

Intro:

There are several different radios and disc players in the C6. The factory add on 6 disc player does not play MP3s. The radio in the '05 did not play MP3s until the dealer did a program flash. The nav unit seems to be the most picky as far as the method of preparing MP3 discs. So far as I have been able to determine, it seems that anything that will play in the nav will play in the rest. With that in mind, the following is a description tailored to making MP3 discs for the nav.

Software (What they each do and where to get them)

EAC (free)

<http://www.exactaudiocopy.de/>

This program is used for copying CDs. The major advantage of this program is that it warns you of errors found while copying the tracks from a CD. With EAC you don't have to listen to every track to know how it will sound in the final product.

LAME (free)

<http://lame.sourceforge.net/>

If you are interested in making high quality MP3s, L.A.M.E is, in my humble opinion, the best encoder you can get. Unfortunately, because of patent restrictions, it is difficult to obtain. The link above is to the computer source code and you would need to compile the program from that source code which is above the capabilities of most users. There are programmers who will risk the ire of the patent attorneys and post lame.dll (sometimes also called lame_enc.dll) which is the compiled file that you need. Be very careful where you download this file since you are downloading a program which could contain a virus.

There are other free MP3 encoders but none produce the consistent high quality of LAME.

An issue you may encounter is that Variable Bit Rate files, although they will play, have issues that make fixed bit rates preferable. You might also want to reduce the bit rate of files to save space and get more on a single CD. LAME can accomplish this. You will need to be familiar with DOS.

To do a batch conversion:

Create a batch file called lamebat.bat consisting of one to three lines as follows:

```
rem This batch file will convert 1 track in directory XXX to 192 CBR in directory test

rem the 9 parameters allow up to 8 spaces in the file names

"c:\program files\eac\lame" --mp1input -b192 -h -m a "c:\erase\mp3s\XXX\%1 %2 %3 %4 %5 %6 %7 %8 %9" "c:\erase\mp3s\test\%1 %2 %3 %4 %5 %6 %7 %8 %9"
```

Make sure when you create this batch file that you use an editor which doesn't throw in extra line feeds. I added a blank line between each of the 3 lines. I think you can see where you would set the final bit rate.

The second batch file is the one that points to all the individual tracks and is the one you run directly. A sample is as follows:

```
call lamebat 01 Love Will Keep Us Together.mp3

call lamebat 02 Rhinestone Cowboy.mp3call lamebat 75_03 Philadelphia Freedom.mp3

call lamebat 04 Before The Next Teardrop Falls.mp3
```

Again I inserted an unneeded blank line between lines to make it easier to see what each of the 3 line were. I create this file by first piping a directory to a file. Go to the source directory and at a command line type "dir >runthis.bat" without the quotes. This will generate a file named runthis.bat with a list of all files. Dir /s >runthis.bat would list all files in the "root" directory and all subdirectories. I then use a simple text editor to massage each line as needed and remove the extra lines of the directories. Just make sure you don't have word wrap turned on in the editor or it will screw up longer lines.

This might seem complicated but it really is simple once you do it a

couple of times. I can set up a disc with 5 subdirectories for conversion in less than 5 minutes. This then allows me to go do other things while each conversion is being done rather than sitting there for hours typing another name as each finishes.

ID3TagIt (free)

<http://www.id3-tagit.de/>

ID3TagIt allows you to easily see and edit all of the ID3 tags in multiple MP3s simultaneously. It is very powerful in its ability to create tags and file names.

A.F.5 (free)

<http://www.fauland.com/af5.htm>

This program can be used to quickly trim multiple folders of files to the required file name length.

Media Monkey (free)

<http://www.mediamonkey.com/>

This program is serious overkill for the intended purpose here of just burning CDs but it works, it is fairly easy to learn, and it is free.

Nero

This is a commercial program and what I use rather than Media Monkey to burn discs because it is far easier to step through but maybe that is just because I've used it more. It could also replace EAC and LAME for ripping CDs but I think the quality of the result is much lower.

iTunes (free)

iTunes can replace EAC, LAME, and Media Monkey. I find the learning curve to get files organized the way you want them to be very steep but it is free. The quality of ripping is also much lower with fewer options.

Windows Media Player (free)

This is a very nice player. It is my favorite music player for the PC. It does NOT create discs that are readable by the Corvette and it makes terrible MP3 copies when ripping CDs. Use it as a player and nothing else.

Obtaining MP3 files (More tips than specific instructions)

Ripping CDs

Copying a CD that you legally own for your own personal use should be legal. See

http://www.riaa.com/physicalpiracy.php?content_selector=piracy_online_the_law

I use EAC to create an MP3. EAC uses LAME to actually create the MP3. EAC is very easy to use once it has been set up for your particular CD drive. See the web site for specific directions on how to use it.

Buying

You can also purchase MP3 files. Many of these, however, have copy protection. Apple makes it especially hard to create an MP3 file that can be copied. Copying these can be done. However, before purchasing music you need to check with the seller to see what restrictions will be placed on copying your purchases.

Other

Many groups will post their audio files on the internet for free download and copying. Just be aware that anyone can post anything on the internet. If you find a site that claims to be Barry Manilow giving away his entire discography, it is probably too good to be true and someone is trying to fool you into downloading this for some reason.

Preparing masters (Technical discussion of what makes a good master)

What is an MP3 anyway?

There is a lot of confusion floating around about what an MP3 is. First, what it is not. An MP3 is not a perfect copy of the original music. It is an approximation of the original that can have varying degrees of distortion from the original. The standard that defines MP3 is only a standard that defines how to decode the digital bits into sound. There is no standard for

how to convert sound to an MP3.

An MP3 is a digital file that, when played, makes sounds. The sounds that are made depend on the number of bits in the file for a particular period of time and what the encoder wanted those sounds to be.

An MP3 file is a file which greatly reduces the amount of data required to represent an audio recording and still sound like a faithful reproduction of the original uncompressed audio for most listeners. The important words there are “most listeners”. One technique used to make MP3s smaller is to ignore sounds that most people’s brain ignores or ears can’t hear. That means that an MP3 might sound fine to one person but sound distorted to someone else.

An MP3 file also contains meta data. This is where the title/artist/album etc. information is stored.

Bit Rates

The bit rate of an MP3 defines how many bits will be used per unit time. The bit rate can be either fixed or variable. Fixed rates vary from 32 bits per second to 320 bps. Variable rates allow the number of bits per second to vary depending on what is needed to represent the needed sounds. Silence doesn’t require any information while high frequency clicks require a lot of information. Variable bit rates are created using a maximum bit rate and then saving less bits when they are not needed.

Uncompressed CD audio files are saved at 1,411.2 bps. Obviously even the highest quality MP3 (320bps) is going to allow much more to be recorded on the same CD. For an “80 minute” CD that’s about 6 hours at the highest bit rate. The lowest quality MP3 could save 10 times that much on the same CD.

The amount of audio saved on a CD would be somewhere in the middle for variable bit rates. And that is where an issue arises. Since it is impossible to predict how many bits there are in any given period of time, it is impossible to predict how much time will be taken by a set of bits until those bits are read and decoded. The MP3 players in our cars don’t have time to read all the bits when fast forwarding or reversing so they get

confused by VBR files. The symptoms are quitting a song early, running silence after a song finishes, getting the time position in the song entirely wrong and making forward and reverse have no effect or exaggerated effect. Sometimes you get lucky and the average bit rate used in the calculations is close to the actual bit rate and you don't notice a problem. Other times it is a very obvious problem. I therefore recommend never using VBR in our cars.

The bit rate is the major determining factor in the sound quality. 32bps is fine for voice recordings because our brains only listen to what is said and not the tremor in the vocal cords. 32bps is terrible for music. The minimum for music for most people seems to be 128bps. I prefer 192bps as a minimum for music and 320bps for master copies.

Encoders are not all created equal

I can't repeat that enough. ENCODERS ARE NOT ALL CREATED EQUAL!!!

Since the MP3 standard only defines how to decode an MP3 file, there are significant differences in encoders. One of the theories used in compressing MP3 is that the human brain doesn't hear all sounds that come through the ears. Significant research into the field of psychoacoustics has been incorporated into the development of some MP3 encoders. Your brain doesn't "hear" all the sounds that come into the ears. It has too many things to listen to and ignores many sounds. If your brain decides there is important information the frequencies it is ignoring, what you hear can change. MP3 encoders use this "feature" to not encode sounds your brain will not hear leaving more bits to encode things you will hear.

The encoder you choose determines which sounds are encoded and which are not. Some people will never notice the difference while others will. Even a single encoder can perform differently at different bit rates. Some are optimized for higher bit rates and some for lower.

ID3 tags

Shortly after the definition of MP3s was released a proposal was

made to include meta data called ID3 version 1.0 tags. This was a fixed area at the end of the file for fixed length records. Version 1.0 ID3 tags is the where the information the car displays while a file is playing is kept.

The title, artist, and album each have 30 character fields set aside in version 1.0 tags. Version 1.1 extended these by another 60 characters by adding another field block before the version 1.0 block. Since these are fixed length fields in fixed locations, you do not have to trim the lengths for our car. You can't enter a string too long and the car will just not display longer strings.

An issue occurs because ID3 version 2.2 was released in 1998. Version 2.2 (and 2.3 and 2.4) have variable length fields and are usually inserted at the front of the file although that is not a requirement. Since they are in different locations you can have both version 1.x tags as well as version 2.x tags in the same file.

Version 2.x also has up to 84 different types of information instead of just title/artist/album. Most programs that create MP3 files now support some subset of version 2.4 tags. Our players do not. Our player will only read the version 1.0 tag fields. 1.1 works because it is a superset of 1.0 with a second set of blocks added which our car just ignores

Preparing burning copies (Tweaks needed for the C6)

Since there are so many places to obtain MP3 files and so many legal problems in not doing it the right way, I'll leave that to you. I'll just say, get some MP3 files on your computer however you can.

Now create a working folder on your hard disc that you will use as a place to store the files that will ultimately be burned to a CD. For this tutorial I will call this the **C:\ERASEWORKING** folder.

Create folders that will be on the CD

For the hundreds of files you can get on a single disc, you should use folders. This will make it quicker and easier to find the one you want. The player has the same problem of finding the right file so it will also run faster if you use folders.

The manual recommends 18 files per folder as a maximum.

Create the folders you will have on the final disc in your working folder. The folder names should be no more than 29 characters. Longer names will disappear when the player tries to read them. Several people have said that special characters are not allowed. I have not found anything in the manual to indicate which special characters might not be allowed and I have not found any characters that have caused a problem. You will have problems with "\:*?"<>|" since those are not legal characters for folder names.

For songs in albums, I prefer a structure like Artist/Album where there are multiple artists with multiple albums. For example, C:\ERASE\WORKING\Billy Joel\Storm Front. If only a single artist is on the disc I drop the artist folder and just create album folders (C:\WORKING\Storm Front). Or if you have multiple artists but only a single album each you might just combine the artist and album in a single folder name. These are just suggestions. You can create any directory structure you want keeping in mind 18 songs per folder is preferred (by not required) and as few folders deep as possible, again, to make it run faster.

Make copies of your masters in the final locations in your working folder. I'm suggesting making copies rather than moving the masters because you may need to do some tweaking to the files to get them in a form the car will be able to read but you don't want to corrupt your masters unless you never want to use those files anywhere else.

The limit on a standard CD is 700 MB. I try to limit the size of all files to 698 MB or less to handle the differences in sector size and the directory structure. Again, this is not a hard and fast rule. I have created disks with 703MB and they work just fine. In Windows Explorer you can right click on the working directory and select properties to see how much space you are using.

Clean the ID3 tags

Now that you have selected the files you want and created the directory structure, the next step is to clean up the ID3 tags that will display while the song is playing. The free program ID3TagIt will quickly allow you

to see and edit multiple tags simultaneously. By selecting the version 1 tag view you can see exactly what the car will display. You can copy from and to file names and from and to version 2 tags.

I prefer to get the version 1 tags correct first. Then I use the tags to create file names that are close to the final desired name. Since you also want to control the order of play, I find it helpful to either use the track number and/or the enumerate function in ID3TagIt to force the first 2 digits of the file name as the desired playing order within the folder.

File names

The limit on file name length is 25 characters plus “.mp3”. I know the manual says 32 but, in my experience, 29 total always works. 30 and 31 sometimes works but often doesn't while 32 never works.

The symptoms of file names that are too long is that the file disappears as far as playing is concerned but the player still knows something is there so it tries to play it. This results in the following file getting played and then repeated. It can get very confusing. Just keep the file names short. The only place the filenames will be seen is on your computer and in the track selection displays. The Title/Artist/Album information that is displayed while the file is playing comes from the tags inside the file. As long as you can identify the file to select it, the name is ok.

The quickest way to trim all the filenames to 29 total characters is with A.F.5. It allows you to select all files in multiple folders and trim the names. A single click renames those that are too long. A.F.5 includes several other features that make renaming files very easy but this tutorial will use only the ability to trim lengths. You can add all the files from all the directories. Then specify the new name as "Left 01-25". Click rename and you're done.

Burning (Quick list of things that must be done for each program)

Nero Express

- Select Music then MP3 Disc (NOT a data disc!)
- Click Add
- Drill down to the working directory, press Ctl A to select all (this will include all of the subdirectories), and click Add
- When it finishes adding the files, click finished on the add file window
- Click Next
- Ensure that the box for "allow files to be added later" is NOT checked.
- Insert a blank unformatted disc, ensure the correct drive is selected and click Burn

Media Monkey

- Using the tree on the left, select "All" under the working directory.
- Press "Ctl A" to select (highlight) all files. Notice at the bottom you get a total number of files, size, and running time. Make sure the total size is 700 MB or less. If you are just a little long you can hold down ctl and deselect individual files.
- Press "Shift-Ctl-D" or click the burn icon.
- Select "Burn Data CD/DVD" and click Next (I know I said don't make a data disc. Don't worry. This will create an MP3 disc with the correct structure)
- Click Next again. It will use the files you have selected.
- In the Disc Format field enter "<folder:2><filename:25>" This will remove 2 root folders so C:\ERASE\WORKING\Storm Front on the computer becomes Storm Front on the CD. The 25 after the file name ensures you don't have any file names longer than 25 + "mp3"

- Uncheck the 4 checkboxes because the car doesn't care about playlists or artwork.
- Scroll through the file name display to make sure they are all yellow. Red indicates there is a problem with the file names. If you are in a hurry you can deselect individual files here also by unchecking the check box next to them.
- Insert a blank unformatted disc and click next.
- Ensure the correct drive is selected. You should see a green bar next to the buttons. Click Burn.

Troubleshooting (Issues and suggestions)

Nothing there

The message “No Valid Disc Loaded” occurs when the player can’t read the directory structure. Typically this occurs with a disc that doesn’t have the correct directory structure due to the software used to create it or the software didn’t finalize the disc before ejecting. The definition of an MP3 disc includes finalizing it to create the correct directory structure. Unfinalized data discs don’t work in the nav although they will work in other places. Windows Media Player says it will create an MP3 disc but if you dig deep enough on the Microsoft website in the help area for WMP, it says “If your CD player can't play CDs that have not been finalized, you must use another CD burning or authoring software program to burn a finalized CD.” Guess what?

Skips songs

A file with a file name longer than 29 total characters will be skipped while playing.

Wrong songs

If a file has been skipped because it had a long file name, the next song will play. This means you can select song “This Song Has A File Name That Is Much Too Long” And the next song in line “This Song Is OK”

will play.

The player sometimes gets even more confused with long file names and will play the same songs repeatedly.

Songs end early won't fast forward/rewind correctly

Variable Bit Rate files may not calculate start and stop times correctly. If the player decides enough bits have been played, the song ends no matter what the actual position in the file.

Since it can't correctly calculate the time position in the file if the file uses VBR, fast forward sometimes results in playing a prior section over and reverse can move forward. VBR files are unpredictable (on a human level) in their response. In my opinion, the saving in space just isn't worth the trouble it can cause with this car.

Names different

The title/artist/album information displayed during playback comes from the ID3 tag information stored inside the file. The song selection menus display file names. There is nothing that says these will be the same or even related. That is up to you before you burn the disc.

Slow starting

An MP3 disc contains a lot more information than a standard CD. The directory of a standard CD might contain 12 file pointers while an MP3 disc can contain hundreds. An MP3 is going to take longer to start playing when first started. By using a well organized folder structure, the time needed to switch from one file to another can be reduced. It takes longer to read through 100 files all in the root folder than to read through 10 files in each of 10 folders. You may also notice that just like a computer, it is often faster after the first time it reads the directory because it buffers it and can read it from memory rather than from the disc again.