

What is DDP and what does it do?

DDP stands for Disc Description Protocol and was created to meet the needs of the media manufacturing industry in the late 1980's by Boon Kelly and Doug Carson of DCA Inc. DDP can be considered "meta-data" whose primary function is to fully describe a given set of data destined for placement on optical media so that this data set can be reliably interchanged between different equipment involved in media manufacturing. A metaphor from the internet is HTML, which is a defined way of describing information so that it can be created, transmitted, displayed and manipulated by a wide variety of systems for a wide variety of purposes. HTML is not the information to be transmitted, it is instead a way of describing text and other information for the purpose of interchange. Likewise, DDP is not the audio, video or software content, it is the preferred way of describing this audio, video and software content so equipment in the media manufacturing industry can understand what it is and what has to be done with it.

DDP is very rich in its descriptive capabilities and is used for every color and flavor of CD including CD-Audio, CD+G, CD+Text, CD-ROM, Mixed Mode CD, Multi-Session CD and Enhanced CD. DDP is equally adept at describing every variation of DVD including DVD-5, 9, 10, 14, 18, DVD-Video, DVD-ROM and DVD-Audio.

What does DDP describe?

DDP, when used for CD-Audio, at its most fundamental can be thought of as an electronic CUE sheet with one master entry for the title, which contains UPC/EAN, disc type (i.e. Audio/ROM/+G/+Text) and human readable title. In addition each track entry will contain the name of the track file, track and index number, starting and playing time, ISRC along with any engineer notes for that track such as the human readable name of the track. If the disc will contain +G (Karaoke) or +Text (programming for CD-changers), there will be separate cue sheet entries for each of these data files as well which include precise Absolute time to place each and every one.

This DDP "CUE" sheet is used by manufacturing equipment to automatically create the CD lead-in contents, P and Q sub-channel which contain table of contents, UPC/EAN, ISRC, Track and Index, Absolute and Program time codes.

For CD-ROM and DVD there are other items included in the DDP that are critical for the manufacturers equipment. For example, CD-ROM content can be brought in either 2048, 2336, 2340 or 2352 bytes per sector, with the manufacturing equipment being required to fill in the missing data to bring each sector up to the specified 2352 bytes per sector. DDP "CUE" sheet describes how many bytes per sector are in the input file, which of these bytes are valid and which are simply placeholders and what additional processing may need to be done. For example, the 2352 bytes on the final CD-ROM sector must contain Sync, Header, EDC and ECC codes, all of which may be left blank in the input 2352 data file. DDP will instruct the manufacturing equipment to automatically add these items.

For DVD, in addition to the number of bytes per sector, there also other critical pieces of information included in DDP. These include CSS and CPPM copy protection processing information, which layer of a multi-layer disc does this particular data file represent as well as the translation and rotation direction required for mastering.

I might add there are two names for DDP in the DVD world, there is DCA DDP that supports both CD and DVD and is therefore universal, and there is DVD Forum CMF, which is a subset of DDP that only supports DVD. At the request of DVD Forum, DCA adapted, authorized and approved the CMF version of DCA DDP for use by DVD Forum licensed companies.

Where is DDP utilized?

DDP has been used internally by virtually 100% of all CD and DVD production since the early 1990's and as such it is well known by the media manufacturing industry. In the early days of CD-ROM (pre-CD-R), DDP was the primary way of describing CD content between developers and media manufacturing. CD-ROM data sets were most often written to a DDP formatted Exabyte 8mm cartridge which was sent directly

to the media manufacturers. Likewise, many professional CD-Audio editing systems also adopted DDP and began sending in DDP 8mm tapes instead of the more expensive U-matic tapes. With the proliferation of CD-R, the audio industry has seen a proliferation of home and even professional CD editing systems, which were designed to support primarily CD-R as the output. Thus, many of the CD sound engineers in the past several years are no longer aware of DDP, the same can be said for many of the CD-ROM title producers. To them, there is no other way than to burn a CD-R and send it to the manufacturer.

Why not use CD-R or DVD-R instead of DDP files?

Despite the widespread usage of CD-R as a media to send in CD content for replication, the majority of CD manufacturing plants will first convert the CD-R to DDP files on a network prior to mastering. This is due to a whole host of manufacturing efficiency issues and fundamental CD-R reliability issues, which are beyond the scope of this paper. Therefore DDP continues to remain the final authority on what actually gets laid down on a replicated CD and not the CD-R which may have been sent.

Note: When there are problems with CD replica's not matching original CD-R discs sent in for manufacturing, in the vast majority of the cases these are due to problems with the CD-R causing read errors or DDP to not be generated properly by the reading systems.

The same situation also exists for DVD, as the majority of all DVD authoring systems only output DDP formatted content on DLT tapes or HD files. As is the case with CD-R input, most DLT tapes (and the occasional DVD-R discs) which are sent to DVD manufacturing facilities are in-fact converted to DDP files on a network prior to mastering.

Why not just FTP the raw image data files instead of burning to CD-R or DVD-R?

Of course the data files are the most important part of a CD or DVD and are in reality the only thing the customer will end up using. However, the CD and DVD readers and drives rely on all the other format related data to be present and accurately placed on the disc in order to properly handle these discs. DDP supplies this remaining data to the manufacturing equipment and thus ensures that what the producer of the content wanted on the final disc is really what is on the final disc, along with all the other format data he doesn't want to be concerned with.

One could learn to cope with just FTP image files being sent in for manufacturing by hiring fairly skilled people to edit and validate the DDP for these sets. These people will tend to be a little more expensive than your receiving dock clerk or order entry clerk and it will take a bit longer to process the order and move it into production. Which means that in the end sending image files via FTP will end up adding costs to the media manufacturing process, which will most likely be passed along to the sender of the FTP image files.

Is DDP Relevant Today?

DDP was very instrumental in the early days of the CD industry, as it enabled free exchange of content between different content owners and manufacturers, all using different equipment. It also allowed content owners to easily experiment with new formats to include multi-media content by ensuring that what they described in the studio was what they would receive on the replica disc. Because of that importance it has played in the growth of media manufacturing over the past 14 years, DDP is the glue that holds virtually all CD and DVD manufacturing facilities together.

Now with the advent of the ever shrinking world, both in terms of geography, margins and delivery times, electronic content delivery to the manufacturing facilities is becoming a necessity and no longer a luxury. The time and costs involved in returning a CD-R which did not read-in properly and waiting for another can be very high for a factory that is fully loaded. Likewise, the cost involved to discover only after replication that the internally created DDP for the simple FTP image files were only one sector off. A CD-Enhanced session does not boot in a PC can be a very expensive way to find out that FTP image files without DDP files are like spinning the wheel in Las Vegas.

Electronic content delivery to manufacturing has never been more relevant than today, and therefore DDP has never been more relevant to the content owners as well as the manufacturers. Sending DDP along with your image files is the only way to achieve "WYSIWYG"..... "What You Send Is What You Get".