

## **Application Note**

# **TSPI\_CONTROLLER\_RECEIVE**

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## 1. Preface

This application note describes the sample software TSPI\_CONTROLLER\_RECEIVE using Serial Peripheral Interface (TSPI).

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 Controller
Timer	T32A:32-bit Timer Event Counter
TSPI	Serial Peripheral Interface

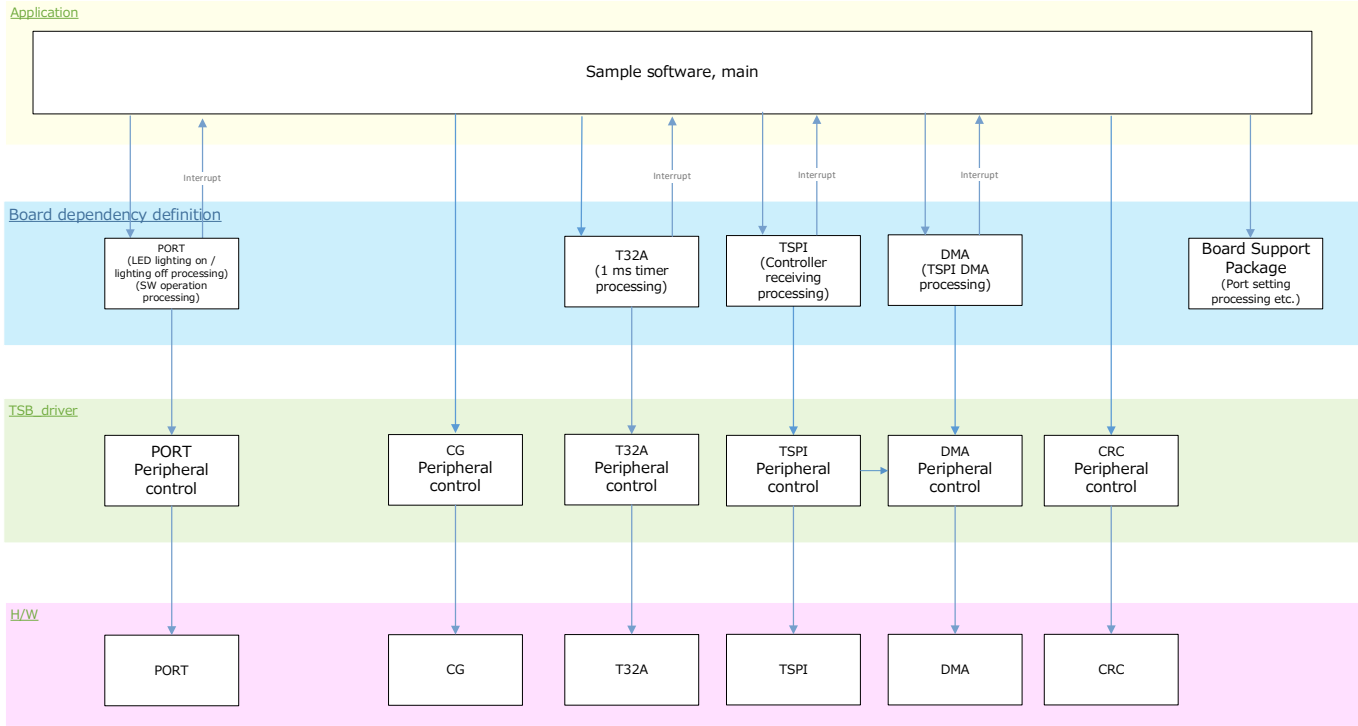
## 3. Reference Document

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_CONTROLLER_RECEIVE	Sample program of SPI function (Controller Receive)

5. Configuration Diagram



## 6. Sample Program: TSPI\_CONTROLLER\_RECEIVE

This sample software that uses the Controller 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.

### 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
(Note1)	T32A TimerA Timer counter increment every 1ms
(Note2)	SPI receive interrupt
(Note3)	SPI error interrupt
INTDMAATC	DMA transmit end interrupt
INTDMAAERR	DMA error interrupt

Note1: For SBK-M471 and AdBun-M3HQA, "INTT32A00AC"

Note2: For SBK-M471, "INTSC0RX"

For AdBun-M3HQA, "INTT1RX"

Note3: For SBK-M471, "INTSC0ERR"

For AdBun-M3HA, "INTT1ERR"

## 6.4. Configuration

Configuration setting.

Configuration	Soft Definition Name	Current Value (Defaults)	Description
DATA_LENGTH	BSP_DATA_LENGTH	12	Data size (unit: byte) Compilation switch (Note1): Be switched by the BSP_CHK_CODE setting.
Check CODE	BSP_CHK_CODE	BSP_CHK_CODE_CRC16	BSP_CHK_CODE_CRC16 and BSP_CHK_CODE_CRC32 can be switched
Communication Control	BSP_REQUEST_MODE	BSP_FIFO_MODE	BSP_FIFO_MODE and BSP_DMA_MODE can be switched.
Receive Fill Level Setting	BSP_RX_FILL_LEVEL	4	Set to RIL of TSPIxCR2

Note1: When BSP\_CHK\_CODE\_CRC16, 12byte.  
When BSP\_CHK\_CODE\_CRC32, 14byte.

## 6.5. Example of Terminal Emulator Output

Nothing.

## 6.6. DMAC Communication Setting

Startup Factors and Transfer Mode

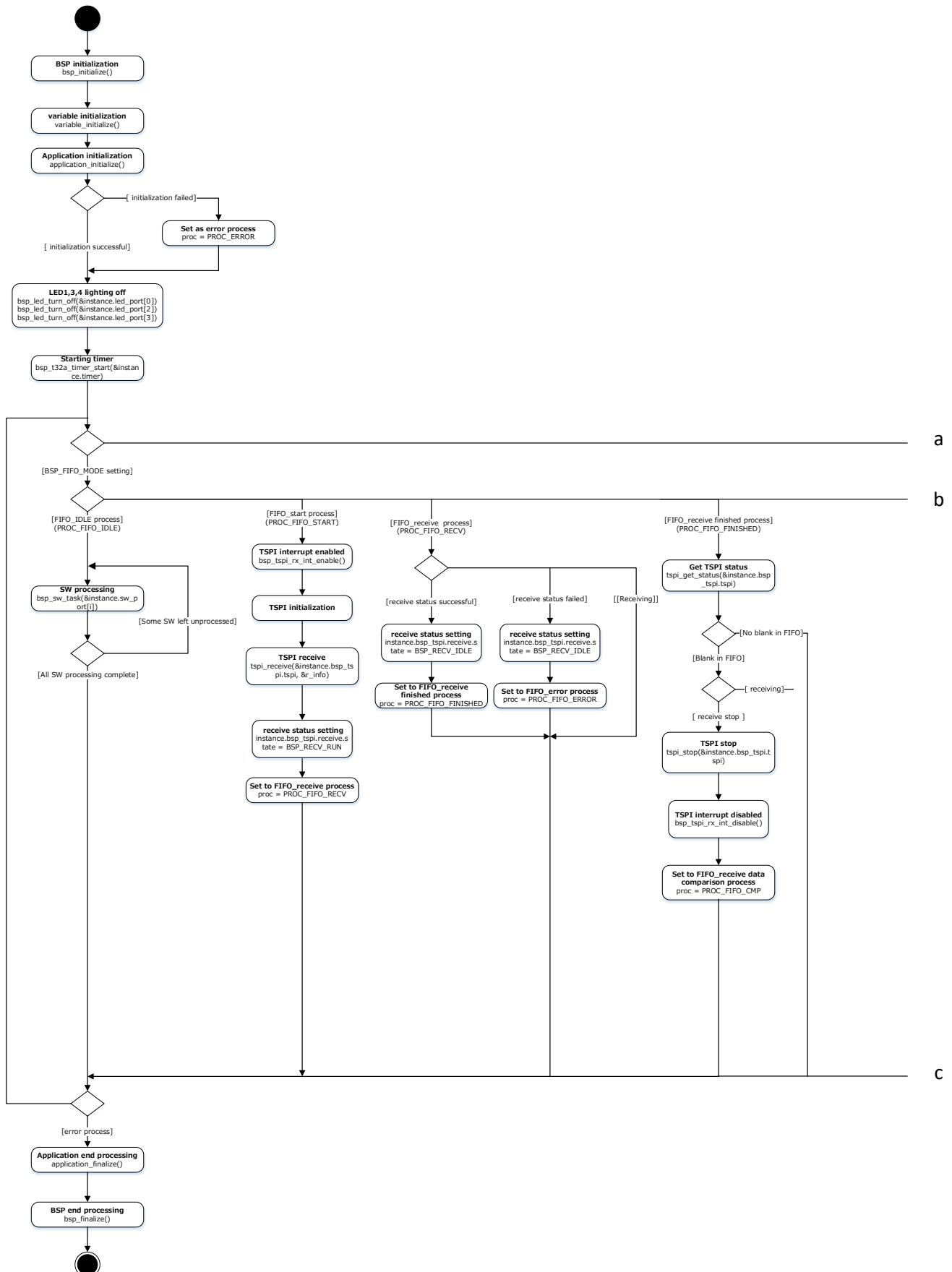
Configuration	Description
Startup Factors	DMA Request from TSPI Driver (Request Based on FIFO level)
Transfer Mode	Singel Transfer/Unit Normal Transfer

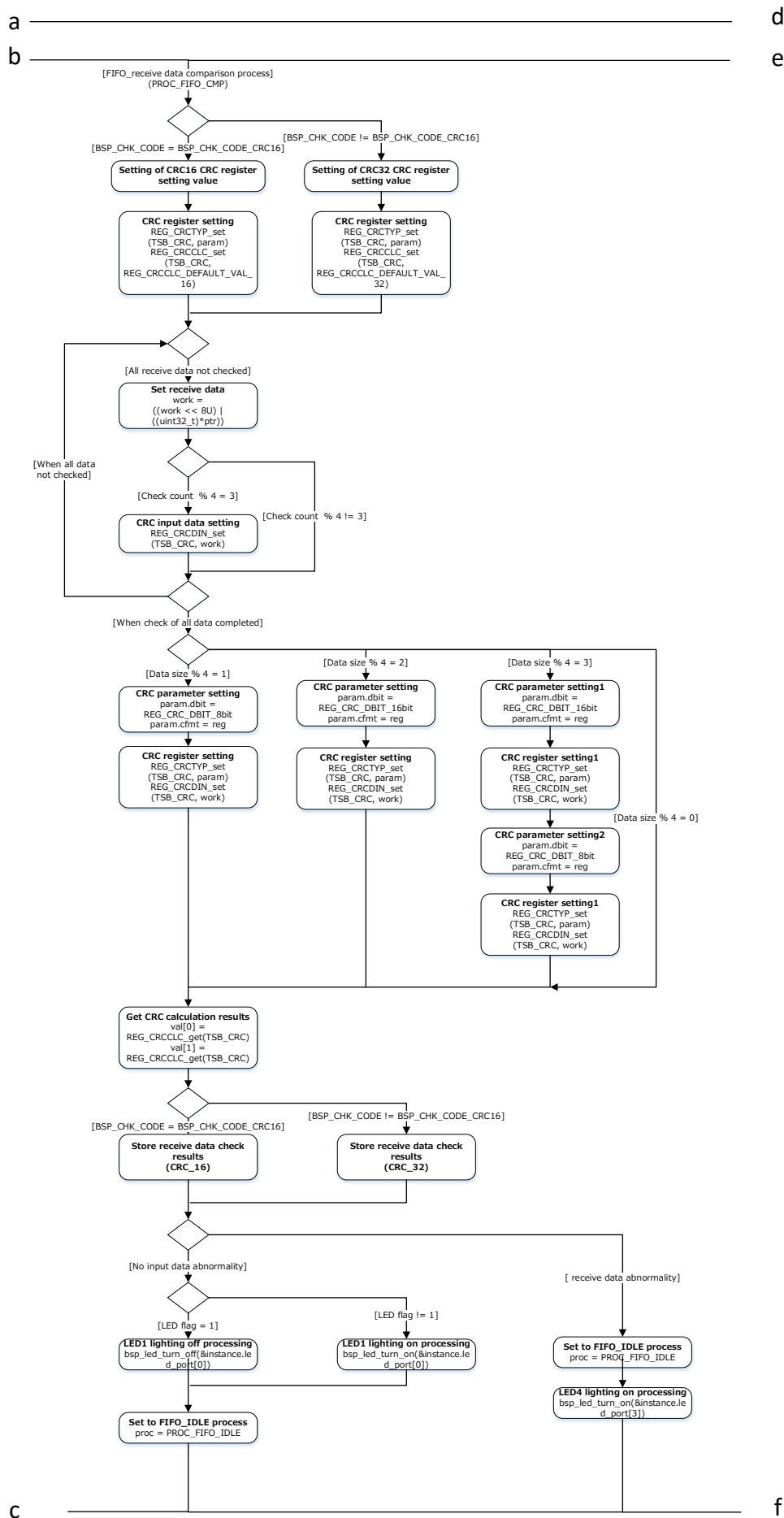
Channel Control Data: Transfer Mode Setting [DMACHnICfg]

Configuration	Description
Destination Address Increment	00: [1byte]
Destination Data Size	00: [1byte]
Source Address Increment	11: [No increment]
Source Data Size	00: [1byte]
Arbitration	0000: [After 1 Rotation Transfer]
Transfer Count	0x00B: [12times (BSP_DATA_LENGTH)]
Singel Transfer Setting	0: [Not used because it is not a chain transfer]
Transfer Mode	001: [Unit Normal Transfer]

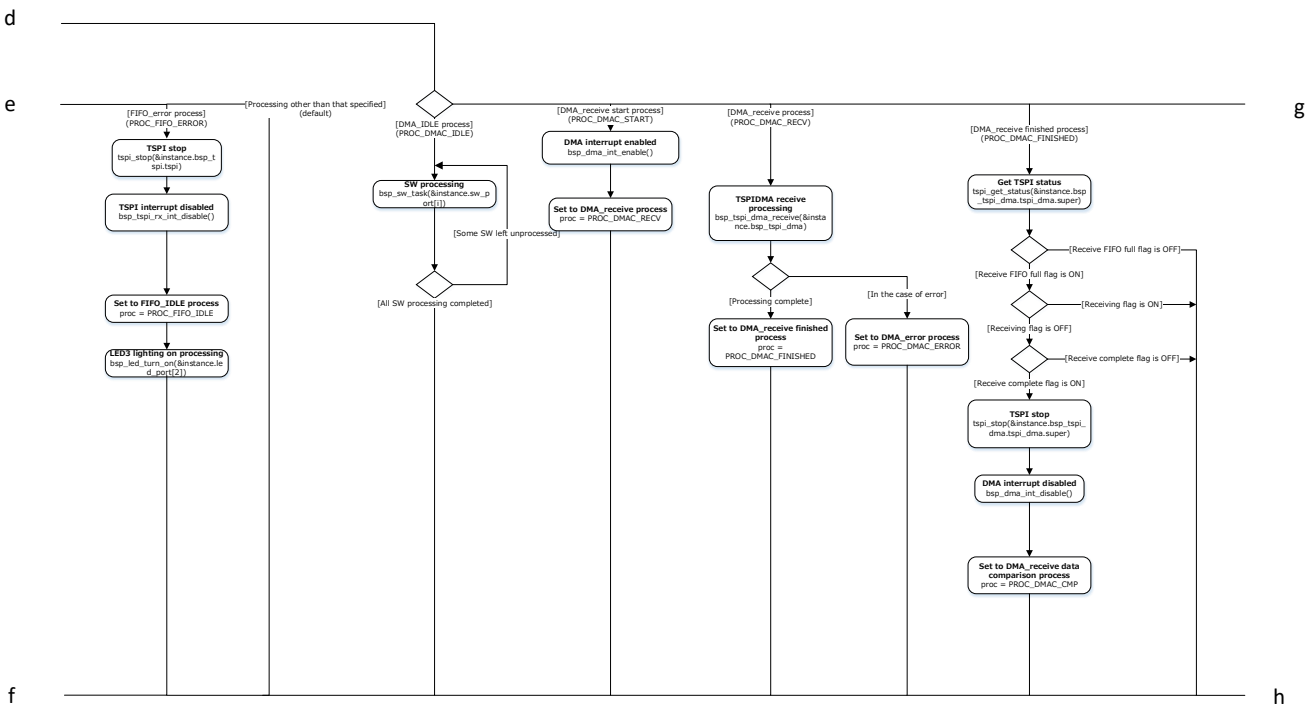
## 7. Activity diagram

### 7.1. main

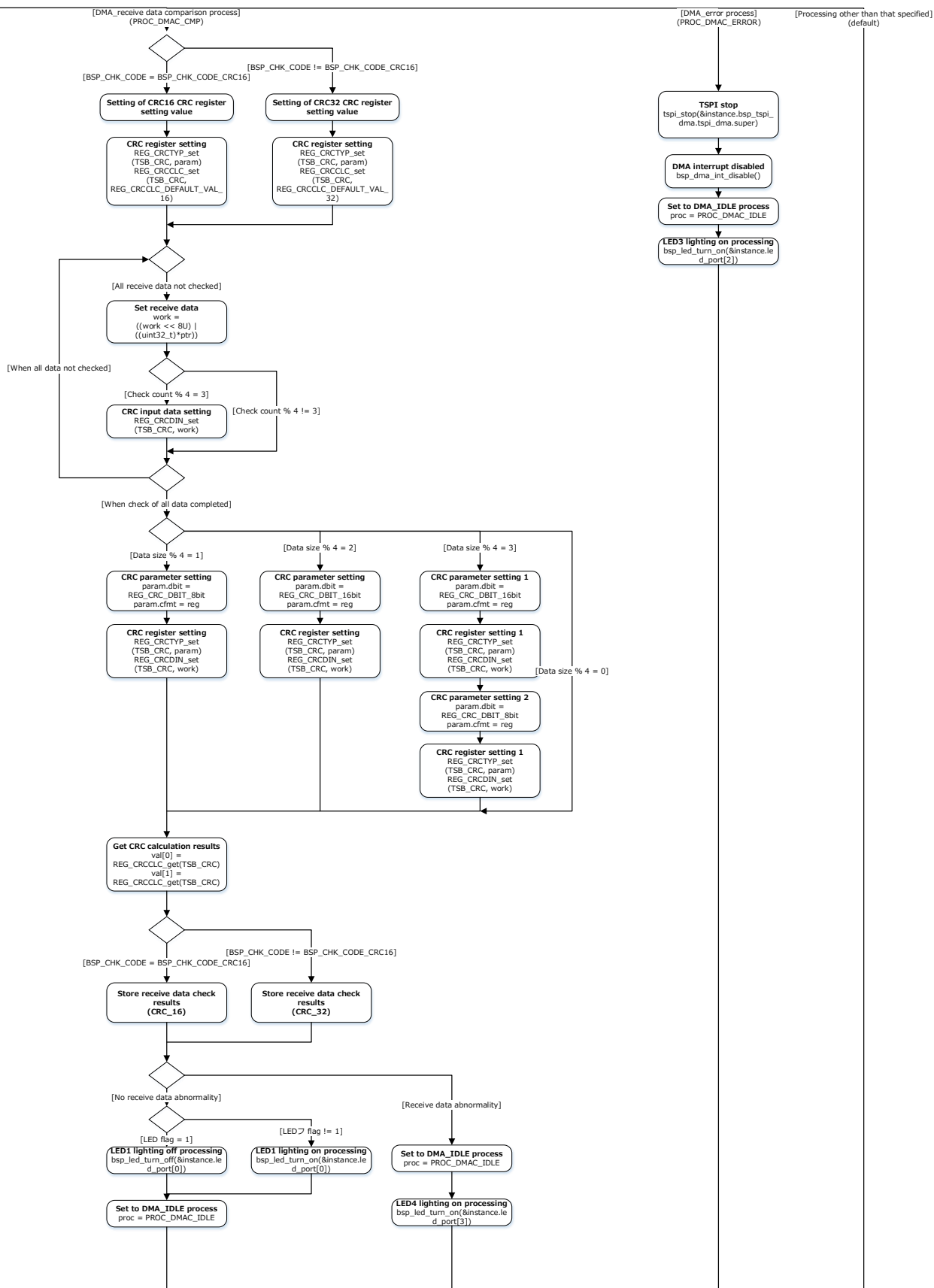






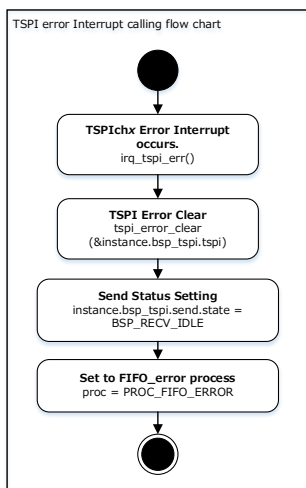
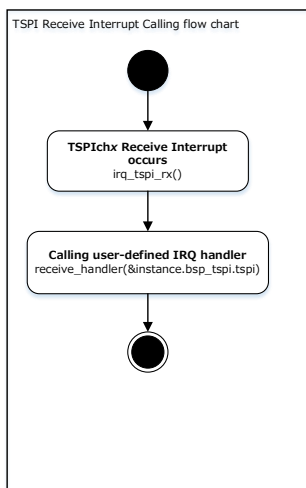
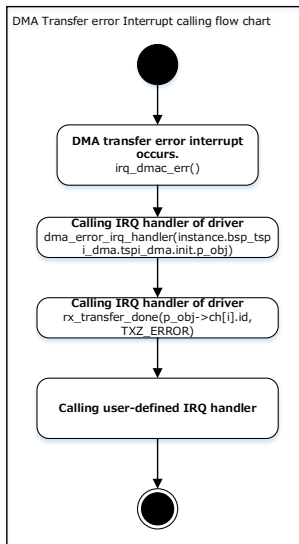
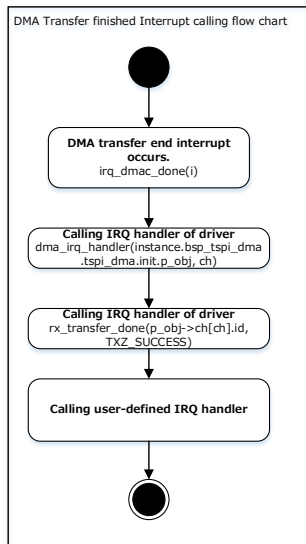
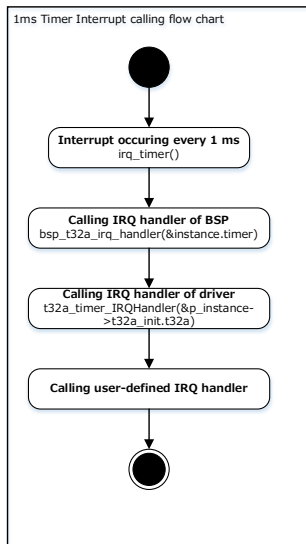


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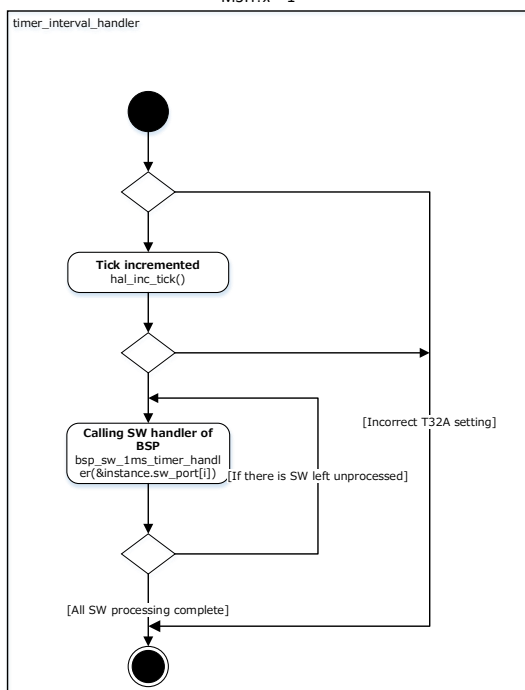
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## 7.2. Interrupt

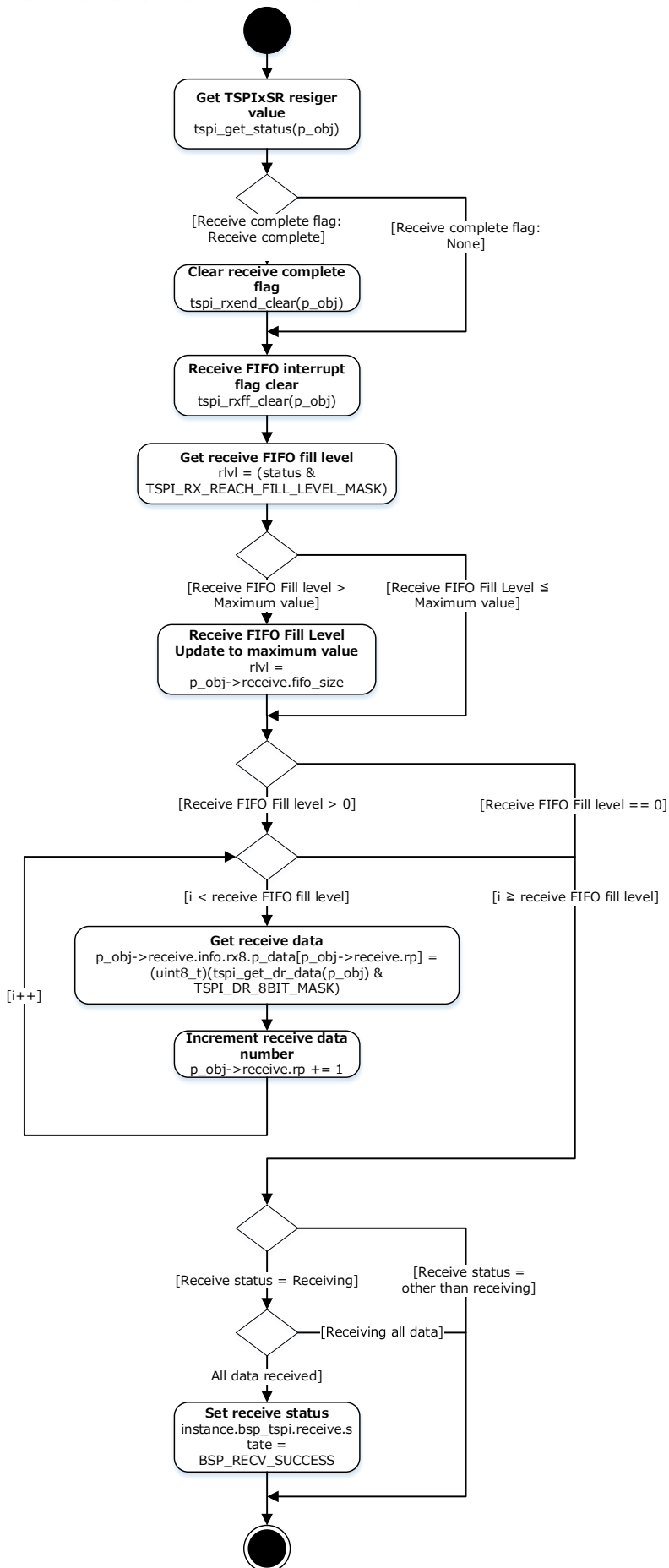


M471: x = 2  
M4L4: x = 0  
M3H: x = 1

M471: x = 2  
M4L4: x = 0  
M3H: x = 1



receive\_handler(BSP\_REQUEST\_MODE = BSP\_FIFO\_MODE)



8. Revision History

Revision	Date	Description
1.0	2025-01-20	First release
1.1	2025-10-30	6.3 Interrupt to Use Added Interrupt for M3H

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