

Cheap DIY SD card breadboard socket

by **Kroden** on August 18, 2009

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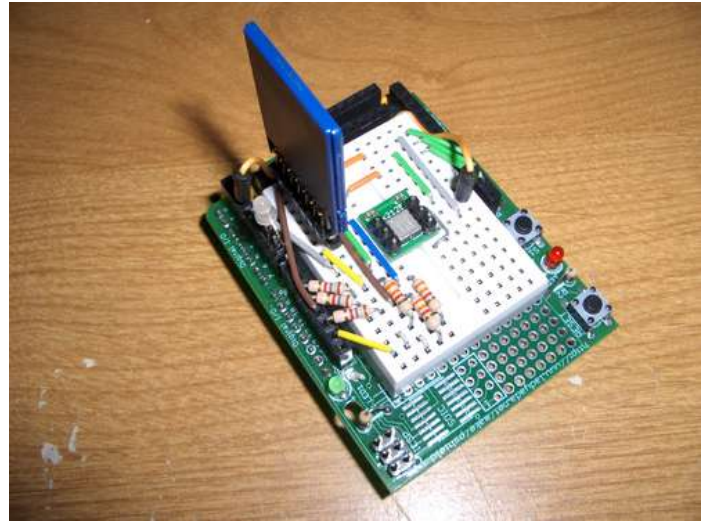
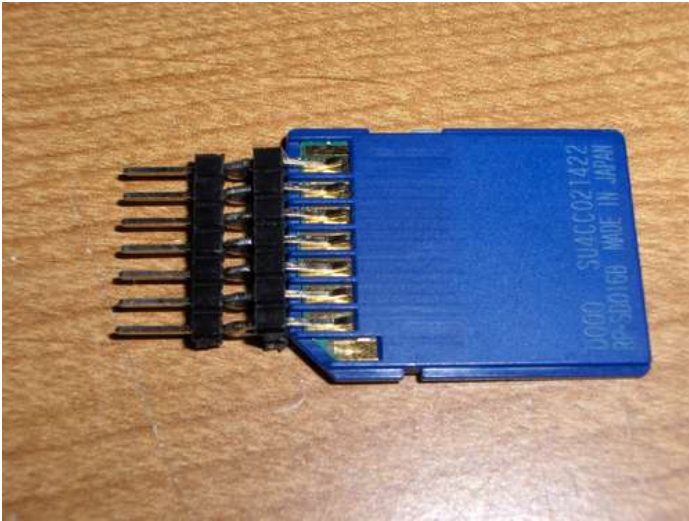
Intro: Cheap DIY SD card breadboard socket

Do you have a project that needs an interface to mass storage, but don't have the resources to build a breakout board for a standard socket?

In this Instructable, you will learn how to make an SD card socket that plugs right into a breadboard for less than two dollars in parts (depending on how you get them of course). I show you how to use a simple straight pin header and modify it so you can plug in an SD card and attach it directly to a breadboard for data logging and prototyping. This is quick and easy so you don't have to wait for a socket in the mail, or build/buy the SMD breakout board for it either.

Basic soldering skills and common tools are required.

I will cover how to make vertical and right angle sockets. Either 7 or 8 pin should work. 9 pin may require some modifications, I only used 7.



Step 1: Gather tools and materials

You will need:

Solder
Soldering Iron, I use 45 watt but this is more than enough
Needlenose pliers
a vise is very useful to keep from burning yourself
and at least 21 pins of straight male breakaway header pins

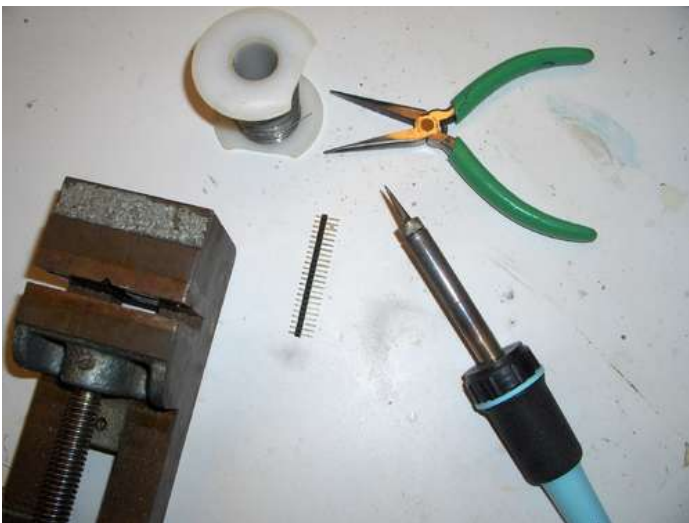
I got the header pins from my local electronics parts shop. Radioshack doesn't carry them as far as I know, but they can be ordered from various places around the internet for very cheap. It was 2 dollars for 40 pins at my local shop.

Here is the digikey part, it's a bit more that 2 dollars. <http://search.digikey.com/scripts/DkSearch/dksus.dll?Detail&name=A26513-40-ND>
Same thing from Sparkfun

http://www.sparkfun.com/commerce/product_info.php?products_id=116

These are straight male breakaway header pins.

You could theoretically use right angle as well, but I used straight pins.



Step 2: Cut the pins you will need

I only needed access to 7 of the 9 pins, so I only made a 7 pin connector. 8 pin would be fairly easy to do as well, but 9 pin may require some modification as it is a little recessed from the other 8.

Cut the header to the number of pins you will be using. You will need 3 sets of that length, for me, 3x7 pins.

Optional: one of the rows is just as a backing for the card. It would be possible to use just a couple of pins on the edges instead of a full row, but I didn't follow this route. The process would begin to be different around step 4, when you attach the second row of header to the first.

If you are doing a right angle connector, right angle header pins may lead to a cleaner result. I used straight pins on mine however and it worked well enough.



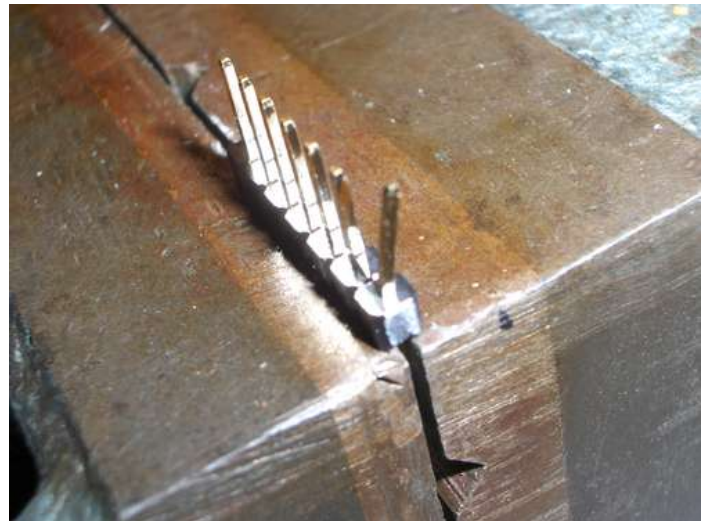
Step 3: Bend contact pins

Now you have the contacts, they need to be bent to ensure perfect and reliable contact with the card.

Take one of the 3 header rows and place it in a vise, or a pair of pliers or vise grips. I held the short end of the pins to keep them from pulling out of the plastic.

Using the needle nose pliers, bend the pins just a bit at the base, so that the tip of the pin is about vertical with the edge of the plastic. See pictures for detail. Not all the pins need to be perfectly aligned. Bend them all against a table or flat surface to line them up better.

Now they need to be bent back on the tip so it is easy to insert the card. Again with the needle nose pliers, grip just a small amount and bend it back the other direction. Do this for all the pins. See picture for detail.



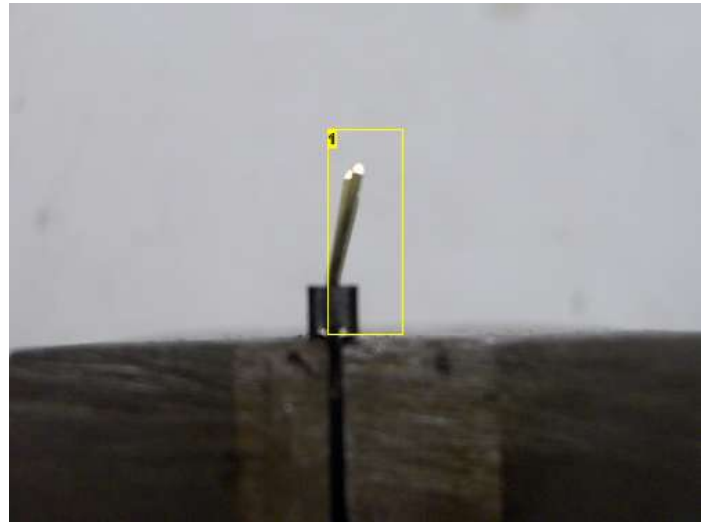
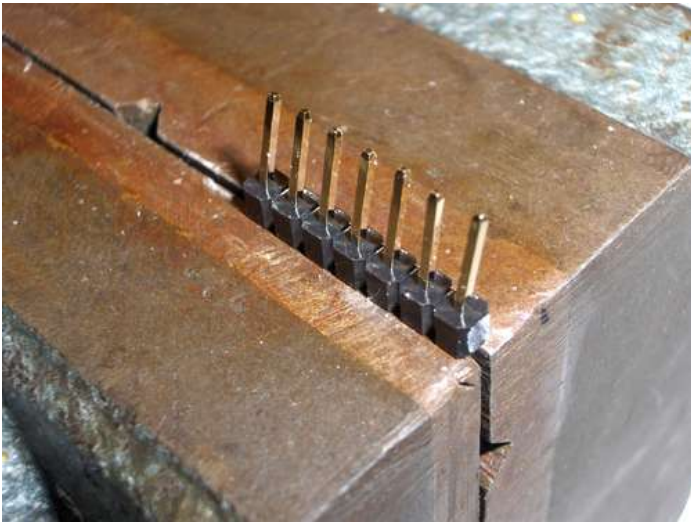


Image Notes

1. the tips should be about vertical with the edge of the plastic

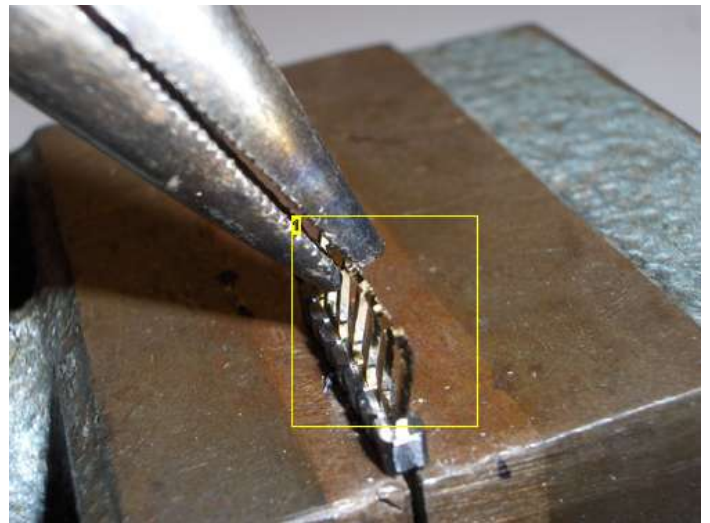
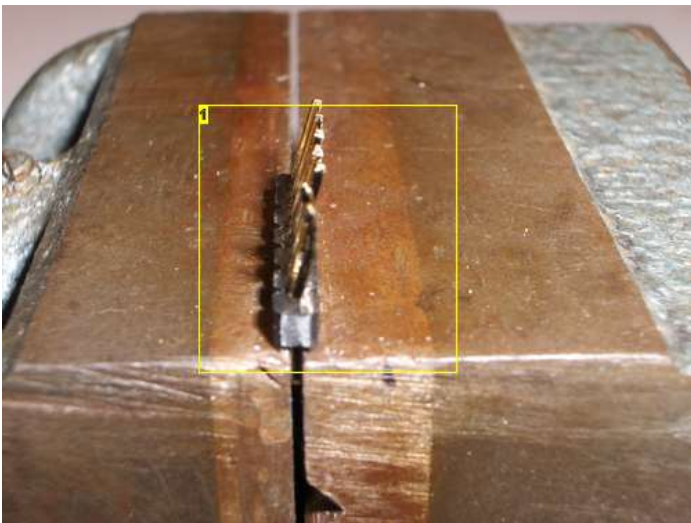


Image Notes

1. here are 2 pins bent back, the rest only forward. You can see how little it actually is

Image Notes

1. it's best to bend all the pins in the same place

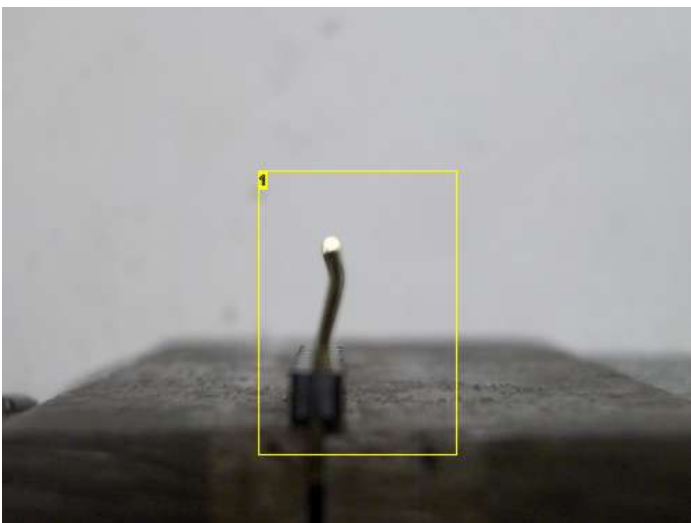


Image Notes

1. all the pins done

Step 4: Attach second row temporarily

The second row of header is actually just a backing. We are going to line up the pins so this works better, and so it is a cleaner solder job. I used a small bead of hot glue on each end to hold them together, but any method that leaves the bottom of the pins exposed will work. Then I put them in the vise again because we need to bend them a little.

Be sure the pins are facing the right direction, the bend should be on the inside of the socket.

So the solder joint is stronger and cleaner, we need to bend the bottom pins a little. This way we aren't filling so much space with solder beads. Grab both pins and squeeze just a little, so the pins are closer together. This may vary a little bit and isn't incredibly crucial that it be exact.

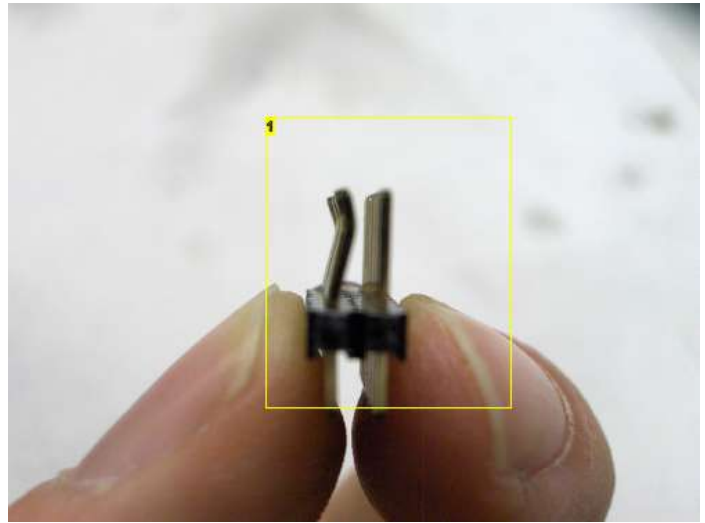
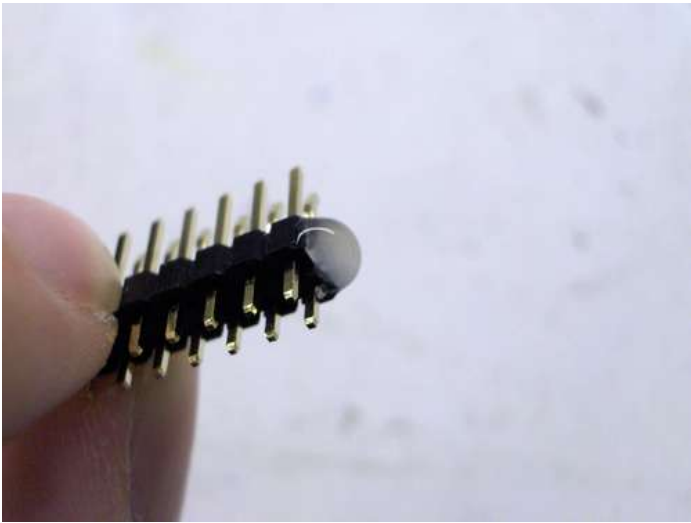
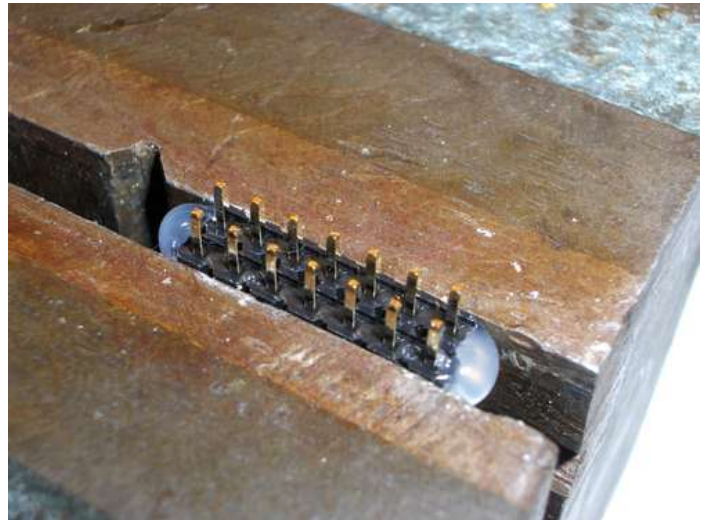
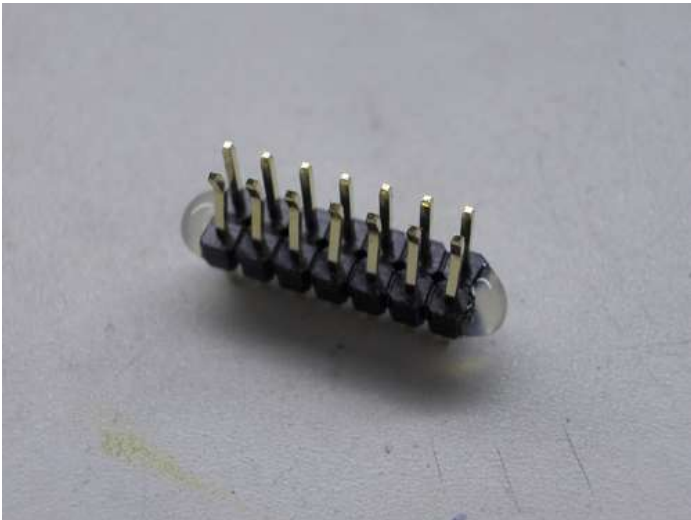


Image Notes

1. the bend is in



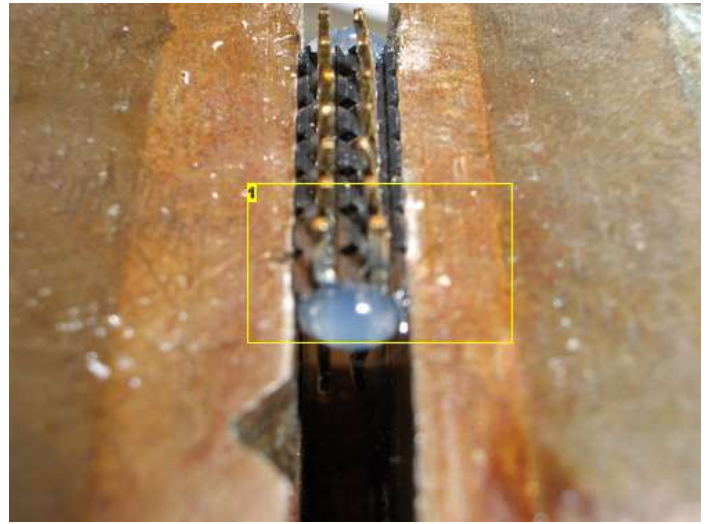


Image Notes

1. these are not bent yet, it's just a small little pinch

Step 5: Prep for soldering

If you have only two hands like me, you will want to make it easy to hold everything at the same time. I find that if I tin the leads, I can make a small solder joint to hold the pieces together the way I want without using one of my hands. I need to hold solder and an iron also. Tin the leads of the final row of header in addition to the double row that is the socket.

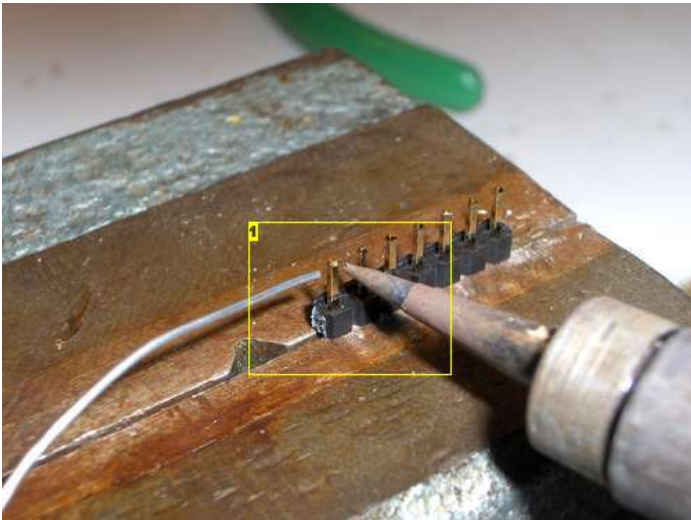


Image Notes

1. tinning makes everything easier

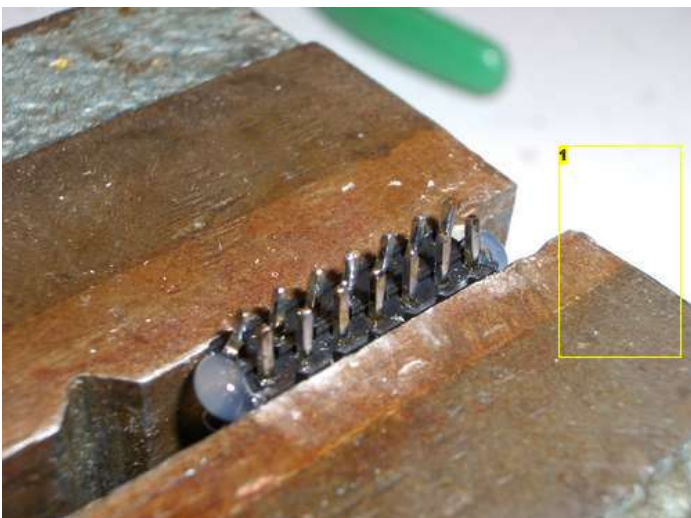


Image Notes

1. these leads are all tinned and ready for the final assembly

Step 6: Attach final header row

Here we get to the final part. You may choose to do vertical or right angle at this point. The only difference in in how you solder the last row on. I guess you could do some odd angle as well if you wanted.

Hold the last row exactly where you want it. Using the soldering iron, touch the tinned leads and the small amount of solder already there should hold the 2 pieces together. Finish all the other joints using more solder, and then add some solder to the first joint. Add a little more solder than necessary to ensure a strong bond, but not so much as to make a ball. These are partially structural, but you probably shouldn't be using this for anything that endures much force either.

You can remove the hot glue or whatever you used. The solder is holding the parts together just fine. It was only temporary anyways.

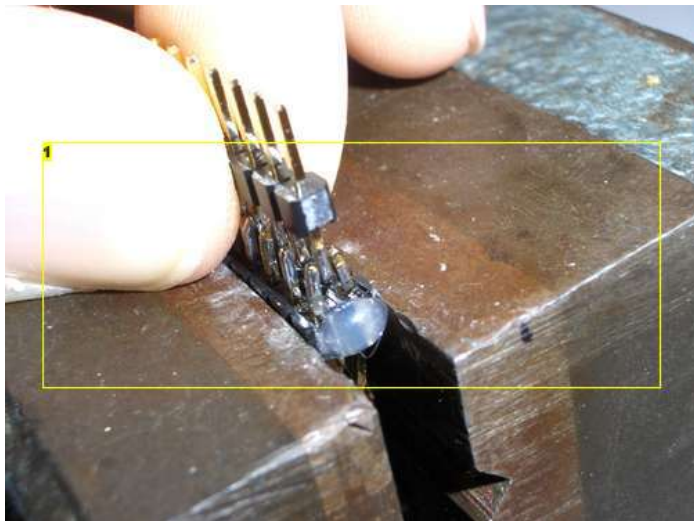


Image Notes

1. the lead from the single row kinda fits in between the pins from the socket

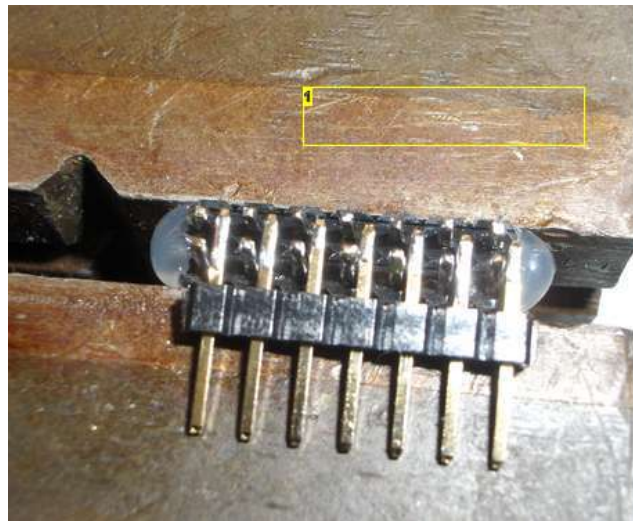


Image Notes

1. right angle view

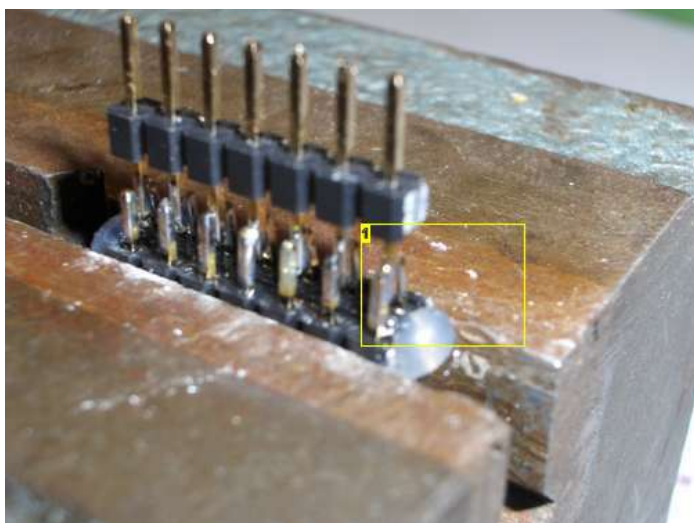


Image Notes

1. this is the only soldered lead, and only using the solder from the tinning. That saved me a second person's help (or a third hand tool which I don't have)

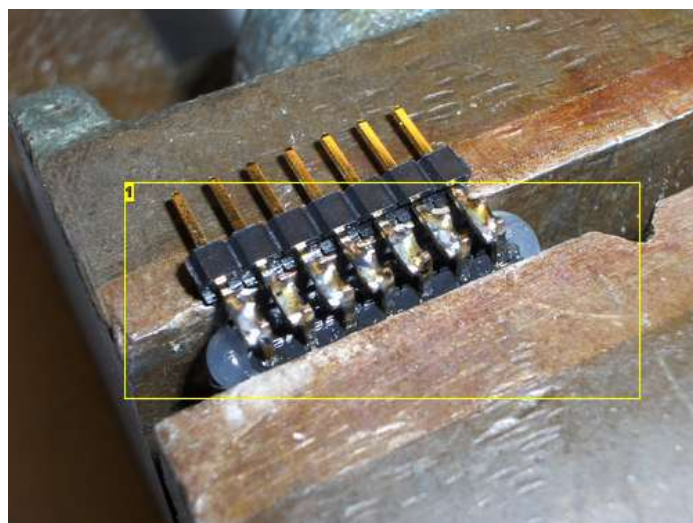


Image Notes

1. All leads soldered, use plenty of it!

Step 7: Prototype your circuit

And we're done. You now have an SD card socket that plugs directly onto a breadboard. What will you make now?

I made mine because I was building a data logger with my Arduino and a Memsic accelerometer, but the possibilities are endless.

Just be sure you don't short out pins 7 and 8, the socket can slide over to it, so be careful.

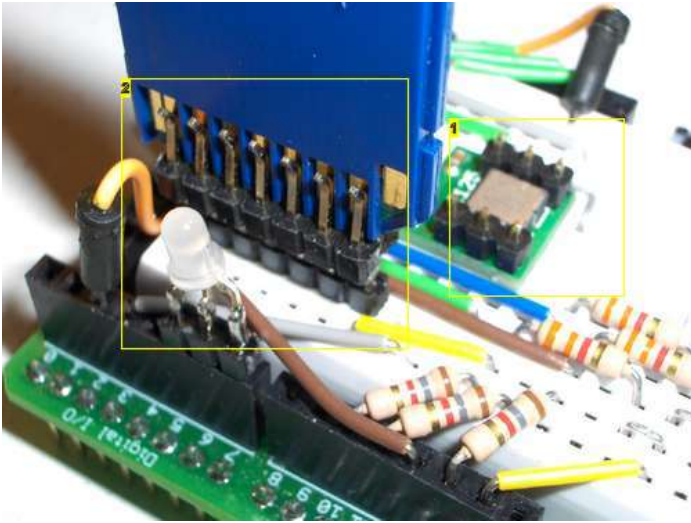


Image Notes

1. memsic dual axis accelerometer from parallax
2. vertical SD socket

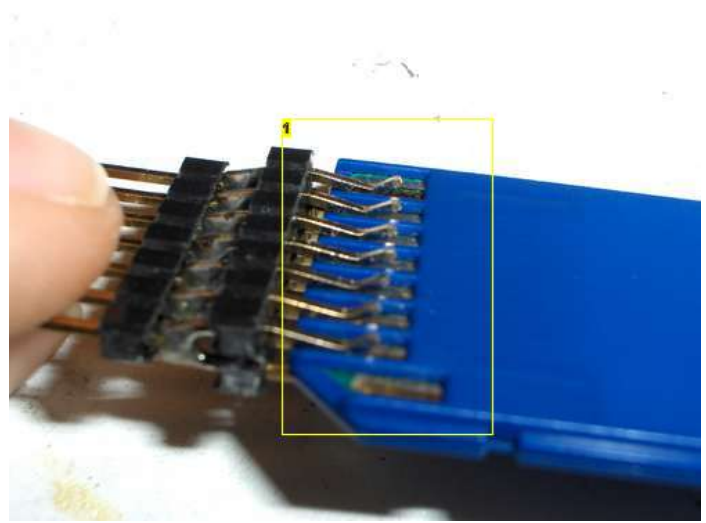


Image Notes

1. the pins pinch enough to hold and make contact, but it's easy to take it out / put it in

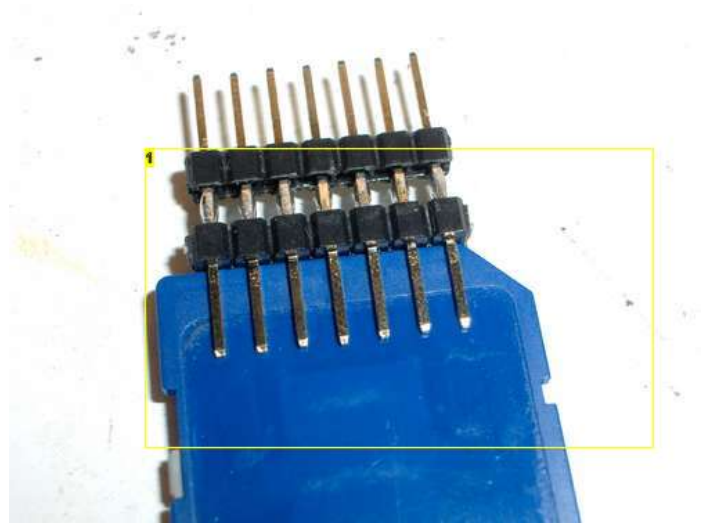
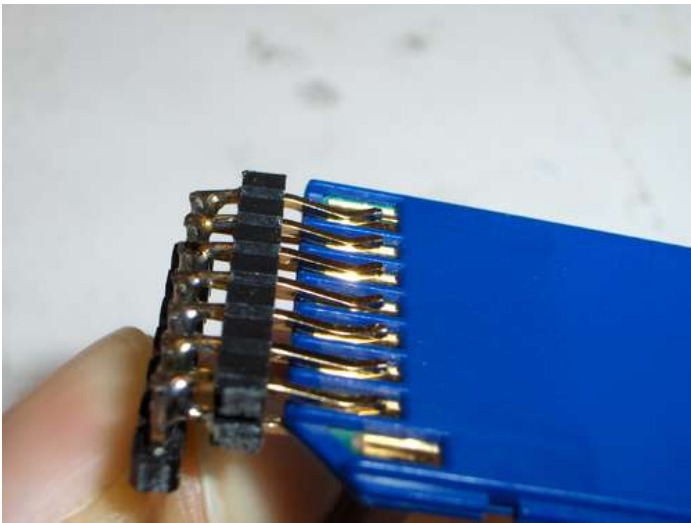


Image Notes

1. this is the back of the card. These pins just help hold it in place

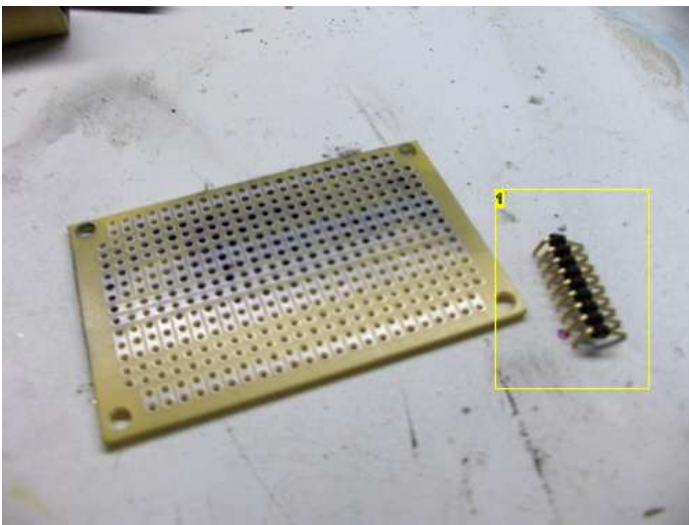


Image Notes

1. right angle header. I have noticed that some are different heights from the board. You should bend the pins accordingly so that the card will fit. I think in some cases this will require bending them up, or adding some extra space between the board and the header

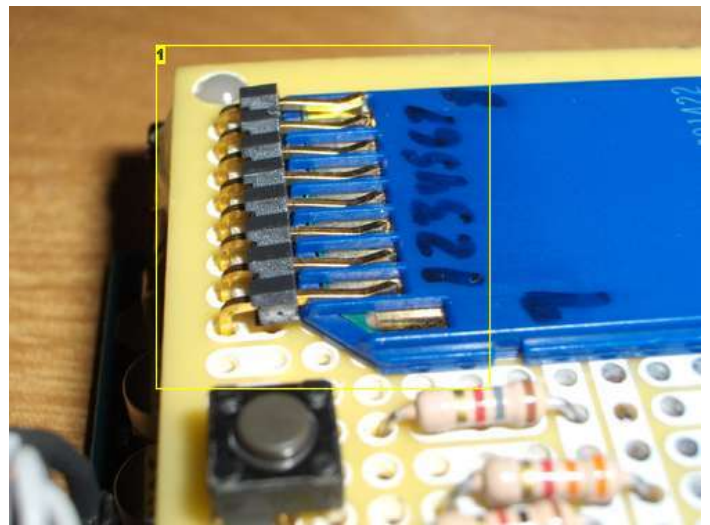


Image Notes

1. same method as the first, just with 2 fewer header rows.

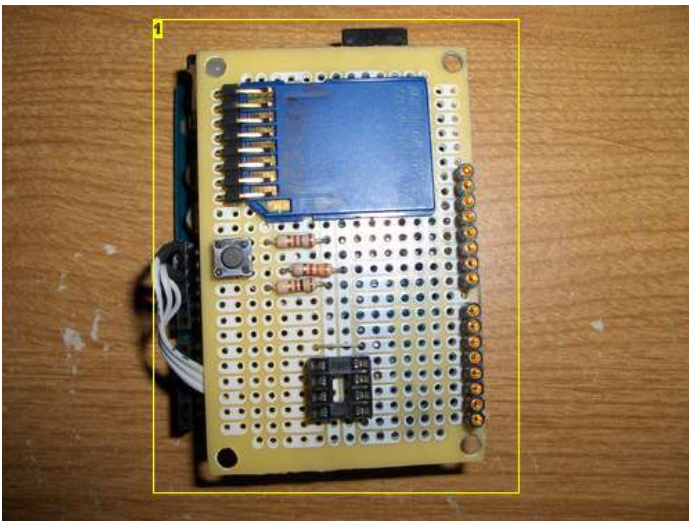


Image Notes

1. shield I built for the arduino I'm using this with. It is a datalogger for an accelerometer.

Related Instructables



Digital Window Sticker (Arduino Controlled) by als_liahona



Make MP3 and a Holga by joe



SD Card Adapter by vaati



Make a Talking Clock by nmcclana



Make MP3 Player by joe



Breadboard / Banana Jack Cable by lucas_m

Comments

50 comments

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raque says:
great! Thanks for sharing

Feb 25, 2011. 8:31 AM [REPLY](#)



CalcProgrammer1 says:
Thanks! I am learning how to use SD cards and prior to finding this I was just holding the card to some headers in the breadboard but it was introducing a lot of connection problems. This was easy and works perfectly! It makes a surprisingly good fit too.

Nov 21, 2010. 10:50 PM [REPLY](#)



Jaapio says:
Nice, now I just have to find out how to send commands and data in SPI mode and I can write data to a nice big storage.
You would not happen to know what the protocol to use?

Apr 14, 2010. 2:51 PM [REPLY](#)



TheZuke! says:
Kudos!

Jan 18, 2010. 11:13 AM [REPLY](#)



TheZuke! says:
Nice idea!

Jan 18, 2010. 11:11 AM [REPLY](#)



Davedwin says:
Thanks! I'm thinking about using this in a prototype that I'm making too (brainstorming right now). As a solution to the pin 7&8 possibly shorting out, you could paint over the unused one, OR since paint will eventually scrap off you could file off the pin altogether. It's just a prototype after all, and you can get new cards for <\$10.

Nov 19, 2009. 6:50 PM [REPLY](#)



als_liahona says:
Great idea, great Instructable! I just added a comment to my own Instructable (<http://www.instructables.com/id/Digital-Window-Sticker-Arduino-Controlled/>) recommending this as an alternative to the expensive SD Card breakout board I used!

Nov 17, 2009. 10:58 PM [REPLY](#)



T-virus says:
Great! Can I turn it into a USB SD card reader?

Aug 20, 2009. 9:11 PM [REPLY](#)



Kroden says:
I suppose you could pick up a USB driver IC and build an interface around it. I think it would save some trouble to just buy one, but it is however possible. It would probably use the SD mode, and as such, you would need pins on all 9 contacts. Good luck to you if you try this, I'd like to hear how it goes if you do.

Aug 21, 2009. 12:45 AM [REPLY](#)



T-virus says:
I'm not good at electronic anyway. I really like the vertical socket, it's look so COOL!!!

Aug 28, 2009. 7:54 AM [REPLY](#)



nevdull says:
Brilliant and fantastic!

Aug 24, 2009. 1:40 PM [REPLY](#)



frollard says:
Neat take on a simple project. Is there something more sturdy or ...suited for the backplate (non-data side) I wonder? The pins just seems like they want to be...not pins :D Looks great though!

Aug 18, 2009. 12:04 PM [REPLY](#)



frollard says:
**Good job on getting tagged on hackaday too!

Aug 18, 2009. 3:10 PM [REPLY](#)



Kroden says:
Thanks for pointing that out, I never expected that. I don't visit hackaday very often, so i might have never seen that. On the subject of the backplate, I've been thinking of a way to use a PCB as the backing, in a more permanent setting. I'll make an update if I ever get around to doing that.

Aug 18, 2009. 4:56 PM [REPLY](#)



frollard says:

ooh, thats a wonderful idea - bend the header appropriate for a card laying flat against the pcb...then solder header on - I like it. It would take some custom drilling, but wouldn't need anything more than perf board.

Aug 19, 2009. 6:00 AM [REPLY](#)



Kroden says:

Hey, you should check out step 8, new!

Aug 19, 2009. 9:59 PM [REPLY](#)



frollard says:

Wonderful!

Aug 21, 2009. 10:38 PM [REPLY](#)



GhostWolf says:

Nice one, I think that I am going to try to make a Parallel port to SD card adapter for my Atari ST and IBM PC.

Aug 21, 2009. 2:09 PM [REPLY](#)



KraZe_EyE says:

Very nice dude; im gonna use this in my class

Aug 19, 2009. 1:21 AM [REPLY](#)



Kroden says:

cool, what kind of class is it?

Aug 19, 2009. 10:00 PM [REPLY](#)



KraZe_EyE says:

Advanced Digital; use of microcontrollers and and memory and stuff like that. I bet my teacher will flip when I whip this out.

Aug 21, 2009. 1:02 PM [REPLY](#)



charlieb000 says:

use a microSD to SD adapter (comes with all/most micro SD cards) then you can swap cards with no soldering

Aug 21, 2009. 1:21 AM [REPLY](#)



brainmedley says:

FWIW a dual-row header works great for this. A couple tricks: I built mine with a dual-row header with roughly equal length pins so one side can grip the card while the other side is still long enough to plug deeply into a breadboard, also I bent the tips of the pins up first, then used a nail that just fit between the rows to make the "lower" bend, finally I slid a metal ruler in between to pry back open the gap so I now have a good - but not too tight - grip on the card. I found 8 or even 9 (x2) pins makes it easier to ensure that pin 7 doesn't get out of alignment. Thanks for bringing to my attention how easy it can be to use SD cards - I finally have a use for the 16MB(!) SD card that came with my camera so many (4) years ago.

Aug 20, 2009. 11:12 PM [REPLY](#)



Kroden says:

Glad you had luck with a double row header. I thought it might be possible, I just didn't have any to try it out with. I might try that 8 and 9 pin adjustment too, sounds better than risking a short. Thanks for the suggestion! And glad you could use the 16MB, thats the same capacity I was using.

Aug 21, 2009. 12:50 AM [REPLY](#)



jewelzc4 says:

Great Stuff, Very MacGyver. Also you got posted to MAKE blog

Aug 20, 2009. 5:02 PM [REPLY](#)



Kroden says:

Thanks! I hear those MacGyver comments a lot.

Aug 21, 2009. 12:46 AM [REPLY](#)



clone 452326 says:

id just go out and get a cheap sd adapter then solder the pins to it so it would be more sturdy

Aug 20, 2009. 2:52 PM [REPLY](#)



fin saunders says:

I'm more of a mechanical than ah, an electronical guy. So could you clarify that you are soldering both rows of two row pins to the single row. It looks that way to me, but I'm not sure. If that is the case, is it a concern that accidental contact with the backside holding/bracing pins could have a tragic influence on the CD card/arduino board? Just asking as a casual observer. Fin A bit of electrical tape folded over the pins or some other type of insulator to cover the backside holding pins could be cheap insurance against stray voltage, etc.

Aug 20, 2009. 8:01 AM [REPLY](#)



kintekobo says:

A small tweak would be to solder to a Mini-SD card adapter then you would be able to use it with Mini-SD's without having to solder to them.

Aug 20, 2009. 5:20 AM [REPLY](#)



Khord says:

This Instructable is an adapter - not soldered. The cards are removable.

Aug 20, 2009. 6:46 AM [REPLY](#)



kintekobo says:

You were ahead of me! :-)

Aug 20, 2009. 7:31 AM [REPLY](#)



gerrit_hoekstra says:

Brilliant in its simplicity!

Aug 20, 2009. 4:08 AM [REPLY](#)

You are right to hold the pins in a metal vice in step 5, so that the excess heat from the soldering operation can be dissipated, lest the plastic melts into a gloopy mess. (Past, failed experiences have taught me this!)



raykholo says:

totally agree with u there just sucks when u try to desolder a header and then the heat makes the pins fall out...

Aug 20, 2009. 6:55 AM [REPLY](#)



Kryptonite says:

Very nice I must say! Just curious, but what is this circuit you use it on? I'd love to do this but I don't know what I'd use it for, or how to make it.

Aug 19, 2009. 12:52 AM [REPLY](#)



Kroden says:

I'm using it as storage for a large file for datalogging. The Arduino can log data through the SPI interface with an SD card. I'm very new to this and am a little lost (im making my way through), but there are a bunch of projects with the arduino that use an SD card for mass storage. There's an mp3 player, a GPS that logs position, all sorts of stuff. Mine logs accelerometer data, and then I can graph it in excel.

Aug 19, 2009. 3:05 PM [REPLY](#)



Kryptonite says:

Very nice, do you have plans to make one into an Instructable? I'd love to see it.

Aug 19, 2009. 10:22 PM [REPLY](#)



Kroden says:

I added another step, it has a pinout for the card, as well as a right angle, flat, PCB socket instead of a breadboard socket. It used the PCB as the backing, is very robust, and holds the card well. Thanks to frollard for the inspiration!

Aug 19, 2009. 9:59 PM [REPLY](#)



jolshefsky says:

Could you add a step with a list of the SD card pins and why you don't need the outer two? Otherwise, this is very innovative and clever. Great job!

Aug 19, 2009. 7:52 AM [REPLY](#)



Kroden says:

I added the pinout to step 8, new!

Aug 19, 2009. 9:57 PM [REPLY](#)



sgt_pinky says:

Great 'ible. Clever idea. Will definitely use this approach when I have a need for an SD card in my project.

Aug 19, 2009. 7:33 PM [REPLY](#)



robomaniac says:

Hey man! Welcome to instructables. Very clever idea and nice instrutables! I give you 5 stars!

Aug 19, 2009. 5:10 PM [REPLY](#)



CADDBOY says:

Great idea & instructable. is there a pin diagram anywhere out there. Can this be used in with a usb connector? IF so which wires do solder where to get it to work?

Aug 19, 2009. 2:35 PM [REPLY](#)



Kroden says:

I'm relatively new to this, but here's my understanding of how SD cards work. They have 2 operating modes, one is fast and has good security features(SD mode), the other is slower and not secure (SPI mode). SPI mode is what the arduino is capable of using, so that is what I used. In SPI mode, pins 8 and 9 aren't used for anything. They are used in SD mode. Wikipedia has a pretty good writeup on SD card and their interface.

Aug 19, 2009. 3:11 PM [REPLY](#)



DriX says:

Why don't you use a two row header, instead of two one row headers? You could also cut the pins of the second row (wich holds in place de card on the other side), so you don't need to solder a third header. Sorry for my english.

Aug 19, 2009. 2:26 AM [REPLY](#)



sparkchaser says:

Aug 19, 2009. 10:00 AM [REPLY](#)

I suspect that bending the pins on a double-row header would be much more difficult, since you would have to use pliers that were small enough to fit between the two rows of pins. You probably could cut off the bottom part of the pins on the second row in order to avoid having to attach the third header, but only if you were mounting this on a PCB. When using this in a breadboard, the bottom half of the pins may not reach far enough on their own to make a connection.



Kroden says:

Aug 19, 2009. 3:09 PM [REPLY](#)

I thought of this after I made the first one. I reasoned as much about the second row getting in the way. I also didn't have any double row headers to try, so if you wanted you could give that a whirl. My guess is that it would work, but would be more difficult to do.



cogswell says:

Aug 19, 2009. 9:33 AM [REPLY](#)

another option (if you can still find one) is an old floppy disk edge connector. <http://www.instructables.com/id/SDMMC-fits-in-floppy-edge-connector/>



Psychic Master says:

Aug 18, 2009. 9:47 AM [REPLY](#)

can the chip be used as a microprosser...?



Kroden says:

Aug 18, 2009. 10:42 AM [REPLY](#)

The SD card is a memory card, like for a digital camera. it only stores data, it doesn't process anything. It can interface with a microprocessor if you have the software to do it. I'm using it to log accelerometer data read on an Arduino microprocessor.



Psychic Master says:

Aug 19, 2009. 7:17 AM [REPLY](#)

thanks thats all i need to know...

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