

Application Note

CG_EXINT

(CG-M4K(2)-E)

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1. Preface

This application note describes sample software for the switches between NORMAL mode and low power consumption mode using clock control and operation mode functions.

This document helps the user check operation of a product under development and develop its program.

2. Technical Term

Term/Abbreviation	Definition
BSP	Board Support Package
CG	Clock Control and Operation Mode
EXCEPT	Except
FLASH	Flash Memory
SIWDT	Clock Selective Watchdog Timer
Timer	T32A:32-bit Timer Event Counter

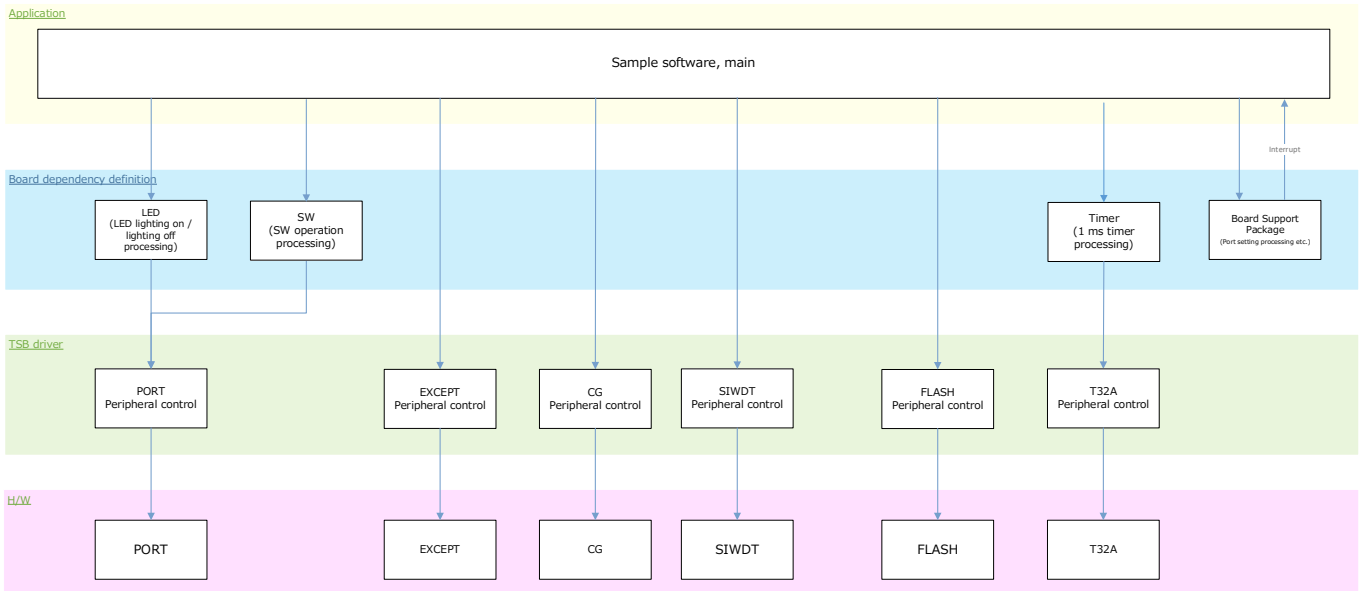
3. Reference Document

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 guide to be used.

4. Target Sample Program

Sample Program	Outline
CG_EXINT	Sample program of clock control and operation mode switching

5. Configuration Diagram



6. Sample Program:CG_EXINT

This is the sample software that uses CG operation mode transition function to shift to the low-power consumption mode and return to NORMAL mode according to the pressed switches.
Visualizes the operation mode by LED.

6.1. Outlines of Operation

Switches (NORMAL/IDLE/STOP1/STOP2) when pressed.

When BSP_PSW_1 is pressed, IDLE mode is entered.
However, it is invalid when pressed during low power consumption mode.

When BSP_PSW_2 is pressed, STOP1 mode is entered.
However, it is invalid when pressed during low power consumption mode.

When BSP_PSW_3 is pressed, STOP2 mode is entered.
However, it is invalid when pressed during low power consumption mode.

When BSP_PSW_5 is pressed, NORMAL mode is entered.
However, if it is pressed during NORMAL, it is disabled.

LED is turned on and off according to the selected mode.

NORMAL mode : BSP_LED_1 blink at a constant Duty for a fixed period. All other LED are turned off.

IDLE mode : BSP_LED_2 is turned on. All other LED are turned off.

STOP1 mode : BSP_LED_3 is turned on. All other LED are turned off.

STOP2 mode : BSP_LED_4 is turned on. All other LED are turned off.

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
PORT (Push Switch)	BSP_PSW_1	Event trigger
	BSP_PSW_2	Event trigger
	*BSP_PSW_3	*Event trigger
	*BSP_PSW_5	*Event trigger
PORT(LED)	BSP_LED_1	For operation check
	BSP_LED_2	For operation check
	BSP_LED_3	For operation check
	BSP_LED_4	For operation check
T32A	BSP_T32A_TIMER_1	Interval timer

* SBK-M4KN does not support STOP2 and does not have BSP_PSW_3.

* SBK-M4KN substitutes BSP_SSW_1.

6.3. Interrupt to Use

Interrupt	Outlines
INT21	External interrupt when pressing BSP_PSW_5. For canceling low power consumption mode
INTT32A00A	T32A Timer A Timer counter increments every 1ms for Switch / LED processing

6.4. Configuration

“main.c” configuration setting.

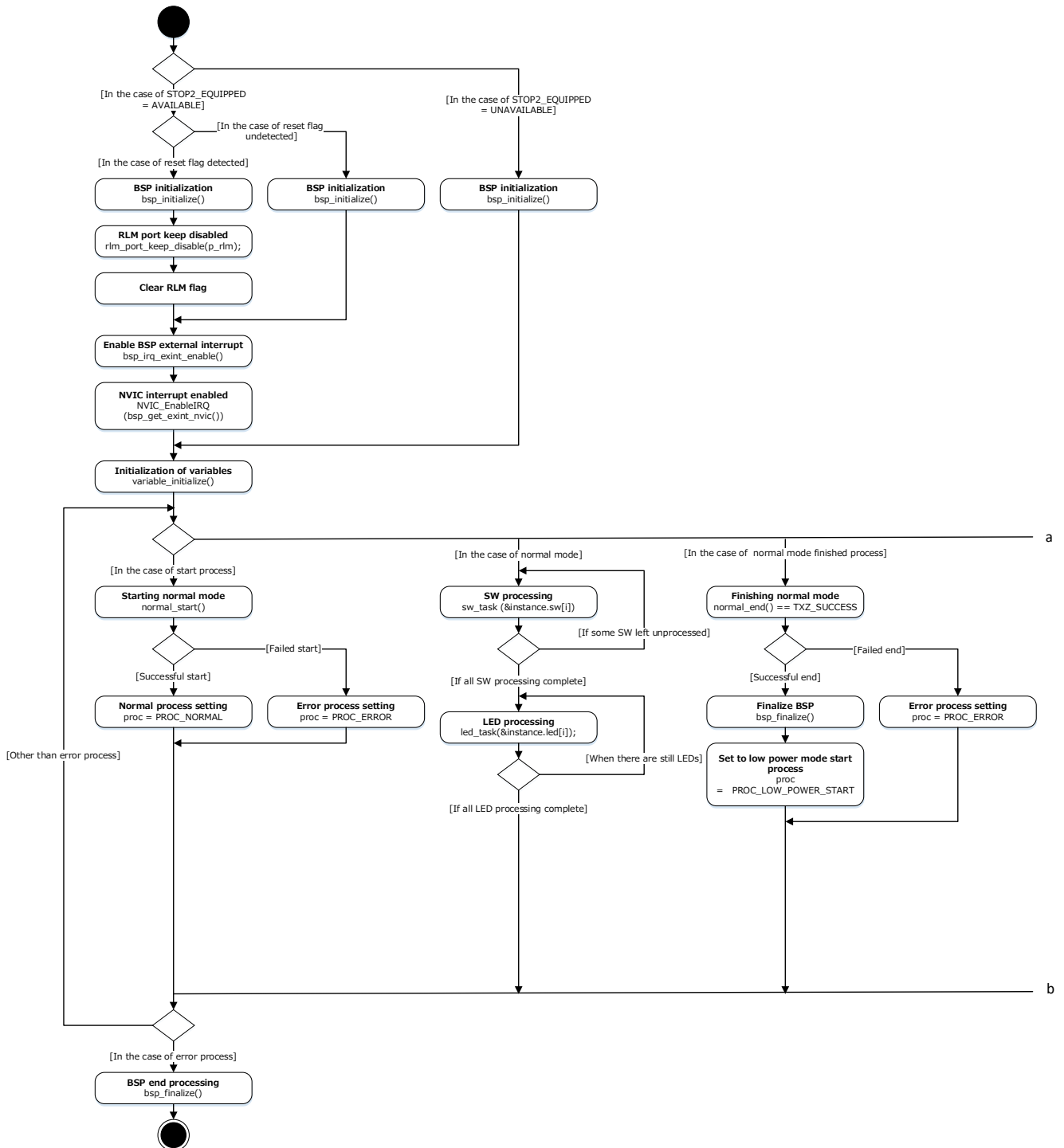
Configuration	Current Value	Description
CFG_LED_BLINK_FRQ	2	LED blink Cycle (Unit:Hz)
CFG_LED_BLINK_DUTY	0.5	LED blink Duty (50%)

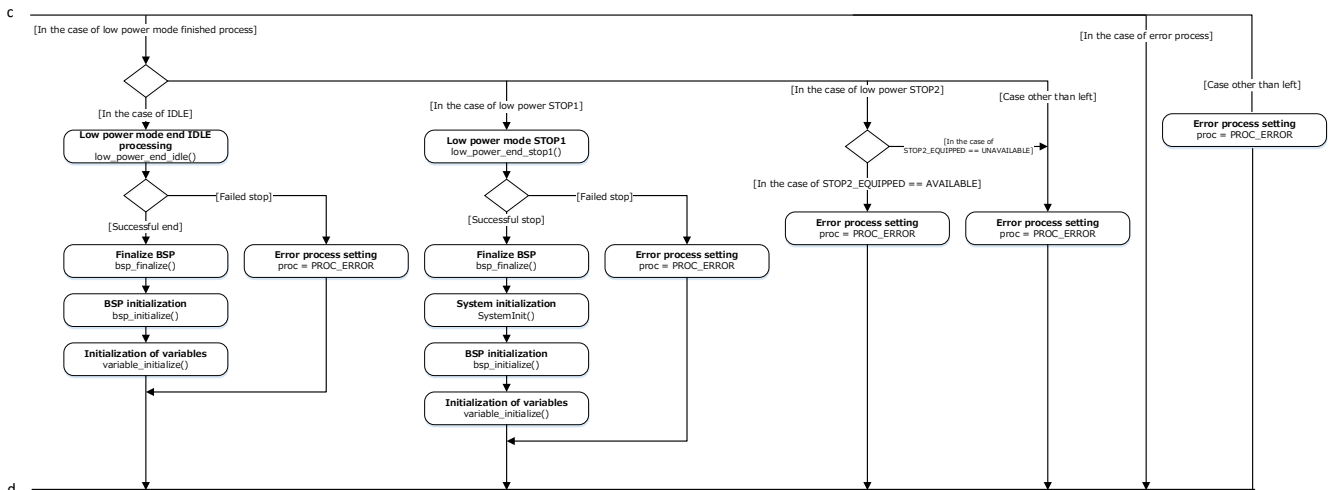
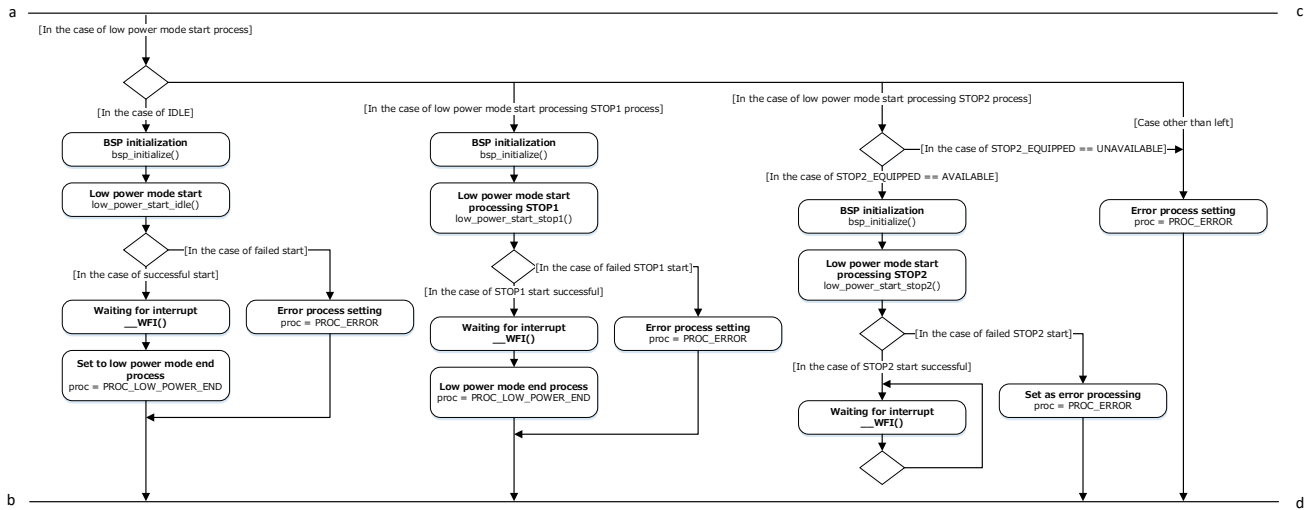
6.5. Example of Terminal Emulator Output

Nothing.

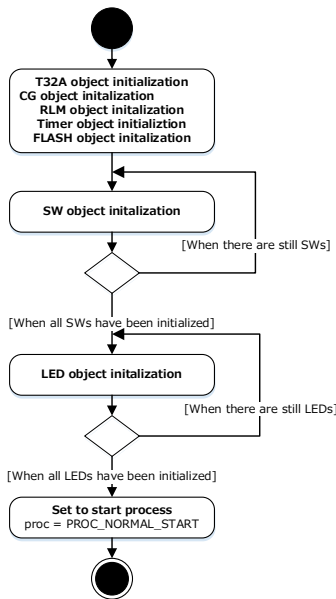
7. Activity diagram

7.1. main

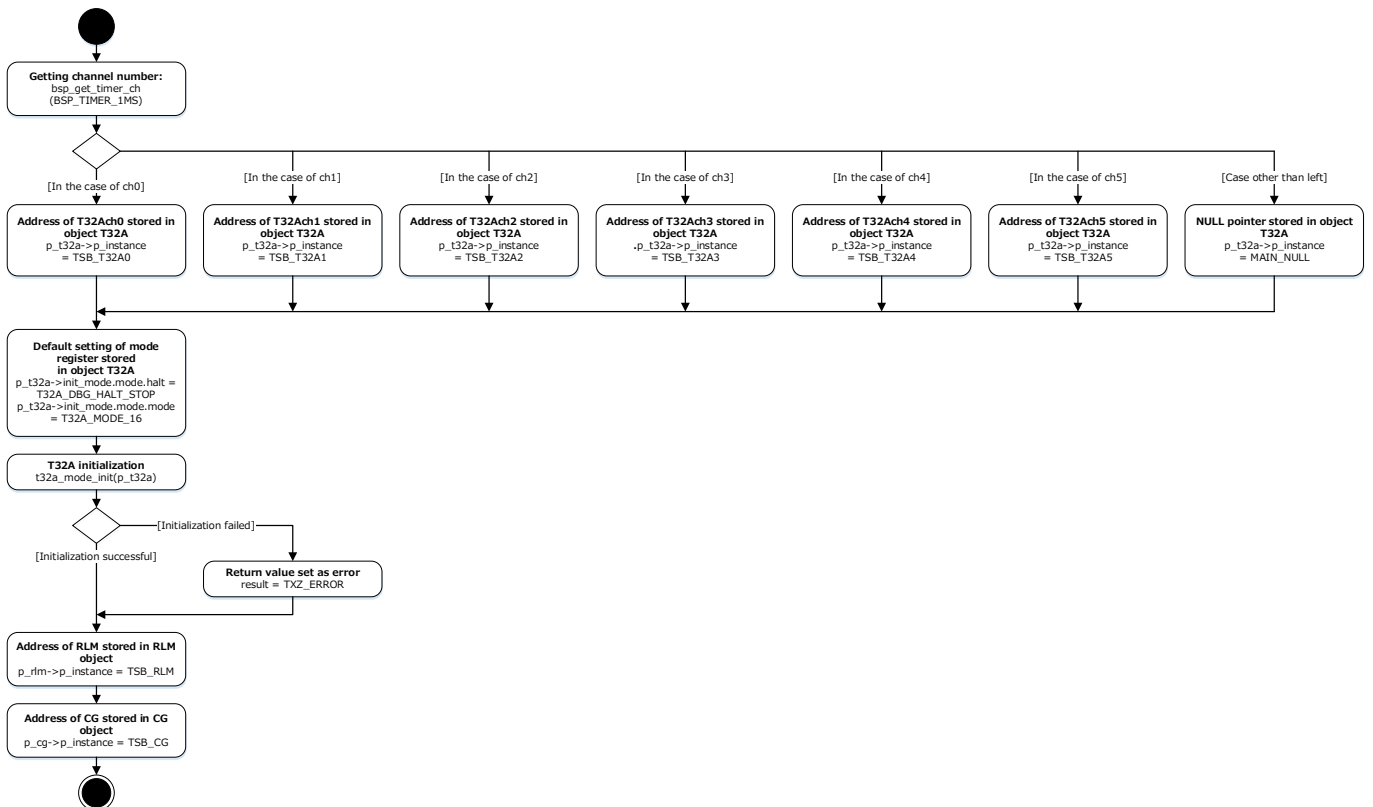




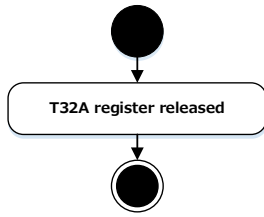
7.2. vaiable_initialize



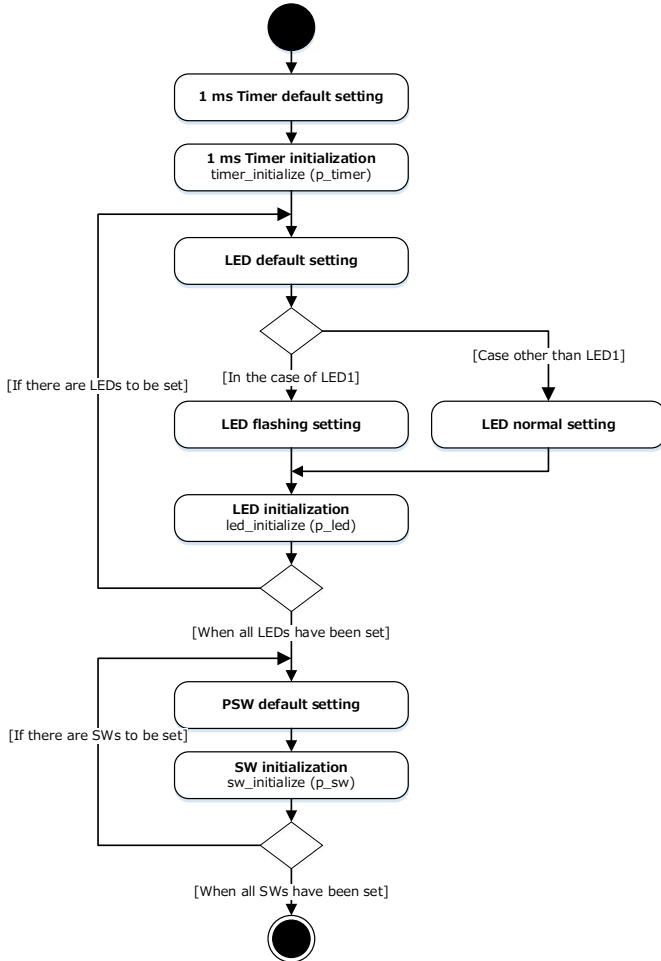
7.3. driver_initialize_normal



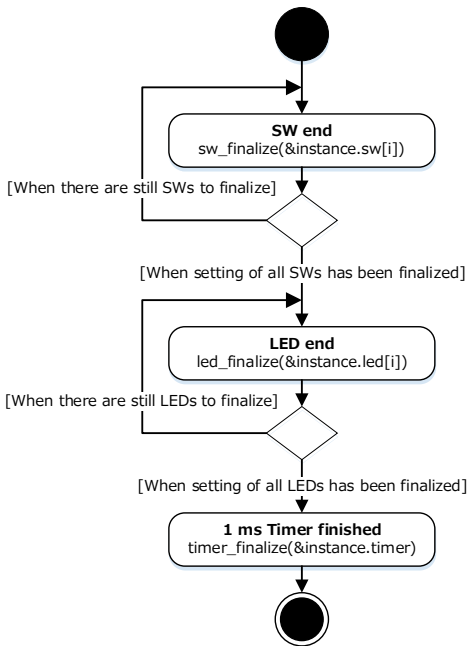
7.4. driver_finalize_normal



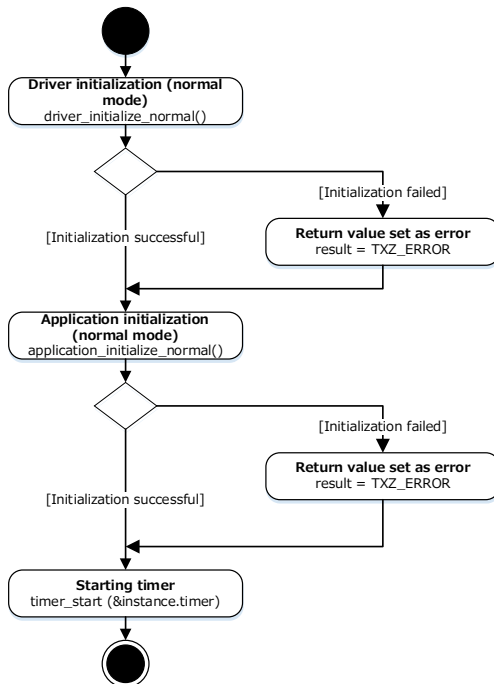
7.5. application_initialize_normal



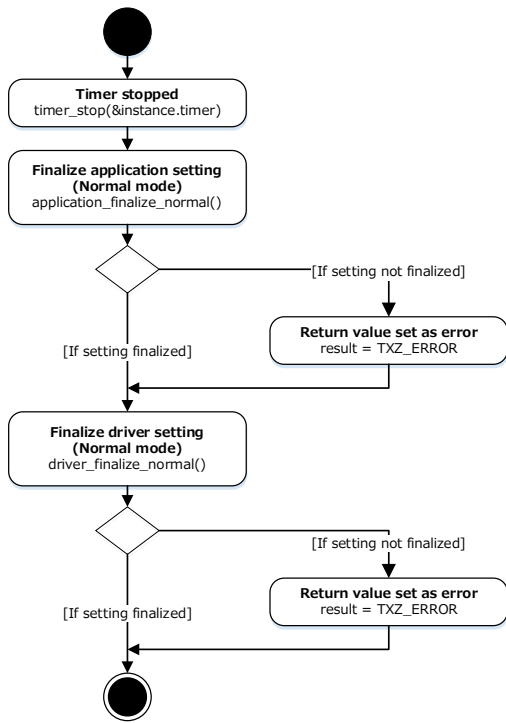
7.6. application_finalize_normal



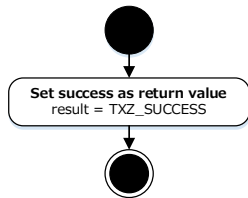
7.7. noraml_start



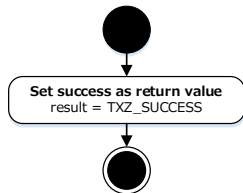
7.8. normal_end



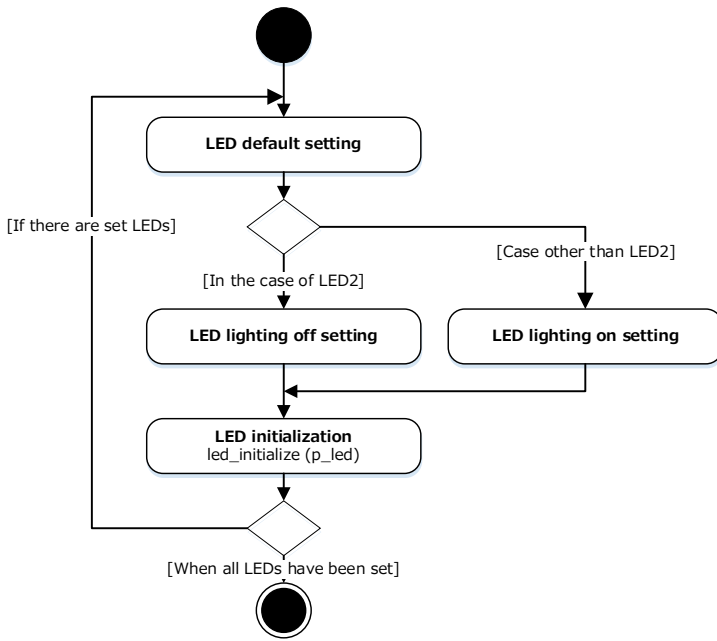
7.9. driver_initialize_idle



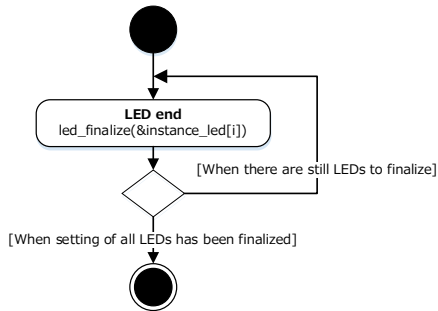
7.10. driver_finalize_idle



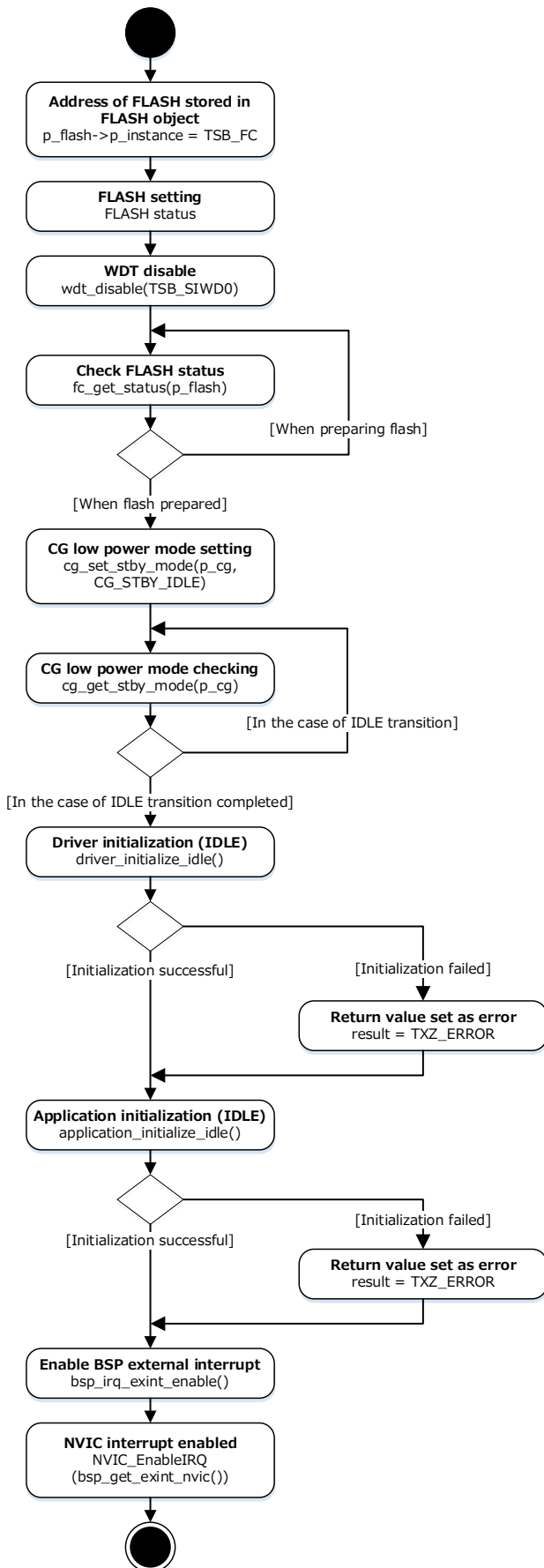
7.11. application_initialize_idle



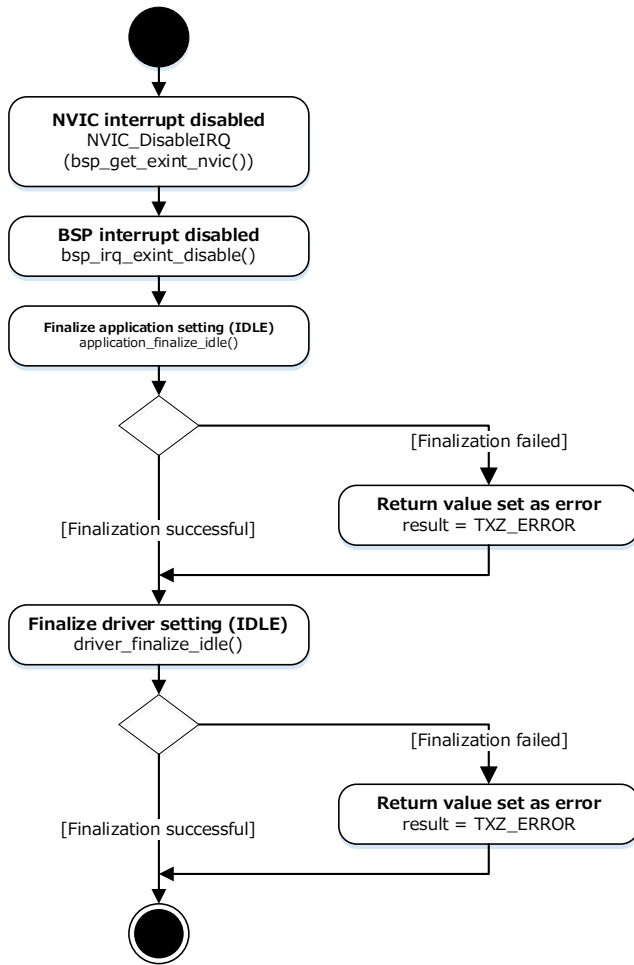
7.12. application_finalize_idle



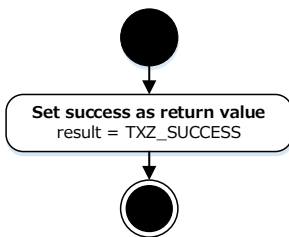
7.13. low_power_start_idle



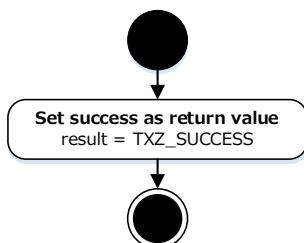
7.14. low_power_end_idle



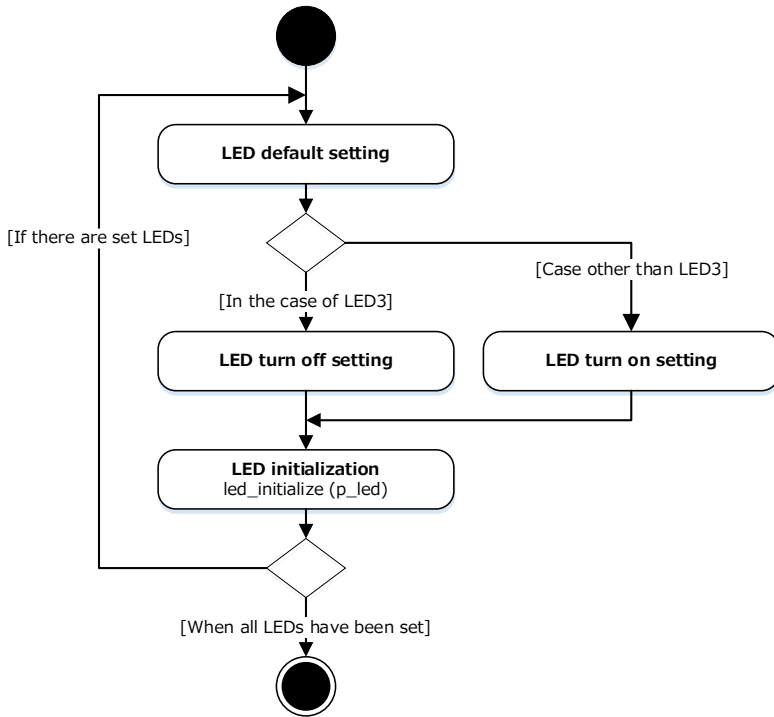
7.15. driver_initialize_stop1



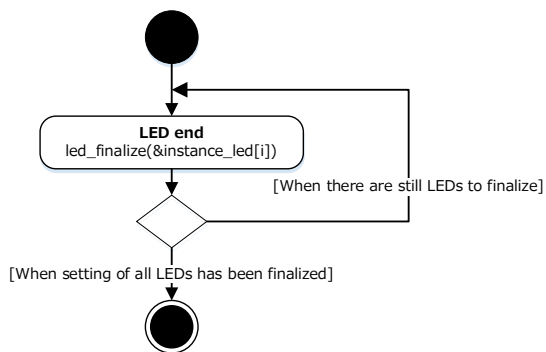
7.16. driver_finalize_stop1



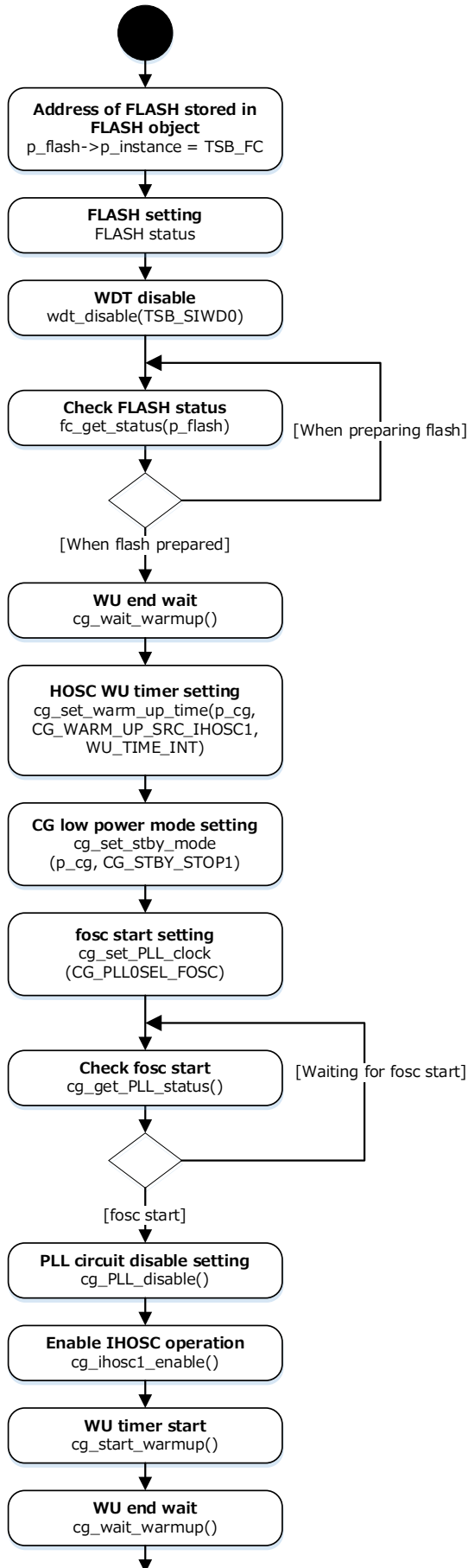
7.17. application_initialize_stop1

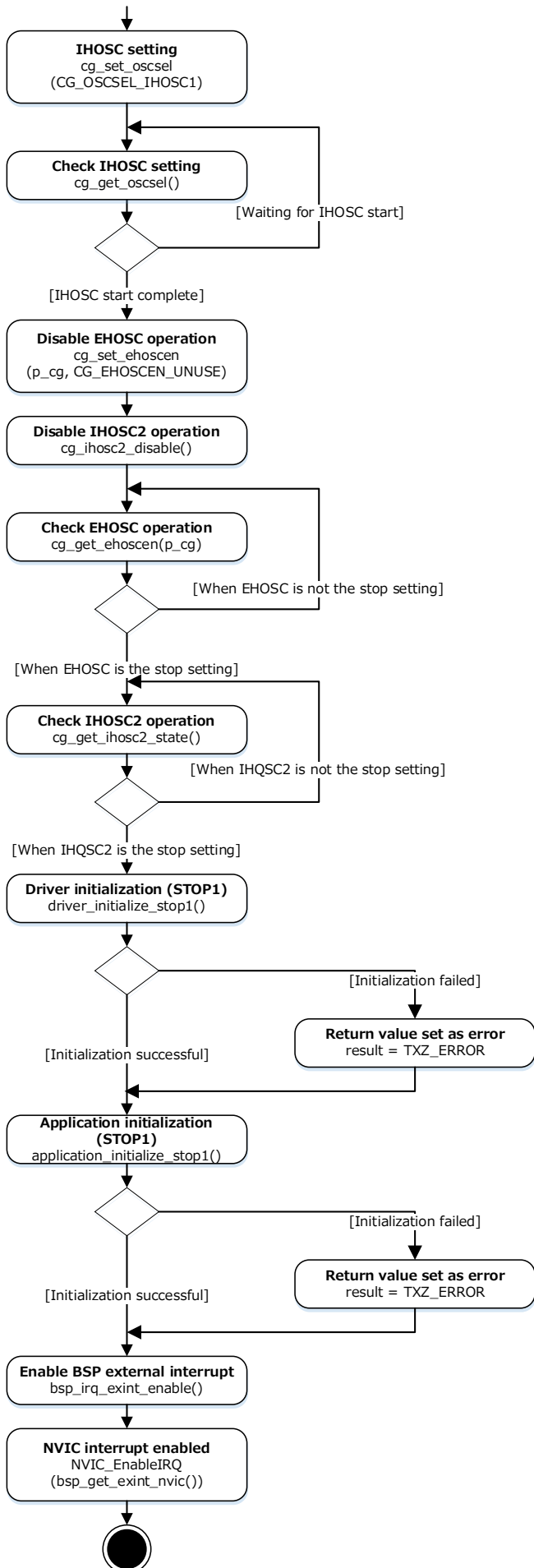


7.18. application_finalize_stop1

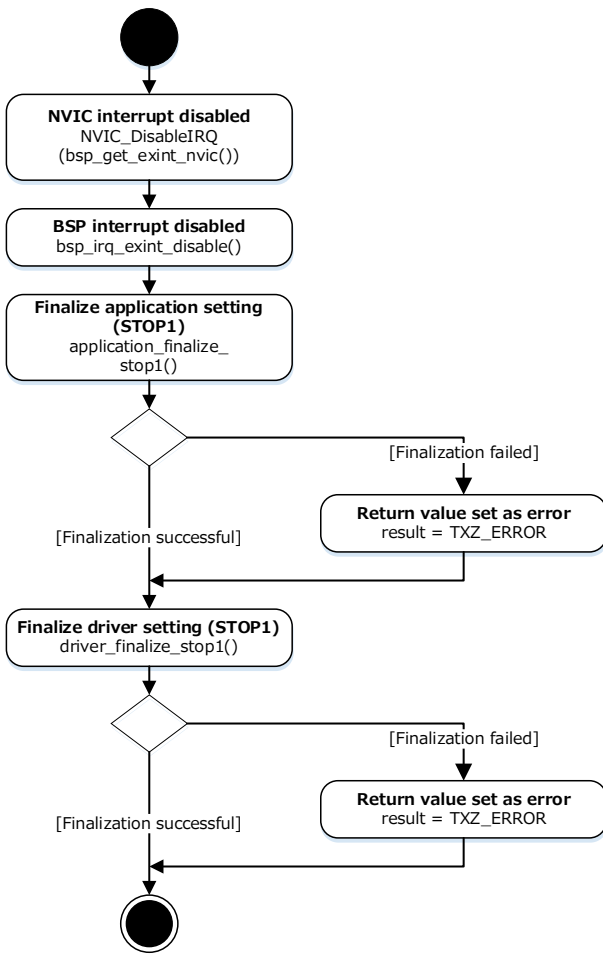


7.19. low_power_start_stop1

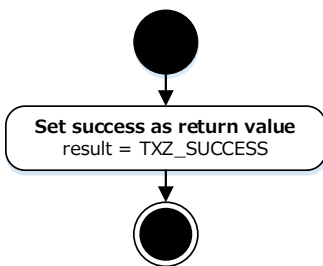




7.20. low_power_end_stop1

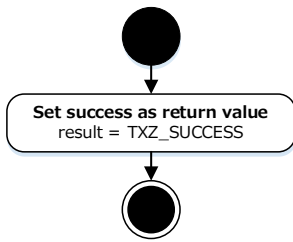


7.21. driver_initialize_stop2



When STOP2_EQUIPPED is defined

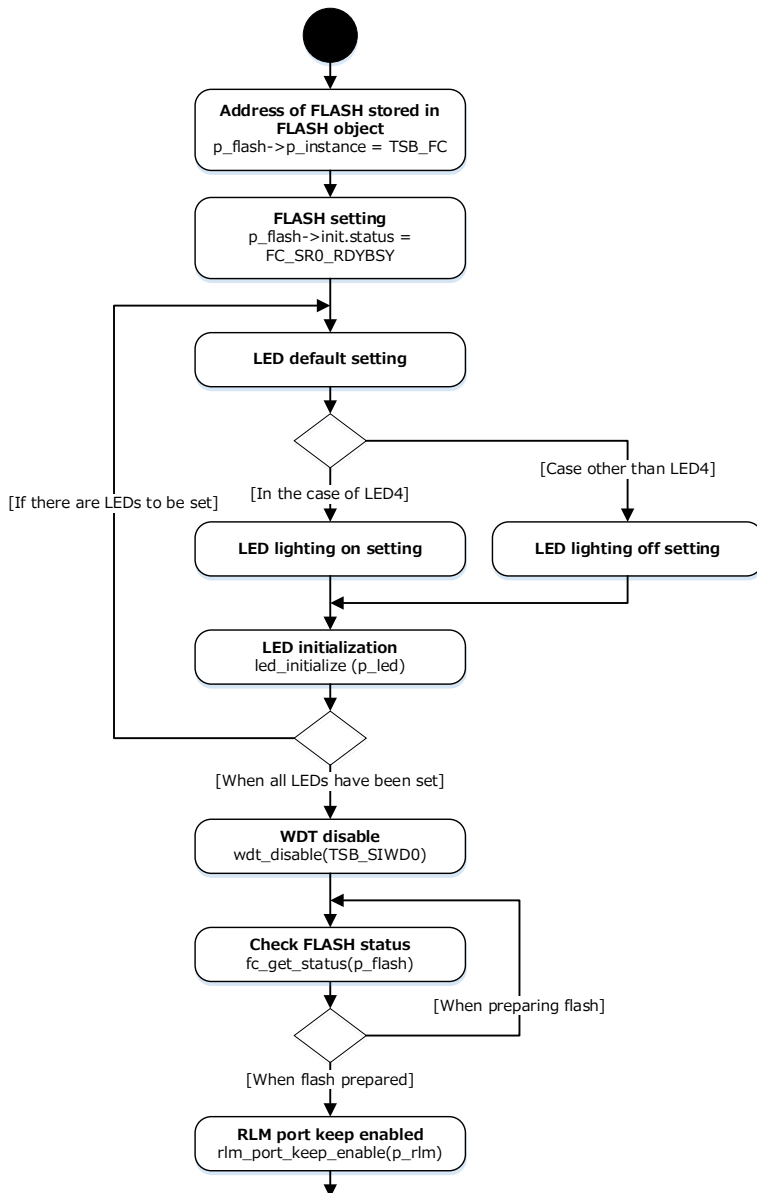
7.22. application_initialize_stop2

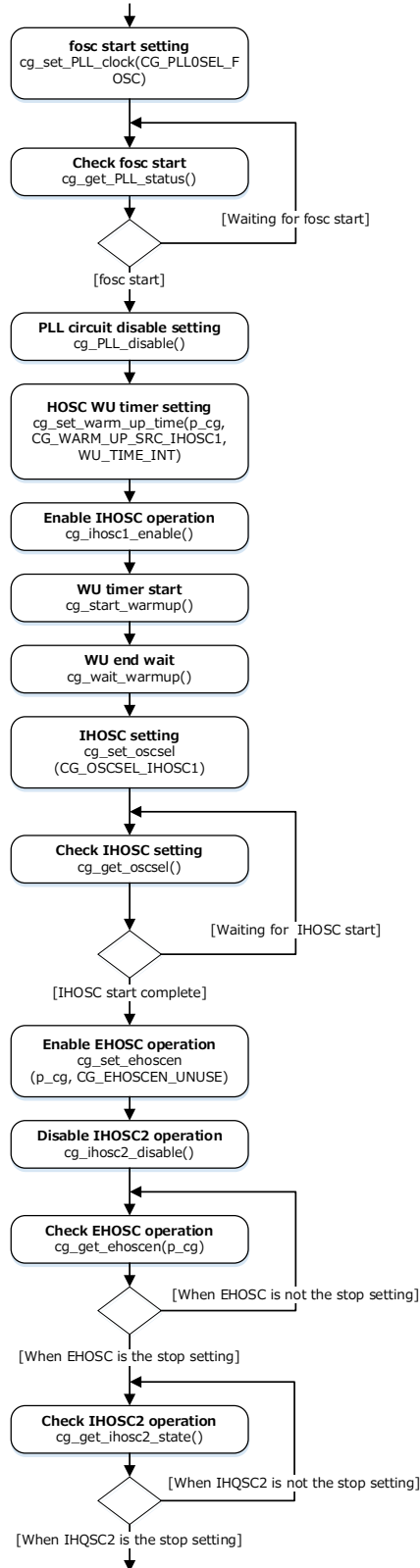


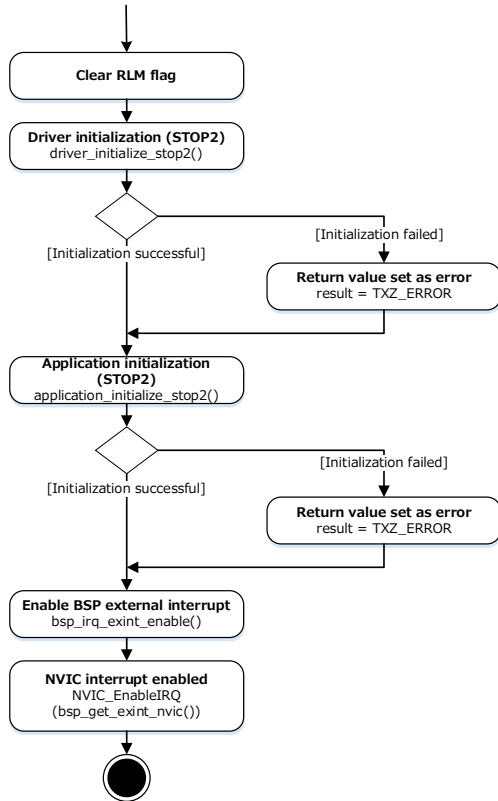
When STOP2_EQUIPPED is defined

7.23. low_power_start_stop2

When STOP2_EQUIPPED is defined

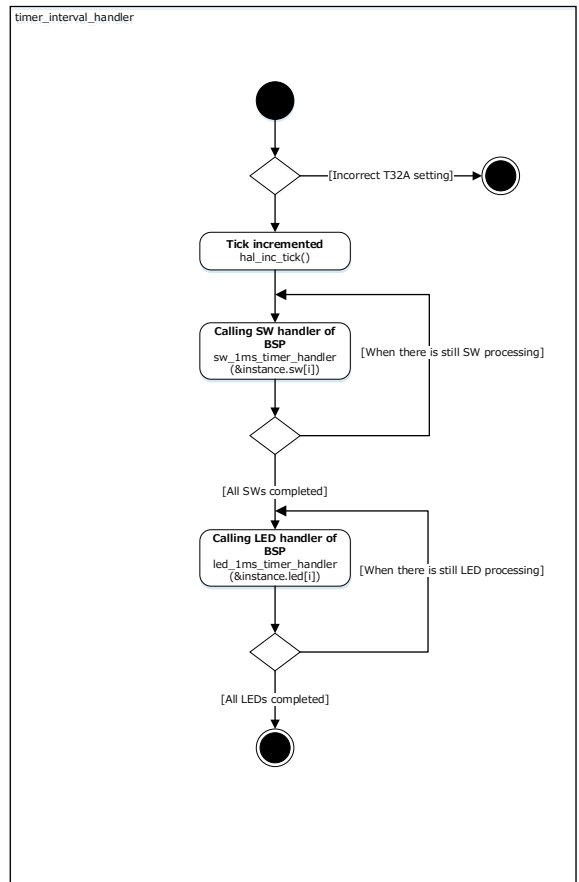
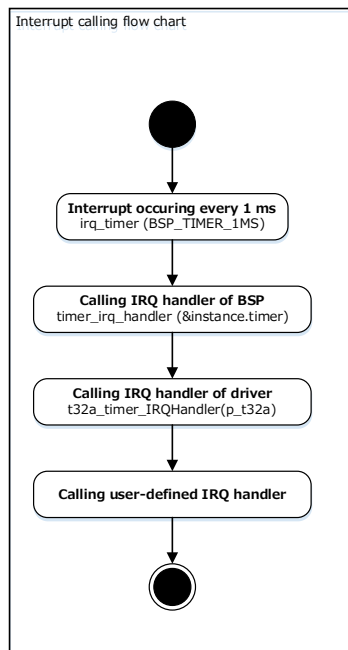
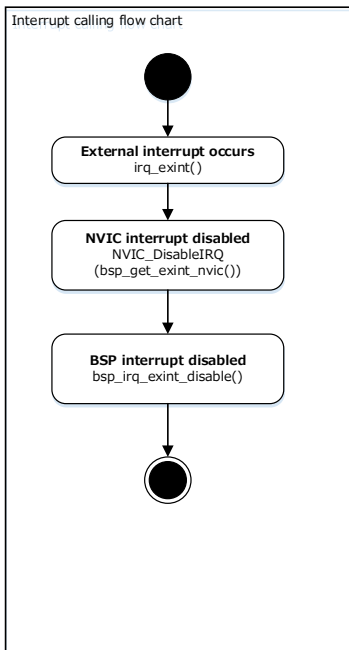


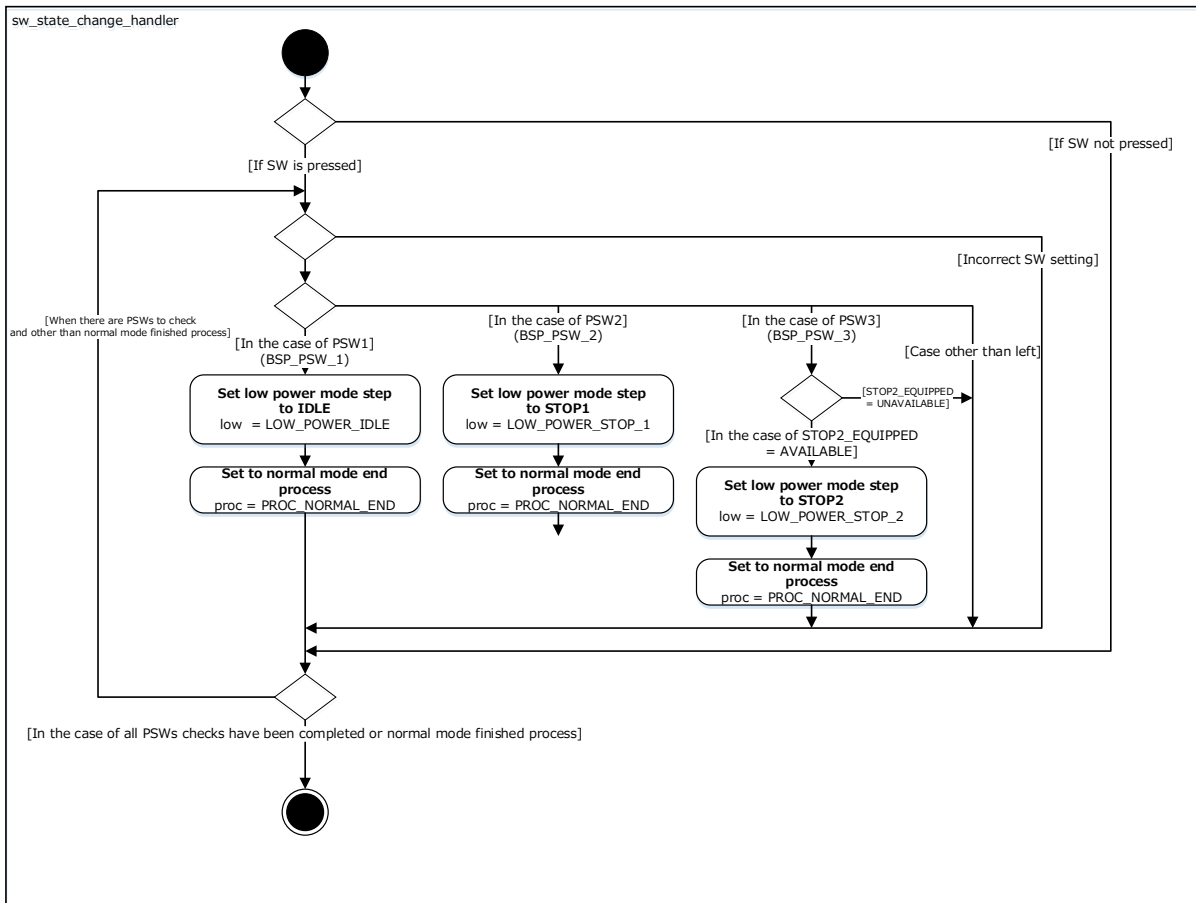




When STOP2_EQIPPED is defined

7.24. Interrupt





8. Revision History

Revision	Date	Description
1.0	2023-10-16	First release

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