channel 6 television denmark

CD and DVD playback compatibility
Quality parameters for CD and DVD production

As digital distributions media CD and DVD have the distinct advantage that the content is an exact copy of the original. A copy will be identical in content - and quality - to the master file from which it is made.

The tape-based distribution of the past relied on a domestic quality copy - usually on VHS - of a professional video master tape. The duplication process implied an unavoidable degradation in comparison to the master, simply because the distribution format - VHS - had a lower bandwidth than the original master. Despite this, tape-based distribution was usually quite reliable - even the roughest copy could usually play on a good quality player, just as one could hope that even a poorly maintained player could play a good copy. The defects in both cases would be there to see and hear, but it usually worked.

With digital distribution based on CD or DVD, the technical quality is very high. However it can be difficult to ensure 100% playback compatibility - the ability of a given disc to playback without faults on any CD or DVD player. Where the analogue technology of the past would have probably given at least a recognizable picture and sound, digital technology usually worked either perfectly - or not at all.

There can be many causes of the problems that the end user may experience when trying to play a CD or DVD. Many of these are within the control of the producer of the DVD, and given the correct authoring and encoding tools they may be eliminated. Other causes of playback problems may exist far outside the control of the producer - simply because the technology of DVD, especially when being played on a computer, relies on hardware and software which is specific to the end users computer. Whilst the problem is most noticeable on computers, dedicated set-top DVD players are also vulnerable to end user configuration errors, which in some cases can give the impression that a DVD may be at fault.

Channel 6 Television produces CD and DVD productions according to a "cook-book" which ensures the optimal playback compatibility by addressing the following issues -

Authoring and encoding

The files which constitute the content of a CD or DVD are produced using tested and popular state-of-the-art professional authoring and encoding tools. These tools employ "recipes" and algorithms which comply fully with the industry standards to ensure that the resulting data may be played without problems. During encoding we take particular care to ensure that the programme bit-rate does not exceed the ability of DVD drives, players and platforms to read and process the data without loss of continuous and synchronous playback. The same attention is given to the creation of media files for web-streaming and download, or for playback via an intranet server.

At the same time, we ensure that the files and their composition on the delivery medium are fully compliant with the playback technology. Once can find many media releases, especially on DVD, where the producer has included additional bonus files, which are not necessary for playback of the primary payload - a film or television programme. Whilst a DVD often has the capacity for additional material, some DVD players will be confused by this extra data, sometime to the extent that they will not play the main feature. Therefore we avoid this strategy at all costs.

There is some difference between how a DVD drive in a computer handles data, and how freestanding DVD player does the same job. As most DVD releases are targeted towards both playback platforms, it is necessary to work to the lowest common denominator when choosing how to author a DVD _ to ensure the optimal playback compatibility.

Raw media

Both DVD and CD raw media (blank discs) are available in differing levels of quality. When planning the release of a large number of DVD discs, it can be tempting to choose a cheaper raw-media - but the benefits of such a choice may be short-lived indeed. It is well known that cheap - so-called "no-name" - disc media are one of the most typical causes of playback incompatibility.

A reliable CD or DVD "burn" implies that the foil, which is sandwiched in the disc, is perforated during the burning process with exactly the correct intensity, otherwise the end user's player may not be able to read the data properly. If the characteristics of the "no-name" foil are outside the usual strict tolerance, the data integrity may be sufficiently weak for an older DVD player - which itself may be functioning slightly under specification - to achieve proper playback.

For this reason, Channel 6 Television uses only high-quality media for CD and DVD - we have used use the best Verbatim media for several years - and we have never experienced a faulty disc.

Burn speed

Many newer CD and DVD writer drives allow burn speeds up to x48 - the burn speed is the single parameter which has most influence on how quickly a DVD producer can duplicate a given DVD order, and is therefore a factor which influences the price for the job.

There is however a clear correlation between the speed used to burn a DVD and the resulting products playback compatibility. Faster burn speeds can result in data which is harder for some (not all) DVD drives to read accurately.

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In general, some older DVD drives in both computers and set-top players are more prevalent to difficulties when reading high-speed burnt DVD's.

Like many aspects of playback compatibility, this is a complex issue because it is usually only some discs which cause problems in some drives - and vice versa.

There is only one simple solution to this problem - burn DVD copies slowly. Therefore Channel 6 Television has a rigid product policy which dictates that speeds exceeding x8 are not employed for any distribution release disc. Furthermore, all duplicated discs are immediately verified for data integrity before packing and delivery to the customer.

DVD writer drives

Despite falling hardware prices in recent years, there is still some difference in quality and reliability between CD and DVD writer drives from different manufacturers - the quality of the drive 8and therefore the burn) is a vital factor when striving for high playback compatibility.

Channel 6 Television uses Pioneer duplication drives because Pioneer have offered a consistency of quality and reliability for many years.

Glass mastering

The most reliable mass-duplication method employs glass-mastering technology. Instead of "burning" minute holes in sandwiched foil - as a PC based writer drives does, the foil is perforated using a glass "stamp" - before it is laminated within the polycarbonate plastic layers. The process is very fast - but also more expensive to tool up when compared to burning technology - therefore it is a more applicable technology for large quantity DVD releases - for example over 1000 copies.

Whilst glass mastering is probably the best technology for eliminating manufacturing errors which can cause playback incompatibility it is important to understand that this technology does little to reduce the incidence of playback incompatibility which is caused by configuration errors on the end-user's playback equipment.

Playback compatibility and the end user's equipment

The majority of the potential causes of playback compatibility of professionally produced CD and DVD releases are to be found in the end user's equipment. There are several reasons for this -

CD technology is now almost 30 years old, and DVD has been with us in various formats for over a decade. This legacy has resulted in a variety of different technologies, many of which are still in use in end users' computers and DVD players. Despite the fact that the recent advance of DVD has resulted in many older CD drives (which were particularly prone to playback errors on burnt CD's) being taken out of commission, there are still many older DVD drives in use, which have difficulty handling all media.

The same is the case for some older DVD players - some older models can have difficulty with certain file formats, and it is far from all DVD players which can be - and are configured correctly to handle content in both 4:3 and 16:9 aspect ratios. Similarly, many newer flat-panel TV's require user configuration to ensure the correct aspect ratio display. This problem can become exaggerated, when handling a DVD with content on both formats - resulting often in the end user needing to select the desired format manually. To make matters worse, many so called widescreen TV and computer displays and are actually 14:9 rather than 16:9, so automatic configuration features to "fit the signal to fill the entire screen" will usually result in an incorrect aspect ratio.

Some DVD drives and their associated player software have difficulty handling DVD discs with less than approximately 400MB data on a 4.7GB DVD. These drives interpret such a disc as "missing data". For this reason, our duplication software adds additional "null data" to the burnt tracks of low-data DVD's so that these discs are interpreted by most drives as fully "DVD-legal".

The majority of current DVD drives and players - in combination with modern displays, are able to handle all aspect ratios and audio formats - but even here such equipment may rely on correct user configuration.

Both DVD players and computer based DVD drives and software may be confused by the complex menu structures and copy-prevention measures employed on some DVD releases. This problem is not even unknown on major American studio releases.

Whilst there is no such thing as the "perfect DVD", most problems can be avoided by a professionally authored and duplicated product where the authored features are selected with regard to the end-users requirements.

The problem is a great deal more complicated when we look at computer based DVD players.

Whilst the hardware and software configuration in most free-standing DVD players is "fixed at the factory" - with only a limited, albeit vital, number of configuration options available to the end user, the configuration of a DVD drive and media player software in a computer is subject to constant change - often without the end user being aware of such changes.

The relationship between the operating system, DVD player hardware and software, graphics and audio cards, and the many "codecs" - software devices which decode audio and video data before it can be played, is a critical one. Regular software updates - often delegated to the operating system's automatic functions or the automatic update features of a variety of installed media players - many of which compete for resources and priority with each other - can easily result in conflicts between these components which result in some or all media types being unable to play properly.

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For this reason, when facing playback incompatibility with any given media, irt is usually worth examining the end user's system configuration before suspecting the integrity of a CD or DVD.

This is too complicated a subject to deal with on these pages. There are many "good recipes" for the configuration of a computer - not only to home and office use, but also for professional workstations such as those we employ in our production facilities.

Whilst many "configuration-tips" many be particular to specific hardware or software configurations, it is our experience that there are many working methods which will benefit any computer - regardless of the specific configuration, and in some cases, regardless of the individual operating system. Our configuration "cook-book" does not simply address the configuration of media devices, but rather a range of methods and approaches which together will ensure that a computer runs in a stable manner for all applications.

For those who have a technical interest in the subject, our configuration cook-book is available (in English) on our technical documents download page.

A word about software media players

There was a time that media players such as Windows Media Player or Quicktime - and many others - were simple players. But particularly since the launch of Windows XP, such players - which are often available for free - have become the basis for big-business for those companies that release them.

Media players are no longer simple players - they are becoming increasingly integrated into the operating system and the user interface, as their producers compete for the user's loyalty to their player application. Configuration of many of these players is often quite complicated, so that many users simply accept the application's default settings.

This of course is exactly what the application publisher hopes and plans for - as their player's default settings usually capture functionality or priority from other, competing applications that may already be installed - all in the quest for becoming "My preferred media player". Windows Media Player, Quicktime and Real Player are all examples of this trend. Often such players and their default configurations result in the implementation of often useless additional features that simply eat memory or processing resources. Often such optional "goodies" are the economic payload, which made distributing the player free of charge possible.

We know by experience, that it can take an hour or two to install and configure the 5-8 media players and other media applications we use, in such a way that they do not conflict with each other, and so that it is us who decide which player should be used for with type of media. But it is time well-spent.

For the home or office user without broad experience in the configuration of multiple media applications, it is always worth considering whether the free player that one can download on the internet is something that one really needs, and one is able to configure properly.

Quality control of media releases

Here at Channel 6 Television, all CD, DVD and streaming or download media products are thoroughly tested on a wide range of platforms before the product is released to the customer. The computer based test routines cover a range of players and different operating systems on both laptop and desktop platforms.

Similarly, all DVD releases are tested in free-standing DVD players.

Media files for internet streaming and download are tested online via our own remote web-server before they are released to the customer. In many cases the approval and delivery process for such files is accomplished online via our web-server, giving the customer an immediate indication of how the product will function in the real world.

If you have any questions or comments about playback compatibility and our quality control measures you are welcome to contact us.

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