

THE COMPUTER CORNER

## No. 144. How to Recycle a Hard Drive

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I admit to being a sort of recycling nut. All plastics, paper, aluminum and other metals in my household find their way to the recyclers at some point. Yes, I said all plastics. Most communities tell you they will take only #2 plastic, but they will recycle others if you put them in your plastic recyclables. Hard drives should be recycled, too.

Let us suppose you have an old 10Gb hard drive with sensitive data on it – stuff that is personal and you don't want it seen by anyone else. A quick and dirty way to fix that is to drill a hole through the entire drive, then throw it in the trash. But most of that drive is recyclable, and I propose you treat it differently here.

A benefit is that most of the weight of that drive is aluminum, which you can put in with your aluminum cans. You will also learn something by disassembly – hard drives are fascinating pieces of technology. They are easily the most complicated mass-marketed electromechanical devices on the planet. Another benefit is that the drive contains one or two powerful permanent magnets. And, I mean really powerful (watch your fingers while handling them – if you are holding them and get near a large piece of steel). You can use them for all sorts of projects around the house, shop or shack. I have a couple on my drill press to hold the chuck key and spare bits. More are on the kitchen refrigerator, glued to the back of old CPUs to act as interesting holders for theater tickets, notes and the like. Others are there glued on the back of little notepaper pads. You'll find lots of uses for the magnets.

So the aim here is to disassemble the drive into its components, to learn something about hard drives in the process, to use the useful parts (magnets) and to recycle everything else. You may need some pretty fine Torxx bits for older drives. Some years ago, drive manufacturers wanted to make it difficult for people to get inside, so they used fine Torxx screws of a size not usually available. Even before that, they used security screws – Torxx screws with a pin in the center of the screw head, so only a special security bit with a hole in its center would fit the screw. In the last few years, most manufacturers have abandoned that ploy, because drives are now cheap and it doesn't pay the average user to get inside to try and fix them (though it can be done, and no, you don't need a "clean room" to do it, just a large, clean plastic bag). So, here is the approach to disassembly.

Start on the bottom where the drive controller circuit board resides. Take out all 3, 4 or 5 screws. Lift off the circuit board – it will be stuck at the end where gold pins on the board insert into a row of sockets on the drive bottom. Just pry it up with a small screwdriver. Toss the board in the general metal recycling bin and throw away any foam gaskets that were underneath it. Flip the drive over.

Remove the (typically) six screws around the cover periphery. That is not all the screws – there are more that hold the cover down, but they are hidden. Feel the large label on the top of the cover – press down as you do so. You will discover one or two depressions under the label. Use a knife or sharp screwdriver to break the label and remove it in these areas. You will discover one or two screws under the label. Remove these, too. The cover is almost ready to remove.

Some drives (Western Digital) have a narrow metal tape that seals the cover all around the periphery of the drive. Pry it free on the back of the drive where the tape overlaps, and you can peel it off the whole drive with a single pull. Alternatively, you can cut the tape with a razor knife to release the cover (but be careful not to cut yourself). Other brands just use a gasket under the cover. Now, use a flat bladed

screwdriver to pry the cover free – and put the cover in the general metal recycling bin. It is not aluminum.

Look at that beautiful, complicated mechanism inside! Notice the shiny (aluminum) platters? Spin them with your fingers. They have been sputter coated with a magnetic medium. That is where the data resides, as zeros or ones. Note the heads and how they travel over the platters – move the arm with your fingers. Yep, that tiny little square at the end of the arm is what reads and writes to the platter. Neat!

Now remove any screws you see near the base of the read/write arm(s), including any that hold the magnets. You'll immediately know where the magnets are because they will pull your driver bit very strongly. Now use a screwdriver to pry up the top magnet and (carefully, now) set it aside. Unscrew the axis of the read/write arm(s). Pull all that stuff out and put it in the general metal recycling bin. Remove the bottom magnet if there is one.

Note that the magnets are glued to a piece of steel. Put the end of just the steel piece in your vise, and bend the other end with pliers. Now you can get a screwdriver between the magnet and steel piece. Pry the magnet off and carefully set it aside for later projects. Throw the steel in the recycling bin.

Now, back to the platters. Remove the (4-6) screws in the middle and remove the metal washer; put it in your washer bin. Now, turn the drive upside down and let the platters, and their separating rings, drop on your workspace. The platters and rings are all aluminum, so put them in the aluminum bin. Or, maybe keep the platters to hang in your cornfield to keep the crows away!

Below the platters is the drive motor. Sometimes you can remove it by unscrewing three holding screws. If so, put it in the general metal recycling.

The main, bottom housing is pure aluminum. Put that in with your aluminum cans – the recycler will be happy to get it. You are done. The benefits: 1. You have learned something about the construction of hard drives. 2. You now have one or two very powerful magnets (keep them well away from any working hard drives!). 3. You have contributed to the metal recycling program. Happy Computing!