Ameba-Z SDK change

Outline

- Ameba-Z Platform
- Memory Layout
- Pin Name
- MBED API
- Raw API
- Pinmap configuration
- Sleep configuration

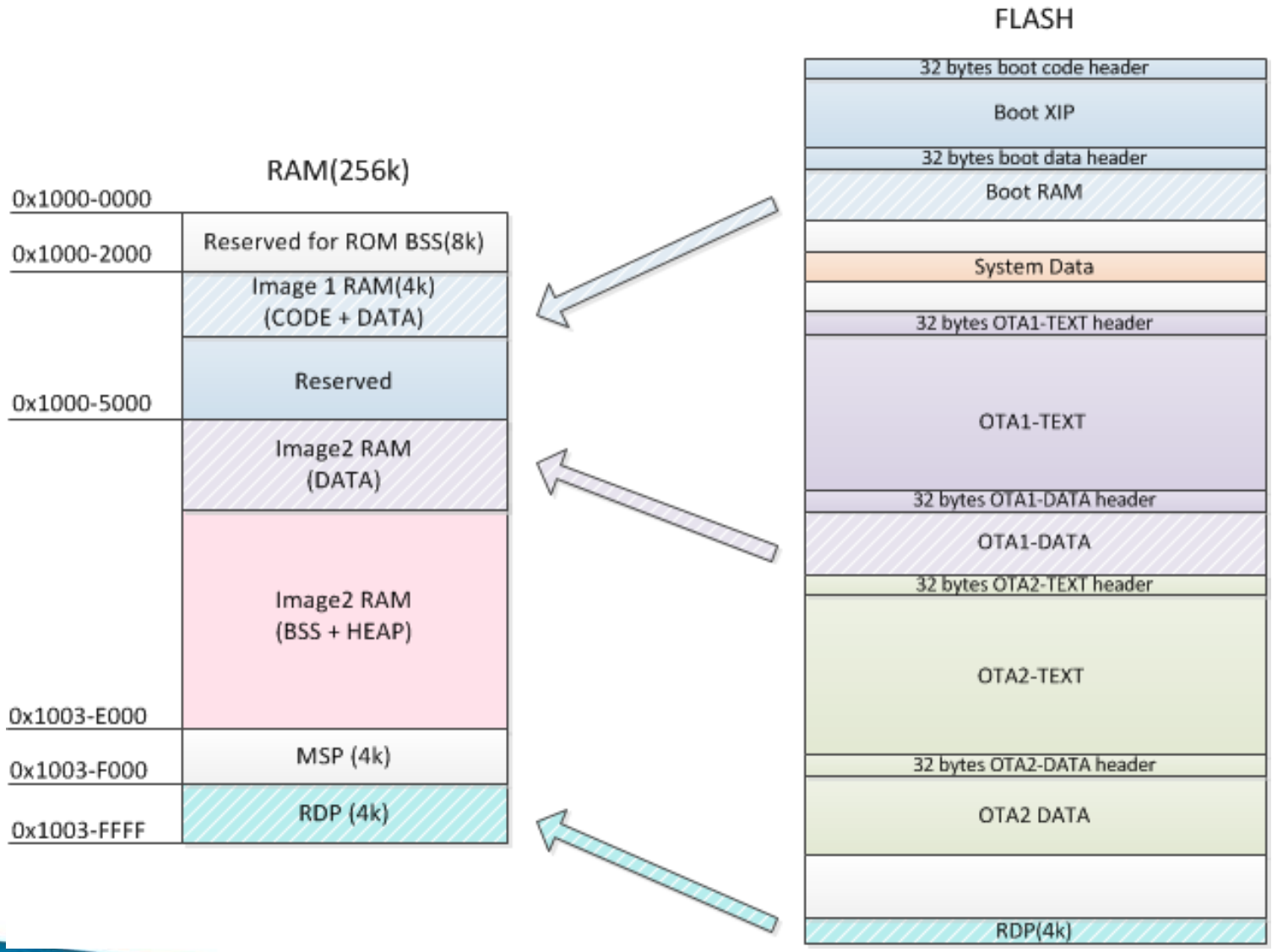
Platform (UM0110)

Platform

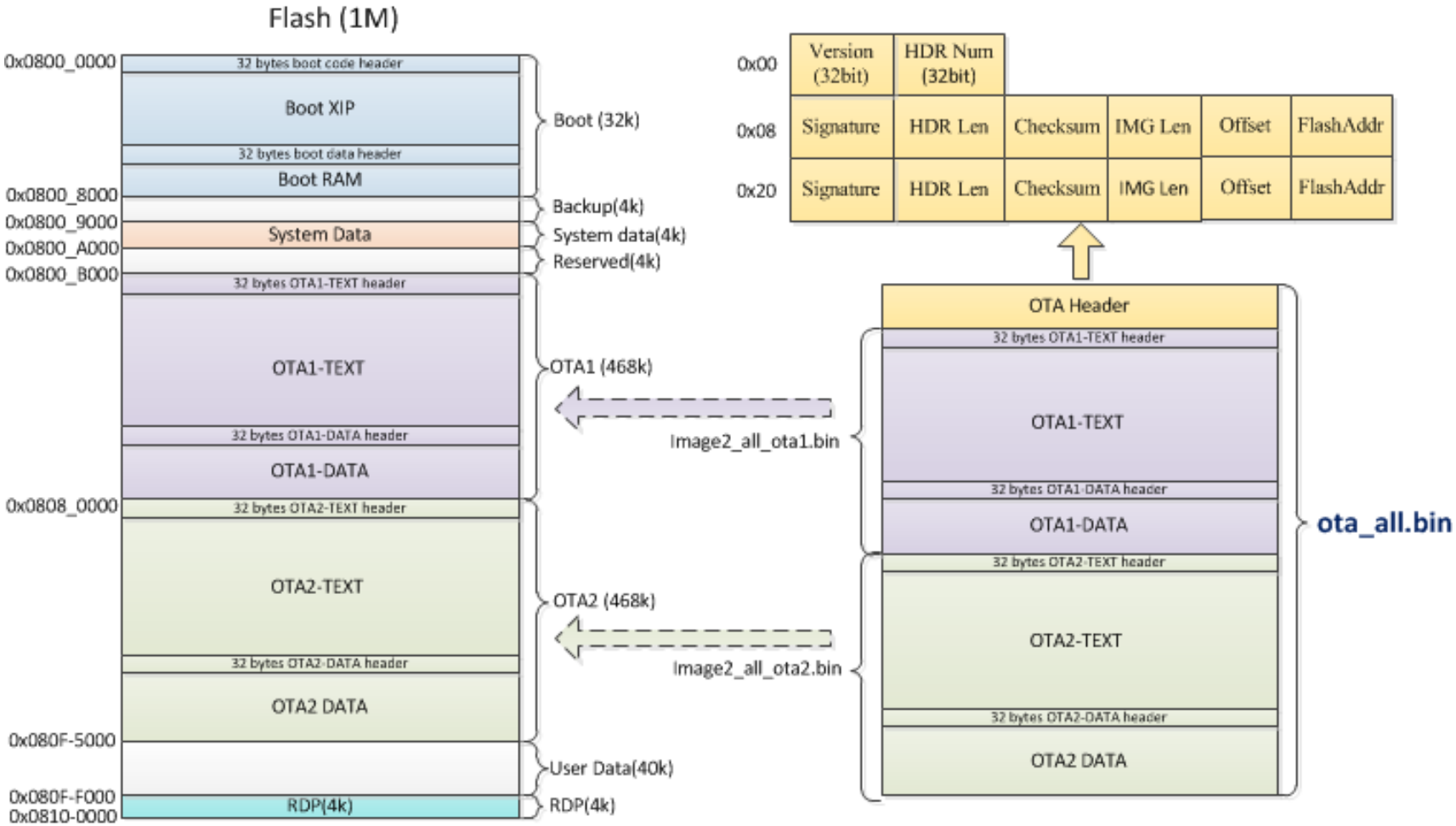
Feature list		QFN68	QFN48	QFN32
Integrated core	Core type	ARM CM4F		
	Core clock maximum freq.	125MHz		
Memory	Internal ROM	512KB		
	Internal SRAM	256KB		
	External FLASH	128MB		
JTAG/SWD		SWD		
FPU	Float process unit	Yes		
XIP	Execute in place	Yes		
FPB	Flash patch breakpoint	Yes		
Backup register	Backup register for power save	16B		
Boot Reason	Reset reason	Yes		
F/W protection		Yes		
Read protection	RAM read protection	4KB		
WIFI	802.11 B/G/N	Yes		
External 32K	External 32K	1		
Dsleep wakepin	Deep sleep wake pin	4		

Memory Layout (UM0111)

Memory Layout



OTA Mechanism



Pin Name

Pin Name

```
typedef enum {
    PA_0  = (PORT_A<<4|0),
    PA_1  = (PORT_A<<4|1),
    PA_2  = (PORT_A<<4|2),
    PA_3  = (PORT_A<<4|3),
    PA_4  = (PORT_A<<4|4),
    PA_5  = (PORT_A<<4|5),
    PA_6  = (PORT_A<<4|6),
    PA_7  = (PORT_A<<4|7),

    PB_0  = (PORT_B<<4|0),
    PB_1  = (PORT_B<<4|1),
    PB_2  = (PORT_B<<4|2),
    PB_3  = (PORT_B<<4|3),
    PB_4  = (PORT_B<<4|4),
    PB_5  = (PORT_B<<4|5),
    PB_6  = (PORT_B<<4|6),
    PB_7  = (PORT_B<<4|7),

    PC_0  = (PORT_C<<4|0),
    PC_1  = (PORT_C<<4|1),
    PC_2  = (PORT_C<<4|2),
    PC_3  = (PORT_C<<4|3),
    PC_4  = (PORT_C<<4|4),
    PC_5  = (PORT_C<<4|5),
    PC_6  = (PORT_C<<4|6),
    PC_7  = (PORT_C<<4|7),
    PC_8  = (PORT_C<<4|8),
    PC_9  = (PORT_C<<4|9),

    PD_0  = (PORT_D<<4|0),
    PD_1  = (PORT_D<<4|1),
    PD_2  = (PORT_D<<4|2),
    PD_3  = (PORT_D<<4|3),
    PD_4  = (PORT_D<<4|4),
    PD_5  = (PORT_D<<4|5),
    PD_6  = (PORT_D<<4|6),
    PD_7  = (PORT_D<<4|7),
    PD_8  = (PORT_D<<4|8),
    PD_9  = (PORT_D<<4|9),

    PE_0  = (PORT_E<<4|0),
    PE_1  = (PORT_E<<4|1),
    PE_2  = (PORT_E<<4|2),
    PE_3  = (PORT_E<<4|3),
    PE_4  = (PORT_E<<4|4),
    PE_5  = (PORT_E<<4|5),
    PE_6  = (PORT_E<<4|6),
    PE_7  = (PORT_E<<4|7),
    PE_8  = (PORT_E<<4|8),
    PE_9  = (PORT_E<<4|9),
    PE_A  = (PORT_E<<4|10),

    PF_0  = (PORT_F<<4|0),
    PF_1  = (PORT_F<<4|1),
    PF_2  = (PORT_F<<4|2),
    PF_3  = (PORT_F<<4|3),
    PF_4  = (PORT_F<<4|4),
    PF_5  = (PORT_F<<4|5),

    PG_0  = (PORT_G<<4|0),
    PG_1  = (PORT_G<<4|1),
    PG_2  = (PORT_G<<4|2),
    PG_3  = (PORT_G<<4|3),
    PG_4  = (PORT_G<<4|4),
    PG_5  = (PORT_G<<4|5),
    PG_6  = (PORT_G<<4|6),
    PG_7  = (PORT_G<<4|7),

    PH_0  = (PORT_H<<4|0),
    PH_1  = (PORT_H<<4|1),
    PH_2  = (PORT_H<<4|2),
    PH_3  = (PORT_H<<4|3),
    PH_4  = (PORT_H<<4|4),
    PH_5  = (PORT_H<<4|5),
    PH_6  = (PORT_H<<4|6),
    PH_7  = (PORT_H<<4|7),

    PI_0  = (PORT_I<<4|0),
    PI_1  = (PORT_I<<4|1),
    PI_2  = (PORT_I<<4|2),
    PI_3  = (PORT_I<<4|3),
    PI_4  = (PORT_I<<4|4),
    PI_5  = (PORT_I<<4|5),
    PI_6  = (PORT_I<<4|6),
    PI_7  = (PORT_I<<4|7),

    PJ_0  = (PORT_J<<4|0),
    PJ_1  = (PORT_J<<4|1),
    PJ_2  = (PORT_J<<4|2),
    PJ_3  = (PORT_J<<4|3),
    PJ_4  = (PORT_J<<4|4),
    PJ_5  = (PORT_J<<4|5),
    PJ_6  = (PORT_J<<4|6),

    PK_0  = (PORT_K<<4|0),
    PK_1  = (PORT_K<<4|1),
    PK_2  = (PORT_K<<4|2),
    PK_3  = (PORT_K<<4|3),
    PK_4  = (PORT_K<<4|4),
    PK_5  = (PORT_K<<4|5),
    PK_6  = (PORT_K<<4|6),
```

```
/* (((port)<<5)|(pin)) */
typedef enum {
    PA_0  = (PORT_A<<5|0),
    PA_1  = (PORT_A<<5|1),
    PA_2  = (PORT_A<<5|2),
    PA_3  = (PORT_A<<5|3),
    PA_4  = (PORT_A<<5|4),
    PA_5  = (PORT_A<<5|5),
    PA_6  = (PORT_A<<5|6),
    PA_7  = (PORT_A<<5|7),
    PA_8  = (PORT_A<<5|8),
    PA_9  = (PORT_A<<5|9),
    PA_10 = (PORT_A<<5|10),
    PA_11 = (PORT_A<<5|11),
    PA_12 = (PORT_A<<5|12),
    PA_13 = (PORT_A<<5|13),
    PA_14 = (PORT_A<<5|14),
    PA_15 = (PORT_A<<5|15),
    PA_16 = (PORT_A<<5|16),
    PA_17 = (PORT_A<<5|17),
    PA_18 = (PORT_A<<5|18),
    PA_19 = (PORT_A<<5|19),
    PA_20 = (PORT_A<<5|20),
    PA_21 = (PORT_A<<5|21),
    PA_22 = (PORT_A<<5|22),
    PA_23 = (PORT_A<<5|23),
    PA_24 = (PORT_A<<5|24),
    PA_25 = (PORT_A<<5|25),
    PA_26 = (PORT_A<<5|26),
    PA_27 = (PORT_A<<5|27),
    PA_28 = (PORT_A<<5|28),
    PA_29 = (PORT_A<<5|29),
    PA_30 = (PORT_A<<5|30),
    PA_31 = (PORT_A<<5|31),

    PB_0  = (PORT_B<<5|0),
    PB_1  = (PORT_B<<5|1),
    PB_2  = (PORT_B<<5|2),
    PB_3  = (PORT_B<<5|3),
    PB_4  = (PORT_B<<5|4),
    PB_5  = (PORT_B<<5|5),
    PB_6  = (PORT_B<<5|6),
    PB_7  = (PORT_B<<5|7),
    PB_8  = (PORT_B<<5|8),

    // Not connected
    NC = (uint32_t)0xFFFFFFFF
} ? end PinName ?  PinName;
```

Mbed API (UM0118)

Mbed API

function	change	add	delete	comment
GPIO	N	N	N	
GPIO IRQ	N	N	N	
GPIO PORT	Y	N	N	
UART	N	N	N	
LOGUART	N/A	N/A	Y	LOGUART=NOMAL UART
I2C	N	Y	N	Add API
I2S	Y	N	N	Add input parameters
SPI	Y	N	Y	Add obj parameter
PWM	N	N	N	
Gtimer	N	N	N	
GDMA	N	N	Y	Not support aggregation copy
Flash	N	N	N	
ADC	N	N	N	
RTC	N	Y	N	Add alarm

GPIO

- API change
  - Ameba-Z pin name is mapping to GPIO directly
  - pin_def is not needed

```
1 struct port_s {
2         PortName port;
3         uint32_t mask;
4         uint8_t *pin_def;
5 };
```

```
1 struct port_s {
2         PortName port;
3         uint32_t mask;
4 };
```

- Example:

```
1  void main(void)
2  {
3          int i;
4          unsigned int pin_mask;
5
6          port0.pin_def = My_Port_Def;
7          pin_mask = 0xFF;     // each bit map to 1 pin: 0: pin
8          port_init(&port0, PortA, pin_mask, PIN_OUTPUT);
9          port_mode(&port0, PullNone);
10
11         while(1){
12                 for (i=0;i<LED_PATTERN_NUM;i++) {
13                         port_write(&port0, led_pattern[i]);
14                         wait_ms(200);
15                 }
16         }
17 }
```

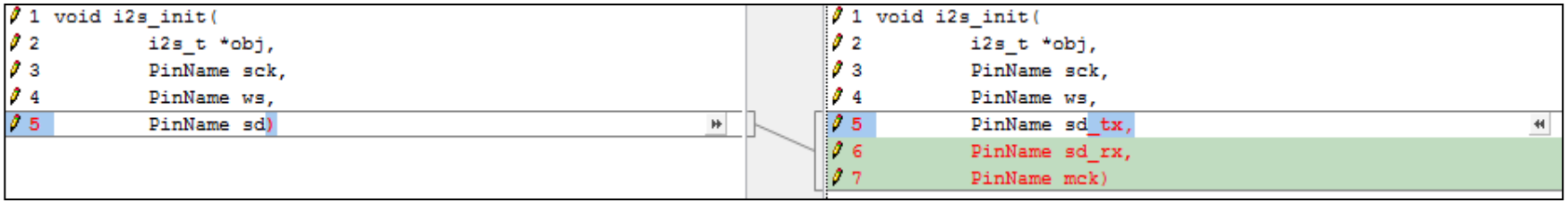
```
1  void main(void)
2  {
3          int i;
4          unsigned int pin_mask;
5
6          pin_mask = 0xFF;     // each bit map to 1 pin: 0: pin
7          port_init(&port0, PortA, pin_mask, PIN_OUTPUT);
8          port_mode(&port0, PullNone);
9
10         while(1){
11                 for (i=0;i<LED_PATTERN_NUM;i++) {
12                         port_write(&port0, led_pattern[i]);
13                         wait_ms(200);
14                 }
15         }
16 }
```

I2C

- API add

```
/**
  * @brief  I2C master send data and read data in poll mode.
  * @param  obj: i2c object define in application software.
  * @param  address: slave address which will be transmitted.
  * @param  pWriteBuf: point to the data to be sent.
  * @param  Writelen: the length of data that to be sent.
  * @param  pReadBuf: point to the buffer to hold the received data.
  * @param  Readlen: the length of data that to be received.
  * @retval the length of data received.
  */
int i2c_repeatread(i2c_t *obj, int address, char *pWriteBuf, int Writelen, char *pReadBuf, int Readlen)
{
    if (i2c_target_addr[obj->i2c_idx] != address) {
        /* Deinit I2C first */
        i2c_reset(obj);

        /* Load the user defined I2C target slave address */
        i2c_target_addr[obj->i2c_idx] = address;
        I2CInitDat[obj->i2c_idx].I2CAckAddr = address;

        /* Init I2C now */
        I2C_Init(obj->I2Cx, &I2CInitDat[obj->i2c_idx]);
        I2C_Cmd(obj->I2Cx, ENABLE);
    }
    I2C_MasterRepeatRead(obj->I2Cx, pWriteBuf, Writelen, pReadBuf, Readlen);

    return Readlen;
}
```

I2S



```
1 void i2s_init(
2         i2s_t *obj,
3         PinName sck,
4         PinName ws,
5         PinName sd)
```

```
1 void i2s_init(
2         i2s_t *obj,
3         PinName sck,
4         PinName ws,
5         PinName sd_tx,
6         PinName sd_rx,
7         PinName mck)
```

- i2s_init include 5 I2S pins:
  - PinName sck
  - PinName ws
  - PinName sd_tx
  - PinName sd_rx
  - PinName mck

SPI

```
struct spi_s {
    /* user variables */
    uint32_t spi_idx;

    /* internal variables */
    uint32_t irq_handler;
    uint32_t irq_id;
    uint32_t state;
    uint8_t  sclk;
    uint32_t bus_tx_done_handler;
    uint32_t bus_tx_done_irq_id;
};
```

```
spi_master.spi_idx=MBED_SPI1;
spi_init(&spi_master, SPI1_MOSI, SPI1_MISO, SPI1_SCLK, SPI1_CS);
spi_format(&spi_master, 8, 0, 0);
spi_frequency(&spi_master, 200000);

spi_slave.spi_idx=MBED_SPI0;
spi_init(&spi_slave, SPI0_MOSI, SPI0_MISO, SPI0_SCLK, SPI0_CS);
spi_format(&spi_slave, 8, 0, 1);
```

- API change
  - spi_idx should be set before spi_init, assert will happen if you forgot
- API delete
  - void spi_slave_select_bypin(spi_t *obj, PinName pinname)

GDMA

- API delete
  - dma_memcpy_aggr_init: not support
  - dma_memory_aggr: not support

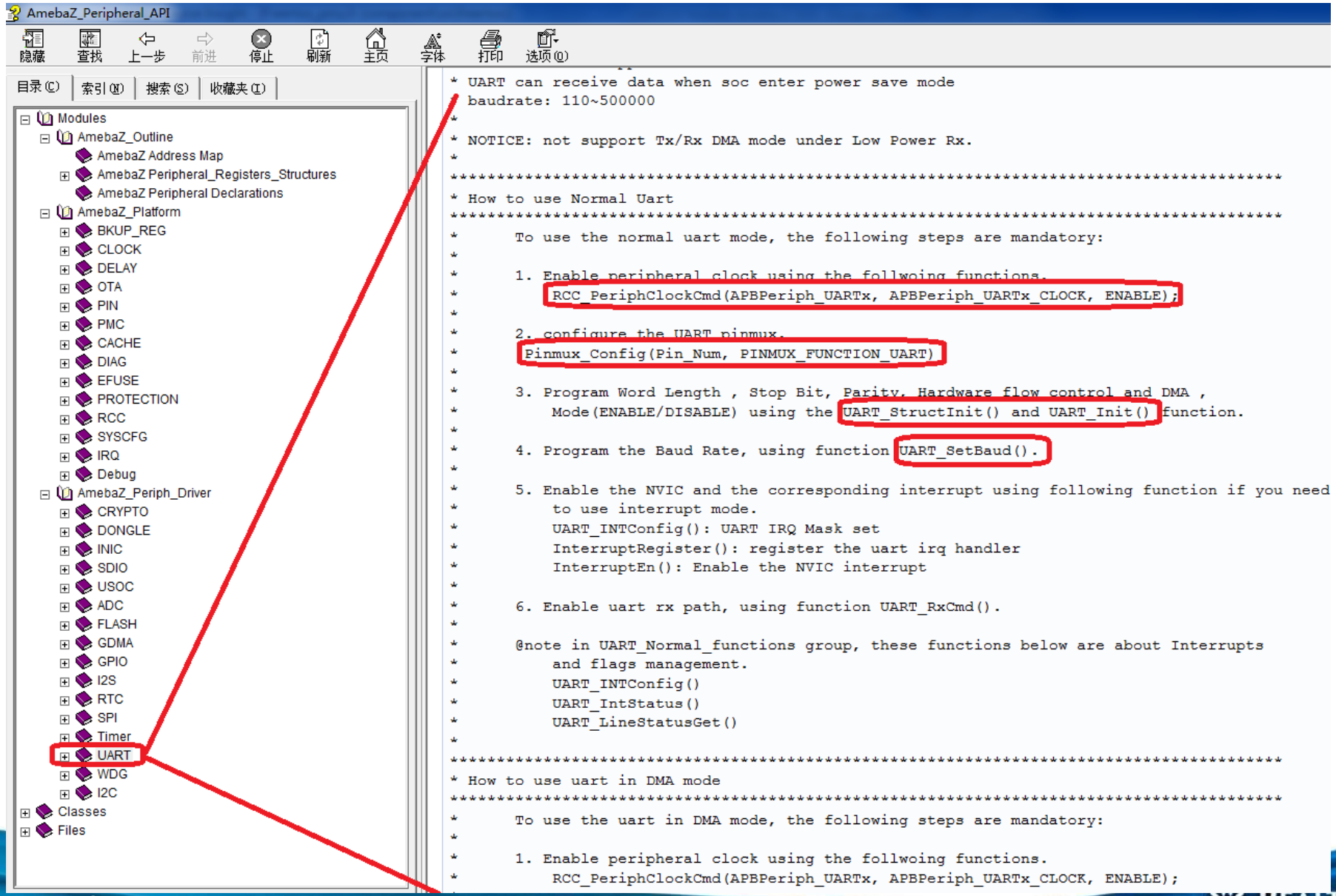
RTC

- API Add
  - u32 rtc_set_alarm(alarm_t *alrm, alarm_irq_handler alarmHandler);
  - void rtc_disable_alarm(void);

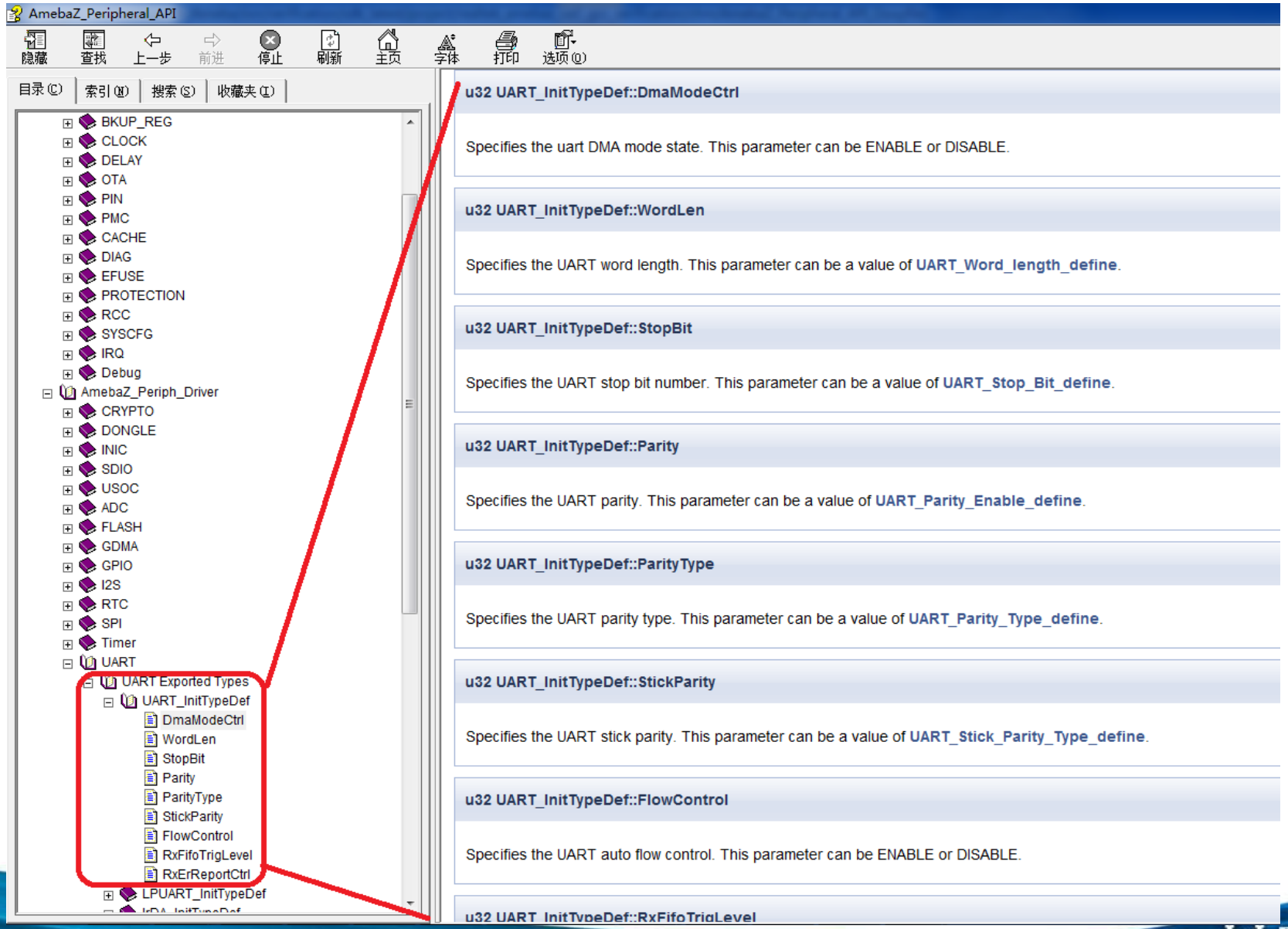
```
typedef void (*alarm_irq_handler)(void);

struct alarm_s {
	uint32_t yday;//which day of the year
	uint32_t hour;
	uint32_t min;
	uint32_t sec;
};

typedef struct alarm_s alarm_t;
```

RAW API (UM0117)

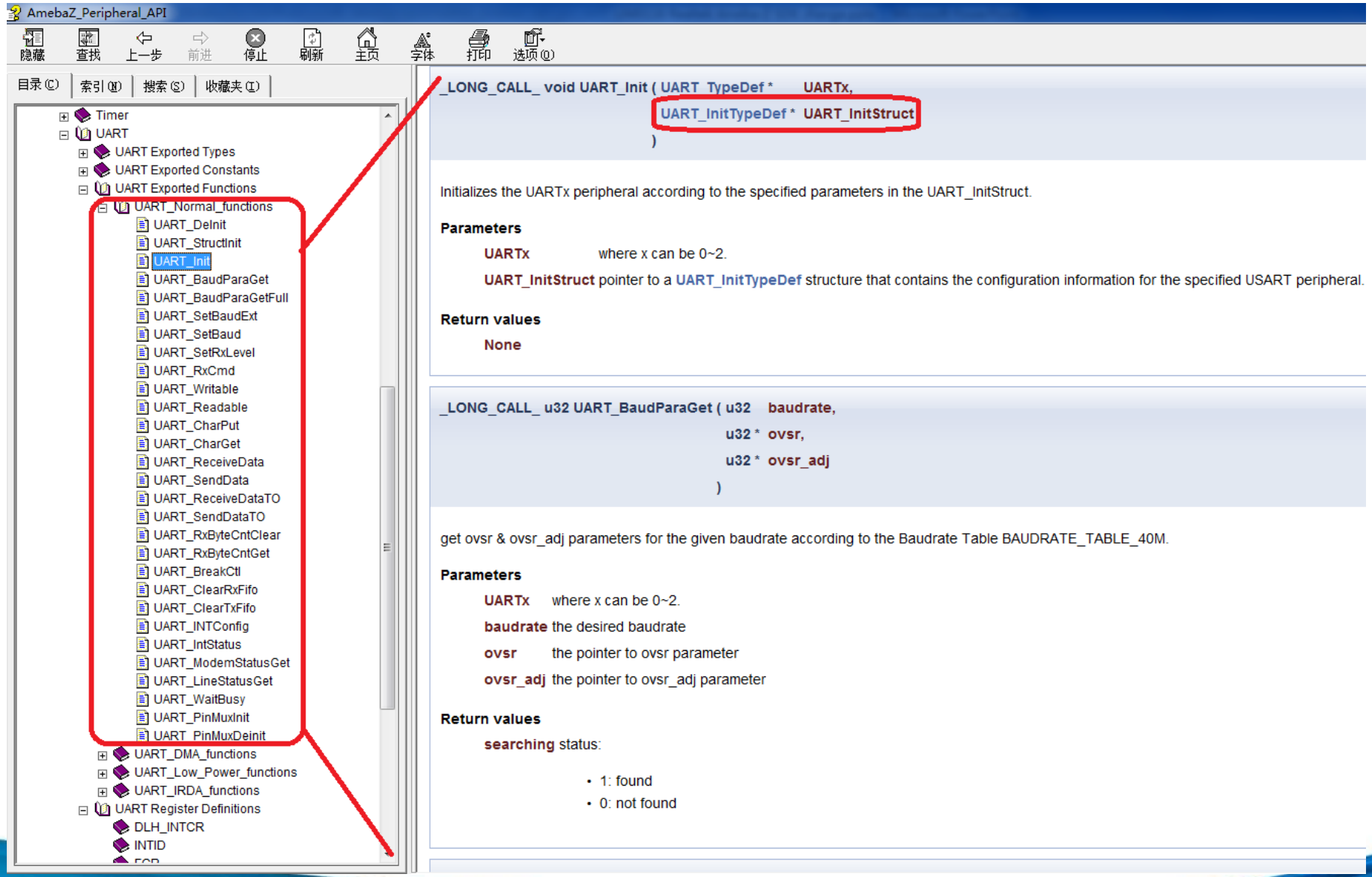
UART



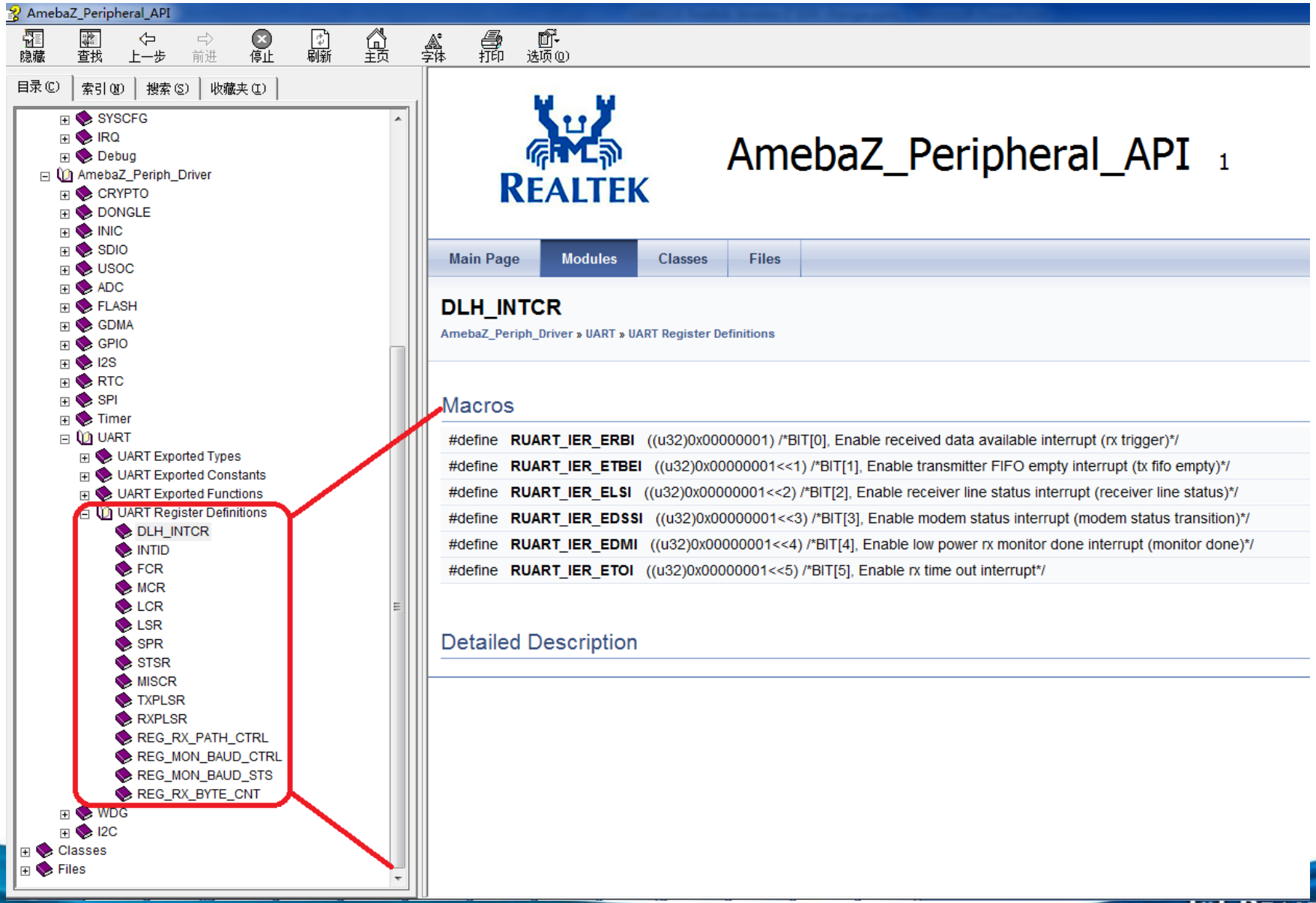
XXX_InitTypeDef



XXX_functions



XXX_registers



Pin Map

Pin Map (Ref: UM0120)

```
const PMAP_TypeDef pmap_func[]=
{
//   Pin Name      Func Select              Func PU/PD              Slp PU/PD              DrvStrenth
     {_PA_14,      PINMUX_FUNCTION_SWD,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SWD_CLK
     {_PA_15,      PINMUX_FUNCTION_SWD,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SWD_DATA
     {_PA_13,      PINMUX_FUNCTION_PWM,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //PWM4
     {_PA_0,       PINMUX_FUNCTION_PWM,     GPIO_PuPd_NOPULL,       GPIO_PuPd_DOWN,    PAD_DRV_STRENGTH_0}, //PWM2
     {_PA_16,      PINMUX_FUNCTION_PWM,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //PWM1
     {_PA_17,      PINMUX_FUNCTION_PWM,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //PWM2
     {_PA_25,      PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART1_RXD
     {_PA_26,      PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART1_TXD
     {_PA_28,      PINMUX_FUNCTION_I2C,     GPIO_PuPd_UP,           GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2C1_SCL
     {_PA_27,      PINMUX_FUNCTION_I2C,     GPIO_PuPd_UP,           GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2C1_SDA
     {_PA_12,      PINMUX_FUNCTION_PWM,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //PWM3
     {_PA_4,       PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART0_TXD
     {_PA_1,       PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART0_RXD
     {_PA_3,       PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART0_RTS
     {_PA_2,       PINMUX_FUNCTION_UART,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART0_CTS
     {_PA_6,       PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_CS
     {_PA_7,       PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_DATA1
     {_PA_8,       PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_DATA2
     {_PA_9,       PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_DATA0
     {_PA_10,      PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_CLK
     {_PA_11,      PINMUX_FUNCTION_SPIF,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPIC_DATA3
     {_PA_5,       PINMUX_FUNCTION_PWM,     GPIO_PuPd_UP,           GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //PWM4
     {_PA_18,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_D2
     {_PA_19,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_D3
     {_PA_20,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_CMD
     {_PA_21,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_CLK
     {_PA_22,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_D0
     {_PA_23,      PINMUX_FUNCTION_SDIOD,   GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SD_D1
     {_PB_0,       PINMUX_FUNCTION_SPIM,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPI1_CS
     {_PB_1,       PINMUX_FUNCTION_SPIM,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPI1_CLK
     {_PB_2,       PINMUX_FUNCTION_SPIM,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPI1_MISO
     {_PB_3,       PINMUX_FUNCTION_SPIM,    GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //SPI1_MOSI
     {_PB_4,       PINMUX_FUNCTION_I2S,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2S_MCK
     {_PB_5,       PINMUX_FUNCTION_I2S,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2S_SD_TX
     {_PA_24,      PINMUX_FUNCTION_I2S,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2S_SD_RX
     {_PA_31,      PINMUX_FUNCTION_I2S,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2S_CLK
     {_PB_6,       PINMUX_FUNCTION_I2S,     GPIO_PuPd_NOPULL,       GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //I2S_WS
     {_PA_30,      PINMUX_FUNCTION_UART,    GPIO_PuPd_UP,           GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART2_log_TXD
     {_PA_29,      PINMUX_FUNCTION_UART,    GPIO_PuPd_UP,           GPIO_PuPd_UP,      PAD_DRV_STRENGTH_0}, //UART2_log_RXD
     {_PNC,        PINMUX_FUNCTION_GPIO,    GPIO_PuPd_NOPULL,       GPIO_PuPd_NOPULL,  PAD_DRV_STRENGTH_0}, //table end
};
```

Pin Map settings

- Func Select
  - Set pinmux function based on your board
- Func PU/PD
  - Set pull control based on the function of this pin
- Slp PU/PD
  - Set pull control under sleep mode to prevent power leakage
  - Set this option based on your board
- DrvStrength
  - Driver strength when PD
  - Don’t set it if not needed

Sleep Configuration (Ref: UM0120)

Power Management

- rtl8710b_sleepcfg.c

```
const PWRCFG_TypeDef sleep_pwrmgt_config[]=
{
//   Module                                  Status
     {BIT_SYSON_PMOPT_SLP_MEM2_EN,           ON},    /* SRAM 192K~256K: 6uA */
     {BIT_SYSON_PMOPT_SLP_MEM1_EN,           ON},    /* SRAM 128K~192K: 6uA */
     {BIT_SYSON_PMOPT_SLP_MEM0_EN,           ON},    /* SRAM 0~128K: 12uA */
     {BIT_SYSON_PMOPT_SLP_SYSPLL_EN,         OFF},   /* Syspem PLL: 6.5mA  */
     {BIT_SYSON_PMOPT_SLP_XTAL_EN,           OFF},   /* XTAL: 2.2mA */
     {BIT_SYSON_PMOPT_SLP_EN_SOC,            OFF},   /* SoC(CPU) domain, 200uA */
     {BIT_SYSON_PMOPT_SLP_EN_PWM,            OFF},   /* SWR/LDO output heavy loading current mode */
     {BIT_SYSON_PMOPT_SLP_EN_SWR,            OFF},   /* SWR/LDO 1.2V */
     {BIT_SYSON_PMOPT_SLP_LPLDO_SEL,         OFF},   /* V12H LDO: 50uA */
     {0xFFFFFFFF,                            OFF},   /* Table end */
};
```

Wake Event configuration

```
const PWRCFG_TypeDef sleep_wevent_config[]=
{
//   Module                                  Status
     {BIT_SYSON_WEVT_GPIO_DSTBY_MSK,         ON},    /* dstandby:  wakepin 0~3 wakeup */
     {BIT_SYSON_WEVT_A33_AND_A33GPIO_MSK,    ON},    /* dsleep:    REGU A33 Timer & A33 wakepin wakeup*/
     {BIT_SYSON_WEVT_ADC_MSK,                OFF},   /* sleep:     ADC Wakeup */
     {BIT_SYSON_WEVT_SDIO_MSK,               OFF},   /* sleep:     SDIO Wakeup */
     {BIT_SYSON_WEVT_RTC_MSK,                ON},    /* dstandby:  RTC Wakeup */
     {BIT_SYSON_WEVT_UART1_MSK,              OFF},   /* sleep:     UART1 Wakeup */
     {BIT_SYSON_WEVT_UART0_MSK,              OFF},   /* sleep:     UART0 Wakeup */
     {BIT_SYSON_WEVT_I2C1_MSK,               OFF},   /* sleep:     I2C1 Wakeup */
     {BIT_SYSON_WEVT_I2C0_MSK,               OFF},   /* sleep:     I2C0 Wakeup */
     {BIT_SYSON_WEVT_WLAN_MSK,               ON},    /* sleep:     WLAN Wakeup */
     {BIT_SYSON_WEVT_I2C1_ADDRMATCH_MSK,     OFF},   /* sleep:     ADC Wakeup */
     {BIT_SYSON_WEVT_I2C0_ADDRMATCH_MSK,     OFF},   /* sleep:     I2C1 Slave RX address Wakeup */
     {BIT_SYSON_WEVT_USB_MSK,                OFF},   /* sleep:     I2C0 Slave RX address Wakeup */
     {BIT_SYSON_WEVT_GPIO_MSK,               ON},    /* sleep:     USB Wakeup */
     {BIT_SYSON_WEVT_CHIP_EN_MSK,            OFF},   /* sleep:     ChipEN Wakeup */
     {BIT_SYSON_WEVT_OVER_CURRENT_MSK,       OFF},   /* sleep:     REGU OVER_CURRENT Wakeup */
     {BIT_SYSON_WEVT_GTIM_MSK,               ON},    /* sleep:     Gtimer 4/5 Wakeup */
     {BIT_SYSON_WEVT_SYSTIM_MSK,             ON},    /* dstandby:  SYS Timer(ANA Timer) Wakeup */

     {0xFFFFFFFF,                            OFF},   /* Table end */
};
```

Wake PIN configuration

```
const WAKEPIN_TypeDef sleep_wakepin_config[]=
{
//   Module             Status         Polarity
     {WAKUP_0,          OFF,           0},  /* wakeup_0: GPIOA_18 */
     {WAKUP_1,          ON,            0},  /* wakeup_1: GPIOA_5 */
     {WAKUP_2,          OFF,           0},  /* wakeup_2: GPIOA_22 */
     {WAKUP_2,          OFF,           0},  /* wakeup_3: GPIOA_23 */

     {0xFFFFFFFF,       OFF,           0},  /* Table end */
};
```

Thank you!