KM1M7AF Series CMSIS BSP Guide

Directory Introduction for 32-bit NuMicro® Family

Directory Information

Document	Driver reference guide and revision history.
Library	Driver header and source files.
SampleCode	Driver sample code.

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1 Document

CMSIS.html	Document of CMSIS version 5.1.1.
NuMicro KM1M7AF Series CMSIS BSP Driver Reference Guide.chm	This document describes the usage of drivers in KM1M7A BSP.
NuMicro KM1M7AF Series CMSIS BSP Revision History.pdf	This document shows the revision history of KM1M7A BSP.
NuMicro KM1M7AF Series CMSIS BSP Driver Revision History Details.xlsx	This document shows the revision history details of KM1M7A BSP Driver.
LICENSE.txt	Document of Apache License.

2 Library

CMSIS	Cortex® Microcontroller Software Interface Standard (CMSIS) V5.1.1 definitions by Arm® Corp.
Device	CMSIS compliant device header file.
StdDriver	All peripheral driver header and source files.

3 SampleCode

ISP	Sample codes for In-System-Programming.
StdDriver	Sample code to demonstrate the usage of KM1M7AF series MCU peripheral driver APIs.
Template	A project template for KM1M7AF series MCU.

* The following IDE versions have been confirmed to work.

IAR: Ver 9.1

KEIL: uVision 5.36

GCC: NuEclipse_V1.02.026

4 SampleCode\ISP

ISP_UART	In-System-Programming Sample code through UART interface. ※PC tools are required to use the ISP. Please contact Nuvoton Technology Corporation Japan for PC tools.

5 SampleCode\StdDriver

System Setting (SYS)

SYS_Reset	Reset, refer to reset factor, clear reset factor.

Flash Memory Controller (FMC)

FMC_Write	Erase and rewrite one sector of I-Flash.

Data Flash Memory Controller (DFMC)

DFMC_Write	Erase and rewrite one sector of D-Flash.

General Purpose I/O (GPIO)

GPIO_EINTAndNF	Show the usage of GPIO external interrupt function and noise filter function.
GPIO_OutputInput	Show how to set GPIO pin mode and use pin data input/output control.

DMA Controller (DMA)

DMA_BasicMode	Use DMA channel 1 to transfer data from memory to memory.

Watchdog Timer (WDT)

WDT_ClearWindow	Demonstrate how to use WDT clear window function.
WDT_TimeoutAndReset	Demonstrate how to initialize WDT, reset WDT counter, and cause WDT error detection reset.

16-bit Timer (TIMER) TIMER0-13

TIMER_Periodic	Use the Timer periodic mode to generate Timer interrupt every 0.05 second.
TIMER_PeriodicINT	Implement Timer counting in periodic mode.
TIMER_PWM_ChangeDuty	Change duty cycle and period of output waveform in PWM up count type.
TIMER_PWM_OutputWaveform	Demonstrate output different duty waveform in Timer0~3 PWM.
TIMER_Trigger	Start the timer with an external trigger.

16-bit Timer (ETIMER) TIMER20-25

ETIMER_Periodic	Use the Timer periodic mode to generate Timer interrupt every 0.002 second.
ETIMER_PeriodicINT	Implement Timer counting in periodic mode.
ETIMER_PWM_ChangeDuty	Change duty cycle and period of output waveform in PWM up count type.
ETIMER_PWM_OutputWaveform	Demonstrate output different duty waveform in Timer20~23 PWM.
ETIMER_Trigger	Start the timer by external trigger input.

Clock Monitoring Circuit (CKM)

CKM_AfterPowerUp	After turning on the power of the MCU, the clock source of BASECLK is switched, and then the clock monitoring is started.
CKM_ChangingClock	The clock monitoring function is stopped, the clock monitoring frequency is changed, and the clock source of BASECLK is switched, and then the clock monitoring function is enabled.

CKM_AfterPowerUp_withClkTransitionMode	After turning on the power of the MCU, switch to the clock transition mode, set the clock monitoring frequency, switch the clock, and enable the clock monitoring function, and then cancel the clock transition mode.
CKM_ChangingClock_withClkTransitionMode	After switching to the clock transition mode, changing the clock monitoring frequency, and switching the BASECLK clock source, cancel the clock transition mode. By using the clock transition mode, the clock monitoring function stops only when BASECLK is switched to the built-in oscillation (HRCCLK), and the original BASECLK can always be monitored before and after switching.

Power Control PWM (GPWM)

GPWM_Brake	Demonstrate how to use GPWM brake function.
GPWM_DeadTime	Demonstrate how to use GPWM Dead Time function.
GPWM_DoubleBuffer	Change duty cycle and period of output waveform by GPWM Double Buffer function.
GPWM_OutputWaveform	Demonstrate how to use GPWM counter output waveform.
GPWM_SwitchDuty	Change duty cycle of output waveform by configured period.

Multi Feedback Assist (MFA)

MFA_Conflict	Demonstration of conflict detection function by MFA.
MFA_Blanking	Demonstration of blanking function by MFA.
MFA_Sync	Demonstration of synchronous start control function by MFA.

Digital-to-Analog Converter (DAC)

DAC_Output	Show how to DAC output.
DAC_SlopePWM	Demonstration of slope compensation by DAC.

Comparator (CMP)

CMP_CompareDAC	Demonstrate how to use comparator 2-level detection mode. (Reference voltage : DAC output)
CMP_WindowCompare	Show how to monitor CMP input with window detection mode.

UART Interface Controller (UART)

UART_TxRxFunction	Demonstrate UART self loop back data transfer to show transmission and reception with one UART.
UART_SingleWire	Demonstrate UART single wire data transfer.
UART_DMA	Demonstrate UART self loop back data transfer with DMA.

Serial Peripheral Interface (SPI)

SPI_TxRxFunction	Demonstrate SPI Master/Slave data transfer.
SPI_DMA	Demonstrate SPI Master/Slave data transfer with DMA.

I^{2}C Serial Interface Controller 0 (I2CA)

I2CA_Master	Show how a master accesses a slave. This sample code needs to work with I2CA_Slave.
I2CA_MultiByte_Master	Show how to set I2CA Multi bytes API Read and Write data to Slave. This sample code needs to work with

	I2CA_Slave.
I2CA_SingleBytes_Master	Show how to use I2CA Single byte API Read and Write data to Slave. This sample code needs to work with I2CA_Slave.
I2CA_Slave	Demonstrate how to set I2CA in Slave mode to receive 256 bytes data from a master. This sample code needs to work with I2CA_Master.

I²C Serial Interface Controller 7 (I2CE)

I2CE_GCMode_Master	Show how a master uses I2CE address 0x0 to write data to a slave. This sample code needs to work with I2CE_GCMode_Slave.
I2CE_GCMode_Slave	Show how a slave receives data from a master in GC (General Call) mode. This sample code needs to work with I2CE_GCMode_Master.
I2CE_Master	Show how a master accesses a slave. This sample code needs to work with I2CE_Slave.
I2CE_MultiByte_Master	Show how to set I2CE Multi bytes API Read and Write data to Slave. This sample code needs to work with I2CE_Slave.
I2CE_SingleByte_Master	Show how to use I2CE Single byte API Read and Write data to Slave. This sample code needs to work with I2CE_Slave.
I2CE_Slave	Demonstrate how to set I2CE in Slave mode to receive 256 bytes data from a master. This sample code needs to work with I2CE_Master.
I2CE_Wakeup_Slave	Show how to wake up MCU from Power-down mode via the I2CE interface. This sample code needs to work with I2CE_Master.

SMBus Interface (SMBUS)

SMBUS_Com	Show how to control SMBus interface and use SMBus protocol between Host and Slave.

CAN Controller (CAN)

CAN_NormalMode_Tx_Rx	Demonstrate CAN bus transmit and receive a message with normal mode by connecting CAN 0 and CAN1 to the same CAN bus.

Analog-to-Digital Converter (ADC)

ADC_ADINT_Trigger	Use ADINT interrupt to do the ADC continuous scan conversion.
ADC_Multiple_Channel	Show how to multi-channel ADC conversion.
ADC_Timer_Trigger	Show how to trigger ADC by Timer.

Power Supply Voltage Detection (LVD)

LVD_BODWakeup	Demonstrate how to wake up system from Power-down mode by brown-out detector interrupt.

CRC Controller (CRC)

CRC_CCITT	Show how to CRC calculation function(CRC-16-CCITT)

LIN Controller (LIN)

LIN_Master	Show how to use LIN communication as a master node. This sample code needs to work with LIN_Slave.
LIN_Slave	Show how to use LIN communication as a slave node. This sample code needs to work with LIN_Master.

Variable Gain Amplifier (VGA)

VGA_ADConversion	VGA0 output is A/D converted by A/D0.

6 Sample Code Compatibility List

Category	00	02	50	52
Part Number / Sample Code	KM1M7AF00N KM1M7AF00M KM1M7AF00K	KM1M7AF02N KM1M7AF02M KM1M7AF02K	KM1M7AF50N KM1M7AF50M KM1M7AF50K	KM1M7AF52N KM1M7AF52M KM1M7AF52K
SYS_Reset	√	√	√	√
FMC_Write	√	√	√	√
DFMC_Write	√	√	√	√
GPIO_EINTAndNF	√	√	√	√
GPIO_OutputInput	√	√	√	√
DMA_BasicMode	√	√	√	√
WDT_ClearWindow	√	√	√	√
WDT_TimeoutAndReset	√	√	√	√
TIMER_Periodic	√	√	√	√
TIMER_PeriodicINT	√	√	√	√
TIMER_PWM_ChangeDuty	√	√	√	√
TIMER_PWM_OutputWaveform	√	√	√	√
TIMER_Trigger	√	√	√	√
ETIMER_Periodic	√	√	√	√
ETIMER_PeriodicINT	√	√	√	√
ETIMER_PWM_ChangeDuty	√	√	√	√
ETIMER_PWM_OutputWaveform	√	√	√	√
ETIMER_Trigger	√	√	√	√
CKM_AfterPowerUp	√	√	√	√
CKM_ChangingClock	√	√	√	√
CKM_AfterPowerUp_withClkTransi	√	√	√	√

Category	00	02	50	52
tionMode				
CKM_ChangingClock_withClkTransitionMode	√	√	√	√
GPWM_Brake	√	√	√	√
GPWM_DeadTime	√	√	√	√
GPWM_DoubleBuffer	√	√	√	√
GPWM_OutputWaveform	√	√	√	√
GPWM_SwitchDuty	√	√	√	√
MFA_Conflict	√	√	√	√
MFA_Blanking	√	√	√	√
MFA_Sync	√	√	√	√
DAC_Output	√	√	√	√
DAC_SlopePWM	√	√	√	√
CMP_CompareDAC	√	√	√	√
CMP_WindowCompare	√	√	√	√
UART_TxRxFunction	√	√	√	√
UART_SingleWire	√	√	√	√
UART_DMA	√	√	√	√
SPI_TxRxFunction	√	√	√	√
SPI_DMA	√	√	√	√
I2CA_Master	√	√	√	√
I2CA_MultiBytes_Master	√	√	√	√
I2CA_SingleByte_Master	√	√	√	√
I2CA_Slave	√	√	√	√
I2CE_GCMode_Master	√	√	√	√

Category	00	02	50	52
I2CE_GCMode_Slave	√	√	√	√
I2CE_Master	√	√	√	√
I2CE_MultiBytes_Master	√	√	√	√
I2CE_SingleByte_Master	√	√	√	√
I2CE_Slave	√	√	√	√
I2CE_Wakeup_Slave	√	√	√	√
SMBUS_Com	√	√	√	√
CAN_NormalMode_Tx_Rx	-	-	√	√
ADC_ADINT_Trigger	√	√	√	√
ADC_Multiple_Channel	√	√	√	√
ADC_Timer_Trigger	√	√	√	√
LVD_BODWakeup	√	√	√	√
CRC_CCITT	√	√	√	√
LIN_Master	√	√	√	√
LIN_Slave	√	√	√	√
VGA_ADConversion	√	√	√	√

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