

Application Note

TSPI SLAVE RECEIVE (TSPI-E)

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1. Preface

This application note describes the sample software for TSPI_SLAVE_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 |

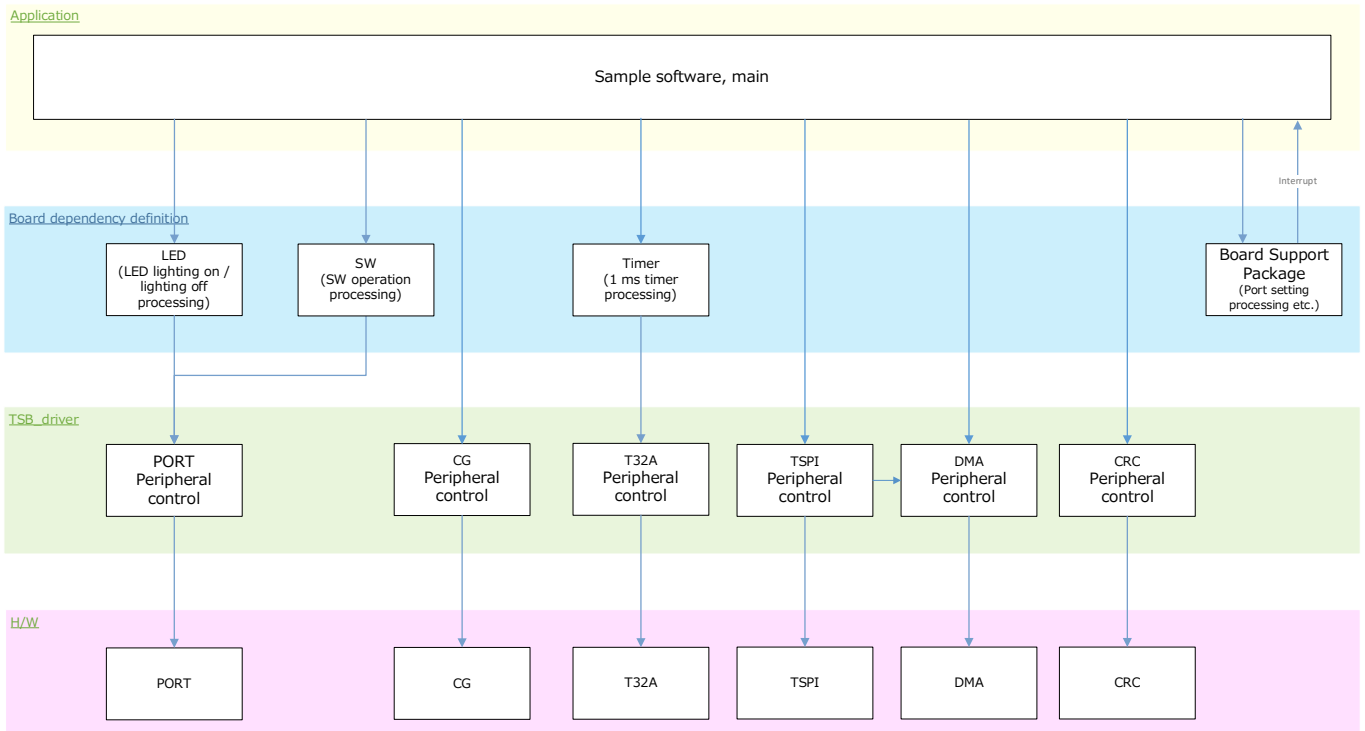
3. Reference Document

| 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_SLAVE_RECEIVE | Sample program of SPI function (Slave Receive) |

5. Configuration Diagram



6. Sample Program:TSPI_SLAVE_RECEIVE

This sample software that uses the Slave 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_2, 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. The data that exceeds the data size will be discarded.

Switches the lighting status (turn on / turn off) of BSP_LED_2.

When SPI read error occurs, BSP_LED_3 is turn on.

When the CRC value of the received data and the calculated CRC value do 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_2 | 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 Switch 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.

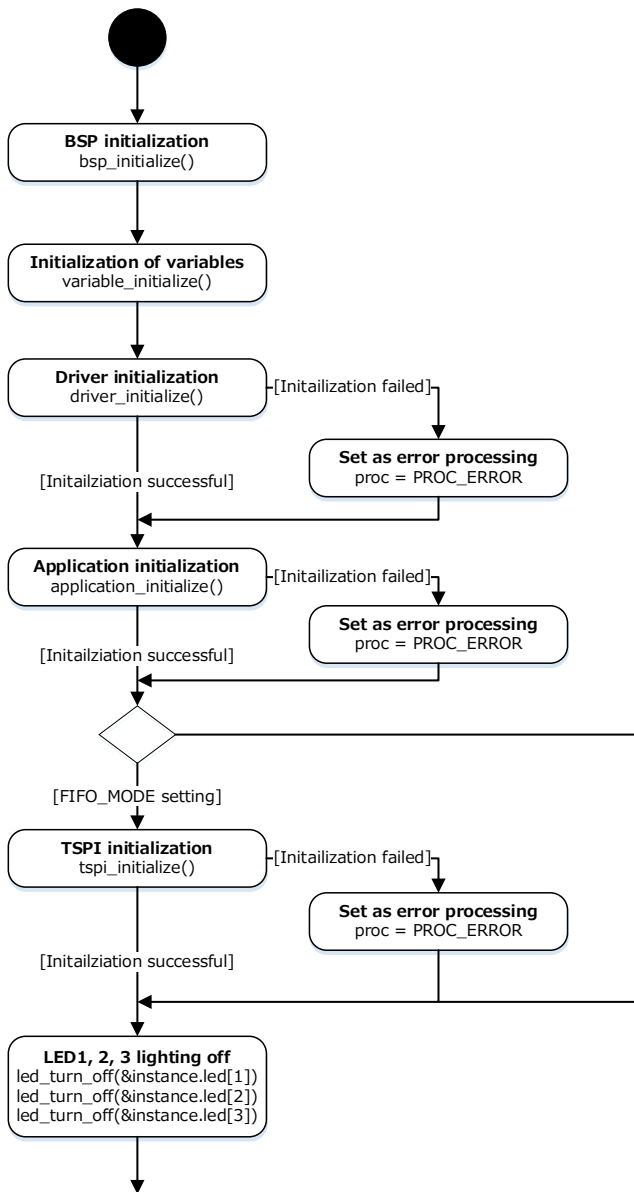
| Configuration | Current Value | Description |
|---------------|----------------|--|
| DATA_LENGTH | 14 | Data size (Unit: byte) Set to 16 by setting the compile switch CHK_CODE |
| CHK_CODE | CHK_CODE_CRC16 | CHK_CODE_CRC16 and CHK_CODE_CRC32 can be switched |
| RX_MODE | FIFO_MODE | FIFO_MODE and DMA_MODE can be switched |
| RX_FILL_LEVEL | 4 | Receive Fill level setting |

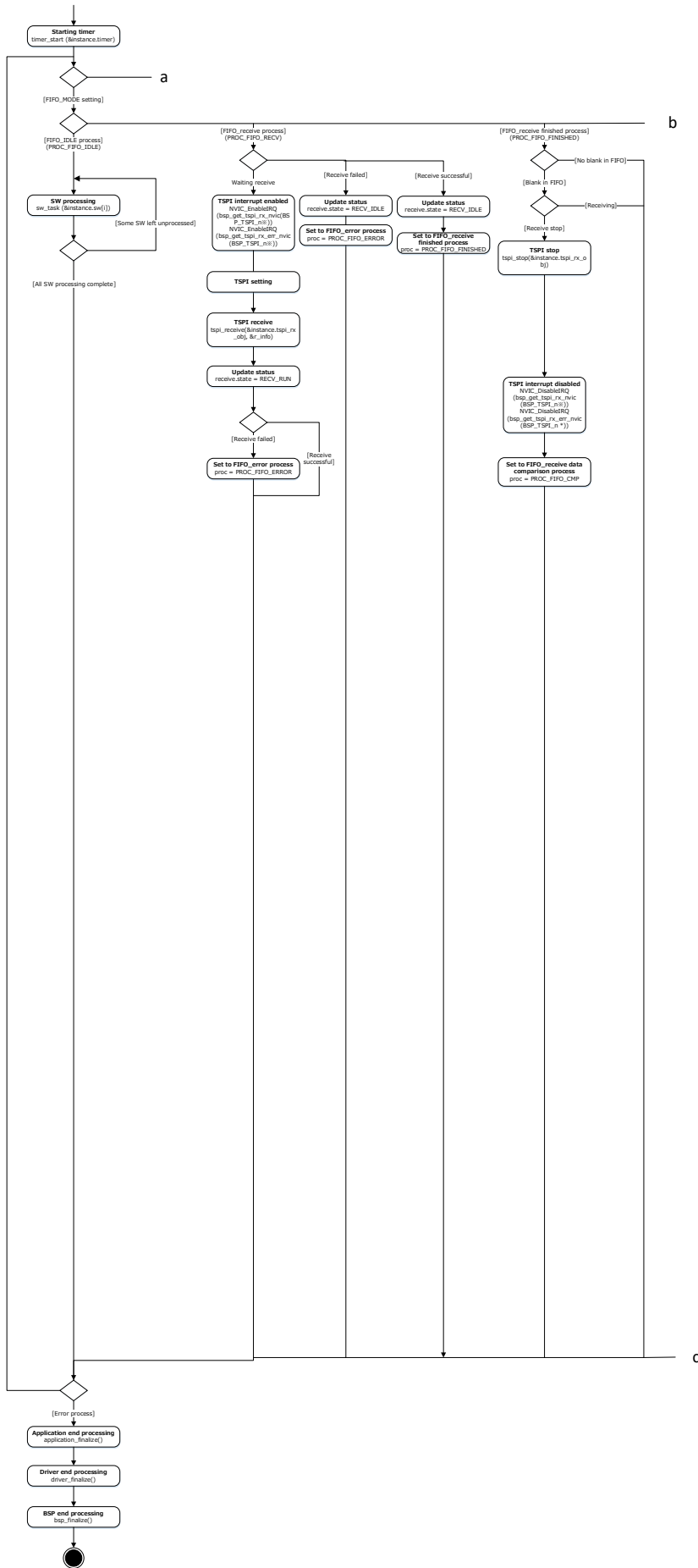
6.5. Example of Terminal Emulator Output

Nothing.

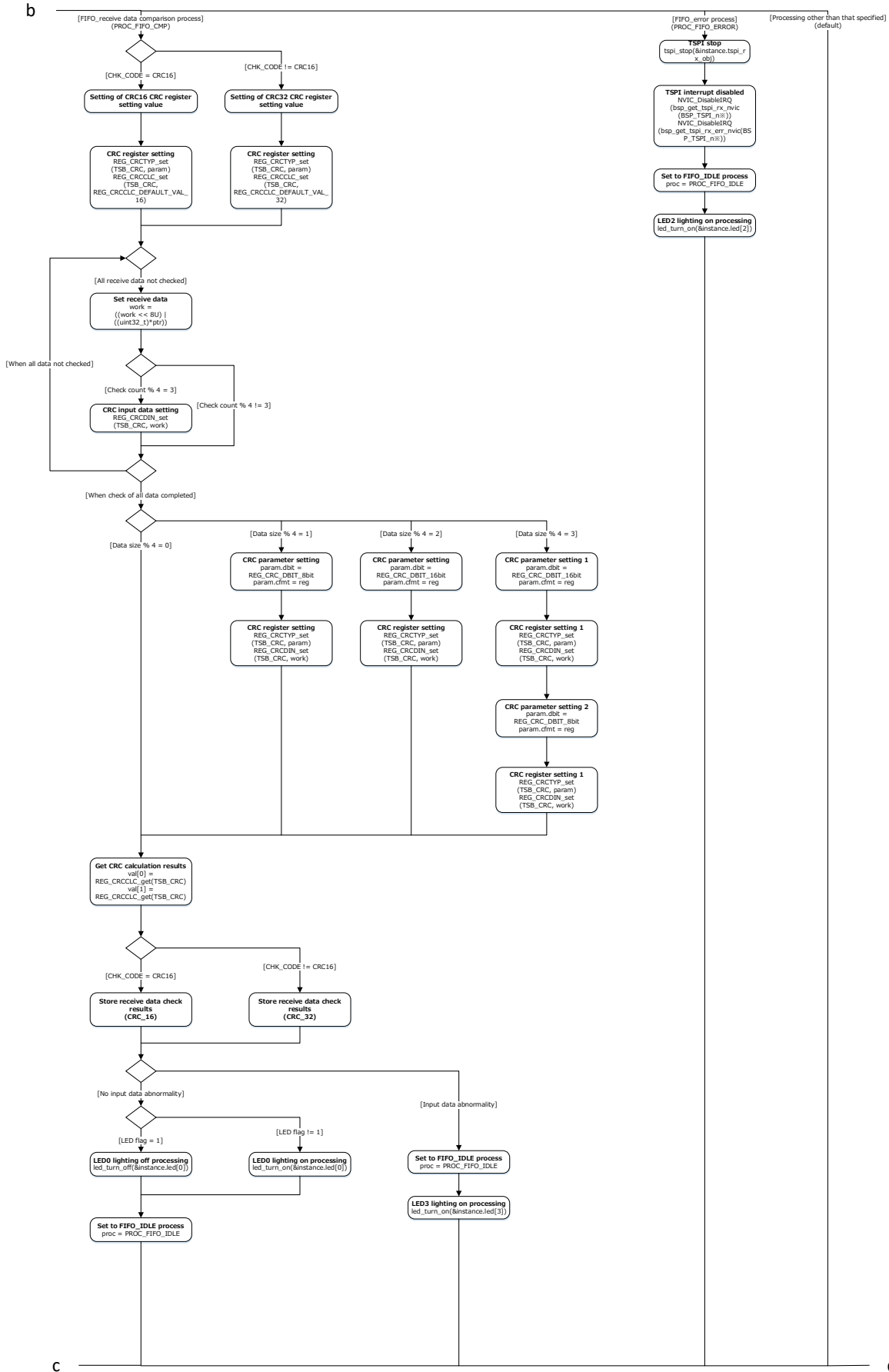
7. Activity diagram

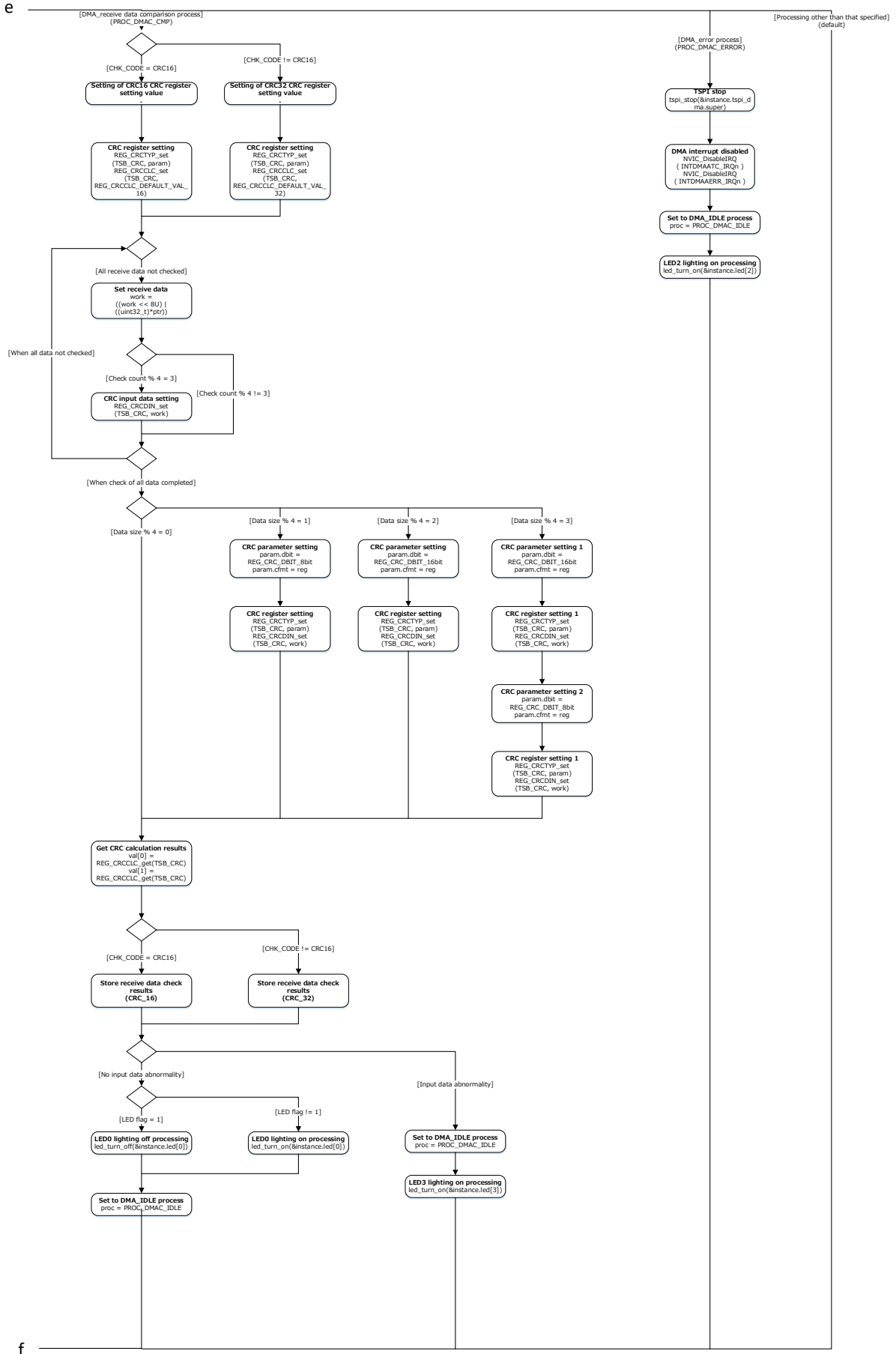
7.1. main



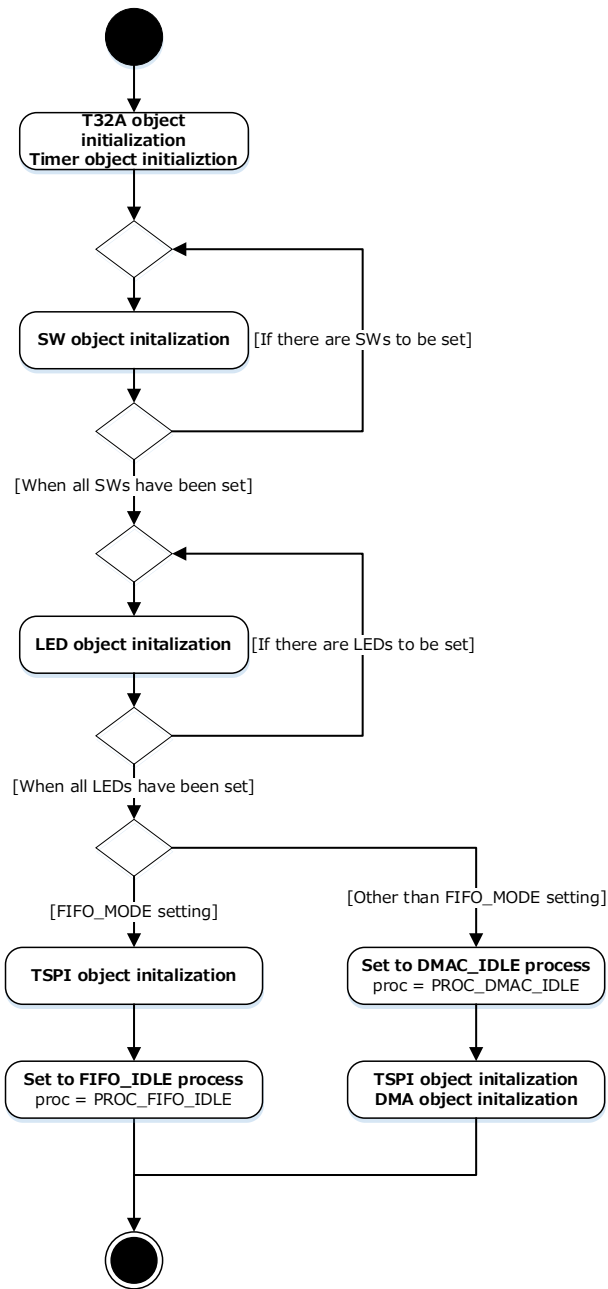


* In the case of M4KN/MN, n=0; in the case of M3H, n=1

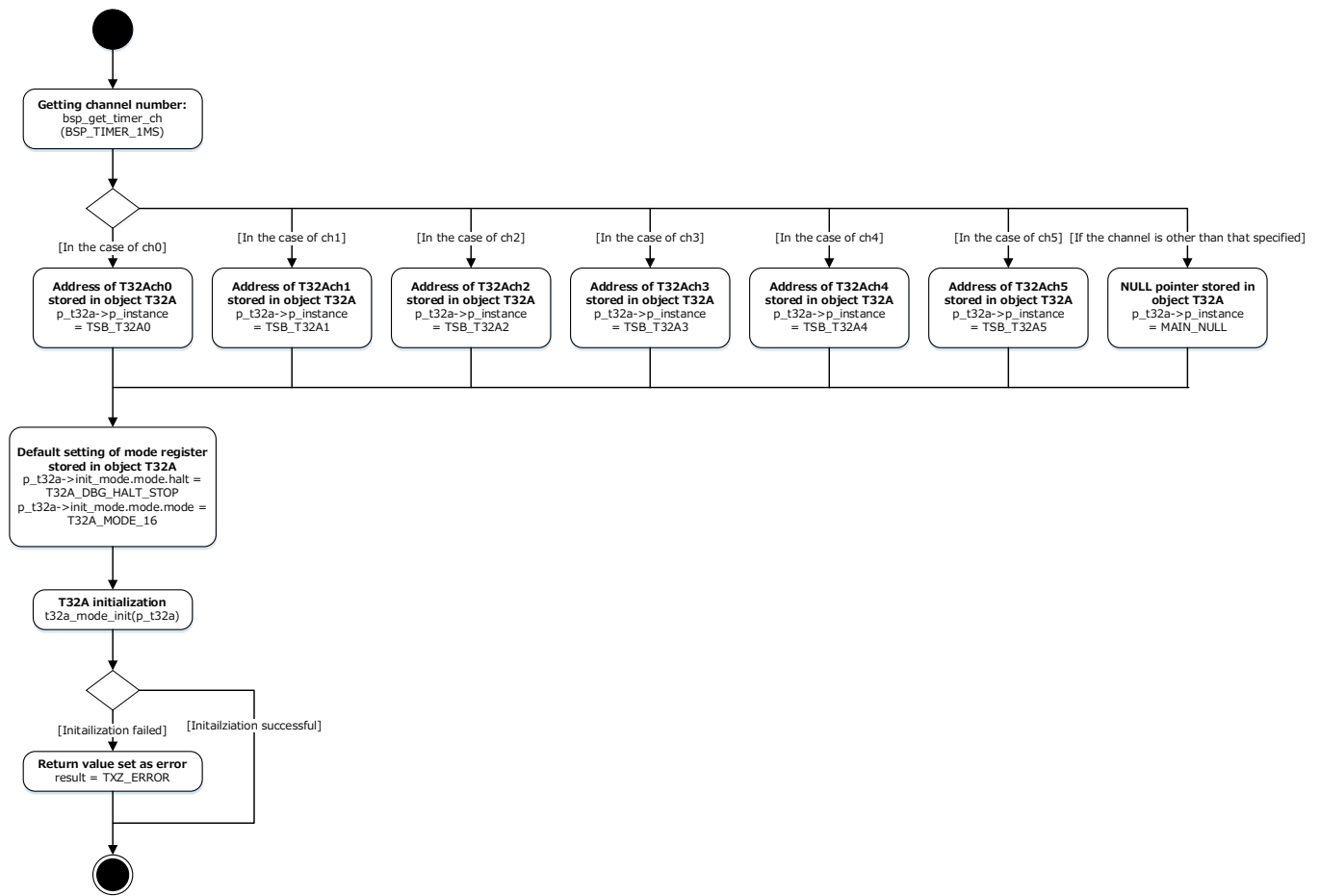




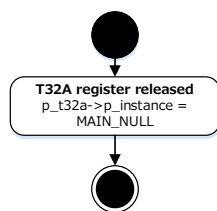
7.2. variable_initialize



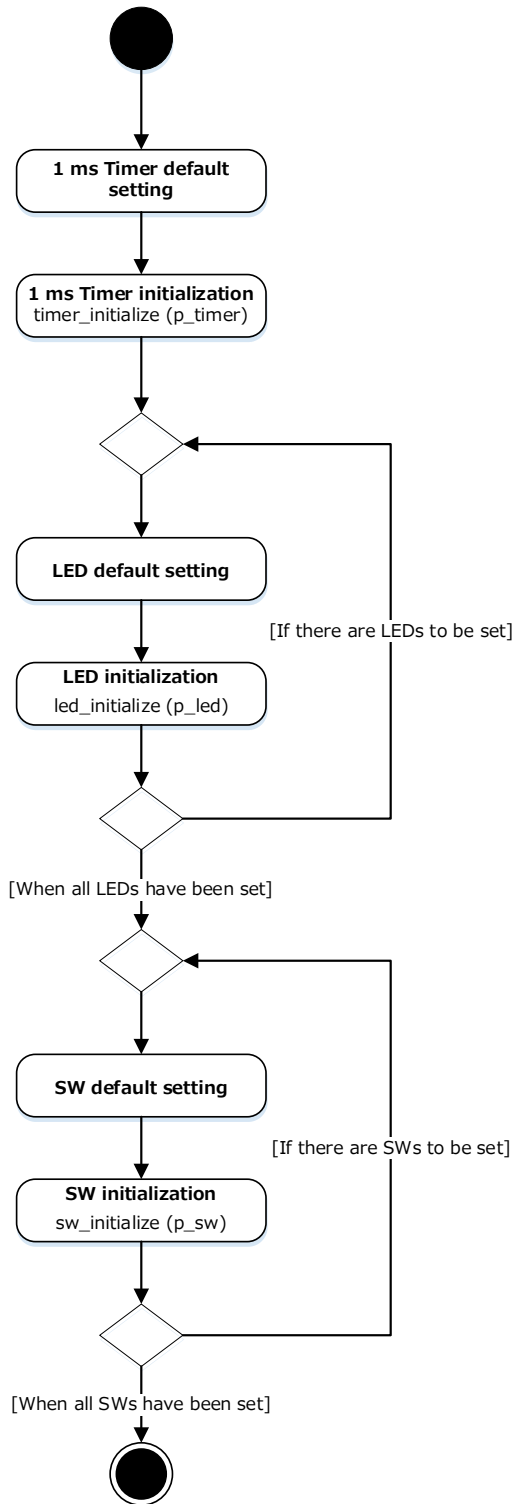
7.3. driver_initialize



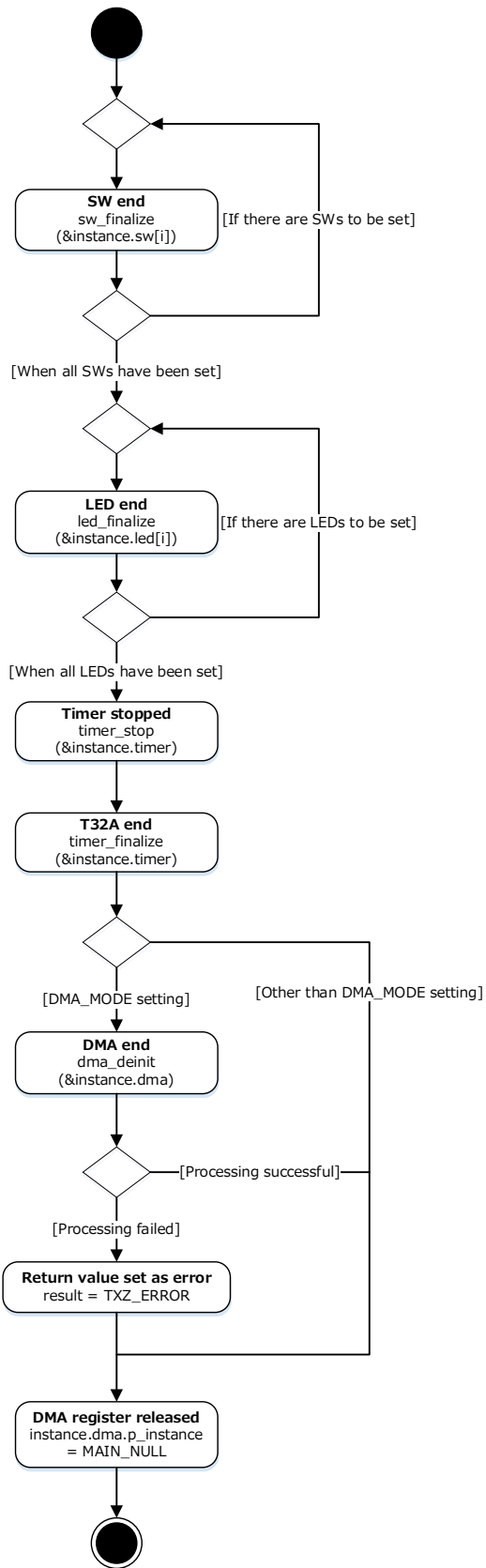
7.4. driver_finalize



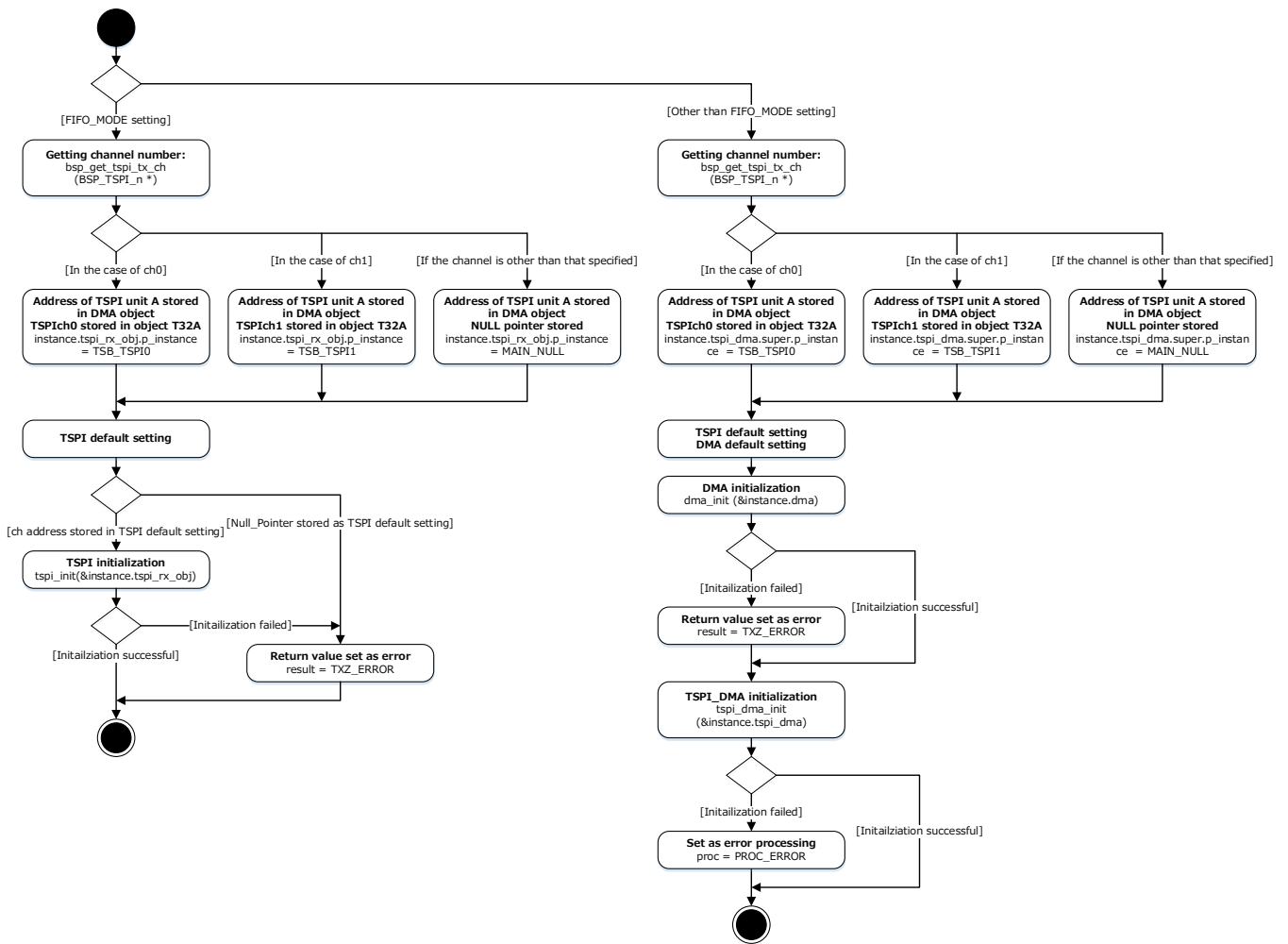
7.5. application_initialize



7.6. application_finalize

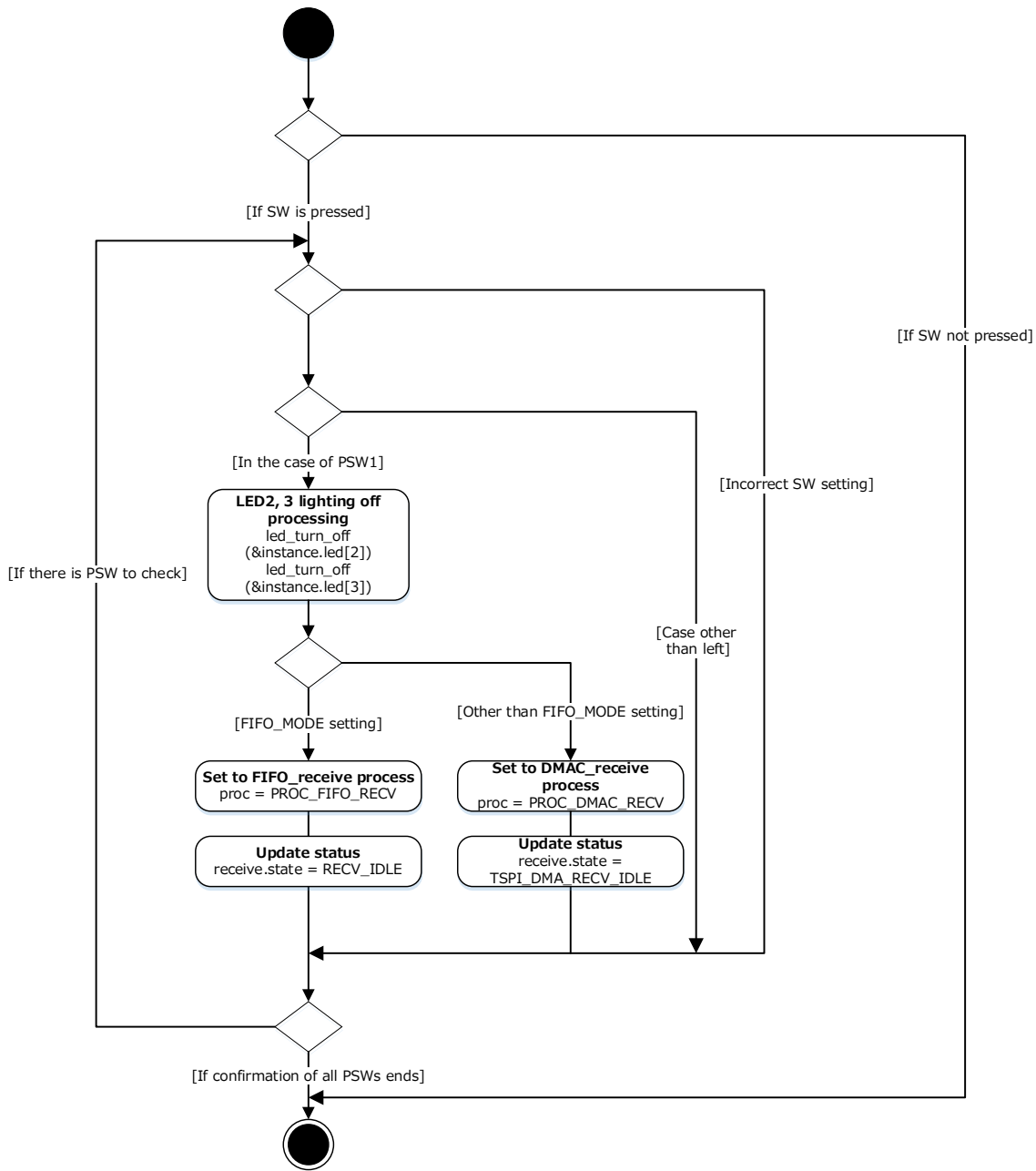


7.7. tspi_initialize

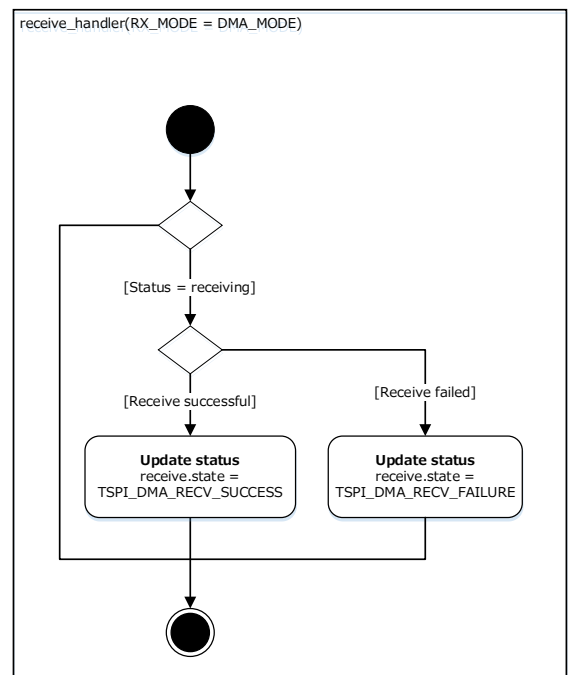
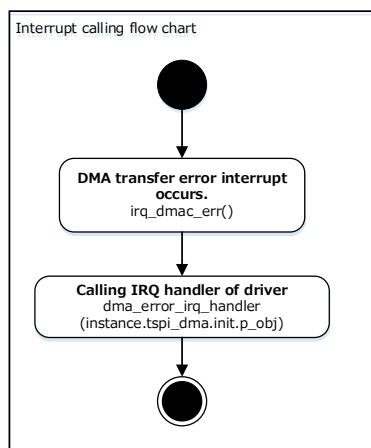
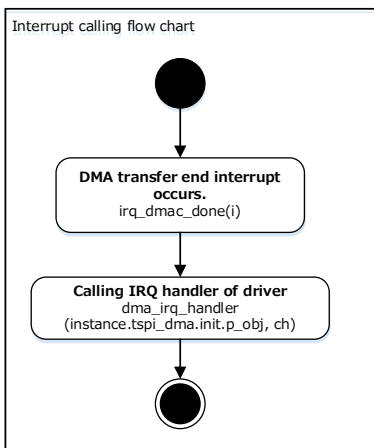
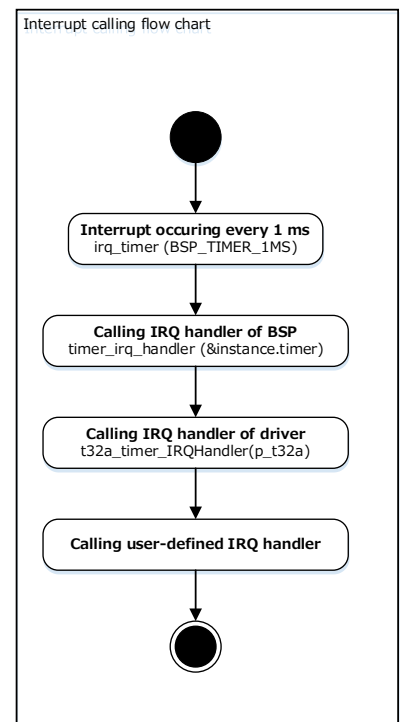
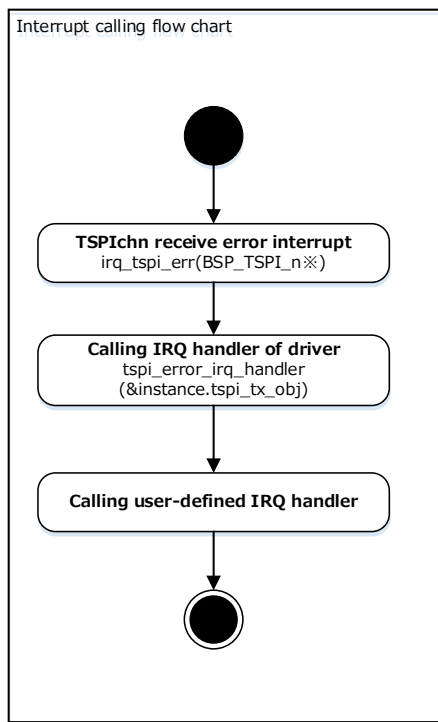
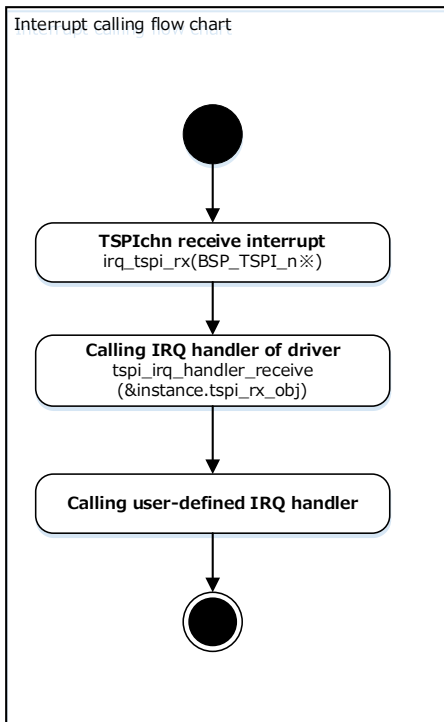


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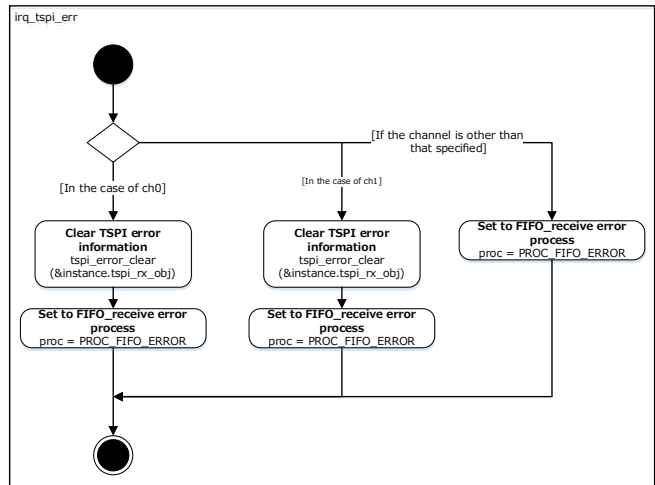
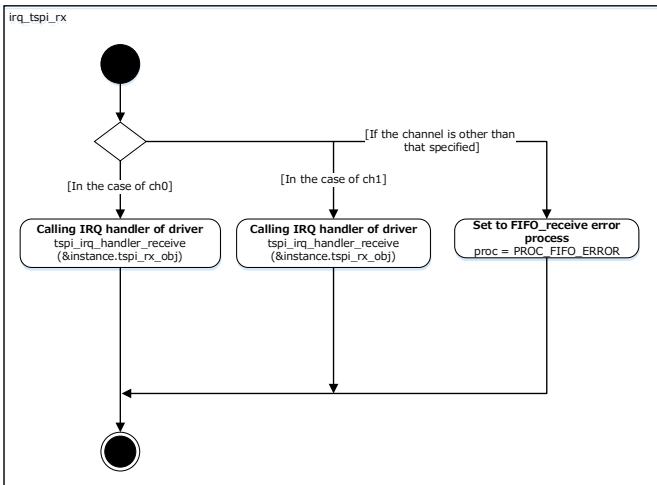
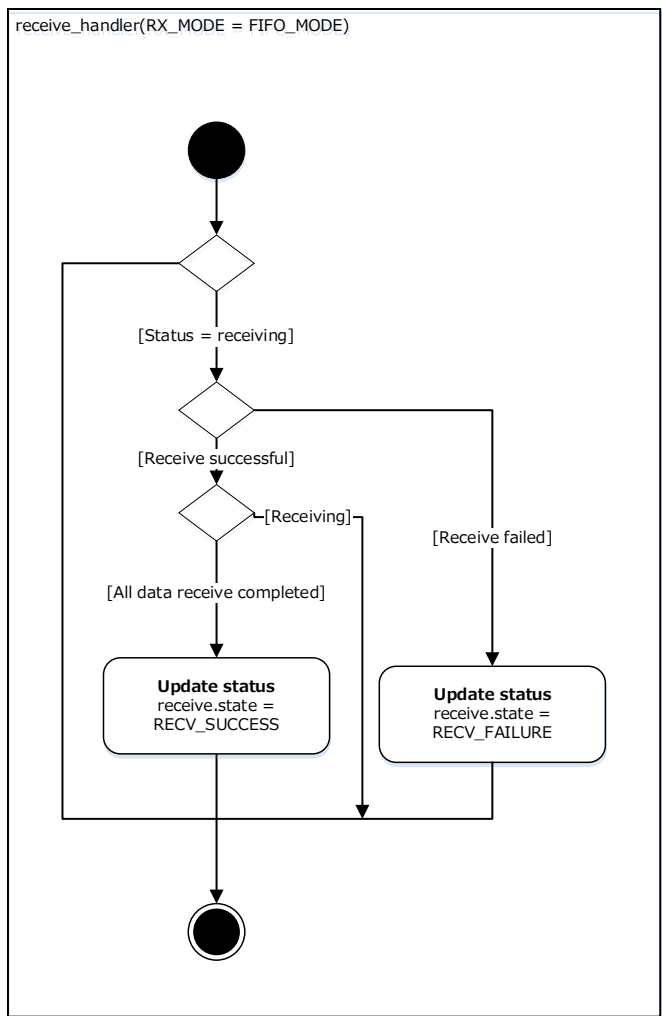
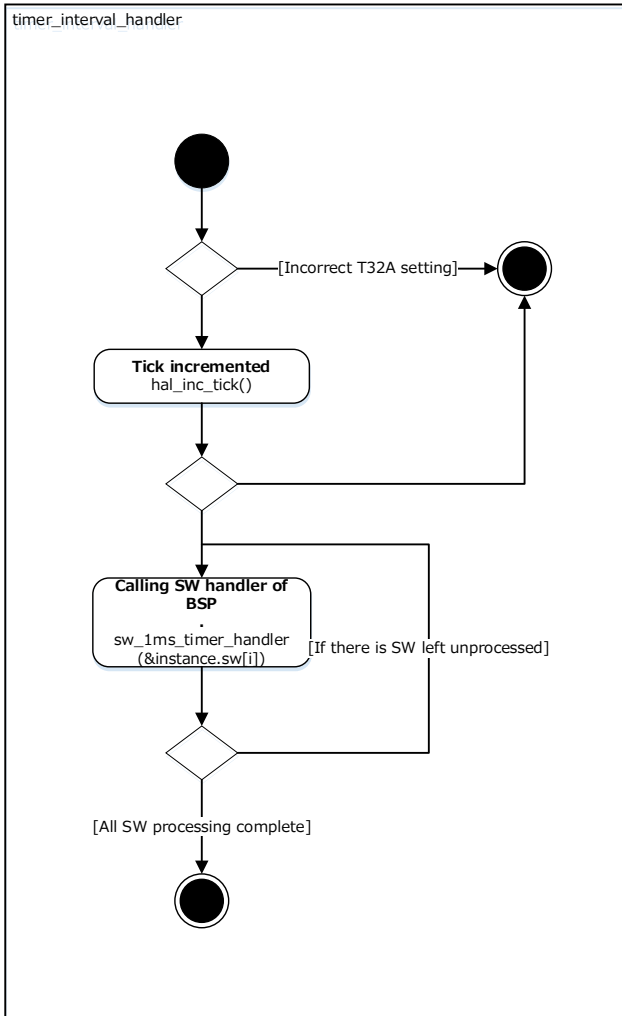
7.8. sw_state_change_handler



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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