HD Radio + MPEG Surround in the USA

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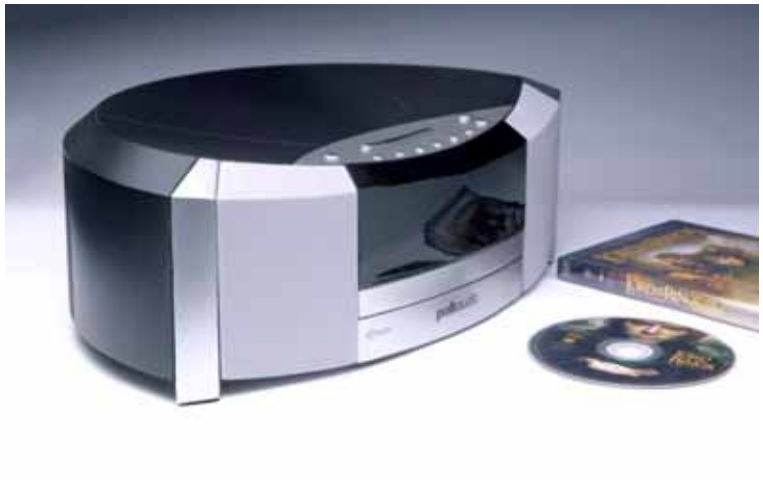
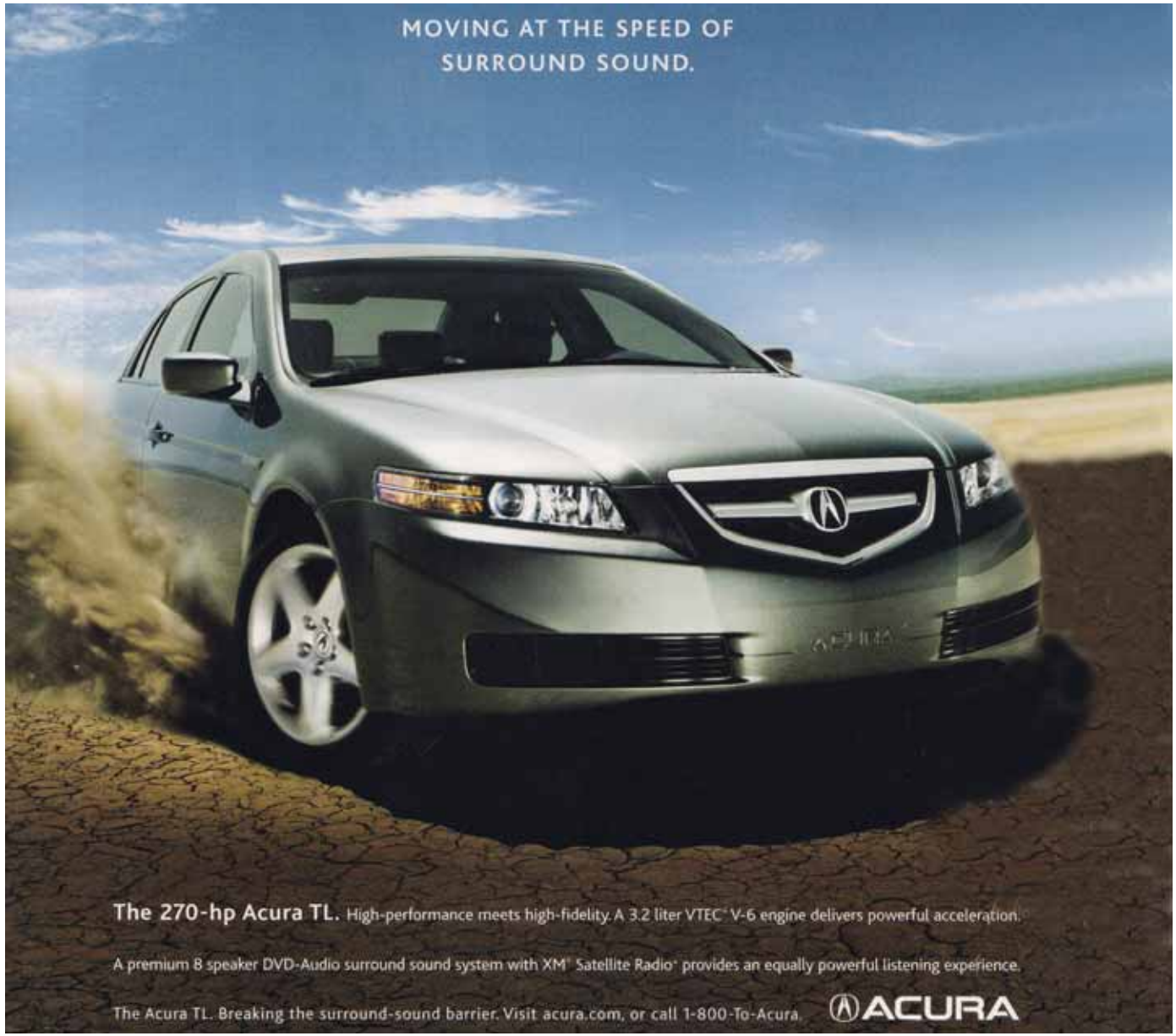
Telos Systems/Omnia/Axia

More than 500 stations on-air now – in all major US cities.



HD Radio


MOVING AT THE SPEED OF
SURROUND SOUND.
The 270-hp Acura TL. High-performance meets high-fidelity. A 3.2 liter VTEC® V-6 engine delivers powerful acceleration.
A premium 8 speaker DVD-Audio surround sound system with XM® Satellite Radio® provides an equally powerful listening experience.
The Acura TL. Breaking the surround-sound barrier. Visit acura.com, or call 1-800-To-Acura.
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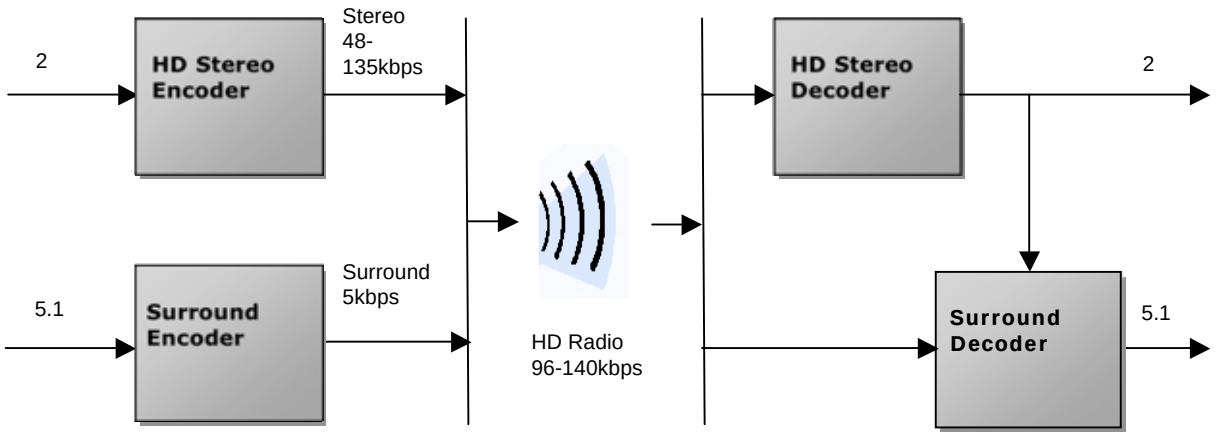
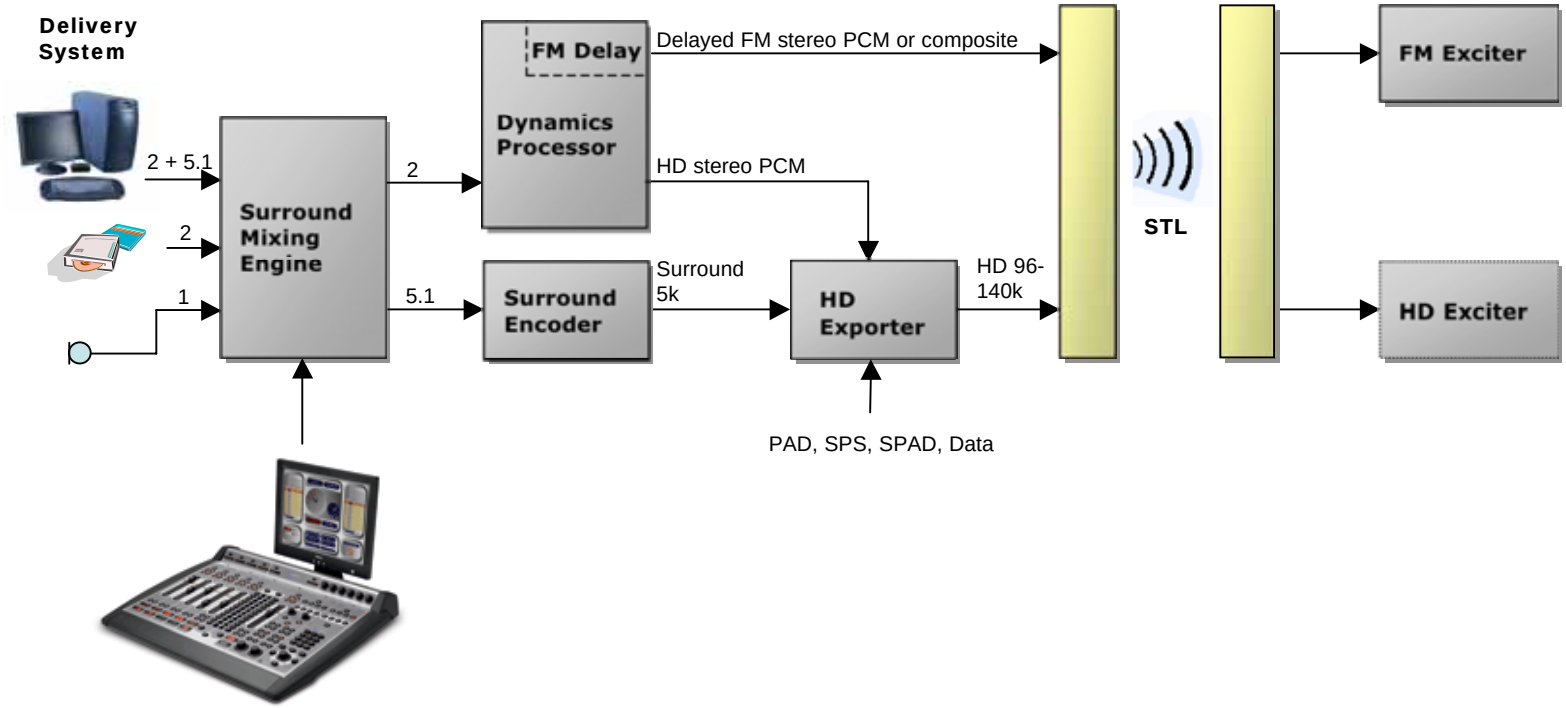
World’s First 24/7 Surround Radio Station will be…

Boston’s Classic Rock
100.7 WZLX
CBS RADIO

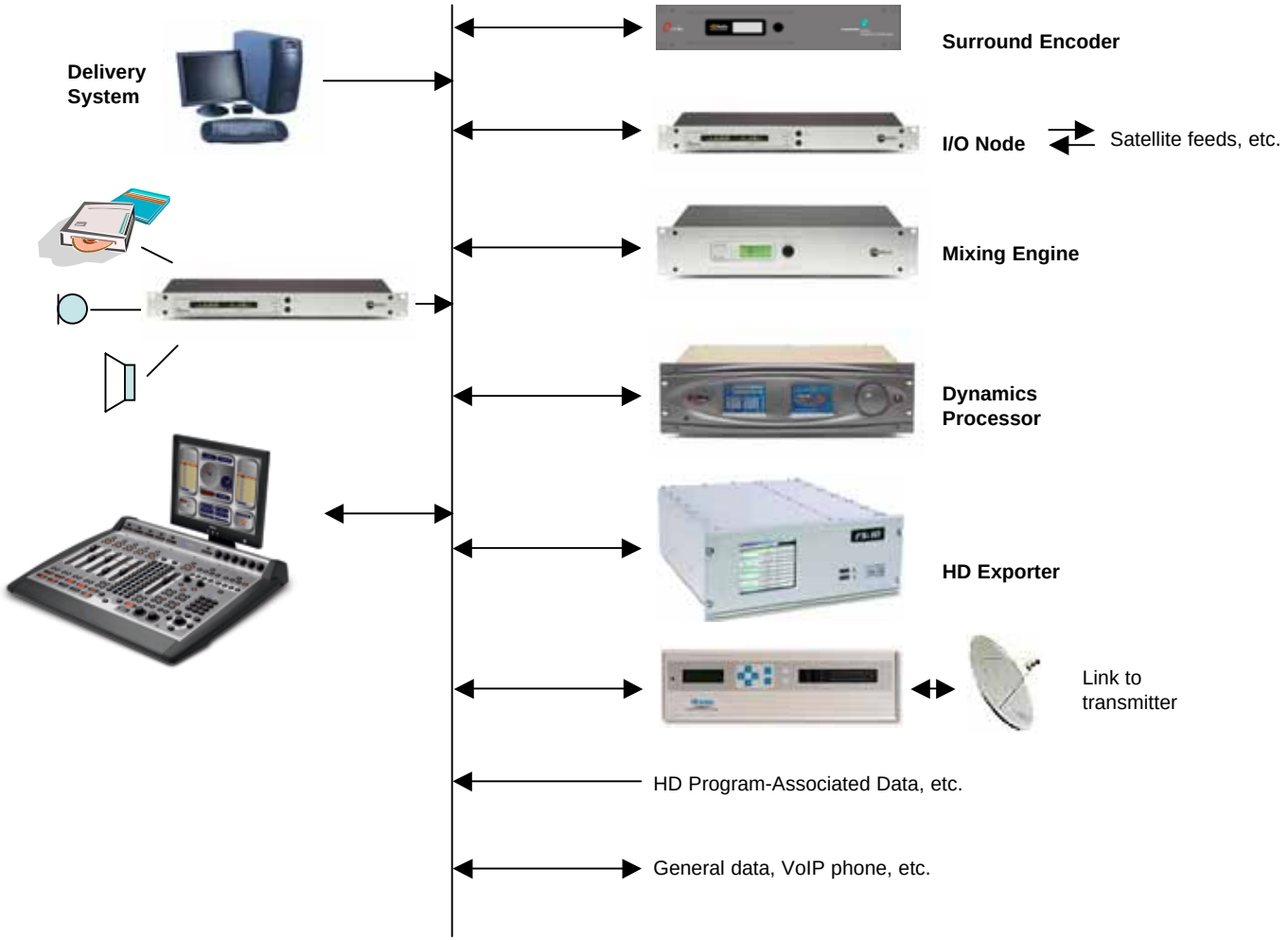


MPEG Surround System via HD Radio

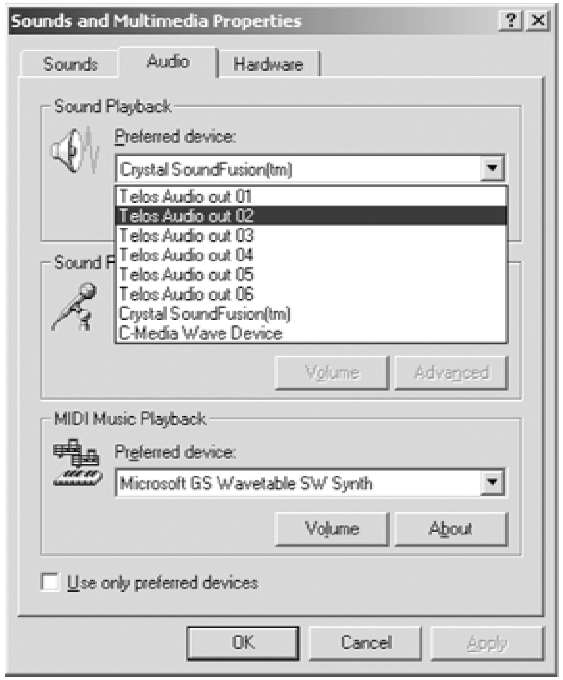


FM + HD Surround Radio Station


IP . AUDIO
Livewire


Delivery System
Surround Encoder
I/O Node
Satellite feeds, etc.
Mixing Engine
Dynamics Processor
HD Exporter
Link to transmitter
HD Program-Associated Data, etc.
General data, VoIP phone, etc.

IP . AUDIO
Livewire



IP . AUDIO Livewire

One RJ-45 for all in and out

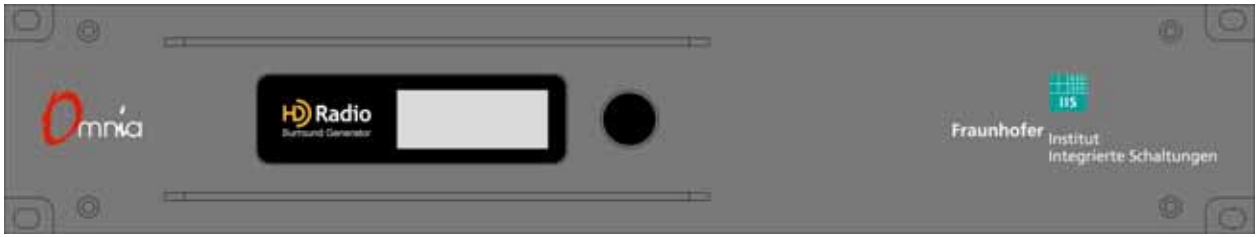
Livewire

- 5.1 + 2 Channels (independent surround and stereo mixes for MPEG Surround transmission)
- Windows RIFF Wave Format
- 24-bits/48kHz

A 300GB HD can store over 1200 3.5-minute pieces in this format.

Axia StudioEngine Mixer

One RJ-45 for all in and out



FHG Surround Encoder

One RJ-45 for all in and out

Omnia 6 HD Processor

No Change Needed

We Don’t Like Matrix for HD Radio!

- Muddy, weird stereo, with soft bass

- Poor surround separation (think about “sweet-spot” in cars…)

- Increase in L-R means multipath problems on the analog FM

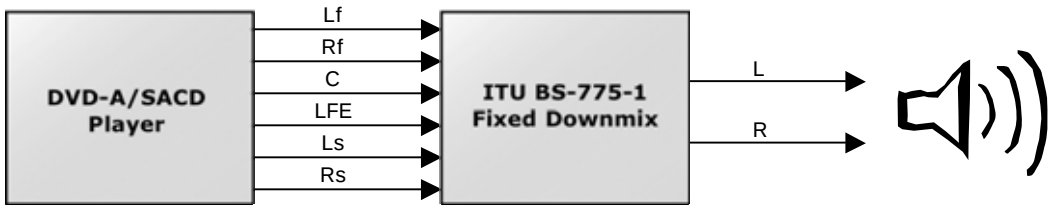
Matrix was designed to squeeze some kind of surround out of an analog 2-channel medium.

If you have a digital channel, why not use it?

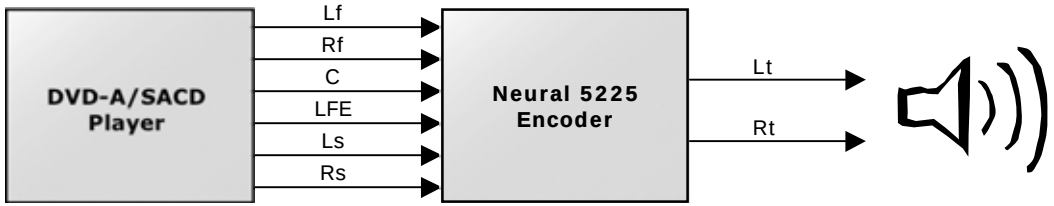
Listen…

1. Original stereo from the source disk

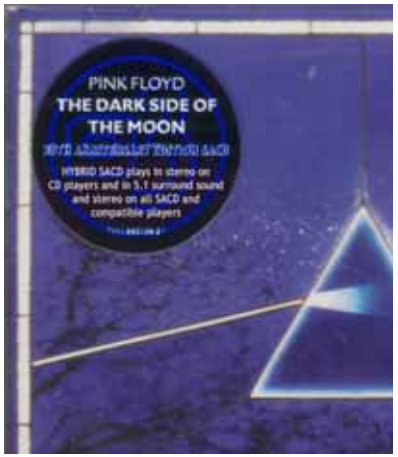
2. Simple downmix from 5.1 source



3. Lt/Rt output from Neural encoder with 5.1 source as input



MPEG Surround



Problem: Many existing SACD and DVD releases have trouble with regard to stereo/surround compatibility. Mainly time synchronization.

Solution: New releases could easily be produced that would have the correct characteristics and would still allow artistic freedom with the two mixes.

They could be delivered to radio stations in multi-channel wav files, for example, to ensure synchronization.

MPEG Surround

Further… when there is a problem with compatibility:

- You could start with the **surround** mix and do a downmix to stereo that is optimized for each piece.

- When only **stereo** is available, you can upmix using a variety of tools. The stereo would be passed with no change and only the surround listeners would get the effect. This, too, can be tuned on a per-piece basis.

There's no freedom to do either of these with matrix.

Yes to MPEG Surround on HD Radio!

Consumers like surround – witness DVD & TV

Sounds great in cars!

Perfect compatibility – no effect on stereo at all

Practical

Costs only 5kbps

Good buzz generator - Could well drive HD receiver sales and adoption in home media center products