



Texas Instruments - Internet Audio

Chris Schairbaum

New Business Development

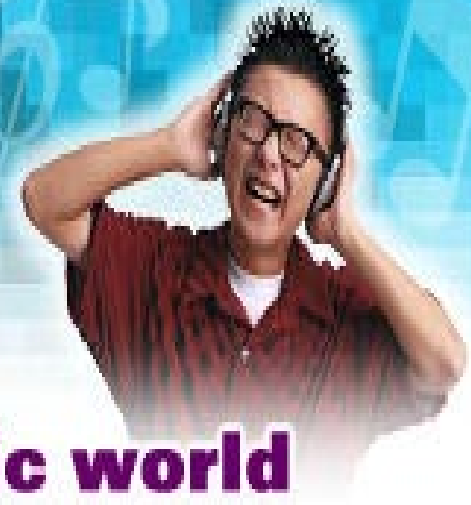
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resources

Internet Audio

Rocking the music world



THE WORLD LEADER IN DSP SOLUTIONS

 TEXAS
INSTRUMENTS

What Is Internet Audio?

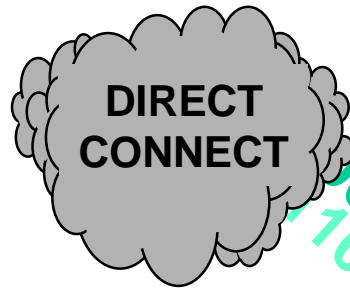


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TODAY

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



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000100001001

000110
1000

TOMORROW



PDA



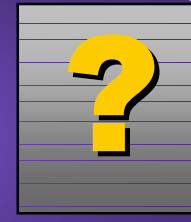
Mobile Phone



Digital Camera



Car Audio



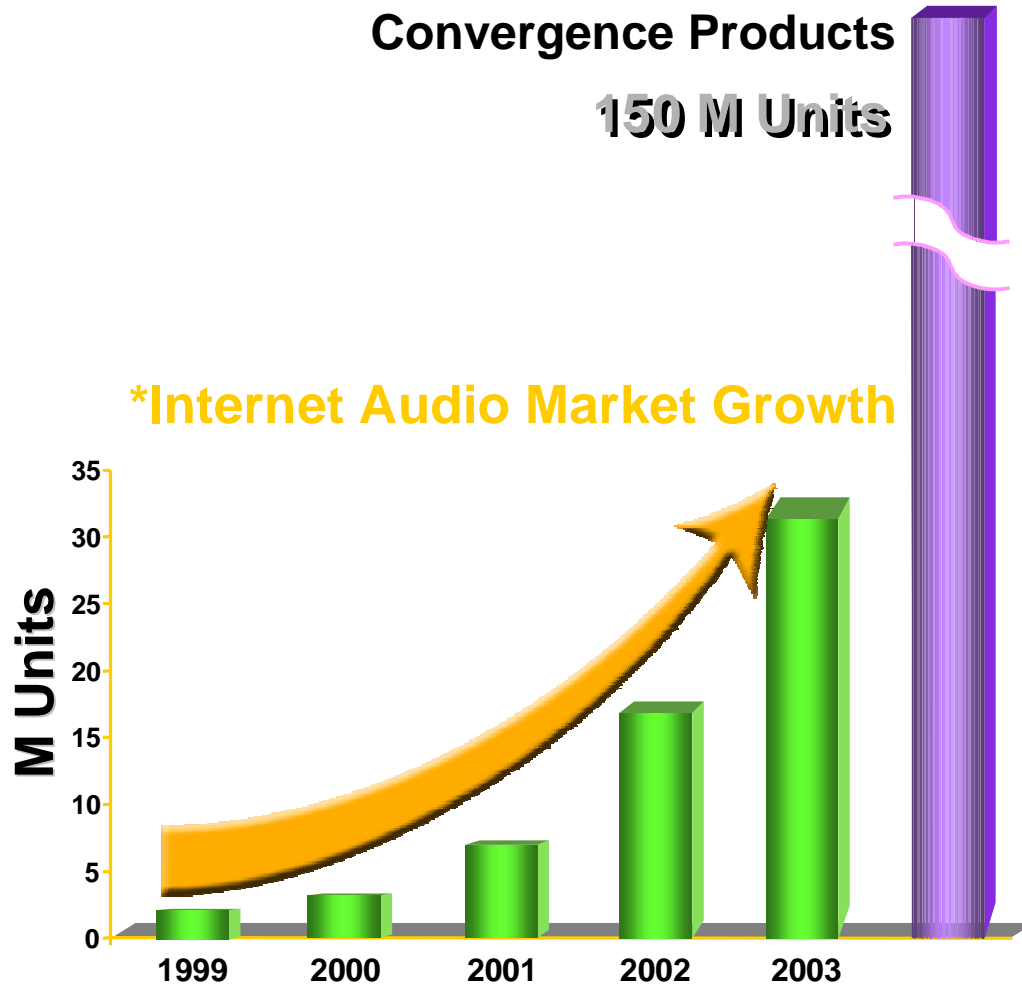
Internet Audio: Market Growth Accelerating



Convergence Products
150 M Units

Market Potential

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



Source: Forrester Research

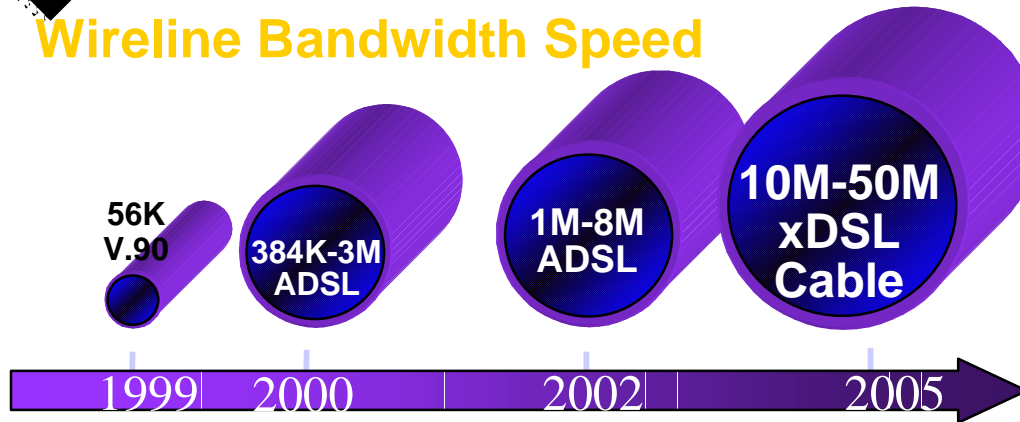
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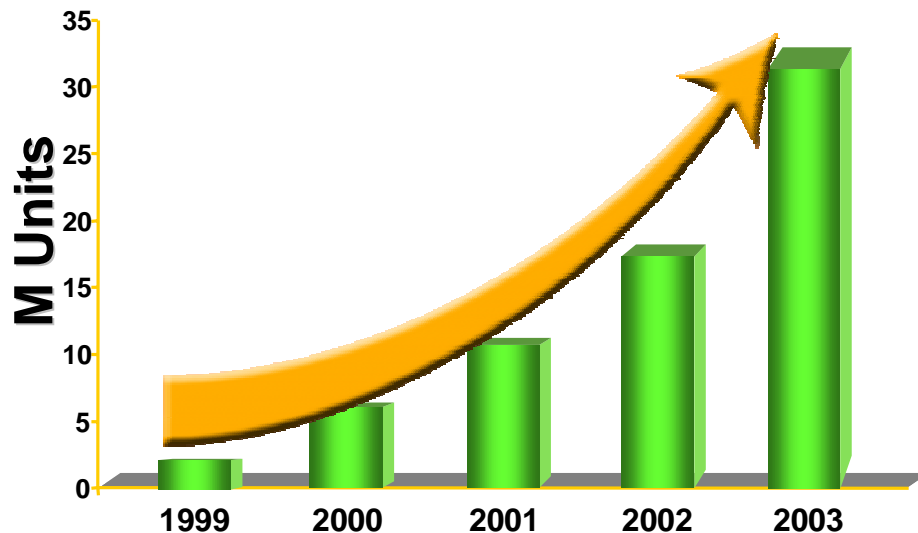
Market Issues – Bandwidth



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



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

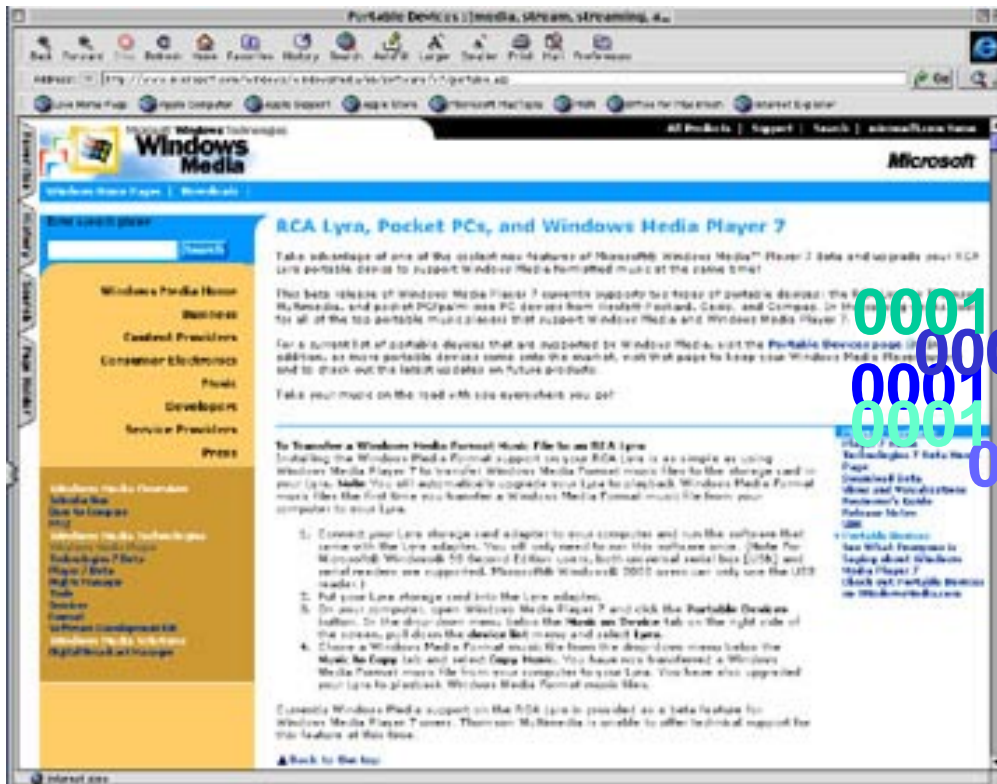
*EPAC / Preview part of Supertracks.com

- ◆ 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



Address:



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THE WORLD LEADER IN DSP SOLUTIONS



TI is Creating Solutions to Shape the Industry



◆ Broadest Support for Multiple Formats



◆ Support for More Security Solutions



◆ Partnerships with Industry Leaders to Produce Market-Driven Solutions



Lucent Technologies
Bell Labs Innovations



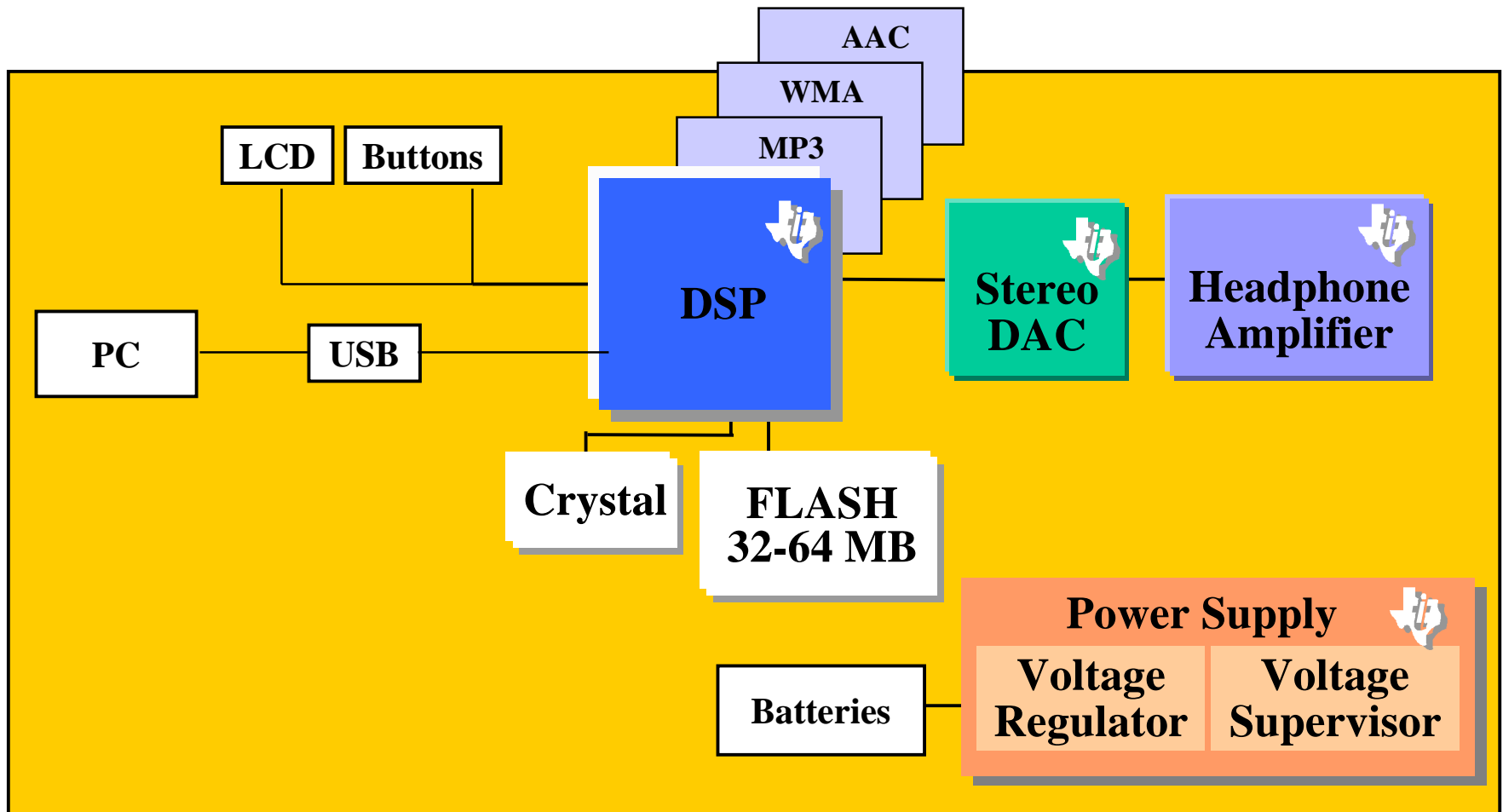
INTERTRUST®
THE METATRUST UTILITY.
Leading Digital Rights Management



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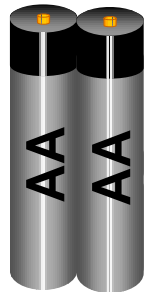
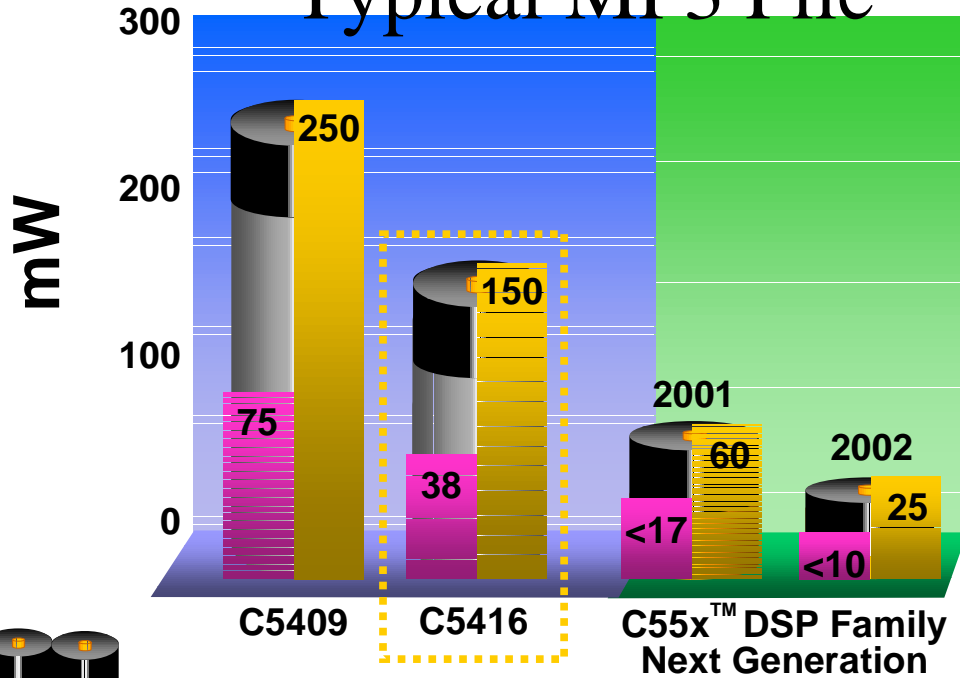
Portable Player - System Block Diagram



TI is THE Low-Power Leader – Enabling Internet Audio



Typical MP3 File



Up to 200 hours of listening time

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

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Internet Audio Roadmap



2H99



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

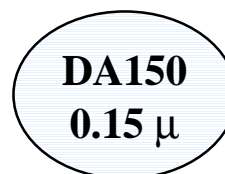


0.8mW/MIPS

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



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



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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



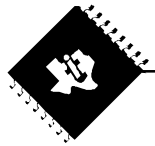
Digital Security

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

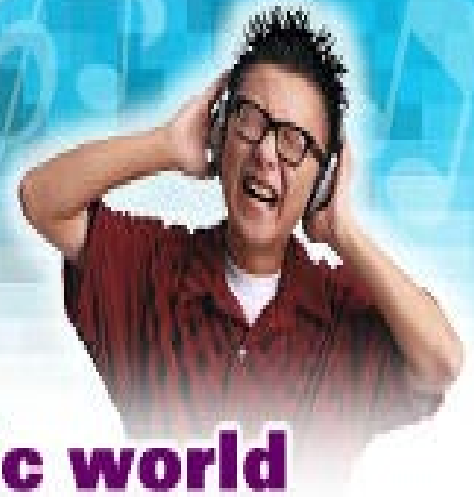
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