

Application Note

TMPM3HQA User Guide

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1. Preface

This application note describes a reference for the usage environment when running the sample program on TPM3HQA.

If you select something other than TPM3HQA on the MCU, a compile error may occur due to insufficient terminal or IP channel.

In that case, please modify the program and check the operation.

2. Technical Term

Term/Abbreviation	Definition
BSP	Board Support Package
UART	Universal Asynchronous Receiver Transmitter
FUART	Full Universal Asynchronous Receiver Transmitter
LED	Light-emitting diode
TSPI	Toshiba Serial Peripheral Interface
TSSI	Toshiba Synchronous Serial Interface
I2C	Inter-Integrated Circuit
EI2C	Enhanced Inter-Integrated Circuit

3. Reference Document

Document	Notes
TMPM3H(1) Group Data sheet	—
Reference manual	Refer to the reference manual of each IP to be used.
Application note MCU User Guide	Refer to the MCU user manual to be used.

4. Operation Confirmation Condition

Item	Equipment name	Version
Microcomputer	TMPM3HQFYAFG	—
Evaluation Board	Adbun-M3HQA	—
Unified Development Environment	IAR Embedded Workbench for ARM	8.50.1
Unified Development Environment	Arm® Keil® MDK	5.29.0.0
Sample program	TMPM3HQA_v100	V1.0.0

5. Used Channel and Port Assignment

5.1. User Interface

5.1.1. Push-Switch

Channel	Function	Port
BSP_PSW_1	Input	PV0
BSP_PSW_2	Input	PV1
BSP_PSW_3	Input	PV2
BSP_PSW_4	Input	PV3
BSP_PSW_5	Input	PC2

5.1.2. Slide-Switch

Channel	Function	Port
BSP_SSW_1	Input	PP6
BSP_SSW_2	Input	PP7
BSP_SSW_3	Input	—
BSP_SSW_4	Input	—

5.1.3. LED

Channel	Function	Port
BSP_LED_1	Output	PK4
BSP_LED_2	Output	PK5
BSP_LED_3	Output	PK6
BSP_LED_4	Output	PK7

5.1.4. DIO

Channel	Function	Port
BSP_DIAGNOSIS_DIGITALIO	Input	PG0

5.2. Communication

5.2.1. UART Communication

Channel	Peripheral Channel	Function	Port
BSP_UART_1	ch0	TXD	PA1
		RXD	PA2
		CTS	—
		RTS	—
BSP_UART_2	ch3	TXD	PG2
		RXD	PG3
		CTS	—
		RTS	—

5.2.2. UART Communication

Channel	Peripheral Channel	Function	Port
BSP_UART_1	Not equipped	TXD	—
		RXD	—
		CTS	—
		RTS	—

5.2.3. TSPI Communication

Channel	Peripheral Channel	Function	Port
BSP_TSPI_1	—	TXD	PB3
		RXD	PB4
		SCK	PB2
		CS	PB5
BSP_TSPI_2	—	TXD	PT3
		RXD	PT4
		SCK	PT2
		CS	PT1

5.2.4. I2C Communication

Channel	Peripheral Channel	Function	Port
BSP_I2C_1	ch1	SCL	PA4
		SDA	PA5
BSP_I2C_2	—	SCL	—
		SDA	—

5.2.5. EI2C Communication

Channel	Peripheral Channel	Function	Port
BSP_EI2C_1	ch1	SCL	PA4
		SDA	PA5
BSP_EI2C_2	—	SCL	—
		SDA	—

5.3. Function

5.3.1. T32A Control

Channel	Peripheral Channel	Function	Port
BSP_T32A_1	BSP_T32A_TIMER_1	ch0A :common 1ms	—
BSP_T32A_2	BSP_T32A_PPG_1	ch3A:Pulse Output	PJ0
BSP_T32A_3	BSP_T32A_PPG_2	ch3B:Pulse Output (TRM)	PG2
BSP_T32A_4	BSP_T32A_CAPT_1	ch2A:Pulse Input (Capture)	PR1
BSP_T32A_5	BSP_T32A_TRM_fs	ch6A:trimming(fs)	—
BSP_T32A_6	BSP_T32A_TIMER_APP	ch-:application	—

5.3.2. ADC

Channel	Peripheral Channel	Function	Port
BSP_ADC_1	BSP_THERMISTOR_1	NTC	PE0
BSP_ADC_2	BSP_VR_1	RV1	PD4
BSP_ADC_3	BSP_VR_2	RV2	PD5

5.3.3. DAC

Channel	Peripheral Channel	Function	Port
BSP_DAC_1	—	PORT_DA0	PG0
BSP_DAC_2	—	PORT_DA1	PG1
BSP_DAC_3	—	Unused	Unused
BSP_DAC_4	—	Unused	Unused

5.3.4. Remote controller

Channel	Peripheral Channel	Function	Port
BSP_RMC_1	—	RC_IN	PB1

5.3.5. Digital LCD

Channel	Peripheral Channel	Function	Port
BSP_DLCD_1			
DCOM			
	BSP_DLCD_DCOM0	DCOM0	PC3
	BSP_DLCD_DCOM1	DCOM1	PC2
	BSP_DLCD_DCOM2	DCOM2	PC1
	BSP_DLCD_DCOM3	DCOM3	PC0
SEG			
	BSP_DLCD_SEG00	(Also used as BSP_PSW_4)	PV3
	BSP_DLCD_SEG01	(Also used as BSP_PSW_3)	PV2
	BSP_DLCD_SEG02	(Also used as BSP_PSW_2)	PV1
	BSP_DLCD_SEG03	(Also used as BSP_PSW_1)	PV0
	BSP_DLCD_SEG04	SEG04	PP7
	BSP_DLCD_SEG05	SEG05	PP6
	BSP_DLCD_SEG06	SEG06	PP5
	BSP_DLCD_SEG07	SEG07	PP4
	BSP_DLCD_SEG08	SEG08	PP3
	BSP_DLCD_SEG09	SEG09	PK7
	BSP_DLCD_SEG10	SEG10	PK6
	BSP_DLCD_SEG11	SEG11	PK5
	BSP_DLCD_SEG12	SEG12	PK4
	BSP_DLCD_SEG13	(Also used as MBEDIF_IO1)	PK3
	BSP_DLCD_SEG14	SEG14	PK2
	BSP_DLCD_SEG15	(Also used as MBEDIF_IO0)	PK1
	BSP_DLCD_SEG16	SEG16	PK0
	BSP_DLCD_SEG17	SEG17	PJ5
	BSP_DLCD_SEG18	SEG18	PJ4
	BSP_DLCD_SEG19	SEG19	PJ3
	BSP_DLCD_SEG20	(Also used as MBEDIF_RXD)	PJ2
	BSP_DLCD_SEG21	(Also used as MBEDIF_TXD)	PJ1
	BSP_DLCD_SEG22	SEG22	PJ0
	BSP_DLCD_SEG23	SEG23	PN0
	BSP_DLCD_SEG24	SEG24	PN1
	BSP_DLCD_SEG25	SEG25	PN2
	BSP_DLCD_SEG26	SEG26	PN3
	BSP_DLCD_SEG27	SEG27	PN4
	BSP_DLCD_SEG28	SEG28	PN5
	BSP_DLCD_SEG29	SEG29	PR7
	BSP_DLCD_SEG30	SEG30	PR6
	BSP_DLCD_SEG31	SEG31	PR5
	BSP_DLCD_SEG32	SEG13	PR4
	BSP_DLCD_SEG33	SEG15	PR3
	BSP_DLCD_SEG34	SEG20	PR2
	BSP_DLCD_SEG35	SEG21	PR1
	BSP_DLCD_SEG36	SEG00	PR0
	BSP_DLCD_SEG37	SEG01	PC6
	BSP_DLCD_SEG38	SEG02	PC5
	BSP_DLCD_SEG39	SEG03	PC4

6. System Setting

Clock	Function	MHz	Note
fEHOSC	External oscillator	10	—
fiHOSC	Internal oscillator	10	—
fs	Low-speed oscillator	0.032768	—
fc	High-speed clock	120	Use fEHOSC. fsys, Φ T0 base clock, ADC, DNF
fsys	System clock	120	Peripheral operating clock other than ADC and DNF
ϕ T0	ϕ T0	120	—

* This is a basic setting. The settings may change depending on the sample software.

7. Communication settings

7.1. UART Communication Setting

Item	Setting Value	Note
Baud Rate	115200(bps)	—
Data Length	8(bit)	—
Parity	None	—
Stop Bit	1(bit)	—
Flow Control	None	—

7.2. I2C Communication Setting

Item	Setting Value	Note
I2C Clock	400kHz	When Master operates
Data Length	8bit	—
Acknowledge	Available	—
Start/Stop Condition	Generated	—

Slave Operating Specifications

Item	Setting Value	Note
Sub Address Size	0x02	—
Data Size	0x10	Indicates the valid data size (byte) Sub Address Range:0000-000F

BSP Slave Device Specifications

Item	Setting Value	Note
IC	24FC256-I/SN	EEPROM
Slave Device Address	0xB0	—
Sub Address Size	2byte	—

7.3. SPI Communication Setting

Item	Setting Value	Note
SPI Clock	15MHz	When Master operates
Data Length	8bit	—
Parity	None	—
Data Transfer Direction	MSB	—

8. Precautions for Use

Please confirm the operation sufficiently if use in an environment other than the operation check environment.

9. Revision History

Revision	Date	Description
1.0	2022-04-08	First release

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