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TECHNOLOGY

Audio confusion

What compression and formats mean to digital music

> By BRIAN WOODDELL STAR-TELEGRAM STAFF WRITER

> > Second of two parts

ONLINE EXCLUSIVE Find out if you can hear the difference in the quality of sound when it's compressed

www.star-telegram.com

Format

Digital music is everywhere, from radios to music players to DVDs, and it has been since 1980, when the compact disc first came on the scene. Since then, music has become more portable, and more perplexing, than ever. If you want to move past CDs into the world of MP3s, you'll need to know the basics behind the technology. Never fear, though; digital music boils down to two things: format and compression.

There are several compressed music formats on the market, and not all players can play the same ones. Think of a format as a set of instructions about how the computer should save music. The format governs compression and quality, as well as features such as the ability to save a song's title, artist and, in some cases, album cover art within the file. Here are some of the most popular formats:

File type	Real name	Overview
MP3	MPEG-1 Audio Layer 3	Introduced in 1991, it's playable on all operating systems and in almost all music players.
WMA	Windows Media Audio	Introduced around the same time as MP3, it did not gain the same widespread acceptance. But it is gaining in popularity.
M4A (or M4P or AAC)	MPEG-4 Advanced Audio Coding	Pushed by Apple for use on its iTunes Music Store and iPods. Its basic founda- tions are similar to those of the MP3.
OGG	Ogg Vorbis	A patent-free, openly editable audio format. Used mainly by independent artists and those who don't want to pay royalties. Vorbis files don't work on most software or hardware music players.
ATRAC	Adaptive Transform Acoustic Coding	Sony's proprietary format first debuted with the MiniDisc in 1992. The current incarnations are ATRAC3, ATRAC3plus and ATRAC Advanced Lossless.

When worlds collide

Let's say you have two copies of the same song. One is a 128 kbps AAC file from iTunes and the other is a 192 kbps MP3 file you ripped from a CD. The MP3 file should sound better because it has a higher bitrate, right? Not necessarily. In fact, assuming the two files encoded properly, they should sound almost the same. That's because different

formats use different compression algorithms. The AAC format is newer than the MP3, and its algorithms have been designed to re-create the original sound even better than its older counterpart at a smaller size and bitrate. The same is true for other formats. The only way true way to compare different formats is to listen to them.

SOURCES: Fraunhofer IIS; Sony; Xiph; International Organization for Standardization; José Feghali, artist in residence and coordinator of Internet technology for the TCU school of music

Compression

The biggest difference between CDs (or records) and digital music files is compression. In order to crunch a fiveminute, 55-megabyte song into a 5megabyte file, a computer must look for what can be removed from the song without losing too much of the original sound. This is done using a set of equations called a "psychoacoustic compression algorithm." which analyzes sound based on how the human ear hears.

In order to compress, the computer removes anything that most human ears aren't capable of hearing, such as sounds as sounds that are overshadowed by other sounds (a trumpet drowning out the violins, for example). You can't hear it, so why waste the space? The overall quality and size of a song

that are either very low (around 20 Hz)

or very high (around 20,000 Hz), as well

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are set by the bitrate, which tells the encoder how many bits to assign to each second of music. For example, a 192 kilobit per second (kbps) song will have 192,000 bits of data for each second. A higher bitrate means less compression, higher quality and larger file size.

Terms to know

■ Bit (b): the smallest piece of data used by a computer, represented in binary as either a one or a zero. There are eight bits per byte (B) of computer data.

■ Digital rights management (DRM): a copyright-protection system used by media downloading services.

■ Encode: to convert from a raw format, such as CD audio, into another format,

■ Hertz (Hz): a metric unit that measures frequency of events per second.

■ **Lossless:** preserving the original's

Lossy: creating a loss in overall quality. ■ **Proprietary:** only usable with software or hardware made by the same company. ■ Rip: to copy and encode audio or video

information from a CD, DVD or other medium onto a computer.

■ Variable bitrate: VBR encoding changes the bitrate of a song based on complexity. This results in better compression and sound quality.



CLICK HERE

Great sites we've found

www.mybraintrainer.com/brainpower

MyBrainTrainer, which has been online since 2002, touts itself as the "senior member of the brain exercise community." It offers a variety of Flash-powered mental gymnastics for a subscription fee of \$9.95 for four months. (The DS games cost \$19.95 each.)

But you don't have to buy anything or register to have the site evaluate your brain power. The test seems simple. You're shown an image and a word. If they match, you press the right arrow on your keyboard; if not, the left. But if the word "reverse" appears at the same time, you press the opposite key. You're graded on accuracy and speed. It's a truly humbling experience, even for a longtime video-game fan.

- Star Tribune (Minneapolis)

Car insurance

Tips for lowering car insurance costs:

▶ Compare insurance costs before you buy a car; models with high sticker prices, repair costs or likelihood of theft and those with poor safety records will probably be most expensive to insure; those with air bags, anti-lock brakes, daytime running lights, anti-theft devices and other safety features may have lower insurance costs

- Raise your deductible; consider dropping collision and comprehensive coverage on older cars
- ▶ Maintain good credit; most insurers use credit-based scores to determine
- insurance premiums Get quotes from at least three insurers

The numbers Average annual

U.S. auto insurance

premiums:

\$851 \$847 2006 2007

SOURCE: Insurance Information Institute (U.S. Graphic: Pat Carl

RECALLS

Product: PARODI glass floor vases, manufactured by IKEA Home Furnishings.

Hazard: The base can break off unexpectedly. **Description:** The vases have thick black. white or clear glass walls, stand about 28 inches and weigh about 11 pounds. The IKEA logo and one of three article numbers are printed on the

base's underside: 201-102-34 (black), 501-121-99 (white) and 000-795-45 (clear). Sold at: IKEA stores from April 2004 through

December for about \$40. What to do: Return the vase to an IKEA store for a full refund. Phone: 888-966-4532. Web site: www.ikea-usa.com

Product: Curling irons, manufactured by Conair Corp.

Hazard: The handle can come apart exposing its line cord, posing a shock or electrocution hazard

Description: The ceramic, gold-matte finish curling irons have a 1-, 11/4- or 11/2-inch barrel, metal counter rest, vertically placed ON-OFF buttons and a heat set dial ranging from 0 to 30. A four-digit date code is on the plug prong. Date codes range from November 2005 through July 2006 (ex. 0706). "Conair" is on the handle.

Sold at: Discount retailers and drug stores for about \$25. What to do: Contact Conair to receive a free

replacement. Phone: 800-687-6916. Web site: www.conair.com/ironrecall.html

Product: Children's "Rachael Rose Kidz" **rings**, imported by Shalom International Corp. Hazard: The jewelry contains high levels of lead, which is toxic if ingested by young children.

Description: The rings are silver- or goldcolored with designs or stones in a variety of colors. They come four to a package. "Kidz by

quality.

Rachael Rose," "Family Dollar \$1" and "SKU 1905580" are printed on the packaging. **Sold at:** Family Dollar stores from December 2005 through January for about \$1.

What to do: Return them to any Family Dollar store for a full refund, or contact Shalom International. Phone: 800-359-8162. Web site: www.familydollar.com

Product: Children's "Ultra Gear" bracelets, imported by DM Merchandising.

Hazard: The jewelry contains high levels of lead, which is toxic if ingested by young children.

Description: The bracelets are 8-inch long, silver-colored chain bands that have a 11/2 -inch long casting with assorted designs.

Sold at: U.S. Gifts stores, dollar stores and

small discount stores from July 2004 through January for about \$1. What to do: Return the jewelry to the store

where purchased or contact DM Merchandising for a full refund. Phone: 800-548-6784. Web site: www.dmmerchandising.com

Product: Heavyweight outerwear jackets, manufactured by Samara Brothers.

Hazard: The snap closures contain excessive amounts of lead, which poses a lead poisoning hazard.

Description: The boy's jackets have a Carter's-brand logo on the front and were sold in toddler and boy's sizes in charcoal, navy and red. Toddler sizes range from 2T to 4T. Boy's sizes include S. M and L.

Sold at: Major and discount department stores from October through November for up to \$50. What to do: Contact Samara Brothers to obtain a full refund. Phone: 800-985-9975. Web

site: www.samaraiacketrecall.com SOURCE: www.cpsc.gov

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Lotto Texas numbers drawn Wednesday, Feb. 21. The jackpot was worth \$42 million. No ticket matched all six numbers. Estimated jackpot for tonight, Feb. 24: \$45 million.

Tickets		
matched	Prize	Winners
6 of 6	\$42 million	0
5 of 6	\$1,869	33
4 of 6	\$53	1,720
3 of 6	\$3	35,334

Day 9, 8, 4 Night 9, 2, 3 Drawn in this order Friday, Feb. 23.

CASH 5 10, 15, 17, 27, 31

Cash 5 numbers drawn Friday, Feb. 23.

TEXAS TWO STEP 2, 10, 13, 24, BB 7

Numbers drawn Thursday, Feb. 22. Estimated prize for Monday, Feb. 26: \$200,000. Confirm winning numbers with lottery vendor.
The Star-Telegram is not responsible



3, 18, 21, 38, 50 Mega Ball **43** Megaplier **4**

Mega Millions numbers drawn Friday, Feb. 23. Estimated prize for Friday, Feb. 23: \$177 million

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- Search article archives. ■ Check local weather conditions and the seven-day forecast.

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