

NUC1311 CMSIS BSP Directory

Directory Introduction for 32-bit NuMicro™ Family

Directory Information

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

The information described in this document is the exclusive intellectual property of Nuvoton Technology Corporation and shall not be reproduced without permission from Nuvoton.

Nuvoton is providing this document only for reference purposes of NuMicro microcontroller based system design. Nuvoton assumes no responsibility for errors or omissions.

All data and specifications are subject to change without notice.

For additional information or questions, please contact: Nuvoton Technology Corporation.

www.nuvoton.com

TABLE OF CONTENTS

2	LIBRARY INFORMATION	4
3	SAMPLE CODE INFORMATION	5
4	SAMPLECODE\ISP	6
5	SAMPLECODE\REGBASED	7
	System Manager (SYS)	7
	Flash Memory Controller (FMC)	7
	General Purpose I/O (GPIO)	7
	Timer Controller (TIMER)	7
	Watchdog Timer (WDT)	8
	Window Watchdog Timer (WWDT)	8
	PWM Generator and Capture Timer (PWM)	8
	UART Interface Controller (UART)	8
	Serial Peripheral Interface (SPI)	9
	I ² C Serial Interface Controller (I ² C)	10
	Controller Area Network (CAN)	10
	Analog-to-Digital Converter (ADC)	10
6	SAMPLECODE\STDDRIVER	12
	System Manager (SYS)	12
	Flash Memory Controller (FMC)	12
	General Purpose I/O (GPIO)	12
	Timer Controller (TIMER)	12
	Watchdog Timer (WDT)	13
	Window Watchdog Timer (WWDT)	13
	UART Interface Controller (UART)	13
	Serial Peripheral Interface (SPI)	14
	I ² C Serial Interface Controller (I ² C)	14
	Controller Area Network (CAN)	15
	Analog-to-Digital Converter (ADC)	16

1 Document Information

Revision History	Show all the revision history about specific BSP.
NuMicro NUC1311 Driver Reference Guide.chm	The usage of drivers in NUC1311 Series BSP.

2 Library Information

CMSIS	CMSIS definitions by ARM® Corp.
Device	CMSIS compliant device header file.
StdDriver	All peripheral driver header and source files.

3 Sample Code Information

ISP	Sample codes for In-System-Programming.
Template	Software Development Template.
Semihost	A sample code to show how to debug with semihost message print.
RegBased	The sample codes which access control registers directly.
StdDriver	NUC1311 Series Driver Samples

4 SampleCode\ISP

ISP_CAN	In-System-Programming Sample code through CAN interface.
ISP_I2C	In-System-Programming Sample code through I2C interface.
ISP_RS485	In-System-Programming Sample code through RS485 interface.
ISP_SPI	In-System-Programming Sample code through SPI interface.
ISP_UART	In-System-Programming Sample code through UART interface.

5 SampleCode\RegBased System Manager (SYS)

SYS_PLLClockOutput	Demonstrate how to change system clock to different PLL frequency and output system clock from CLKO pin.
SYS_PowerDown_MinCurrent	Demonstrate how to minimize power consumption when entering power down mode

Flash Memory Controller (FMC)

FMC_IAP	Show how to call LDROM functions from APROM. The code in APROM will look up the table at 0x100E00 to get the address of function of LDROM and call the function.
FMC_MultiBoot	Implement a multi-boot system to boot from different applications in APROM. A LDROM code and four APROM code are implemented in this sample code.
FMC_RW	Demonstrate how to read/program embedded flash by ISP function.

General Purpose I/O (GPIO)

GPIO_EINTAndDebounce	Demonstrate how to use GPIO external interrupt function and de-bounce function.
GPIO_INT	Demonstrate how to use GPIO interrupt function.
GPIO_OutputInput	Demonstrate how to set GPIO pin mode and use pin data input/output control.
GPIO_PowerDown	Demonstrate how to wake-up form Power-down mode by GPIO interrupt.

Timer Controller (TIMER)

TIMER_Capture	Demonstrate how to use timer2 capture event to capture timer2 counter value.
----------------------	--

TIMER_Counter	Demonstrate how to use timer1 counter input function to count the input event.
TIMER_PeriodicINT	Demonstrate how to perform timer counting in periodic mode.
TIMER_PowerDown	Demonstrate how to use timer0 toggle-output interrupt event to wake-up system.

Watchdog Timer (WDT)

WDT_PowerDown	Demonstrate how to use WDT time-out interrupt event to wake-up system.
WDT_TimeoutINT	Select one WDT time-out interval period time to generate time-out interrupt event.
WDT_TimeoutReset	Demonstrate how to cause WDT time-out reset system event while WDT time-out reset delay period expired.

Window Watchdog Timer (WWDT)

WWDT_CompareINT	Select one WWDT window compare value to generate window compare match interrupt event.
------------------------	--

PWM Generator and Capture Timer (PWM)

PWM_Capture	Demonstrate how to use PWMB Channel 2 captures PWMB Channel 1 Waveform.
PWM_DeadZone	Demonstrate how to use PWM Dead Zone function.
PWM_DoubleBuffer	Use PWM Double Buffer function to change duty cycle and period of output waveform.

UART Interface Controller (UART)

UART_AutoFlow_Master	Demonstrate how to transmit and receive data with auto flow control. The sample code needs to work with UART_AutoFlow_Slave .
-----------------------------	---

UART_AutoFlow_Slave	Demonstrate how to transmit and receive data with auto flow control. The sample code needs to work with UART_AutoFlow_Master .
UART_IrDA_Master	Demonstrate how to transmit and receive data in UART IrDA mode. The sample code needs to work with UART_IrDA_Slave .
UART_IrDA_Slave	Demonstrate how to transmit and receive data in UART IrDA mode. The sample code needs to work with UART_IrDA_Master .
UART_LIN	Demonstrate how to transmit LIN header and response.
UART_RS485_Master	Demonstrate how to transmit and receive data in UART RS485 mode. The sample code needs to work with UART_RS485_Slave .
UART_RS485_Slave	Demonstrate how to transmit and receive data in UART RS485 mode. The sample code needs to work with UART_RS485_Master .
UART_TxRx_Function	Demonstrate how UART transmit and receive data from PC terminal through RS232 interface.
UART_Wakeup	Show how to wake up system form Power-down mode by UART interrupt.

Serial Peripheral Interface (SPI)

SPI_Loopback	Implement SPI Master loop back transfer. This sample code needs to connect SPI0_MISO0 pin and SPI0_MOSI0 pin together. It will compare the received data with transmitted data.
SPI_MasterFifoMode	Demonstrate how to communicate with an off-chip SPI slave device with FIFO mode. This sample code needs to work with SPI_SlaveFifoMode sample code.
SPI_SlaveFifoMode	Demonstrate how to communicate with an off-chip SPI master device with FIFO mode. This sample code needs to work with SPI_MasterFifoMode sample code.

I²C Serial Interface Controller (I²C)

I2C_EEPROM	Demonstrate how to access EEPROM by I ² C interface.
I2C_GCMode_Master	Demonstrate how a Master uses I ² C address 0x0 to write data to I ² C Slave. Needs to work with I2C_GCMode_SLAVE sample code.
I2C_GCMode_Slave	Demonstrate how to receive Master data in GC (General Call) mode. Needs to work with I2C_GCMode_MASTER sample code.
I2C_Master	Demonstrate how a Master access Slave. Needs to work with I2C_SLAVE sample code.
I2C_Slave	Demonstrate how to set I ² C in slave mode to receive the data of a Master. Needs to work with I2C_MASTER sample code.
I2C_Wakeup_Master	Demonstrate how to wake-up MCU from power-down. Needs to work with I2C_Wakeup_Slave sample code.
I2C_Wakeup_Slave	Demonstrate how to set I ² C to wake-up MCU from power-down mode. Needs to work with I2C_Wakeup_Master sample code.

Controller Area Network (CAN)

CAN_Set_MaskFilter	Demonstrate how to use MaskFilter to receive message in Normal mode. The sample code needs to work with CAN_Test_MaskFilter .
CAN_Test_MaskFilter	Demonstrate how to use message object No.1 to send message objects (ID=0x700~0x70F). The sample code needs to work with CAN_Set_MaskFilter .

Analog-to-Digital Converter (ADC)

ADC_ContinuousScanMode	Demonstrate how to use continuous scan mode and finishes two cycles of conversion for the specified channels.
ADC_MeasureAVDD	Measure AVDD voltage by ADC.

ADC_PwmTrigger	Demonstrate how to trigger ADC by PWM.
ADC_ResultMonitor	Demonstrate how to use the digital compare function to monitor the conversion result of channel 2.
ADC_SingleCycleScanMode	Demonstrate how to use single cycle scan mode and finishes one cycle of conversion for the specified channels.
ADC_SingleMode	Demonstrate how to use single mode and finishes the conversion of the specified channel.

6 SampleCode\StdDriver

System Manager (SYS)

SYS_PLLClockOutput	Demonstrate how to change system clock to different PLL frequency and output system clock from CLKO pin.
SYS_PowerDown_MinCurrent	Demonstrate how to minimize power consumption when entering power down mode

Flash Memory Controller (FMC)

FMC_IAP	Show how to call LDROM functions from APROM. The code in APROM will look up the table at 0x100E00 to get the address of function of LDROM and call the function.
FMC_RW	Demonstrate how to read/program embedded flash by ISP function.

General Purpose I/O (GPIO)

GPIO_EINTAndDebounce	Demonstrate how to use GPIO external interrupt function and de-bounce function.
GPIO_INT	Demonstrate how to use GPIO interrupt function.
GPIO_OutputInput	Demonstrate how to set GPIO pin mode and use pin data input/output control.
GPIO_PowerDown	Demonstrate how to wake-up form Power-down mode by GPIO interrupt.

Timer Controller (TIMER)

TIMER_Capture	Demonstrate how to use timer2 capture event to capture timer2 counter value.
TIMER_Counter	Demonstrate how to use timer1 counter input function to count the input event.

TIMER_Delay	Show how to use timer0 to create various delay time.
TIMER_PeriodicINT	Demonstrate how to perform timer counting in periodic mode.
TIMER_PowerDown	Demonstrate how to use timer0 toggle-output interrupt event to wake-up system.

Watchdog Timer (WDT)

WDT_PowerDown	Demonstrate how to use WDT time-out interrupt event to wake-up system.
WDT_TimeoutINT	Select one WDT time-out interval period time to generate time-out interrupt event.
WDT_TimeoutReset	Demonstrate how to cause WDT time-out reset system event while WDT time-out reset delay period expired.

Window Watchdog Timer (WWDT)

WWDT_CompareINT	Select one WWDT window compare value to generate window compare match interrupt event.
------------------------	--

UART Interface Controller (UART)

UART_Autoflow_Master	Demonstrate how to transmit and receive data with auto flow control. The sample code needs to work with UART_Autoflow_Slave .
UART_Autoflow_Slave	Demonstrate how to transmit and receive data with auto flow control. The sample code needs to work with UART_Autoflow_Master .
UART_IrDA_Master	Demonstrate how to transmit and receive data in UART IrDA mode. The sample code needs to work with UART_IrDA_Slave .
UART_IrDA_Slave	Demonstrate how to transmit and receive data in UART IrDA mode. The sample code needs to work with UART_IrDA_Master .

UART_LIN	Demonstrate how to transmit LIN header and response.
UART_RS485_Master	Demonstrate how to transmit and receive data in UART RS485 mode. The sample code needs to work with UART_RS485_Slave .
UART_RS485_Slave	Demonstrate how to transmit and receive data in UART RS485 mode. The sample code needs to work with UART_RS485_Master .
UART_TxRx_Function	Demonstrate how UART transmit and receive data from PC terminal through RS232 interface.
UART_Wakeup	Show how to wake up system form Power-down mode by UART interrupt.

Serial Peripheral Interface (SPI)

SPI_Loopback	Implement SPI Master loop back transfer. This sample code needs to connect SPI0_MISO0 pin and SPI0_MOSI0 pin together. It will compare the received data with transmitted data.
SPI_MasterFIFOmode	Configure SPI0 as Master mode and demonstrate how to communicate with an off-chip SPI Slave device with FIFO mode. This sample code needs to work with SPI_SlaveFifoMode sample code.
SPI_SlaveFIFOmode	Configure SPI0 as Slave mode and demonstrate how to communicate with an off-chip SPI Master device with FIFO mode. This sample code needs to work with SPI_MasterFifoMode sample code.

I²C Serial Interface Controller (I²C)

I2C_EEPROM	Demonstrate how to access EEPROM by I ² C interface.
I2C_GCMode_Master	Demonstrate how a Master uses I ² C address 0x0 to write data to I ² C Slave. Needs to work with I2C_GCMode_SLAVE sample code.

I2C_GCMode_Slave	Demonstrate how to receive Master data in GC (General Call) mode. Needs to work with I2C_GCMode_MASTER sample code.
I2C_Master	Demonstrate how a Master access Slave. Needs to work with I2C_SLAVE sample code.
I2C_Slave	Demonstrate how to set I ² C in slave mode to receive the data of a Master. Needs to work with I2C_MASTER sample code.
I2C_Wakeup_Master	Demonstrate how to wake-up MCU from power-down. Needs to work with I2C_Wakeup_Slave sample code.
I2C_Wakeup_Slave	Demonstrate how to set I ² C to wake-up MCU from power-down mode. Needs to work with I2C_Wakeup_Master sample code.

Controller Area Network (CAN)

CAN_BasicMode_Receive	Demonstrate how to receive message in Basic mode. The sample code needs to work with CAN_BasicMode_Transmit .
CAN_BasicMode_Transmit	Demonstrate how to transmit message in Basic mode. The sample code needs to work with CAN_BasicMode_Receive .
CAN_NormalMode_Receive	Demonstrate how to receive message in Normal mode. The sample code needs to work with CAN_NormalMode_Transmit .
CAN_NormalMode_Transmit	Demonstrate how to transmit message in Normal mode. The sample code needs to work with CAN_NormalMode_Receive .
CAN_BasicMode_SilentMode	Use CAN Silent mode to listen to CAN bus communication test in Basic mode.
CAN_NormalMode_SilentMode	Use CAN Silent mode to listen to CAN bus communication test in Normal mode.
CAN_Wakeup	Show how to wake up system form Power-down mode by detecting a transition.

Analog-to-Digital Converter (ADC)

ADC_ContinuousScanMode	Demonstrate how to use continuous scan mode and finishes two cycles of conversion for the specified channels.
ADC_MeasureAVDD	Measure AVDD voltage by ADC.
ADC_PwmTrigger	Demonstrate how to trigger ADC by PWM.
ADC_ResultMonitor	Demonstrate how to use the digital compare function to monitor the conversion result of channel 2.
ADC_SingleCycleScanMode	Demonstrate how to use single cycle scan mode and finishes one cycle of conversion for the specified channels.
ADC_SingleMode	Demonstrate how to use single mode and finishes the conversion of the specified channel.

Important Notice

Nuvoton Products are neither intended nor warranted for usage in systems or equipment, any malfunction or failure of which may cause loss of human life, bodily injury or severe property damage. Such applications are deemed, "Insecure Usage".

Insecure usage includes, but is not limited to: equipment for surgical implementation, atomic energy control instruments, airplane or spaceship instruments, the control or operation of dynamic, brake or safety systems designed for vehicular use, traffic signal instruments, all types of safety devices, and other applications intended to support or sustain life.

All Insecure Usage shall be made at customer's risk, and in the event that third parties lay claims to Nuvoton as a result of customer's Insecure Usage, customer shall indemnify the damages and liabilities thus incurred by Nuvoton.

*Please note that all data and specifications are subject to change without notice.
All the trademarks of products and companies mentioned in this datasheet belong to their respective owners.*