

Characteristics of DAB receivers

The European Standard EN 50248:1997 has the status of a
British Standard

ICS 33.160.20

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents



Document Sharing Hub

National foreword

This British Standard is the English language version of EN 50248:1997.

The UK participation in its preparation was entrusted by Technical Committee EPL/100, Audio, video and multimedia systems and equipment, to Subcommittee EPL/100/1, Receiving equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

Amendments issued since publication

Amd. No.	Date	Text affected

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 June 1998

© BSI 1998

ISBN 0 580 29714 4

ICS 33.160.20

Descriptors: Sound broadcasting, television broadcasting, satellite broadcasting, digital technics, receivers, characteristics, performance evaluation, measurements, parasitic signals, test results, presentation

English version

Characteristics of DAB receivers

Caractéristiques du récepteur DAB

Eigenschaften von DAB-Empfängern

This European Standard was approved by CENELEC on 1997-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

© 1997 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 206, Broadcast receiving equipment.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50248 on 1997-10-01.

The following dates were fixed:

- lastest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-09-01

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. In this standard, annex B is normative and annex A is informative.

Contents

	Page
Foreword	2
1 Scope	3
2 Definitions, abbreviations, symbols and block diagram	3
3 References	3
3.1 Normative references	3
3.2 Informative references	3
4 Basic implementation and functional performance requirements	5
4.1 Audio decoder	5
4.2 Automatic mode selection	5
4.3 Frequency bands	5
4.4 Programme service selection	5
4.5 Receiver reactions to a multiplex re-configuration	5
4.6 Automatic switching to another ensemble	5
4.7 Response to conditional access (CA) services	5
4.8 Output for audio and other services	6
4.9 Transparency for copy protection	6
4.10 Coding profiles (Minimum implementation of specified coding profiles)	6
5 Interfaces:	6
5.1 RF input	6
5.2 Analogue audio interface IEC 268-15	6
5.3 Digital audio interface IEC 958	6
5.4 Coded audio interface	6
5.5 General digital interface (F in figure 1)	6
5.6 Conditional access interface	6
6 Options	6
6.1 Receiver display:	6
6.2 Other features	6
7 Reference performance levels and measuring methods:	7
7.1 General conditions	7
7.2 Audio part	8
7.3 R. F. part	8
Annex A (informative) Recommended centre frequencies for DAB	13
Annex B (normative) Characteristics of a Rayleigh channel	15

1 Scope

This standard describes the DAB (Digital Audio Broadcasting) receiver characteristics for consumer equipment intended for terrestrial and cable reception operating in band III and L-band and for satellite reception in L-band. Dedicated receivers for specific applications are not within the scope of this standard.

2 Definitions, abbreviations, symbols and block diagram

Receivers which are intended to receive and decode programmes transmitted according to the DAB system specification ETSI ETS 300 401 are called DAB receivers. In this document “A typical value” is an average value that can be used as a basis for planning, whereas “Minimum requirement” is the lowest value that a DAB receiver should fulfil in order to be called a DAB receiver. Minimum requirements take into account low cost receivers. Other definitions, abbreviations and symbols are solely related to DAB unless stated otherwise.

Example of a Functional Block Diagram of a DAB Receiver (see Figure 1 for information only)

3 References

The following documents include provisions which, through reference in this text, constitute provisions of this standard.

If the reference standard is subject to revision, the latest version will apply.

3.1 Normative references

ETSI ETS 300 401, *Digital Audio Broadcasting to mobile, portable and fixed receivers. (DAB system standard)*.

ISO/IEC 11172-3, *Coding of moving pictures and associated audio for digital storage media at up to 1.5 Mbit/s — Part 3: Audio*.

ISO/IEC 11172-4, *Coding of moving pictures and associated audio for digital storage media at up to 1.5 Mbit/s — Part 4: Compliance testing*.

ISO/IEC 13818-3, *Generic coding of moving pictures and associated audio information — Part 3: Audio*.

ISO/IEC 13818-4, *Generic coding of moving pictures and associated audio information — Part 4: Compliance testing*.

IEC 268-15, *Preferred matching values for the inter-connection of sound system components*.

IEC 958, *Digital Audio Interface*.

IEC 1606, *Basic methods of measurement of the audio characteristic of the digital audio part of audio and audio-visual equipment*.

IEC 315-1, *Methods of measurement on radio receivers for various classes of emission*.

Part 1: General considerations and methods of measurement, including audio-frequency measurement.

IEC 581-11, *High fidelity systems for use in vehicles*.

EN 50255, *Digital Audio Broadcasting system — Specification of the Receiver Data Interface (RDI)*.

3.2 Informative references

EN 50067, *Specification of Radio Data Systems (RDS)*.

prEN 12313, *Traffic and Traveller Information (TTI) — TTI Messages via Traffic Message Coding — Coding Protocol for Radio Data System-Traffic Message Channel (RDS-TMC)*.

IEC 68-1, *Environmental testing — Part 1: General and guidance*.

IEC 721-1, *Environmental parameters and their severities*.

IEC Guide 106, *Guide for specifying environmental conditions for equipment performance rating*.

CCITT Rec.O.151, *Error performance measuring equipment operating at a primary bit-rate and above*.

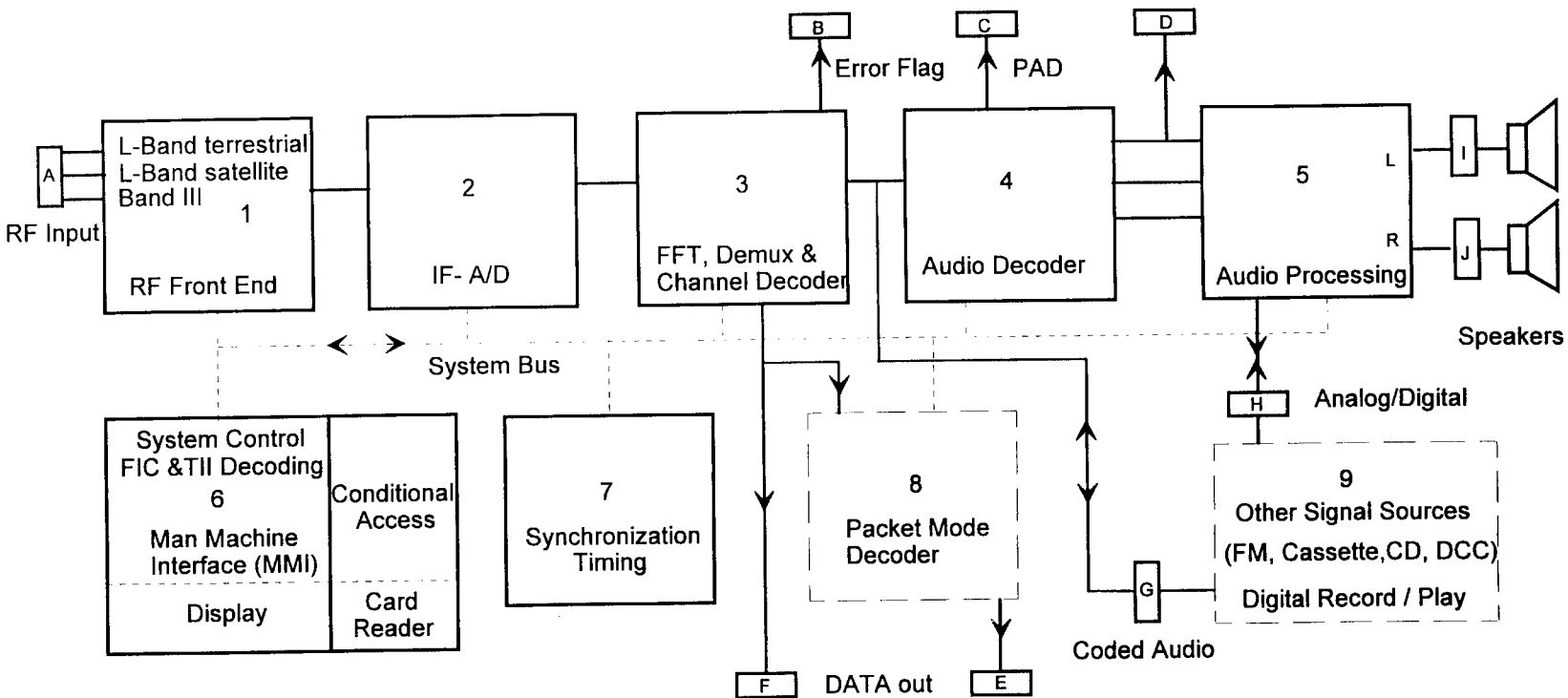


Figure 1 — Example of a Functional Block Diagram of a DAB Receiver
(Block 8 is optional, block 9 is not part of the DAB receiver)

4 Basic implementation and functional performance requirements

4.1 Audio decoder

The audio decoder function of a DAB receiver shall conform to the subset of ISO/IEC 11172-3 as defined in ETSI ETS 300 401. The conformity is described in ISO/IEC 11172-4. The audio decoder should include an error concealment method which may be based on the ScF-CRC (Scale Factor-Cyclic Redundancy Check) as defined within ETSI ETS 300 401. If for any reason the data stream cannot be decoded, the receiver shall mute.

The audio part shall be able to decode DAB bit streams corresponding to both 24 and 48 kHz sampling frequencies.

It shall comply with ISO/IEC 11172-3 and ISO/IEC 13818-3 (bit-rates above 256 kHz/sec are optional).

4.2 Automatic mode selection

4.2.1 Introduction

Four different transmission modes are defined: modes I, II, III & IV. Radio frequency characteristics are described in ETSI ETS 300 401 (see Radio Frequency Characteristics).

The modes can be detected by checking the following relevant parameters of the DAB signal: the frame duration, null symbol duration and carrier spacing.

4.2.2 Requirements

The receiver shall detect the mode of the DAB signal and switch to the appropriate reception mode.

4.3 Frequency bands

The receiver shall provide reception of at least one DAB ensemble, in the following RF Bands:

Band III: 174 MHz to 240 MHz

L-Band: 1452 MHz to 1492 MHz (see note)

The centre frequencies are given in annex A. The receiver should be able to correct transmitter frequency offsets by up to $\pm 1/2$ of the carrier spacing.

NOTE L-Band as defined by ITU WARC-92. L-Band is allocated for both terrestrial and satellite digital sound broadcasting.

See also "Radio Regulations, Article 8 (Frequency Allocations) International Telecommunication Union. Update in 1995 Geneva Switzerland".

4.4 Programme service selection

4.4.1 Introduction

The MSC (Main Service Channel) and the FIC (Fast Information Channel) carry the component and Multiplex Configuration Information (MCI) respectively of the services which make up a DAB Ensemble Multiplex.

Each service has one or more Service Components. As an example, a service could contain a stereo audio component, Service labels in the SI (Service Information) and a Traffic Message Channel prEN 12313. Several services may be carried in one Ensemble Multiplex.

A user of a DAB receiver accesses Service Components by selecting a Service.

A distinction is made between the essential Service component of a Service, which is called the "Primary" component (for a programme service this would normally be the main, or perhaps the only audio stream) and other components which are considered "Secondary".

The MCI is carried in the FIC to avoid the inherent transmission delay associated with the time-interleaving process applied to the MSC.

4.4.2 Requirements

To gain access to the desired Programme Service, the receiver must decode the MCI, make the information available to the MMI (Man Machine Interface) for selection, and then output the selected service.

4.5 Receiver reactions to a multiplex re-configuration

Information on a multiplex reconfiguration is provided in advance, to the receiver. This information includes the following parts:

- the event of a forthcoming multiplex reconfiguration;
- the time when the receiver has to switch according to the MCI (Multiplex Configuration Information);
- next MCI.

The receiver shall follow the multiplex reconfiguration.

In cases where the position and size of the service is unchanged by the reconfiguration, reception of that service should continue without any adverse effect.

4.6 Automatic switching to another ensemble

In order to allow seamless reception of a particular service component the ability of a DAB receiver to switch automatically to an other ensemble is mandatory for mobile receivers.

4.7 Response to conditional access (CA) services

4.7.1 Introduction

In DAB some Service Components belonging to a Service may be individually scrambled to make these components incomprehensible for unauthorised users.

4.7.2 Requirements for DAB receivers without CA capabilities

These receivers shall either make scrambled Service Components unavailable for selection or indicate their presence together with the fact that they are scrambled and thus not accessible. Special care has to be taken in the transition from "unscrambled" to "scrambled". When this occurs on one of the selected Service Components, the receiver shall mute the audio and give an appropriate indication.

NOTE For DAB receivers with CA capabilities, see clause 6.2.