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ISPI160x
Low Power Consumption

May 2003

Application Note
Rev 1.0**Revision History:**

Version	Date	Description	Author
1.0	May 2003	First release.	Jason Ong

Note: ISPI160x denotes any Philips embedded USB Host Controller whose name starts with 'ISPI160'; this includes ISPI160, ISPI160/01 and any future derivatives.

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Note: ISPI I60x denotes any Philips embedded USB Host Controller whose name starts with 'ISPI I60'; this includes ISPI I60, ISPI I60/01 and any future derivatives.

1. Introduction

This application note explains how to achieve low current consumption in the ISPI I60x when it is in the suspend state.

2. Current consumption

The typical current consumption during the operational mode is approximately 50 mA. When the Host Controller is put into suspend, however, the current consumption drops to approximately 22 mA. To achieve typical current consumption in the range of microamperes, the following additional steps must be performed:

- Write a value of 0x2344 to the 0xBA register.
- Write a value of 0xA0 to the 0xB8 register followed by a value of 0x80.

An example of a simple C program for the ISPI I60x ISA evaluation kit would be:

```
#define com 0x296
#define data 0x294

void low_current(void)
{
    w32(0xba, 0x2344);
    w16(0xb8, 0xa0);
    w16(0xb8, 0x80);
}

void w16(unsigned char reg_no, unsigned int data2write)
{
    outport(com, reg_no);
    outport(data, data2write);
}

void w32(unsigned char reg_no, unsigned long data2write)
{
    unsigned int low_word;
    unsigned int hi_word;

    low_word=(data2write)&0x0000FFFF;
    hi_word=((data2write)&0xFFFF0000) >> 16;

    outport(com, reg_no);
    outport(data, low_word);
    outport(data, hi_word);
}
```

Table 2-1: Static characteristics of the ISPI160x

$V_{CC} = 3.0\text{ V to }3.6\text{ V or }4.0\text{ V to }5.5\text{ V}$; $V_{GND} = 0\text{ V}$; $T_{amb} = -40\text{ °C to }+85\text{ °C}$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC} = 5\text{ V}$						
$V_{REG(3V3)}$	internal regulator output	typical at $T_{amb} = 25\text{ °C}$	[1] 3.0	3.3	3.6	V
I_{CC}	operating supply current	typical at $T_{amb} = 25\text{ °C}$	-	47	-	mA
$I_{CC(susp)}$	suspend supply current	typical at $T_{amb} = 25\text{ °C}$	-	40	500	μA
$V_{CC} = 3.3\text{ V}$						
I_{CC}	operating supply current	typical at $T_{amb} = 25\text{ °C}$	-	50	-	mA
$I_{CC(susp)}$	suspend supply current	typical at $T_{amb} = 25\text{ °C}$	-	150	500	μA

[1] In the suspend mode, the minimum voltage is 2.7 V.

3. References

- *Universal Serial Bus Specification Rev. 2.0*
- *ISPI160 Embedded Universal Serial Bus Host Controller datasheet.*

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