

Fixing a Seagate 7200.11 Hard Drive

Identifying the Problem

These are instructions for fixing a Seagate 7200.11 hard drive that is stuck in the BSY state. This can be determined by the fact that it won't be recognized by the computer's BIOS. If your drive is detected, but shows up as a size of 0, then your drive has a different problem and these instructions will not apply.

If your Seagate hard drive was bought at retail, then you are lucky. Seagate will fix your drive for free! See this [Seagate Forum Post](#) for more information about how to contact Seagate Tech Support to have them fix the issue for you.

If your drive is an OEM drive, then you're probably out of luck. My drive came with a Dell computer. It was under warranty, so Dell sent me a replacement hard drive, but they wouldn't do anything to help with data recovery. I was stuck with either paying someone to have it done, or doing it myself. I'm a pretty frugal guy, and the DIY method didn't sound too intimidating, so I gave it a try and was successful in un-bricking my drive.

These instructions are meant to be fairly comprehensive, with lots of pictures. After reading through them once, you'll probably want to refer to the [Short & Simple Instructions](#) for fixing your own drive.

I've read through a few other web pages to gather this information. The main one was this [MSFN thread](#). You need to read through that entire thread to get good information though - the OP has a few things wrong and is corrected by another poster in later posts.

NOTE: I am not an expert. I've gathered these instructions from other places and successfully followed them to repair my own drive. I do not guarantee that they will work for you. Proceed at your own risk.

What You Will Need

You will need some basic soldering tools. A simple soldering iron and resin-core solder will work fine.

You will also need a Torx T6 screwdriver for removing the hard drive's PCB.



The most important part, and the one you are least likely to already possess, is a serial-line TTL adapter. This is a device that will allow you to connect a computer to the serial line of the hard drive, allowing you to send it commands and receive replies (the hard drive is really a little computer itself). A direct serial-line connection won't work, because the RS-232 spec uses 12v, while the hard drive prefers about 3-5v. So you'll need some sort of adapter.

I picked this [RS232-to-TTL Adapter](#) from [alldav.com](#). It connects to a computer's serial port, and it only costs \$4, including shipping:

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Of course, this will only work if you own a computer with a serial port. Many modern computers do not have serial ports. If you don't have one, you could try this USB to UART adapter instead. It's \$6 shipped. The good news is that less soldering should be necessary, since it is powered from the computer's USB port. I haven't tried using one of them, so I can't guarantee that it will work. Other people have had luck with random cell phone USB adapters that happened to contain the right type of electronics. The MSFN thread referenced above contains more information.

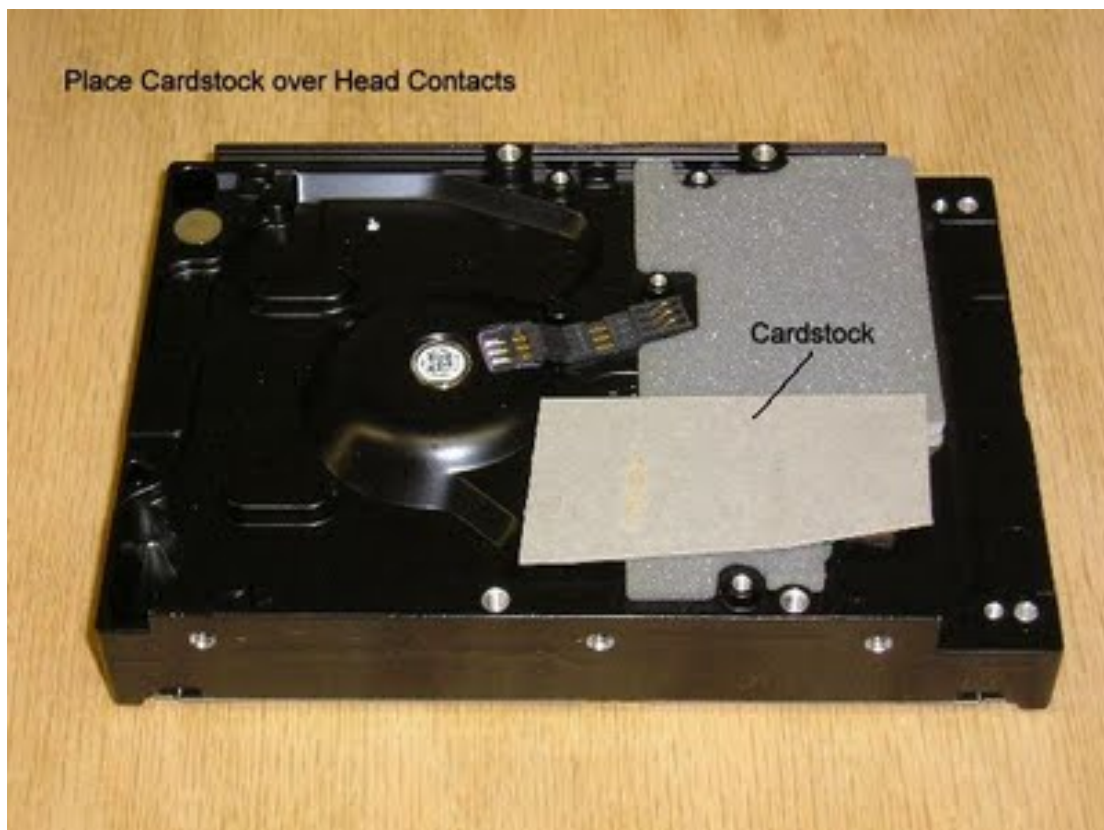
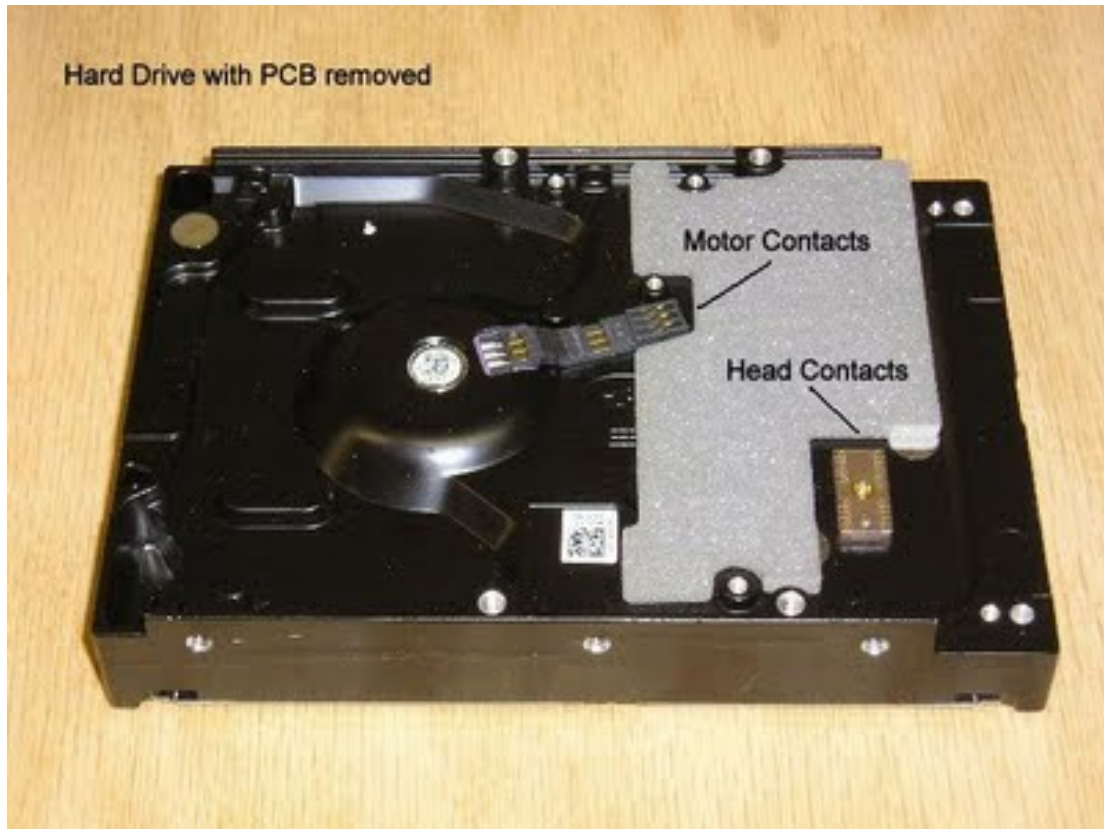
Finally, you'll need various wires and connectors for putting everything together. I simply made do with what I had lying around, and if you're the type of DIYer who's actually considering this project, you'll probably be able to do the same.

Hardware Preparation

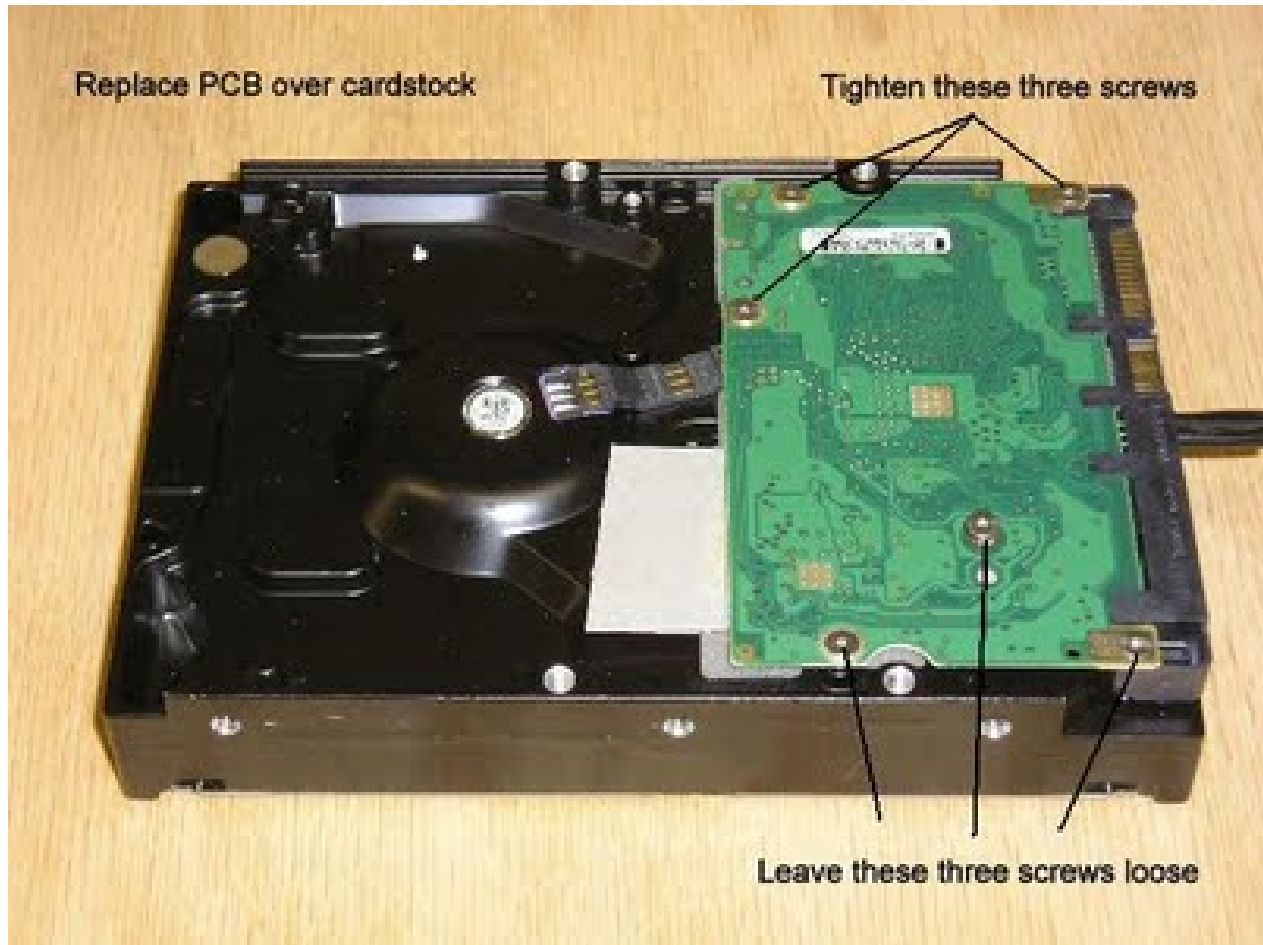
Prepare Drive

Loosen or remove the PCB from the hard drive. Place cardstock between the PCB and the contacts for the drive head. Leave the drive motor contacts in place. Tighten the three screws closest to the motor contacts. Leave the other three screws loose or removed.

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You will need to connect a power supply to the hard drive PCB, but do not do so yet. Wait until after you have tested your RS232-to-TTL adapter.

Preparing the RS232-to-TTL Adapter

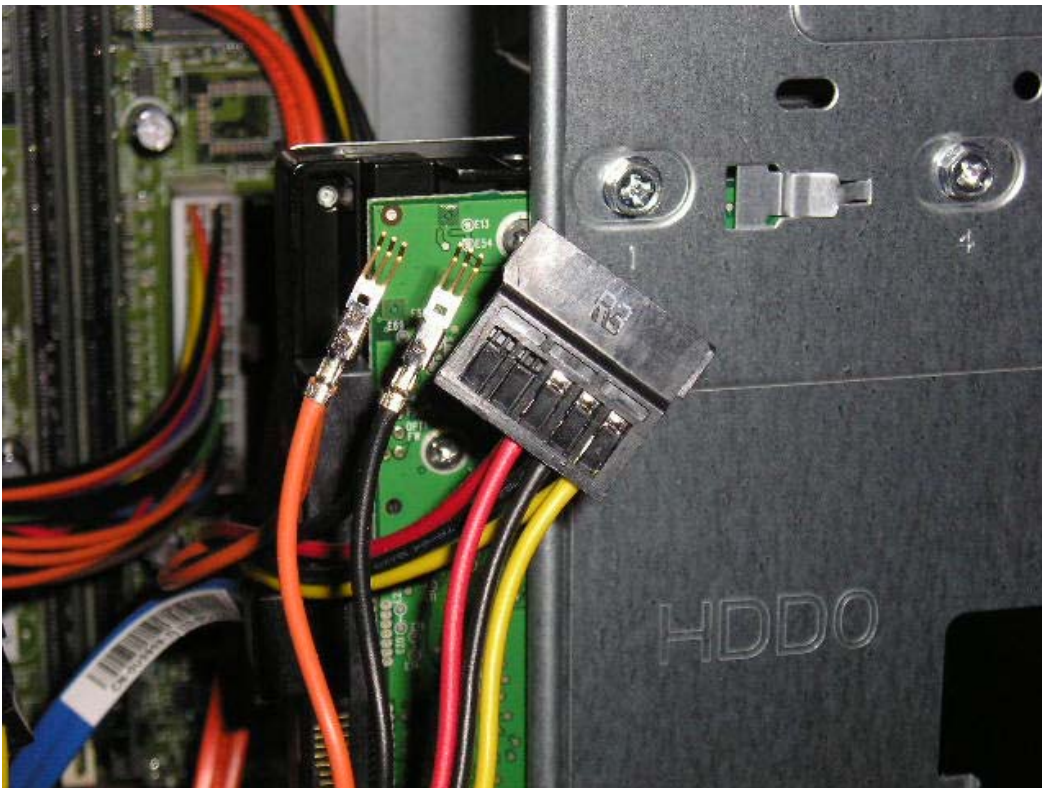
Powering the RS232-to-TTL Adapter

Connect power to the RS232-to-TTL adapter. I suggest using +3.3v from the same power supply that you will use to power the hard drive (orange wire is 3.3v, black is ground). These images show how I take apart a SATA power connector in order to connect the 3.3V line to the RS232-to-TTL adapter. Click on the pictures to enlarge. Here's a connector:

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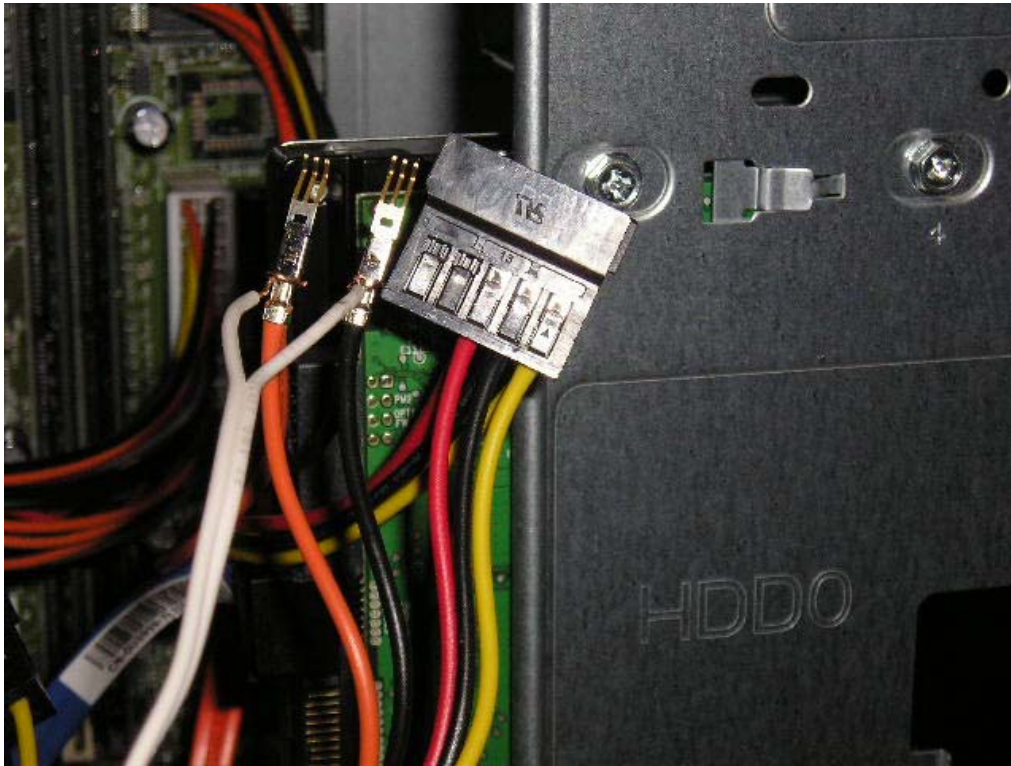


If you lift up on the tabs in the black plastic connector, you can remove the contacts. This shows two contacts removed (3.3v and ground):



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Next, I wrapped wires around these contacts (the other end of these wires will be soldered to the RS232-to-TTL's Vcc & ground contacts).



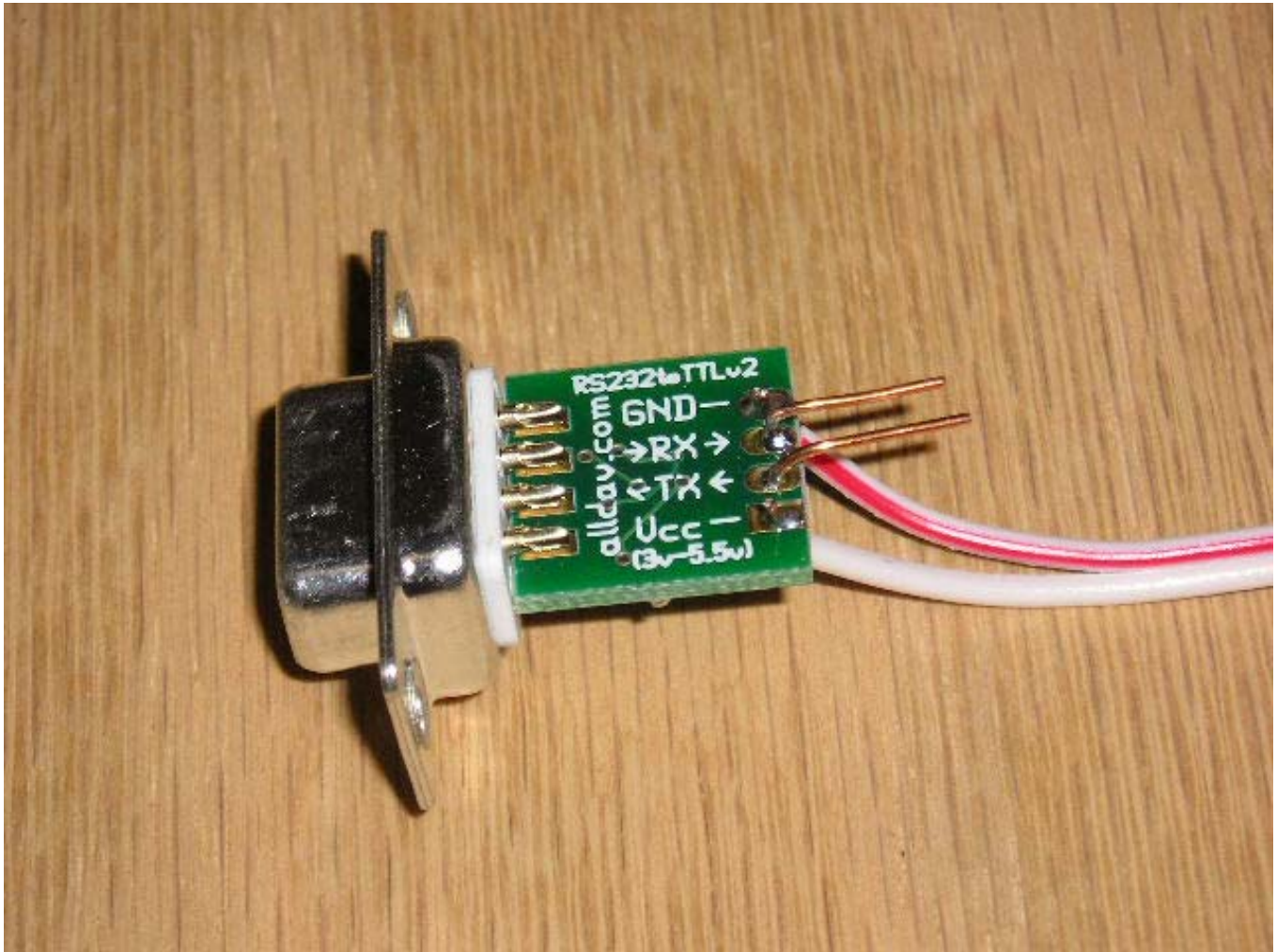
Finally, I wrapped the contacts with electrical tape to make sure they don't touch each other or anything else:



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You can also use a 3V battery, or 2 or 3 AA's in series, etc. If using a battery, you must also connect the RS232-to-TTL adapter's ground pin to the hard drive ground pin, or it will not work. The two devices must share a common ground in order to communicate. If they're powered by the same power supply, then that will insure that they share a ground.

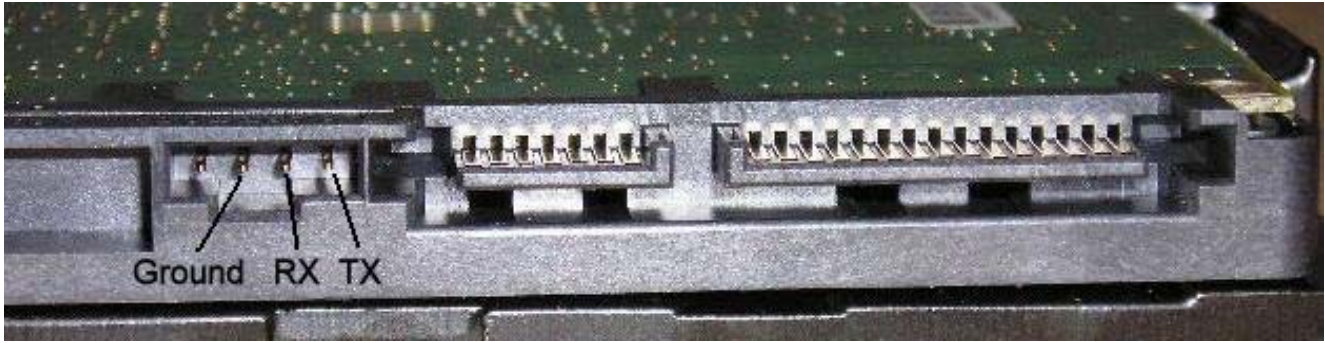
Here is the RS232-to-TTL adapter with the power supply wires connected, as well as a couple of short wires soldered to the RX & TX contacts to act as a poor-man's "header".



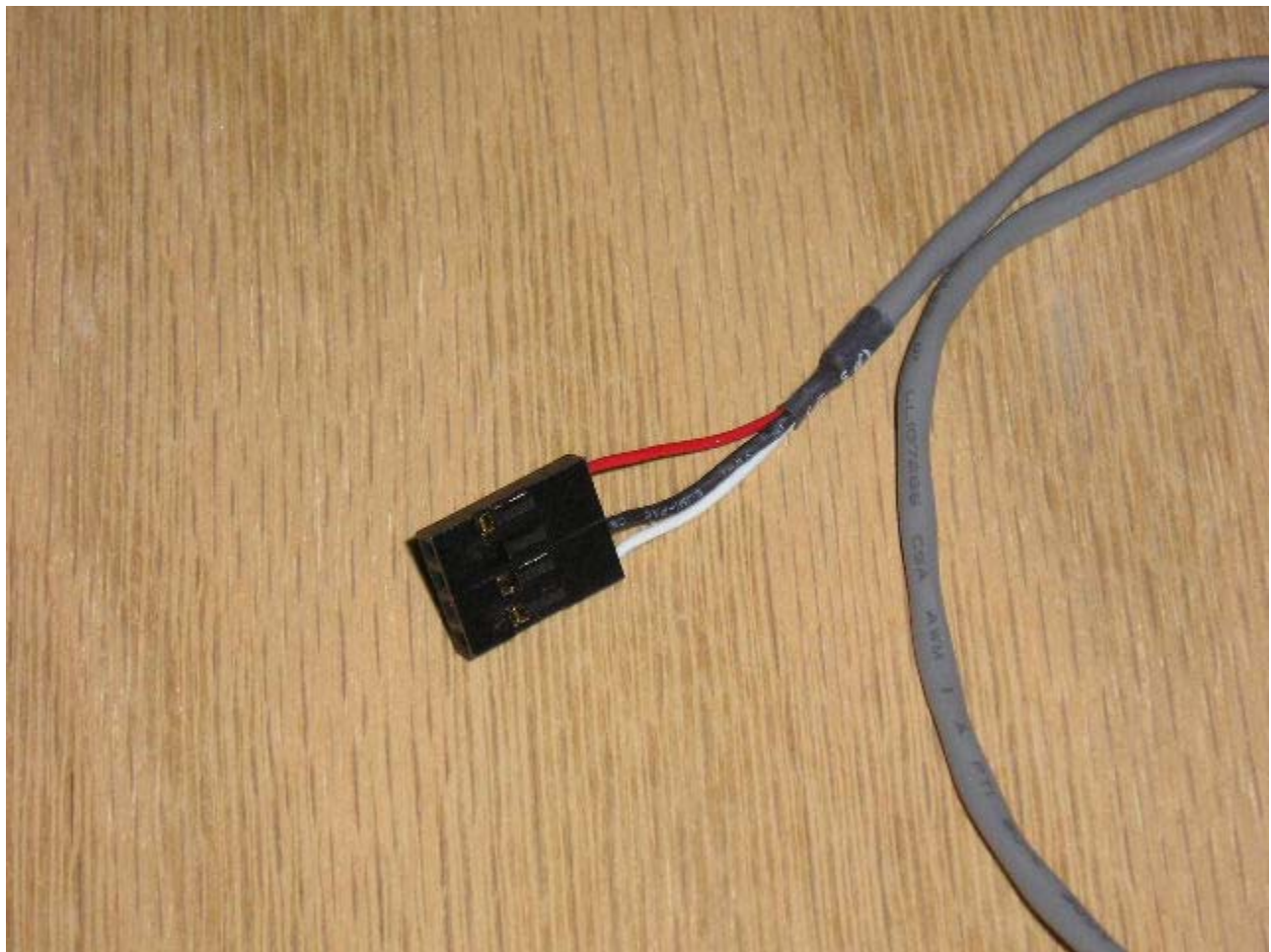
Connecting the RS232-to-TTL Adapter to the Hard Drive

You will be connecting two wires between the RS232-to-TTL adapter and the hard drive: receive (RX) & transmit (TX) for the serial connection. You should connect the TX pin of the hard drive to the RX pin of the adapter, and the hard drive's RX pin to the adapter's TX pin. These pins are located next to the hard drive's SATA connector.

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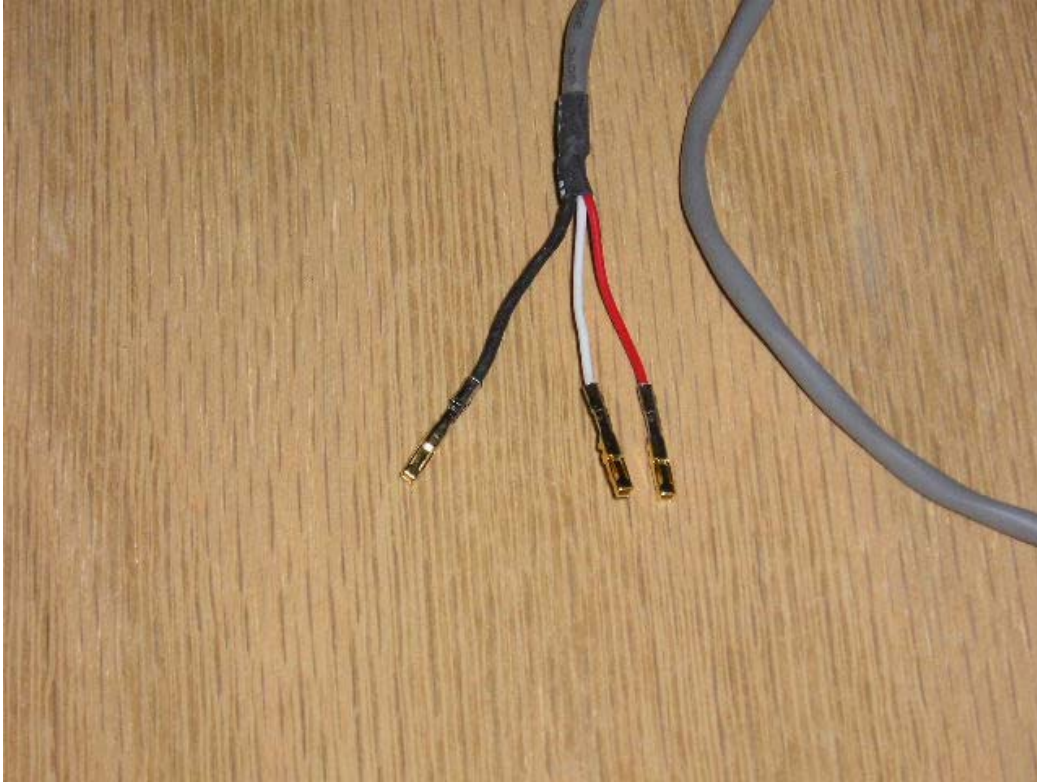


I didn't have a connector that would plug into the outlet on the hard drive. I did have one from an old PC that was just a bit too large - I think it was an internal connector for the lights, or maybe the PC speaker. This picture shows one of the ends of my cable. Click on the image to enlarge:

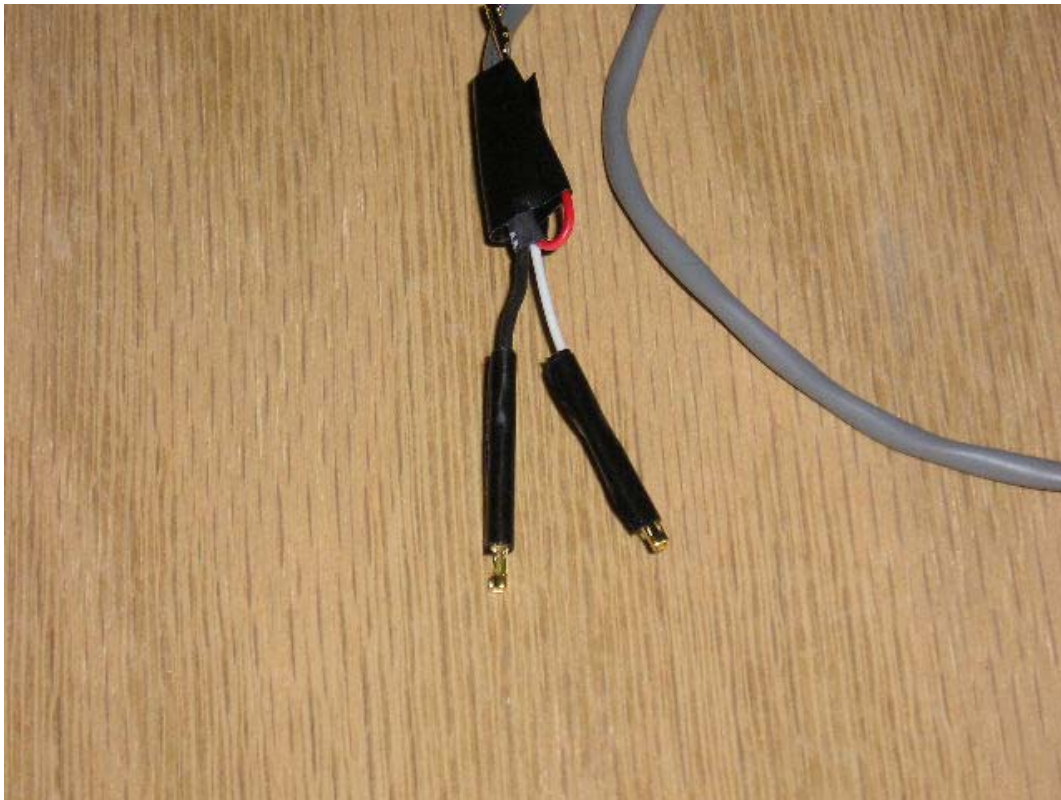


There are small tabs on the black plastic connector. If you lift up on these, you can pull out the contacts. These contacts are the right size for connecting to the hard drive's RX and TX pins:

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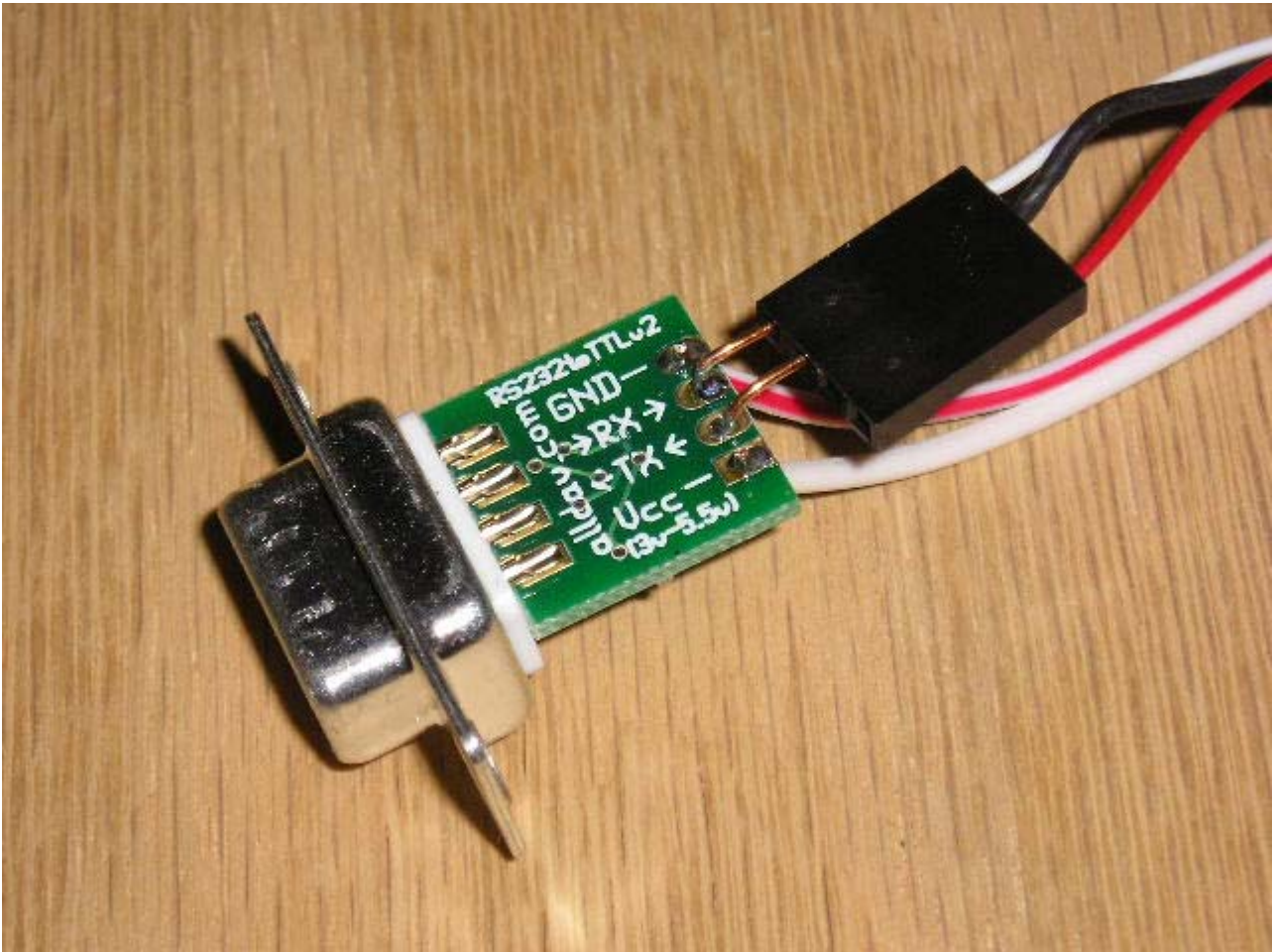


Finally, I wrapped the contacts in electrical tape to make sure they don't touch each other or anything else. These connect to the RX & TX pins on the hard drive. But don't connect them just yet - we're going to test the adapter first.



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Next, I connected the other end of this cable to the wires that I had soldered to the RS232-to-TTL adapter's RX & TX contacts:



Next, connect the RS232-to-TTL adapter to a computer's serial port. This is the computer you will be using as a terminal to communicate with the hard drive. I just plugged the adapter directly into the serial port.

Terminal Configuration

You will need a terminal program on the computer to which you connect the RS232-to-TTL adapter. You can use Hyperterminal, which comes with Windows XP & earlier. I suggest using putty, but any terminal program will do.

Configure your terminal program to use the serial port with the following settings:

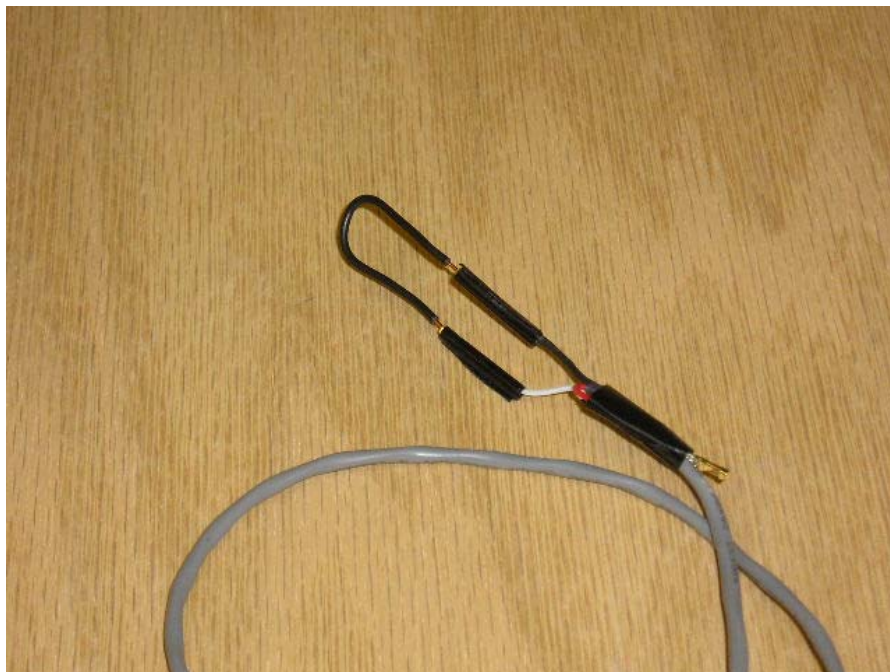
Baud	38400
Data Bits	8
Stop Bits	1
Parity	none
Flow Control	none

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Testing the RS232-to-TTL Adapter

Confirm that the RS232-to-TTL adapter is connected to the laptop, the power supply is connected to the RS232-to-TTL adapter, and the hard drive is not connected to anything. Turn on the power supply, and start your terminal program. Type a few letters. If you see the letters that you type, then you have your terminal program in "local echo" mode. Turn this feature off, otherwise you'll see double characters when talking to your hard drive.

Next, create a loopback connection on the adapter. All you need to do is connect the RX & TX pins of the adapter together. These pictures show a loopback being created by connecting a wire between the contacts that will eventually connect to the hard drive:



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Now if you type into your terminal program, you should see the characters being displayed. If not, then there's something wrong with your RS232-to-TTL adapter, and you should not proceed until you determine the problem and fix it.

Fixing The Drive

Turn off your power supply. Connect the RS232-to-TTL adapter to the hard drive's serial pins.



Attach the power supply's SATA power connector to the hard drive. Turn on power to the RS232-to-TTL adapter and the hard drive.

NOTE: Commands for you to type are in red boldface. Pay attention to upper & lower case - it is important.

After a few seconds, Press CTRL+z. You should then see a prompt like this:

```
F3 T>
```

If not, you may have the TX & RX wires swapped. Switch them and try again.

```
Access Level 2 (type /2):
```

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```
F3 T>/2 (enter)
F3 2>
```

Wait about 20 seconds, then spin down the motor:

```
F3 2>Z (enter)

Spin Down Complete
Elapsed Time 0.147 msec
F3 2>
```

If you instead see a message similar to this:

```
LED: 000000CE FAddr: 00280D4D
```

Then you entered the commands too quickly after supplying power to the drive. Cycle power, wait 20 seconds, then begin again.

Very carefully, remove the cardstock that you placed between the PCB and the drive head contacts. Carefully replace and tighten the 3 loose screws. If you removed the screws, I suggest using a small piece of masking tape to help you hold the screws while you put them back in place. Then start the motor:

```
F3 2>U (enter)

Spin Up Complete
Elapsed Time 7.093 secs
F3 2>
```

Next go to Level 1 (type /1):

```
F3 2>/1 (enter)
```

And do a S.M.A.R.T. erase (create S.M.A.R.T. sector):

```
F3 1>N1 (enter)
```

When the prompt comes back up, turn off power to the hard drive, wait a few seconds, then turn it back on. Wait about 20 seconds, then finally do partition regeneration:

```
F3 T>m0,2,2,0,0,0,0,22 (enter)
```

After 15-30 seconds, you should see something like:

```
Max Wr Retries = 00, Max Rd Retries = 00, Max ECC T-Level = 14, Max
Certify Rewrite Retries = 00C8
```

```
User Partition Format 10% complete, Zone 00, Pass 00, LBA 00004339,
ErrCode 00000080, Elapsed Time 0 mins 05 secs
```

```
User Partition Format Successful - Elapsed Time 0 mins 05 secs
```

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Do not turn off drive until you see this message.

Once seen, drive can be turned off.

Power down everything, place drive back into your computer, and confirm that it's working.