Want a tiny, HIGH PO
Start with an old CD

Did you know that you can convert the flea-power motors from old CD or DVD-ROM drives to high-power operation – eg, for model aircraft or other demanding uses? While it may seem improbable it is relatively easy to do, the main change being to fit Neodymium 'Rare Earth' magnets. Oh, you also need to find some suitable motors.

I've been interested in aero-modelling for many years. When I heard whispers a while ago that I could make my own high-performance brushless model aircraft motors using parts salvaged from an old floppy disk or CD-ROM/DVD drive, at first I was sceptical.

But after doing a little research, I found that it was indeed possible. It seemed that all that was basically required was to place some so-called "super magnets" inside the motor and to replace the windings to enable higher current flow.

However, as with many projects, when I looked further into it I discovered it wasn't going to be as straightforward as I'd imagined.

I would need to find a good source of old drives, locate the required type of neodymium 'rare earth' magnets, suitable ball-bearings and would need access to a lathe.

The lathe wouldn't be a problem because my dad recently gave me his old Emco on permanent loan. Finding the right bearings also wasn't much of an issue; the types required are used extensively in the likes of model helicopters and cars and are sold in most model shops (and are also widely available online).

The magnet hurdle also proved easy enough to overcome since I soon found a source on the web prepared to ship as many as I wanted and so I promptly sent away for a couple of sets. The next big problem was impatience; the magnets would take a couple of weeks and I wanted be up and running today!

Sourcing parts

Since I own a computer repair company, finding old drives is not a problem; most workshops like ours have a healthy stack of them until periodic clean-outs mean we get to start on a new stack. It is worth ringing around to see what repair shops have available – and avoid those who'll want to charge you for taking away what is essentially rubbish.

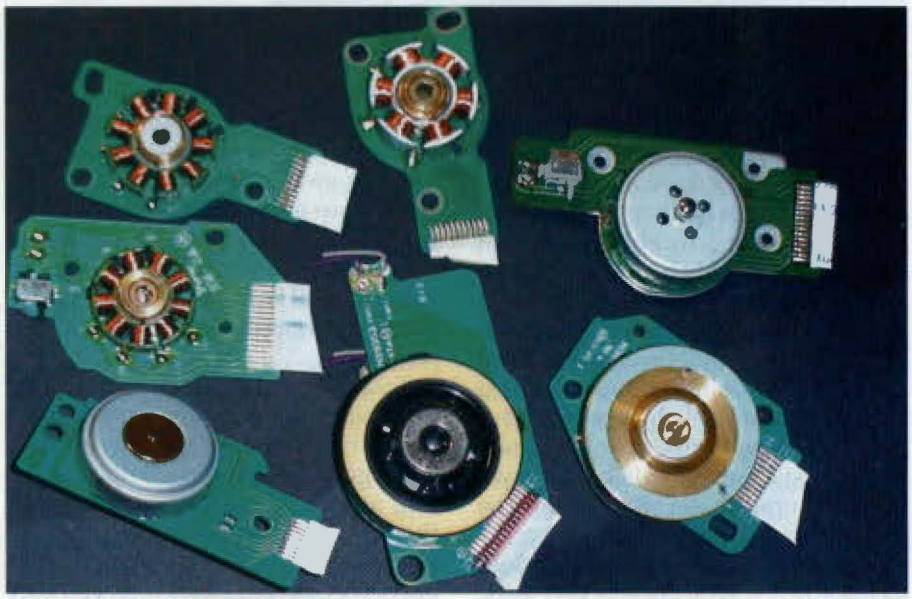
One of the bigger problems you'll face is that many optical drives don't use what has become the standard-sized motor; a roughly 25-27mm diameter can/bell with an overall thickness or bell depth of around 6mm. While you can theoretically make your brushless motor from any old drive motor you salvage, many are not particularly suitable for the job, nor are they physically compatible with the standard sizes of available magnets, the majority of which have been designed to fit the 25-27mm motor mentioned above.

I stripped half a dozen old drives to get a couple of decent bells. So get

Here's a typical (if a little ancient these days!) CD-ROM drive, shown in its "as-removed-from-old-PC" state at left. The centre photo shows the controller board removed, revealing the motor in the centre (circled). Finally, the photo at right shows what we are after: the motor removed from the CD-ROM drive (via those three Phillips screws on the bracket in the centre photo) and held in the hand to show just how small the motor actually is. Despite its tiny size, it's quite a powerful little beast and, just as importantly, is very reliable (when CD-ROM drives fail, it's very seldom the motor that has given up the ghost). But even more importantly, this motor can be modified to give significantly more power output – enough, in fact, to power an electric model aircraft. And that's what we are doing in this feature.

VER brushless motor? /DVD-ROM drive!

By Dave Thompson



At right: an assortment of motors pulled from various surplus drives. Note the variety of styles and sizes; while you can fashion your motor using any sized 'donor' motor, most builders use the 26mm model because the majority of available jigs and magnets are designed for this 'standard-sized' body.

as many old drives as you can while you're on the scrounge.

If you're wondering why I didn't simply work out which make and models of drive contain the right motors and look for them, rather than go through all this rigmarole, it isn't that simple.

You can take two outwardly-indistinguishable models and find they have significantly different mechanisms. The chipset and firmware might be the same but the cradle, motor and laser assemblies vary greatly from drive to drive, even within supposedly "identical" models.

Useful bits and pieces

Regarding other parts in your optical drive, there are several parts which could come in useful.

Retain the chromed shafts the laser assembly runs on, as you can use these for prop shafts. They are usually high-quality chromed steel and well worth saving, though as they are often coated with grease, you'll probably have to clean them before use.

Also take care with the laser. If your donor unit is an 8X or faster DVD drive, the laser diode is a sought-after component for optics experimenters who want them for match-lighting and balloon-popping laser projects so careful extraction is well worth-while.

I suppose you could even sell the laser for a few dollars to cover any costs you may have incurred obtaining the drive, or save it for your own evil-genius laser projects.

Then again, anyone who wants one of these has probably scrounged it themselves (and possibly discarded the motor!).

If you do decide to salvage it, take great care as I've discovered these laser diodes to be extremely static-sensitive and physically easy to damage and they are usually solidly fastened to the head assembly.

While you are breaking the drive down, there may also be many little gears, switches, bearings, belts and other bits and pieces that always come in handy so get as much as you can from each drive.

Even if the motor is not a suitable donor there are plenty of other goodies worth salvaging or passing on to someone who will use them.

Which motor type?

There are two basic configurations: in-runners and out-runners. An example of an in-runner motor is your typical DC brushed unit, in which the

A small selection of the thousands of commercial brushless motors available. They're easily distinguishable from standard (ie brushed) motors because invariaby they will have three wires – brushed motors have just two.