

Digital Music

We will cover:

- Music is sound, but what is sound??
- How to make a computer (and some hand-held portable devices) play music.
- How to get music into a “suitable” format (e.g. get music off of CDs and into an MP3 player).
- How to do some simple sound editing.
- How to buy music on-line.
- How to make a music CD.
- Using a portable MP3 player.

You can download this file from
<http://home.comcast.net/~bscclub/training.htm>

Software Covered

	Multimedia player	Format converter	CD rip / burn	Sound editor	
Windows Media Player 9 &10 www.microsoft.com/windows/windowsmedia	✓		✓		
Music Match (shareware) http://www.musicmatch.com/download/free	✓	✓	✓		
EZ CD Creator (bundled with drives) www.roxio.com			✓		
GoldWave (shareware) www.goldwave.com	✓	✓		✓	

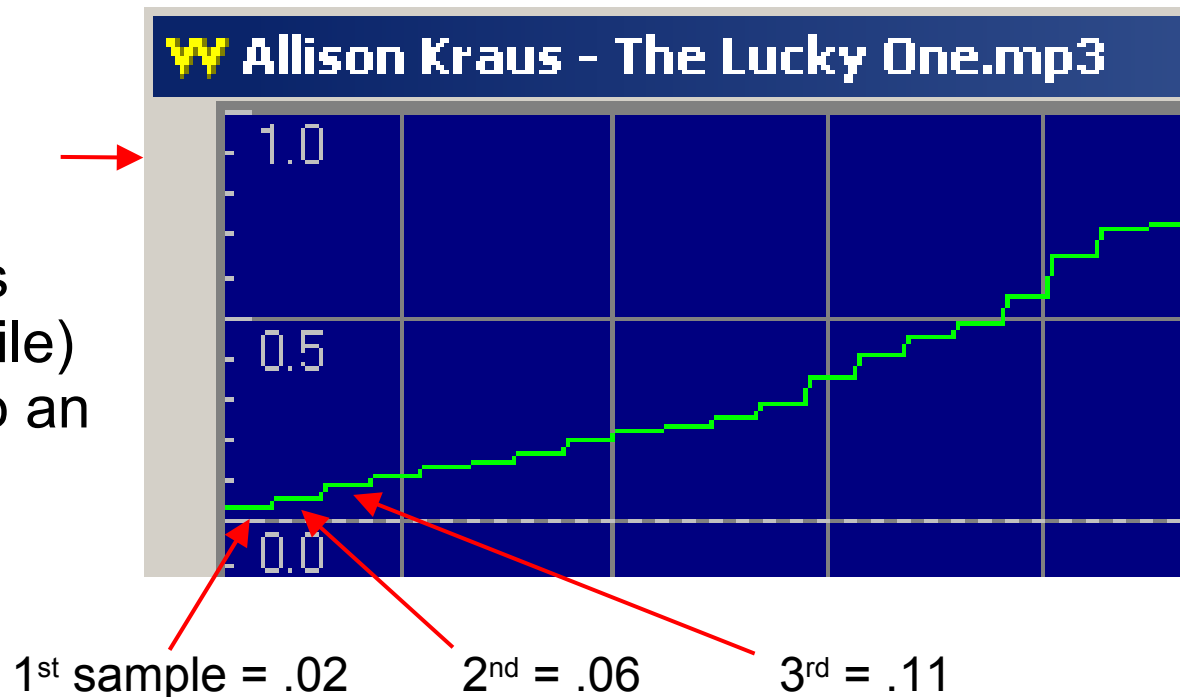
Sound is....

- Sound is rapidly changing air pressure!!
- If the air pressure is changing faster than 20 times a second, and slower than 15 thousand times a second, we can “hear” it.



Digital quantization effects

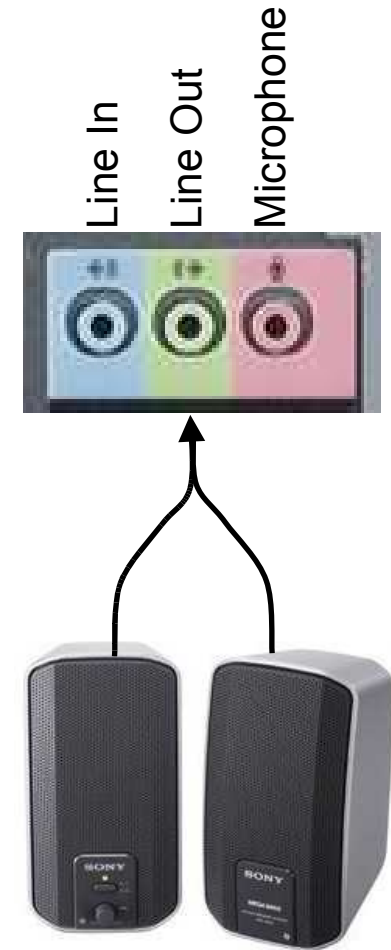
- Records & tapes “continuously” record the sound pressure signal. Such systems are called “Analog”.
- “Digital” systems need to reduce the sound signal to a sequence of numbers.
- Zooming in on the previous screen....
- Computers take this sequence of numbers (typically stored in a file) and convert them into an electrical signal.



Digital music is just a sequence of numbers showing how pressure changes with time.

Getting Sound From A Computer

- Speakers convert this electrical signal into the changing pressure wave that is sound.
- Most PCs today are sound-capable. They typically will have blue/green/pink colored connectors. Connect the speakers (or headphones) to the green connector – sometimes called “Line Out”.
- Some speakers may be amplified, and thus will have to be powered (plugged into a 120-volt AC house power).
- Windows will already have all the “software drivers” loaded.



That's all there is to it!

Playing a CD on a computer (Media Player 9)

Screen shots are of Media Player 9 running on Win2K.

Inserting the CD starts the player at the 1st song. For more control:

Click “Now Playing” or “Copy from CD”.

Double click the song you want to start with. It will start to play.

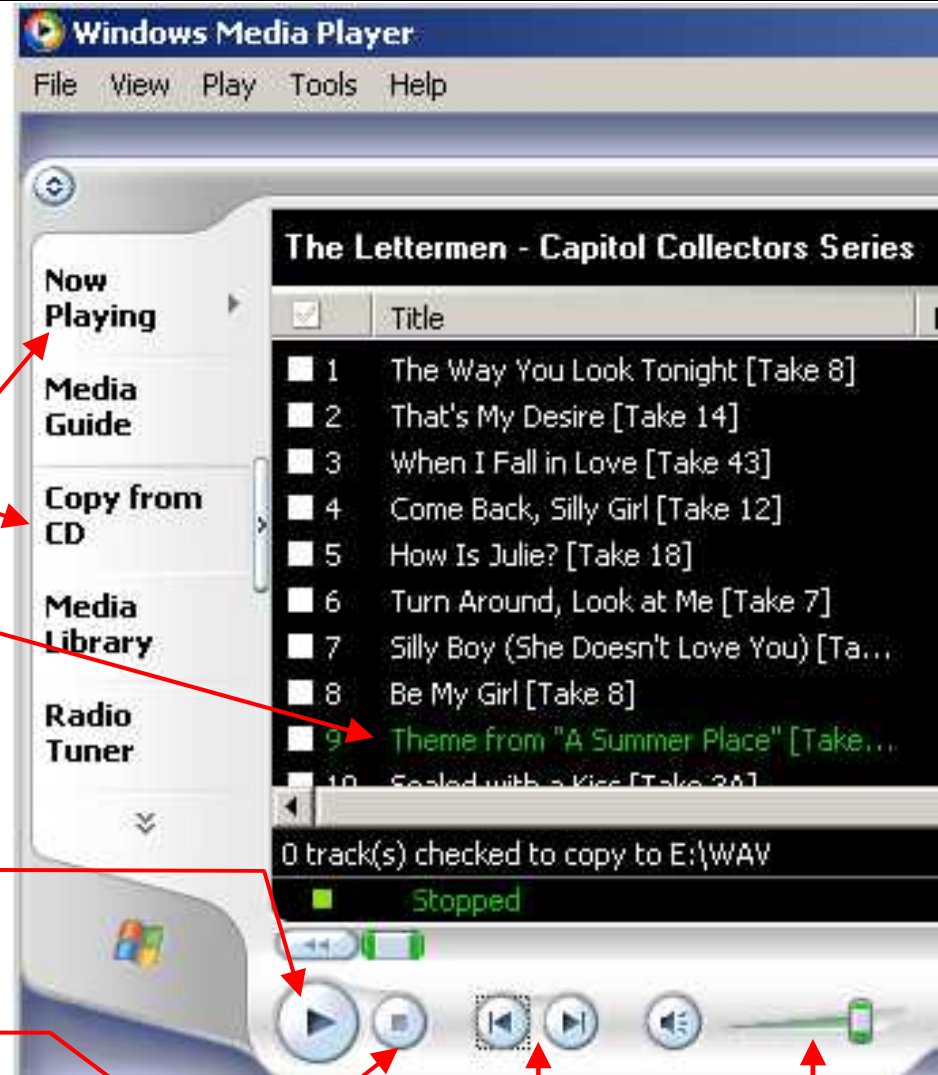
The standard controls are:

Play / pause

Stop

Previous / next track

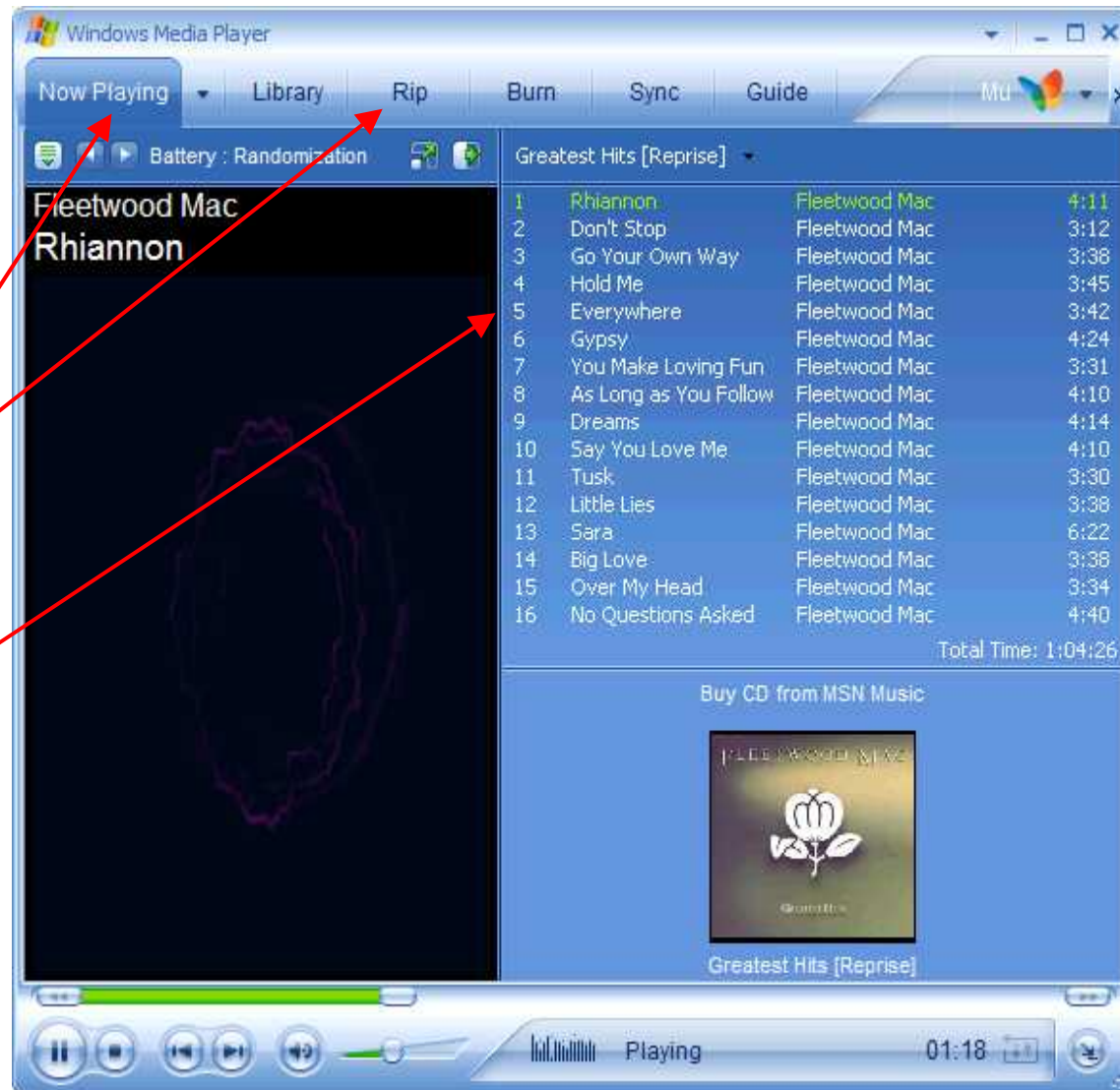
Adjust volume



Playing a CD on a computer (Media Player 10)

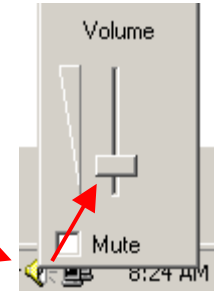
*Media Player 10
running on WinXP.*

1. Just inserting the CD starts the player at the 1st song. For more control...
2. Click "Now Playing" or "RIP".
3. Double click the song you want to start with. It will start to play.



Ways to Adjust Sound Volume

1. Use Media Player's Volume Slider
2. Click the speaker icon (desktop - lower right) – then use the popup slider; or
3. Double-click the speaker icon to bring up the full “Volume Control” window.



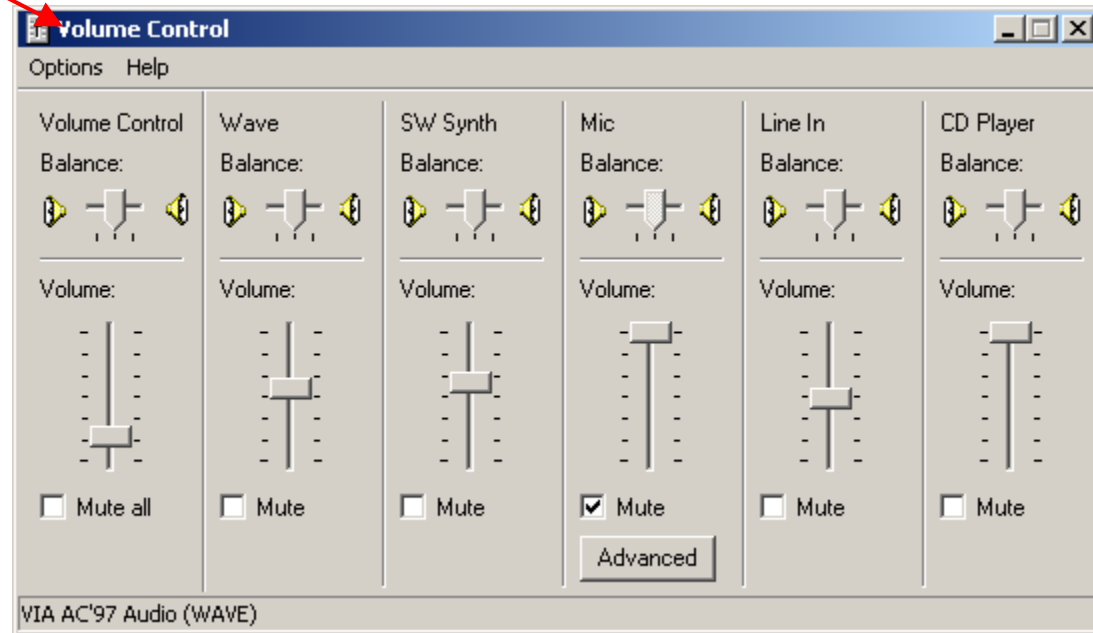
Note:

The single Volume slider is the same as the Volume Control “Master”.

While playing a CD with Media Player, volume is also controlled by “Wave” (not by “CD Player”).

Your speakers may have still another volume control.

The volume you hear is the product of all the controls (Media Player * Wave * Volume Control * speaker).



Master

Individual control for each sound source

Copying Music from “Audio” CDs

If you own the CD, this is absolutely legal!!

This copying process is often referred to as “ripping”.

The way data is stored on an audio CD is very different from the way files are stored. Most of the properties of normal files (e.g. a filename) don’t apply to CD audio tracks!

Most software that can rip CDs will try to look up track information (song title, artist, composer, genre,) on the internet.

Data on audio CDs is stored in:

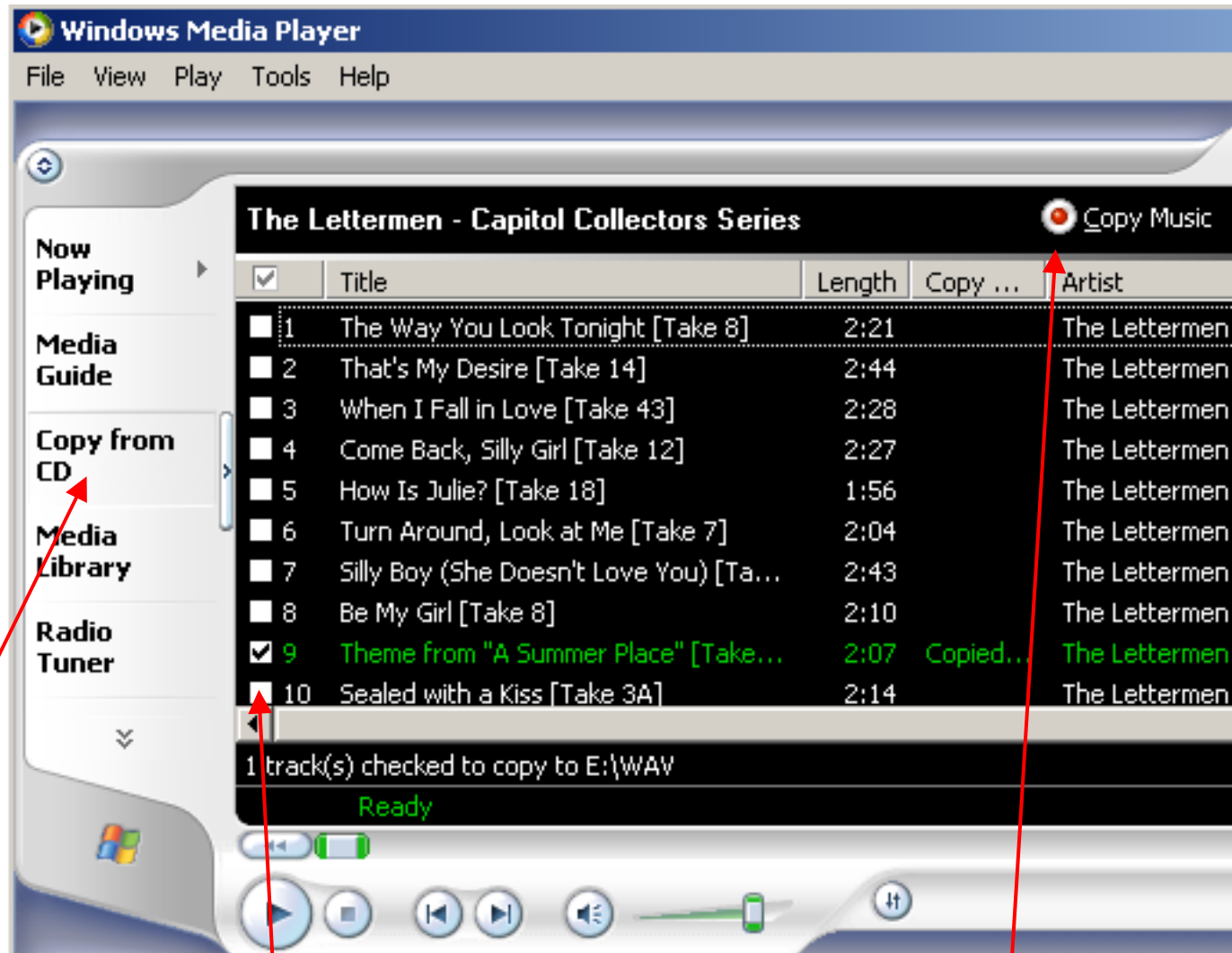
- Stereo (i.e. two separate channels of sound – “left” & “right”)

- Each channel is sampled 44 thousand times per second

- Each sample uses 16 bits (i.e. 2 bytes) of data

A floppy disk would be filled after storing only 8 seconds of sound!!
Thus the need for compressed formats like MP3 (but more on that later).

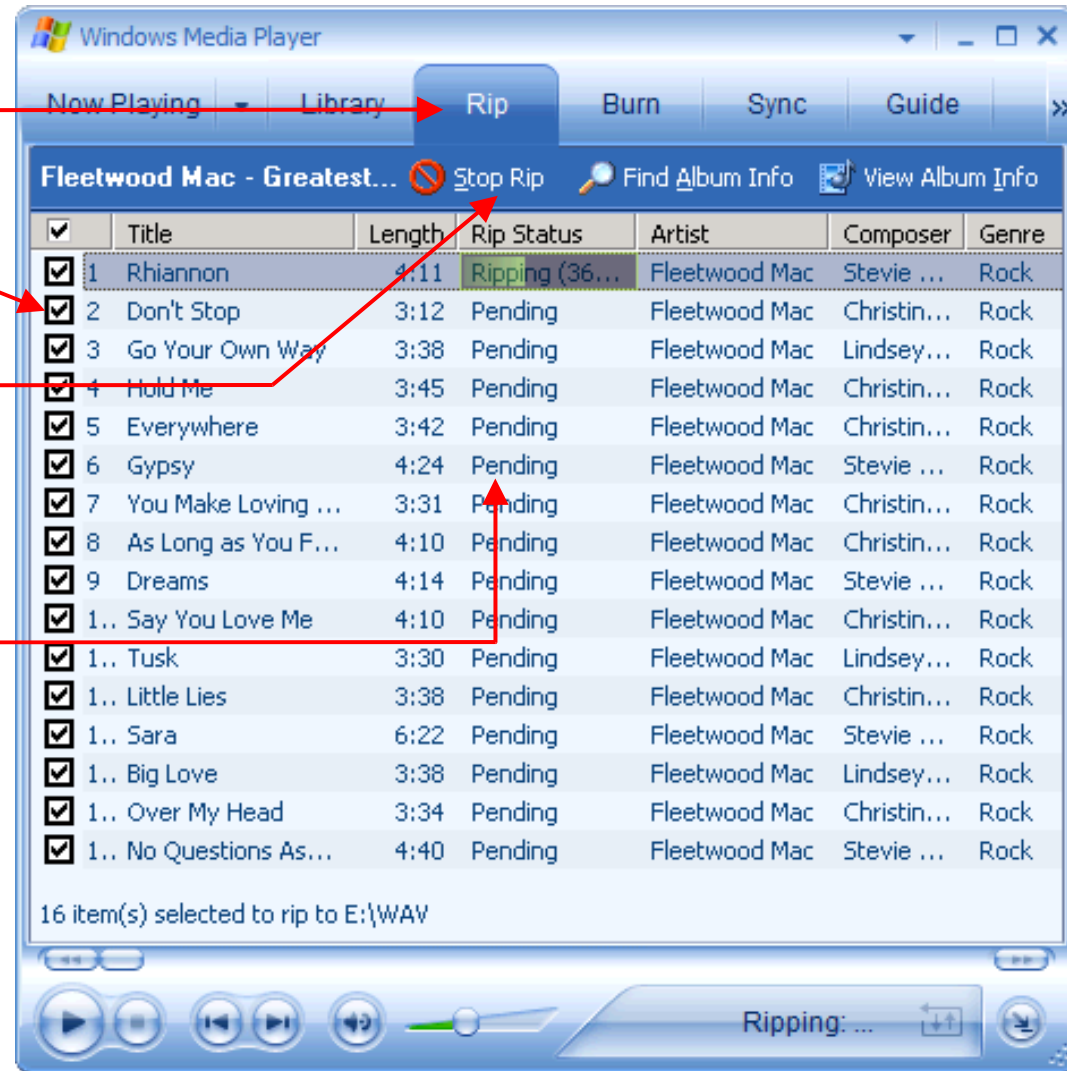
Ripping CDs (Media Player 9)



- 1) Select "Copy"
- 2) Check songs to be copied
- 3) Click "Copy Music"

Ripping CDs (Media Player 10)

- 1) Select “Rip”
- 2) Check songs to be copied
- 3) Click “Rip Music” / “Stop Rip”
- 4) Progress shown under “Rip Status”



Ripping Options (Media Player 10)

For more control over the to-be-created audio file, click:

>Tools >Options

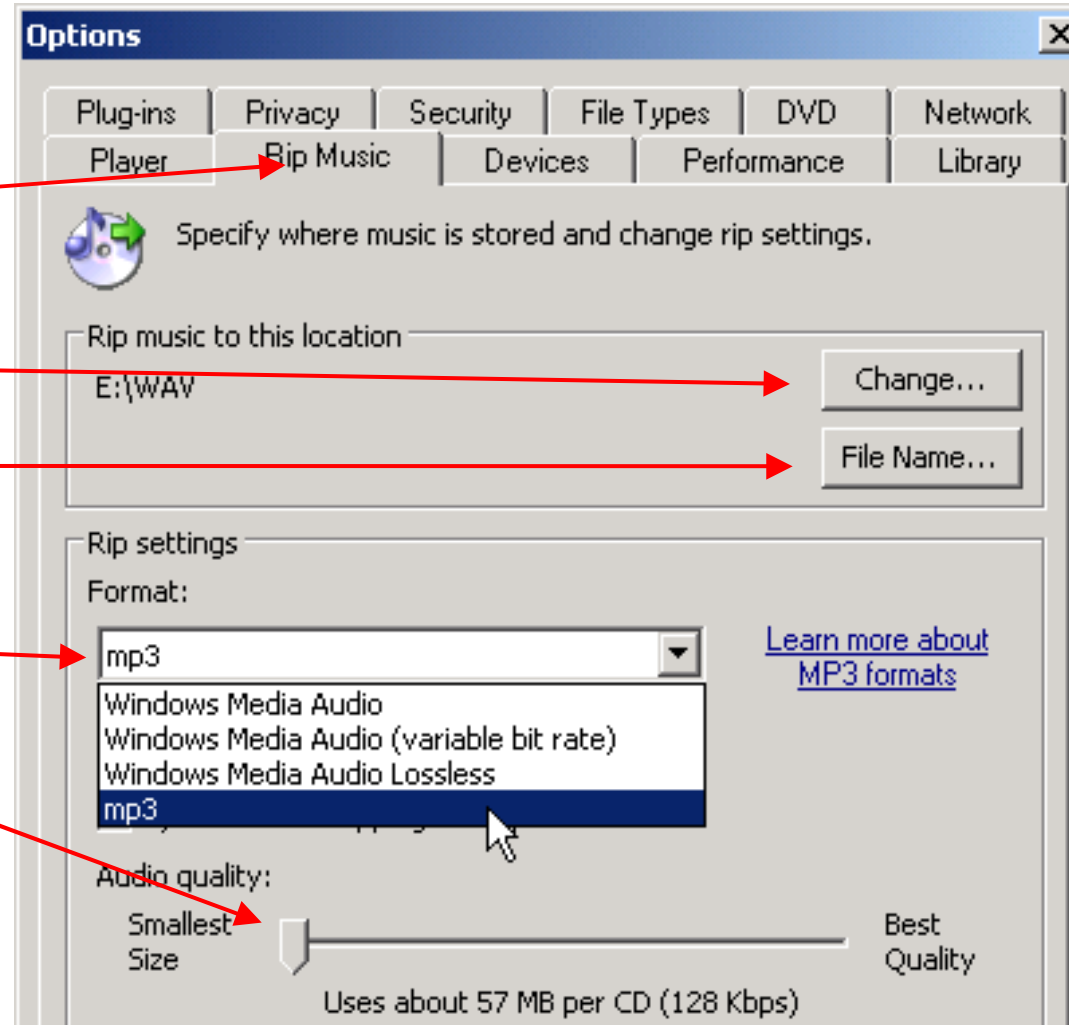
Click the “Rip Music” tab

Set where the ripped files will be stored

Set what the file will be called

Set the file format

Set the compression level
(128 kbps gives “CD-like” performance)



Playing a CD on a computer (Music Match)

- Just inserting the CD starts the player at the 1st song. For more control...
- Click "CD".
- Double click the song you want to start with.
- The same standard controls.



Ripping CDs (Music Match)

1. On the Playlist Window, click "Copy from CD"
2. The Recorder Window appears. Check the tracks you want copied.
3. Press "Start Copy"
4. As with Media Player, the recording parameters are set in "Tools".



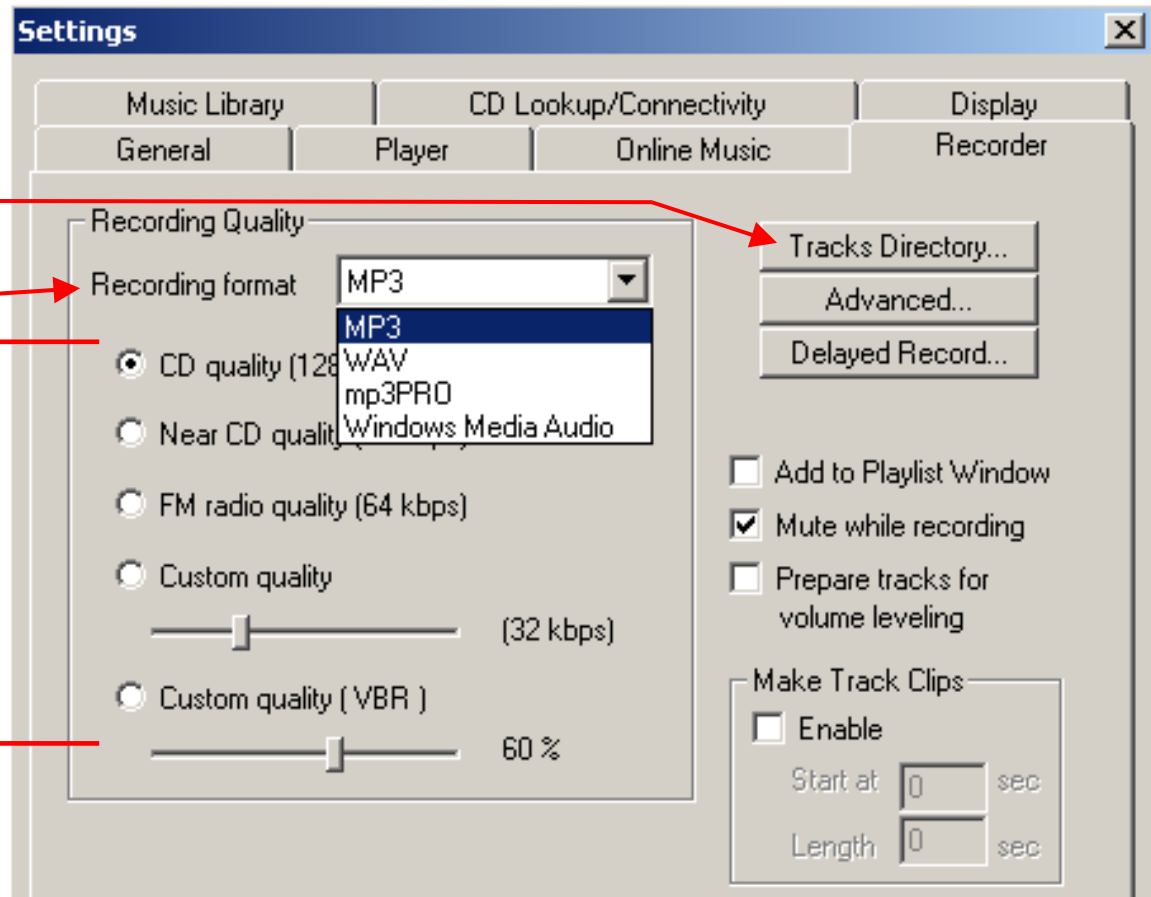
Ripping Options (Music Match)

For more control, click: >Options >Recorder >Settings

Set where the ripped files will be stored, and what the file will be called

Set the file format

Set the compression level for MP3 and WMA



So..... How do you know which format to choose?

Music file formats

- WAV: This is the only format that preserves all the quality of the CD. A WAV file is essentially the number sequence off the CD with some header information added. WAV files are very large.
- MP3: a public-domain sound compression format.
- WMA: Microsoft's sound compression format.
- AAC: Sony's compression format used on Apple's iPod.

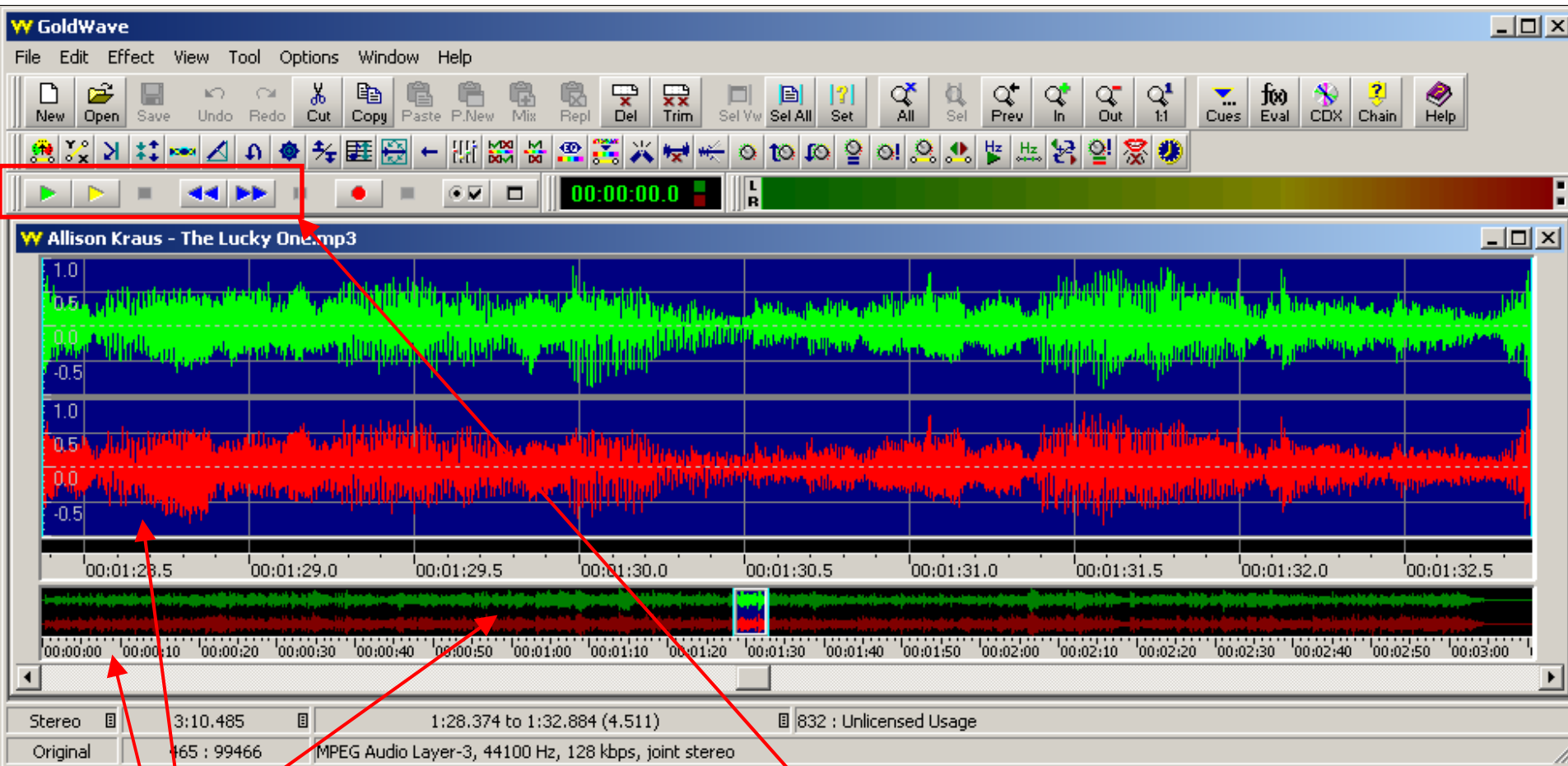
MP3, WMA & AAC all can reduce file size by 90% with hardly any degradation! MP3 is the widest used, but does not allow copy-protection.

Recommendations:

Build your music library with MP3-formatted files (2nd format choice is WMA).

If you want to edit a song, rip it as a WAV, make the edits, and then convert it to MP3.

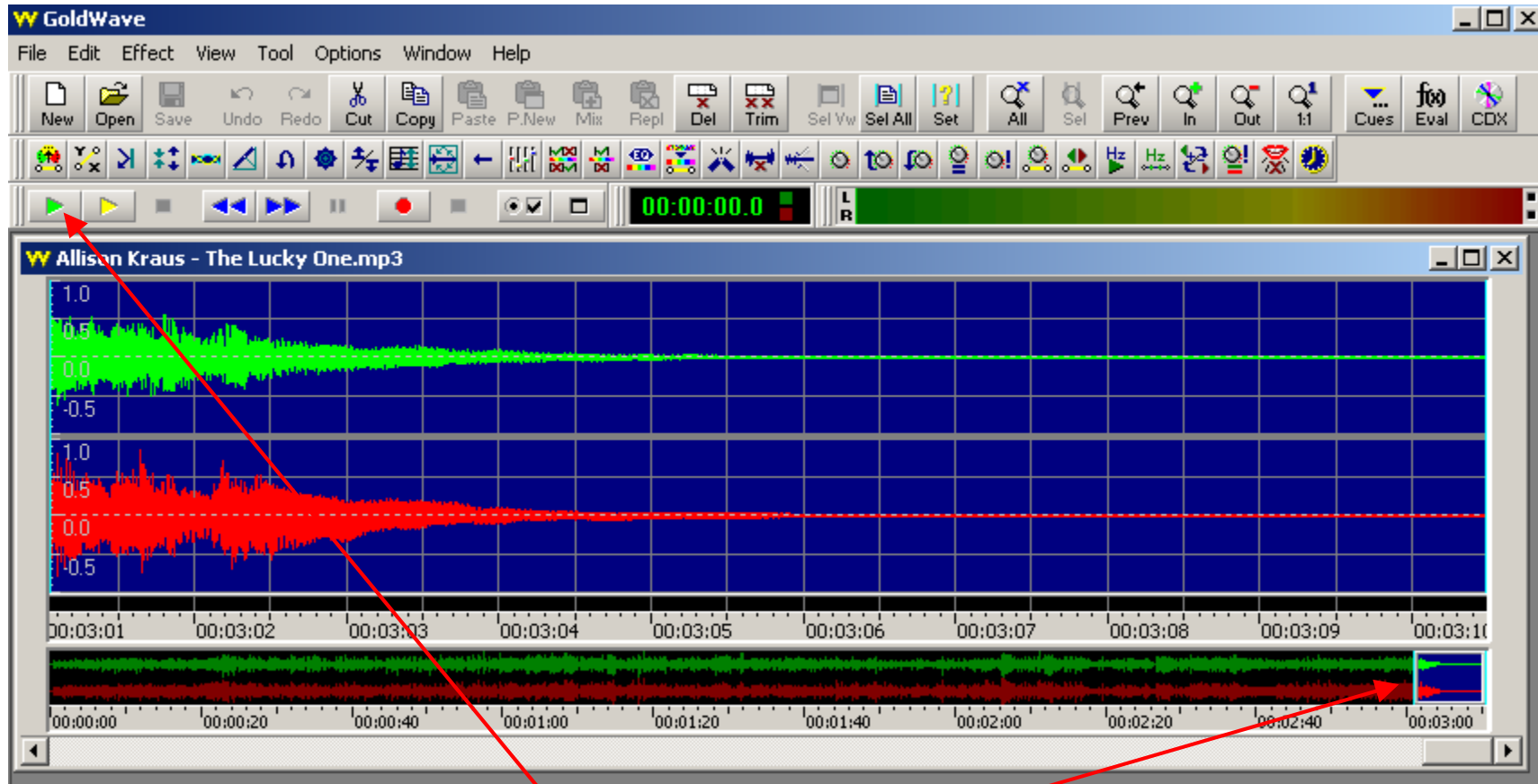
Some Simple Editing with Goldwave



- Display of the entire song
- Display of selected region
- Time marks (hh:mm:ss)

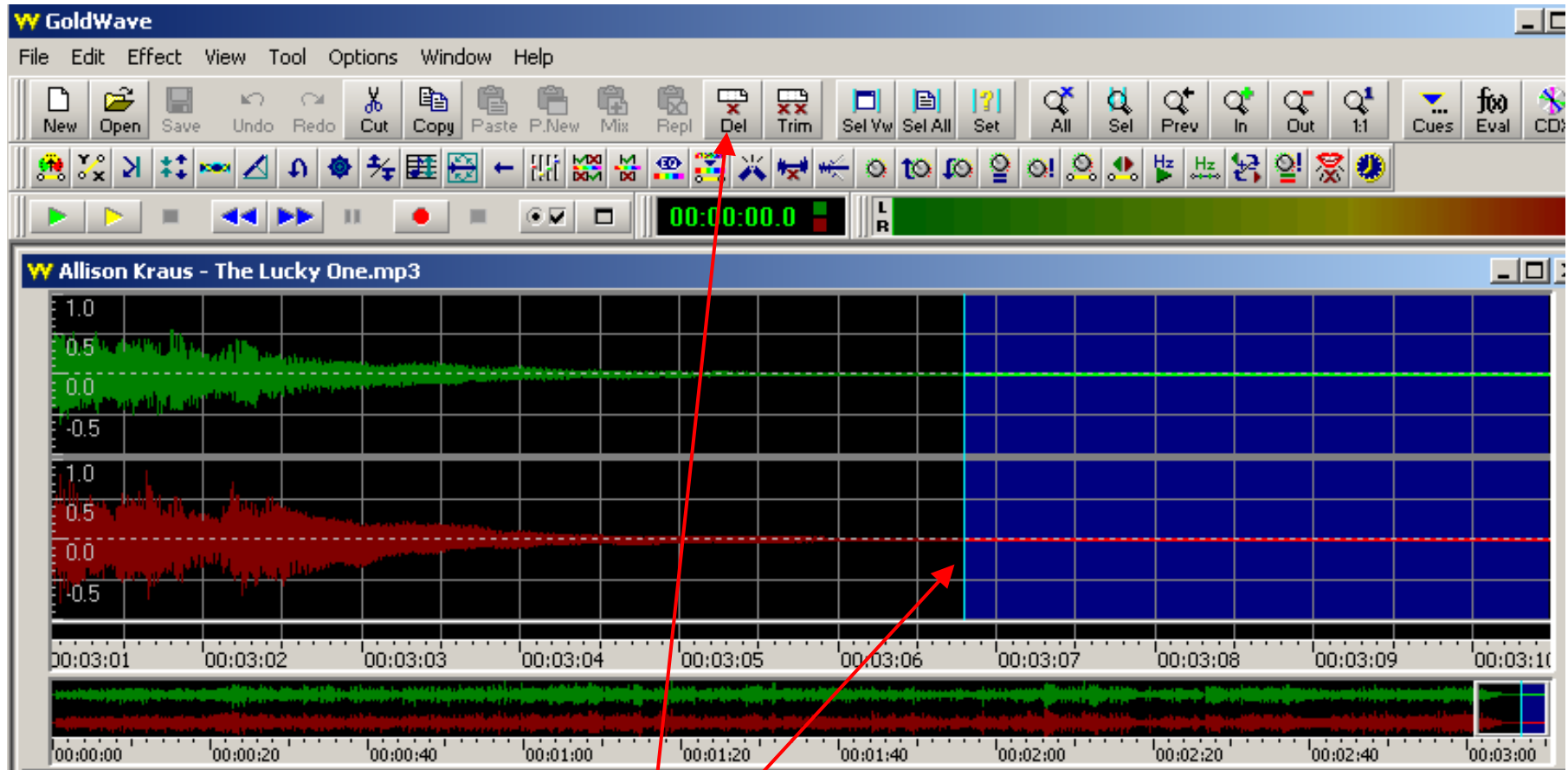
- Player controls for "Selected Region"

Trim off the ending & reset volume





- Select the approximate region
- Verify it by listening to it

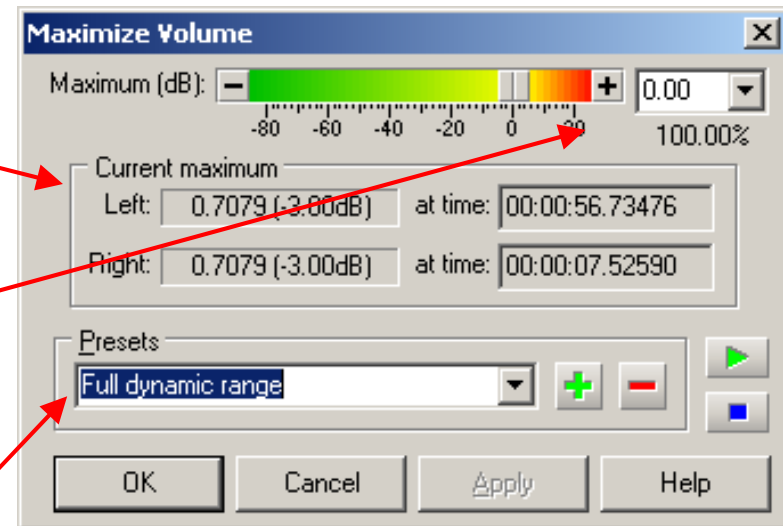
Trim Off The Ending



- Select the exact region (click & drag)
- Optionally verify it by listening to it
- Delete the highlighted (blue) region

Reset the Song's Volume


- Edits are only applied to the blue section, so start by selecting the whole file (Cntl-A, the  button, or >Edit >Select_All)
- Select >Effect >Volume >Maximize_Volume or just press the  button
- The file is scanned, and the max left & right channel volumes are identified.
- Either:
Set the desired gain change using the slider (in dB) or type a number (in % change).
or
Under Presets, select "Full dynamic range"
- Click OK

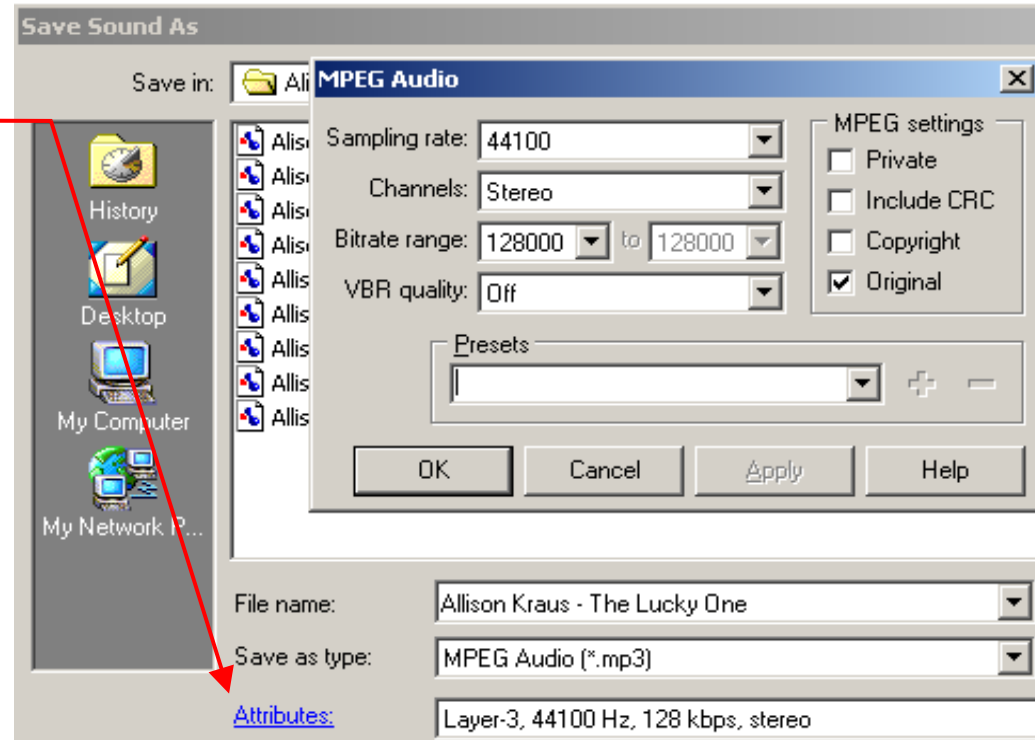


All editing operations are
protected with an Undo function



Saving the Results

- Save results (Cntl-S, , or >File >Save). There are dozens of format choices.
- For MP3s, there is a separate attributes window. (hint: just take the defaults)

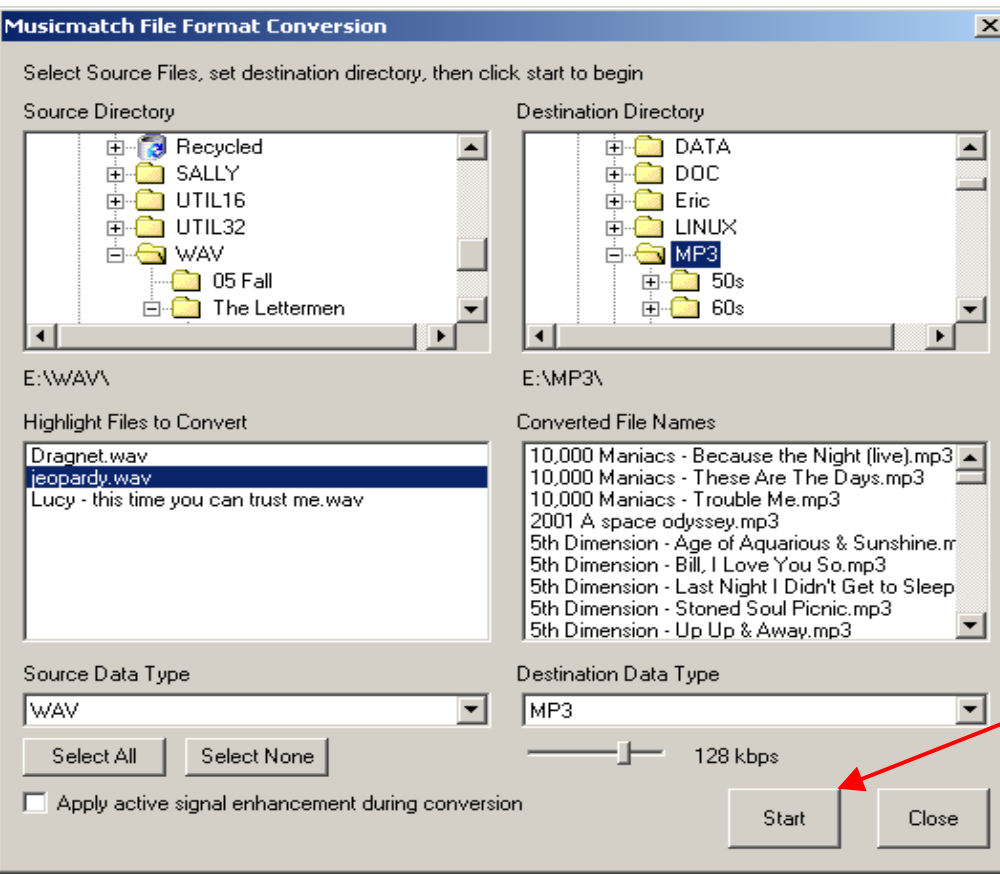
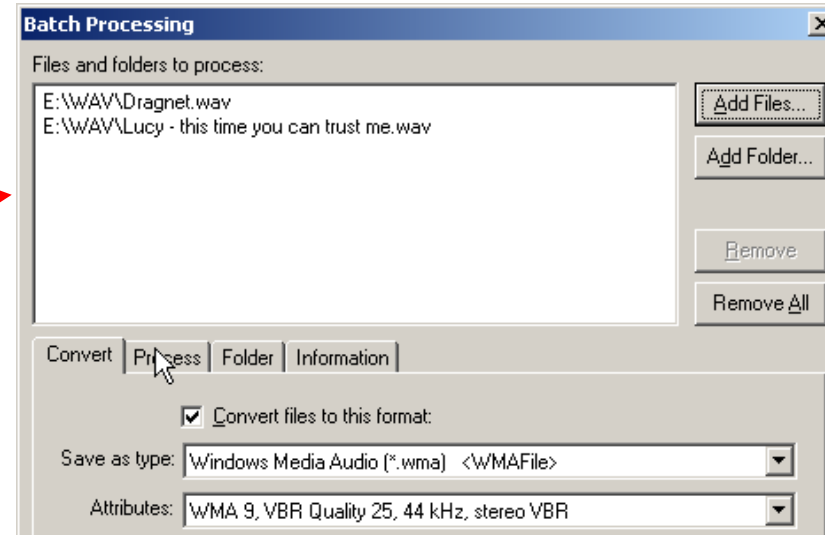


- For WAVs, there is a long pick list – which includes “ADPCM, 8kHz, 4-bit, Mono”. This is the format used for cell phone ring tones.

Converting between formats

Goldwave:

- Open the file, Save_As another format; or
- >File >Batch Processing



MusicMatch: (wav <-> mp3):

>File >Convert_Files

Set Source Dir, then Type, then
set of source files

Set Destination Dir, then Type. If
<Type> is compressible, set the
amount of compression

Click "START"

Buying Songs On-Line

- Many sites offer large selections of songs for ~\$1.
- iTunes (*.m4p) and Walmart (*.wma) are popular – & incompatible. Special software may be needed to buy songs on-line. iTunes & MusicMatch are their own purchasers. Walmart has software to augment Media Player.
- What happens when I download a song?
When you click the "Download All Songs Now" button to download your entire order, you initiate a process that downloads each song and its license to your computer. The license file contains information that allows Media Player to determine the usage rights associated with a song and to decrypt the song so you can play it, transfer it to a portable device or burn it to a CD.
- What computer should I use to download my music?
You should download your music to the one computer where you keep your digital music. Once you play a song, it can be played, burned or transferred to a portable player from that computer only.
- When I buy downloads from Walmart, what can I do with the music files?
By purchasing a music download, you can:
 - Download the music to 1 computer, back up music to 2 more computers
 - Make 10 burns to a CD
 - Make unlimited transfers to a portable device
 - Media Player keeps track of the rights associated with each song.

Buying Songs On-Line (Walmart)

A large collection at \$.88 / song at:

<http://downloads.walmart.com/swap> (must use Internet Explorer)

- Search for the song
- Hear a short sample
- After paying, songs are downloaded to your computer.
- Purchased songs are copy protected (e.g. Goldwave won't edit & MusicMatch won't reformat them).
- You can burn them to audio CDs.

Address <http://downloads.walmart.com/swap/>


« Back to Wal-Mart Music Download Music | Create Custom CDs | Buy C

WAL-MART Music Downloads Your Account Eric Hein

Search Artist

Home / Various Artists / Albums / Saturday Night Fever

Various Artists



Saturday Night Fever
Various Artists
Songs Sold Individually
Release Date: 2/6/96
Songs: 17
Definitive album

Songs on this Album 17 Songs« Previous | Next »

Tr...	R...	Song	...	Artist	Album	Year	P...	Buy
1	1	Stayin' Al...	...	The Bee Gees	Saturday Night Fever	19...	\$0.88	Buy
4	2	More Tha...	...	The Bee Gees	Saturday Night Fever	19...	\$0.88	Buy
3	3	Night Fev...	...	The Bee Gees	Saturday Night Fever	19...	\$0.88	Buy
13	4	You Shoul...	...	The Bee Gees	Saturday Night Fever	19...	\$0.88	Buy

Buying Songs On-Line (iTunes)

- “After installing iTunes, you'll only be able to transfer music to your iPod using iTunes. To transfer music from MusicMatch Jukebox or Audible Manager to your iPod, you'll need to first import the music into iTunes. For more information, search iTunes and Music Store Help.”
- iTunes_6 purchase = *.m4p = AAC format. Will play on [iTunes, Real Player_10 (but can't add to MyLibrary), ??]
- Not recognized by [Easy CD Creator_5/Media Creator_7, Media Player_9, Goldwave_5.10, MusicMatch_9, ...]
- iTunes reformats only non-copy protected files.



Buying Songs On-Line (Music Match)

- 1) Start by clicking “Music Store”
- 2) Search for the song
- 3) Hear a short sample
- 4) Buy it

Log in Account

Not Logged In

GET

On Demand

Music Store

Radio

PLAY

Library

CD

Now Playing

COPY

Copy from CD

Burn to CD


Portable Device

Music Store

Search: alison krauss Artist


Back Jump to Home My Matches New Music Top Hits Genres Eras


Music Store Alison Krauss




Alison Krauss


Now That I've F... New Favorite

 12... \$9... BUY ALBUM

 13... \$9... BUY ALBUM

Lonely Runs Bo... Forget About It

 15... \$9... BUY ALBUM

 11... \$9... BUY ALBUM

Tracks Albums Related Artists Artist Info

Sorted By Popularity

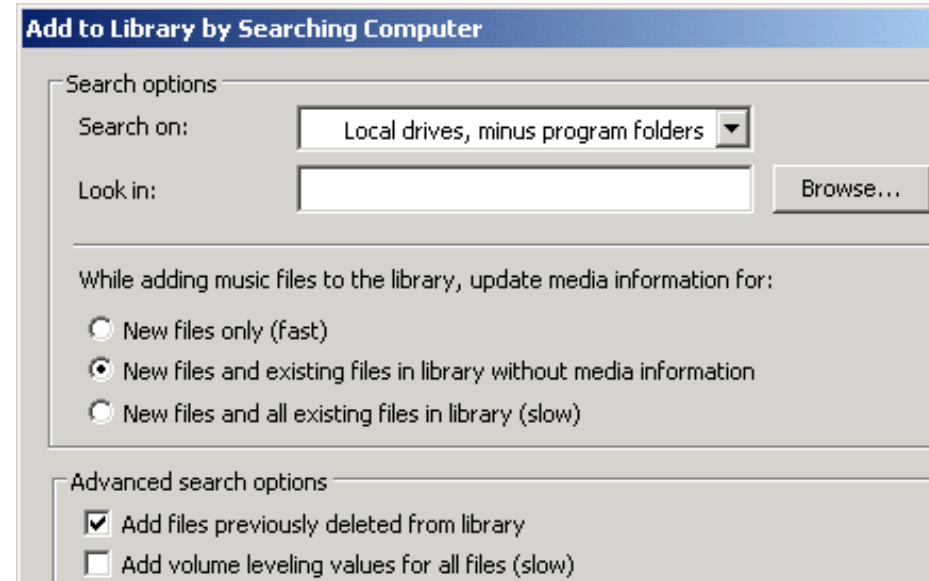
#	Track Title	Album Title	Buy	Price
1	When You Say Nothing At All	Now That I've Found You: ...	BUY TRACK	\$.99
2	The Lucky One	New Favorite	BUY TRACK	\$.99
3	Baby Now That I've Found You	Now That I've Found You: ...	BUY TRACK	\$.99

Adding Music to the “Library”

The “Library” is a database of links to music files. There are many ways to create these links. In Media_Player:

- 1) Place all your music in a single directory tree, then
>Tools >Search for Media Files;

or



- 2) Drag-and-drop from an Explore Window (e.g. My Computer);

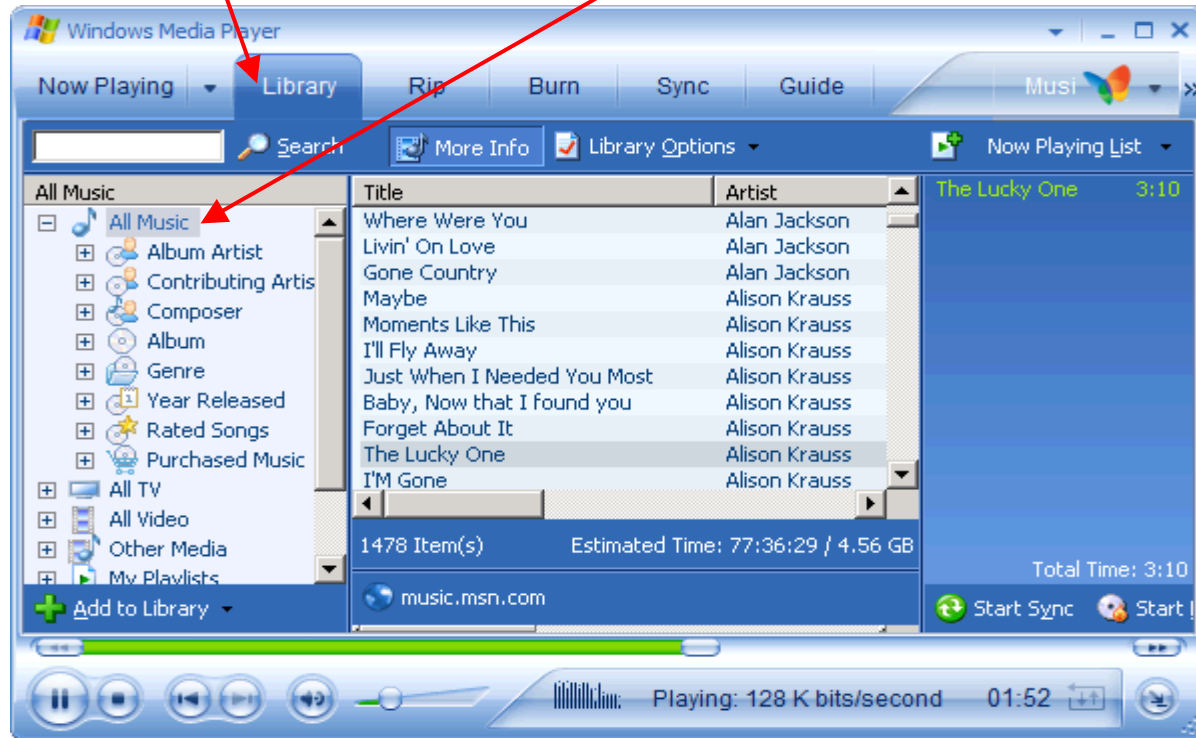
or

- 3) You can configure Media Player to automatically add links into the Library whenever a song is played. However, I've found this to be confusing and/or undesirable.

Playing stuff in the Library (Media Player)

Select “Library”, then expand “All Music”.

Selecting the artist (e.g. Alison Krauss) displays all of his/her songs.

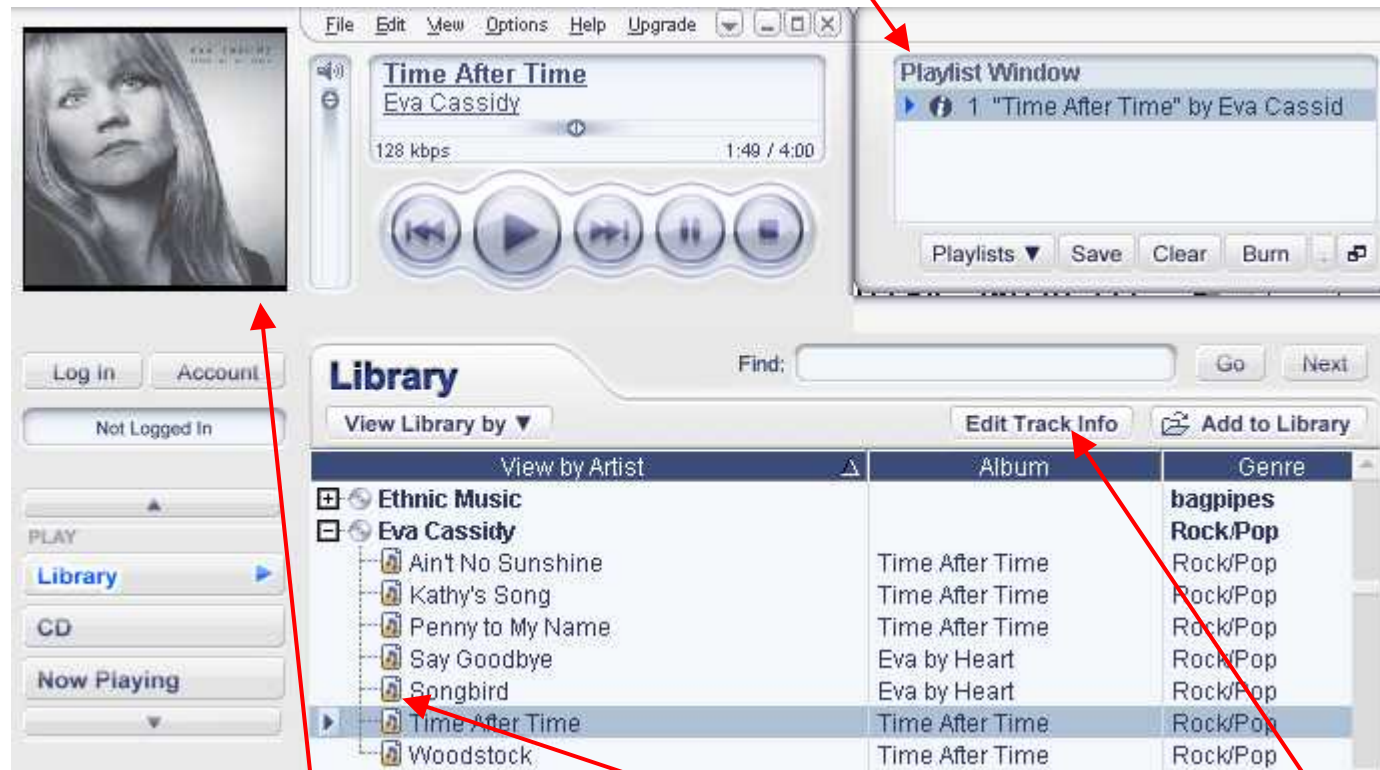


Select your song(s), and drag them under “Now Playing List”

You can save any set of songs in a “Play List” (click “Now Playing List” – then “Save Playlist As..”).

Playing stuff in the Library (Music Match)

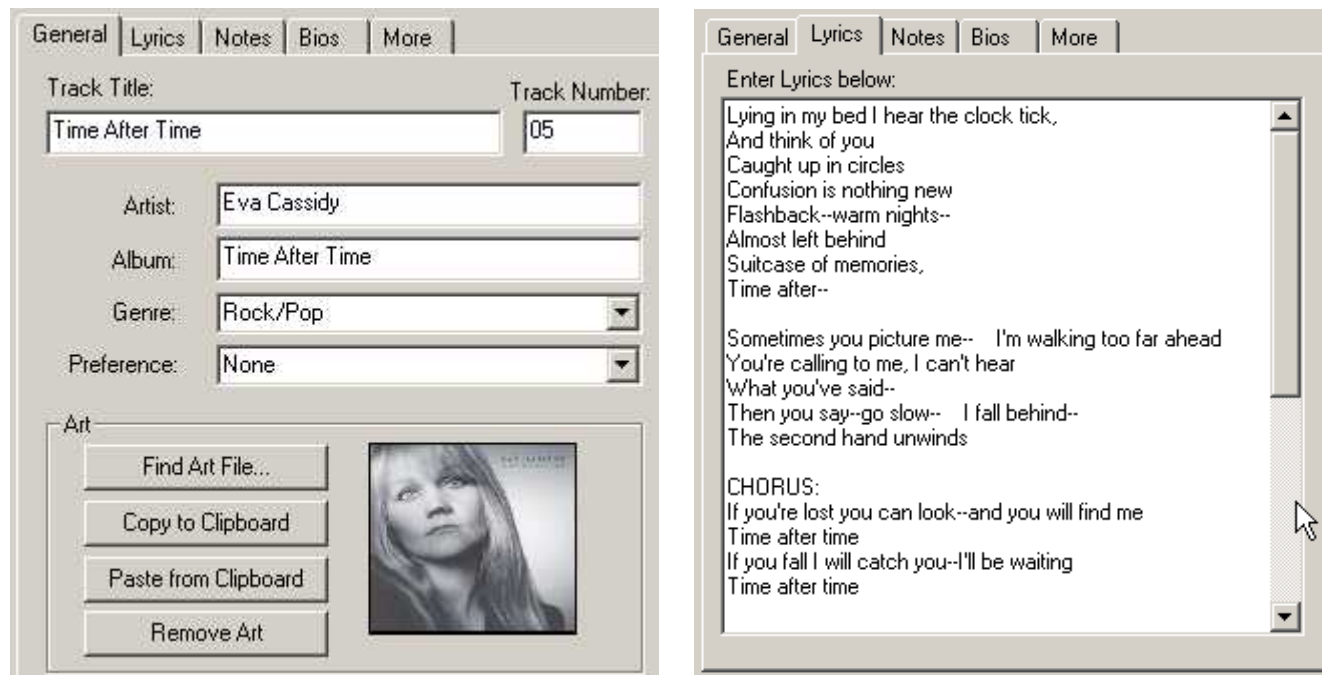
The GUI is similar – but adds a “Playlist” window. Set the songs to be played by double-click or drag-and-drop from the Library. Right-click the Playlist window to save it as a playlist file.



Note additional info: Album_thumbnail Auto_Volume track_info

MP3 Header Information

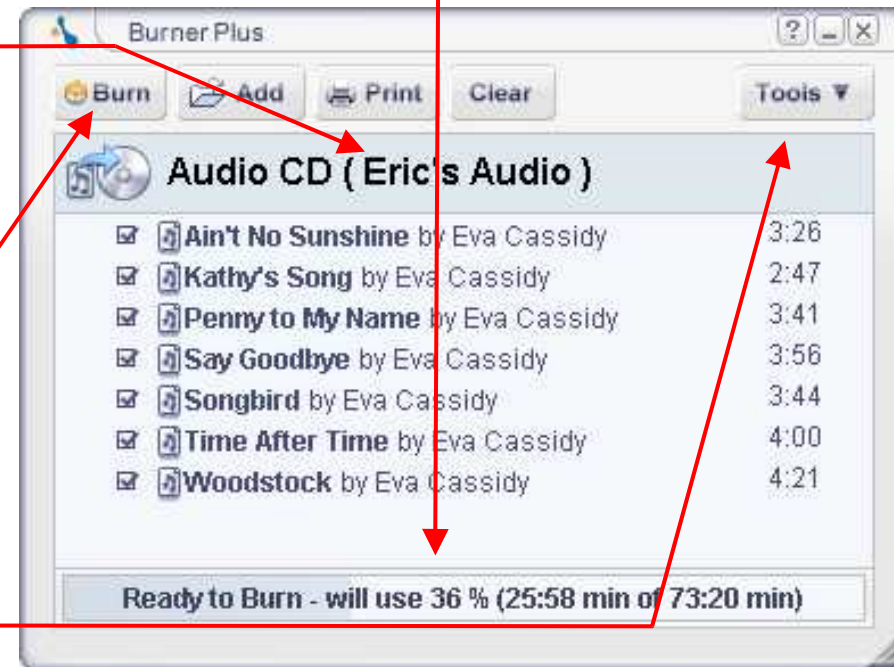
MP3s allow for lots of extra info about the song. Some data is common to the MP3 standard (Title, Artist, Genre, ...), but some is unique to the player you're using. MusicMatch adds lots of extra data items including: Art, Lyrics, Volume leveling



Right-click a song in the Library >Prepare for Volume Leveling: this scans the song & saves a gain setting used during playback.

Make Your Own Audio CD (MusicMatch)

- Click “Burn to CD”
- The “Burner Plus” window appears. Drag-and-drop files to it from the Library. The status bar shows how much of the CD will be used.
- Set the title (e.g “Eric’s Audio”)
- Drag-and-drop within the window to set playback order.
- Click “Burn”



You can play with lots of options under “Tools”

Make Your Own CDs (Easy CD Creator 5)

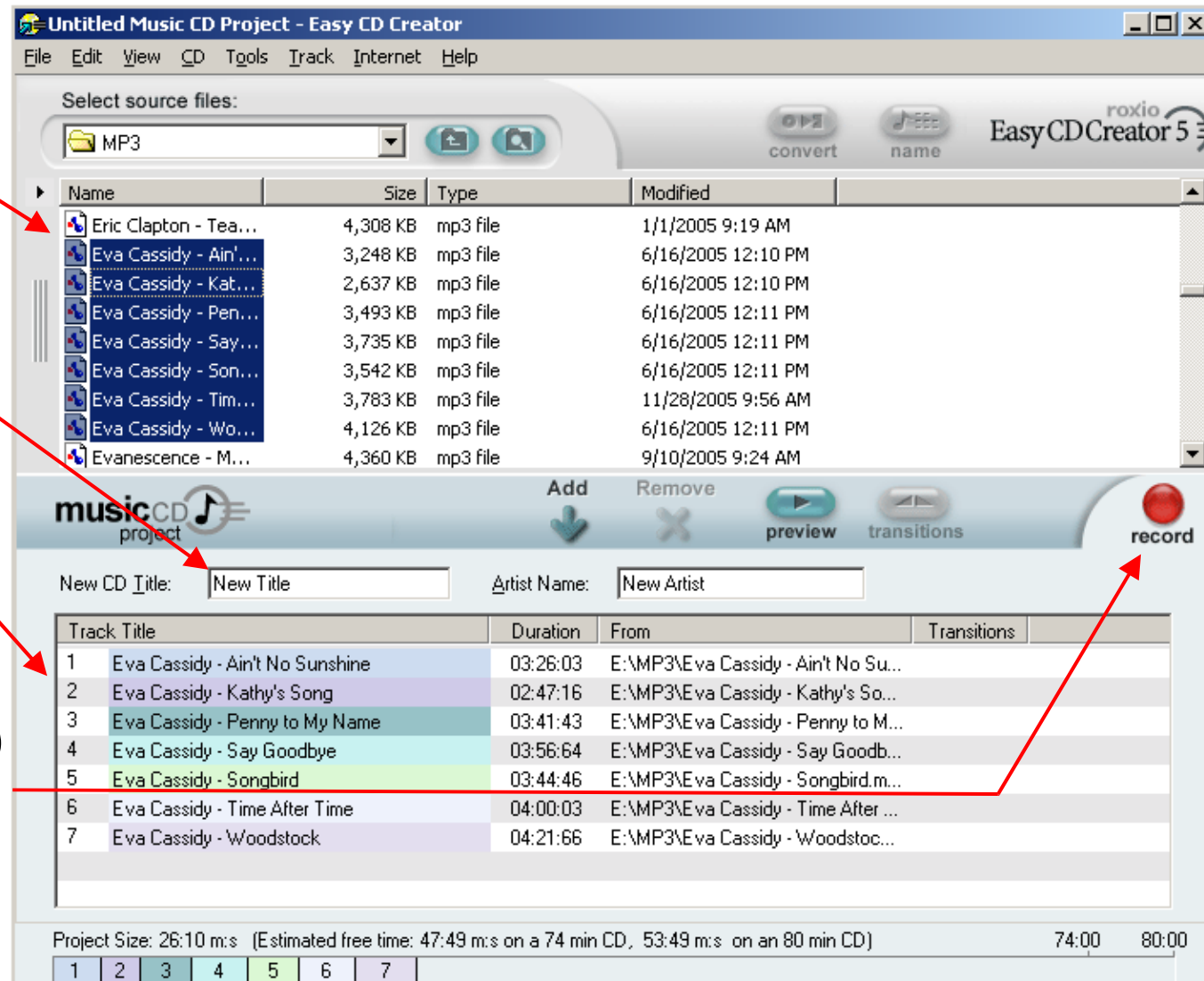
>File >New CD Project >Music CD

Select_files

Set_title

Set_order

Burn (i.e. Record)



Make Your Own CDs (Easy Media Creator 7)

Audio_CD Select_files Set_title Set_order Burn

The screenshot shows the 'Creator Classic' window with a menu bar (File, Edit, View, Tools, Track, Help) and a left sidebar with task categories: Tasks, Common Projects, Advanced Projects, and Other Tasks. The 'Common Projects' list includes 'Data Disc', 'Audio CD', and 'MP3 Disc'. The 'Audio CD' project is selected. The main workspace is divided into three sections: 'Select Source', 'Audio CD Project - Untitled*', and a track list. The 'Select Source' section shows a file tree with 'MP3' selected, displaying a list of MP3 files. The 'Audio CD Project - Untitled*' section has fields for 'Disc Title' (Various Albums) and 'Artist Name' (Eva Cassidy). The track list at the bottom shows 7 tracks with their titles, lengths, and source files. A 'Burn' button is located in the top right of the project section. Red arrows point from the labels above to these specific elements: 'Audio_CD' points to the 'Audio CD' project in the sidebar; 'Select_files' points to the 'Select Source' section; 'Set_title' points to the 'Disc Title' field; 'Set_order' points to the track list; and 'Burn' points to the 'Burn' button.

Select Source

Name	Size	Type	Modified
Eric Clapton - My Father's Eyes.mp3	5,098 KB	mp3 file	3/15/2005 8:38 PM
Eric Clapton - Signe.mp3	2,037 KB	mp3 file	1/1/2005 9:19 AM
Eric Clapton - Tears in Heaven.mp3	4,308 KB	mp3 file	1/1/2005 9:19 AM
Eva Cassidy - Ain't No Sunshine.mp3	3,248 KB	mp3 file	6/16/2005 12:10 PM
Eva Cassidy - Kathy's Song.mp3	2,637 KB	mp3 file	6/16/2005 12:10 PM
Eva Cassidy - Penny to My Name.mp3	3,493 KB	mp3 file	6/16/2005 12:11 PM

Audio CD Project - Untitled*

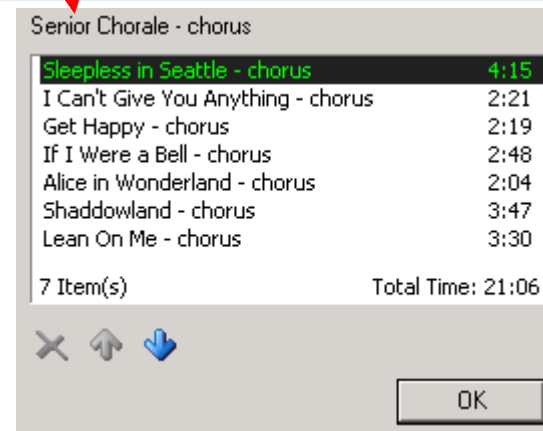
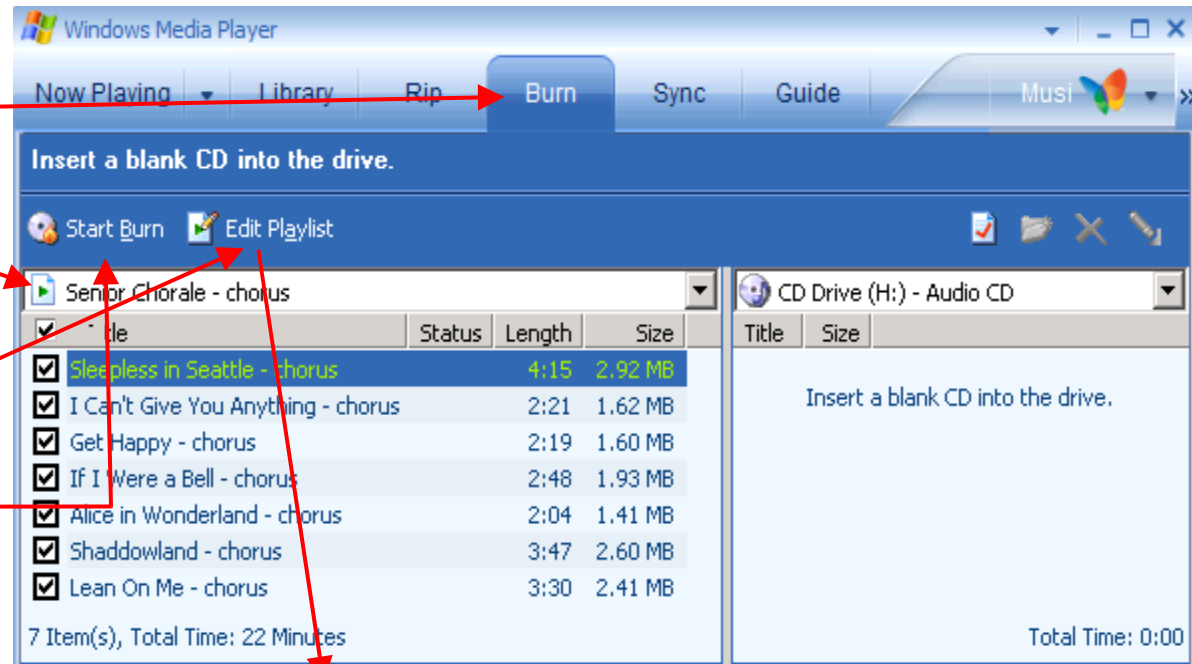
Disc Title: Various Albums Artist Name: Eva Cassidy

Track Title	Length	From	Transitions
1 Ain't No Sunshine	03:26:03	E:\MP3\Eva Cassidy - Ain't No ...	
2 Kathy's Song	02:47:16	E:\MP3\Eva Cassidy - Kathy's ...	
3 Penny to My Name	03:41:43	E:\MP3\Eva Cassidy - Penny t...	
4 Say Goodbye	03:56:64	E:\MP3\Eva Cassidy - Say Goo...	
5 Songbird	03:44:46	E:\MP3\Eva Cassidy - Songbir...	
6 Time After Time	04:00:03	E:\MP3\Eva Cassidy - Time Aft...	
7 Woodstock	04:21:66	E:\MP3\Eva Cassidy - Woodst...	

Disc Size: 80 min (703 MB) Audio CD Project Time: 25:58 m:s - (Estimated Free Time: 54:01 m:s)

Make Your Own CDs (Media Player 10)

- Burn
- Select the Files / Playlist
- Set order ("Edit Playlist")
- "Start Burn"



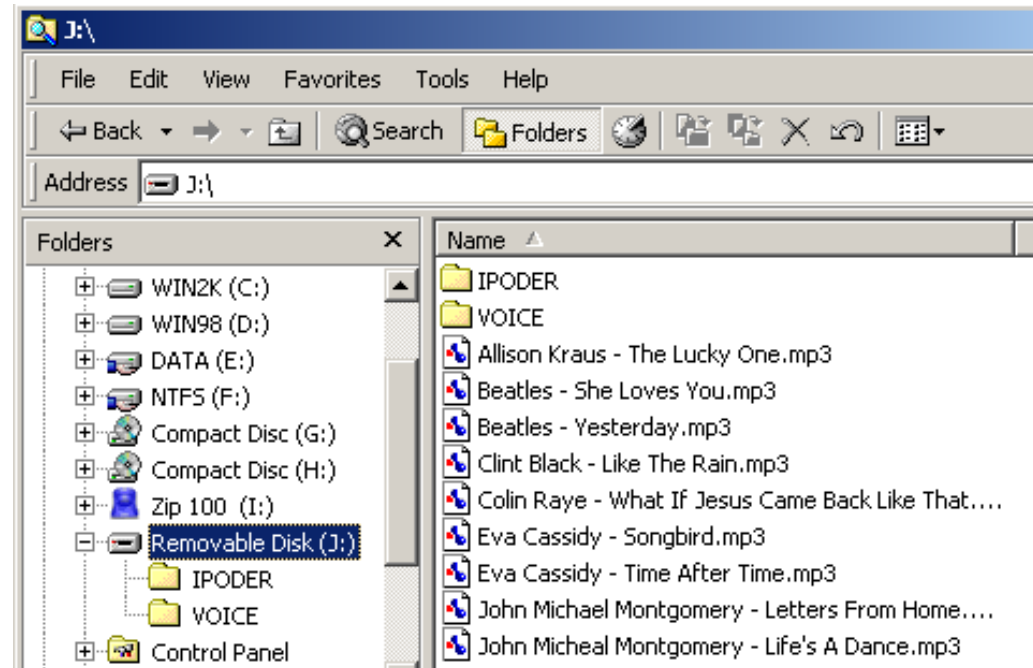
Portable MP3 Players

- Some portables (e.g. iPod) use small hard drives. Most use “flash memory”.
- Some include FM radios and Voice recorders.
- Most appear to your computer as another disk.



SanDisk 512MB

- Same basic controls
- Some have equalizers
- One AAA battery lasts 15 hrs
- Can only drive headphones (or amplified speakers)



Summary

We've covered:

0. How to play music on a computer
1. How to get new music into a computer from a CD
2. How to do some sound editing.
3. How to buy music on-line.
4. How to make a music CD
5. How to use portable MP3 players