

*Advance your verification processes with
DCA's HCRC (Hierarchical CRC)*

DCA Presents Innovations In Verification

Innovators drive technology forward.

In the optical disc industry, DCA provides innovative, leading-edge solutions. As the industry has grown from CD to DVD to formats such as Xbox™, DCA continues to provide customers with the tools to take advantage of new opportunities.

At DCA, the innovation continues.

DCA's HCRC is the new standard for verification. Using HCRC ensures that your DDP fileset is ready for mastering without relying on bit-for-bit. The verification results from an HCRC check are as reliable as a complete bit-for-bit analysis and provide as immediate a response as a standard CRC.

Traditional validation of content has been through a combination of bit-for-bit verification between content, and simple, "flat" CRCs computed over the entire CD or DVD image. Flat CRCs neither give the user insight into the error location, nor aid in identifying what has gone wrong with the content. During the course of verification, the HCRC check does both. This allows you to perform the roles of both bit-for-bit checking and CRC validation during the same HCRC processing.

Only DCA's family of products – DDP Pro, DDP Loader and DDP Compare – allow you to take advantage of HCRC during loading and pre-mastering. In addition, DCA products provide you with loading, verification and compare capabilities as well as an upgraded DDP analysis engine.

What is HCRC and why is it useful?

An HCRC, or Hierarchical CRC, is a CRC value calculated over each sector of a disc, including CSS and CPPM encrypted sectors. With HCRC you can verify 100% of every bit in every sector of the 2048 user data including CSS and CPPM.

Because an HCRC completely represents the content from which it is generated, it eliminates the need to have the customer IP (content) available either on the network or on physical media in order to verify that an image or replica is identical to the original customer IP. Using HCRC ensures that your DDP fileset is ready for mastering without relying on bit-for-bit.

HCRC removes bit-for-bit as the bottleneck in your production process, reducing your network bandwidth and improving security. Using an HCRC allows for self-validating data transfers from any point to any point with minimal overhead (as opposed to requiring double bandwidth for transferring the contents once, then performing a read back after transfer to ensure it is OK).

The verification results from an HCRC check are as reliable as a complete bit-for-bit analysis. Since an HCRC is only a fraction of the size of the original customer content, as the density or volume of media increases you will not have to expand your mastering network to perform bit-for-bit analysis.

A New Approach

The DDP® fileset remains the foundation for content loading and transfer. By utilizing DDP as their foundation, DCA products allow for backward and cross-vendor capability, while allowing you additional functionality. Because DCA is the originator and licensor of DDP, your output files will be in conformance with the DDP specification.

In addition to calculating HCRC, DCA products allow you to capture information about the data and utilize it throughout your facility. This 'metadata' includes information about the media, copy protection keys, reports and the history of the media from the moment it enters your plant through mastering and replication.

Source metadata includes the customer work order ID or title. By capturing, and thereby associating, copy protection key files with the content during the transfer process, the keys are linked to the

content. Handling of copy protection with the data sets can thus be automated – ensuring that the copy protection keys are kept with the correct media.

The history of the media is also kept and updated as the media works through your facility. Each time the media is accessed through a DCA product, the results of that job are appended to the media history. In a single glance, you can see when the media was initially loaded, its verification results, and even the results of Mastering and Quality Control.

DDP Pro

DDP Pro is DCA's full featured transfer and verification product for Windows XP. DDP Pro allows you to take control over your process workflow. With DDP Pro, you can transfer content from various input media to File or SCSI tape devices. During the transfer, the HCRC is calculated, DDP validated and metadata associated to the job. HCRC Verification and comparison are built into the application, with bit-for-bit available as well. Finally, if you have DCA's Commander, DDP Pro includes standard integration with that application.

DDP Pro can be purchased as software for your system, or with a DCA qualified platform. The current platform delivers high performance and quad loading, while supporting a wide variety of input and output devices.

DDP Pro Options

Output to Recordable Media: DDP Pro optionally supports output to recordable media, whether CD-R/RW, DVD-R/RW, DVD+R/RW or Dual Layer DVD recordable formats. Output to recordable media allows content to be stored as an archive with all the necessary material for it to be mastered at a future date. DDP Pro also optionally supports automated robotic disc duplication and printing of archive discs.

Umatic Tape Input: DDP Pro optionally supports input from Umatic tape. Umatic tape drives are no longer produced, but thousands of Umatic tapes remain in traditional archives. The Umatic option allows DDP Pro to transfer from Umatic tape input. Whether the Umatic tape has PQ burst, or DDP on floppy, the Umatic option can handle it.

The Umatic option also includes a Cue Sheet Editor that allows you to manually enter Cue Sheet

information for Umatic tape that does not have either PQ burst or DDP. The Umatic Cue Sheet editor converts that Cue sheet information into DDP and also carries it over into the Archive fileset.

Copy Protection, including CSS and CPPM: DDP Pro supports a wide variety of copy protection options, both in transfer and in verification, including CSS and CPPM for DVD, and SafeDisc for CD.

DDP Loader

DCA's DDP Loader has one function: to convert data on physical media into a DDP fileset on a hard drive or network. Once the data is transferred, DDP Loader automatically performs a bit-for-bit and HCRC compare between the input and transferred DDP fileset to ensure that the transfer is successful and the DDP meets specification.

DDP Loader has an easy to use, intuitive interface which requires minimal user training. DDP Loader supports CD, DVD and SCSI tape input for conversion into a DDP fileset. The DDP fileset can then be copied from the hard drive, or sent electronically via DCA's OptiSend.

Because DDP Loader is based on DDP Pro, it also creates the HCRC, saves metadata and reports on all relevant job information and DDP information. The metadata and reports are included in the output directory and can be easily included when the DDP fileset is sent on to the mastering facility.

DDP Compare

DCA's DDP Compare is a software-only application that allows you to compare a CD or DVD replica back to the HCRC which was generated during transfer. Because of the compact size of the HCRC, the HCRC can be located on a distant server or network drive, and still be used to perform a compare against the source. This means that you can pull a CD or DVD from the replication line, load it into a drive and verify the disc content without returning it to mastering.

Optionally, standard bit-for-bit comparison can be added to DDP Compare. This option allows you to compare a replica against the source media without using the HCRC.

	DDP Pro	DDP Loader	DDP Compare
Windows XP	Y	Y	Y
Transfer Media	Y	Y	N
Job Throughput			
Speed Adjustment	Y	Y	Y
Compare via HCRC	Y	Y	Y
Compare via Bit-for-bit	Y	Y	O
CSS and CPPM Support	O	O	O
Authoring Input			
Plug-in Support	O	O	N
Robot Burn-n-Print	Y	N	N
HCRC Verify of Replica	Y	N	Y
DDP Validation	Y	Y	N
Output to playable CD-R	Y	Y	N
Archive Output to recordable disc	O	N	N
Umatic Support	O	N	N
Commander Integration	Y	O	Y

DCA also offers the following DDP Tools for Premastering

DDP Audio Player is used to listen to audio tracks from a DDP fileset located on a hard drive or network. With the DDP Player, you can listen to each track, fast forward through a track to a specific time, or set the DDP Player to scan all tracks by playing a short preview of each track.

DDP Enhanced CD Builder joins a CD-Audio session and a CD-ROM session together into a single multi-session, enhanced CD. It merges the DDP and lead-in information and adjusts the file system in order to ensure that the enhanced CD is playable in both audio and ROM drives.

DDP Analyzer is a simple yet powerful DDP analysis and validation tool. DDP Analyzer also includes the ability to edit and modify existing DDP data. As the originator and licensor of DDP, DCA is uniquely qualified to provide a robust DDP tool.

About DCA

DCA was founded in 1988 to provide leading edge signal processing technology to the optical disc manufacturing industry. Today DCA continues to deliver the software used in the most demanding environments. DCA innovations include mastering direct from CD, high speed mastering, full radius graphics, as well as multi-session and network mastering. DCA's Disc Description Protocol (DDP®) is the industry standard for CD and DVD mastering.

DCA innovations in verification technology include delivering the first bit-for-bit verifier for CD-ROM discs (DVS, 1989) and bit-for-bit verifier for stamper and replica players (SVS, 1994).

Founder Doug Carson's pursuit of a technological vision has grown into an organization committed to professional excellence, imagination and exploration. Working on the leading edge of the industry, Doug often describes DCA as an entity that is "pulling technology" toward the future. This is balanced by a personal commitment to customers, and the people who are DCA.

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