KENWOOD

DAB

Digital Audio Broadcasting

Screen-shot photographs are simulated.
Monitor shown is not available.

Introducing DAB and the Multimedia Potential of Datacasting

DAB – Digital Audio Broadcasting – is set to replace current analog radio using a revolutioary technology that allows CD-quality sound to be transmitted digitally along with text and other data, using terrestrial transmitters.

What is DAB?

Digital Audio Broadcasting is a "push" technology ideally suited for the 21st century. It was originally developed as part of a collaborative research program known as the Eureka-147 Project and intended to supersede conventional analog AM and FM services, which suffer from interference due to high congestion and multipath propagation. When fully deployed, DAB will deliver high-quality audio – similar to that of CDs – to mobile and portable receivers, which typically experience greater reception difficulties than stationary receivers. And listeners will not have to change frequency as they travel. But there is a more to DAB than just audio: according to the Multimedia Object Transfer (MOT) specification, DAB can also carry text and graphics, including Internet pages.

Eureka-147

In charge of developing and promoting the successful implementation of DAB is the Eureka-147 Project, representing companies and organizations from more than 25 countries – including electronics manufacturers, public and private broadcasters, transmission providers, regulators and satellite operators.

It is estimated that by the end of 1997 more than 100 million people in Europe will be able to receive DAB. Meanwhile, Canada, China and India are already conducting pilot projects.

Technical Details

The MPEG (Moving Picture Experts Group) audio encoding technique utilizes psycho-acoustics to make room for additional data to be inserted into the bitstream, while maintaining high audio quality. Interference is avoided by using a broadband transmission system called COFDM (Coded Orthogonal Frequency Division Multiplex) in combination with error detection and correction. The program provider can adjust the data rate to suit the content – even transmitting in MPEG format.

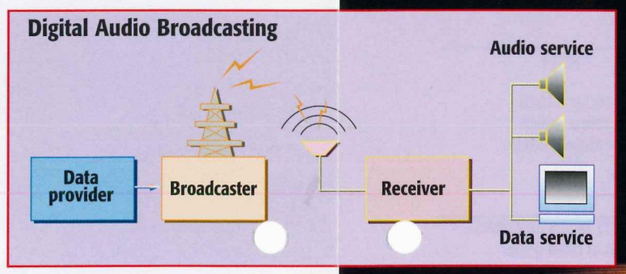
The OSI model for DAB specifies 7 layers, from the physical layer (actual radio transmission of the OFDM signal) to the presentation layer (final conversion and presentation of the broadcast information to the listener/viewer). An intermediate transport layer identifies the audio and ancillary data services and multiplexes them. There are two areas where such ancillary data may be carried within the system multiplexer:

1. Fast Information Channel (FIC): this carries information about the multiplexer, TMC, paging, Conditional Access (encryption), PTY, etc.

2. Main Service Channel (MSC): this can be used for general data services, including Program Associated Data (PAD) – information directly linked to the audio program, such as song and artist identification, lyrics, and dynamic range control (DRC) data.

Datacasting

DAB is perfectly suited for delivering high-volume multimedia content, offering simultaneous reception at all locations and fixed distribution costs, irrespective of the number of receivers. Traditional providers can add a variety of textual or graphic data to their music programming – including advertising and lyrics for *karaoke* applications. But media-migration will mean that newspapers and faxes can be delivered by DAB. Traffic, weather and financial information can also be supplied in this way – either as text or as speech generated from text. As providers explore the enormous potential of this new medium, we will see DAB used for file transfers and software or database updates. Internet providers will display HTML-encoded information, and interactive applications will also appear, using a back-channel for feedback, quiz games, etc. Selected information can be stored in the DAB receiver for later retrieval.



Testing Equipment

Playing a critical role in the verification of audio and data DAB services is the combination of Kenwood's DAB-3801 test signal generator and DAB-3802 up converter, which comply with European standard ETS 300 401. In a typical setup, a multimedia PC and/or CD player would be connected to DAB-3801 for subsequent output to a DAB transmission antenna by the up converter.

DAB-3801
Features inputs for digital audio, serial data, and a 10MHz reference signal. Also offers quasi-random code output for BER measurement.

DAB-3802
Takes the 38.912MHz IF signal from the generator and outputs an RF signal in DAB bands II, III and L. Output level can be set from 0 to -110dBm.

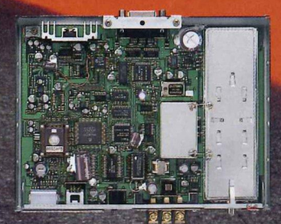
News & weather
DAB represents a unique way to deliver multimedia news with no time lag and without the costs associated with fax broadcasting.

Corporate communications
The Conditional Access feature will allow a company to broadcast selectively to mobile employees, with a back-channel for, say, inventory lookups.

Traffic information
Up-to-date traffic information picked up by a DAB receiver can be linked to real-time GPS data to enhance a car navigation system.

Tourist information
Information on local restaurants and hotel vacancies can be broadcast together with maps for tourists driving into the area.

Software delivery
In addition to multimedia content for listening or viewing, DAB can handle pure binary data for remote software or database updates.



Inside the DAB tuner

DAB
Digital Audio Broadcasting

DAB antenna

Supplied antenna receives terrestrial DAB transmissions.

KRC-358DAB

In addition to receiving DAB (bands II, III & L) signals from the hide-away tuner, the KRC-358DAB picks up FM/MW/LW broadcasts, plays cassettes, and can act as a controller for CD and MD changers. Other features include: ▮ RDS EON ▮ DNPS ▮ 25W x 4-channel power amp ▮ Removable TDF panel ▮ User-friendly menu system ▮ Green LCD with panel illumination

DAB tuner

This compact hide-away DAB tuner is designed to be installed in a car trunk or under the driver's seat. A 5-meter cable is supplied for connection to the KRC-358DAB.

KRC-358DAB SPECIFICATIONS

DAB tuner section	
Frequency range	
Band II	87.522MHz to 107.968MHz
Band III	175.04MHz to 249.984MHz
Band L	1451.072MHz to 1492.00MHz
Frequency raster	16kHz(for all bands)
Usable sensitivity	
Band II, III	+10dBm to -90dBm
Band L	+2dBm to -85dBm
Usable mode	All modes (I, II, III and IV)
FM tuner section	
Frequency range (50kHz space)	87.5MHz to 108.0MHz
Usable sensitivity	0.7μV/75Ω
Frequency response (±3.0dB)	30Hz to 15kHz
MW tuner section	
Frequency range (9kHz space)	531kHz to 1611kHz
Usable sensitivity	30μV
LW tuner section	
Frequency range	153kHz to 281kHz
Usable sensitivity	45μV
Cassette player section	
Tape speed	4.76cm/sec.
Wow & Flutter (WRMS)	0.12%
Frequency response (120μs)	30Hz to 14kHz (±3dB)
Separation (1kHz)	40dB
Signal-to-noise ratio	54dB
Audio section	
Maximum output power	25W x 4
Tone action	
Bass	100Hz ±10dB
Treble	10kHz ±10dB
Preout level/load	1800mV/10kΩ
Preout impedance	≤600Ω
General	
Operating voltage	14.4 (11 to 16V allowable)
Current consumption	9A at rated power
Installation size (W x H x D)	
Head unit	182 x 53 x 154mm
Hideaway unit	210 x 34 x 160mm
Weight:	
Head unit	1400g
Hideaway unit	1100g

Kenwood follows a policy of continuous advancement in development. For this reason specifications may be changed without notice.

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