

## **Application Note**

## **T32A\_MEASURE**

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## 1. Preface

This application note describes the sample software T32A\_MEASURE using the 32bit Timer Event Counter(T32A).

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

## 2. Technical Term

Term/Abbreviation	Definition
CG	Clock Control and Operation Mode
T32A	T32A:32-bit Timer Event Counter
UART	Universal Asynchronous Receiver Transmitter

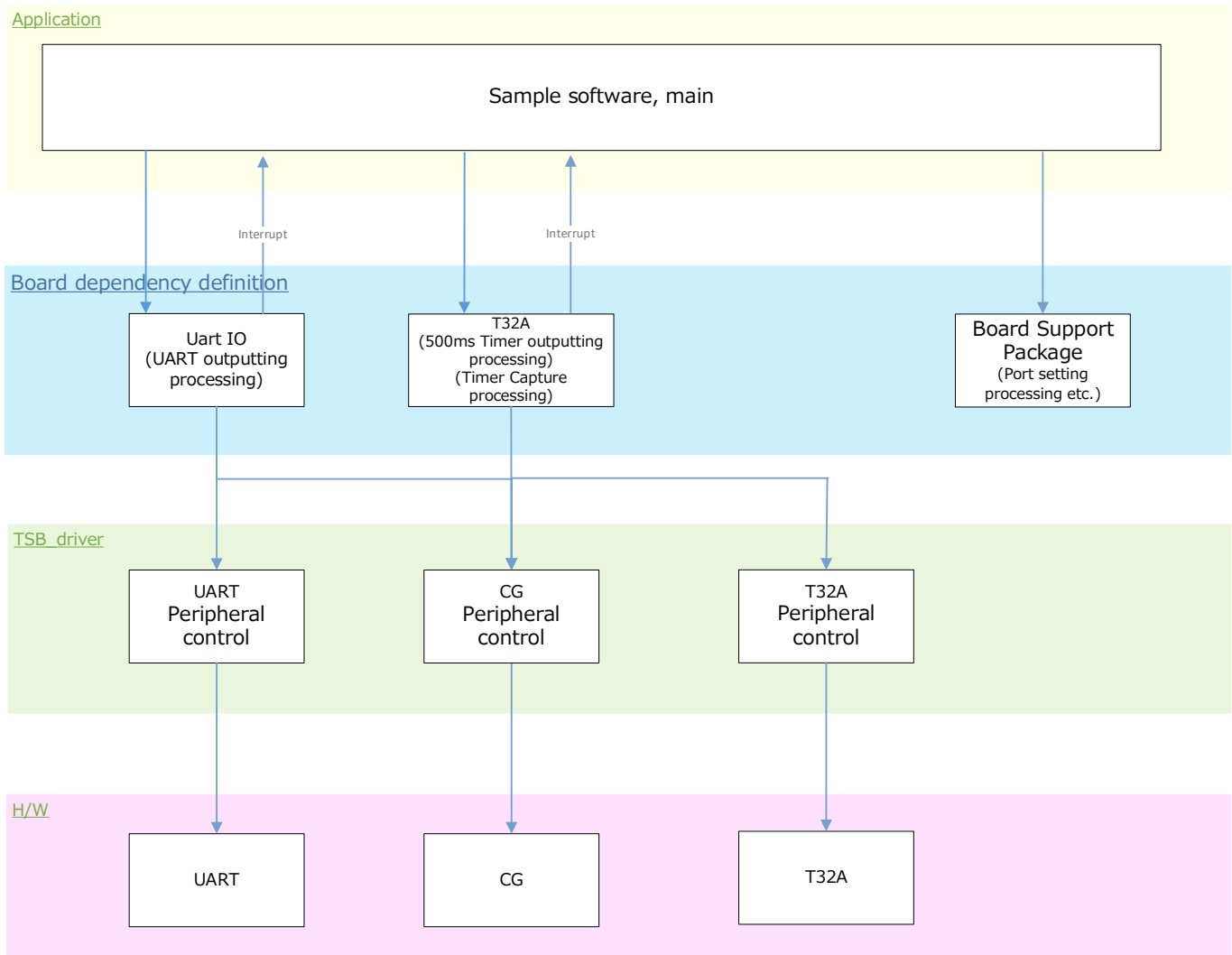
## 3. Reference Document

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
T32A_MEASURE	Sample program of frequency measurement using T32A capture

5. Configuration Diagram



## 6. Sample Program: T32A\_MEASURE

This is sample software that uses the T32A capture function to measure frequency.  
The frequency is calculated from the captured count number.

### 6.1. Outlines of Operation

After measurement period A has elapsed, the timer count is captured using T32A with T32AxOUTA and T32AxTRGINxPHCK internally connected.

A measurement square wave (measurement period A) is created by T32AxOUTA, and the frequency is measured based on the number of counts of BSP\_T32A\_CAPT\_2 between high levels.

### 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
T32A	BSP_T32A_CAPT_2	Prescaler output frequency counter. Captures the counter value on the edge of T32AxTRGINxPHCK.
	BSP_T32A_PPG_1	T32AxOUTx Output
UART	BSP_UART_1	For terminal emulator communication

### 6.3. Interrupt to Use

Interrupt	Outlines
(Note1)	T32A Timer A Timer counter increment per 512ms. For PPG outputting
(Note2)	UART Transmit Interrupt
(Note3)	UART Error Interrupts

Note1: For SBK-M471,  
For AdBun-M3HQA,

Note2: For SBK-M471,  
For AdBun-M3HQA,

Note3: For SBK-M471,  
For AdBun-M3HQA,

"INTT32A04AC".

"INTT32A03AC".

"INTSC0TX".

"INTUART0TX".

"INTSC0ERR".

"INTUART0ERR".

6.4. Configuration

Configuration setting.

Depending on the setting value, the BSP\_T32A\_CAPT\_2 count may overflow, making it impossible to measure correctly.

Configuration	Soft Definition Name	Current Value (Defaults)	Description
Measurement cycle A	BSP_SAMPLING_PERIOD	512	BSP_T32A_PPG_1 period (Unit: ms)
Sample Signal	BSP_SAMPLING_CLOCK_ PRESCALER	T32A_PRSCLx_1024	(Note1): It is used as the source clock for BSP_T32A_CAPT_2 and counts up in free-running mode. For the setting values, refer to the t32a_x.h file.

Note1: Please set a value that will not overflow.

## 6.5. Example of Terminal Emulator Output

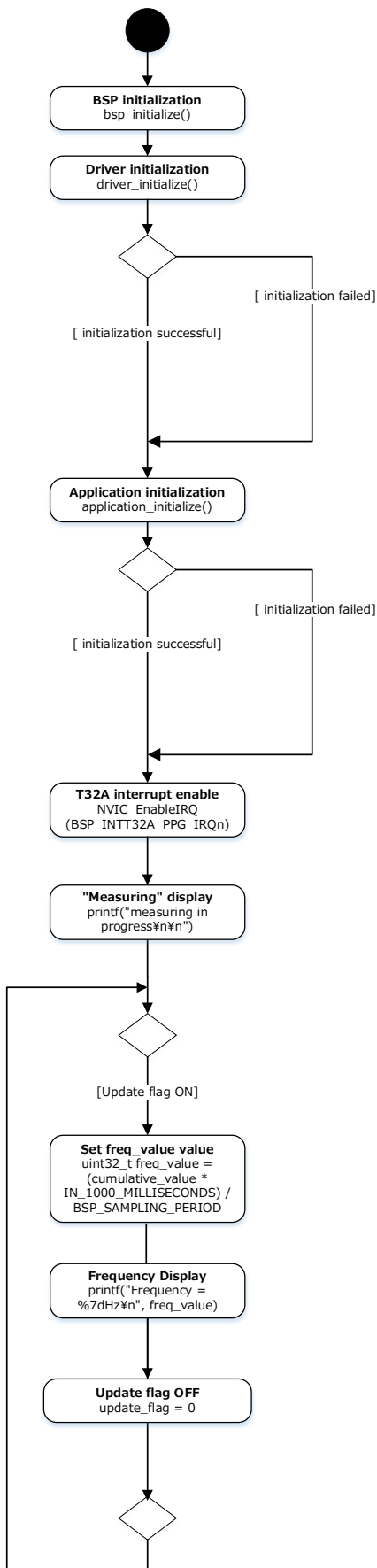
Outputs the calculated frequency.

measuring in progress

Frequency = xxHz

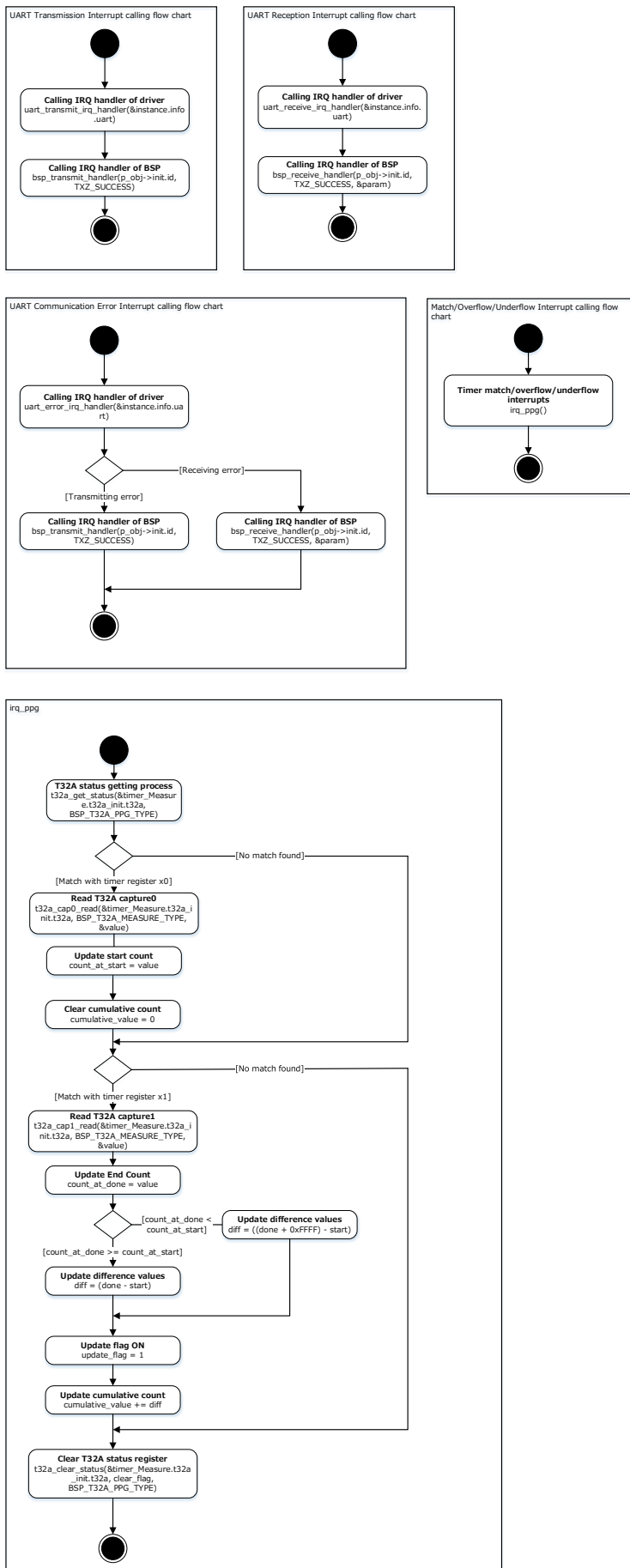
## 7. Activity diagram

### 7.1. main





## 7.2. Interrupt



8. Revision History

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

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