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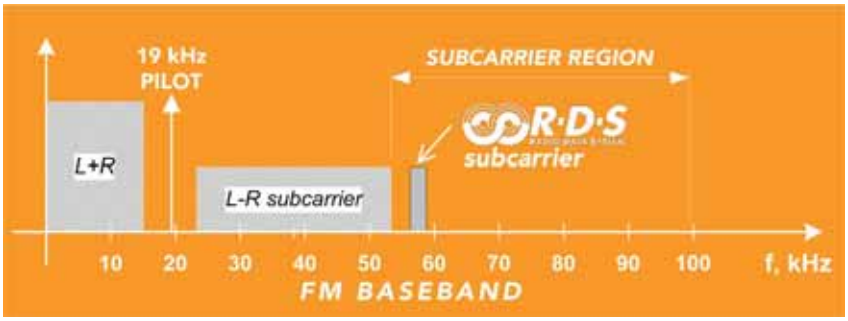
Radio Data System (RDS) Turns 25

Without a doubt the most successful FM subcarrier-based data broadcasting technology has been the Radio Data System (RDS). RDS has undergone a renaissance of sorts in the U.S. in the last few years, and is now widely used for transmission of program associated data (PAD) such as song title and artist, as well as for traffic information to navigation devices by the Broadcast Traffic Consortium (BTC) and Total Traffic Network (TTN). An informal NAB poll conducted late last year suggested that in some major markets 80% or more of stations are transmitting RDS.



The RDS signal consists of a digitally modulated subcarrier centered at 57 kHz in the FM baseband (see figure – note that the 57 kHz subcarrier frequency is exactly three times that of the 19 kHz stereo pilot subcarrier). While it has a modest data capacity of approximately 700 bits per second it is an extremely robust signal and if a receiver is capable of capturing an FM signal then it is usually able to decode an RDS signal embedded within it. One of the most recent applications of RDS technology is called “RDS tagging” which involves transmitting a “tag” using RDS, simultaneously with broadcast music, which identifies the song being played so the listener can easily purchase it over the Internet (see the October 20, 2008 issue *of Radio TechCheck* for more about RDS tagging).

Some information about the evolution of RDS was provided to NAB by Mr. Dietmar Kopitz, chief executive of the RDS Forum (www.rds.org.uk, a European trade organization based in Geneva, Switzerland focusing on RDS) and a recognized expert in RDS technology. His narrative is summarized in the paragraphs below.

Introduction – RDS was developed by the public broadcasters collaborating within the European Broadcasting Union (EBU) from about 1975. The first specification was issued by the EBU in March 1984. It was then agreed with the European car radio industry that the public broadcasters would rapidly implement the system on all their networks so that the industry could launch on the European market RDS car radios from mid-1987, and so it happened!

RDS technology take-off in radio receivers was relatively slow, as the first RDS car radios were all high-end models that were fairly expensive. However within 10 years, there were already over 50 million RDS car radios sold, and by 2004 the total had reached 200 million [note – these units were mostly outside of the U.S.]. From 2005 the industrial production of RDS FM receivers literally exploded. The reason was the availability of a new

generation of very inexpensive and very small highly integrated FM-RDS ICs that made RDS technology also interesting for portable devices like music players and mobile phones. Since then, annual production has increased to over 200 million units a year.

The origins – the basic idea was launched by the French public broadcaster ORTF, now Radio France. The proposal was inspired by a traffic broadcast identification system called ARI, jointly developed in Germany by the public broadcasting research centre IRT and the car radio maker Blaupunkt. The precise mandate given to the EBU in 1974 was to come up with a technology more flexible than ARI, applicable to all FM broadcasts, and permitting inaudible automatic receiver tuning for best signal reception within a broadcast network radiating the same radio program.

The Europe-wide development lasted 10 years with many field trials and at least five alternative proposed solutions. The modulation system was taken from a previously introduced Swedish paging system and the baseband coding was a new design, mainly developed by the BBC and the IRT. Everything was carefully coordinated through the EBU, and at the final stage of the development, the European car radio industry was invited to join the numerous field trials. Two of the most severe criteria to be met were that the data added to the FM broadcast had to be completely inaudible, even in the most critical listening mode (*i.e.*, on headphones) and that only insignificant additional RF interference caused by the RDS signal was permitted.

The people behind RDS - Dr. Kari Ilmonen from Yleisradio in Finland and André Keller from TDF in France had the basic development idea. Both were representatives in the EBU Technical Committee, which launched at its 1974 Paris meeting the development task to be carried out within Working Party R, then chaired by Hermann Eden (IRT), who entrusted the job to a Sub-group, chaired by Ernst Schwarz (Swiss PTT) and inside that Sub-group a Specialist group was created, chaired by Dr. Bob Ely (BBC Research). It was this Specialist group, which met during many years until 1992, that created RDS.

Bob Ely created the backbone for the baseband coding, Jürgen Mielke (IRT), Dr. Josef Berger (ORF), Sten Bergman (Swedish Radio), Dr. Mario Cominetti (RAI), Henri van der Heide (NOS), were those engineers that inspired most the first specification version published in 1984 and Theo Kamalski (then Philips, now TomTom) and Simon Parnall (then BBC, now NDS) joined and continued to improve it further in the following years, especially with implementation experiences.

In this context it is also important to mention the RDS promotion campaign launched through the EBU, heavily assisted by the BBC and specifically three persons – Johnny Beerling, then Head of BBC Radio 1, Mark Saunders, Head of the BBC's RDS development office and Bev Marks, Project Manager of the BBC's RDS implementation team, who also brought many implementation ideas to the group and who also worked on implementing EON. Johnny Beerling launched the idea of the RDS logo which was then developed by the BBC and later offered to the EBU for integration into the RDS standards and to be used to mark industry products with standardized RDS functionality. Among the latest additions to the RDS specification RadioText Plus is worth mentioning and the people behind this were Dr. Hans-Christoph Quelle (Nokia), Matthias Ewert (WDR) and Werner Richter (IRT). The coordinator of the RDS project was all this time Dietmar Kopitz, formerly EBU Chief Engineer and nowadays the Chief Executive of the RDS Forum.

RBDS – in February 1990, discussion started about standardizing RDS for the U.S. under the auspices of the National Radio Systems Committee (NRSC). The RBDS Standard was adopted by the NRSC on January 8 1993, consisting of the major components of the European RDS Standard but also with some important differences, including the following:

- *Program Type Definitions* – due to differing broadcast styles, the program type (PTY) code definitions (*i.e.* Jazz, Rock, etc.) differ between RDS and RBDS;
- *Program Identification Coding* – North American program identification (PI) codes differ in functionality in three ranges. This affects alternate frequency switching and regionalization;
- *"Dynamic" Program Service Name* – the RBDS Standard allows "nondistracting" changes to the program service (PS) field, while the RDS Standard strictly forbids dynamic changes to the PS;
- *ID Logic Feature (IDL)/RDS Updates to In Receiver Database (IRDS)* – a licensed feature which allows the receiver to identify the call sign and format of non-RDS FM and AM broadcast stations via a built in database. This database may be updated via an Open Data Application (ODA);
- *AMRDS* – the RBDS standard has a reserved section for an AM equivalent to RDS;

- *Emergency Alert System (EAS) ODA* – an ODA has been developed to carry emergency information compatible with the U.S. Federal Communication Commissions (FCC) EAS protocol. This public ODA also offers increased consumer receiver functionality with emergency messaging.

The RDS Forum – the RDS Forum, created in 1993, is a non-profit international professional industry association that has the objective to promote and maintain RDS technology. The RDS Forum serves its members also as an efficient contact network for experience exchange, regarding the use and correct implementation of the RDS technology in the many different countries involved. Maintenance means not only keeping the RDS system correctly going as originally conceived by the EBU, but also upgrading it, maintaining full compatibility with the very large number of existing RDS receivers, to enable new functionalities that have only recently become available for implementation in the latest RDS receiver generations.

NRSC's RBDS Subcommittee Re-activating at The 2009 NAB Show

The National Radio Systems Committee (NRSC) is re-activating one of its subcommittees, the RBDS Subcommittee, after a hiatus of 2 1/2 years (the last meeting was held on September 20, 2006). This group will meet on Saturday, April 18, 2009 in Ballroom E of the Las Vegas Hilton, in conjunction with The 2009 NAB Show (www.nabshow.com). All convention attendees (except members of the press) are welcome to attend. Barry Thomas, Vice President of Engineering – Radio, Lincoln Financial Media, will be serving as chairman of the group. A list of current Subcommittee members is shown in the table.

NRSC RBDS SUBCOMMITTEE

(BOLD indicates active voting status as of 4/9/2009)

Averna	**Greater Media, Inc.**
Beasley Broadcast Group	The Hadfield Group
Bonneville International Corp.	Industry Canada - DBCP
Broadcast Electronics	Inovonics
Broadcast Mgmt. & Technology	**Kenwood**
Broadcast Signal Lab	KUVO Radio
Canadian Assoc. of Broadcasters	Lincoln Financial Media
Canadian Broadcasting Corp.	Panasonic
Cesium Communications	Microsoft
Clear Channel Broadcasting, Inc.	MN Radio Talking Books Network
Cohn & Marks	Nassau Broadcast Partners
Corporation for Public Broadcasting	**NPR**
Cox Broadcasting	Radio Computing Services
Cumulus Media	viaRadio Corporation
Delphi	Visteon Automotive Systems
DTS, Inc.	Westwood One
Entercom Communications Corp.	**WYE Consulting**
Global Security Systems LLC	XMOD Company, Inc.

This Subcommittee was formed in the early 1990's to develop the U.S. version of the RDS Standard which was originally called the RBDS Standard so as to distinguish it from its European counterpart. The RBDS Standard was first adopted in 1993 and has been updated twice since then, in 1998 and most recently in 2005 when its designation was changed to NRSC-4-A so as to conform to the NRSC Standards naming convention. The group has re-convened to consider incorporating a new feature of RDS called "RadioText+" into the Standard, in response to a similar action being undertaken with the European version of the RDS Standard (IEC 62106 Edition 2).

Anyone who has a business interest in the technology being investigated by the NRSC is welcome to join the Subcommittee and participate in its activities. Member representatives of the NRSC are generally engineers, scientists, or technicians with in-depth knowledge of the subject being studied. In order to promote the free exchange of ideas during Committee work, members of the press are not allowed to attend NRSC meetings. However, members of the press are free to contact Committee chairpersons, NAB, or CEA with general questions about meetings. Contact David Layer at NAB (dlayer@nab.org) for additional information.

Radio Heard Here exhibit at NAB Show to feature FM Radio in cell phones

While you are at the 2009 NAB Show (April 18 - 23, 2009 www.nabshow.com be sure to check out the Radio Heard Here exhibit in the north hall of the Las Vegas Convention Center, booth N6138. A number of cell phones that have built-in FM radios will be on display including those with integrated FM antennas. Register for a daily drawing for either a Motorola Cell Phone with Integrated FM Radio or a Sony HD Radio.

RADIO HEARD HERE