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Notes From The Mastering Department: Preparing CD-ROM Masters for Replication

Thank you for considering World Media Group, Inc. to manufacture your CD-ROM project. Here are some guidelines and information that will be helpful as you prepare your disc for duplication.

Terminology:

Note that there are two parts of the process that are both called mastering. **Glass mastering** is the process of using a laser and photochemical processes to physically etch glass from which ultimately a stamper is made, which sits in a mold to physically press a CD. [Note that this is an entirely different process from CD-Rs, which use changes in colors of light sensitive inks to record the CD-R.] **Pre-mastering** is the process of burning a CD-R from which a glass master will be made.

Delivering your CD-ROM masters on CD-R media

Unless you ask us to make changes, the replicated CD-ROMs we press for you will be bit-for-bit the same as the master you send us on CD-R. Therefore it is very important that you know before you submit it, that it is exactly right. The file, the file order, and the disc naming is determined when you create your master.

- ✓ Always **check file naming**. Disc burning software allows you to specify the disc volume name of any disc you burn. If you do not specify it, it will assign its own name, usually a seemingly random series of numbers based on the date and time the disc is burned. This name will be seen alongside the disc icon whenever the disc is shown on screen. While this generally does not affect the operation of the disc, it can appear unprofessional to have your disc name appear as random numbers. This is an easy thing to take care of when burning your disc, but is often overlooked.
- ✓ Replicated discs hold exactly the same amount of data as your CD-ROMs, which is 650MB. 700MB discs are available, and we can make discs that length as well. However these discs shorten track pitch to fit the extra information on the disc, and by doing so violate the original CD physical specifications. Since these discs do not meet spec, we cannot guarantee they will play properly in all CD-ROM drives.
- ✓ **Test your master**. Try to run your master in several computers of varying ages, with older drives and older operating systems. If your program or master has trouble in a certain computer, your replicated disc probably will too.
- ✓ Handle with care. Scratches and fingerprints damage your disc. Although it may still play in your drive, a damaged disc can be beyond the specifications acceptable for glass mastering. Always pick up your discs by the edges, and use Jewel cases rather than paper or plastic sleeves.
- ✓ Always use the best possible media. It does not pay to save a few cents per disc if it costs you time, and you must use more discs. As of this writing, we see the fewest problems on discs from Mitsui and Taiyo Yuden. We see the most problems with blue dye. However different media may work best in different burners.
- ✓ Use the best drives. Go with name brands. There is a wide difference in capabilities and error rates between the best and worst drives.
- ✓ Use CD-R, not CD-RW media. CD-rewritable media generally has a higher error rate than write once media. Also, use your CD-R only once – do not write additional sessions to the disc (unless making a CD-Plus – see below). All sessions will be reproduced during glass mastering. The presence of multiple sessions may confuse some CD-ROM drives.
- ✓ **Never send your only copy**. Always keep a safety. Discs may be damaged in transit.
- ✓ We will test your CD for conformance to standards, and for error rates before glass mastering. We also will attempt to run your disc on an appropriate system. We do not, however, check every function of your program, or that it will run on every possible configuration. This is your responsibility. We will report on any obvious problems, and ask how you wish to proceed. Certain changes can be made here at WMG. This is \$110/hr plus the cost of material.
- ✓ Please feel free to call us with any questions you may have about CD-ROMs and CD-ROM mastering.

Delivering your files on other media

We can accept your files for CD-ROM on other media, but they will have to be pre-mastered onto CD-R at WMG before glass mastering.

- ✓ Acceptable formats include: Zip, Zip250, Jaz (1G), and floppy disc. Please call to ask about other formats.
- ✓ Do not exceed 650MB. You can go to 700MB – see the warning in the previous section.
- ✓ Specify your desired file structure. Clearly indicate what files you wish to be on the root directory of the disc. For instance, if you include your files in a directory for transfer, indicate whether you wish that directory to be included on the final disc.
- ✓ Be sure to specify the desired format of the disc: Mac only, PC only, Hybrid, or CD-Plus. If the content was created on one platform, and is intended for a Hybrid disc, or a disc of the other platform, be aware of differences in file structures and naming conventions. Mac files simply stored on PC-format media may contain extraneous files when viewed on a PC. Also be aware that Macs imbed information about file types and what programs run a file within the file itself, while PCs rely on the 3-character extension (e.g. .txt, .htm, .jpg) to convey this information.
- ✓ Prepare and document your material. Making it simple and obvious for us to transfer your content to CD-ROM will help the process go quicker, and save you money. Be aware that anything beyond simple file transfer, such as writing custom autostart programs or menus, changing of files, or any additional programming comes under the realm of authoring, not mastering, and will increase the amount of time (and therefore cost) preparing your disc.

PC Format CD-ROMs

- ✓ Make sure you set your software to write the disc in **Joliet** mode if you wish the disc to contain long file names.
- ✓ You can use an autorun.inf file to have a program automatically run on insertion of the disc, or to give the disc its own icon. This should be a text file with the line "OPEN =..." and the name of a program (executable or batch) on the disc you wish to run and/or "ICON = ..." and the name of a file whose icon you wish to be displayed as the disc icon. If the file specified is at root level on the disc, the filename only (not the path) is needed. If it is in a folder or subfolder on the disc, include the path, but NOT the disc letter (e.g. use \files\start.exe and not D:\files\start.exe). Test your CD to be sure autorun functions are working properly.

PC Naming Conventions

ISO9660 is the name of the original file naming convention for PCs. This was used by DOS based computers, as well as Windows 3.1. All versions of Windows are ultimately descended from DOS, so this naming convention shows up from time to time, sometimes causing problems if you don't account for it. It specifies that a file can contain up to 8 characters (including letters numbers, the underscore and a few other characters – but always starting with a letter), followed by a dot, and then a 3-character extension.

Joliet is the file naming convention introduced with Windows 95. It allows additional characters, including spaces, and names up to 256 characters long. You should still always include only one dot, immediately before the 3-character extension. This extension is what tells the operating system what type of file it is, and thus with which program to open the file.

If a Joliet-named file is stored or transferred on a medium only capable of **ISO9660** naming, the file name will become truncated. For example the file: *This is my file.txt* will become *THISIS~1.TXT*, when transferred on an ISO9660-only medium. Any other files using or running this file will no longer be able to find it.

Mac Format CD-ROMs

The most widely available burning software for Macintosh is Adaptec's *Toast*.

- ✓ Care and feeding of partitions: To burn a Mac disc in *Toast*, you will need to create a temporary partition. Note that the Name, Icon, Opened/Closed status, window size, icon layout, and current view type of files in the partition will be recreated exactly as default values on the disc created (and all discs replicated from the master). Make sure these are exactly as you want them.
- ✓ The *Toast* software allows you to set a file to automatically open or run upon insertion of the disc.

Hybrid (PC/Mac) CD-ROMs

- ✓ Watch naming conventions and file types. Understand PC file naming conventions, and the fact that the Windows operating system relies on the three character extension to know what kind of file a file is, and what should be used to open it. Understand also that Macs may have trouble with files imported from PC/Windows, and may consider it a generic "PC file" and not know what kind of file it is or what to open it with.
- ✓ Do not try to create a hybrid by writing multiple sessions. Many people try this. It does not work.

- ✓ Use a Mac. Macintosh computers generally have an easier time reading PC files and media than PC/Windows computers have reading Macintosh files and media. And, while *Toast* (the most popular Mac disc burning software) easily burns hybrid discs, many PC-based burning programs do not. Using *Toast*, after selecting Hybrid from the Formats menu, you will have to create a partition for the files for the Mac portion of the disc, but you will drag and drop PC files into the program.
- ✓ If your disc includes cross-platform files, which you wish to have on both Mac and PC portions of the disc, you are able to save space by writing these files only once, rather than to both Mac and PC portions of the disc. Using *Toast*, select “Custom Hybrid” under the “Other” menu, create a partition for your Mac files, include the cross-platform files in your partition containing the Mac disc files, then drag and drop common files to *Toast*’s ISO9660 window. The drag and drop any additional non-common files from wherever they reside on the hard drive. (Note: While *Toast* refers to PC discs as ISO9660, you may use Joliet file names by checking the appropriate settings.)

CD-Plus / Enhanced CD / Multisession CD

CD-Plus, CD-Extra, Enhanced CD, mixed mode, and Multisession CD are all names for putting Audio playable on a normal CD player, **and** data usable on a computer’s CD-ROM drive on the same disc. Mixed mode was an early attempt, which added the data in the lead-in of track 1 of the audio. This caused problems with many CD players, which would try to play the data as audio, with occasionally speaker-blowing results. All the other forms place the audio first in one disc “session”, then add the data in a second separate “session”. Thus, these are referred to as Multisession CDs, but are also known as CD-Plus, or CD-Extra. These will play in all CD audio players; however, they may have trouble with a few very old CD-ROM drives. However, any drives old enough to have trouble with such discs are also so slow by today’s standards that nearly all of them have been retired.

Enhanced CD is often used to mean almost any audio/data CD. However it refers to a type of multisession CD with a very specific format, with very specific file and structure requirements. It is intended for including track info, cover art, pictures, video, and other multimedia along with the music in a specific standardized format. Although the idea of including multimedia and computer content with music CDs has become popular, the specific “Enhanced CD” format and standards have not. Specific information on this format is available from the *Toast* users manual, and on several web sites.

The process for creating Multisession CDs is as follows. Master and burn your audio CD as you normally would, however set your audio burning software to leave the disc open for additional sessions. However at the same time, you must burn the audio session disc at once. Then take the same disc and burn your data session. This can be a Mac, PC or Hybrid session. You should set your data burning software to close the disc to additional sessions when finished. The data session may be track at once, or disc at once.

If you are burning Hybrid (Mac **and** PC) data, note the following. Although you can burn Joliet-named pc files when you are creating a data-only disc, burning the data as part of a multisession CD will cause any Joliet-style names to truncate into ISO9660 names (see sidebar), causing any files or programs pointing to those files not to be able to find them. Therefore, during your authoring process, you should make sure that all file names conform to the ISO9660 standard.

As with any disc, try your disc on as many different computers and players as possible. If your master doesn’t work right, your replicated discs won’t either.

Note: New developments in hardware and software may cause parts of this text to become outdated or inaccurate. Please check with World Media Group, Inc. for the latest information.