

Application Note

TSPI MASTER RECEIVE (TSPI-E)

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1. Preface

This application note describes the sample software for TSPI_MASTER_RECEIVE using Serial Peripheral Interface (SPI).

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
CRC	Cyclic Redundancy Check
DMA	Direct Memory Access
Timer	T32A:32-bit Timer Event Counter
TSPI	TOSHIBA Serial Peripheral Interface

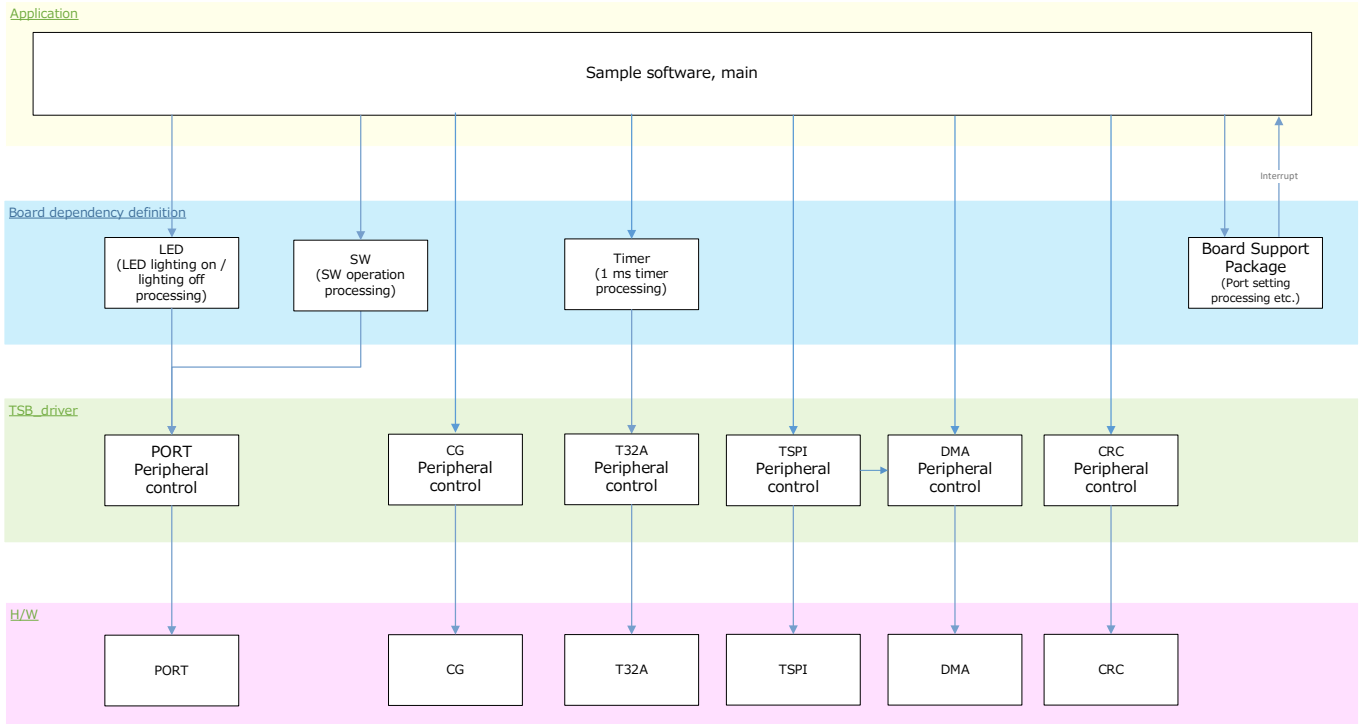
3. Reference Document

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
TSPI_MASTER_RECEIVE	Sample program of SPI function (Master Receive)

5. Configuration Diagram



6. Sample Program:TSPI_MASTER_RECEIVE

This sample software that uses the Master receive processing function of the SPI communication function to enter the reception waiting state when the switch is pressed, and switches the LED turn on / turn off each time data receive is completed.

This sample software allows you to select FIFO_MODE or DMA_MODE.

6.1. Outlines of Operation

Turns off BSP_LED_1, BSP_LED_3, and BSP_LED_4.

When BSP_PSW_1 is pressed, BSP_LED_3 and BSP_LED_4 are turned off and data for the data size is received. Switches the lighting status (turn on / turn off) of BSP_LED_1.

When an SPI read error occurs, BSP_LED_3 is turn on.

When CRC does not match, BSP_LED_4 is turn on.

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
TSPI	BSP_TSPI_1	SPI Communication
T32A	BSP_T32A_TIMER_1	Interval timer
PORT(Push-Switch)	BSP_PSW_1	Event Trigger
PORT(LED)	BSP_LED_1	For operation check
	BSP_LED_3	For operation check
	BSP_LED_4	For operation check

6.3. Interrupt to Use

Interrupt	Outlines
INTT32A00A	T32A Timer_A Timer counter increment every 1ms for SW processing
*1	SPI receive interrupt
*2	SPI error interrupt
INTDMAATC	DMA transmit end interrupt
INTDMAAERR	DMA error interrupt

*1 For SBK-M4KN, "INTSC0RX", for AdBun-M3HQF10, "INTT1RX"

*2 For SBK-M4KN, "INTSC0ERR", for AdBun-M3HQF10, "INTT1ERR"

6.4. Configuration

"main.c" configuration setting.

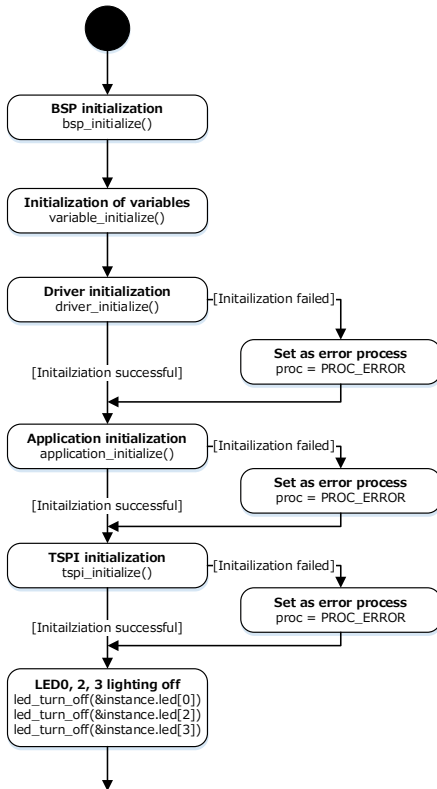
Configuration	Current Value	Description
DATA_LENGTH	10	Data size (Unit: byte) Set to 16 by setting the compile switch CHK_CODE.
CHK_CODE	CHK_CODE_CRC16	CHK_CODE_CRC16 and CHK_CODE_CRC32 can be switched
RX_MODE	FIFO_MODE	FIFO_MODE and DMA_MODE can be switched
RX_FILL_LEVEL	4	Receive Fill level setting

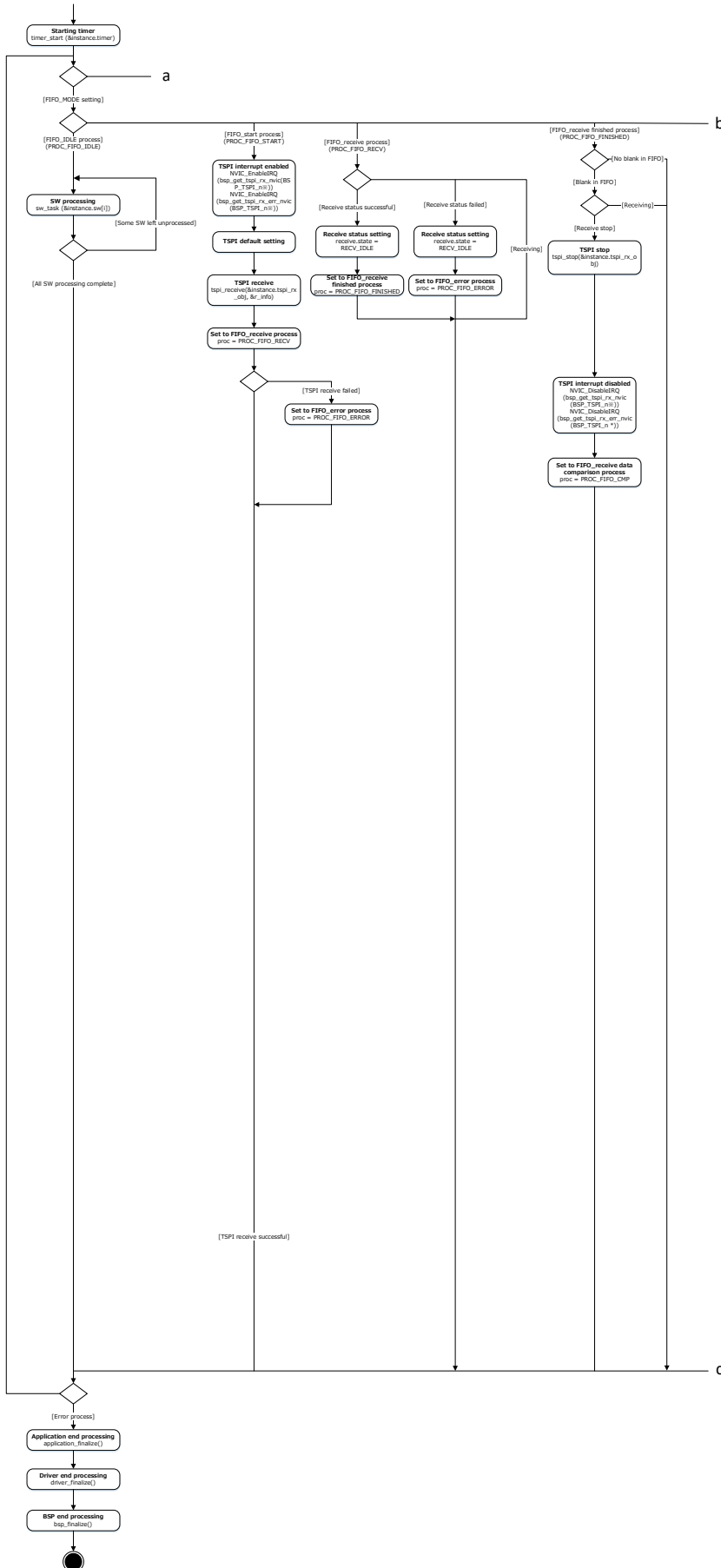
6.5. Example of Terminal Emulator Output

Nothing.

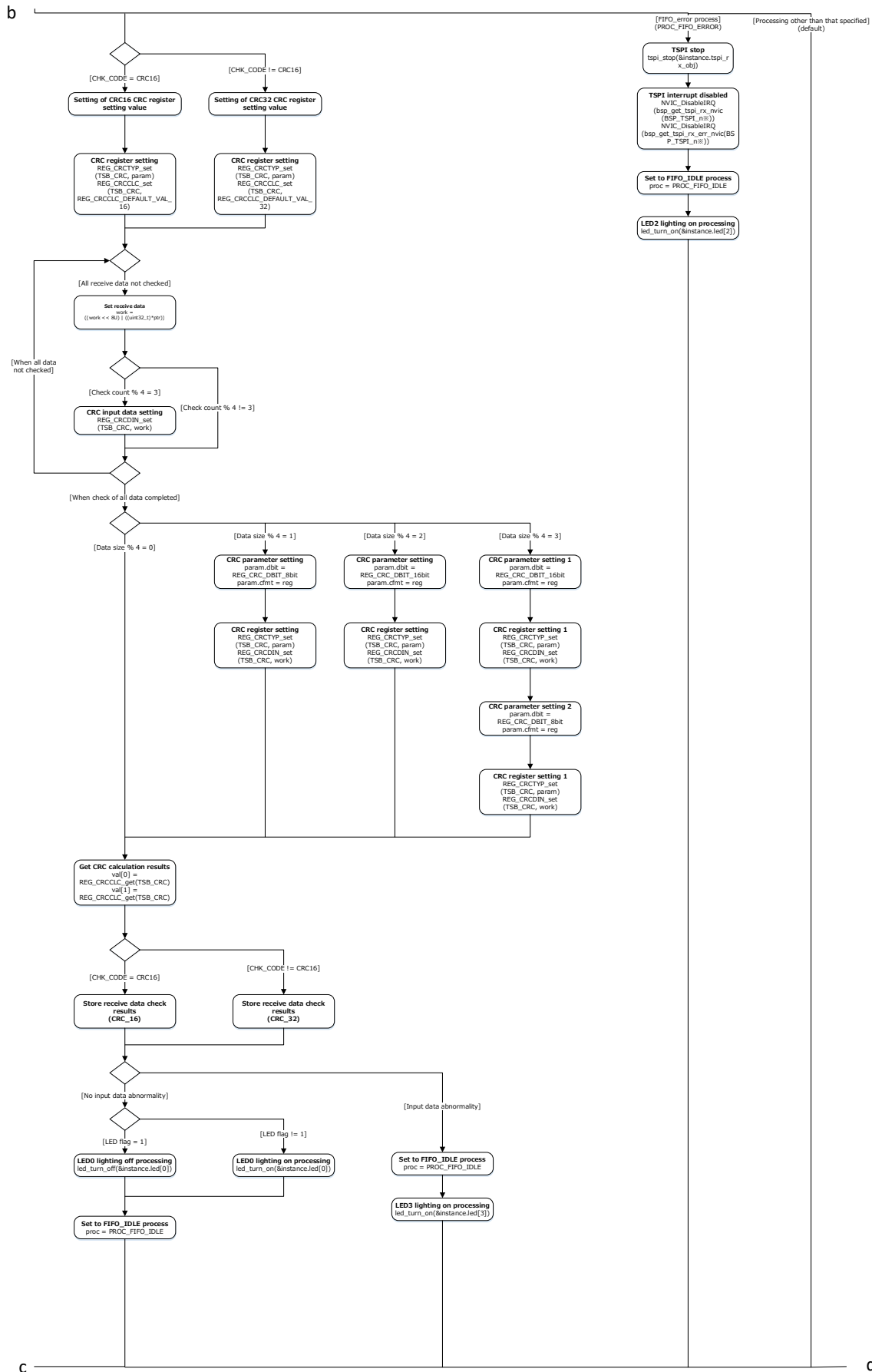
7. Activity diagram

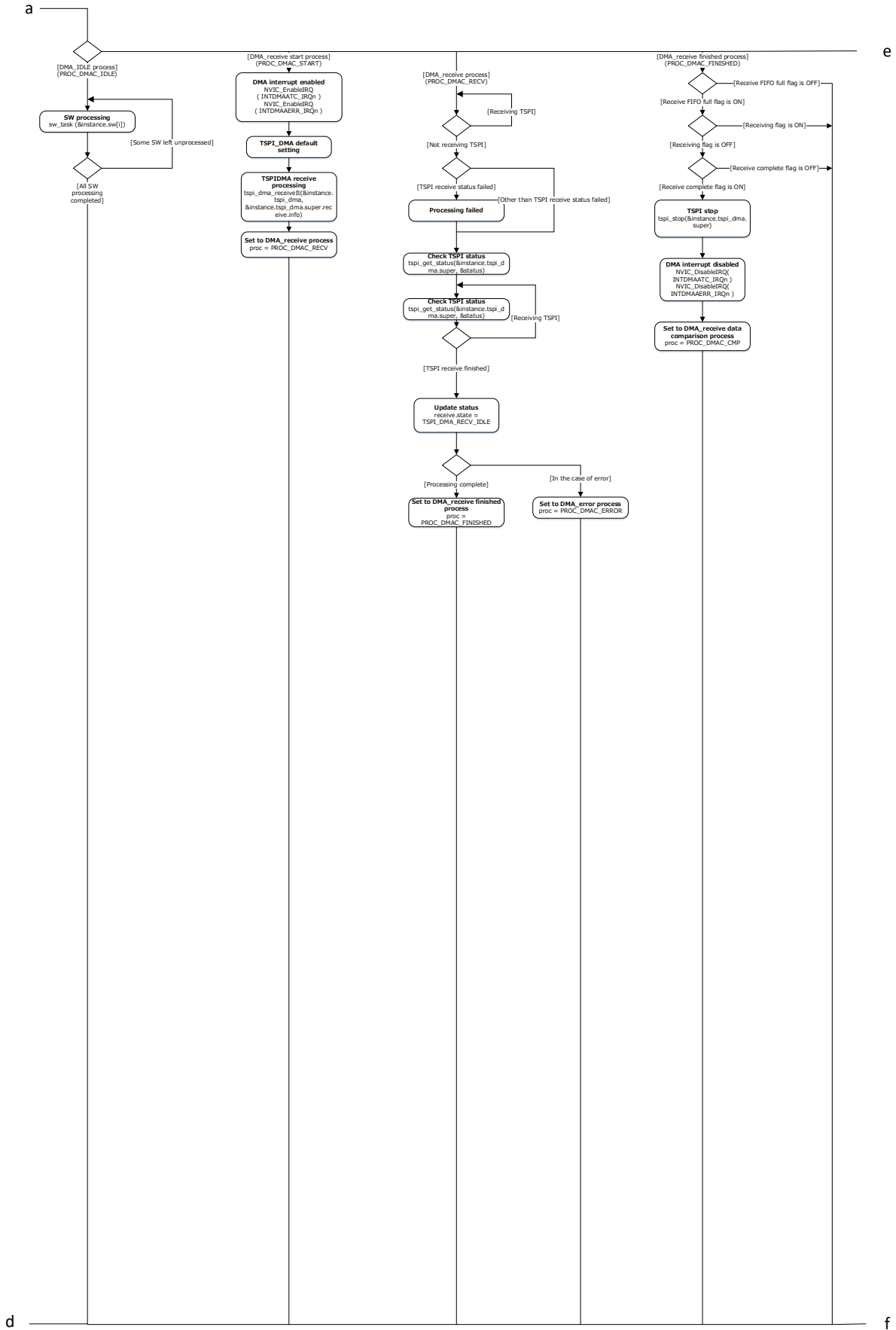
7.1. main

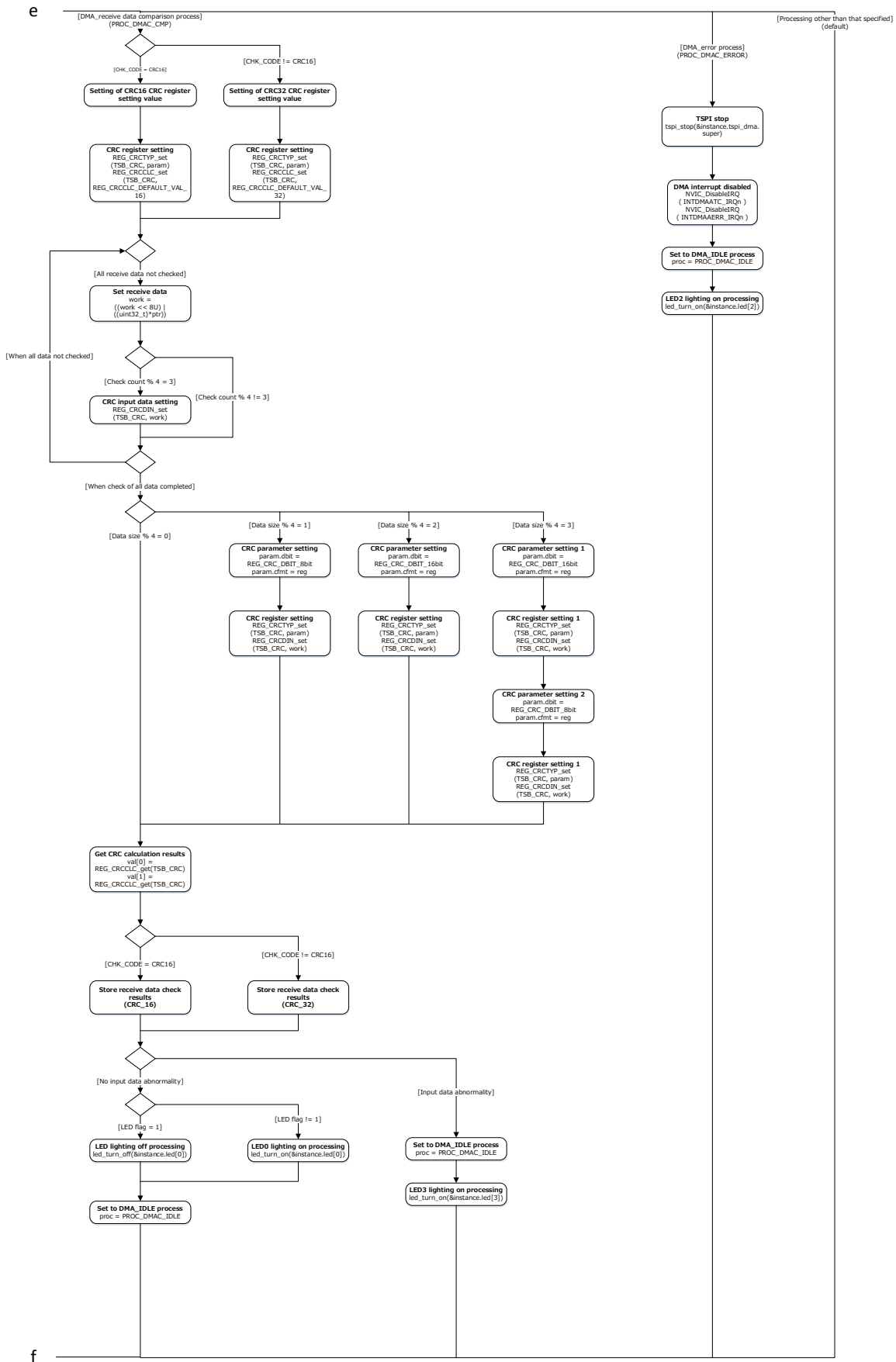




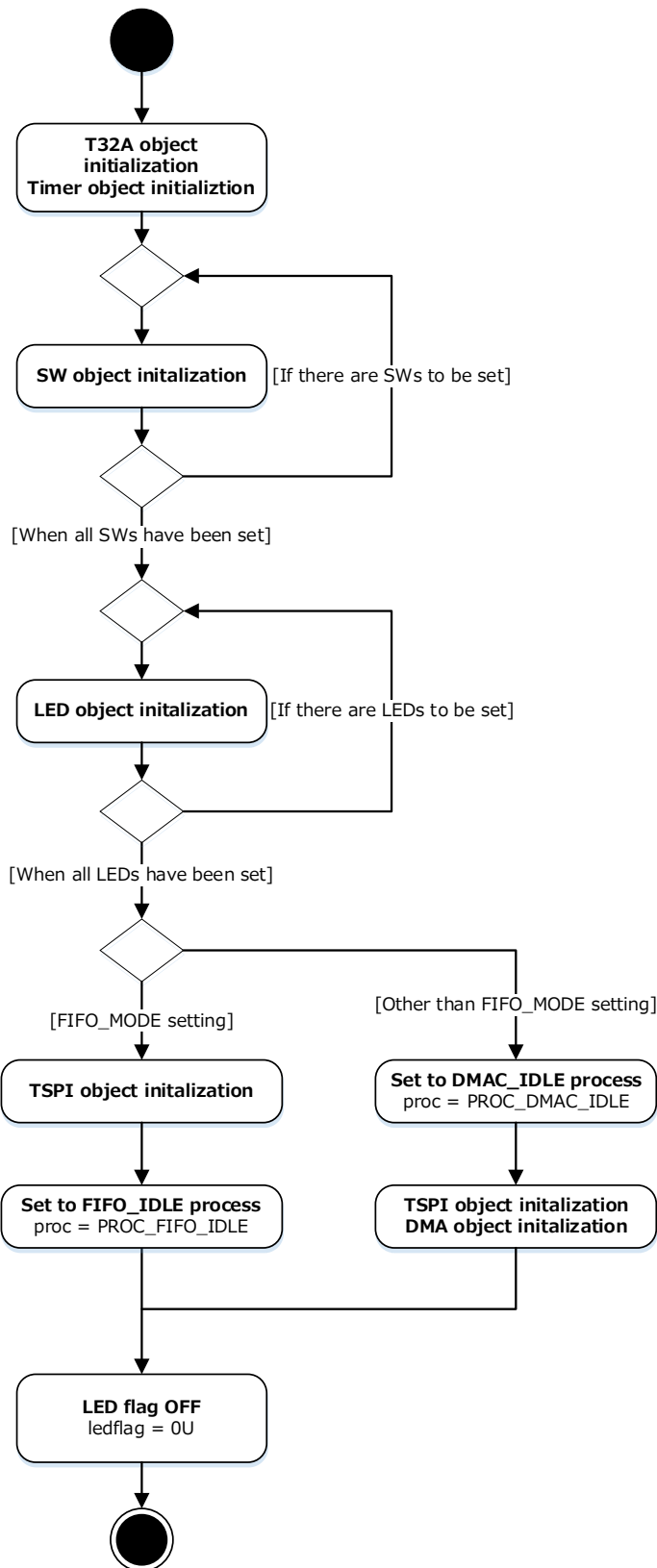
* In the case of M4KN/MN, n=0; in the case of M3H, n=1



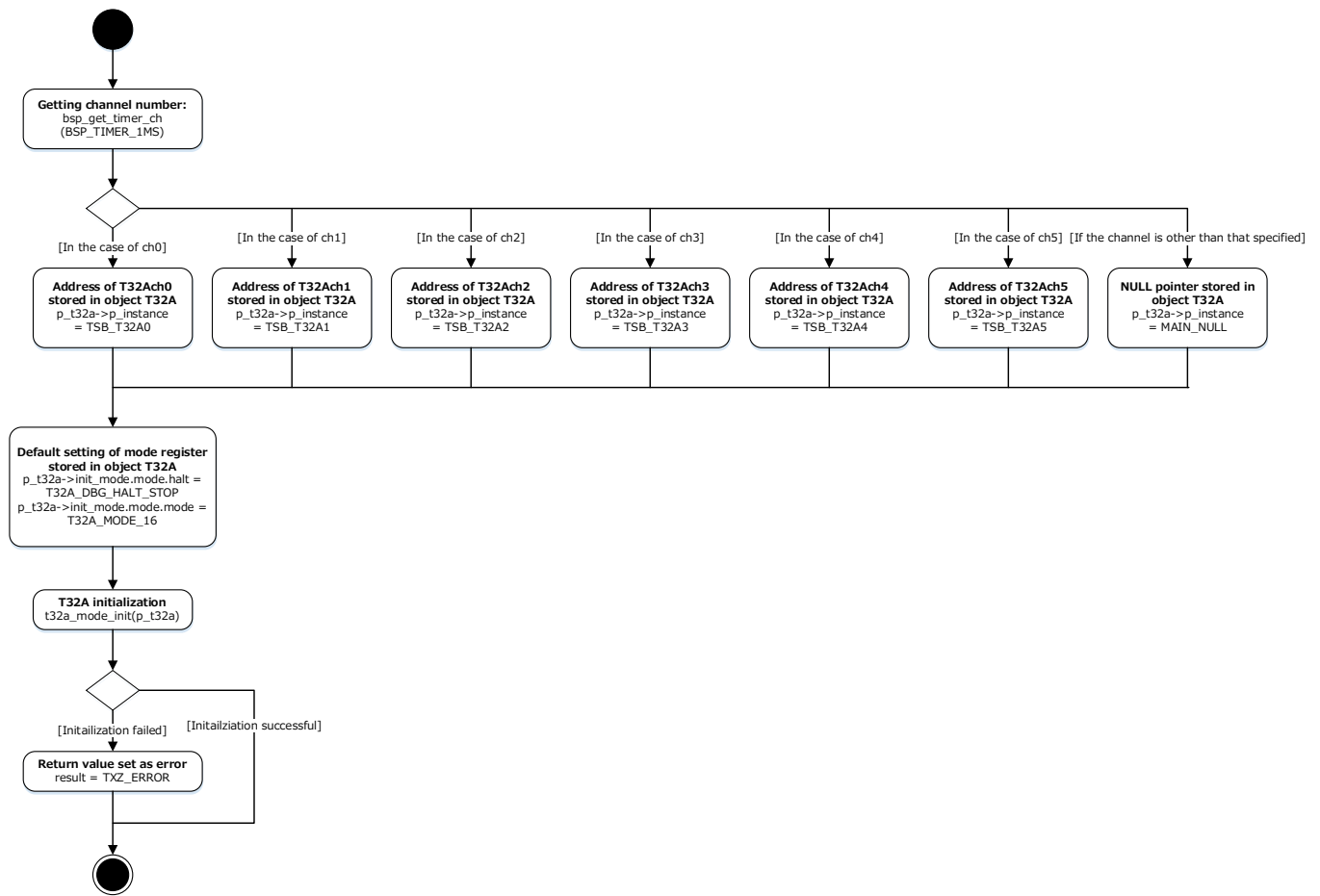




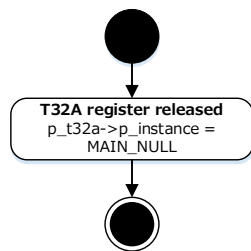
7.2. variable_initialize



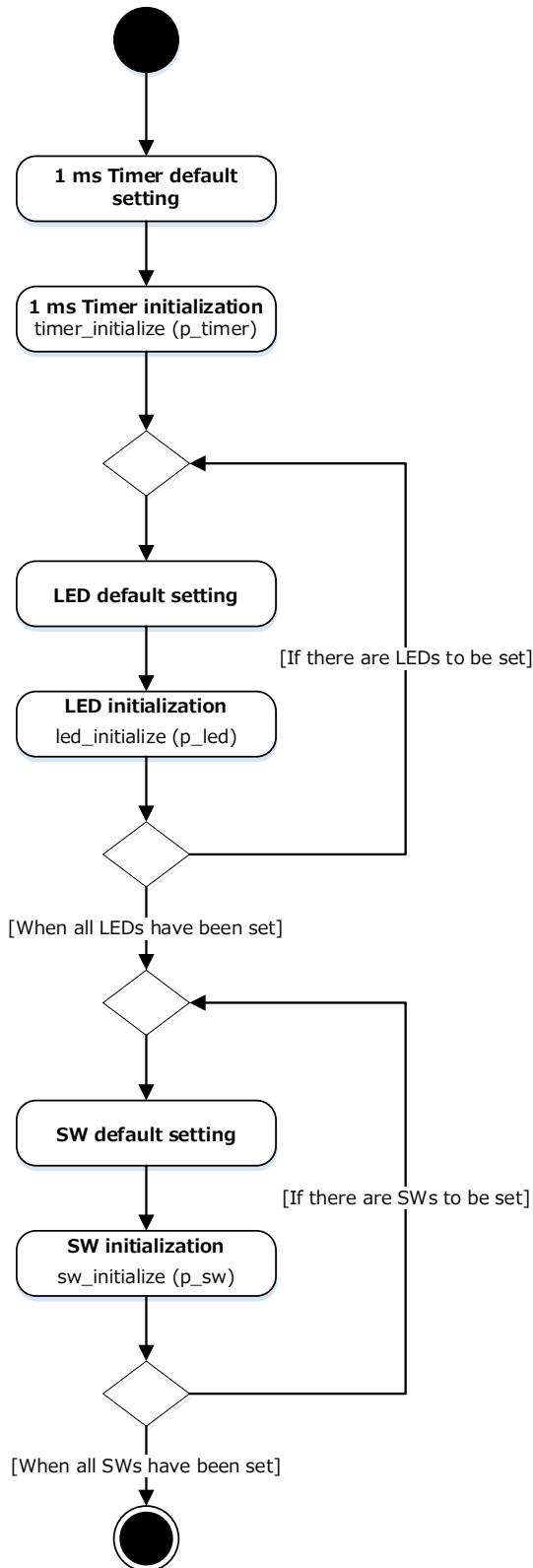
7.3. driver_initialize



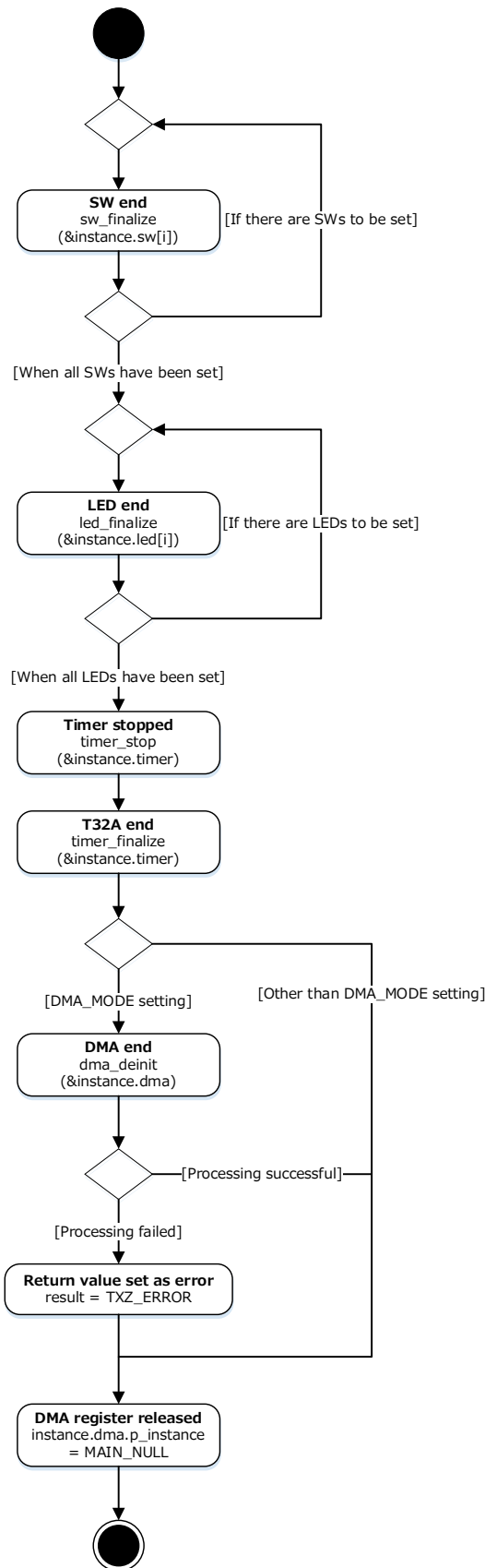
7.4. driver_finalize



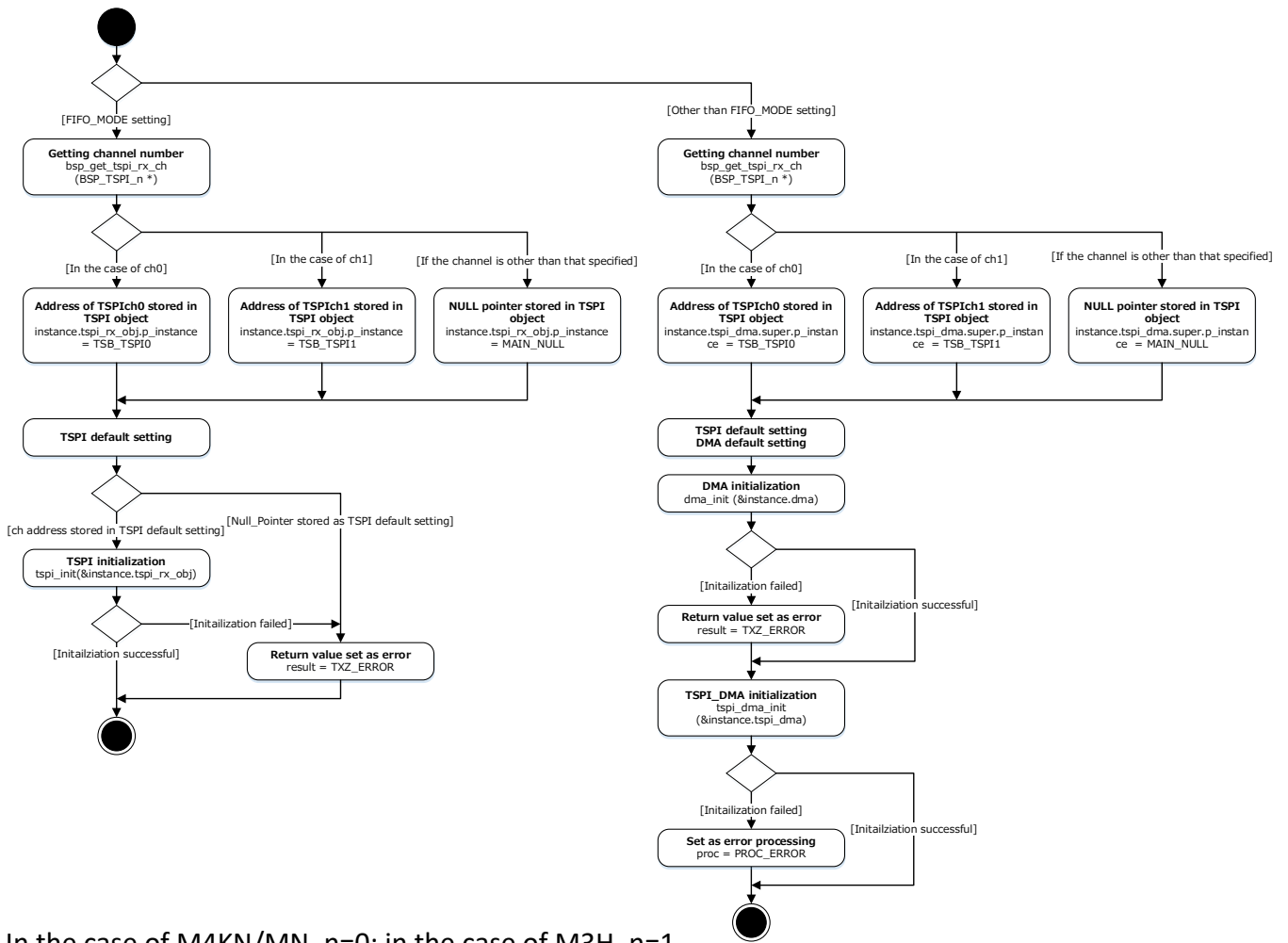
7.5. application_initialize



7.6. application_finalize

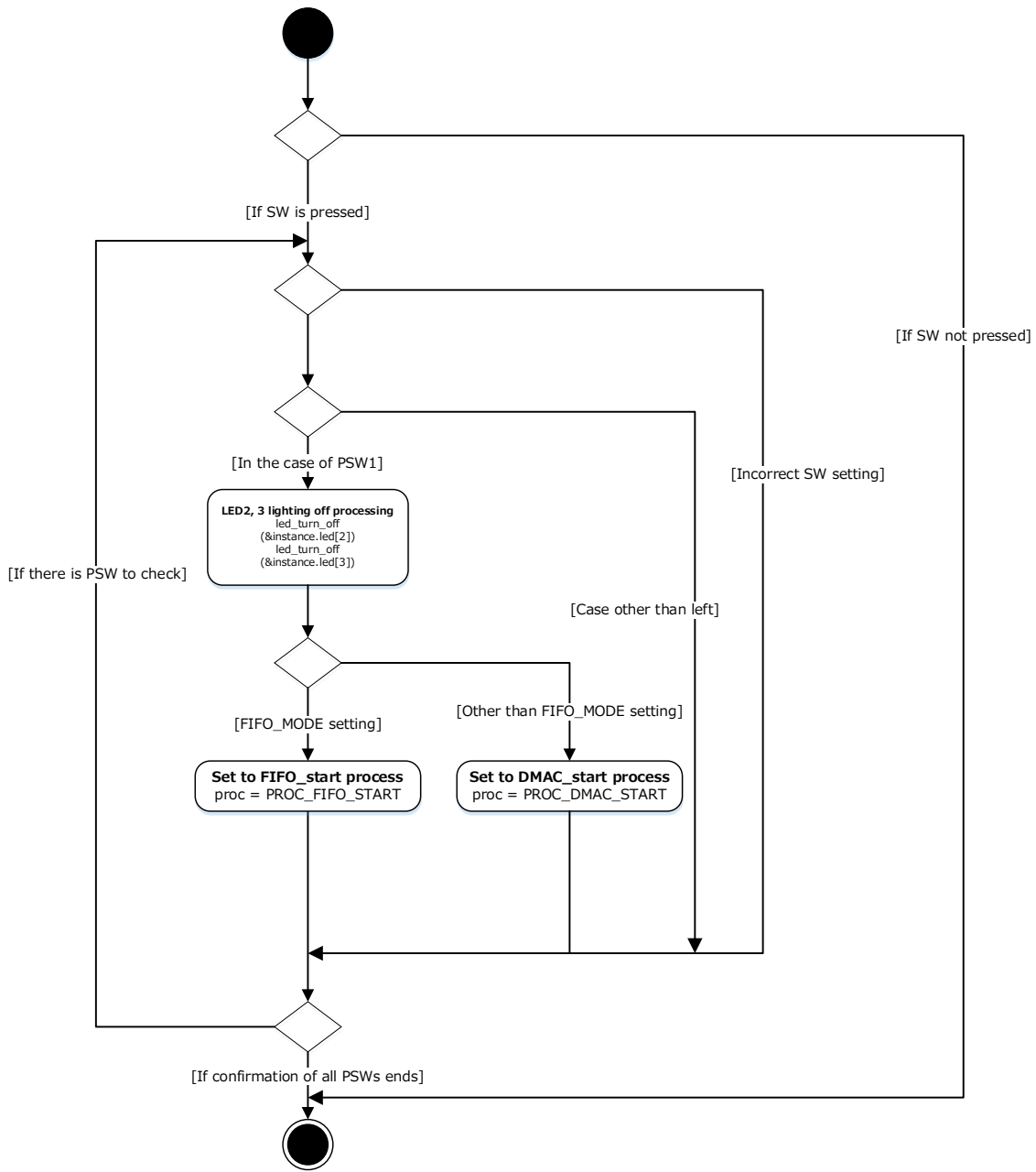


7.7. tspi_initialize

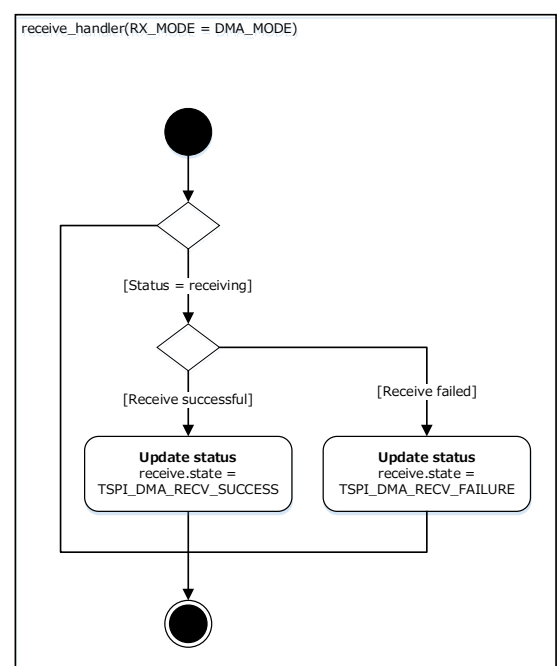
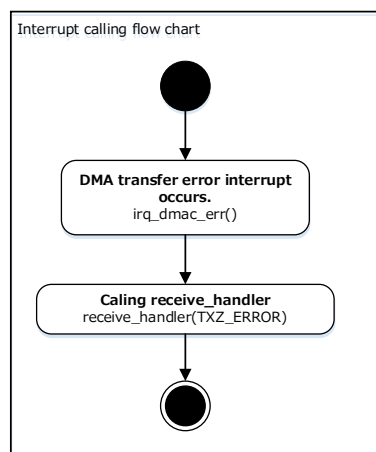
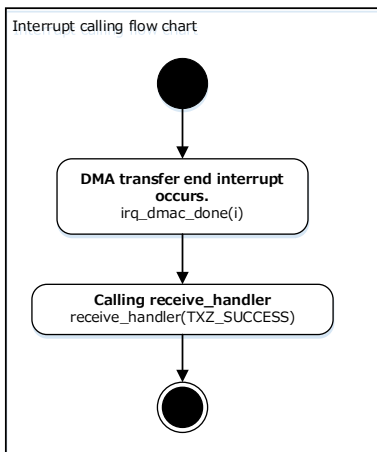
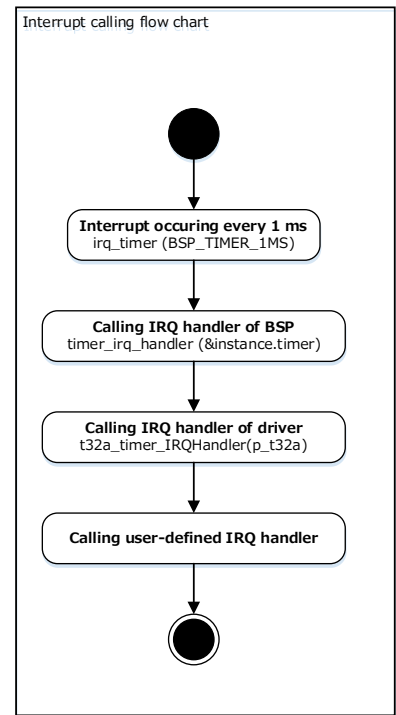
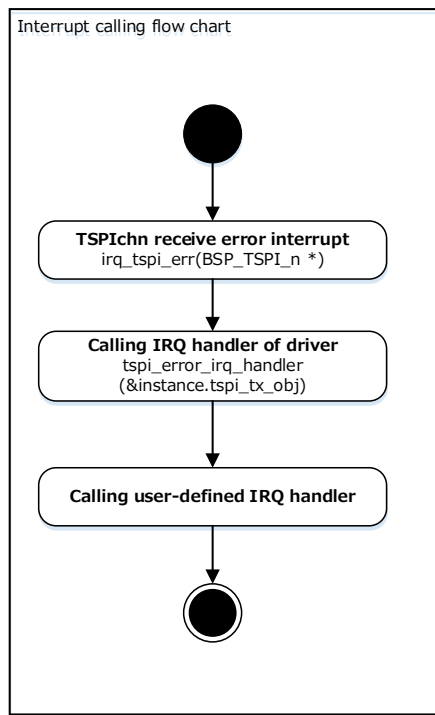
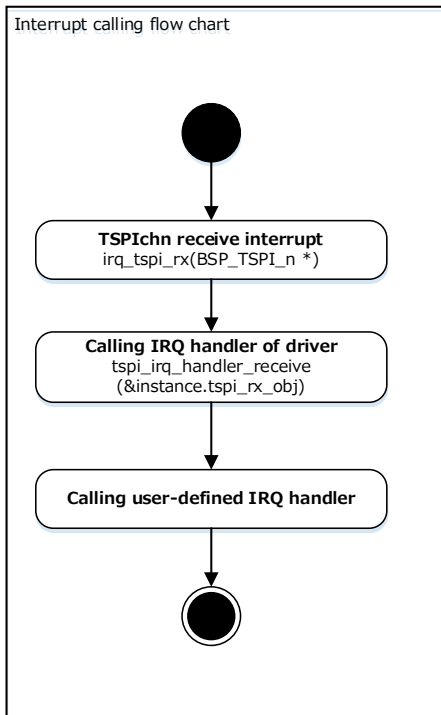


* In the case of M4KN/MN, n=0; in the case of M3H, n=1

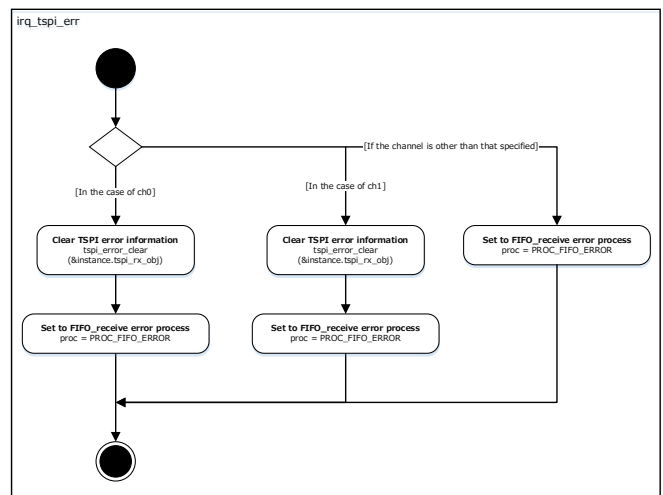
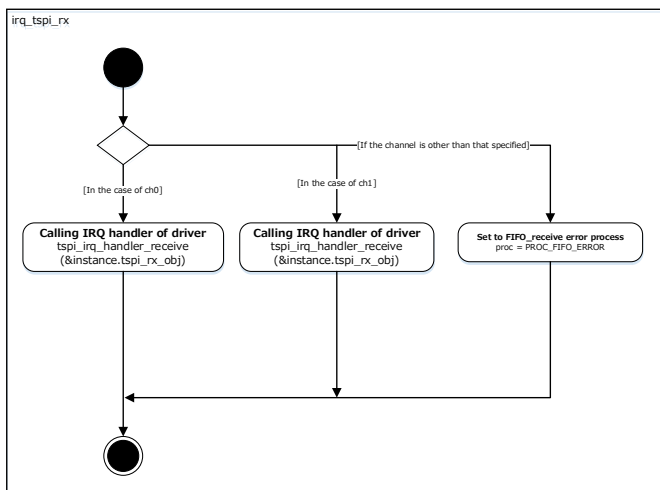
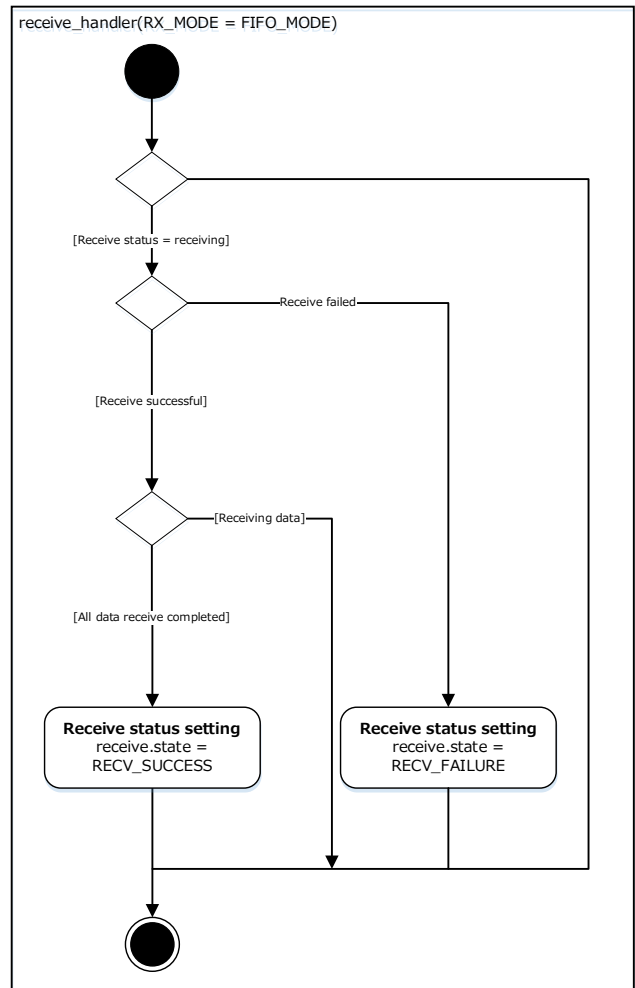
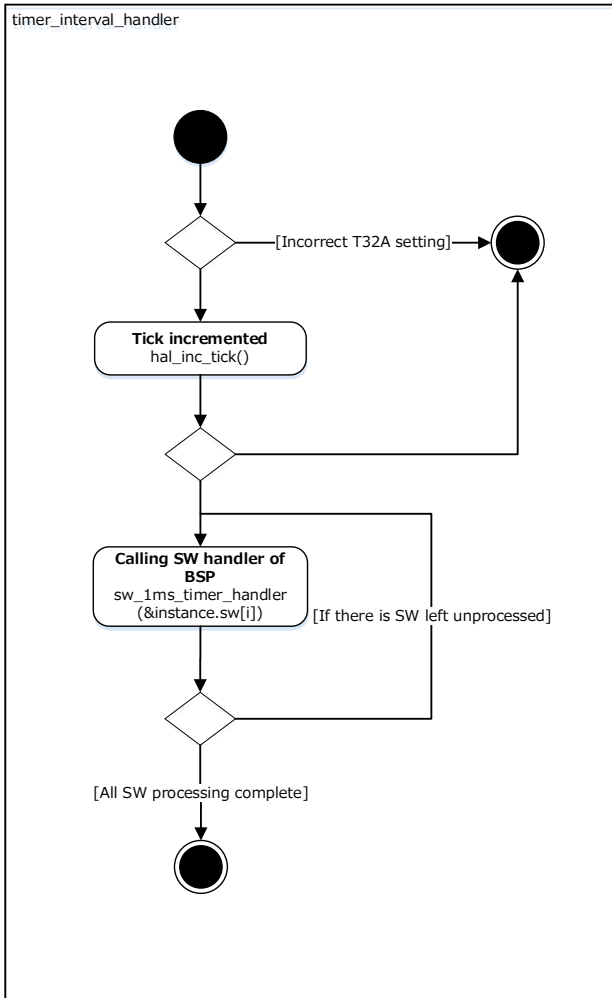
7.8. sw_state_change_handler



7.9. Interrupt



* In the case of M4KN/MN, n=0; in the case of M3H, n=1



8. Revision History

Revision	Date	Description
1.0	2023-10-16	First release

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