Re: hard drive guts questions.

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- *From*: Robert Baer <robertbaer@xxxxxxxxxxxxx>
- *Date*: Sat, 20 May 2006 02:12:04 GMT

J wrote:

> "Jay Christnach" <jay.christnach@xxxxxxxxxxxxxxxx> wrote in message
> news:446cf235@xxxxxxxxxxxxx
>
> > "J" <nospamplease> wrote:
> >
> > > Newbie questions way over my head, but here goes...
> > >
> > > 1) I have a newer sata drive dissassembled.
> >
> > if you opened the housing which contains the disk plates, keep it as a
> > decoration, it will most probably never work again (dust)
>
> Yeah, I know. It was most likely dead − I had already done data recovery on it after it crashed with frequent clicking / boot sector errors. That's alright. I opened _this_ one because its the newest 'disposable' drive I had laying around. If I had opened an older one, It wouldn't tell me anything about newer drive manufacturing. I specifically opened it to see if there were any chips in the housing.
>
> > > The outside pcb controller
> > > has a contact interface with an internal printed circuit cable
> > > leading to
> > > the
> > > actuator − about 20 contacts.. Mounted on the cable attached
> > > to the
> > > actuator body is a small chip. the printed circuit cable has a
> > > couple
> > > wires which head off to the actuator's voice coil, but the rest

> of the
> fine traces enter this chip, and the other side of the chip has
> traces
> leading out to
> the r/w heads (16 traces − 4 to each head). What is this chip?

It is the amplifier(s), the signal from the heads is so weak that the amplifier has to be as close as possible to the heads to minimize noise.

smacks self. of course! That's awesome. So I could, theoretically, if I wasn't a dumbarse, build a usb interface with ADDA converters and controlers and such which managed the drive motors and heads. It's obvious to me now − the chip had some extra traces to it for power... and two other mini surace mount components.

> 2) What kind of hardware would it take to measure and graph
> the voltages
> present on the printed circuit cable's outter interface while
> issuing
> simple
> dd linux commands? Could I put it together with on a usb/pic
> chip
> platform?

Best would be to use the hardware on the outer pcb which was designed for that task. The signal you get on the leads to the coils has to be demodulated, decoded etc.

And the upshot lies here. Companies sell devices for data recovery for 30 to 50 thousand dollars. vogon has a component which supposedly breaks the ata3 passwords.

> 3) The motor control seems to have 4 contacts. Are these 2
> for power and
> 2 for monitoring?

see stepper motor

right... makes sense, though I never immagined a steppermotor at 10,000 rpms.

> 4) 4 traces to each head: is this a write pair and a read pair?

> don't know, but perhaps differential signal and two traces for ground shield
> or as you said 2 symetric signals read and write (don't think so)

incidentally, to each head, there's a pair printed 'in bold' and a pair printed a little finer...

> If you can point me to a very specific reference, that'd be
> great.
> Thanks in advance,
> −JB

> Yes, would be very interesting! but really. Too expensive equipment needed
> to do anything with the information.
>
> I'm not specialized on that matter, but think about the transfer rates of a
> modern disk and you'll just say "wow, it worked and did cost me so few that
> I even dared to open it and screw it up"!

I'm a bit unclear on that last bit...
To address what I think you might mean,
1) I had no use for the drive anymore because I didn't trust it.
2) My theoretical device could afford to operate at slow speeds − it would either image the drive or read the hidden ata password... the main idea is to build a custom hd controller anyways...

> kind greetings

Does not matter what the rotational speed of the paltters, as the flying head runs so close to the platter that *any* dust will absolutely guarantee total disaster.
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