

범용 입출력 포트

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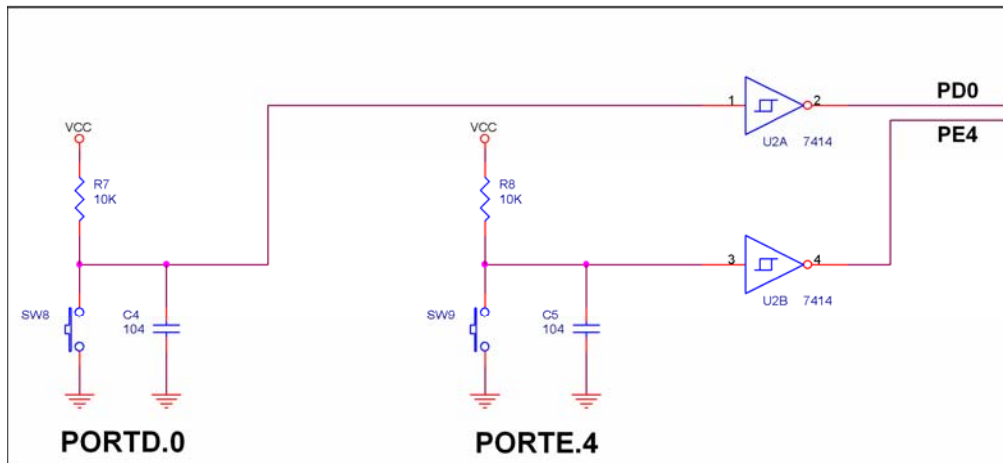
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LED 점등

- LED 1,3 과 2,4 를 500msec 간격으로 교대로 점멸하는 프로그램을 작성하라
- PB7 | PB6 | PB5 | PB4
- 1 | 2 | 3 | 4 번 LED

스위치 입력을 받아 LED on-off

- 키를 눌렀다 떼는 순간 LED On 과 Off 토글
- PD0: 스위치 입력
- PB0: LED 출력



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프로그램 구조

```
#include <***.h>
#define *****
```

Define Functions

```
int main(void)
{
}
}
```

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Delay Functions

```
void delay_us(unsigned char time_us)          /* time delay for us */
{ register unsigned char i;

  for(i = 0; i < time_us; i++)              // 4 cycle +
  { asm volatile(" PUSH R0 ");              // 2 cycle + R0: temporary register
    asm volatile(" POP  R0 ");              // 2 cycle +
    asm volatile(" PUSH R0 ");              // 2 cycle +
    asm volatile(" POP  R0 ");              // 2 cycle +
    asm volatile(" PUSH R0 ");              // 2 cycle +
    asm volatile(" POP  R0 ");              // 2 cycle = 16 cycle = 1 us for 16MHz
  }
}

void delay_ms(unsigned int time_ms)          /* time delay for ms */
{ register unsigned int i;

  for(i = 0; i < time_ms; i++)
  { delay_us(250);
    delay_us(250);
    delay_us(250);
    delay_us(250);
  }
}
```