



Application of MPEG-4 Digital Multimedia Broadcasting

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Overview:

- **Available DMB-System**
- **Requirements Of The New System**
- **System Solution**
- **Challenges**
- **Benefits**



Available DMB-System (1/4):



Digital Audio Broadcast

- European standard
- Offers a secure transmission of audio and data information



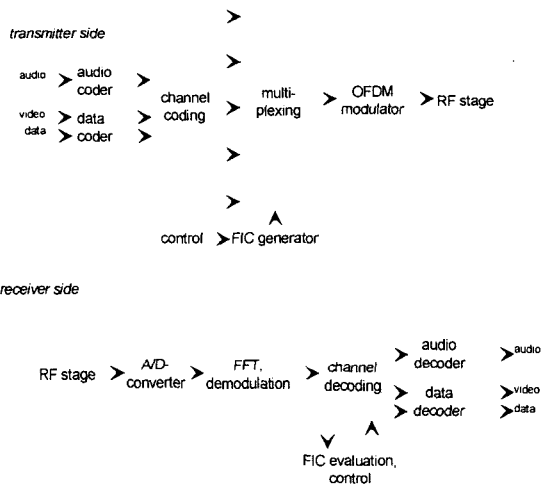
Digital Multimedia Broadcast

- Extends DAB to video transmission
- Interference-free reception in fast moving vehicles



The DAB System

- Developed within Eureka 147 (ETS 300 401)
- For the broadcasting of
 - audio
 - programme associated data
 - video
 - still images
- OFDM transmission scheme (1.5 MHz)
- transmission is also possible to mobile receivers with high velocities

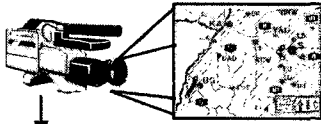




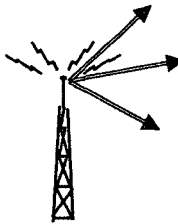
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Available DMB-System (2/4):

Video and data content



DAB - Equipment



Information
Advertising
News
Entertainment



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Available DMB-System (3/4):



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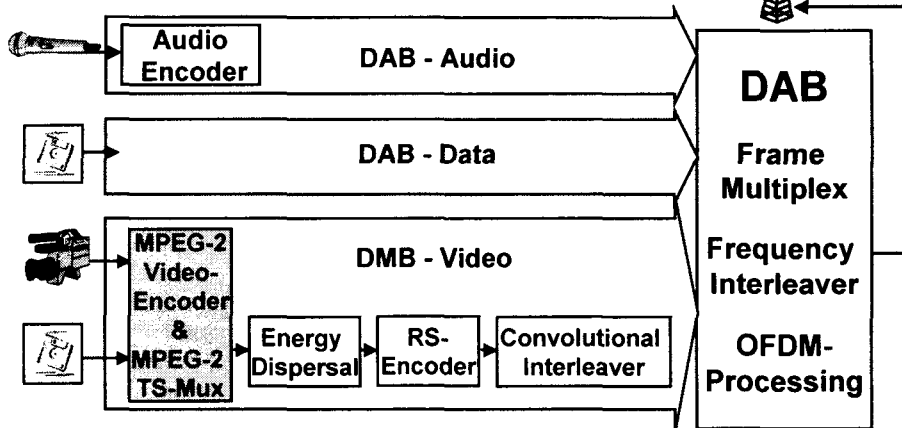
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Available DMB-System (4/4): Signal processing



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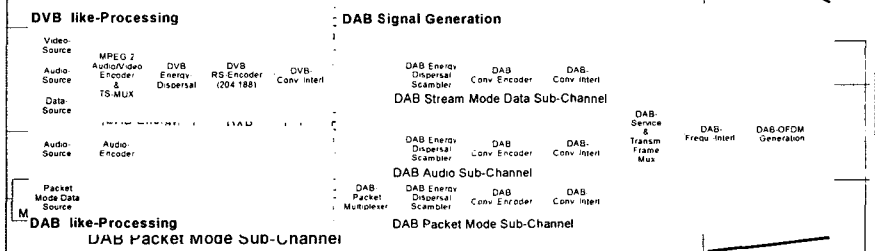
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The DMB System

- MPEG-2 based video transmission via DAB
- Transmitting up to 1.7 Mbit/s to mobile receivers
- Outer forward error correction is the same like in DVB transmission systems

Block diagram

DAB Signal Generation



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Requirements Of The NEW System

- High quality video @ 1.0 Mbit/s
- Integration of multi-channel audio
- Encoding and decoding in real-time
- User interactivity
- Modular 'future safe' hardware concept



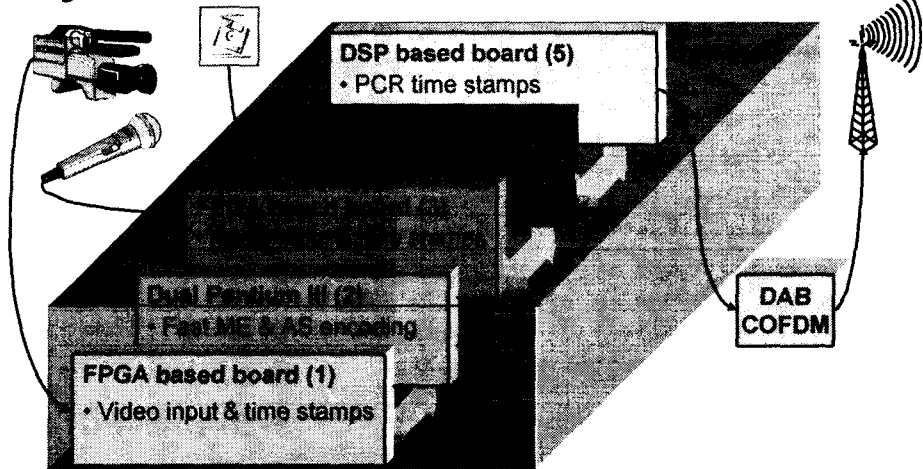
System Solution (1/3):

- MPEG-4 AS-Profile (up to TV resolution)
 - ⇒ 30-50% reduced data rate compared to MPEG-2
- MPEG-4 AAC-Codec (CD quality @ 128 kbit/s)
 - ⇒ 30-50% reduced data rate compared to MPEG-2
- MPEG-4 Systems BIFS
 - ⇒ Interactivity and improved coding efficiency



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System Solution (2/3): real-time encoder



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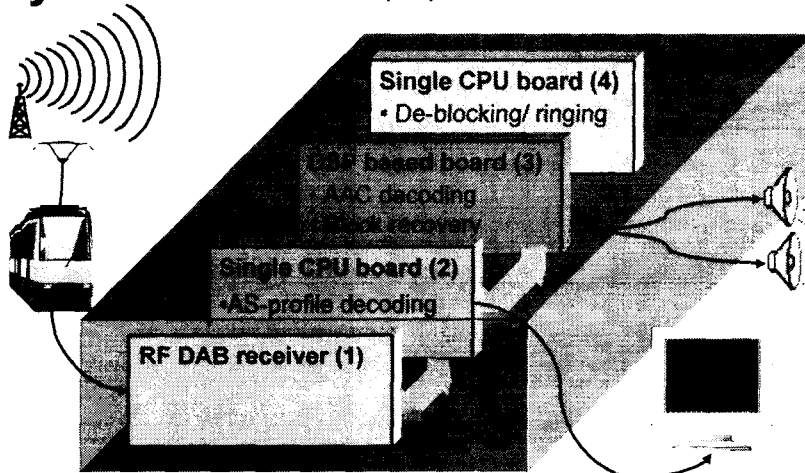
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System Solution (3/3): real-time decoder



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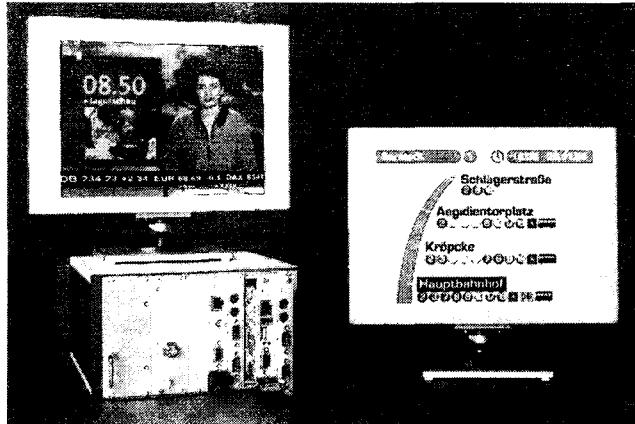
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System Solution (3/3): real-time decoder



Challenges (1/2): real-time implementation

Encoder system: Linux OS

Video:

- AS Profile with 1/4 pel ME/MC and GMC
- Highly optimized assembler code for MMX and ISSE
- Multithreading concept for Dual Pentium platform

Audio:

- Highly improved quantization & coding process for AAC



Challenges (2/2): real-time implementation

Decoder system: Windows NT OS

Video:

- **Highly optimized assembler code for MMX**
- **'Distributed scheduler' for Dual CPU architecture**

Audio: Floating point DSP as target platform

- **VM software: debugged, profiled and highly optimized**
- **Clock recovery concept**



Benefits:

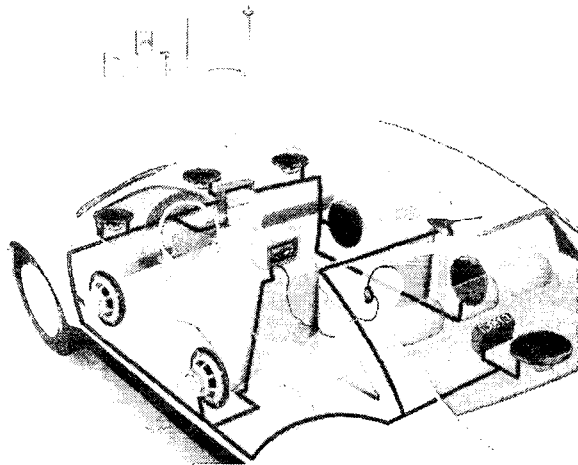
- **Integration of audio**
- **Reduced AV-data rate**
- **Interactivity**
- **'Future safe' system concept**

MPEG-4 + DMB = mobile multimedia



MPEG-4 DMB System

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