Re: CD question

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> I find there are two kinds of blanks available, ones that look yellow
> (gold or silver) and those that look blue. Audio players, especially ones
> made in the last century can not read blue disks. I think the capability
> to read them came in around 2002 or so.

I'm aware of three types of dyes:

Phthalocyanine − almost transparent to visual light frequencies. This results in discs whose bottoms look silver or gold, since the color of the reflective metal layer shows through without being modified very much. This was the type of dye used on the first CD−R discs developed by Taiyo Yuden.

Cyanine − light blue to the eye. This results in discs which look light to medium blue (against a silver−colored reflector) or green (against a gold reflector).

Azo − somewhat darker blue than cyanine. This seems to be the most recently developed dye type, and I'm not sure how common it is.

I haven't noticed any consistent difference in audio−player compatibility between *good* phthalocyanine, and *good* cyanine discs. In theory, Orange Book (CD−R) discs were *supposed* to be playable on any Red Book audio CD player.

CD−RW is a different story − the phase−change layer has such a low contrast that older CD players often can't get any sort of signal lock on them at all.

> The space between sectors is well defined in the various standards.

The Red Book standard allows for some amount of variation and tolerance.

72−minute CD−R discs (if well made) have a track spacing and rotation rate which sits right in the middle of the Red Book tolerance range.

The 80−minute discs squeeze the spacings down right to the lower limit of what a Red Book player is supposed to accept.

The actual "sector" structure isn't manufactured into a CD−R blank. Instead, the track is molded into the disc, with a slight side−to−side "wobble" with a well−defined period between peaks. When the CD−R drive spins the disc, its laser servo follows the track, and in doing so it develops a sinusoidal voltage in the horizontal tracking circuit which corresponds to the track wobbling. The drive then uses a phase−locked loop to monitor the frequency of the wobble, and adjust the drive's rotation speed to the correct rate. It then "burns" the actual pits and lands into the dye layer, defining the block structure of the disc as it goes... and it's the burned pits and lands which the CD player (or CD−ROM drive) uses to address and find the data.

> Several systems exist to prevent the errors, such as "burn free", or "seamless link", and so on. They work by detecting the buffer under−run and stopping the burn in such a way the disk is still readable. They still produce what according to the original standard is an unreadable disk, but by the extended standards they are perfectly ok.
>
> As far as I know, CD ROM drives from around 2000, and all DVD ROM drives, except for the very early single speed ones can read these disks without an error, but audio players can not. Possibly the new ones with read−ahead (anti skip) can, but most of the players out there can not.

Yeah, an audio disc with a "burn free" hiccough does end up with a nonconforming data pattern in its output bitstream. A standard audio CD player can lose lock on the signal and mute.

> My experience with CD−ROMs and old drives has been that if you expect to read a disk, you have to turn off buffer underrun protection, use yellow blanks, and record it at no faster speed than it will be read at.

That's a good way to go about it.

For the *best* compatibility with audio CD players (new or old) it can help to buy the type of blanks which are intended to be burned in "real time" CD−R recorders (i.e. at a 1x rate). These tend to use a nice, thick dye layer − they're optimized for long laser exposure. They're actually a lot more like the original first−generation CD−R discs, in some ways, than they are like modern high−speed discs.

> There was a thread a long time ago on the audio groups about using Armour−All, a car polish on the disks. In every case it improved the reading (sound) of audio CD's, but many turned cloudy after a few months.

I'm rather sceptical of the claims of improved sound, except to the extent that the treatment might have slightly reduced the rate of error correction.

Armor−All Protectant really should never have been used on CDs. It isn't formulated as a plastic cleaner or polish − it's a silicone emulsion − and I don't find it surprising that it reacted badly with polycarbonate plastic.

The only cleaners or scratch removers I'd suggest that people use on a CD, are those which are specifically designed for safe use on polycarbonates. The Novus products I mentioned (Novus 1 [cleaner] and Novus 2 [light scratch remover and polish]) are of this sort. I wouldn't use Novus 3 (heavy scratch remover) as it is specifically *not* recommended for polycarbonates − only for acrylics.

> No one knew what the long term effect was of them turning cloudy, but that was so long ago (early 1990's) that there should be some somewhere if one can locate them.

I kinda suspect that they're ruined, unless somebody has managed to figure out a way to buff off the surface crazing.

> Dave, on a personal note, a high school friend that went to school with you just contacted me facebook and I literally just sent him an email detailing what was going on in my life and mentioned that you and I occasionally follow−up each other's postings.

Neat! Could you email me his address, or email mine to him?

−−
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