FAQ0123

Frequently Asked Questions

8-bit ADC sampling with DMA

Questions:

Some of AT32 microcontrollers feature a fixed 12-bit ADC conversion precision, meaning that their ADC precision is not allowed to be altered. So what can we do to obtain 8-bit ADC converted data if necessary?

Answer:

Configure ADC through hardware.

The following example is based on ADC1.

1) Configure ADC according to the following requirements

A. Select ADC left alignment

```
adc_base_struct.data_align = ADC_LEFT_ALIGNMENT;
adc_base_config(ADC1, &adc_base_struct);
```

B. Select DMA byte transfer mode

```
__IO uint8_t adc1_ordinary_valuetab[5];
dma_init_struct.peripheral_data_width = DMA_PERIPHERAL_DATA_WIDTH_BYTE;
dma_init_struct.memory_data_width = DMA_MEMORY_DATA_WIDTH_ BYTE;
dma_init(DMA1_CHANNEL1, &dma_init_struct);
```

C. DMA "source address" is ADC ordinary data register address+1, and "destination address" is an array of bytes

```
dma_init_struct.peripheral_base_addr = (uint32_t)&(ADC1->odt)+1;
dma_init_struct.memory_base_addr = (uint32_t)adc1_ordinary_valuetab;
dma_init(DMA1_CHANNEL1, &dma_init_struct);
```

2) Software intervention

Not needed. After changing ADC configuration, the adc1_ordinary_valuetab will store 8-bit data (the low 4 bits are discarded).

Attention should be paid to the following:

A. This method can only be used to obtain 8-bit precision sampling, not supporting others.

B. This method can only be used for regular group

C. This method is not applicable to dual ADCs

D. Although this method can be used to get 8-bit ADC conversion precision, the actual conversion time is still calculated on 12-bit precision.

Type: MCU application
Applicable products: AT32F4xx series
Main function: ADC
Other function: None

Document revision history

Date	Revision	Changes
2022.3.4	2.0.0	Initial release

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