

## Re: Help installing Fedora

**Source:** <http://linux.derkeiler.com/Newsgroups/comp.os.linux.setup/2004-01/0670.html>

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**From:** Richard Steven Hack (*richardhack\_at\_prontomail.com*)

**Date:** 01/14/04

Date: Wed, 14 Jan 2004 12:03:45 GMT

On Tue, 13 Jan 2004 17:10:25 GMT, ptb@oboe.it.uc3m.es (P.T. Breuer) wrote:

>> *Slave to a hard drive, yes, but to another optical?*  
>  
>*I already pointed once to the paragraph in my (first? second?) post*  
>*which stated what I was saying. The gist of the claim was that cdroms*  
>*don't (or didn't) come with electronics to be master to a "full" ide*  
>*device. Choose your value of "full" appropriately.*

My impression has always been that the issue is one of wanting a faster device to be ahead in the channel of a slow device. I've never heard anything about "full" vrs "non-full" IDE devices. I'm not doubting your memory of this point, but it would be nice if you had a reference.

Here is what PC-Guide says about the difference between "master" and "slave":

=====  
Each IDE/ATA channel can support either one or two devices. IDE/ATA devices of course each contain their own integrated controllers, and so in order to maintain order on the channel, it is necessary to have some way of differentiating between the two devices. This is done by giving each device a designation as either master or slave, and then having the controller address commands and data to either one or the other. The drive that is the target of the command responds to it, and the other one ignores the command, remaining silent.

Note that despite the hierarchical-sounding names of "master" and "slave", the master drive does not have any special status compared to the slave one; they are really equals in most respects.

[NOTE THIS NEXT LINE] The slave drive doesn't rely on the master drive for its operation or anything like that, despite the names (which are poorly-chosen—in the standards the master is usually just "drive 0" and the slave "drive 1").{NOTE THE PREVIOUS LINE]

The only practical difference between master and slave is that the PC considers the master "first" and the slave "second" in general terms. For example, DOS/Windows will assign drive letters to the master drive before the slave drive. If you have a master and slave on the primary IDE channel and each has only one regular, primary partition, the master will be "C:" and the slave "D:". This means that the master drive (on the primary channel) is the one that is booted, and not the slave.

<snip>

As long as one drive is jumpered as master and the other as slave, any two IDE/ATA/ATAPI devices should work together on a single channel. Unfortunately, some older hard disks will fail to work properly when they are placed on a channel with another manufacturer's disk. One of the reasons why drives don't always "play nicely together" has to do with the Drive Active / Signal Present (/DASP) signal. This is an IDE/ATA interface signal carried on pin #39, which is used for two functions: indicating that a drive is active (during operation), and also indicating that a slave drive is present on the channel (at startup). Some early drives don't handle this signal properly, a residue of poor adherence to ATA standards many years ago. If an older slave drive won't work with a newer master, see if your master drive has an "SP" (slave present) jumper, and if so, enable it. This may allow the slave drive to be detected.

Drive compatibility problems can be extremely frustrating, and beyond the suggestion above, there usually is no solution, other than separating the drives onto different channels. Sometimes brand X won't work as a slave when brand Y is the master, but X will work as a master when Y is the slave! Modern drives adhere to the formal ATA standards and so as time goes on and more of these older "problem" drives fall out of the market, making all of this less and less of a concern. Any hard disk bought in the last five years should work just fine with any other of the same vintage or newer.

When using only a single drive on a channel, there are some considerations to be aware of. Some hard disks have only a jumper for master or slave; when the drive is being used solo on a channel it should be set to master. Other manufacturers, notably Western Digital, actually have three settings for their drives: master, slave, and single. The last setting is intended for use when the drive is alone on the channel. This type of disk should be set to single, and not master, when being used alone.

Also, a single device on an IDE channel "officially" should not be jumpered as a slave. In practice, this will often work despite being formally "illegal". Many ATAPI drives come jumpered by default as slave—because they are often made slaves to a hard disk's master on the primary IDE channel, this saves setup time. However, for performance reasons they are sometimes put on the secondary channel,

and often the system assemblers don't bother to change the jumpers. It will work, but I don't recommend it; if nothing more, it's confusing to find a slave with no master when you or someone else goes back into the box a year or two later to upgrade.

For performance reasons, it is better to avoid mixing slower and faster devices on the same channel. If you are going to share a channel between a hard disk and an ATAPI device, it is generally a good idea to make the hard disk the master. In some situations there can be problems slaving a hard disk to an optical drive; it will usually work but it is non-standard, and since there is no advantage to making the ATAPI device the master, the configuration is best avoided.

There are many more performance considerations to take into account when deciding how to jumper your IDE devices, if you are using several different ones on more than one channel. Since only one of the master and slave can use any channel at a time, there are sometimes advantages to using more than one IDE/ATA channel even if not strictly necessary based on the number of devices you are trying to support. There can also be issues with using a drive that has support for a fast transfer mode like Ultra DMA with older devices that don't support these faster modes. See this section for a discussion of performance issues and IDE/ATA configuration.

=====  
Now here they say something that might relate to what you're saying:

=====  
While all modern systems have the primary and secondary IDE controllers built into the motherboard, some older systems didn't implement both channels identically. The better systems included full transfer mode support and bus mastering for both the primary and secondary channels, but some systems—especially early Pentiums from the mid-1990s—wimped out. In order to save a few bucks, they included support for the faster PIO modes (3 and 4) only on the primary channel, meaning that the secondary channel would only run at the lower PIO modes (0, 1 and 2). The idea was that the primary channel would be used by the main hard disks (fast) and the secondary channel by extra, older hard disks and ATAPI devices (slow). Really, having full support on both channels is a much smarter idea, and this practice has fortunately been abandoned.

=====  
And this bit reinforces what I mean about speed differences between devices being the main issue:

=====  
Independent Master/Slave Device Timing

Since the transfer modes associated with the IDE/ATA interface are constantly being improved, new devices support faster transfer modes than older ones do. In addition, hard disks often support faster

transfer modes than ATAPI devices such as optical drives do. Yet, these devices can be combined on the same IDE/ATA channel, raising the question of compatibility when the devices are together.

The ability of an IDE/ATA channel to operate a master and slave device using different transfer modes is called independent device timing. The hard disk controllers integrated on modern chipsets all pretty much support independent timing, as do modern add-in controllers, but this was not always the case. Independent timing can be an issue if, for example, you upgrade an older PC and get a new, high-speed drive, but want to continue to be able to use the older one on the same channel with the new one.

If your system does not support independent device timing, and you use a newer hard disk that supports PIO mode 4 on the same channel as an older hard disk that operates only at PIO mode 0, the system will knock down the PIO mode to 0 for both drives. This will hamper the performance of the newer hard disk.

[NOTE THIS SENTENCE]The lack of independent device timing on many older systems is one reason why placing ATAPI devices like CD-ROMs on the same channel as a fast hard disk is usually not recommended.[NOTE PREVIOUS SENTENCE]

(It should be pointed out that we are talking here about the interface or external transfer speed of these devices. Reducing the speed of the interface only causes big issues if the effective interface speed becomes less than the sustained transfer rate of the disk. For a full discussion of these issues, please see this page.)

Again, today's chipsets all pretty much support independent timing, so this is less of an issue than it once was. However, there are still other good reasons to be careful about how you assign drives to the IDE/ATA channels in your system; see this page for a full discussion of these issues.

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But none of this indicates any concern with the drive electronics between hard disks and opticals, except in the sense that hard disks operate on ATA and opticals operate on ATAPI which used to be a different kettle of fish altogether but has been integrated with ATA in recent ATA standards.

>> >, and another of which (atapi  
>> >howto) says that if alone on a bus a cdrom must be jumpered as master.  
>  
>> And none of your docs explain why.  
>  
>I know why in that case. The kernel ide or cdrom driver code (I forget >which) never used to even look for a slave if a master was not present.

Okay, I'll buy that but see what I said below which is reiterated in the PC Guide article above.

>> *I just read a PC Guide article that says while it is correct to jumper  
>> a CDRom alone on a bus as master, some CDRoms will work as solo slaves  
>> and others won't.*  
>  
>> *The PC Guide site has a lot of stuff on master-slave and IDE/ATAPI  
>> configuration issues, but there isn't a lot relative to how  
>> CDRW/CDRs/DVDs necessarily need to relate to each other. It's mostly  
>> about keeping hard drives master and opticals slaves, which is fairly*  
>  
>*A hard drive is a "full" ide device by most peoples yardstick.*

But they don't seem to mention anything about differences in IDE devices as far as implementation goes, other than the obvious fact that there are differences in CAM implementation and ATA levels. Opticals run on ATAPI, not "real" ATA whereas HD's run on ATA. But the protocols are merged to some degree in the later standards.

>> *>My mind is perfectly open!*  
>  
>> *Empty is not the same as open – although it can be if it's the "right"  
>> kind of empty...:-)*  
>  
>*My mind is empty of prejudices.*

BWAHAHAHAHAHA!!! Good one, Peter! Tell me another!

>> *>(and it is documented as such in the atapi howto) that cdroms come from  
>> >the factory jumpered as slaves.*  
>  
>> *Which is reasonable as before CDs became common, it was expected that  
>> you had one hard drive, and if you had a second, it should be on the  
>> secondary IDE channel as master for performance reasons, which leaves  
>> only a slave position for an optical drive. Since most opticals end  
>> up as slaves, the factories jumper them that way. What is surprising  
>> about that?*  
>  
>*The surprising thing is that they didn't come jumpered as master, so  
>you could pop them straight on to the empty second ide bus.*

As the PC Guide article above says, usually they're slaves so that's why they're jumpered that way.

Oh, well, it's 4AM again! Goodnight!

--  
Richard Steven Hack  
"Whatever does not kill me makes me stronger" -  
and YOU have not killed me!