

Application Note

DA16200 DA16600 Antenna Switching Diversity

AN-WI-008

Abstract

This document provides information about Antenna Switching Diversity function in DA16200 and DA16600.

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1 Introduction

The DA16200 (DA16600) provides an antenna switching diversity function to improve antenna performance in a multi-path environment. The PHY HW block measures the Received Signal Strength Indicator (RSSI) of each antenna and selects the antenna with the largest RSSI. The selected antenna is also used for transmission. To use the Antenna Switching Diversity function, an external switch element is required. Switch control is done through a GPIO. Two GPIOs can be used for switch control. For this purpose, select any of unused pins among the GPIO pins. The control signal can be changed with a register setting to suit the external switching device.

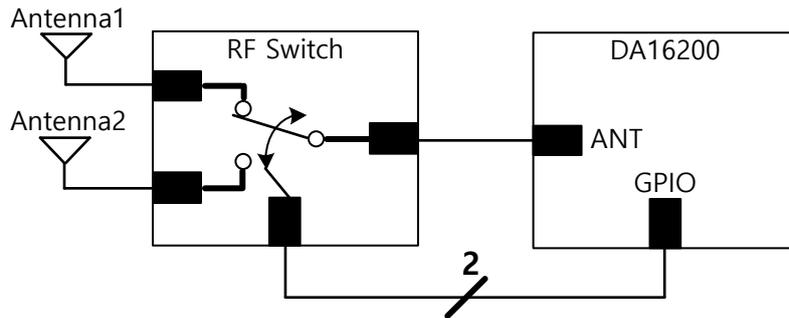


Figure 1. Antenna Switch Internal Block Diagram

2 Registers

Antenna Switching Diversity uses the registers mentioned in the tables below.

Table 1: GPIO Alternate Functions (0x4001003C)

Bit	Mode	Symbol	Description	Reset
12:0	R/W	FUNC_OUT_EN	Alternate Function output enable [12] : UART2_TXDOE enable [11] : UART1_TXDOE enable [10] : UART0_TXDOE enable [9] : RF_SW2 enable [8] : RF_SW1 enable [7] : mSPI_CSB[3] enable (1=enable) [6] : mSPI_CSB[3] enable [5] : mSPI_CSB[1] enable [4] : Ext_Intr enable [3] : PWM_OUT[3] enable (1=enable) [2] : PWM_OUT[3] enable [1] : PWM_OUT[1] enable [0] : PWM_OUT[0] enable	0x0000

This register serves to designate a GPIO port as one of the alternate functions. Bit[9:8] should be set to '1' for RF switching signals used for the Antenna Switching Diversity function.

Table 2: RF Switch Output Select (0x40010FC8)

Bit	Mode	Symbol	Description	Reset
15:0	R/W	RF_SW_OUTSEL	RF_SW[1:0] port selection [7: 4] : port sel of the RF_SW2 [3: 0] : port sel of the RF_SW1	0x0000

This register serves to select which GPIO ports to use for the RF switch control signals that the PHY HW generates after the RSSI of each antenna is measured.

When GPIOA[11] needs to be used for RF_SW2 while GPIOA[10] is used for RF SW1, 0xBA should be set, in which 'B' is for GPIOA[11] and 'A' for GPIOA[10].

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Table 3: RF_Interface_Control (0x60C0C000)

Bit	Mode	Symbol	Description	Reset
19:18	R/W	AN_SW_Value2for_DIV	RF switch signals values when ANT2 selected	2'b01
17:16	R/W	AN_SW_Value1for_DIV	RF switch signals values when ANT1 selected	2'b10

This register serves to set the values for the RF switching signals RF_SW1 and RF_SW2.

Table 4: Antenna Switching Enable (0x60C036F0)

Bit	Mode	Symbol	Description	Reset
4	R/W	ANT_DIV_MODE_EN	1 for enable.	1'b0

This register enables the automatic Antenna Switching operation, when set.

The PHY HW will measure the RSSI from both antennas and select the one with the strongest RSSI generating RF switching control signals of RF_SW1 and RF_SW2 automatically.

If software control is preferred over automatic antenna switching control, this register should not be enabled, which will disable the automatic antenna switching operation of the PHY HW.

For manual control, the following registers are used for RF switch control.

Table 5: Antenna Select (0x60C0F0A4)

Bit	Mode	Symbol	Description	Reset
4	R	AS_STATUS	Selected Antenna Number 0 : Antenna 1 1 : Antenna 2	1'b0
0	R/W	AS_VALUE	Antenna Number to select 0 : Antenna 1 1 : Antenna 2	1'b0

Table 6: Antenna Select Set (0x60C0F0A0)

Bit	Mode	Symbol	Description	Reset
0	R/W	AS_FORCE_WRITE	When set, the antenna with AS_VALUE will be selected. This bit will be cleared automatically after set.	1'b0

When this register is set to value '1', the antenna with AS_VALUE in Antenna Select register will be selected and RF switch control signals RF_SW1 and RF_SW2 with the values set in the RF_Interface_Control register will output accordingly.

Revision History

Revision	Date	Description
1.2	14-Dec-2021	Watermark removed, editorial.
1.1	25-Nov-2021	Title was changed.
1.0	14 May 2020	Initial version.

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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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