



Texas Instruments - Internet Audio

Chris Schairbaum

New Business Development

<http://www.ti.com/sc/internetaudio>

A man with dark hair and glasses, wearing a maroon shirt, is laughing and holding his headphones. The background is a blue-toned collage of musical notes (treble clef, bass clef, eighth notes) and binary code (0s and 1s).

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What Is Internet Audio?



TODAY

- ◆ Download Digital Audio Content from the Web and “rip” CDs to the PC
- ◆ Play Compressed Content on a Portable Internet Audio Player

TOMORROW



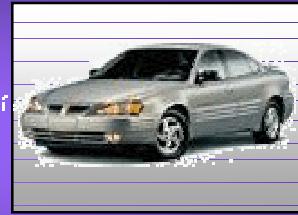
PDA



Mobile Phone



Digital Camera



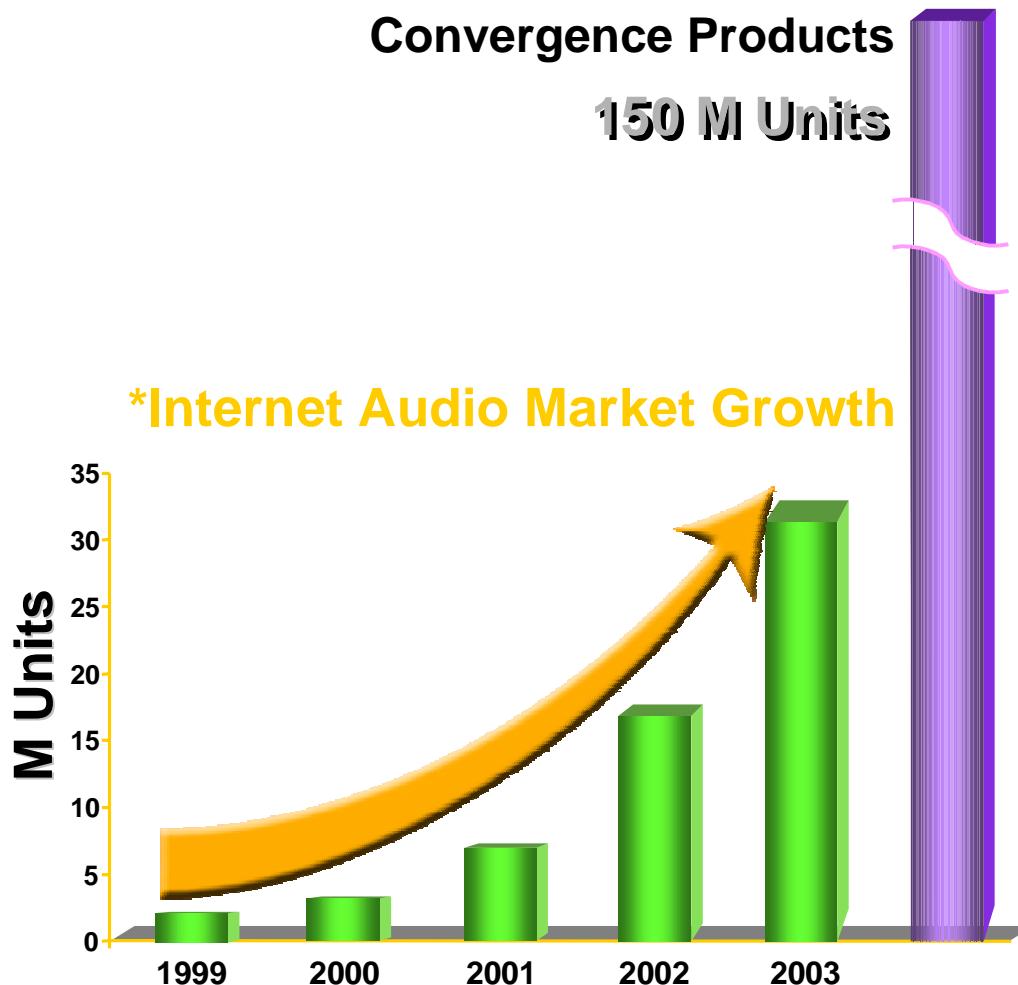
Car Audio



THE WORLD



Internet Audio: Market Growth Accelerating



Market Potential

- ◆ Rapidly Growing Market
- ◆ Application Convergence Creates Awesome Opportunity
- ◆ TI DSPs in 100s of Millions of Products, Enables Rapid Convergence

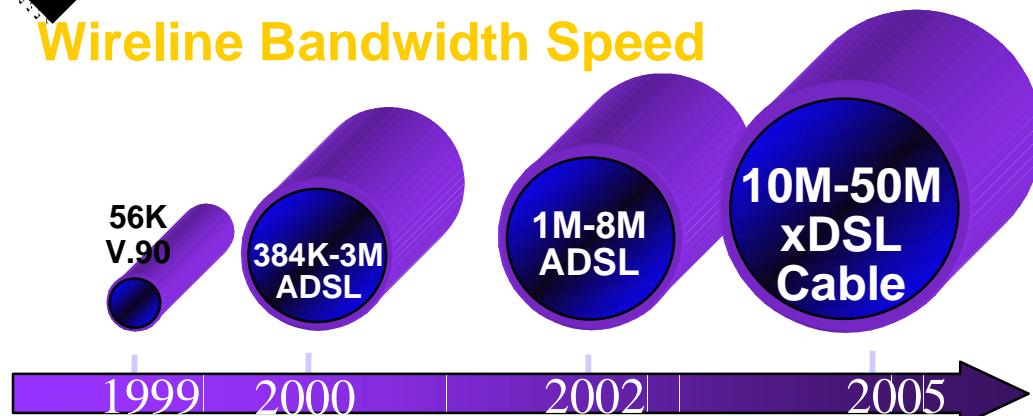
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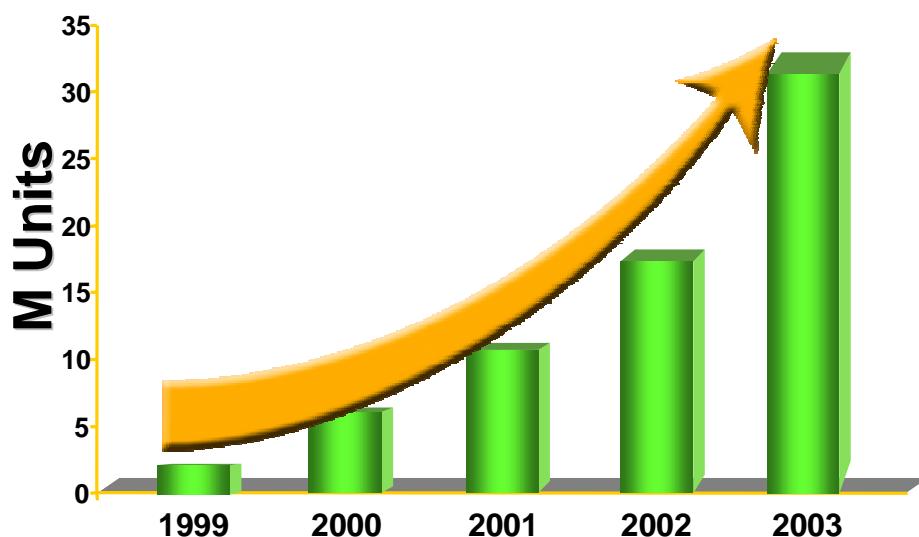
Market Issues – Bandwidth



Wireline Bandwidth Speed



Internet Audio Market Growth



Market Issues

- ◆ Internet Audio Perceived as Very Cool Technology – Industrial Design is Critical
- ◆ Removable Flash Memory a Favorite Feature
- ◆ Cost of Players a Barrier – Magic Price Point \$149-\$99
- ◆ Dialup Download Speeds Slow – Broadband Needed

Internet Music / Audio Algorithms



Music Decoders

- ◆ AAC - Dolby IP license
- ◆ MP3 - Thomson IP license
- ◆ WMA - Microsoft
- ◆ ATRAC3 - Sony
- ◆ AC3 - Dolby
- ◆ TwinVQ - NTT
- ◆ EPAC - Lucent
- ◆ QDMC - Qdesign
- ◆ Real G2 - Real Networks
- ◆ Vorbis - Open IP Model

Audio Decoders

- ◆ ACELP.NET - Voiceage
- ◆ 723.1 (spoken word)
- ◆ ADPCM

DRM / Security Format

- Liquid Audio
- Microsoft
- Intertrust
- IBM EMSS
- SD
- Memory Stick / Magic Gate
- Secure MMC

Watermarking - SDMI

- phase 1 - Verance
- phase 2 - ?, decision 1Q01

Video Playback

- Real Networks
- Microsoft
- Quicktime

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Market Environment Big 5

<u>Label</u>	<u>Compression</u>	<u>DRM / Security</u>	<u>Portal</u>
◆ Universal	AAC, ePAC	Intertrust	Universal
◆ EMI	AAC, WMA, *EPAC	Liquid, WMA, Preview	Musicmkr, MSFT
◆ BMG	AAC, MP3, WMA	Liquid, Intertrust	Amazon
◆ Warner	AAC, MP3, QDMC	Liquid, IBM	CD Now, Amazon
◆ Sony	AAC, WMA, ATRAC3	Liquid, WMA	Sony, MSFT

*EPAC / Preview part of Supertracks.com

◆ These are not final only of what each company did as it tested the waters with a few songs, bands and portal sites. The Big 5 controls 90% of the music sold in the world on a unit and rev basis.

TI DSP Enables Field Upgradeability



Portable Devices | Media, Stream, Streaming, 4...

Address : <http://www.microsoft.com/windows/windowsmedia/en/software/v7/portable.asp>

Windows Media | Windows

Windows Home Page | Windows

Help | Support | Search | Microsoft Home

Portable Devices | Media, Stream, Streaming, 4...

RCA Lyra, Pocket PCs, and Windows Media Player 7

Take advantage of one of the newest features of Microsoft Windows Media® Player 7 Beta and upgrade your RCA Lyra portable MP3 to support Windows Media formatted music at the same time!

This beta release of Windows Media Player 7 supports support of a range of portable devices including the RCA Lyra, the Thomson MySync, and various PC devices from Creative, Creative Labs, Creative, and Creative. In the future, support for all of the top portable manufacturers will support Windows Media and Windows Media Player 7.

For a complete list of portable devices that are supported by Windows Media, visit the [Portable Devices page](#). In addition, to more portable device come onto the market, visit that page to keep track of Windows Media Player 7 support for those devices.

Take your music on the road with the events you love.

To Transfer a Windows Media Format Music File to an RCA Lyra

Transfer a Windows Media Format Music File to an RCA Lyra is a simple as using Windows Media Player. To transfer a music file to your Lyra, follow the steps below for the storage and/or your Lyra. Make sure you still have the appropriate cable and the playback Windows Media Format music file. The first time you transfer a Windows Media Format music file from your computer to your Lyra:

1. Connect your Lyra storage card adapter to your computer and run the software that comes with the Lyra adapter. You will only need to run this software once. (Note: For Microsoft Windows 98 second Edition users, both universal serial bus (USB) and serial readers are supported. Microsoft Windows 2000 users can only use the USB reader.)
2. Put your Lyra storage card into the Lyra adapter.
3. On your computer, open Windows Media Player 7 and click the Portable Devices button. In the dropdown menu, under the Music on Device tab is the right side of the screen, pull down the device list and select a Lyra.
4. Choose a Windows Media Format music file from the dropdown menu under the Music to Copy tab and select Copy Music. You have now transferred a Windows Media Format music file from your computer to your Lyra. You have also upgraded your Lyra to playback Windows Media Format music files.

Currently Windows Media support on the RCA Lyra is provided as a beta feature by Windows Media Player 7 users. Thomson MySync is unable to offer technical support for this feature at this time.

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TI is Creating Solutions to Shape the Industry



AAC

MPEG-2 Advanced Audio Coding

MP3

Fraunhofer USA



Lucent Technologies
Bell Labs Innovations



INTERTRUST®
THE METATRUST UTILITY.
Leading Digital Rights Management

MEMORY STICK ™

A SONY DIGITAL DATA STORAGE MEDIA PRODUCT

- ◆ Broadest Support for Multiple Formats
- ◆ Support for More Security Solutions
- ◆ Partnerships with Industry Leaders to Produce Market-Driven Solutions



Dolby



ATRAC-3

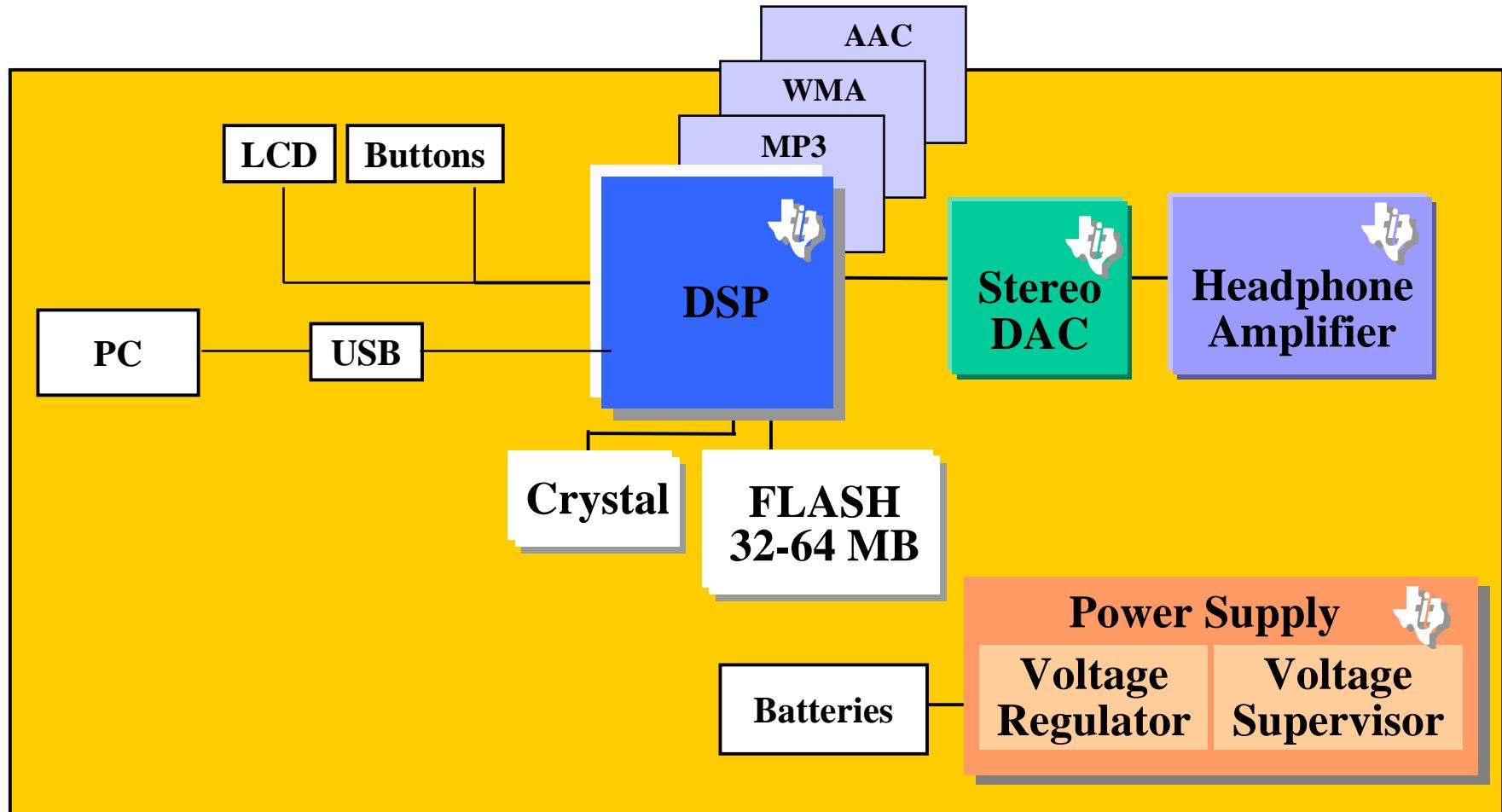
TWINVQ

audible.com
Who you gonna listen to?

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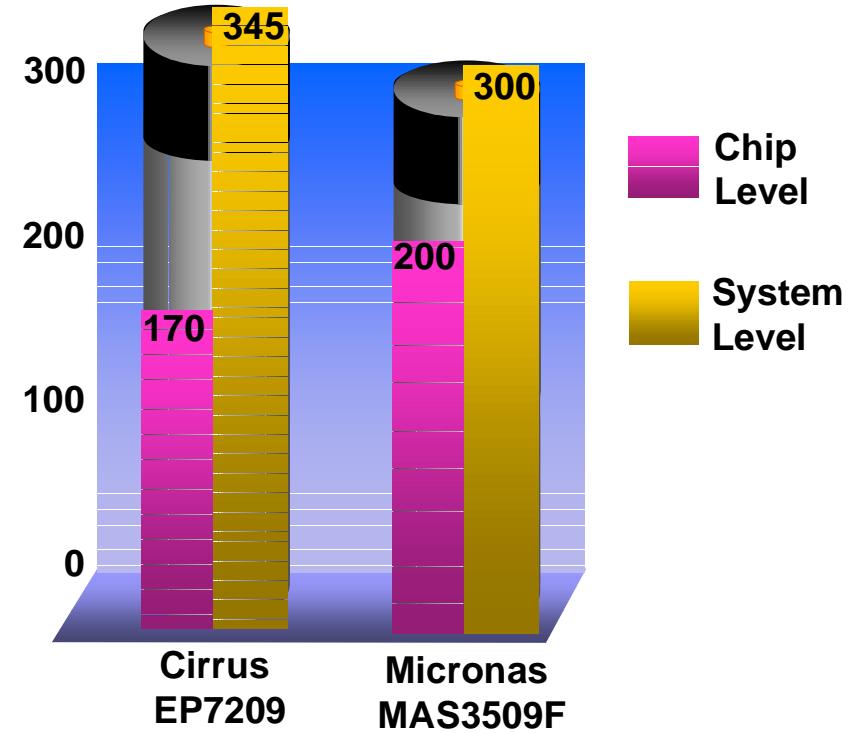
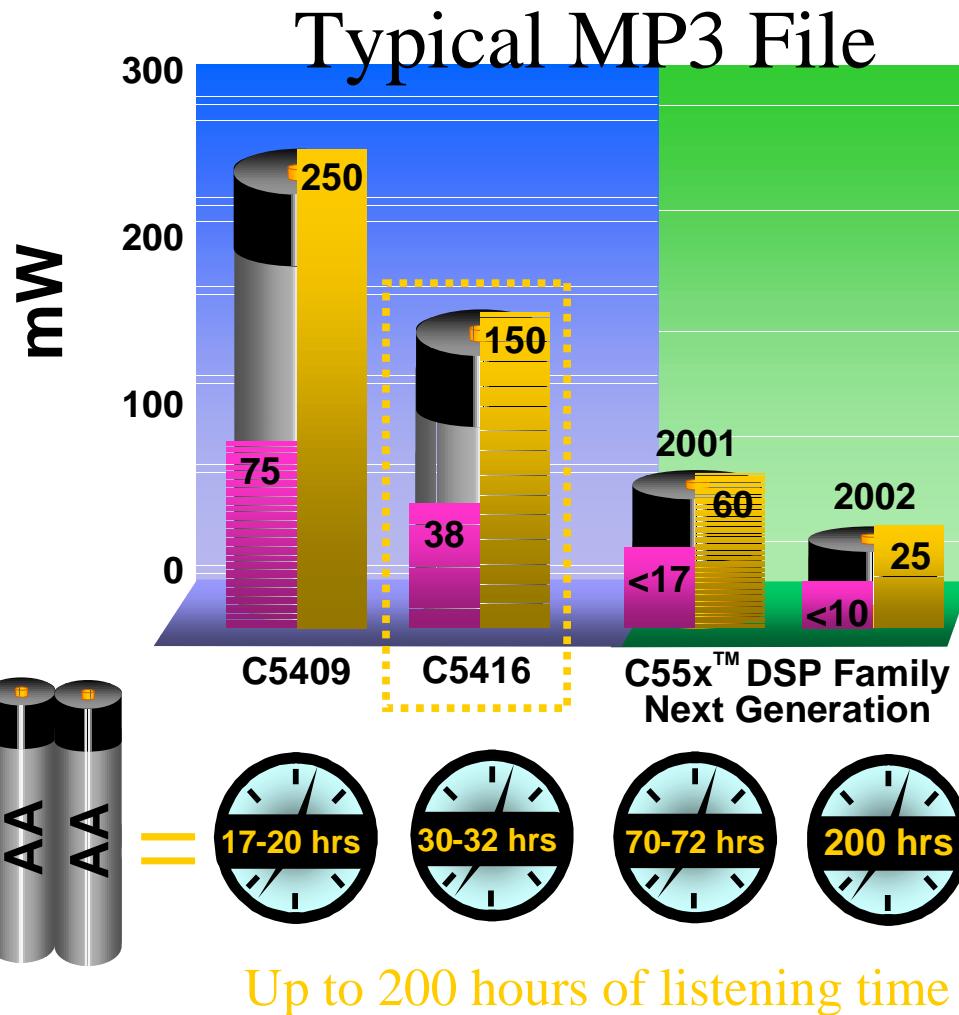
Portable Player - System Block Diagram



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TI is THE Low-Power Leader – Enabling Internet Audio



- ◆ Industry Leader in Power/Performance
- ◆ Offers More than 50% Longer Battery Life than other Solutions

Internet Audio Roadmap



2H99

DA100
0.25 μ

1.5mW/MIPS

Based on vc5410
100 Mips DSP core
64K RAM
16K ROM
3 McBSP
8 bit HPI
6 channel DMA
2.5V core voltage
Production Now.

1H00

DA050
0.18 μ

0.8mW/MIPS

Based on vc5409
100 Mips DSP core
32K RAM
16K ROM
3 McBSP
8 bit HPI
6 channel DMA
1.8V core voltage
Production Now.

2H00

DA150
0.15 μ

0.4 mW/MIPS

Based on vc5416
160 Mips DSP core
RAM 128K
ROM 16K
3 McBSP
8/16 bit HPI
6 channel DMA
1.5V core voltage
Device ID
Microless-design EVM with
USB is shipping now.
Production Now.

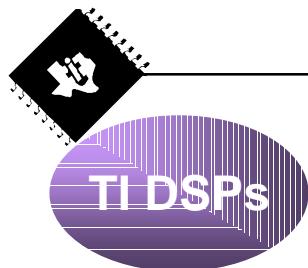
2001

Next Gen.

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TI Leadership — Driving the Future of Internet Audio



Longer Battery Life

LOW POWER DSPs FOR > 50% LONGER BATTERY LIFE

Seamless Listening

BROADEST SUPPORT FOR MULTIPLE STANDARDS

Easily Upgradeable

ONLINE-UPGRADES, FUTURE PROOF PRODUCTS

Digital Security

SECURE MUSIC DOWNLOADS, CHARTER MEMBER SDMI

**TI DSPs Chosen by 8 of Top 10
Consumer Electronic Manufacturers**

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TI Internet Audio Website

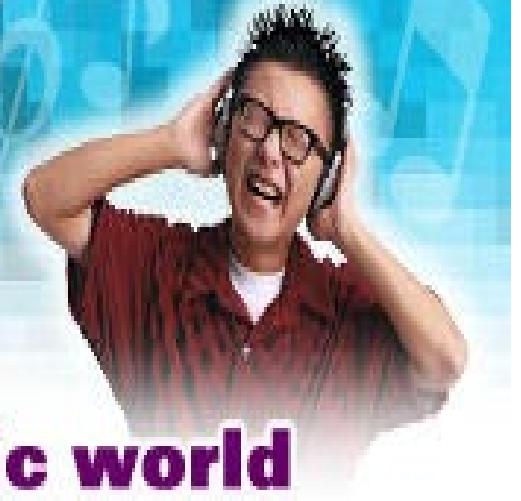


<http://www.ti.com/sc/internetaudio>

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[resources](#)

**Internet Audio
Rocking the music world**



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