

# AN10766

## Clock source switching on the fly

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Application note

### Document information

Info	Content
<b>Keywords</b>	LPC9351, clock, on the fly
<b>Abstract</b>	This application note describes the method of switching the clock sources on the fly for LPC9351.

## Revision history

Rev	Date	Description
01	20081202	Initial revision.

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## 1. Introduction

The P89LPC9351 can implement clock source switching 'on the fly' (while code is running) on any of the following sources: watchdog oscillator, 7/14MHz IRC oscillator, external crystal oscillator and external clock input. The CLKOK bit in the CLKCON register is read only and used to indicate the clock switch status. When CLKOK is '0', clock switch processing is not completed. When CLKOK is '1', clock switch is completed. When starting a new clock source switch, CLKOK is cleared automatically. Notice that when CLKOK is '0', writing to CLKCON register is not allowed. During reset, CLKCON register value comes from UCFG1 and UCFG2. The reset value of CLKCON.2 to CLKCON.0 come from UCFG1.2 to UCFG1.0 and the reset value of CLKDBL bit comes from UCFG2.7.

Please refer to the P89LPC9351 User manual (UM10308) for register description.

**Table 1. Clock control register (CLKCON - address FFDEh) bit allocation**

Bit	7	6	5	4	3	2	1	0
Symbol	CLKOK	-	-	XTALWD	CLKDBL	FOSC2	FOSC1	FOSC0
Reset	1	0	0	0	X	X	x	x

## 2. Environment

### 2.1 Hardware environment

The Keil MCB900 was used as the test board for this AN. There are 8 LEDs on the board that are used to indicate clock switching. The program is downloaded to on chip flash via ISP using Flash Magic software.

### 2.2 Software environment

Keil uVision3 (PK51 ver8.15) is the IDE and toolchain for the software.

## 3. Clock switch demo software

The demo software switches the clock source into the following sources: watchdog oscillator, 7/14MHz IRC oscillator, external crystal oscillator. Blinking LEDs on the board indicate that the clock switches to a certain source.

The source code for the clock switch demo software is listed below.

## 4. Appendix

```

1  /*-----
2  Clock.C - adapted for the P89LPC9351 and the Keil MCB900 Microcontroller Board
3  Demonstration for clock switching on the fly of LPC9351
4  Copyright NXP Semiconductors.
5  Rev.01, 2008 Sep 1st.
6  -----*/
7  #include <REG9351.H>           // register definition
8
9  void delay (unsigned int cnt)

```

```
10  {
11    while (--cnt);
12  }
13
14  void main()
15  {
16    unsigned char i;
17    P2M1 = 0;
18    P2 = CLKCON;
19    delay(50000);
20    delay(50000);
21    delay(50000);
22    delay(50000);
23
24    for(;;)
25    {
26      /* IRC Clock: 011 Internal RC oscillator, 7.373 MHz +/- 1 %. */
27      if (CLKCON & 0x80)
28      {
29        CLKCON = (CLKCON | 0x07) & 0xFB;
30        P2 = 0x0f;
31        delay(50000);
32      }
33
34      while((CLKCON & 0x80) == 0);
35
36      for (i = 0x01; i; i <<= 1)
37      {
38        P2 = i;                // simulate running lights
39        delay (50000);
40      }
41
42      /* Ext Osc Clock:
43       010 Low frequency crystal, 20 kHz to 100 kHz.
44       001 Medium frequency crystal or resonator, 100 kHz to 4 MHz.
45       000 High frequency crystal or resonator, 4 MHz to 18 MHz.*/
46      if (CLKCON & 0x80)
47      {
48        CLKCON &= 0xf7;
49        P2 = 0xf0;
50        delay(50000);
51      }
52
53      while((CLKCON & 0x80) == 0);
54
55      for (i = 0x01; i; i <<= 1)
56      {
57        P2 = i;                // simulate running lights
58        delay (50000);
59      }
60    }
```

```
61      /* Watch dog Clock: 100 Watchdog Oscillator, 400 kHz +/- 5%. */
62      if (CLKCON & 0x80)
63      {
64          CLKCON = (CLKCON | 0x04) & 0xFC;
65          P2 = 0xFF;
66          delay(50000);
67      }
68
69      while((CLKCON & 0x80) == 0);
70
71      for (i = 0x01; i; i <<= 1)
72      {
73          P2 = i;                // simulate running lights
74          delay (50000);
75      }
76  }
77 }
```

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