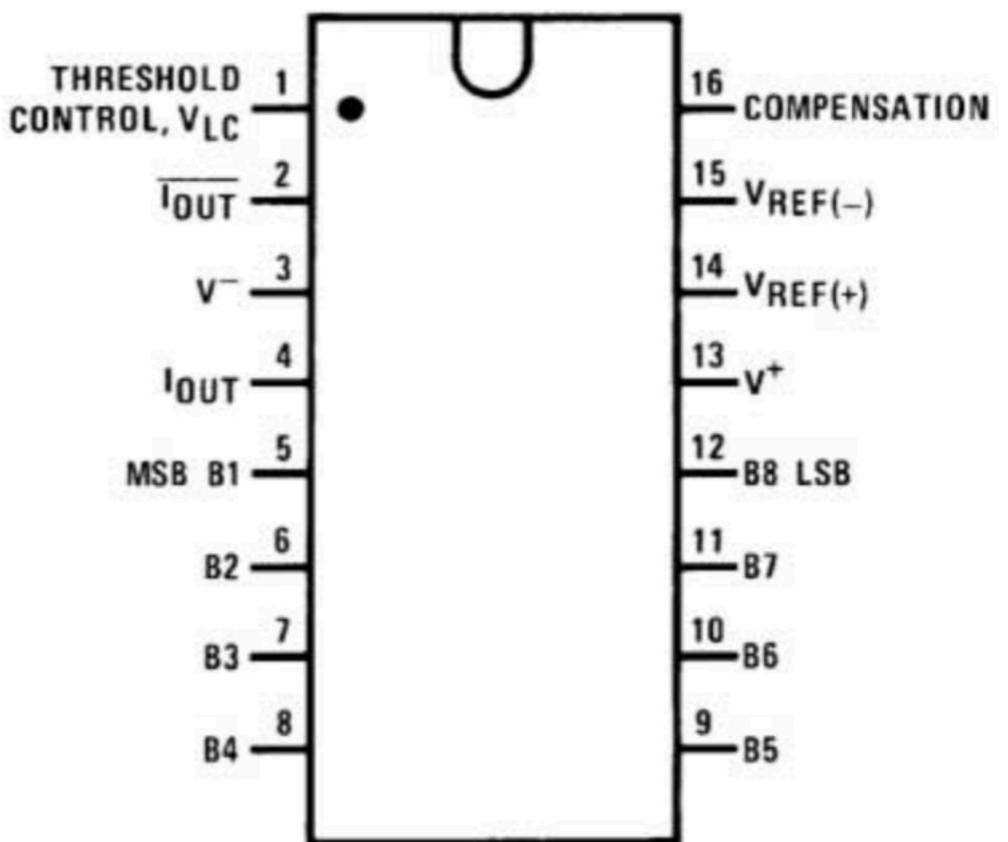
LM741

LM741 Pinout Diagram





Example circuit only. Don't build this one!

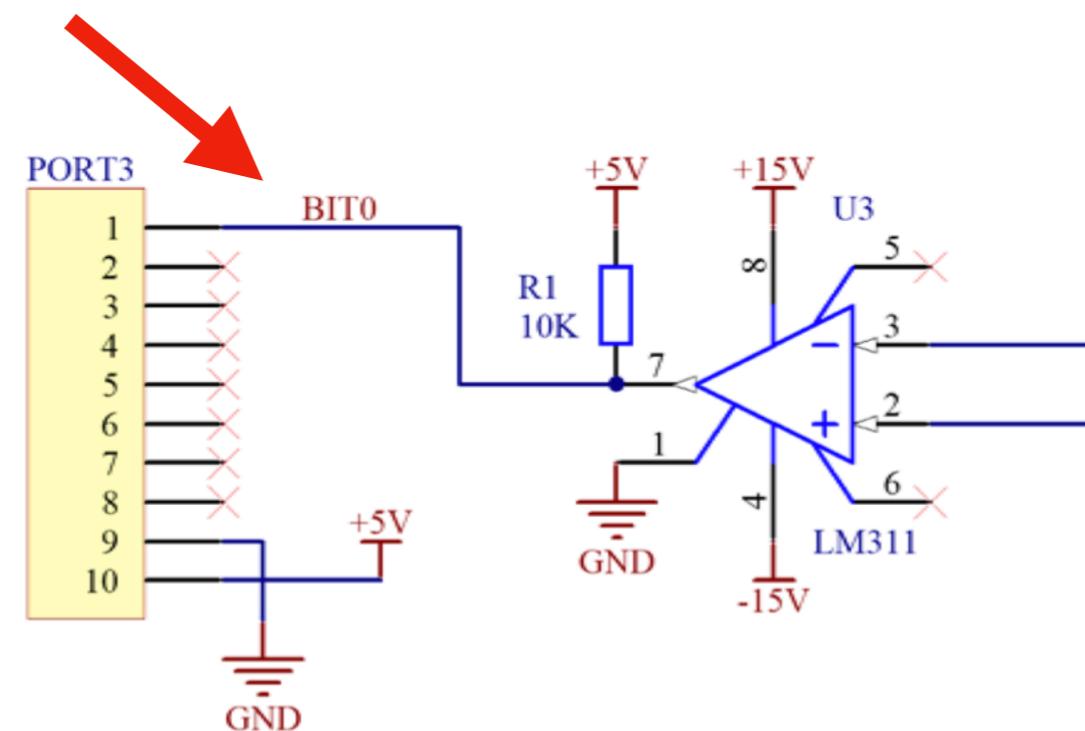


```
// ECEN202 LAB4 Staircase ADC  
// Nick Thompson, Robin Dykstra 2018
```

diy_adc.c

```
#include "lcd.h"  
#include <stdio.h>  
  
//Macros  
#define Sfr(x, y)      sfr x = y  
#define Sbit(x, y, z)   sbit x = y^z  
  
// Pin and Port definitions  
Sfr(PORT_DAC, 0x80); //DAC output port sfr(NAME,ADDR) //Port 0  
Sbit(PIN_CMP, 0xB0, 0); //Comparator input pin sbit(NAME,ADDR,BIT_NUM) // Port 3 pin 0  
  
// Stair case converter code  
unsigned char staircaseConverter(){  
    unsigned char test_val;  
    for(test_val=0; test_val<256; test_val++){  
        PORT_DAC = test_val; //set the value of the port  
        delay(100); // wait for the comparator to stabilise  
        if(PIN_CMP){ //check if the comparator is high  
            return test_val; //return the value if the comparator is high  
        }  
    }  
    return 0;  
}  
  
void main(){  
    int adc_value;  
    char output_text[16];  
    initLCD();  
    while(1){  
        adc_value=staircaseConverter();  
        sprintf(output_text,"V: %d", adc_value);  
        writeLineLCD(output_text);  
        delay(10000);  
        clearLCD();  
    }  
}
```

staircaseConverter()



```
// Stair case converter code
unsigned char staircaseConverter() {
    unsigned char test_val;
    for(test_val=0; test_val<256; test_val++){
        PORT_DAC = test_val; //set the value of the port
        delay(100); // wait for the comparator to stabilise
        if(PIN_CMP){ //check if the comparator is high
            return test_val; //return the value if the comparator is high
        }
    }
    return 0;
}
```

main()

```
void main(){
    int adc_value;
    char output_text[16];
    initLCD();
    while(1){
        adc_value=staircaseConverter();
        sprintf(output_text,"V: %d", adc_value);
        writeLineLCD(output_text);
        delay(10000);
        clearLCD();
    }
}
```