

Digital audio broadcasting system — Specification of the receiver data interface (RDI)

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British Standard

ICS 33.160.20

National foreword

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English version

Digital audio broadcasting system — Specification of the receiver data interface (RDI)

Système de radiodiffusion sonore
numérique (DAB) — Spécification de l'interface
de données du récepteur (RDI)

Digitales Tonrundfunk-System Spezifikation
für die Empfänger Datenschnittstelle (RDI)

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Foreword

This European Standard was prepared by Eureka 147 Working Group D, RDI Task Force, and transferred to 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 50255 on 1997-10-01.

The following dates were fixed:

- latest 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- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-09-01

By Technical Board decision D103/153 the text of the International Standard IEC 62105:1999, which is identical with EN 50255:1997, was approved by CENELEC as EN 62105 on 2002-04-01. As a consequence EN 50255:1997 is renumbered as EN 62105:2002 by corrigendum May 2002.

The following dates were fixed:

- latest date by which the existence of EN 62105 has to be announced at national level (doa) 2002-07-01

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1 Introduction and general considerations

1.1 Introduction

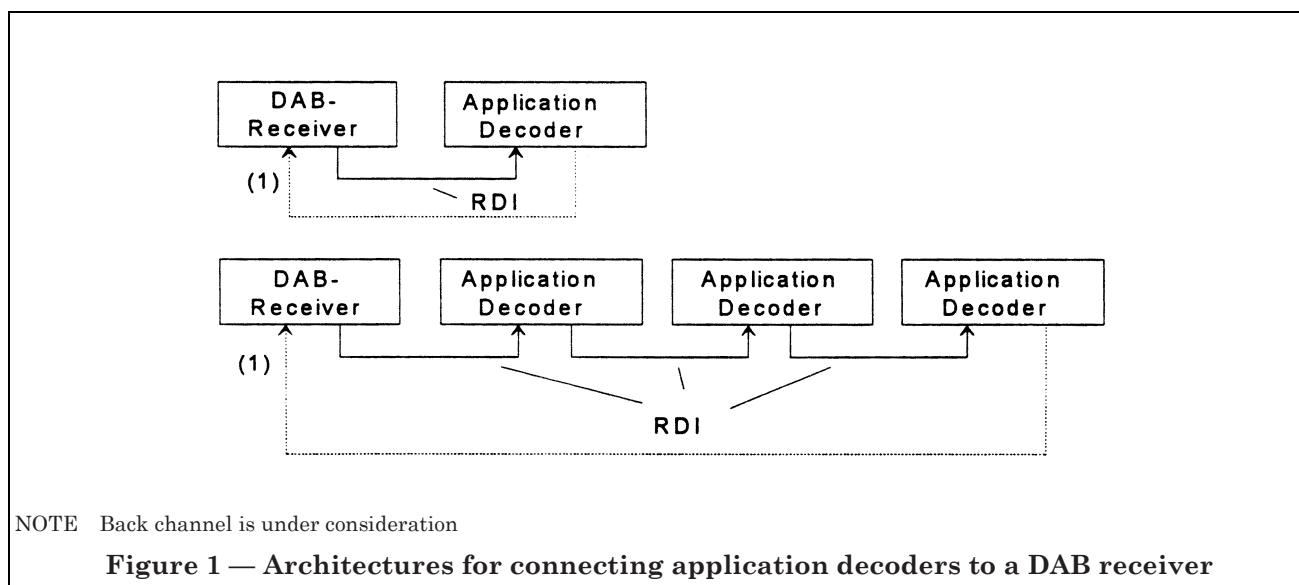
The Eureka 147 digital audio broadcasting system [1] is able to transmit data rates of up to 1.8432 Mbit/s. This data rate occurs if an EEP with a code rate of 0.8 is selected. Audio receivers generally will be capable to decode one or several MSC subchannels, but will not contain decoders for all possible data services. Therefore, the source for the data to be carried on the receiver data interface (RDI) is the output bit stream of the channel decoder of a DAB receiver. Dedicated decoders for data applications, computers, etc., but also devices for audio postprocessing and recording can be connected to the DAB receiver through this interface. The intention of specifying the RDI is to provide a common interface for this purpose fulfilling the following requirements.

- 1) It should be able to carry the full information obtained by the DAB receiver, i.e. the maximum data rate of the MSC, plus the FIC and information on the received transmitters (TII) in a suitable format.
- 2) It should be able to carry data in the format of the output format of recently developed channel decoders and input format of audio source and data decoder ICs (the so-called DAB 3 interface, see Annex A).
- 3) The RDI specification should be independent of any physical interfaces. Interfaces commonly used in consumer electronics should be supported.
- 4) It should be possible to connect several decoders to a receiver.
- 5) It should be possible to implement a return channel for receiver control from an application terminal.
- 6) It should be possible to connect the DAB receiver to a data network.

This first issue of the RDI specification provides a basic approach to these requirements. A generic coding structure for the data to be carried by the RDI based on a 24 bit RDI frame structure has been developed. All requirements have been met by this coding scheme. Two modes of the RDI have been defined to fulfil requirements (1) and (2). The mode fulfilling requirement (1) is called the “high capacity mode”, the mode fulfilling requirement (2) only is called the “low capacity mode” of the RDI. With respect to requirement (3), only the IEC 958 physical layer is supported by now. The mapping of RDI frames onto other physical interfaces including networks [requirement (6)] and the development of a command language for the return channel [requirement (5)] are under consideration in the RDI Task Force of WG D.

1.2 Architecture of the receiving system

The RDI interface specified below is intended to be used for the direct connection of one or more data application decoders to DAB receivers (“stand-alone solution”). The architectures envisaged are described in Figure 1. If two or more application decoders are to be connected to a DAB receiver, each application decoder (except the last one) is required to have an input and output connector for the interface. In this case, the received RDI data stream is relayed directly to the output interface.



1.3 Considerations on the data rates of suitable physical interfaces

The following table gives an indication on how many RDI frames are required per time to transport the relevant data: The right time scale for this approach is physical CIFs which are 22.429 ms (2153 RDI frames).

Channel	Data capacity	RDI frames available	Remarks
DAB main service channel	1.856 MBit/s (22 bit/RDI F) ¹⁾ 1.687 MBit/s (20 bit/RDI F)	≤ 2153 (2025 usable for data) ²⁾	in 22.429 ms
DAB FIC	Mode I, II, IV 80.2 kbit/s (22 bit/RDI F) 72.9 kbit/s (20 bit/RDI F) Mode III 107.25 kbit/s (22 bit/RDI F) 97.5 kbit/s (20 bit/RDI F)	≤ 358 (350 usable for data) 119 (117 usable)	in 3.738 ms
TII pattern ³⁾	1 + NRT ⁴⁾ RDI F	Mode I: 238 Mode II: 61 Mode III: 31 Mode IV: 121	
TII carrier samples	64 RDIF each received transmitter 16 RDIF each received transmitter 16 RDIF each received transmitter 32 RDIF each received transmitter	Mode I: 238 Mode II: 61 Mode III: 31 Mode IV: 121	NCP

NOTE 1 An RDI frame (RDIF) carries 24 bit, of which 20 or 22 are useful data (see 2.1).
NOTE 2 Assuming a protocol overhead of 3 RDI frames per subchannel/FIB.
NOTE 3 Assuming evaluation of TII in the receiver (### Main + sub.Id.) NRT = number of received transmitters.
NOTE 4 Assuming evaluation of best carrier pairs per transmitter in the receiver, communication of FFT result, real and imaginary parts 16 bit each. NRT = number of received transmitters (typ. max. 5), NCP = number of carrier pairs (typ. max. 4).

2 RDI frames and frame types

The RDI is based on RDI frames of 24 bits each (see Figure 2).

