

Application Note

CAN_Loopback (CAN-B)

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1. Preface

This application note describes sample software for the CAN_Loopback sample software that uses Controller Area Network (CAN) function.

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
BSP	Board Support Package
CAN	Controller Area Network
CG	Clock Control and Operation Mode
Timer	T32A:32-bit Timer Event Counter
UART	Universal Asynchronous Receiver Transmitter

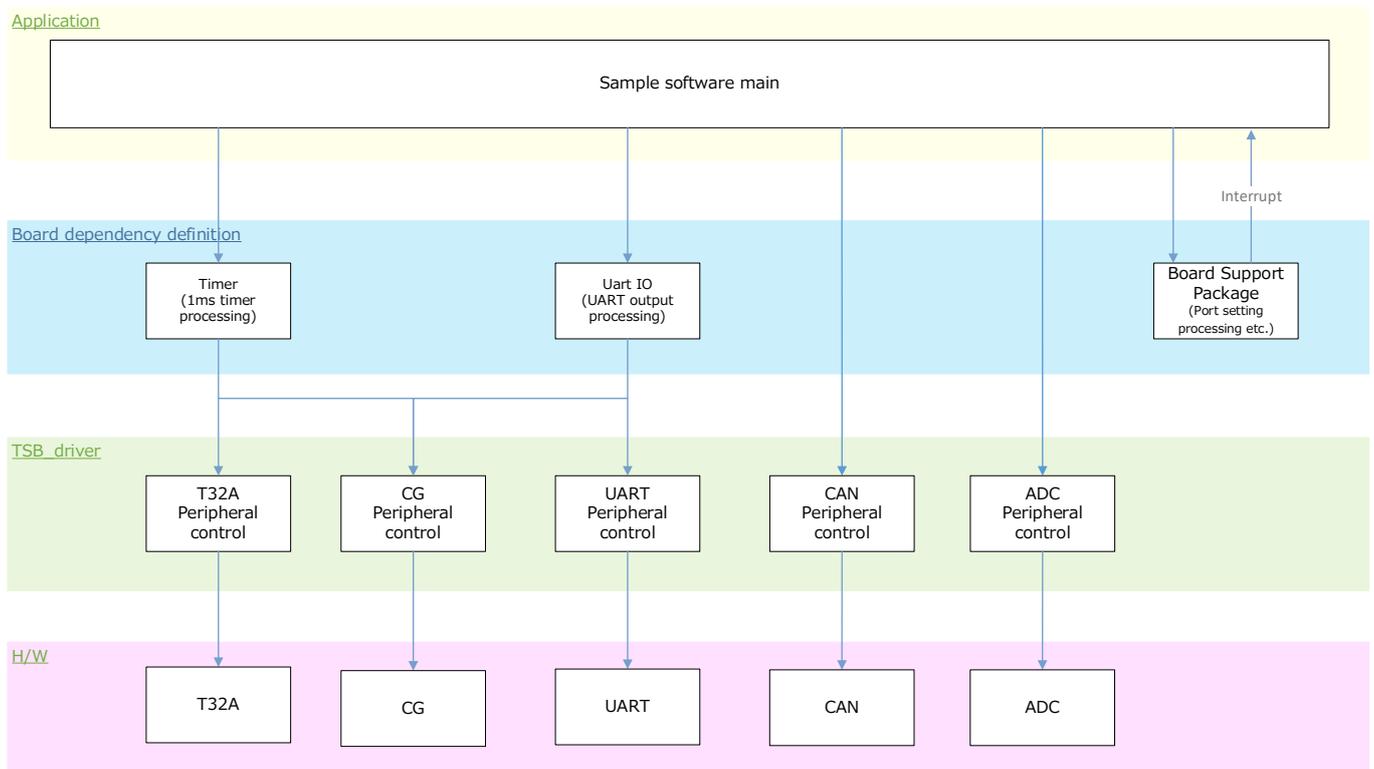
3. Reference Document

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 guide to be used.

4. Target Sample Program

Sample Program	Outline
CAN_Loopback	Sample program of CAN Communication function

5. Configuration Diagram



6. Sample Program:CAN_Loopback

This is sample software that measures the voltage of a variable resistor, uses the CAN communication function to send and receive the measurement results in test loopback mode, and outputs them to the terminal software.

6.1. Outlines of Operation

The voltage of BSP_VR_1 and BSP_VR_2 is measured at a certain interval, and AD converted value is transmitted and received using the loopback mode of BSP_CAN_1.
 The received data is outputted to the terminal emulator through USB-UART.
 The measurement interval is set in 6.4 Configuration.

6.2. Function to Use

The functions to use are as follows:
 For the Port assignment of each channel, refer to the MCU user guide.

IP	Channel	Objective
CAN	BSP_CAN_1	CAN communication
ADC	BSP_VR_1	For voltage measurement of variable resistor 1
	*BSP_VR_2	For voltage measurement of variable resistor 2
UART	BSP_UART_1	For terminal emulator communication
T32A	BSP_T32A_TIMER_1	Used as a 1ms interval timer

* Since BSP_VR_2 is not installed in SBK-M4KN, BSP_VR_1 is used for measurement in this example.

6.3. Interrupt to Use

Interrupt	Outlines
INTT32A00A	T32A Timer A Timer counter increment every 1ms for measurement and output timing
INTUART0RX	UART ch0 Receive interrupt for terminal emulator
INTUART0TX	UART ch0 Transmission interrupt for terminal emulator
INTUART0ERR	UART ch0 Error interrupt for terminal emulator

6.4. Configuration

“main.c” configuration setting.

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

6.5. Example of Terminal Emulator Output

6.5.1. Normal Operation

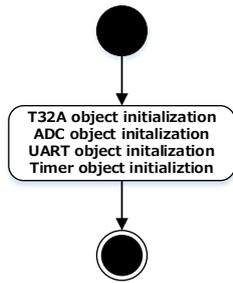
Outputs AD conversion value.

```
nAIN0 > 0x19b  
nAIN1 > 0x4f3  
nAIN0 > 0x19c  
nAIN1 > 0x4f3  
nAIN0 > 0x2a6  
nAIN1 > 0x5fc
```

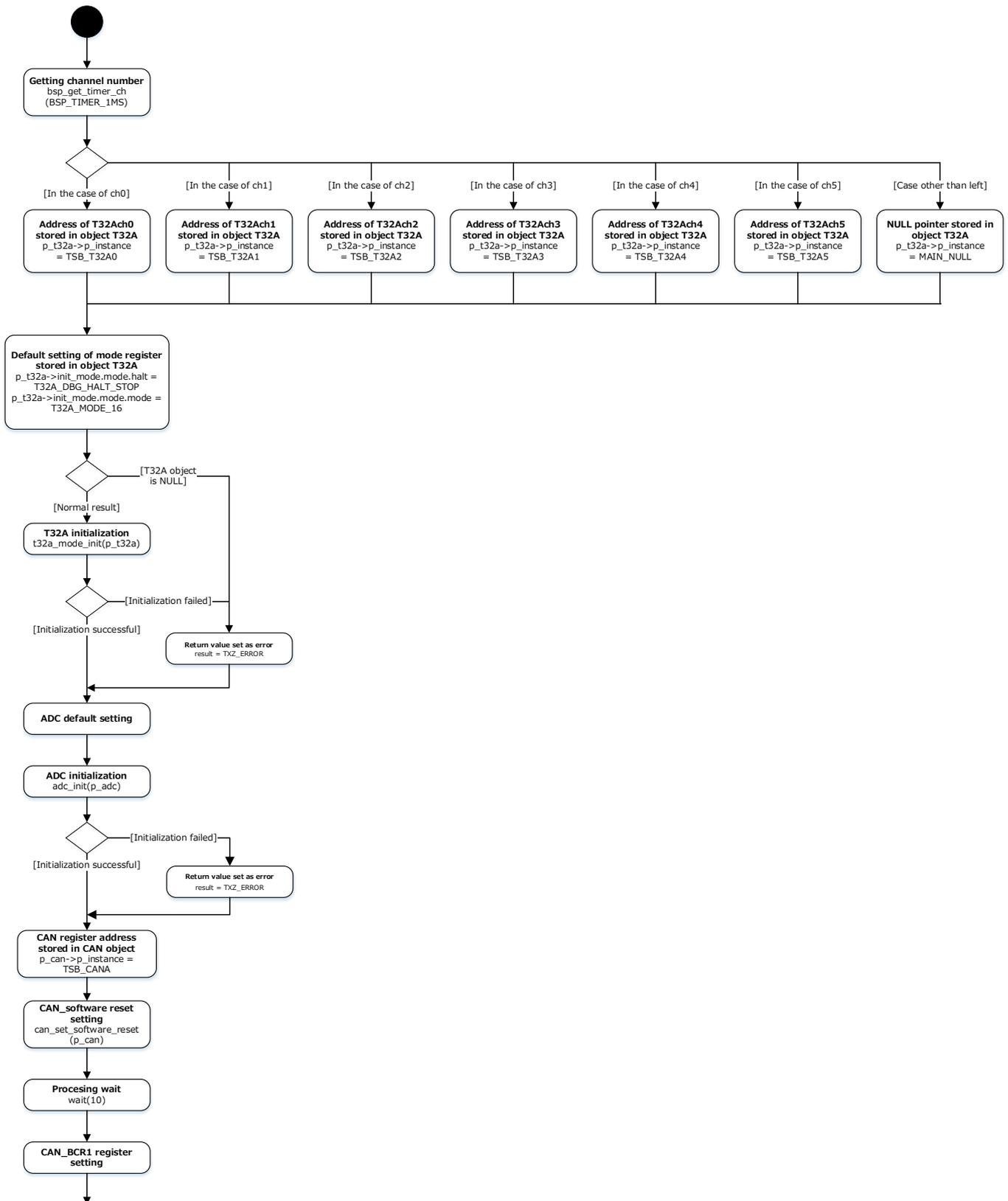
6.5.2. Case of Error Occurrence

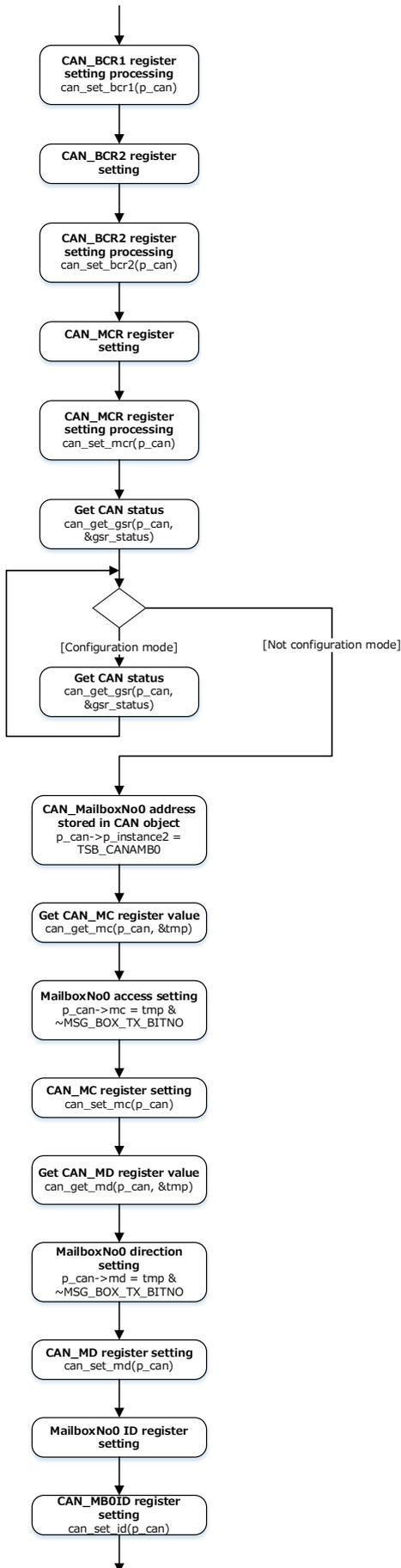
Nothing.

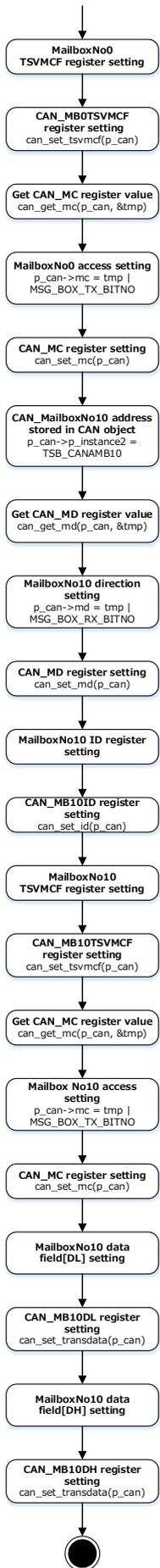
7.2. variable_initialize



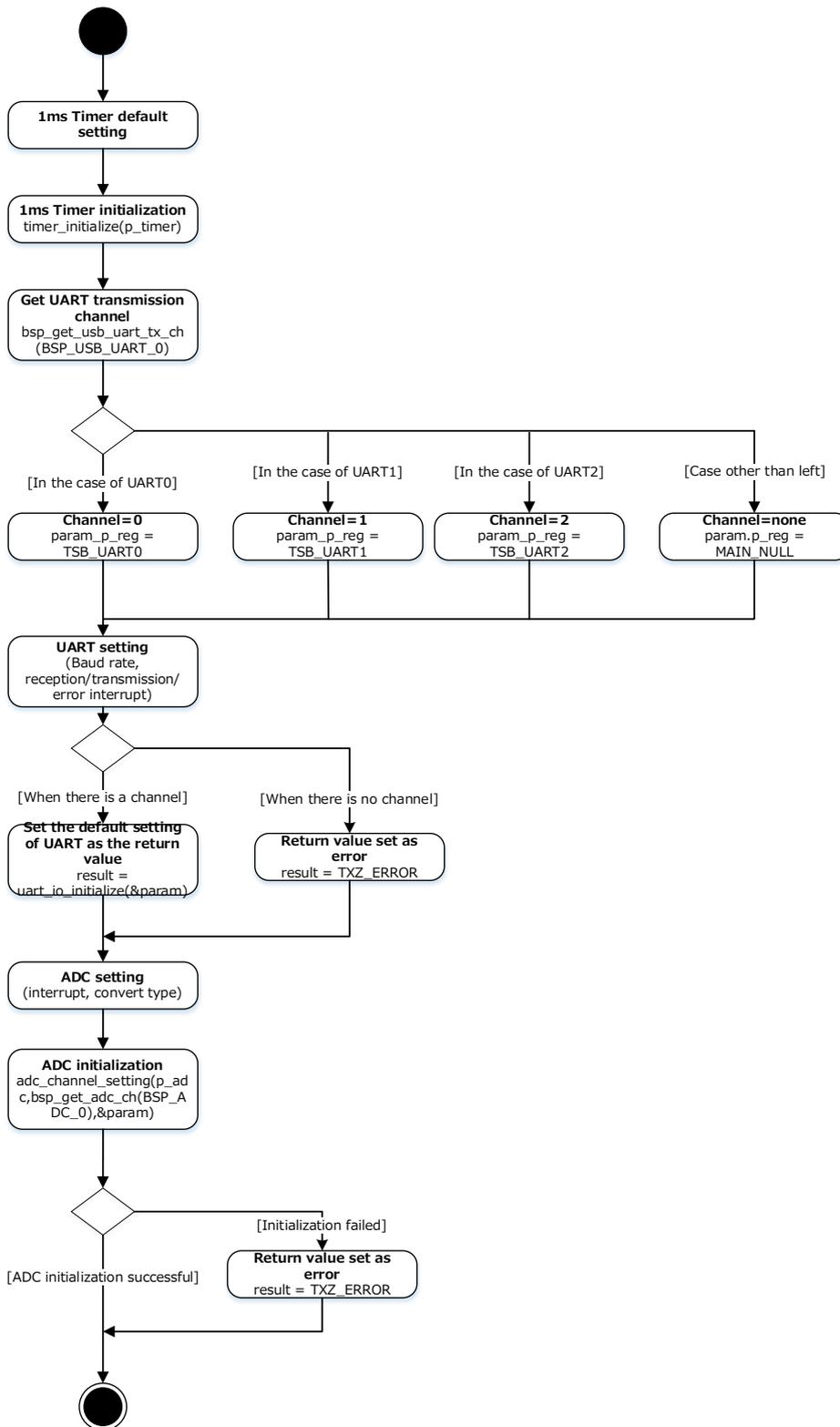
7.3. driver_initialize



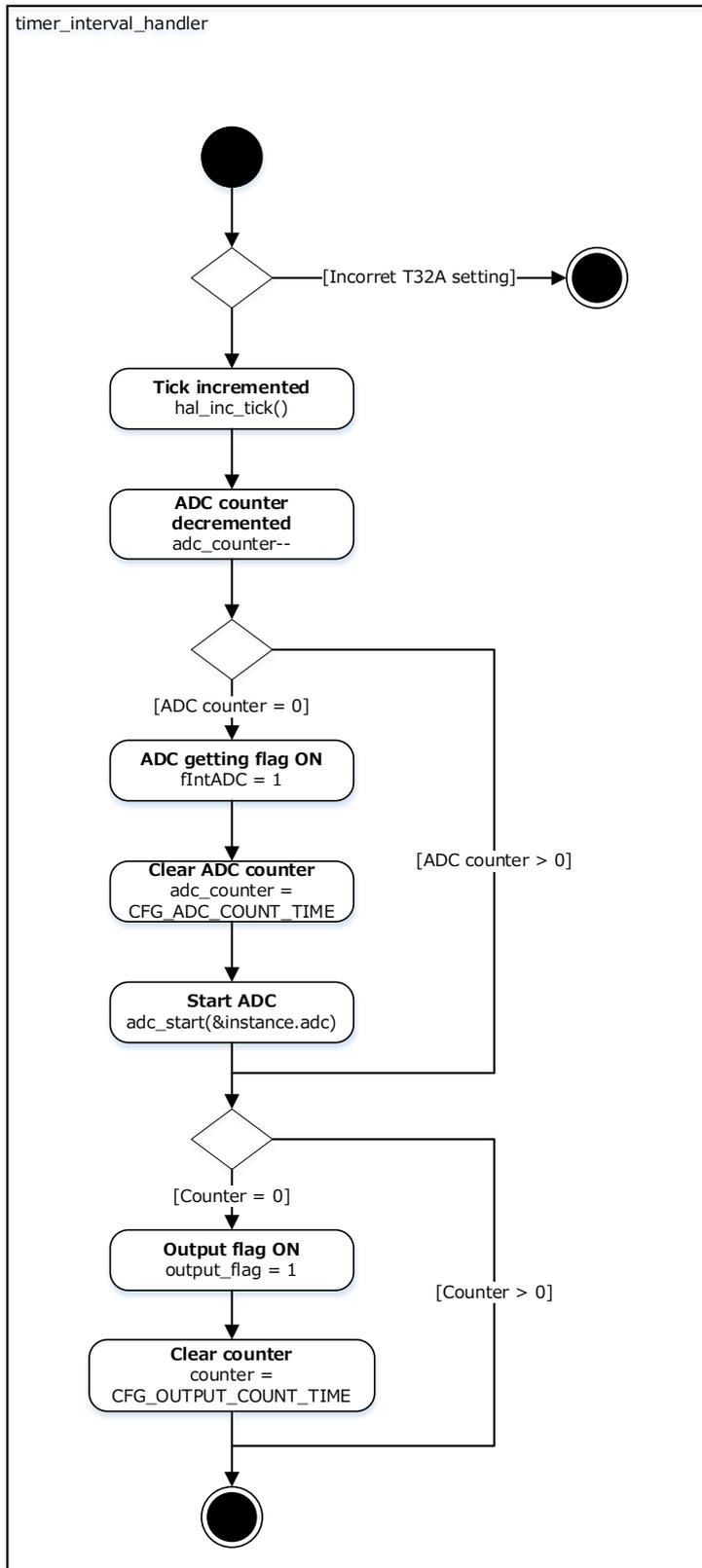
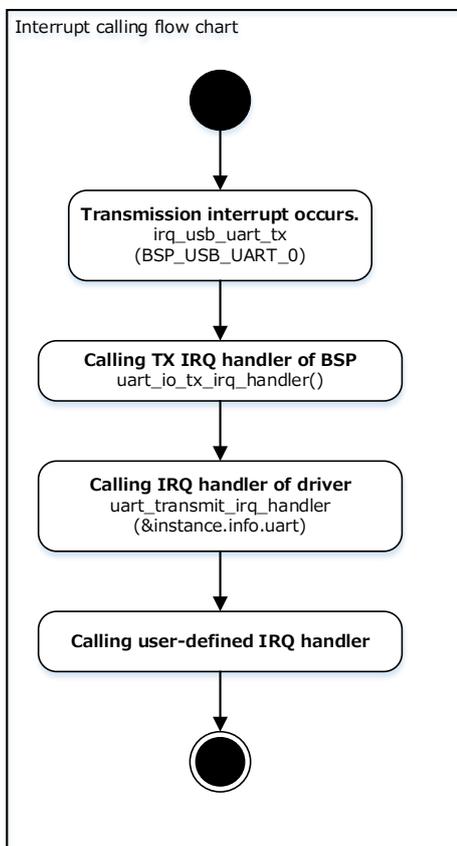
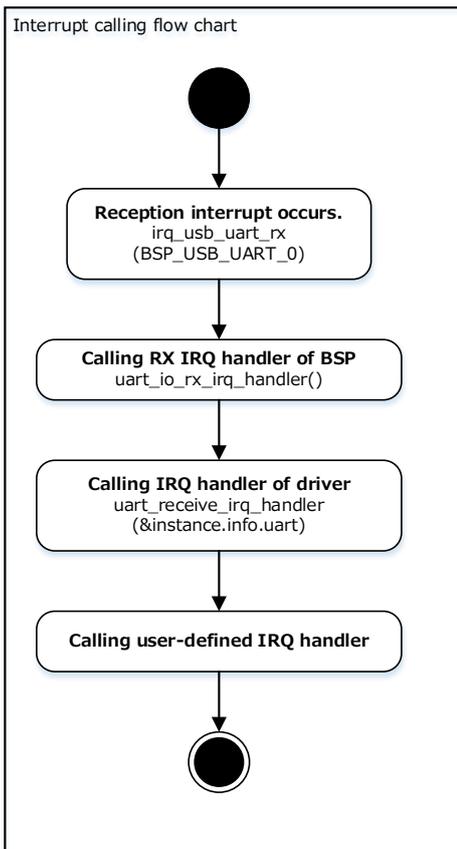


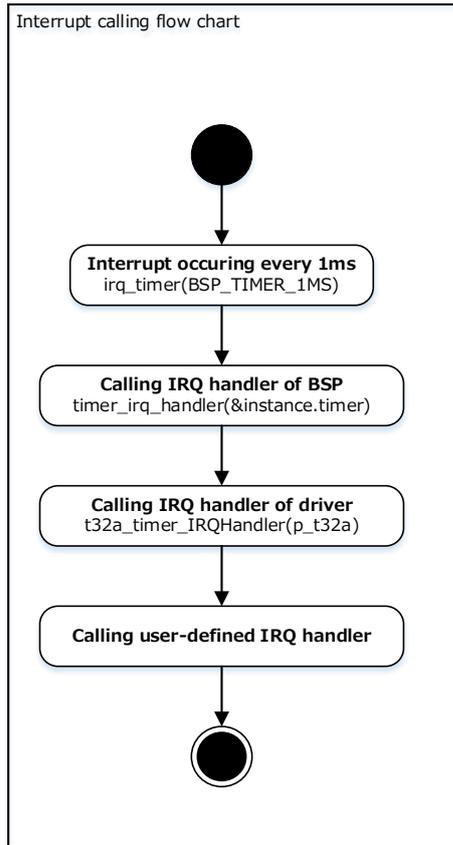
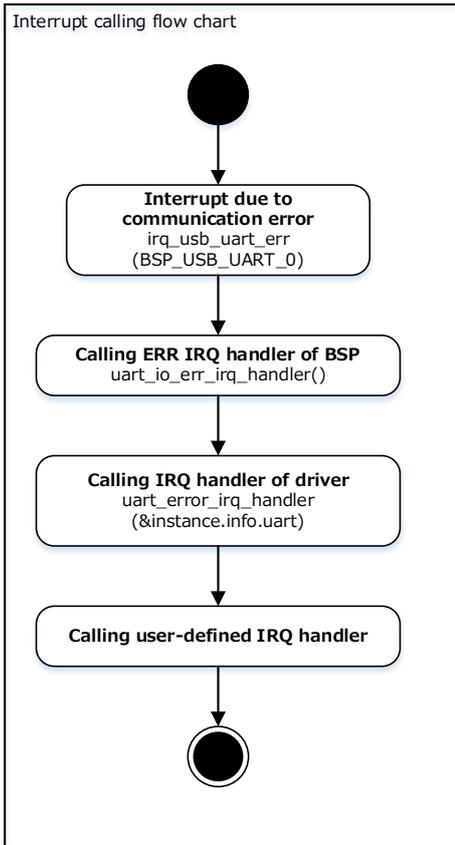


7.4. application_initialize



7.5. Interrupt





8. Revision History

Revision	Date	Description
1.0	2023-10-16	First release

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