



April 2001

EIA-794 Data Radio Channel (DARC) System

Overview

One method for one-way broadcasting of transportation or traffic information to travelers and vehicles is through the use of subcarriers by broadcast FM stations. In the United States, the broadcast FM band extends, nominally, from 88 MHz to 108 MHz, with stations generally licensed on the odd multiples of 100 KHz frequency in that band. Stations can use one or more of several possible subcarriers to broadcast information in addition to the main audio channel. These subcarriers are not audible with a standard FM receiver, but can be demodulated with equipment designed to match the subcarrier signal.

Subcarrier standards generally focus on the broadcast protocols for the lower layers of the Open System Interconnection (OSI) Reference Model. This standard was developed under the auspices of the Consumer Electronics Association (CEA), Technology and Standards R6 Mobile Electronics Committee and is published as an Electronics Industry Alliance (EIA) document.

To obtain a copy of this standard, please contact:

Global Engineering Documents

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What is this standard for?

This standard, **EIA-794, Data Radio Channel (DARC) System**, specifies the technical details for a system for the delivery of data services to mobile, portable, and fixed receivers using subcarrier signals within the standard FM broadcast band. It specifies the modulation and coding schemes and content of the transmitted signal and describes the organization of the multiplex for the DARC system.

The DARC system is intended for one-way transmission of ITS and other information to mobile and fixed users using subcarriers on broadcast FM signals. It is designed to be flexible, allow for trade-offs among data rate, robustness, receiver battery life, and transmission delay. DARC is designed so that a transmitter can employ multiple subcarriers and explicitly supports the following:

- ATIS message sets defined by SAE J2369;
- Differential global positioning system (DGPS) message sets defined by the Radio Technical Commission for Maritime Services (RTCM), Special Committee No. 104;
- Paging;
- Emergency alert system messages defined by the Code of Federal Regulations (CFR) Title 47, Part 11; and
- Retransmission of radio broadcast data system (RBDS) data.

This system supports the original mobile high-rate encoding methods as tested by the National Radio Systems Committee (NRSC) High Speed Subcarrier (HSSC) Subcommittee.

Who uses it?

This standard should be used by developers of DARC transmission and reception equipment; FM radio transmission, reception, and modulation engineers; and to information providers as a guide for incorporating ITS data into the FM subcarrier data stream.

How is it used?

This standard should be used by communications engineers concerned with the design, development, and deployment of subcarrier modulation services in commercial FM broadcast transmission station equipment and FM receivers designed to receive, demodulate, and process the services. Additionally, this standard provides necessary design information on

networking service providers and transmitters for wide area multiple transmitter application. This standard also provides detailed timing and channel information that can be used by service providers of differential GPS signal or traffic and traveler information .

Scope

The standard provides a detailed description of the DARC waveform. This description begins with a list of definitions arranged in an order that provides a tutorial of the waveform. The definitions are followed by the details of the physical layer, including modulation and filtering. The standard also includes specifications for the frame structure and system messages. Annexes are included for various encoding options that support multiple applications with diverse requirements.

This standard includes the data link and physical media layers of the OSI protocol stack for the DARC system. It describes the signal, as it would be provided to the FM station, but does not cover processing by the FM station itself (i.e., modulation and transmission). The standard describes the coding and interleaving to be used for several different encoding options and describes applications that might use these encoding options. It does not, however, address the processing of the applications that the DARC system might support.

Related documents

NRSC RBDS -- United States Radio Broadcast Data Systems Standard (RBDS), January 1993 [Note: RBDS is a joint committee of the National Association of Broadcasters (NAB) and the Electronics Industries Alliance (EIA)]

[EIA-795 – Subcarrier Traffic Information Channel \(STIC\) System](#)

[SAE J2369 – Standard for ATIS Message Sets Delivered Over Bandwidth Restricted Media](#)

ISO 7498 – Information Processing Systems, Open Systems Interconnection - Basic Reference Model

ITU-R Recommendation BS 1194 – Data Radio Channel (DARC)

ITU-R Recommendation 412 – Planning Standard for FM Broadcasting

ITU-T Recommendation X.200 – Reference Model of Open Systems Interconnections for CCITT Applications