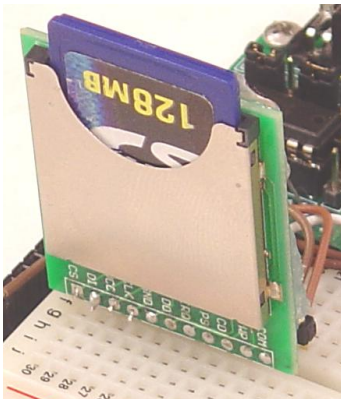


Build A 5v MMC/SD Connector

By Michael Simpson

After creating the DiosPro MMC/SD interface library I created several connectors using various edge connectors.
The problem is that the memory card needs to run at 3.3v. You can run a DiosPro at 3.3v but this presents a problem when interfacing with many other devices.

To create a 5v interface to a MMCor SD memory card you only need about $1 worth of componets. And depending upon the connector you choose you can mount the interface direcly on the connector.

A company called SparkFun sells a couple of different MMC/SD connectors. For this article we are going to use the SD-MMC Breakout board.

Once the construction is complete you can plug the board into any female header or breadboard as shown in Figure 1.

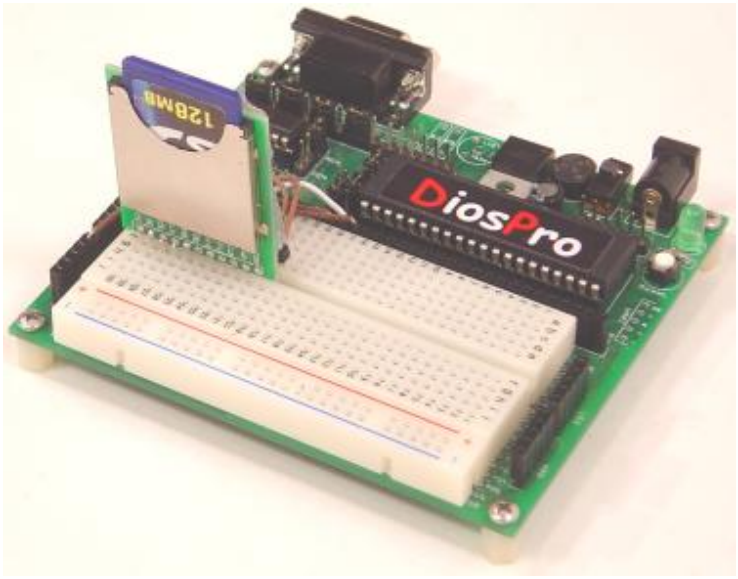


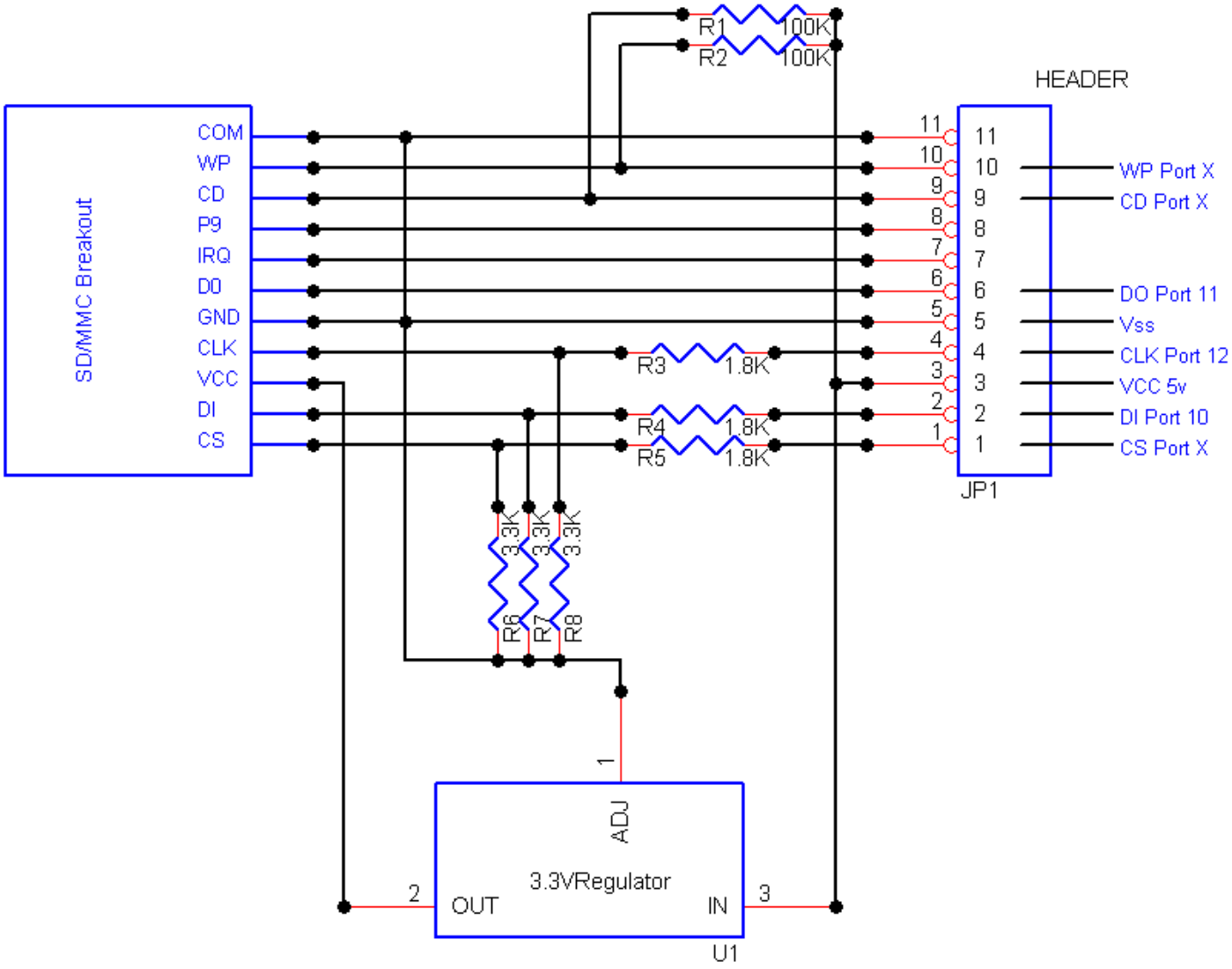
Figure 1

Kronos Robotics and Electronics

www.KronosRobotics.com

The breakout board has a couple extra features as well. For one you can detect when the card is inserted or removed or the status of the write protect switch.

Schematic 1 shows the circuit we will add to the back of the board. Note that I only show 8 of the connections on the header. These are all that is needed for DiosPro interface.



Schematic 1

Construction

The construction is a very simple procces. You will need the following:

- 2, 100K resistors. Brown/Black/Yellow
- 3, 1.8K resistors. Brown/Grey/Red
- 3, 3.3K resistors. Orange/Orange/Red
- 3.3 v regulator JameCo #232114
- 11-pin Right angle header
- SD-MMC breakout board

Note that Iused 1/4 watt resistors but you may use 1/8 watt if you can find them. The small size of 1/8 watt resistors will make hookup easier.

Step 1

Take a 1.8K resistor and a 3.3K resistor and join them together at one end by wrapping one of the 1.8K leads around the 3.3K resistor leads. Solder in place and clip the excess off the 1.8K resistor as shoen in Figure 2.

Step 2

Next take the same end of the 3.3K resisotor that you just attached and make a small loop as shown in Figure 2.

Step 3

Take the free end of the 1.8K resistor and bend it to look like the one shown in Figure 2.

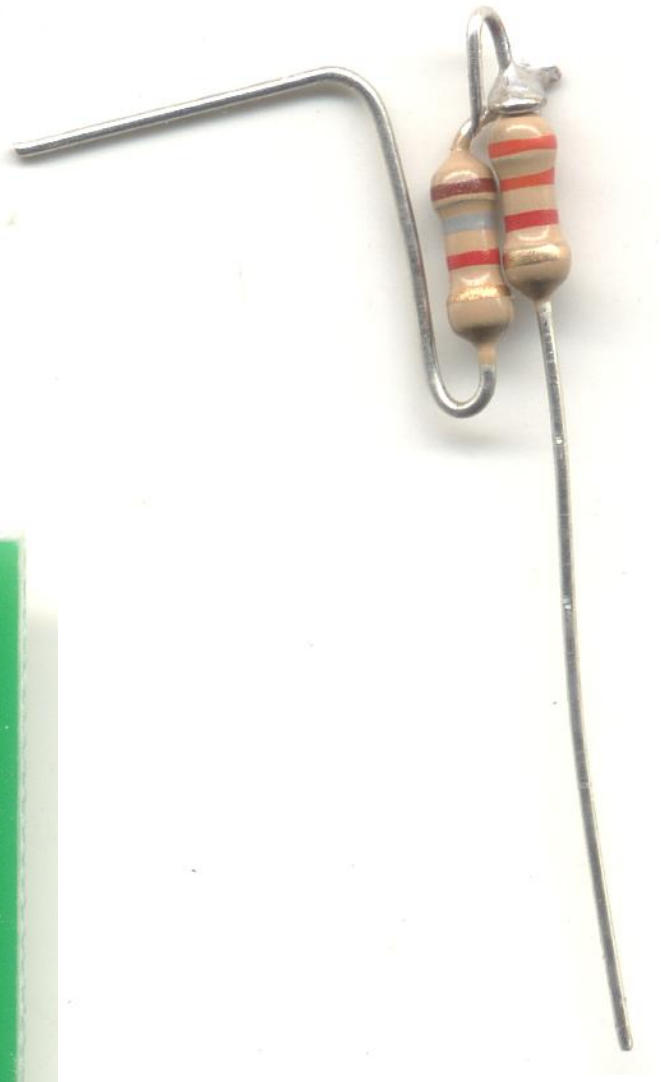


Figure 2

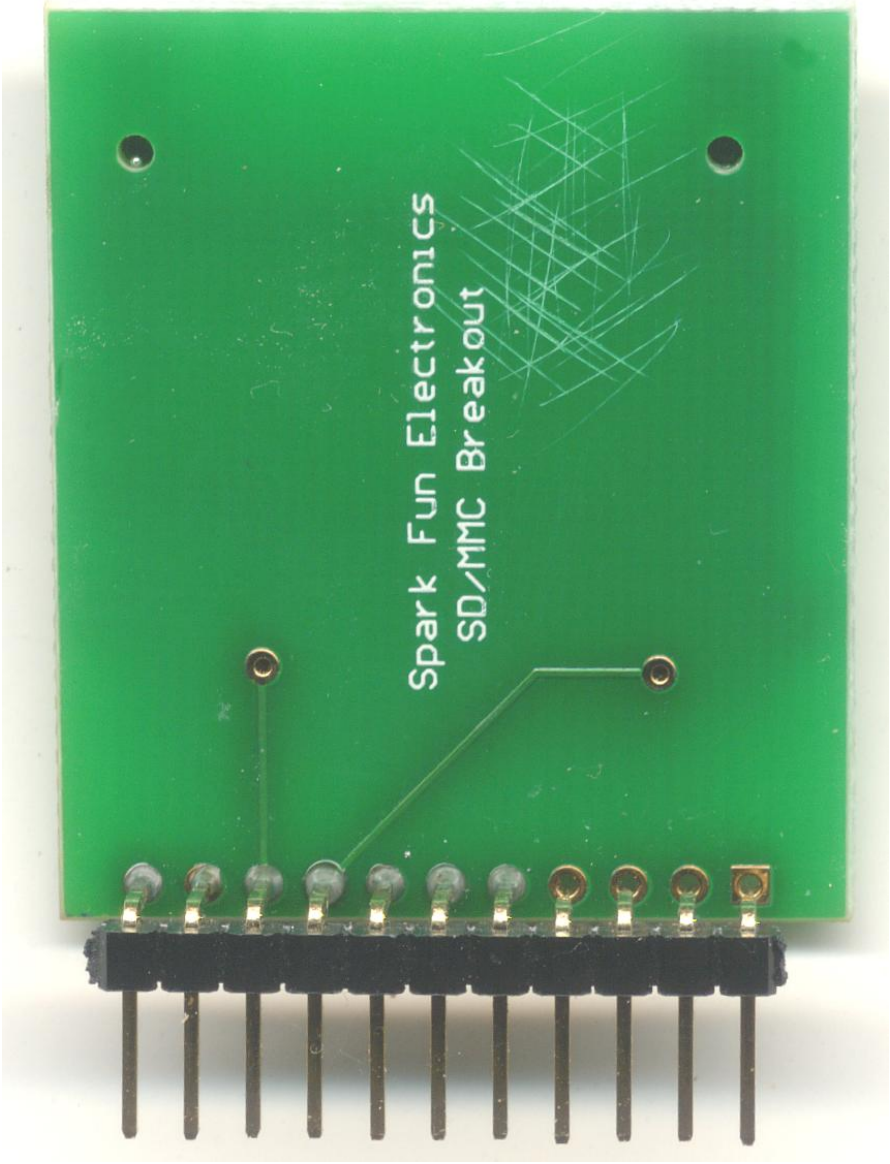


Figure 3

Step 4

Take the 11-pin right angle header and push all the pins so that the bend comes in contact with the spacert plastic as shown in Figure 3.

Step 5

Cut the 4 rightmost pins. Dont cut them all the way to the spacer. You want to leave enough to solder a small loop of wire to.

Step 6

Now attach the healder to the board as shown in figure 3. The pins will be a tight fit. Only insert the pins enough so that you can make a solder joint. They should not protrude out the opposite side. Solder in place the 7 leftmost pins.

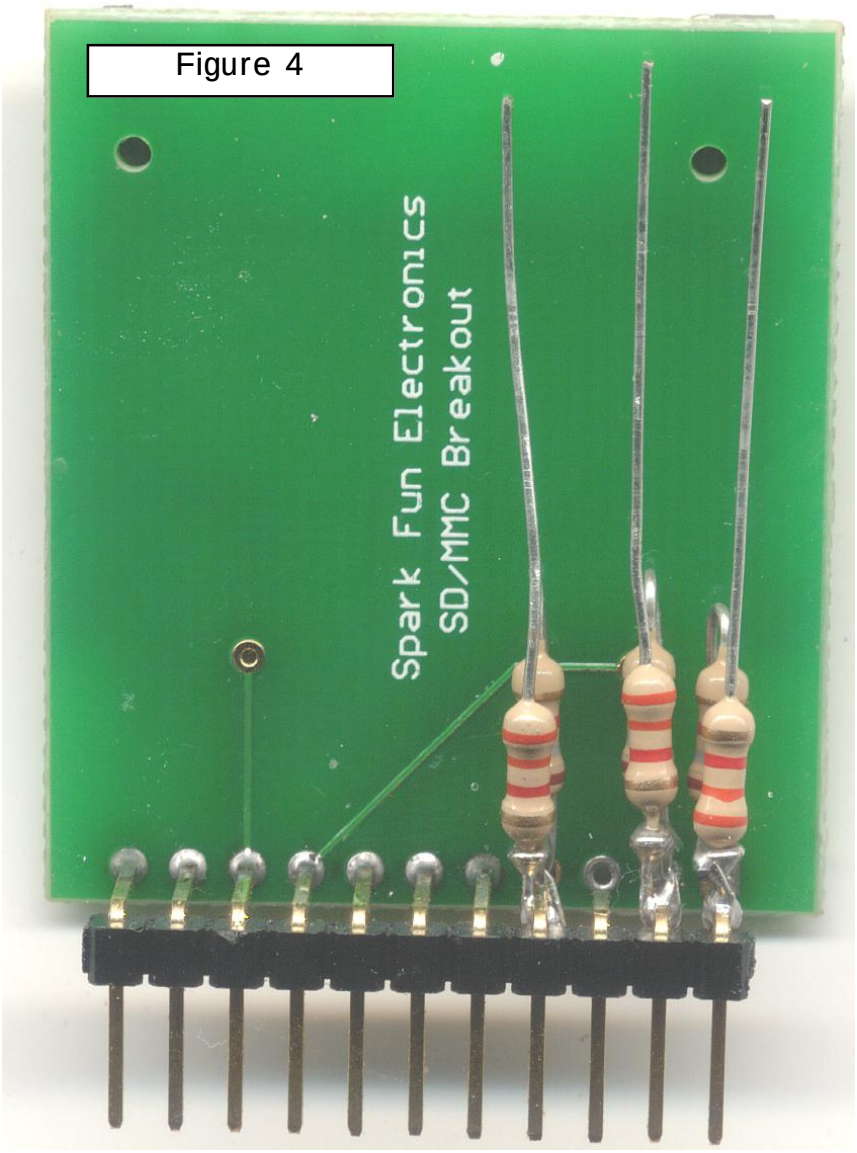


Figure 4

Step 7

Take the bent end of the 1.8K resistor and insert it into the hole shown in Figure 3. The small loop on the connected leads should be placed arround the pin on the header that has been cut. Solder in place.


Figure 5

Take a look at Figure 5. this shows a different angle of the connection.

Step 8

Rough up the surface under the regulator with a razor knife. Apply a small bit of hot glue to the board and stick the regulator in place as shown in Figure 6.

Step 9

Solder the three free ends of the resistors to the first lead on the regulatar. Clip the excess leads as shown in Figure 6. The bottom lead will become GND.

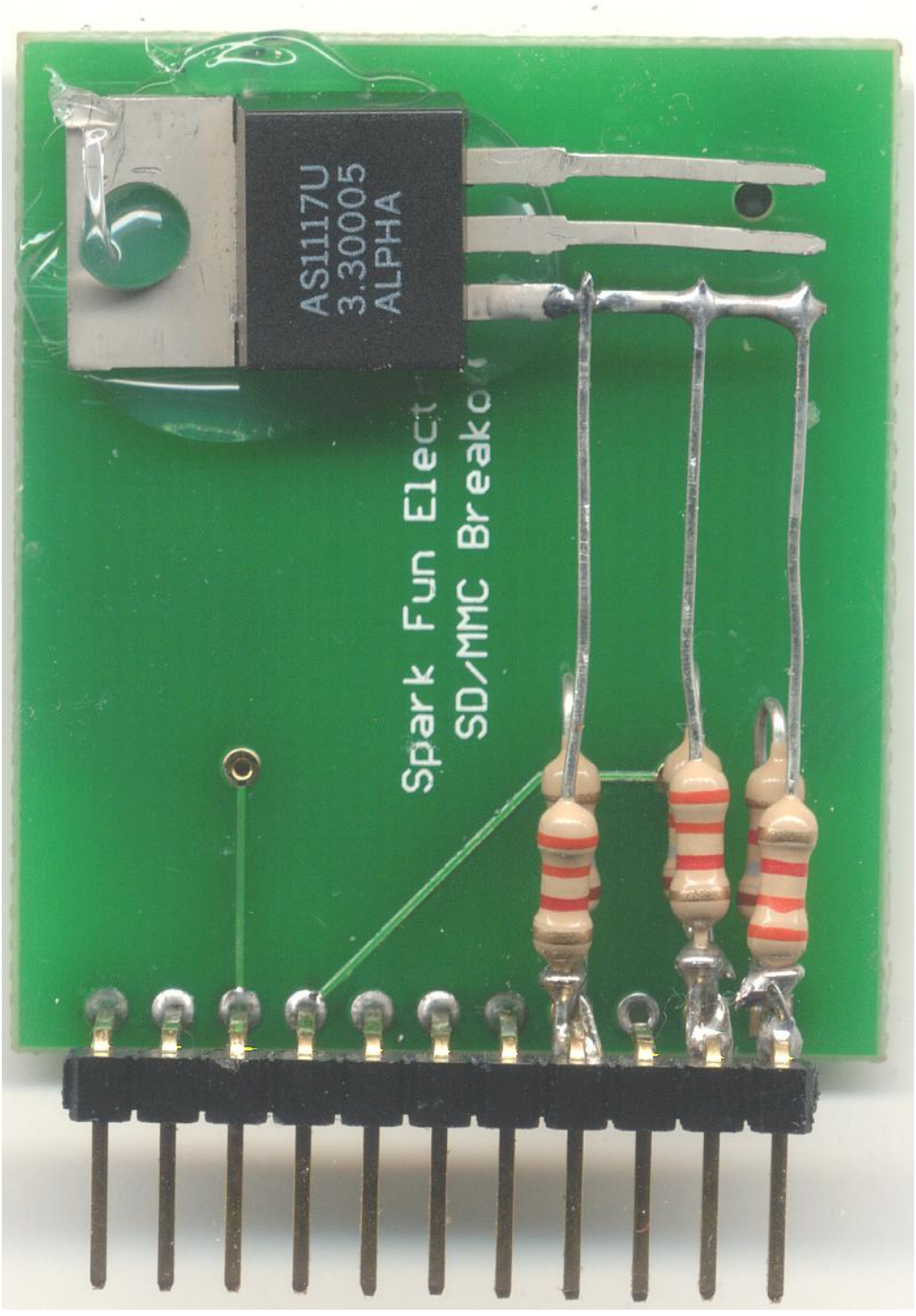


Figure 6

Step 10

Take a small piece of hookup wire. Strip and insert onr end into the hole marked Vcc on the breakout board. Solder in place. Connect the other end to the top pin on the regulator. This is the regulator output. Solder in place.

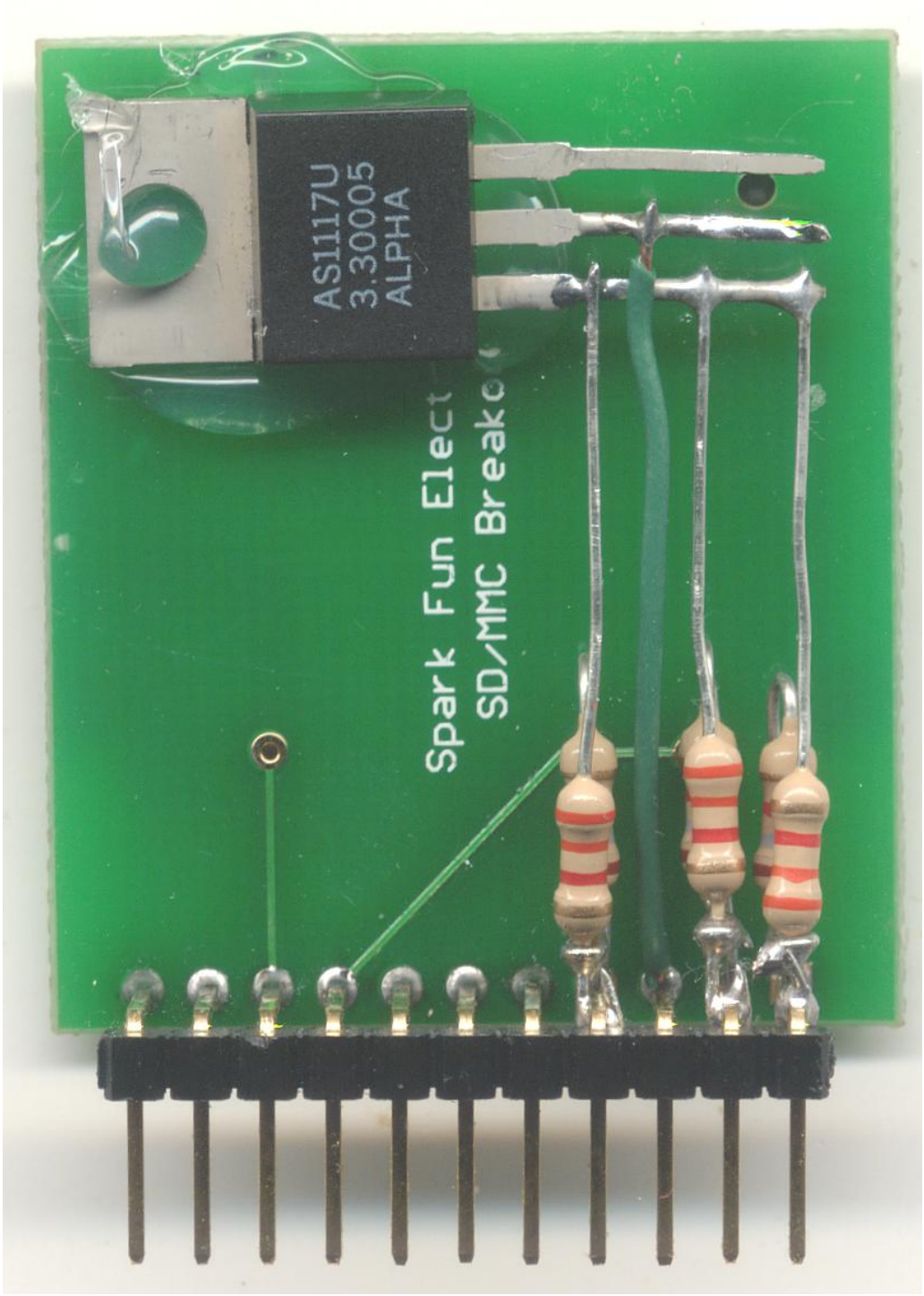


Figure 7

Step 11

Take another small hookup wire and wrap one end around the third header pin from the right as shown in Figure 7. This is VCC. Solder in place. Connect the other end to the middle lead on the regulator. This is the Vin pin on the regulator.

Tip: Dont pull too hard on the wire once it has been attached to the pin. If you do you will pull the pin out of the spacer. If this happens be sure to push the pin back in before you connect the wire to the regulator.

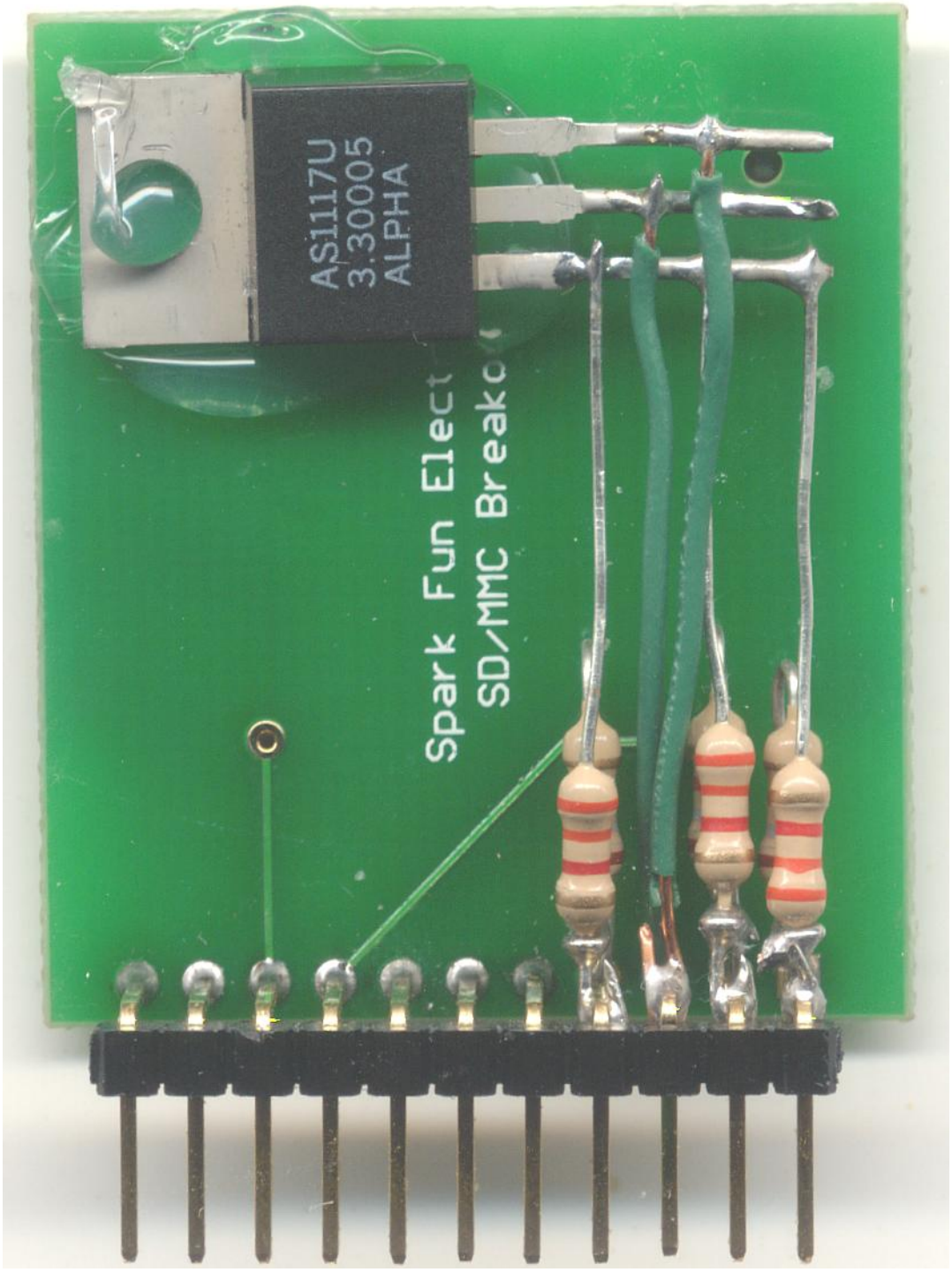


Figure 8

Step 12

Connect a 100K resisotr to the pins that are soldered to the CDand WP holes on the breakout board. Solder in place. Then connect the other ends together and attach to the top pin on the regualtor as shown in Figure 9.

Tip: You should use a small piece of heatshrink or insulation to keep the wire from shorting out against the other leads on the regulator.

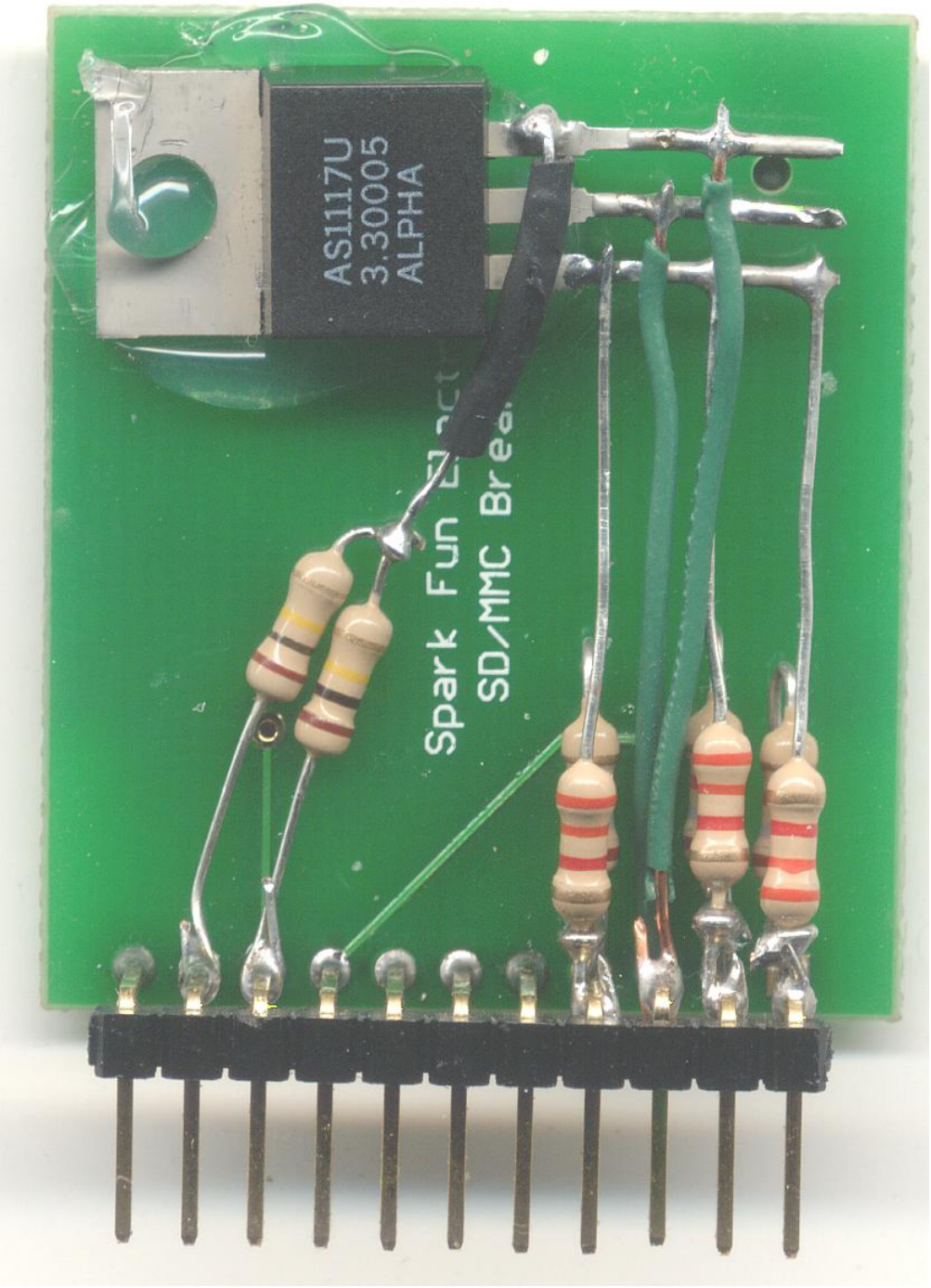


Figure 9

Step 13

Connect a wire between the pin marked Gnd to the lead on the 3.3k resistor as shown in Figure 10. Note this is the black wire in the Figure.

Step 14

Connect a wire between the pin marked COM to the lead on the 3.3k resistor as shown in Figure 10. Note this is the green wire in the Figure.

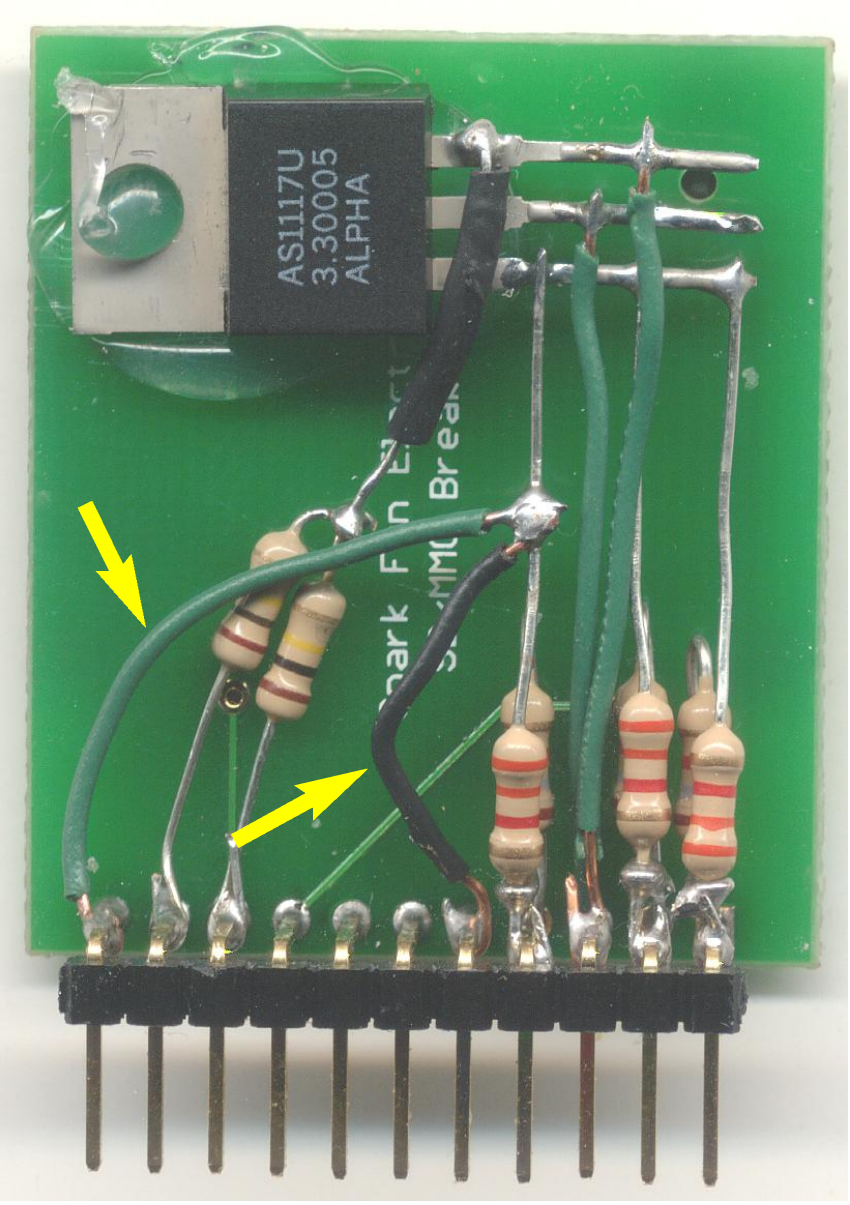


Figure 10

Testing

Test 1

The first test you need to perform is a voltage check. Plug the board into a breadboard and supply 5v to the pin marked VCC and GND to the pin marked GND. Use a volt meter and check the voltage on the solder points marked VCC and GND shown in Figure 11. You should see 3.3v. Do Not insert a memory card into the socket for this test.

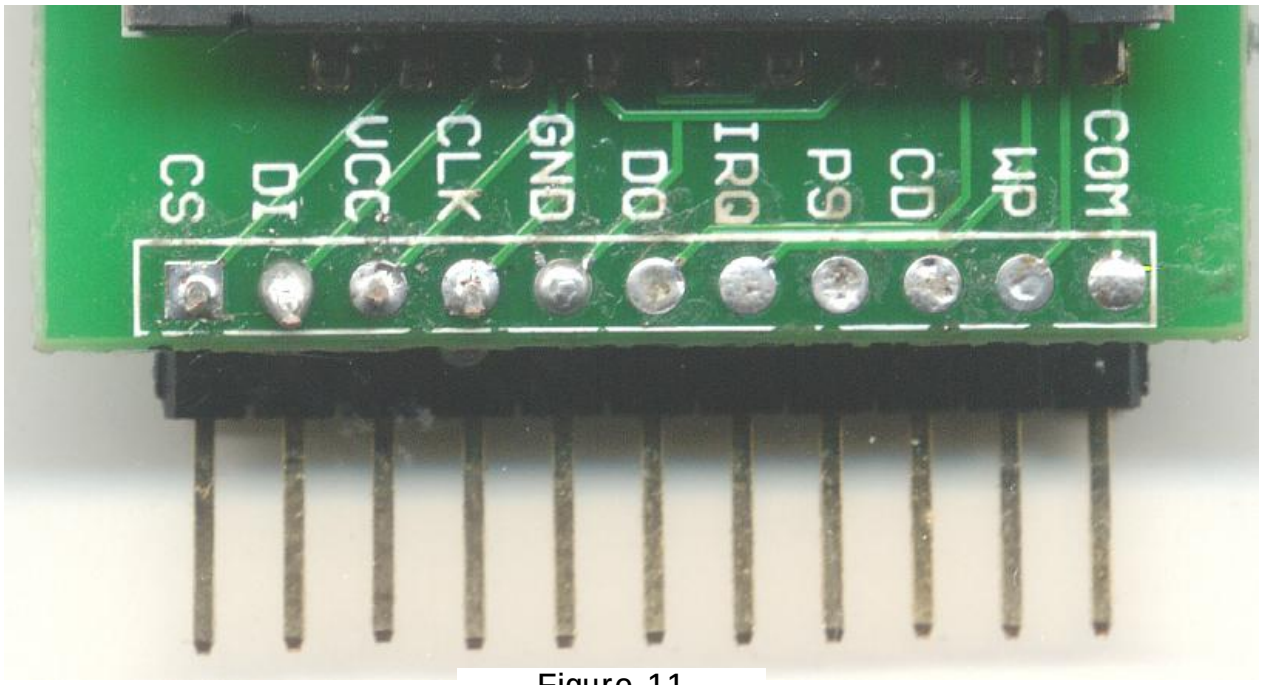


Figure 11

Test 2

Load Program 1 into the DiosPro. Once again connect power to the card. Make the following Dios connections to the header.

Port 1 = CS
Port10 = DI
Port11 = Clk
Port12=DO

Once you run the program you should see 3v at the DI and the Clk pins on the header.

```
DiosPro

func main()

   dim stat as integer
   stat = MMCinitfat16(1,1)

endfunc

include \lib\MMC16.lib
```

Program 1

Test 3

Connect the last two connections to the header.

Port 2 = CD
Port 3 = WP

Load and run Program 2.

When you insert a card the program will tell you that you have inserted a card and report its locked status. It will also list the files on the card. When you remove the card it will tell you as well.

Final Step

If all the tests passed then you should seal the componets on the back of the board with hot glue as shown in Figure 12.

When the back of the board is coated it will keep componets from shifting and keep the header pins from being pushed up through the spacer.

Thats it !!!

Experiment with the library or create your own routines with the lowlevel commands.

Figure 12

```
DiosPro
'Detection Test
func main()

  dim state as integer
  state = 0

loop:
   if inp2 = state then
     if state = 0 then
       print "Card inserted"
       if inp3 = 1 then
         print "Card locked"
       else
         print "Card unlocked"
       endif
       initcard()
       state = 1
     else
       print "Card Removed"
       state = 0
     endif
    endif
   pause 10
   goto loop

endfunc


func initcard()
     dim stat as integer
   stat = MMCinitfat16(1,1)

   if stat = 0 then
     print "Init Error"
     end
   endif

   MMCdir()
endfunc

include \lib\MMC16.lib
```

Program 2

3, 1.8K resistors
3, 3.3K resistors
2, 100K resitors
1, Right Angle Header
1, 3.3v regulator . . . . . .jameco 242144

DiosPro40 . . . . . .http://kronosrobotics.com/xcart/customer/product.php?productid=16428
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Free Dios Compiler . . . . . .http://www.kronosrobotics.com/downloads/DiosSetup.exe

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