| Title: | **RD5 Reference integration Note** |
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| **Project** | RD5 | | |
| **Project ID:** | xx | **Doc-ID:** | RD5_RBT_SW_RIN__CoDSP |
| **Author:** | Bernard Noisette | **Version** | a01 |
| **Date:** | 16 june 2011 | **Maturity:** | Reviewed |

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| **Role** | **Name** | **Date and signature** |
| BT CoC architect | JC.Villette | |
| **Released by** | | |
| **Role** | **Name** | **Date and signature** |
| BT CoC leader | Ch.Ambrosino | |

**Purpose:**

- The purpose of this document is to describe what is RD5 radio product, in order to get Bluetooth qualification

**Scope (validity area & date, replaced documents):**

This document forms the Reference Integration Note for «RD5 RADIO» end user product, which is registered under Bluetooth Qualified Design ID (QD ID) B017985.

**Audience:**

Members of Bluetooth BQE

**Maintenance:**

This is the first version of the document.

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# 1 PREFACE

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## 1.1 RIN Template Instructions

This document is a basic template for use by Bluetooth Members whos Qualified Designs are intended to be further integrated to create other Bluetooth product implementations. The Bluetooth SIG is providing this document as a reference guide for a Member in creating a Reference Integration Note (RIN). This document, or one of similar content, is required for Component manufacturers and optional for manufacturers of other Bluetooth product types.

1. Fill out the fields as detailed below. This form may be modified and additional sections, photographs, charts, tables may be added as needed. Where bolded brackets denoted in blue color exist, fill in Company information as requested.
2. Add any additional requirements necessary for the integration of the Qualified Design and as required to demonstrate the requirements met in the Design's qualification.
3. Save a copy of this RIN to Adobe PDF naming it as required by your Company documentation policy.
4. Upload this document onto the Qualification Listing Interface (QLI) Web site prior to qualification of this Design.

## 1.2 What is a Reference Integration Note

This section explains the requirement of a RIN and has been placed within this document solely to provide further understanding of the requirements of a RIN as a part of the Bluetooth Qualification Program. The definition within Bluetooth PRD 2.0 states that a RIN is the instructions from the Member manufacturing the Bluetooth Component Product on how the Bluetooth Component Product is integrated.

### 1.1.1 Minimum Requirements for a RIN

Prior to the qualification of a Bluetooth Qualified Design, a RIN document is required for any Bluetooth Components and optional for any other Bluetooth product type. A completed RIN document published on the QDL is required to have sufficient detail so that a Member or their BQE can evaluate the applicability of a Component's pre-tested functionality toward the qualification of an End product design. Additionally, for other Bluetooth product types the use of a RIN may be a necessary document to further describe the integration of such product type into new Bluetooth implementations, such as a Subsystem's Compliant Portion toward the conformance test requirements of a System Under Test (ref. PRD 2.0).

A Member or their BQE who will subsequently use this RIN Design to qualify a complete Bluetooth solution consisting of a pre-tested and qualified Bluetooth Component should not need more information than what is available on the Web site and should be able to list their product without any further questions to either the Member or their BQE who has listed the Bluetooth Component on the Web site.

The following information shall be included in the Reference Integration Note:

Test setup (hardware / software reference platform) for upper and lower tester:

- Hardware / software reference platform for upper and lower tester
- Hardware (e.g. PC, type, processor, version, memory, used radio part / module)
- Software (Kind of software, e.g. operating system, version)
- Interface description
- Component:
  - Description of the component
  - Interface description to the lower layers (if applicable)
  - Interface description to the upper layers (if applicable)

  Note: If a special interface is used a detailed description is required.

Note: The contents of a RIN stated above are required for Bluetooth Component product types and optional for other Bluetooth product types. However, the use of the RIN should be utilized by Members whos product type is likely to be further integrated into other Bluetooth product implementations. Doing so would further protect the Member from questions from the Bluetooth SIG regarding their design and decrease the likelyhood that a subject design will be audited by the Bluetooth SIG in accordance with the PRD and Qualification Enforcement Program.

## 1.3 Who should read this RIN guide

This guide provides user information about the Bluetooth **«RD5 RADIO» system.** Anyone interested in understanding or modifying this ***hardware and software*** design should read this guide.

**Additionally, include this statement;**
**"This guide is targeted to help a Bluetooth Member or their BQE understand the role of the** «RD5 RADIO» **in a complete Bluetooth wireless product being integrated for qualification. The Bluetooth Program Reference Document requires that all Bluetooth Components have a Reference Integration Note (RIN) as a pre-requisite for qualification. This RIN has been uploaded to the Bluetooth SIG Qualification Listing Interfaces for the Qualified Design ID** `B017985` **prior to qualification of this design."**

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# 2 PRODUCT OVERVIEW

## 2.1 HARDWARE FEATURES

### 2.1.1 Product Type Declaration

This design is listed as a *Bluetooth* **End Product** on the Bluetooth SIG Qualified Design List (QDL) **B017985.** Further use of this design to create subsequent Bluetooth implementations can be achieved without further qualification provided that the resulting implementation has no negative material impact on the Bluetooth performance or functionality of the design, and the subsequent implementation is listed on the Bluetooth End Product List (EPL) by the integrator of this design. There is no charge for listing your product on the EPL and if you do not desire to have this listing publicly displayed, you can choose to not have it listed on the public database while filling out the EPL form. You can find the EPL at https://bluetooth.org/EPL. Please note that if the design has been changed, the design is required to be re-assessed by the Member integrating the design to assert that the change does not result in a different Bluetooth design and that there has been no changes within the PICS selections from the this design (as listed on the Bluetooth QDL). If you have changed or modified this product such that the Bluetooth functionality or performance is affected, further qualification and listing may be required in accordance with the Bluetooth Qualification Process (ref. PRD 2.0). To start the process for a new qualification, please visit https://bluetooth.org/TPG

### 2.1.2 Hardware Overview

The RD5 project is a Radio-Connectivity-Multimedia product for PSA. The product is composed of 4 main modules:

- Radio: master of the system, also called Host;
- Multimedia chipset for CD, USB and iPod features;
- DAB/DMB chipset for digital Radio;
- BT Connectivity: based on ADI BF532 processor connected to Host, it is also called CoDSP. It includes BT stack core and profiles which are provided by 3rd party supplier iAnywhere.

The RD5 product is connected to an intelligent display called EMF. The presentation part of HMI is located in the EMF.

The RD5 product is also connected to an intelligent master box called BSI which handles the product start-up and shutdown. The remote keyboard (including on/off) is connected to this box.

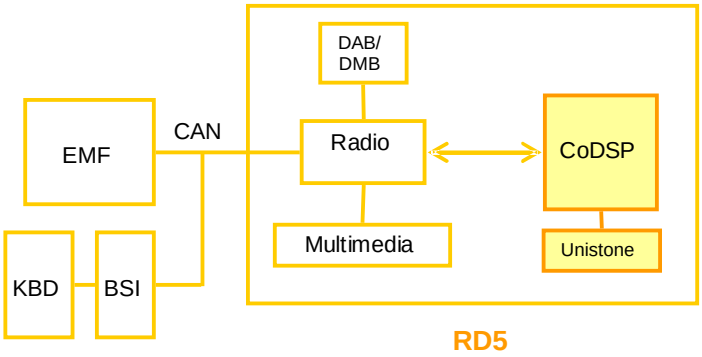


**Figure 1: RD5 system context**

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2 product variants are developed :

- L3 with a single AM/FM tuner,
- L5 with a double AM/FM tuner.

The BT part is exactly the same for both variants

### 2.1.3 Standard Operating Conditions

This product is for automotive market.

Operating Voltage supply is 12 V.

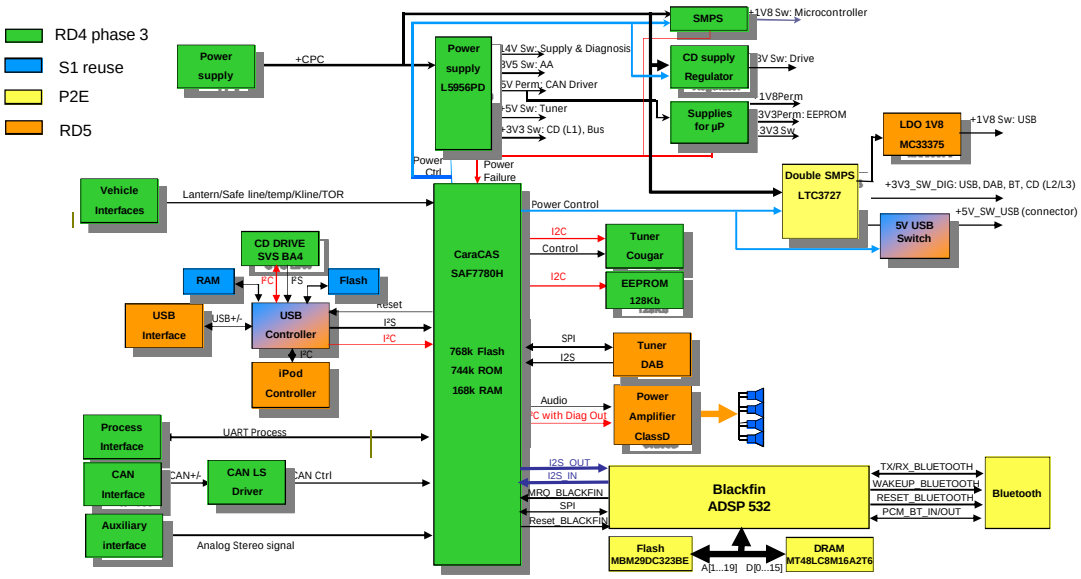
Operating temperature range is -20 to +70 °C

### 2.1.4 Application

The system is a “Car radio and infotainment system”. It is made of HW modules with embedded SW.

### 2.1.5 Block Diagram

Block diagram of L3 variant, with a single AM/FM tuner :

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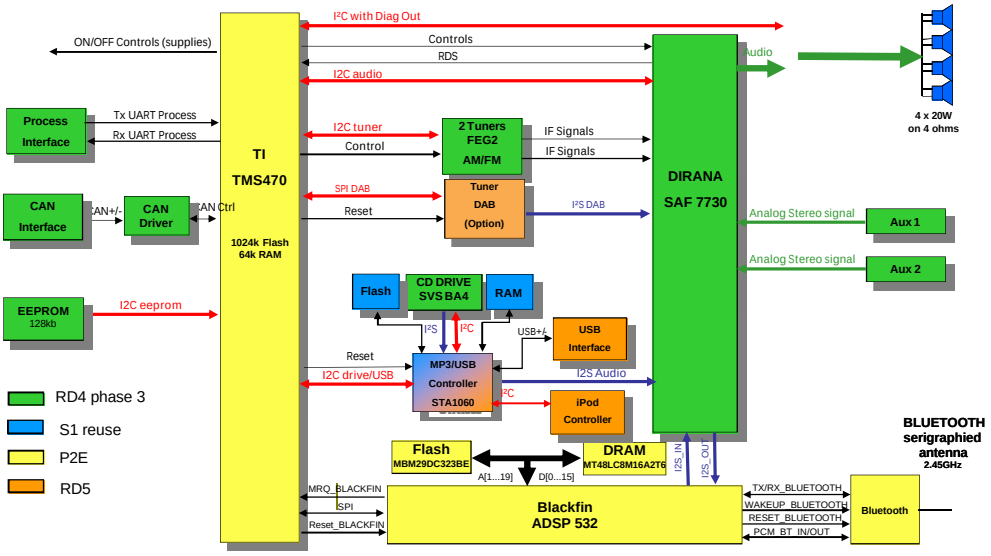
Block diagram of L5 variant, with a double AM/FM tuner :




## 2.1.6 Hardware Features

- Main controller for L3 variant : NXP Caracas chipset
- Main controller for L5 variant : TI TMS470 controller + NXP Dirana SAF 7730 CarDSP
- Power supply
- Class D Audio amplifier
- Radio tuner FM/AM
- Radio tuner DAB
- USB controller
- CD drive
- BT module = CoDSP Blackfin 532 + Unistone BT Front End module
- CAN controller

## 2.1.7 Radio Modules

- BT host = CoDSP Blackfin 532
- BT Front End module from Infineon :
  - QDID = `B014999, Unistone 2.01 (BT v 2.1+EDR)`

## 2.1.8 Interfaces

CAN interface to connect the system to the vehicle network.

Internal interface : UART and I2S interface between main controller and Infineon BT module

I2C interfaces to USB module, tuner module, class D audio amplifier

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## 2.2 SOFTWARE FEATURES

### 2.2.1 Product Type Declaration

§ This design is listed as a *Bluetooth* **End Product** on the Bluetooth SIG Qualified Design List (QDL) **B017985**. Further use of this design to create subsequent Bluetooth implementations can be achieved without further qualification provided that the resulting implementation has no negative material impact on the Bluetooth performance or functionality of the design and the subsequent implementation is listed on the Bluetooth End Product List (EPL) by the integrator of this design. There is no charge for listing your product on the EPL and if you do not desire to have this listing publicly displayed, you can choose to not have it listed on the public database while filling out the EPL form. You can find the EPL at https://bluetooth.org/EPL. Please note that if the design has been changed, the design is required to be re-assessed by the Member integrating the design to assert that the change does not result in a different Bluetooth design and that there has been no changes within the PICS selections from the this design (as listed on the Bluetooth QDL). If you have changed or modified this product such that the Bluetooth functionality or performance is affected, further qualification and listing is required in accordance with the Bluetooth Qualification Process (ref. PRD 2.0). To start the process for a new qualification, please visit https://bluetooth.org/TPG.

### 2.2.2 Software Overview

The software is embedded in the hardware. It is specific to this end user product, it cannot be ported to an other environment.

### 2.2.3 Application

The system is a “Car radio and infotainment system”. It is made of HW modules with embedded SW.

### 2.2.4 Software Features

- Power supply control : switch-on, switch-off
- Audio amplifier control by the system user
- Radio tuner FM/AM
- Radio tuner DAB
- USB controller
- CD drive control
- BT stack and applications to handle phone call, phonebook downloading, audio streaming
- Interface to CAN bus
- Handling of user inputs via remote keyboard
- Handling of remote display

### 2.2.5 Software Architecture

The software includes following Bluetooth component :

iAnywhere BT stack:

- QDID = B014592 = Blue SDK 3.x and profiles (AV SDK, MT OBEX, BNEP, HFP, HID, PBAP, SAP)
- QDID = B015048 = Blue SDK Profiles (AVRCP, A2DP, BIP, BPP, HCRP, HSP, SAP, BNEP)

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### 2.2.6 Interfaces

External interface : CAN messages use a proprietary OEM protocol.

Internal interface : UART and I2S interface between main controller and Infineon BT module

### 2.2.7 Sample Portings

The SW is embedded in specific HW design, it cannot be ported to an other environment.

### 2.2.8 Hardware / Software Reference Platforms

[This section lists the environment which was utilized in qualifying this design (i.e., implementation/equipment under test and the remote side platforms.]

For PTS tests, the product shall be connected to OEM PSA CAN network, with all connected products or CAPRI box to simulate KBD and BSI.

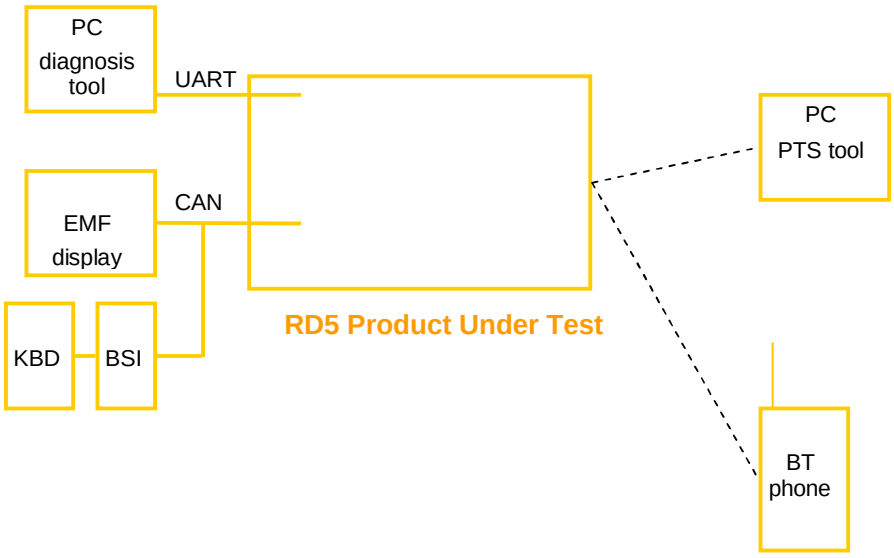


**Figure 2: RD5 Test environment**

For radio tests, the product shall be connected to Continental diagnosis UART interface, to put the Unistone Bluetooth controller in test mode.

# 3 Contact Information

[This section identifies important contact information relevant to the support of this design.]

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