

⑥ Can I Use the Optical Pickup from a CD/DVD Player or CD/DVDROM for Interferometry?

With the nice precision optics, electromechanical actuators, laser diode, and photodiode array present in the mass produced pickup of a CD/DVD player, CD/DVDROM drive, or other optical disc/k drive, one would think that alternative uses could be found for this assembly after it has served for many years performing its intended functions – or perhaps, much earlier, depending on your relative priorities. :-)

(Also see the section: [Using a CD or DVD Optical Pickup in a Precision Position or Angle Encoder](#).)

People sometimes ask about using the focused laser beam for scanning or interferometry. This requires among other things convincing the logic in the CD/DVD player or CD/DVDROM drive to turn the laser on and leave it on despite the possible inability to focus, track, or read data. The alternative is to remove the optical pickup entirely and drive it externally.

If you keep the pickup installed in the CD player (or other equipment), what you want to do isn't going to be easy since the microcontroller will probably abort operation and turn off the laser based on a failure of the focus as well as inability to return valid data after some period of time.

However, you may be able to cheat:

- If the unit has a 'Test Mode', it may be possible to force the laser to remain on despite a total lack of return signal – or even without the focus and tracking actuators even being connected, for that matter. Many models have a Test switch, jumper, or pair of solder pads on the mainboard (enable before powering up). Then, there may be a key sequence to enable the laser, move the sled, etc. See the document: [Notes on the Troubleshooting and Repair of Compact Disc Players and CDROM Drives](#) for more information.

Where such a feature is not provided:

- First, whatever is used to detect a disc must be defeated. Usually, this is a reflection of the laser (most common), but may be a separate sensor.
- Then, the 'focus ok' signal must be provided even if you are not attempting to focus the laser beam. It may be possible to tie this signal to the appropriate logic level to do this.
- Even if it is not possible to access these signals, depending on design, you may be able to locate the logic signal to turn on the laser and enable it there. However, some systems bury this inside a chip based on the controller to activate it. Getting a schematic will probably be essential – but this may be difficult (especially for a CDROM).

CAUTION: Take care around the lens since the laser will be on even when there is no disc in place and its beam is essentially invisible. See the section: [Diode Laser Safety](#) before attempting to power a naked CD player or similar device.

It may be easier to just remove the pickup entirely and drive it directly. Of course you need to provide a proper laser diode power supply to avoid damaging it. See the chapter: [Diode Laser Power Supplies](#) for

details. You will then have to provide the focus and/or tracking servo front-end electronics (if you need to process their signals or drive their actuators) but these should not be that complex.

Some people have used intact CD player, CDRom, and other optical disc/k drive pickup assemblies to construct short range interferometers. While they have had some success, the 'instruments' constructed in this manner have proven to be noisy and finicky. I suspect this is due more to the construction of the optical block which doesn't usually take great care in suppressing stray and unwanted reflections (which may not matter that much for the original optical pickup application but can be very significant for interferometry) rather than a fundamental limitation with the coherence length or other properties of the diode laser light source itself as is generally assumed.

In any case, some of the components from the optical block of that dead CD/DVD player may be useful even if you will be substituting a nice HeNe laser for the original laser diode in your experiments. Although CD optics are optimized for the IR wavelength (generally 780 nm), parts like lenses, diffraction grating (if present and should you need it), and the photodiode array, will work fine for visible light. However, the mirrors and beamsplitter (if present) may not be much better than pieces of clear glass! (DVDs lasers are 635 to 650 nm red, so the optics will be fine in any case.)

Unfortunately, everything in a modern pickup is quite small and may be a bit a challenge to extract from the optical block should this be required since they are usually glued in place.

If what you want is basic distance measurements, see the section: [Using a CD or DVD Optical Pickup for Distance Measurements](#) which discusses the use of the existing focusing mechanism for this purpose – which could be a considerably simpler approach.

Also see the section: [Basics of Interferometry and Interferometers](#).
