

Power Meter Shield for the Arduino

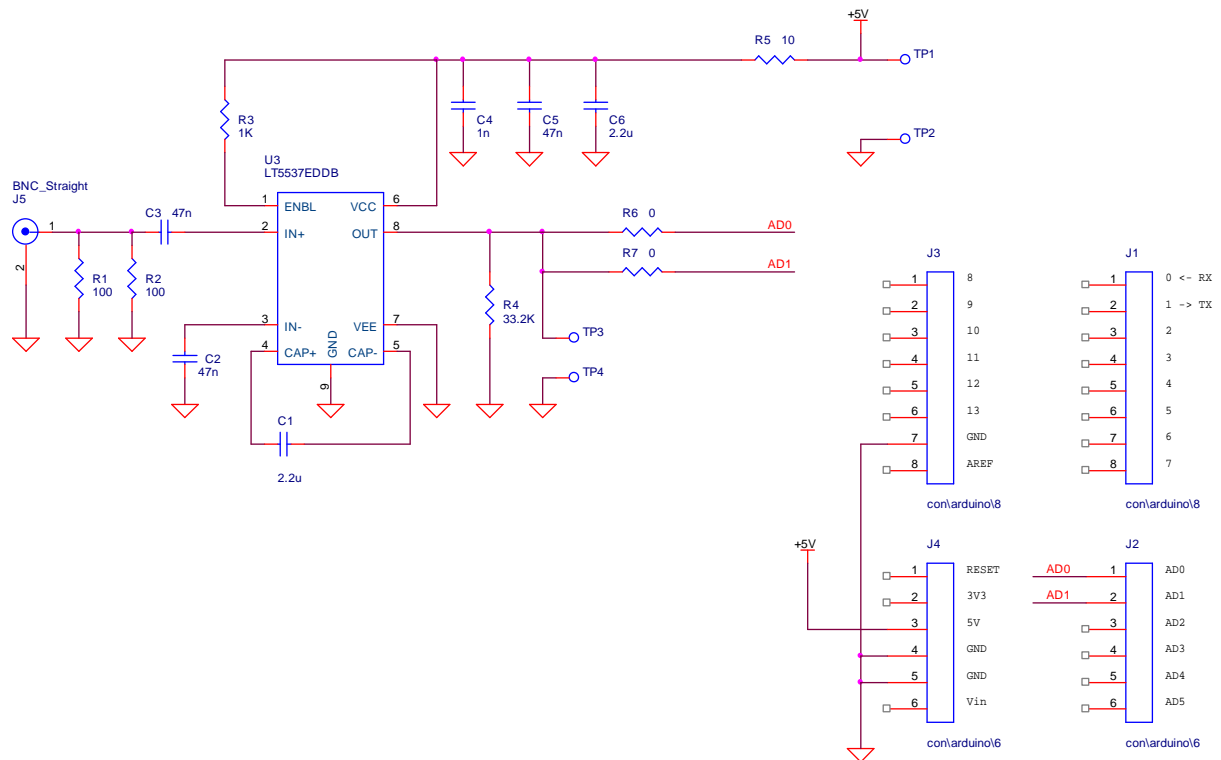
Jay_Diddy_B

Introduction

This document describes the construction of an RF power meter built around the Linear Technology LT5537.

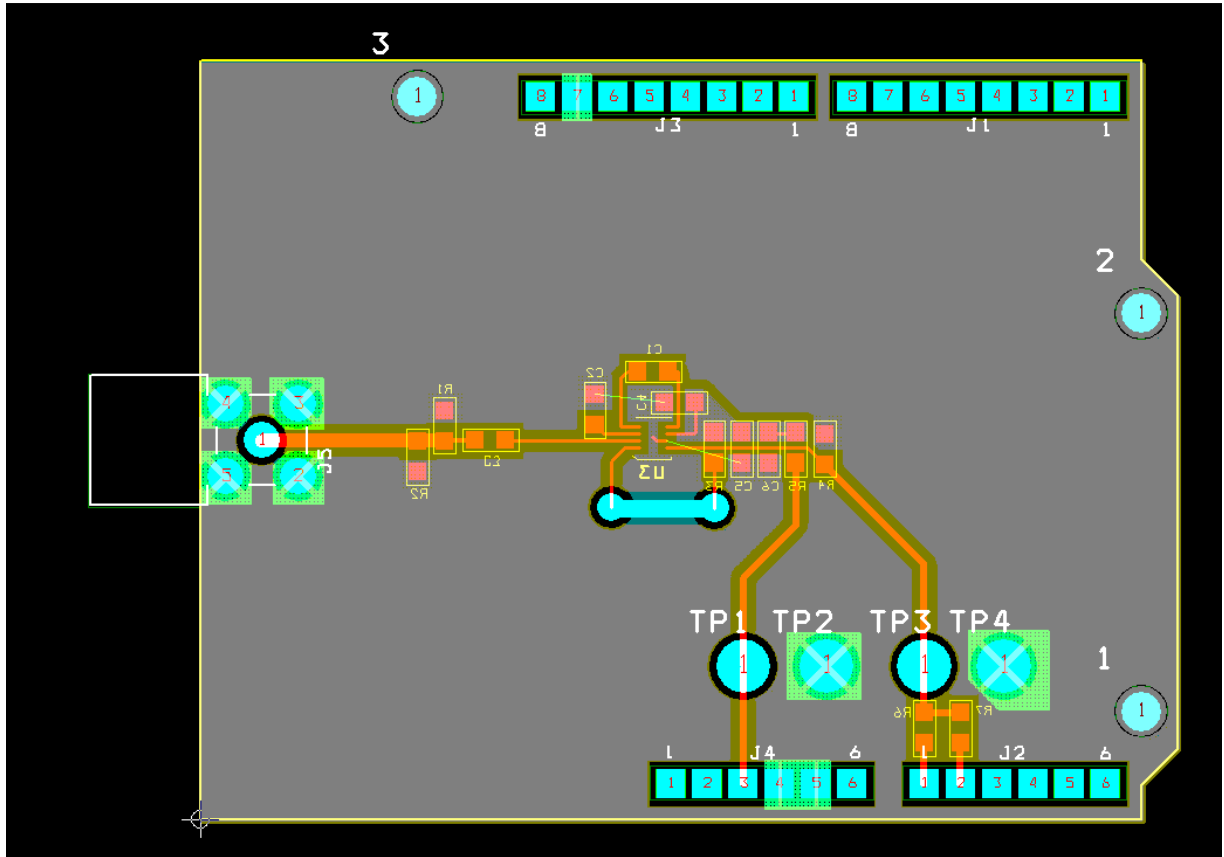
Link: <http://www.linear.com/product/LT5537>

Schematic:

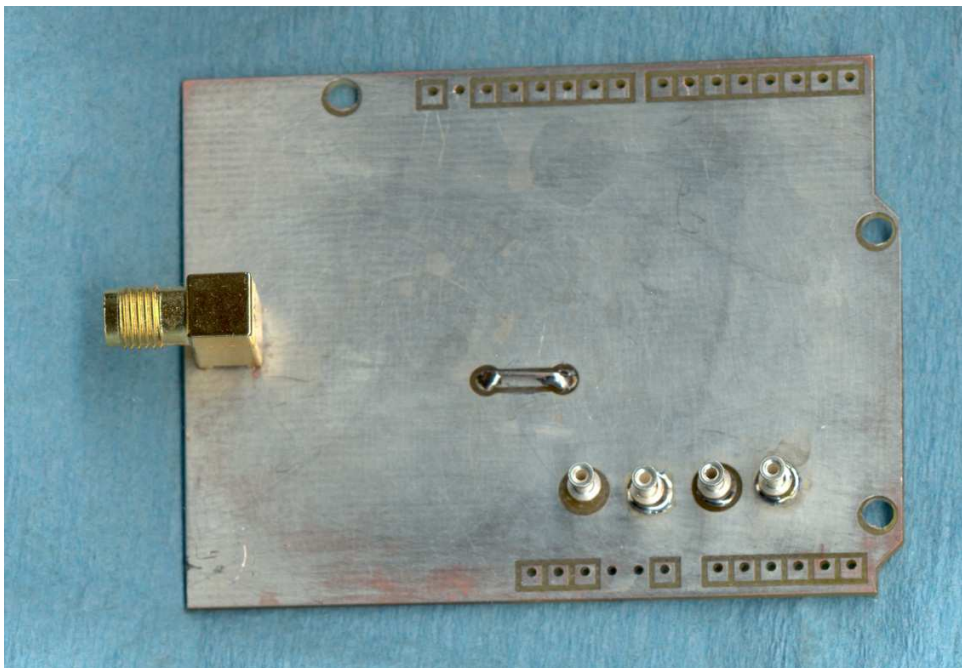
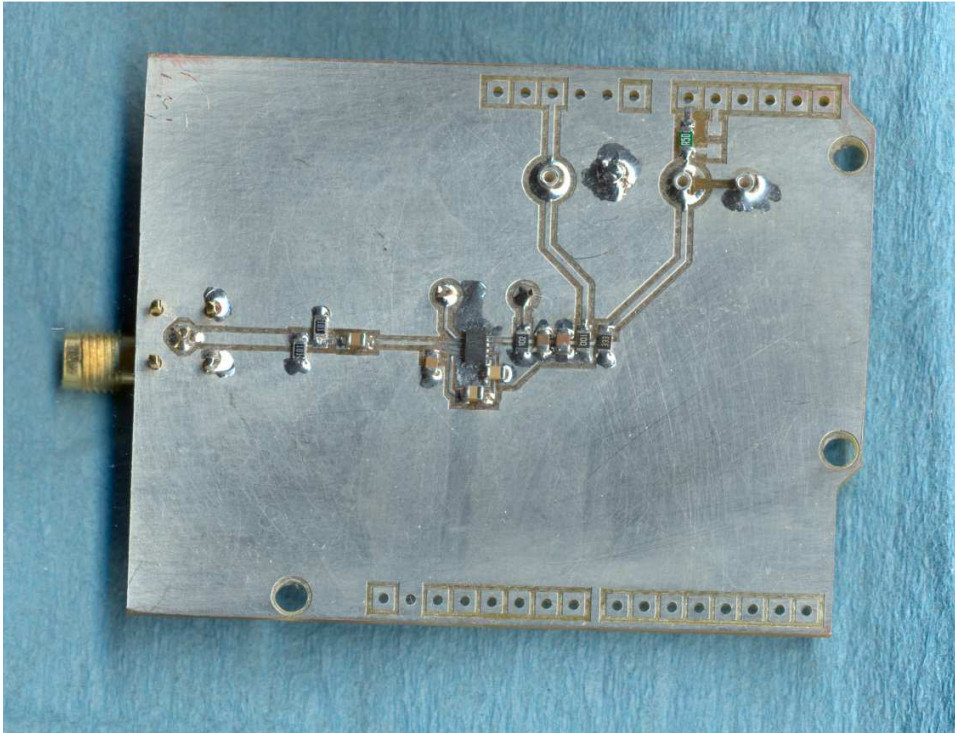


Note: Either R6 or R7 is fitted, not both.

Circuit Board Design



Construction



The turret terminals are to allow testing outside of the Arduino environment.

Software

I wrote a little software for testing the board.

This is the part of the code that does all the work:

```
//Power Meter Stuff is here.

do {

    // subtract the last reading
    total= total - readings[index];

    // read from the sensor:
    readings[index] = analogRead(sensorPin);

    // add the reading to the total
    total= total + readings[index];

    // advance to the next position in the array
    index = index + 1;

    // if we're at the end of the array
    if (index >= numReadings)

        // wrap around to the beginning:
        index = 0;

    powerValue = map (total, 2050, 4100, -490, -1);

    graphic.setCoordinate(10,72);

    graphic.print("  "); // Clear results area.

    graphic.setCoordinate(10,72);

    sprintf(ascii,"%0d.%1d",powerValue/10, abs(powerValue) % 10);

    graphic.print(ascii);

    graphic.setCoordinate(82,72);

    graphic.print("dBm");

    delay(100);

}
```

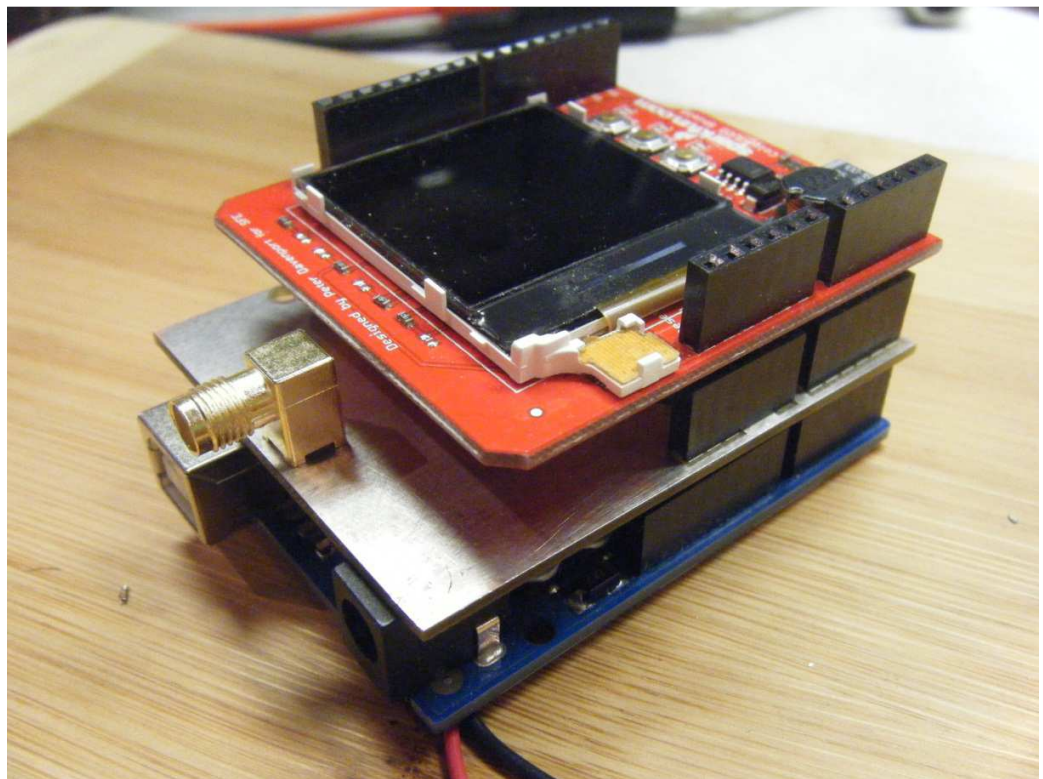
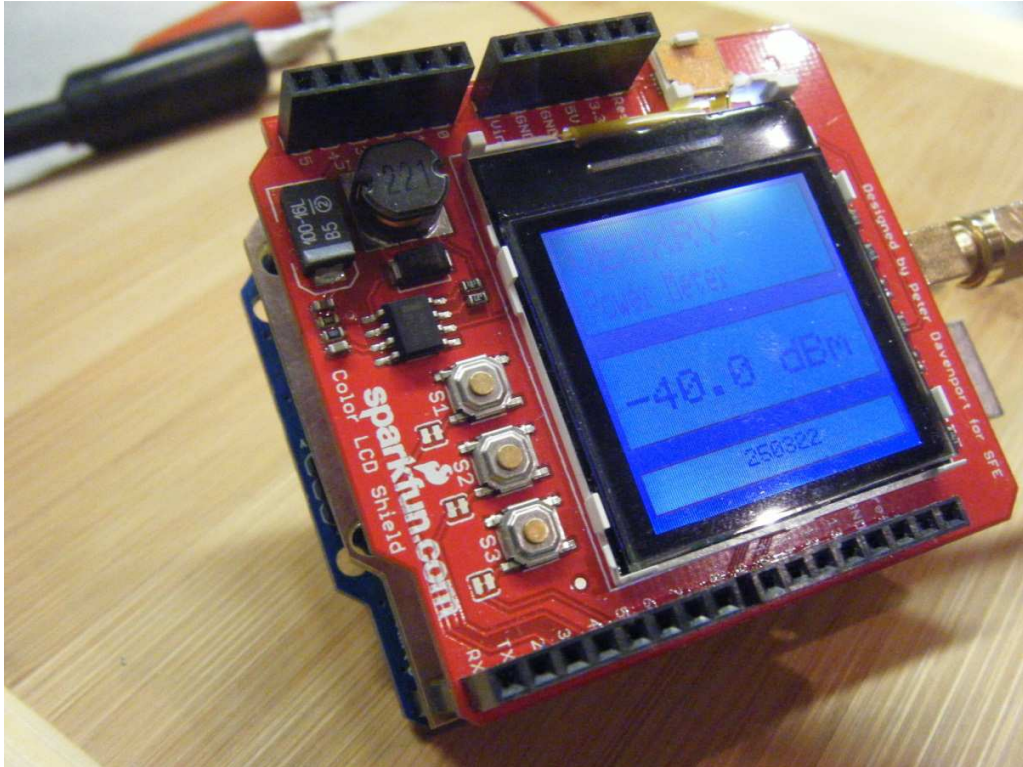
Display

I used the Sparkfun Color LCD Display Shield.



Link: <https://www.sparkfun.com/products/9363>

Arduino Stack



Testing

Works good !!

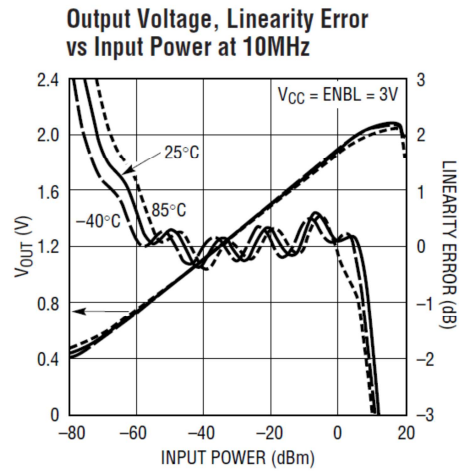
There will be no further testing, testing power meter is known to be a very time consuming activity.

Tested with HP3335A Synthesizer / Level Generator

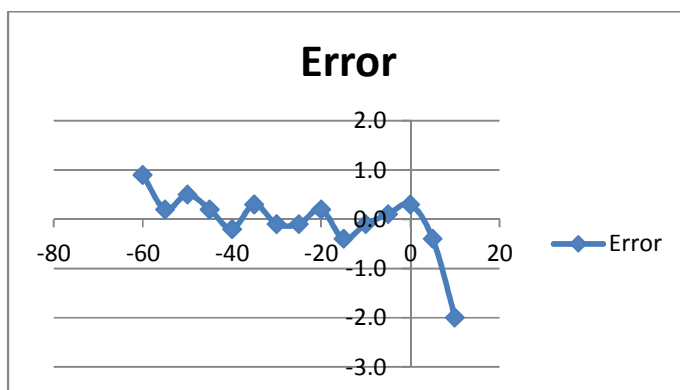
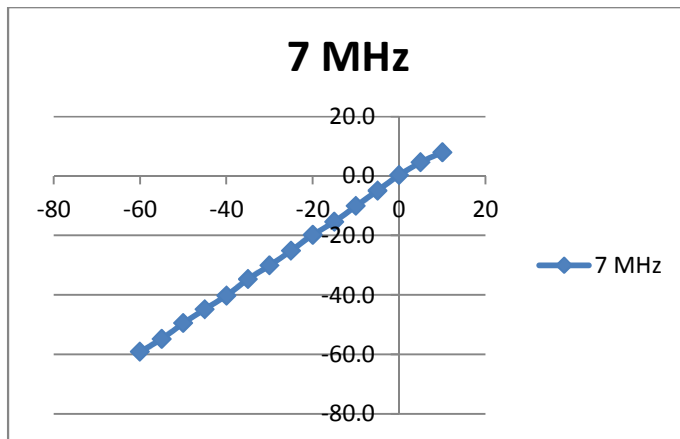
Amplitude	7 MHz	14 MHz	21 MHz	28 MHz
10	8.0	8.1	8.3	8.4
5	4.6	4.8	4.8	5.1
0	0.3	0.2	0.1	0.1
-5	-4.9	-4.8	-4.7	-4.5
-10	-10.1	-10.0	-9.9	-9.7
-15	-15.4	-15.3	-15.2	-15.1
-20	-19.8	-19.8	-19.7	-19.6
-25	-25.1	-25.1	-25.0	-25.0
-30	-30.1	-30.1	-30.0	-30.0
-35	-34.7	-34.8	-34.6	-34.7
-40	-40.2	-40.0	-40.0	-40.0
-45	-44.8	-44.9	-44.8	-44.7
-50	-49.5	-49.7	-49.6	-49.6
-55	-54.8	-55.0	-54.8	-54.9
-60	-59.1	-59.2	-59.2	-59.2

The meter was calibrated at 0dB and -40dB at 20 MHz.

Performance versus datasheet



The datasheet shows large errors above 5dBm. The measured results are consistent with the datasheet.



With no signal applied, the meter reads -60dBm, this is equivalent to 221 μ V RMS.

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