FAQ0099
Frequently Asked Questions

How to wake up AT32F421 from standby mode?

Questions:
How to wake up AT32F421 from Standby mode?

Answer:
AT32F421 series can be woken up from Standby mode through the rising edge on the WKUPx pin, the rising edge on the ERTC alarm event, external reset on NRST pin or IWDG reset.

1. For ERTC alarm event wakeup, please refer to the example code located under the *Project\AT_START_F421\Examples\PWR\STANDBY* directory.

```
int main(void)
{
  __IO uint32_t index = 0;
  /* congfig the system clock */
  system_clock_config();
  /* init at start board */
  at32_board_init();
  /* config priority group */
  nvic_priority_group_config(NVIC_PRIORITY_GROUP_4);
  /* turn on the led light */
  at32_led_off(LED2);
  at32_led_off(LED3);
  at32_led_off(LED4);
  /* enable pwc and bpr clock */
  crm_periph_clock_enable(CRM_PWC_PERIPH_CLOCK, TRUE);
  if(pwc_flag_get(PWC_STANDBY_FLAG) != RESET)
  {
    /* wakeup from standby */
    pwc_flag_clear(PWC_STANDBY_FLAG);
    at32_led_on(LED2);
  }
  if(pwc_flag_get(PWC_WAKEUP_FLAG) != RESET)
  {
    /* wakeup event occurs */
    pwc_flag_clear(PWC_WAKEUP_FLAG);
    at32_led_on(LED3);
  }
  delay_sec(1);
  /* config ertc */
  ertc_config();
```

```
    at32_led_on(LED4);
    ertc_alarm_config();
    delay_sec(1);
    ertc_alarm_value_set(3);
    /* enter standby mode */
    pwc_standby_mode_enter();
    while(1)
    {
    }
}
```

2. For IWDG wakeup event, please refer to demo located under the *Project\AT_START_F421\Examples\IWDG\IWDG_Standby* directory.

```
int main(void)
{
    system_clock_config();
    at32_board_init();
    /* enable the pwc clock */
    crm_periph_clock_enable(CRM_PWC_PERIPH_CLOCK, TRUE);
    if(crm_flag_get(CRM_WDT_RESET_FLAG) != RESET)
    {
      /* reset from wdt */
      crm_flag_clear(CRM_WDT_RESET_FLAG);
      at32_led_on(LED4);
    }
    else
    {
      /* reset from other mode */
      at32_led_off(LED4);
    }
    delay_ms(100);
    /* disable register write protection */
    wdt_register_write_enable(TRUE);
    /* set the wdt divider value */
    wdt_divider_set(WDT_CLK_DIV_4);
    /* set reload value
    timeout = reload_value * (divider / lick_freq )       (s)
    lick_freq       = 40000 Hz
    divider          = 4
    reload_value = 3000
    timeout = 3000 * (4 / 40000 ) = 0.3s = 300ms
    */
    wdt_reload_value_set(3000 - 1);
    /* enable wdt */
    wdt_enable();
    /* enter standby mode */
```

```
    pwc_standby_mode_enter();
    while(1)
    {
    }
}
```

3. AT32F421 series can be woken up through the following WKUP PINs:

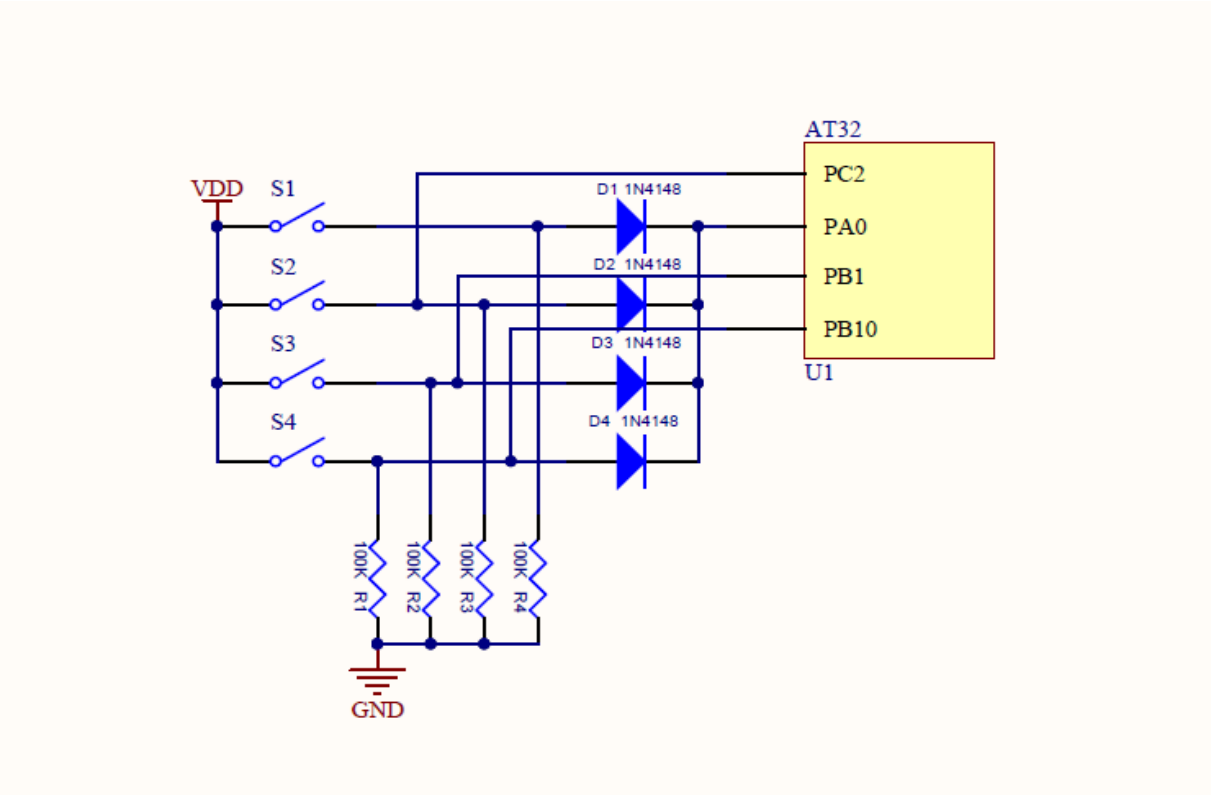
WKUP1	PA0
WKUP2	PC13
WKUP6	PB5
WKUP7	PB15

For more information, refer to the demo under the *project\at_start_f421\examples\pwc\standby_wakeup_pin*

```
    int main(void)
{
    __IO uint32_t index = 0;
    /* congfig the system clock */
    system_clock_config();
    /* init at start board */
    at32_board_init();
    /* config priority group */
    nvic_priority_group_config(NVIC_PRIORITY_GROUP_4);
    /* turn on the led light */
    at32_led_off(LED2);
    at32_led_off(LED3);
    at32_led_off(LED4);
    /* enable pwc clock */
    crm_periph_clock_enable(CRM_PWC_PERIPH_CLOCK, TRUE);
    if(pwc_flag_get(PWC_STANDBY_FLAG) != RESET)
    {
      /* wakeup from standby */
      pwc_flag_clear(PWC_STANDBY_FLAG);
      at32_led_on(LED2);
    }
    if(pwc_flag_get(PWC_WAKEUP_FLAG) != RESET)
    {
      /* wakeup event occurs */
      pwc_flag_clear(PWC_WAKEUP_FLAG);
      at32_led_on(LED3);
    }
    at32_led_on(LED4);
    for(index = 0; index < 0xFFFFFF; index++);
    /* enable wakeup pin1(pa0), pin2(pc13), pin6(pb5), pin7(pb15)    */
    pwc_wakeup_pin_enable(PWC_WAKEUP_PIN_1 | PWC_WAKEUP_PIN_2 | PWC_WAKEUP_PIN_6 |
PWC_WAKEUP_PIN_7, TRUE);
    /* enter standby mode */
    pwc_standby_mode_enter();
```

```
    while(1)
    {
    }
}
```

4. Additionally, AT32F421 can be woken through other pins, such as PC2, PB1 and PB10, with the circuit shown below:



Type: MCU

Applicable products: AT32F421

Main function: PWC

Minor function: WDT, GPIO

Document revision history

Date	Revision	Changes
2022.2.24	2.0.0	Initial release