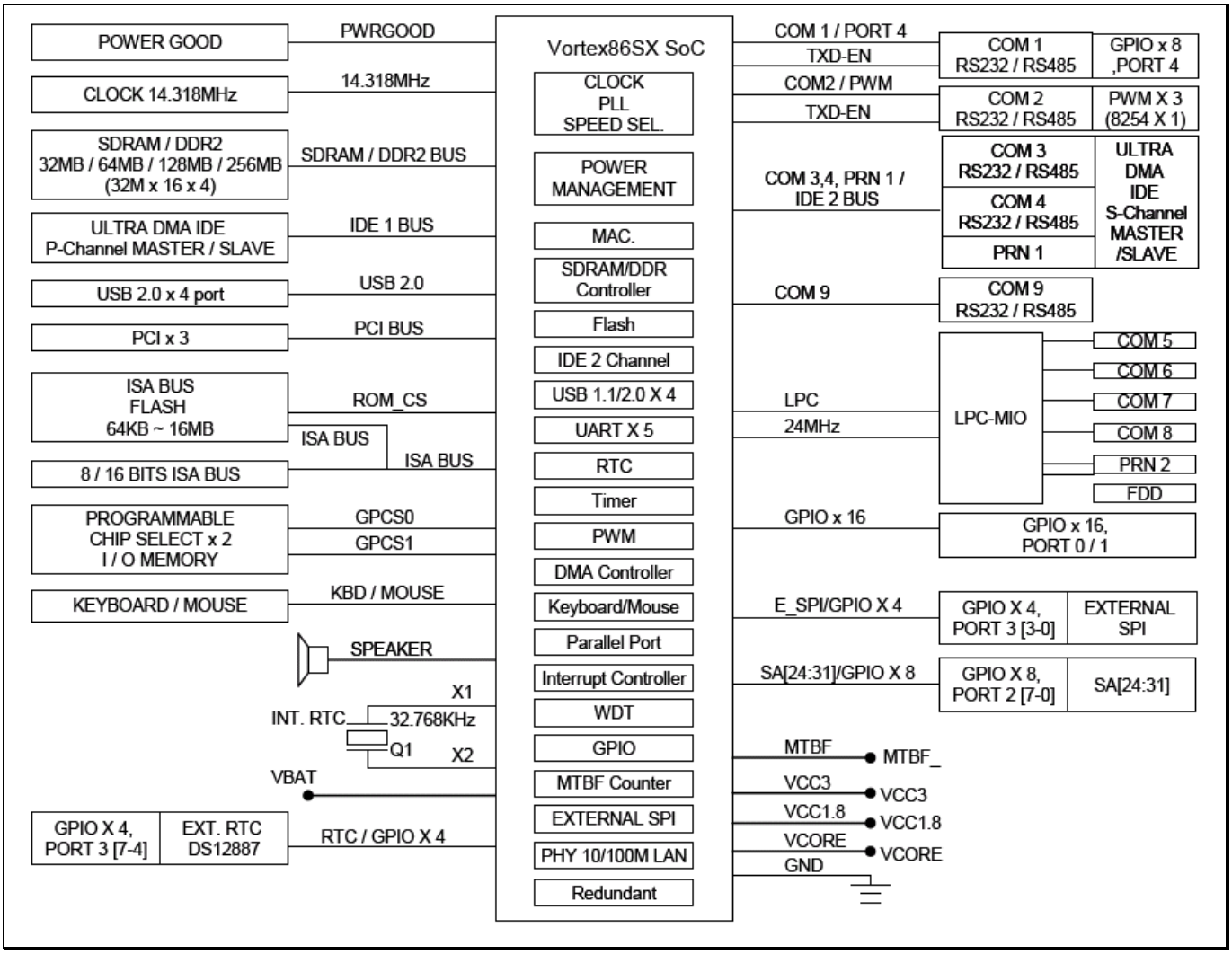
Using GPIO in Vortex86SX/DX SoC

2009-05-27

40 GPIO pins are provided by the Vortex86SX/DX for general usage in the system. All GPIO pins are independent and can be configured as inputs our outputs; when configured as outputs, pins have 8 mA drive capability and are unterminated; when configured as inputs, pins are pulled-high with a 75k ohm resistance. Refer to Vortex86SX functions block diagram:



GPIO port 0,1 and 2 are always free for use normally. If your system does not use external RTC and SPI, GPIO port 3 is also free for use. Developer also can disable COM1 to select GPIO port 4. The actual free GPIO pins depend on your system. Please check it before using GPIO.

Setup GPIO Direction

Here is GPIO direction and data registers:

	Port 0	Port 1	Port 2	Port 3	Port 4	Description
Data Register	78H	79H	7AH	7BH	7CH	
Direction Register	98H	99H	9AH	9BH	9CH	0: GPIO pin is input mode 1: GPIO pin is output mode

If send value 0FH to port 98H, it means that GPIO port0 [7-4] are input mode and port[3-0] are output mode.

If send value 00H to port 98H, it means that GPIO port0 [7-0] are input mode.

If send value FFH to port 98H, it means that GPIO port0 [7-0] are output mode.

If send value 03H to port 98H, it means that GPIO port0 [7-2] are input mode and port[1-0] are output mode.

DOS Example

```
#include <stdio.h>

void main(void)
{
  /* set GPIO port0[7-0] as input mode */
  outportb(0x98, 0x00);

  /* read data from GPIO port0 */
  inportb(0x78);

  /* set GPIO port1[7-0] as output mode */
  outportb(0x99, 0xff);

  /* write data to GPIO port1 */
  outportb(0x79, 0x55);

  /* set GPIO port2[7-4] as output and [3-0] as input*/
  outportb(0x9a, 0xf0);

  /* write data to GPIO port2[7-4], the low nibble (0x0a) will be ignored */
  outportb(0x7a, 0x5a);

  /* read data from port2[3-0] */
  unsigned char c = inportb(0x7a) & 0x0f;

  /*--- if GPIO port3 is free, those codes can work ---*/

  /* set GPIO port3[7-2] as output and [1-0] as input*/
  outportb(0x9b, 0xfc);

  /* write data to GPIO port2[7-2], the bit 1-0 will be ignored */
  outportb(0x7b, 0xa5);

  /* read data from port3[1-0] */
  unsigned char c = inportb(0x7b) & 0x03;

  /*--- if GPIO port4 is free, those codes can work ---*/
```

```
  /* set GPIO port4[7,5,3,1] as output and port4[6,4,2,0] as input*/
  outportb(0x9c, 0xaa);

  /* write data to GPIO port4[7,5,3,1], the bit 6,4,2 and0 will be ignored */
  outportb(0x7c, 0xff);

  /* read data from port4[6,4,2,0] */
  unsigned char c = inportb(0x7c) & 0xaa;
}
```

Linux Example

```
#include <stdio.h>

#include <stdio.h>
#include <sys/io.h>
#define  outportb(a,b) outb(b,a)
#define  inportb(a)    inb(a)

void main(void)
{
  iopl(3);

  /* set GPIO port0[7-0] as input mode */
  outportb(0x98, 0x00);

  /* read data from GPIO port0 */
  inportb(0x78);

  /* set GPIO port1[7-0] as output mode */
  outportb(0x99, 0xff);

  /* write data to GPIO port1 */
  outportb(0x79, 0x55);

  /* set GPIO port2[7-4] as output and [3-0] as input*/
  outportb(0x9a, 0xf0);

  /* write data to GPIO port2[7-4], the low nibble (0x0a) will be ignored */
  outportb(0x7a, 0x5a);

  /* read data from port2[3-0] */
  unsigned char c = inportb(0x7a) & 0x0f;

  /*--- if GPIO port3 is free, those codes can work ---*/

  /* set GPIO port3[7-2] as output and [1-0] as input*/
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  unsigned char c = inportb(0x7b) & 0x03;

  /*--- if GPIO port4 is free, those codes can work ---*/

  /* set GPIO port4[7,5,3,1] as output and port4[6,4,2,0] as input*/
```

```
  outportb(0x9c, 0xaa);

  /* write data to GPIO port4[7,5,3,1], the bit 6,4,2 and0 will be ignored */
  outportb(0x7c, 0xff);

  /* read data from port4[6,4,2,0] */
  unsigned char c = inportb(0x7c) & 0xaa;
}
```

Windows CE Example

```
#include "stdafx.h"

unsigned char inportb(int addr)
{
  __asm
  {
    push edx
    mov edx, DWORD PTR addr
    in al, dx
    and eax, 0xff
    pop edx
  }
}

void outportb(int addr, unsigned char val)
{
  __asm
  {
    push edx
    mov edx, DWORD PTR addr
    mov al, BYTE PTR val
    out dx, al
    pop edx
  }
}

void main(void)
{
  /* set GPIO port0[7-0] as input mode */
  outportb(0x98, 0x00);

  /* read data from GPIO port0 */
  inportb(0x78);

  /* set GPIO port1[7-0] as output mode */
  outportb(0x99, 0xff);

  /* write data to GPIO port1 */
  outportb(0x79, 0x55);

  /* set GPIO port2[7-4] as output and [3-0] as input*/
  outportb(0x9a, 0xf0);

  /* write data to GPIO port2[7-4], the low nibble (0x0a) will be ignored */
  outportb(0x7a, 0x5a);

  /* read data from port2[3-0] */
```

```
  unsigned char c = inportb(0x7a) & 0x0f;

  /*--- if GPIO port3 is free, those codes can work ---*/

  /* set GPIO port3[7-2] as output and [1-0] as input*/
  outportb(0x9b, 0xfc);

  /* write data to GPIO port2[7-2], the bit 1-0 will be ignored */
  outportb(0x7b, 0xa5);

  /* read data from port3[1-0] */
  unsigned char c = inportb(0x7b) & 0x03;

  /*--- if GPIO port4 is free, those codes can work ---*/

  /* set GPIO port4[7,5,3,1] as output and port4[6,4,2,0] as input*/
  outportb(0x9c, 0xaa);

  /* write data to GPIO port4[7,5,3,1], the bit 6,4,2 and0 will be ignored */
  outportb(0x7c, 0xff);

  /* read data from port4[6,4,2,0] */
  unsigned char c = inportb(0x7c) & 0xaa;
}
```

Technical Support

For more technical support, please visit http://www.dmp.com.tw/tech or mail to tech@dmp.com.tw.