Test Signals for debug purpose

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Keywords

- *SoC*
- *Debug*
- *Test signals*
- *CC1110*
- *CC1111*
- *CC2510*
- *CC2511*
- *CC2430*
- *CC2431*

1 Introduction

The LPRF SoCs from Texas Instruments contains a few test signals useful to debug applications. These signals are for test purpose only and should not be used in the final application.

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2 Abbreviations

SoC	System-On-Chip

3 Test Settings

A number of signals can be selected to be output on pins P1_4 through P1_7 by setting four registers OBSSEL0 through OBSSEL3. When these registers are set to any other value that zero, the signal selected according to Table 1, Table 2 and Table 3 will be output on pin P1_4 if OBSSEL0 is set, P1_5 if OBSSEL1 is set, P1_6 if OBSSEL2 is set and P1_7 if OBSSEL3 is set.

For the CC1110, CC1111, CC2510 and CC2511 devices the OBSSEL registers are located within the Radio Register memory at the following addresses:

```
#define  OBSSEL3   XREG( 0xDF32 )  /*  Test Signal at pin P1_7          */
#define  OBSSEL2   XREG( 0xDF33 )  /*  Test Signal at pin P1_6          */
#define  OBSSEL1   XREG( 0xDF34 )  /*  Test Signal at pin P1_5          */
#define  OBSSEL0   XREG( 0xDF35 )  /*  Test Signal at pin P1_4          */
```

For the CC2430 and CC2431 devices the OBSSEL registers are located within the Radio Register memory at the following addresses:

```
#define  OBSSEL3   XREG( 0xDF5E )  /*  Test Signal at pin P1_7          */
#define  OBSSEL2   XREG( 0xDF5D )  /*  Test Signal at pin P1_6          */
#define  OBSSEL1   XREG( 0xDF5C )  /*  Test Signal at pin P1_5          */
#define  OBSSEL0   XREG( 0xDF5B )  /*  Test Signal at pin P1_4          */
```

Note that these register can only be accessed through XDATA memory space. See datasheets [1][2][3][4] for more details.

Note that writing to the OBSSEL register overrides GPIO settings.

3.1 Interrupt Test Signals

OBSSEL setting	Observed Signal	Comment
1	IRQ – RFERR / IRQ – RFTXRX	RFERR for CC243x RFTXRX for CC111x and CC251x
2	IRQ – URX0IF	
3	IRQ – T1IF	
4	IRQ – T2IF	
5	IRQ – T3IF	
6	IRQ – T4IF	
7	IRQ – P0IF	
8	IRQ – DMAIF	
9	IRQ – ADCIF	
10	IRQ – URX1IF / I2SRXIF	I2SRXIF not valid for CC2430/CC2431
11	IRQ – ENCIF	
12	IRQ – RTCIF	
13	IRQ – RFIF	
14	IRQ – P2IF	
15	IRQ – UTX0IF	
16	IRQ – UTX1IF / I2STXIF	I2STXIF not valid for CC2430/CC2431
17	IRQ – P1IF	
18	IRQ – WDTIF	

Table 1. Interrupt Test signals

3.2 DMA Test Signals

OBSSEL setting	Observed Signal	Comment
96	DMA Trigger – T1 Channel 0	
97	DMA Trigger – T1 Channel 1	
98	DMA Trigger – T1 Channel 2	
99	DMA Trigger – T2 Compare	Only valid for CC243x
100	DMA Trigger – T2 Overflow	
101	DMA Trigger – T3 Channel 0	
102	DMA Trigger – T3 Channel 1	
103	DMA Trigger – T4 Channel 0	
104	DMA Trigger – T4 Channel 1	
105	DMA Trigger – Sleep Timer	Only valid for CC243x
106	DMA Trigger – Ioc 0	
107	DMA Trigger – Ioc 1	
108	DMA Trigger – Usart0 Rx	
109	DMA Trigger – Usart0 Tx	
110	DMA Trigger – Usart1 Rx	
111	DMA Trigger – Usart1 Tx	
112	DMA Trigger – Flash Prog	
113	DMA Trigger – Radio	
114	DMA Trigger – ADC CHALL	
115	DMA Trigger – ADC CH0	
116	DMA Trigger – ADC CH1	
117	DMA Trigger – ADC CH2	
118	DMA Trigger – ADC CH3	
119	DMA Trigger – ADC CH4	
120	DMA Trigger – ADC CH5	
121	DMA Trigger – ADC CH6 / I2STX	I2STX not valid for CC243x
122	DMA Trigger – ADC CH7 / I2SRX	I2SRX not valid for CC243x
123	DMA Trigger – Enc Up	
124	DMA Trigger – Enc Down	

Table 2. DMA Test signals

3.3 Oscillator Test signals

These signals will output the different oscillator signals. They should not be used to drive other devices and does not necessarily reflect the actual signal when it comes to duty-cycle.

OBSSEL setting	Observed Signal	Comment
37	OSCILLATOR – XOSC	26 MHz for CC1110 & CC2510 24 MHz for CC1111 & CC2511 32 MHz for CC2430 & CC2431
40	OSCILLATOR – 32kHz	Either internal RC or external
44	OSCILLATOR – HS RC	

Table 3. Oscillator Test signals

References

[1] Low-Power SoC with MCU, Memory, 2.4 GHz RF Transceiver, and USB Controller (CC251xFx.pdf)

[2] Low-Power SoC with MCU, Memory, Sub-1 GHz RF Transceiver, and USB Controller (CC111xFx.pdf)

[3] A True System-on-Chip solution for 2.4 GHz IEEE 802.15.4 / ZigBee (CC2430.pdf)

[4] A True System-on-Chip solution for 2.4 GHz IEEE 802.15.4 with Location Engine (CC2431.pdf)

4 General Information

4.1 Document History

Revision	Date	Description/Changes
SWRA241A	2008.12.11	Changed the title
SWRA241	2008.11.24	Initial release.