

# Application Note

## DA16200 Bluetooth Coexistence

### AN-WI-002

#### Abstract

*This document gives application information about the DA16200 Bluetooth Coexistence interface and configuration options.*

---

---

## Contents

Abstract .....	1
1 Introduction.....	3
2 Interface Configuration.....	3
3 Operation Scenario .....	3
4 Pin Configuration .....	4
5 Pin Multiplex Setup .....	4
6 Application Programming Interface .....	4
Revision History .....	6

## Figures

Figure 1: Bluetooth Coexistence Interface .....	3
---	---

## Tables

Table 1: Bluetooth Coexistence Pin Configuration.....	4
Table 2: Bluetooth Coexistence API Elements.....	4

## DA16200 Bluetooth Coexistence

### 1 Introduction

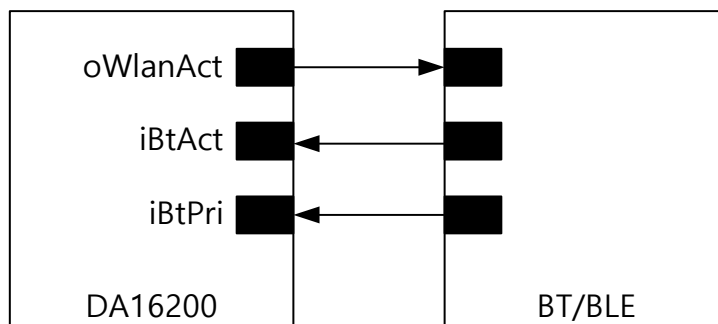
DA16200 provides the Bluetooth coexistence function to properly align with external devices activated at 2.4 GHz.

### 2 Interface Configuration

The following three pins can be set in pin multiplexing:

- BT\_sig0 (oWlanAct)
  - Indicates that Output, WLAN is currently active
- BT\_sig1 (iBtAct)
  - Indicates that Input, BT/BLE is currently active
- BT\_sig2 (iBtPri)
  - Indicates that Input (Optional), BT/BLE has a higher priority

A variety of configurable settings are available, including polarity of signals, manual force mode, use status of the optional iBtPri function, and whether or not to switch oWlanAct to be active in the event of TX/RX/TRX. See [Figure 1](#).



**Figure 1: Bluetooth Coexistence Interface**

### 3 Operation Scenario

The Bluetooth coexistence feature can be turned on/off with the configurable register. The activation scenarios based on the status of each pin are as follows:

- BT\_sig0 (oWlanAct)
  - When asserted, external BT/BLE is expected to stop occupying RF
- BT\_sig1 (iBtAct)
  - When asserted, DA16200 stops occupying RF
- BT\_sig2 (iBtPri)
  - Optional and thus may not be used
  - When used, DA16200 stops occupying RF when both iBtAct and iBtPri are active even it has something to transmit at that moment.

When both DA16200 and BT/BLE want to transmit some packet at the same time, there is a configuration in DA16200 by which priority is decided at that moment. When priority is set to be higher in DA16200 than BT/BLE, it will ignore iBtAct signal and transmit its packet anyway.

And when priority is set to be lower than BT/BLE, it will not transmit its packet at that moment.

Priority can be set in the API which will be described in later section in this document.

## DA16200 Bluetooth Coexistence

### 4 Pin Configuration

Table 1 shows the pin configuration of Bluetooth coexistence.

**Table 1: Bluetooth Coexistence Pin Configuration**

DA16200 Pins	Pin Number	I/O	Signals	Description	Note
GPIOA8	30	I/O	oWlanAct	WiFi Active signal	SDIO_D1
GPIOA9	29	I/O	iBtAct	BT active signal	SDIO_D0
GPIOA10	28	I/O	iBTPri	BT priority	

GPIOA8 and GPIOA9 are also assigned for D1 and D0 for SDIO interface (for both host and slave) in DA16200.

Therefore, if SDIO interface should be used for an application, only GPIOA10 pin can be used for BT Coex.

In this case, GPIOA10 pin should be connected to BtAct signal from BT/BLE making DA16200 stop occupying RF whenever BT/BLE activates.

### 5 Pin Multiplex Setup

Pin multiplexing for Bluetooth coexistence is present in the SDK. The setup of pin multiplexing should be included in `int config_pin_mux(void)` of file `main_xxx.c`.

```
// pin mux setup for Bluetooth coexistence
_fc9k_io_pinmux(PIN_EMUX, EMUX_BT);
_fc9k_io_pinmux(PIN_FMUX, FMUX_GPIOBT);
```

### 6 Application Programming Interface

**Table 2: Bluetooth Coexistence API Elements**

<code>void rf_meas_btcoex(uint8_t enable, uint8_t priority, uint8_t gpio);</code>	
enable	0 or 1 (1: enable)
priority	priority: 0,1,2 0: BT > WiFi (BT priority is higher than WiFi) 1: BT = WiFi (BT and WiFi priority are equal) 2: BT < WiFi (WiFi priority is higher than BT)
gpio	Pin mux setup for test Is used for test purpose. Should be '0'
Return	Void

The sample code for Bluetooth coexistence API:

```
rf_meas_btcoex(1, 0, 0); // 1: BT coexistence is enabled, 0: BLE win in conflict
rf_meas_btcoex(1, 2, 0); // 1: BT coexistence is enabled, 2: WiFi win in conflict
```

Bluetooth coexistence can be enabled in the below feature.

```
[\src\customer\customer_xxx.h]
#define      __SUPPORT_BTCOEX__           // BT Coexistences
```

Please make sure your SDK has the above-mentioned configuration, otherwise Bluetooth Coexistence API will not work correctly.

---

## DA16200 Bluetooth Coexistence

When SDIO interface is required, the feature `__SUPPORT_BTCOEX_SDIO__` should be defined in `rf_meas_api.c` in our SDK. And GPIOA10 should be connected to BtAct as described before.

Pin multiplexing configuration should be like this:

```
// pin mux setup for Bluetooth coexistence with SDIO interface
_fc9k_io_pinmux(PIN_EMUX, EMUX_SDm); // for SDIO host
_fc9k_io_pinmux(PIN_FMUX, FMUX_GPIOBT); // GPIOA10 as BtAct
```

**Revision History**

<b>Revision</b>	<b>Date</b>	<b>Description</b>
1.3	09-Apr-2020	Document number changed to AN-WI-002 from AN-B-080, minor edits
1.2	06-Jan-2020	Section 6: add sample code and configuration. Finalized document
1.1	28-Nov-2019	Editorial review
1.0	14-Aug-2019	Preliminary DRAFT Release

## DA16200 Bluetooth Coexistence

### Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

### Disclaimer

Unless otherwise agreed in writing, the Dialog Semiconductor products (and any associated software) referred to in this document are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of a Dialog Semiconductor product (or associated software) can reasonably be expected to result in personal injury, death or severe property or environmental damage. Dialog Semiconductor and its suppliers accept no liability for inclusion and/or use of Dialog Semiconductor products (and any associated software) in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Information in this document is believed to be accurate and reliable. However, Dialog Semiconductor does not give any representations or warranties, express or implied, as to the accuracy or completeness of such information. Dialog Semiconductor furthermore takes no responsibility whatsoever for the content in this document if provided by any information source outside of Dialog Semiconductor.

Dialog Semiconductor reserves the right to change without notice the information published in this document, including, without limitation, the specification and the design of the related semiconductor products, software and applications. Notwithstanding the foregoing, for any automotive grade version of the device, Dialog Semiconductor reserves the right to change the information published in this document, including, without limitation, the specification and the design of the related semiconductor products, software and applications, in accordance with its standard automotive change notification process.

Applications, software, and semiconductor products described in this document are for illustrative purposes only. Dialog Semiconductor makes no representation or warranty that such applications, software and semiconductor products will be suitable for the specified use without further testing or modification. Unless otherwise agreed in writing, such testing or modification is the sole responsibility of the customer and Dialog Semiconductor excludes all liability in this respect.

Nothing in this document may be construed as a license for customer to use the Dialog Semiconductor products, software and applications referred to in this document. Such license must be separately sought by customer with Dialog Semiconductor.

All use of Dialog Semiconductor products, software and applications referred to in this document is subject to Dialog Semiconductor's [Standard Terms and Conditions of Sale](http://www.dialog-semiconductor.com), available on the company website ([www.dialog-semiconductor.com](http://www.dialog-semiconductor.com)) unless otherwise stated.

Dialog, Dialog Semiconductor and the Dialog logo are trademarks of Dialog Semiconductor Plc or its subsidiaries. All other product or service names and marks are the property of their respective owners.

© 2020 Dialog Semiconductor. All rights reserved.

### RoHS Compliance

Dialog Semiconductor's suppliers certify that its products are in compliance with the requirements of Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment. RoHS certificates from our suppliers are available on request.

## Contacting Dialog Semiconductor

#### United Kingdom (Headquarters)

Dialog Semiconductor (UK) LTD  
Phone: +44 1793 757700

#### Germany

Dialog Semiconductor GmbH  
Phone: +49 7021 805-0

#### The Netherlands

Dialog Semiconductor B.V.  
Phone: +31 73 640 8822

#### Email:

enquiry@diasemi.com

#### North America

Dialog Semiconductor Inc.  
Phone: +1 408 845 8500

#### Japan

Dialog Semiconductor K. K.  
Phone: +81 3 5769 5100

#### Taiwan

Dialog Semiconductor Taiwan  
Phone: +886 281 786 222

#### Web site:

[www.dialog-semiconductor.com](http://www.dialog-semiconductor.com)

#### Hong Kong

Dialog Semiconductor Hong Kong  
Phone: +852 2607 4271

#### Korea

Dialog Semiconductor Korea  
Phone: +82 2 3469 8200

#### China (Shenzhen)

Dialog Semiconductor China  
Phone: +86 755 2981 3669

#### China (Shanghai)

Dialog Semiconductor China  
Phone: +86 21 5424 9058