

Application Note

DA16200 Bluetooth Coexistence

AN-WI-002

Abstract

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

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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](#).

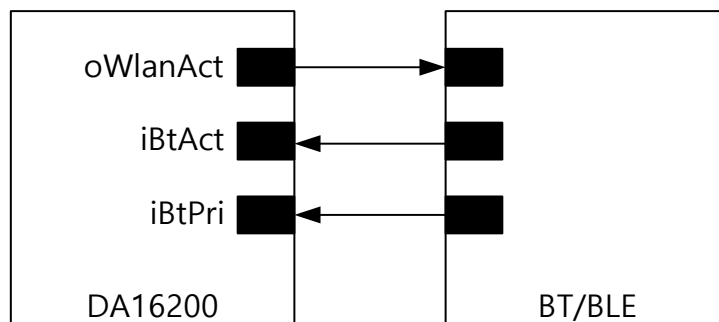


Figure 1: Bluetooth Coexistence Interface

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.

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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.

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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
```

DA16200 Bluetooth Coexistence**Revision History**

Revision	Date	Description
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

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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.

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