

# **Application Note**

## **ADC Monitor** **(ADC-I)**

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## 1. Preface

This application note describes sample software for the analog-to-digital converter (ADC) monitoring 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
CG	Clock Control and Operation Mode
Timer	T32A:32-bit Timer Event Counter
UART	Universal Asynchronous Receiver Transmitter

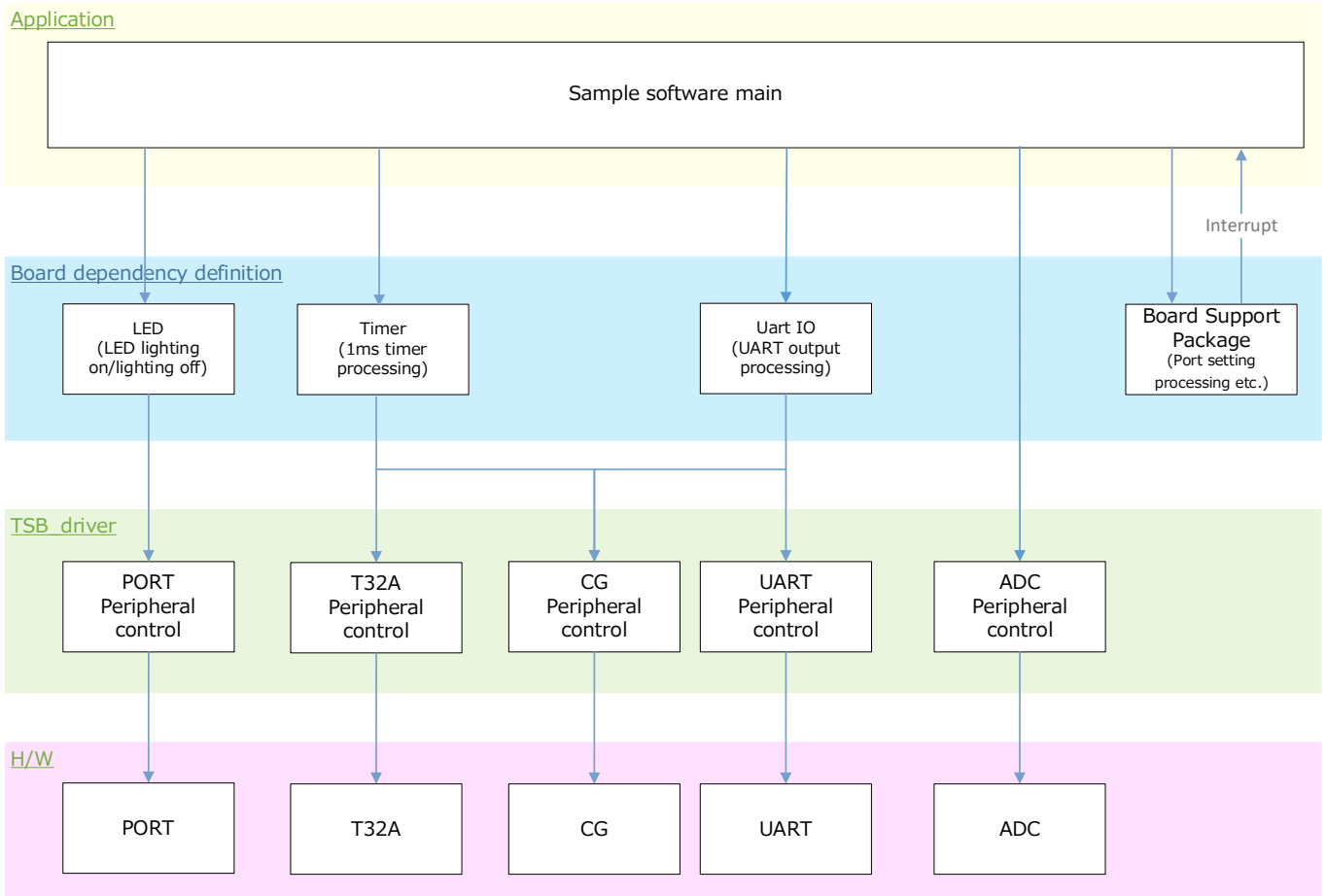
## 3. Reference Document

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
ADC_Monitor	Sample program of ADC monitoring function

## 5. Configuration Diagram



## 6. Sample Program:ADC\_Monitor

This is sample software that changes the LED display pattern according to variable resistance value changes using the ADC monitoring function.

### 6.1. Outlines of Operation

Measure the output voltage of BSP\_VR\_1 with ADC.

When the acquired value is less than or equal to CMPValueA, BSP\_LED\_1 and BSP\_LED\_2 are turned off.

If the obtained reading is CMPValueA large and lower than CMPValueB, BSP\_LED\_1 turns off and BSP\_LED\_2 turns on.

If the acquired value is equal to or greater than CMPValueB, BSP\_LED\_1 and BSP\_LED\_2 are turns on.

BSP_VR_1 value	BSP_LED_1	BSP_LED_2	Description
$BSP\_VR\_1 \leq CMPValueA$	OFF	OFF	-
$CMPValueA < BSP\_VR\_1 < CMPValueB$	OFF	ON	-
$CMPValueB \leq BSP\_VR\_1$	ON	ON	-

For the values of CMPValue A and B, refer to 6.4. Configuration.

### 6.2. Function to Use

The functions to use are as follows:

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

IP	Channel	Objective
ADC	BSP_VR_1	Variable resistance value
PORT	BSP_LED_1	For operation check
	BSP_LED_2	For operation check
UART	BSP_UART_1	For terminal emulator communication (Outputs log)
T32A	BSP_T32A_TIMER_1	interval timer

### 6.3. Interrupt to Use

Interrupt	Outlines
INTUART0RX	UART ch0 Receive interrupt for terminal emulator
INTUART0TX	UART ch0 Transmission interrupt for terminal emulator
INTUART0ERR	UART ch0 Error interrupt for terminal emulator
INTT32A00A	T32A Timer A Timer counter increment every 1ms for display update
INTADACP0	ADC monitor for variable resistance value (CMPValueA) For information monitoring
INTADACP1	ADC monitor for variable resistance value (CMPValueB) For information monitoring

### 6.4. Configuration

“main.c” configuration setting.

Configuration	Current Value	Description
Timer A	5s	-
CMPValueA	0x555	-
CMPValueB	0xAAA	-

## 6.5. Example of Terminal Emulator Output

### 6.5.1. Normal Operation



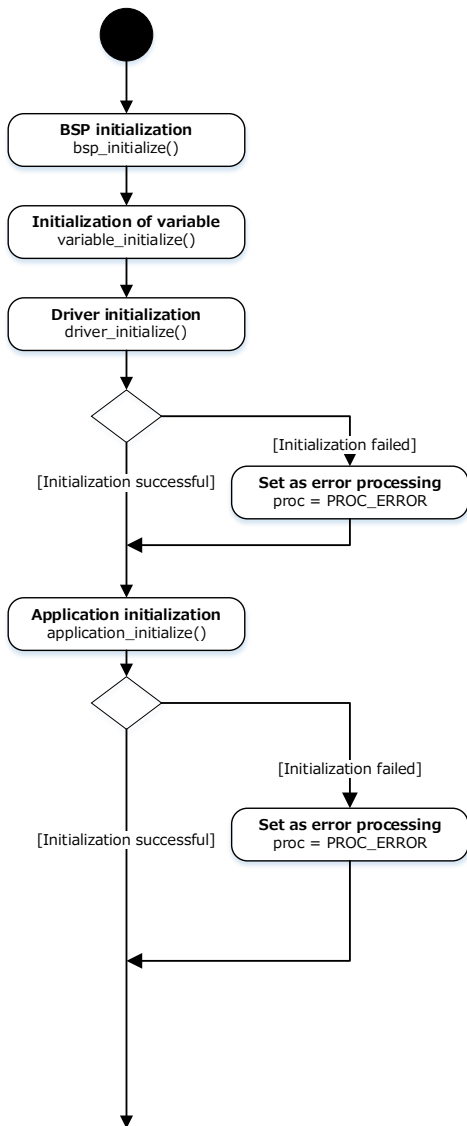
Convert Result Value [VR1]:0x128

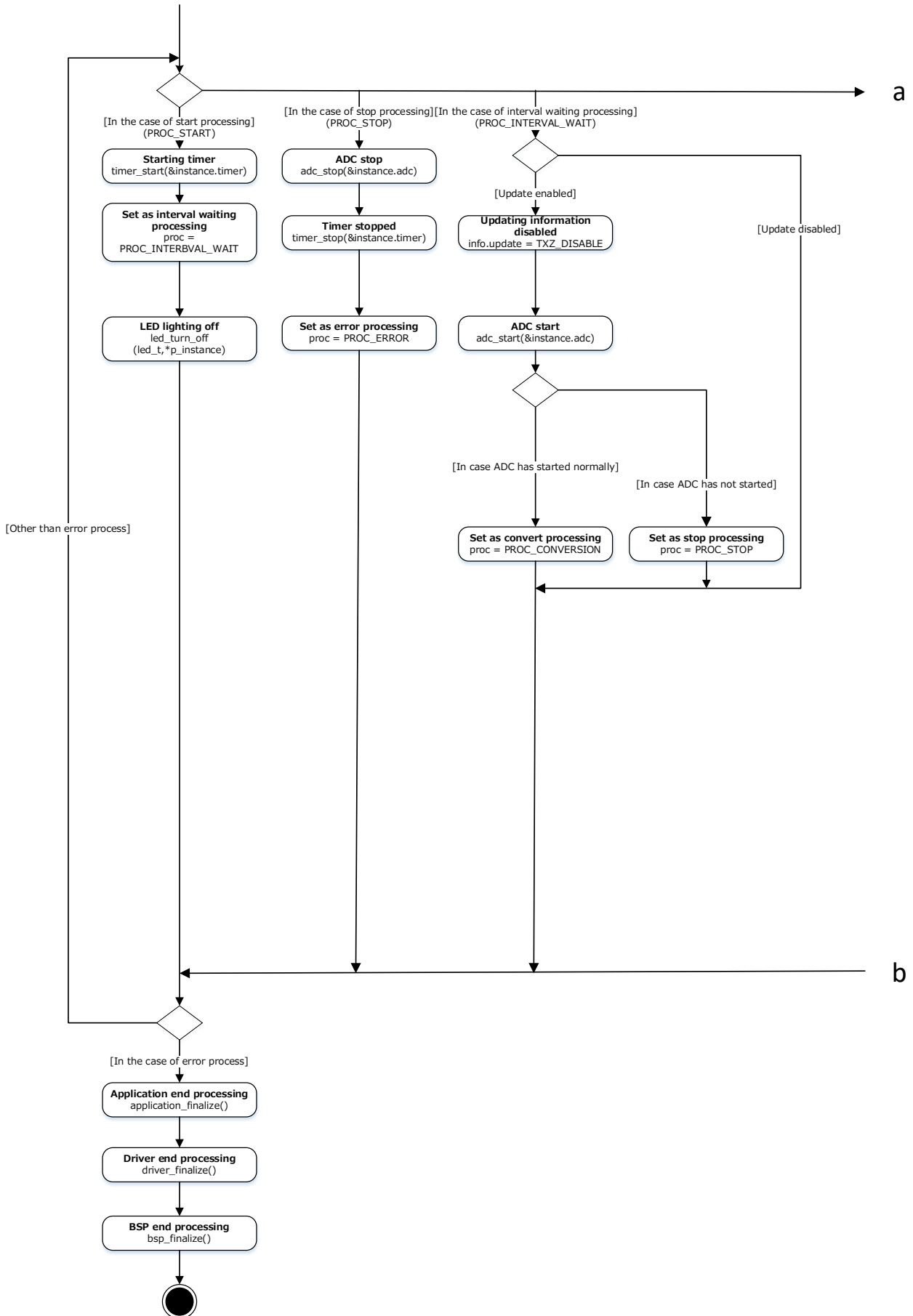
### 6.5.2. Case of Error Occurrence

Nothing.

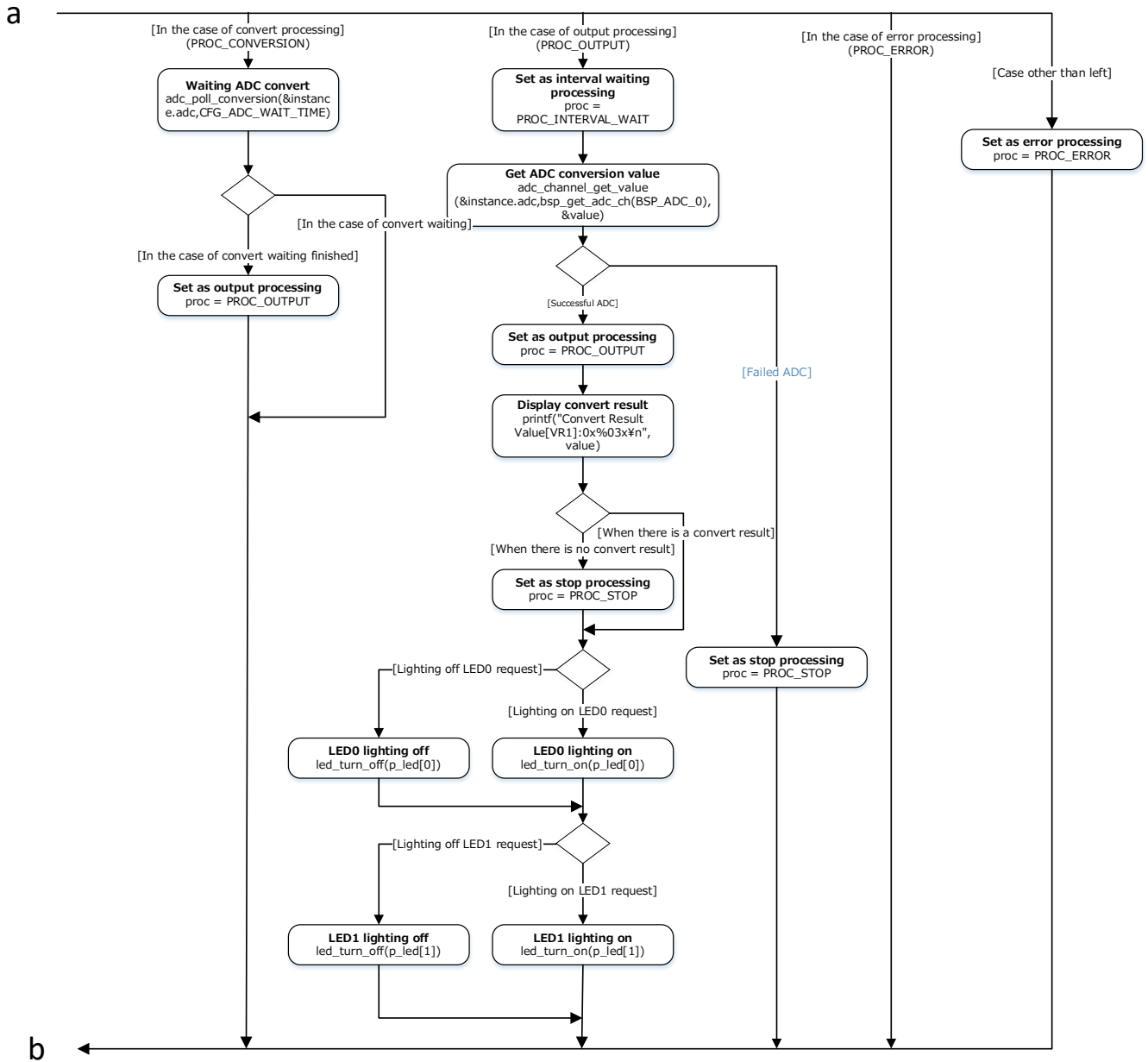
## 7. Activity diagram

### 7.1. main

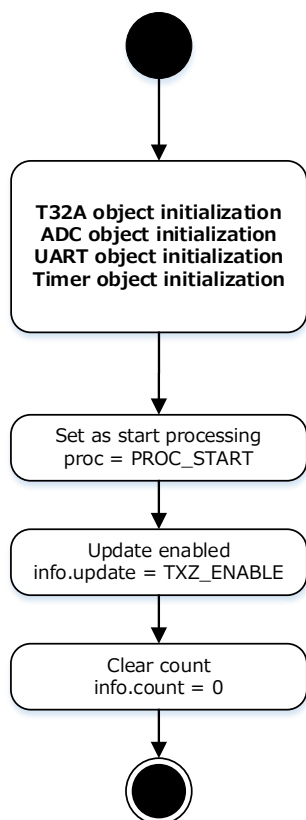




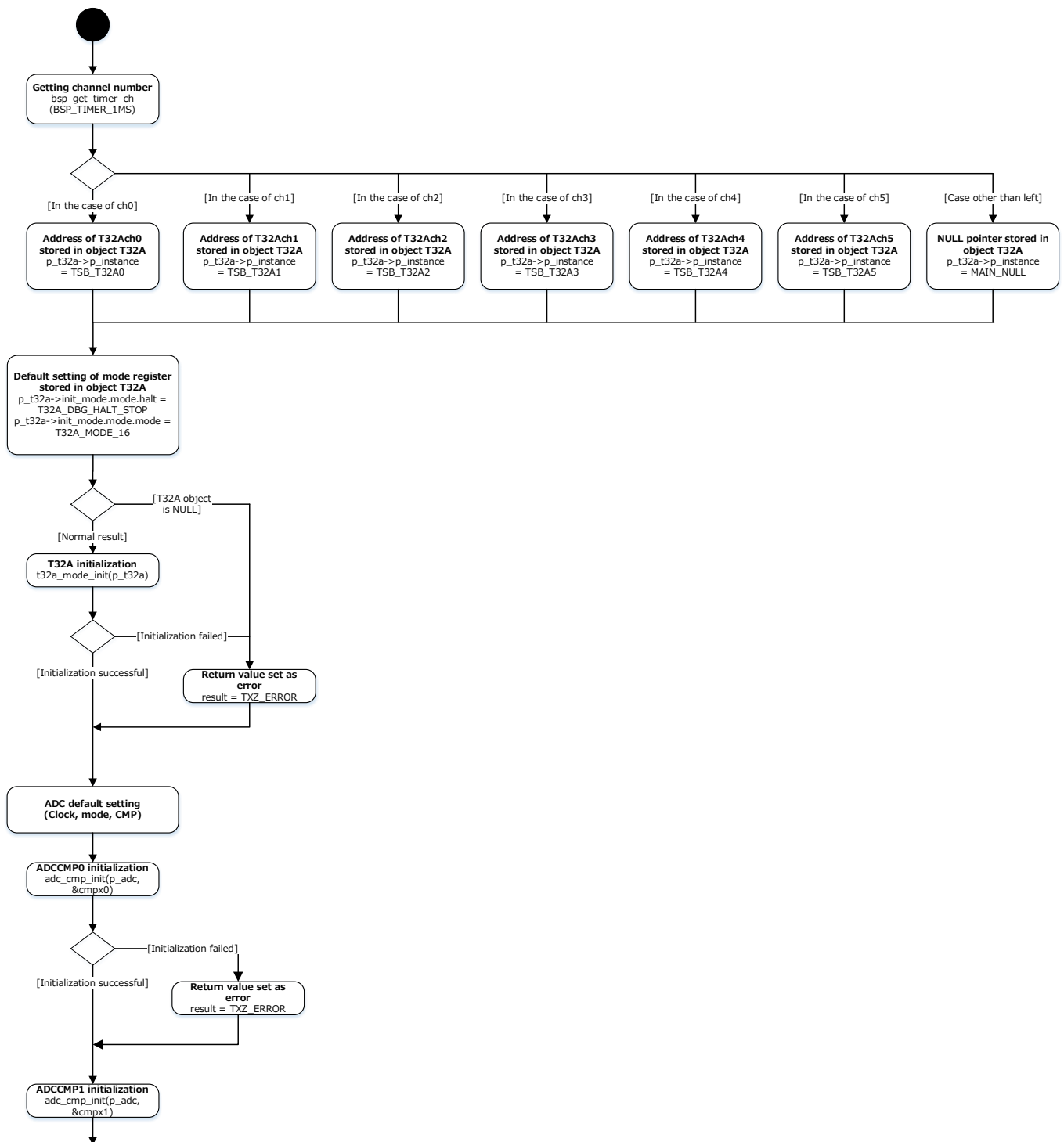


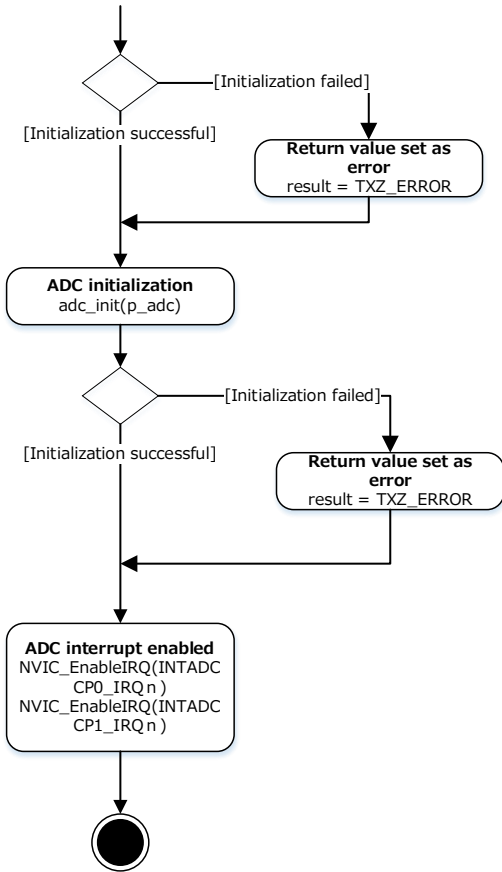


## 7.2. variable\_initialize

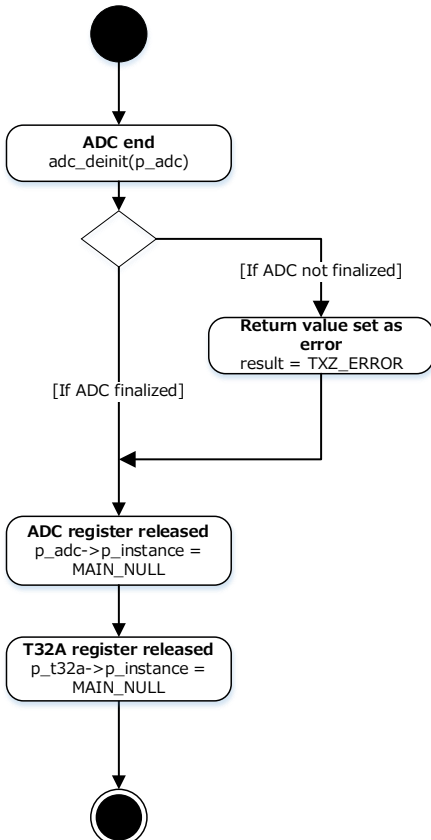


## 7.3. driver\_initialize

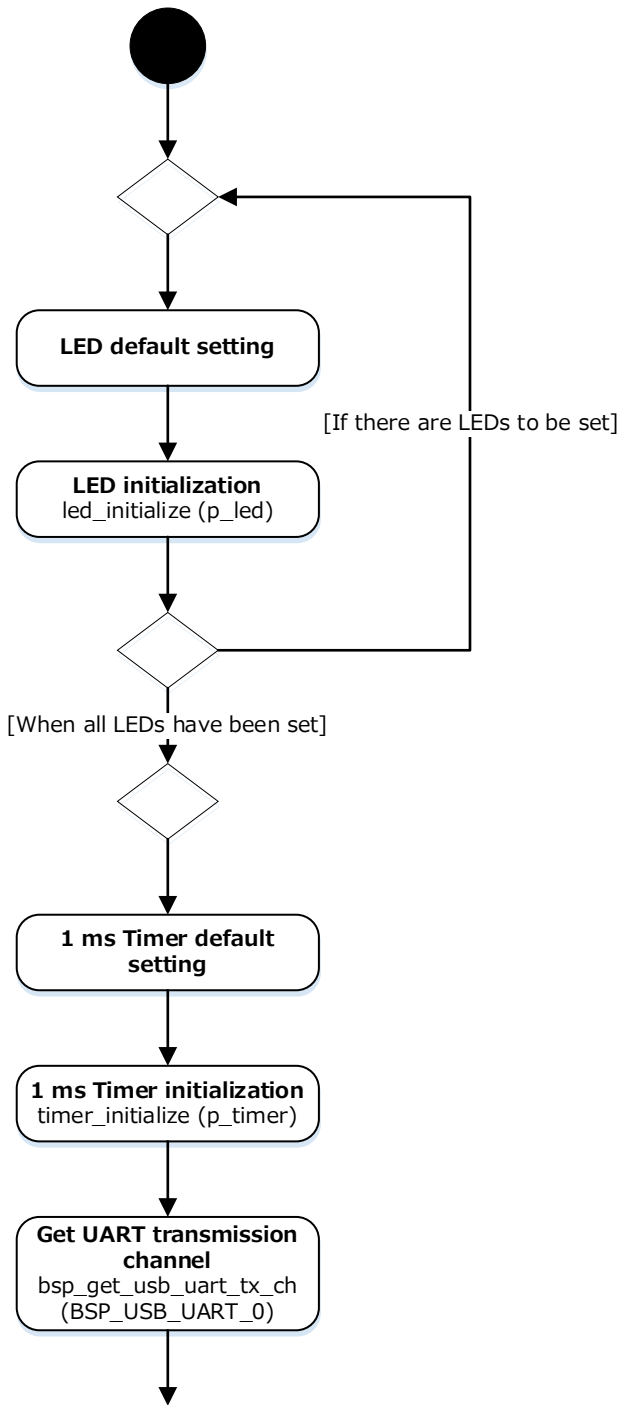


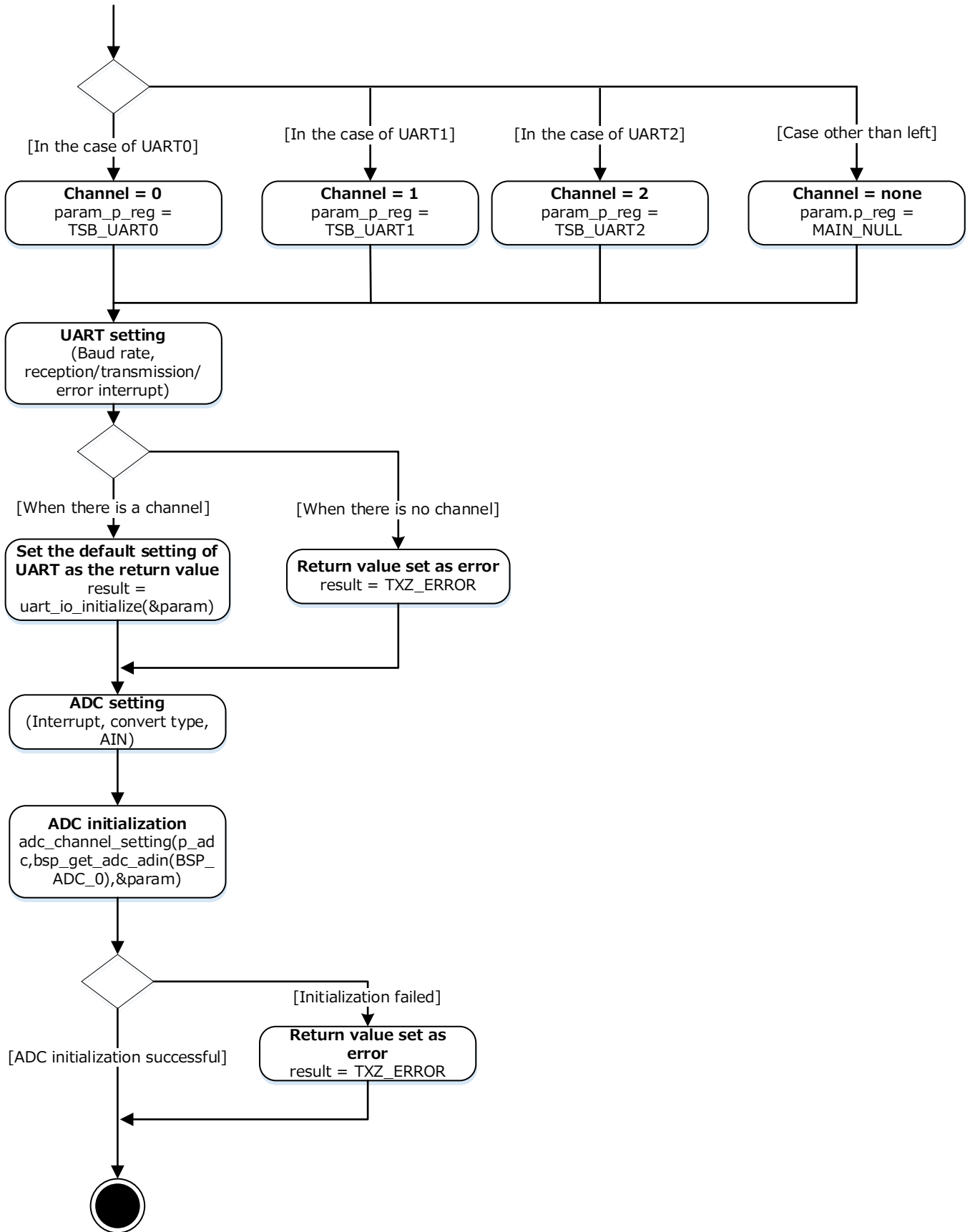


## 7.4. driver\_finalize

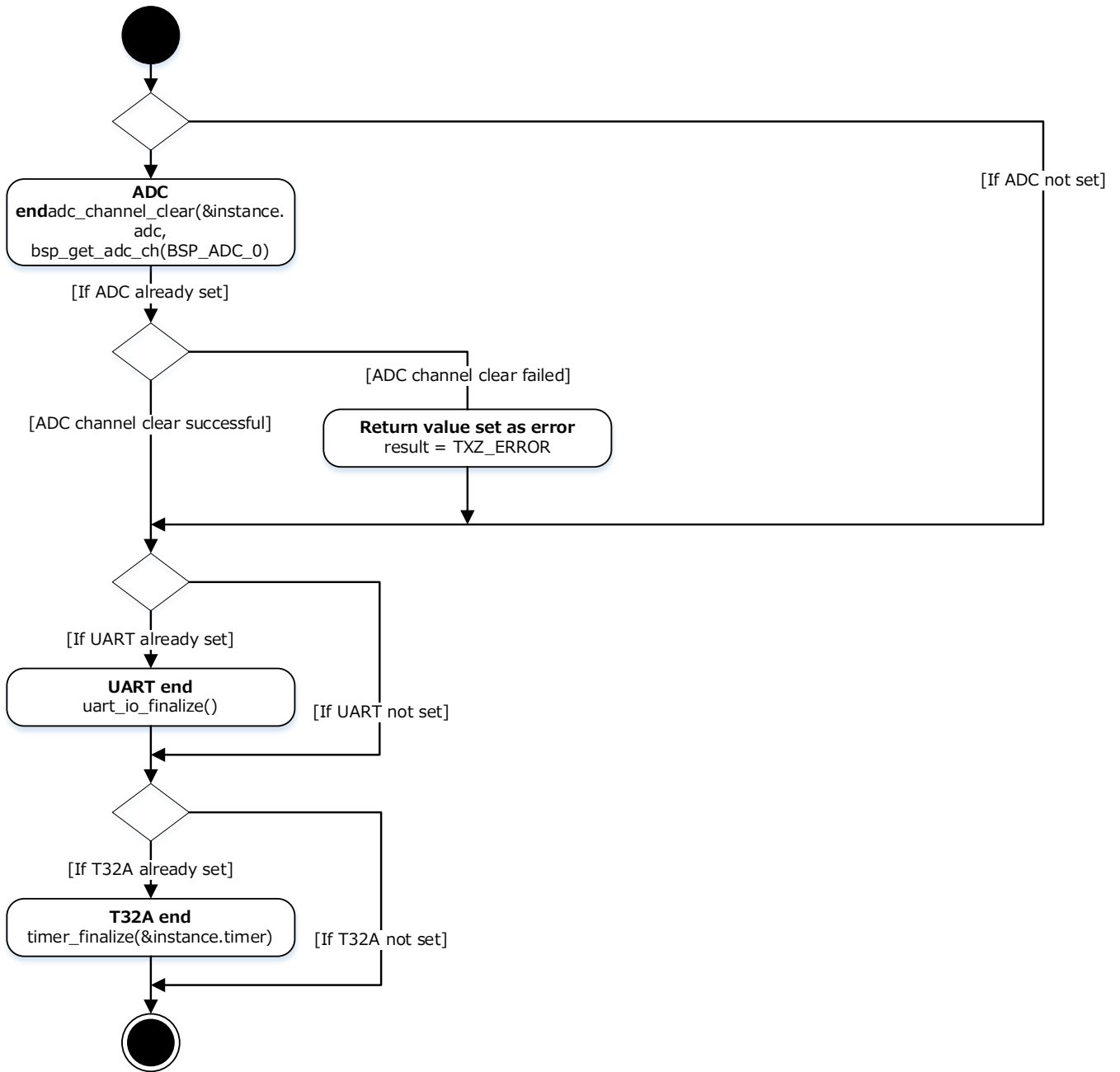


## 7.5. application\_initialize

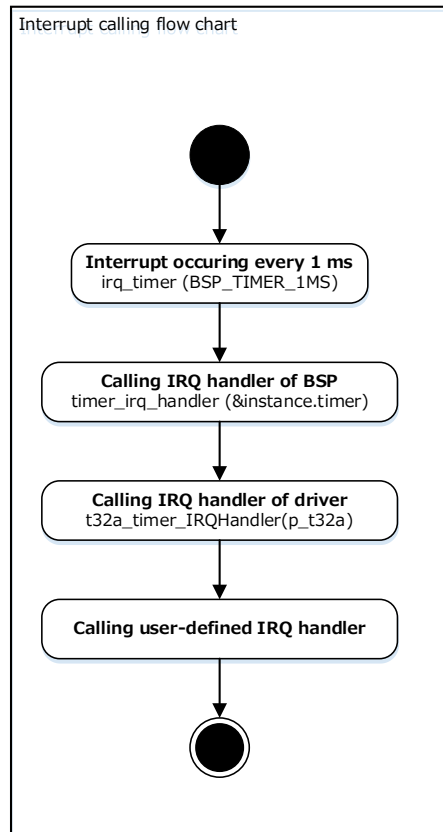
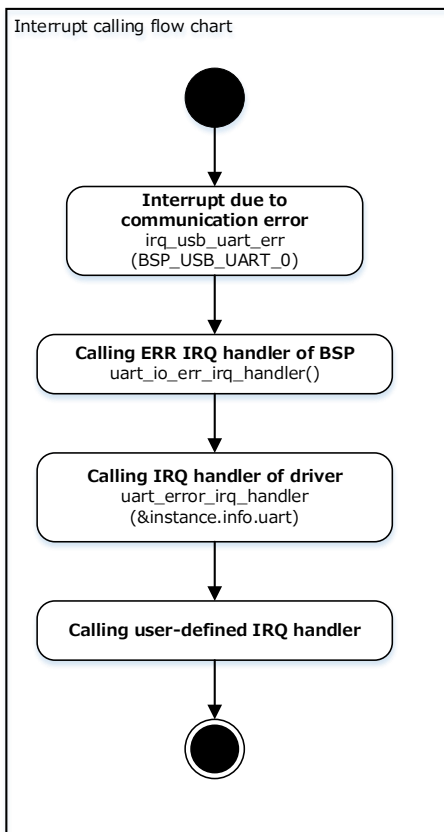
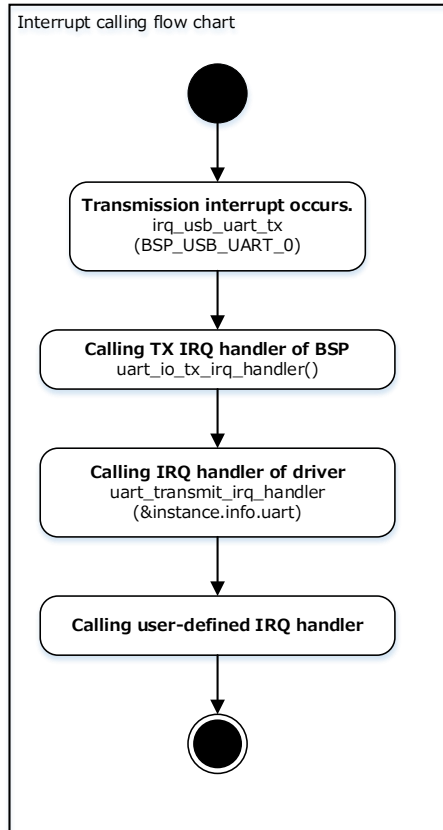
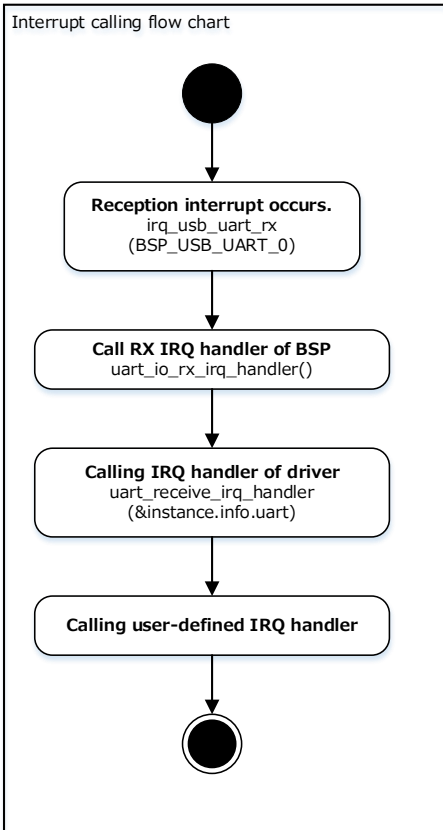




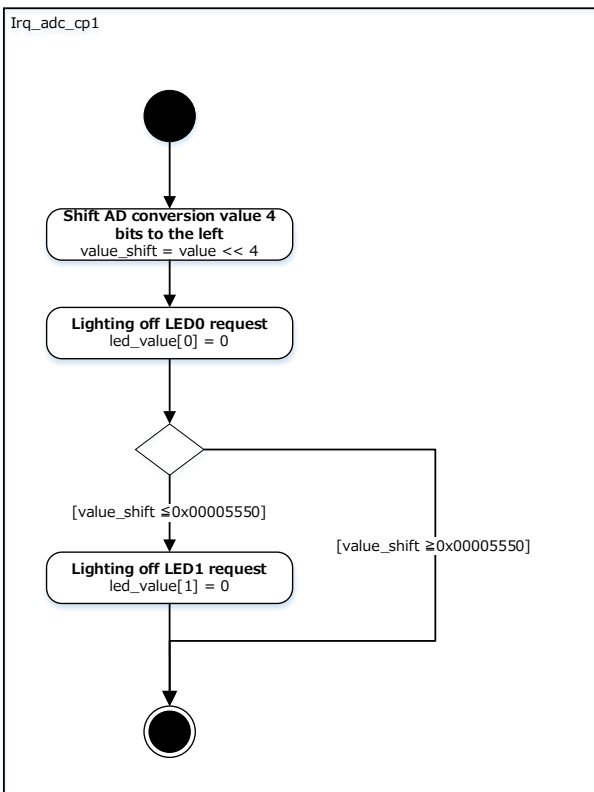
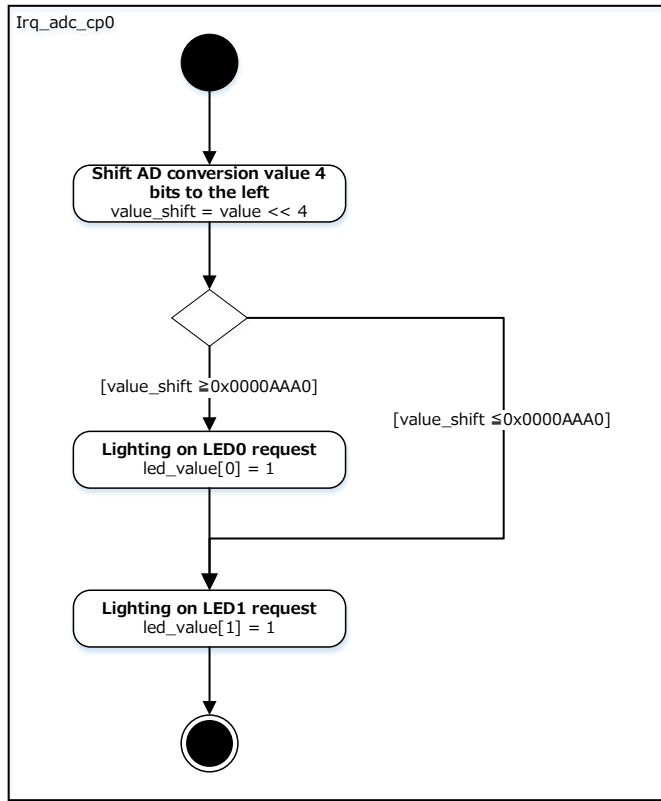
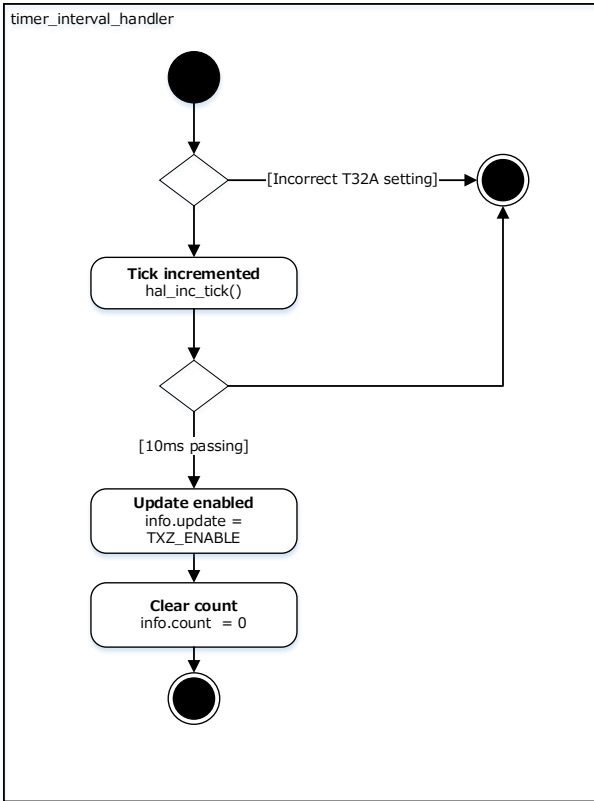
## 7.6. application\_finalize



## 7.7. Interrupt







## 8. Revision History

Revision	Date	Description
1.0	2023-10-16	First release

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