

Application Note

ADC UART

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1. Preface

This application note describes the sample software of ADC_UART using Analog to Digital Converter (ADC) and Universal Asynchronous Receiver Transmitter (UART). This document helps the user check operation of a product under development and develop its program.

2. Technical Term

Term/Abbreviation	Definition
ADC	Analog to Digital Converter
UART	Universal Asynchronous Receiver Transmitter
T32A	32-bit Timer Event Counter

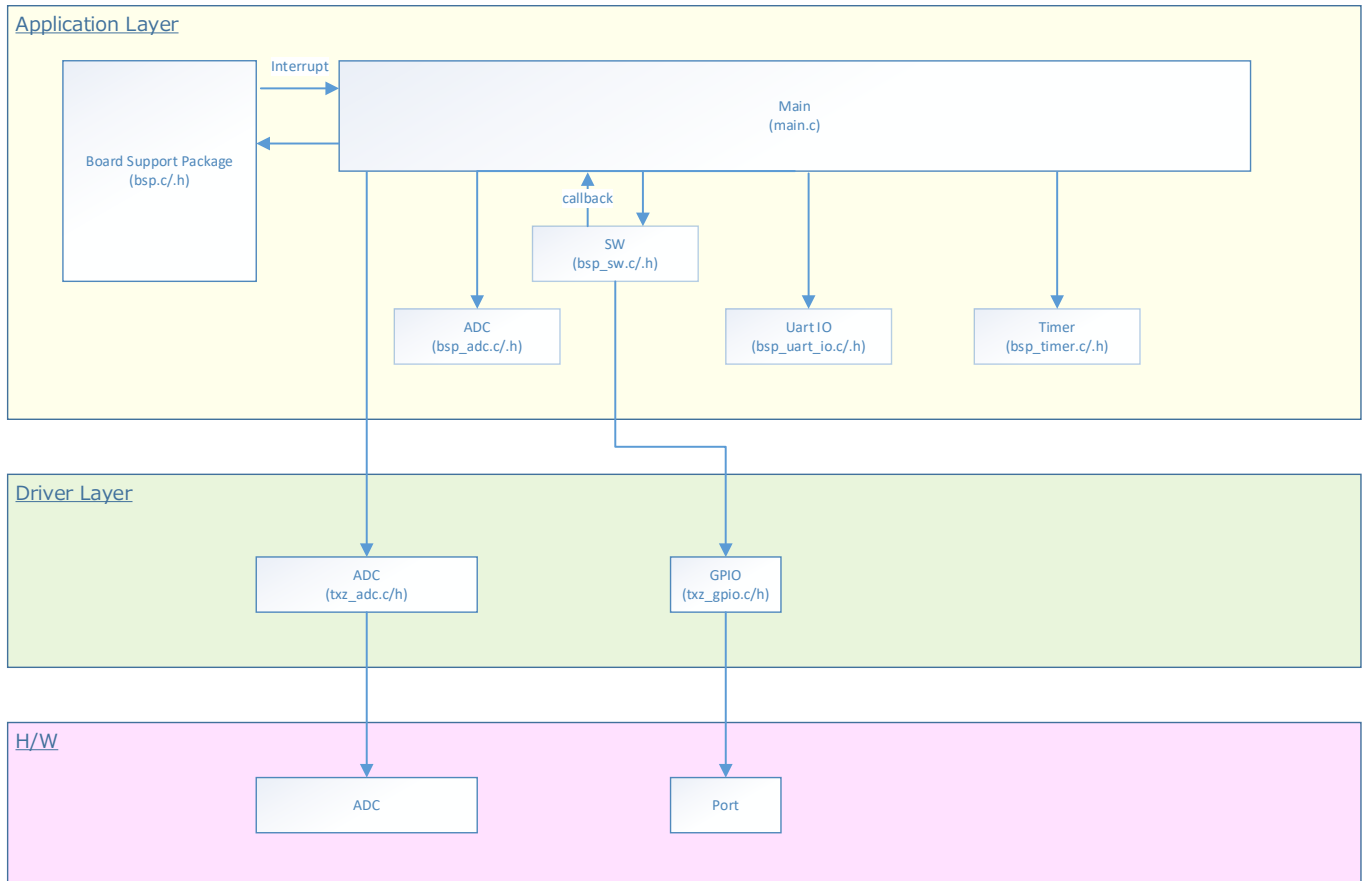
3. Reference Document

Document	Notes
Data sheet	Refer to the data sheet of MCU to be used.
Reference manual	Refer to the reference manual of each IP to be used.
Application note MCU User Guide	Refer to the MCU user manual to be used.

4. Target Sample Program

Sample Program	Outlines
ADC_UART	Sample of ADC conversion and UART communication

5. Configuration Diagram



6. Sample Program: ADC_UART

This sample program uses ADC function and outputs a conversion data in terminal emulator.

6.1. Outlines of Operation

6.1.1. Sample A

Measure the output voltage of a thermistor by BSP_ADC_1, value converted to temperature by the CPU and variable resistance value measured by BSP_ADC_0 are output to the terminal emulator via USB-UART. The output period is set by 6.4 configuration.

When turn on the BSP_PSW_3, ADC starts working.

When turn off the BSP_PSW_3 again, ADC stop working.

6.1.2. Sample B

Measure variable resistance values by BSP_ADC_0, and output to terminal emulator via USB-UART.

The output period is set by 6.4 configuration.

When turn on the BSP_PSW_3, ADC starts working.

When turn off the BSP_PSW_3 again, ADC stop working.

6.2. Function to Use

The functions to use are as follows.

For the Port assignment of each channel, refer to the MCU user manual.

IP	Channel	Objective
ADC	BSP_ADC_0	Output voltage of a variable resistance.
	BSP_ADC_1	Output voltage of a thermistor
UART	BSP_UART_0	Communication with the terminal emulator
PORT	BSP_PSW_3	Switch input

6.3. Interrupt to Use

Interrupt	Outlines
UART Interrupt	UART reception interrupt
	UART transmission interrupt
	UART ERROR interrupt
Interval timer Interrupt	Interval timer interrupt

6.4. Configuration

“ADC_MONITOR” configuration setting

Configuration	Current Value	Description
CFG_OUTPUT_INTERVAL	5000	Terminal emulator output cycle (Unit: ms)

6.5. Example of Terminal Emulator Output

6.5.1. Sample A

6.5.1.1. Normal Operation

Output temperature value (Celsius value).

```
Temp:27degrees  
Convert Result Value[VR1]:0x698
```

6.5.1.2. Case of Error Occurrence

Nothing.

6.5.2. Sample B

6.5.2.1. Normal Operation

Output AD measurement.

```
Convert Result Value[VR1]:0x74d
```

6.5.2.2. Case of Error Occurrence

Nothing.

7. ADC_UART Driver

7.1. List of Drivers

The ADC is controlled by using the following drivers.
For an example of use, refer to the source code.

Interface Name	Control Outlines
adc_channel_clear	ADC channel is cleared.
adc_channel_get_value	ADC value is acquired.
adc_channel_setting	ADC channel is set.
adc_cmp_deinit	ADC Compare register is released.
adc_cmp_init	ADC Compare register is initialized.
adc_deinit	ADC object is released.
adc_get_status	Conversion status is acquired.
adc_init	ADC object is initialized.
adc_poll_conversion	Wait for the end of a single conversion.
adc_start	Conversion is started.
adc_stop	Conversion is stopped.

8. Revision History

Revision	Date	Description
1.0	2021-10-13	First release

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