

M051 Series 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

1 Document Information

Revision History.pdf	Show all the revision history about specific BSP.
NuMicro M051 BSP Driver Reference Guide.chm	Describe the definition, input and output of each API.

2 Library Information

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

3 Sampel Code Information

M051-LB_004	Samples for M051 Learning Board.
Hard_Fault_Sample	Show hard fault information when hard fault happened.
ISP	Sample codes for In-System-Programming.
Template	Software Development Template.
Semihost	Show how to debug with semi-host message print.
RegBased	The sample codes which access control registers directly.
StdDriver	M051 Series Driver Samples

4 \SampleCode\ISP

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

ACMP	Demonstrate how ACMP ^[1] works with internal band-gap voltage.
ACMP_Wakeup	Show how to wake up MCU from Power-down mode by ACMP wake-up function.
ADC_BurstMode	Demonstrate A/D conversion with burst mode. In burst mode, ADC will sample and convert a specified channel continuously and store the conversion result in FIFO buffers.
ADC_ContinuousScanMode	Perform A/D Conversion with ADC continuous scan mode.
ADC_PwmTrigger	Demonstrate how to trigger ADC by PWM.
ADC_MeasureAVDD	Measure AVDD voltage by ADC.
ADC_ResultMonitor	Monitor the conversion result of channel 2 by the digital compare function.
ADC_SingleCycleScanMode	Perform A/D Conversion with ADC single cycle scan mode.
ADC_SingleMode	Perform A/D Conversion with ADC single mode.
EBI_NOR	Configure EBI interface to access W39L040P (NOR Flash) on EBI interface.
EBI_SRAM	Configure EBI interface to access BS616LV4017 (SRAM) on EBI interface.
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 4 APROM code are implemented in this sample code.
FMC_MultiBoot_SwReset	Show how to use software reset to implement multi-boot system to boot from different applications in APROM. Five APROM code are implemented in this sample code.
FMC_RW	Show how to read/program embedded flash by ISP

	function.
GPIO_EINTAndDebounce	Show the usage of GPIO external interrupt function and de-bounce function.
GPIO_INT	Show the usage of GPIO interrupt function.
GPIO_OutputInput	Show how to set GPIO pin mode and use pin data input/output control.
GPIO_PowerDown	Show how to wake up system from Power-down mode by GPIO interrupt.
HDIV	Show how to use divider API and how to use hardware divider by control registers.
I2C_EEPROM	Show how to use I ² C interface to access EEPROM.
I2C_GCMode_Master	Show how a Master uses I ² C address 0x0 to write data to Slave. This sample code needs to work with I2C_GCMode_Slave.
I2C_GCMode_Slave	Show a Slave how to receive data from Master in GC(General Call) mode. This sample code needs to work with I2C_GCMode_Master.
I2C_Master	Show a Master how to access Slave. This sample code needs to work with I2C_Slave.
I2C_Slave	Show how to set I ² C in Slave mode and receive the data from Master. This sample code needs to work with I2C_Master.
I2C_Wakeup_Master	Show how to wake up MCU from Power-down. This sample code needs to work with I2C_Wakeup_Slave.
I2C_Wakeup_Slave	Show how to wake up MCU from Power-down mode through I ² C interface. This sample code needs to work with I2C_Wakeup_Master.
PWM	Generate different frequency(Tenor C Do ~ Si) waveform by PWM.
PWM_Capture	Capture the PWMB Channel 1 waveform by PWMB Channel 2.

PWM_DeadZone	Demonstrate how to use PWM Dead Zone function.
PWM_DoubleBuffer	Change duty cycle and period of output waveform by PWM Double Buffer function.
SPI_Loopback	Implement SPI Master loop back transfer. This sample code needs to connect MISO_0 pin and MOSI_0 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.
SYS	Change system clock to different PLL frequency and output system clock from CLK0 pin.
TIMER_Capture	Show how to use the timer1 capture function to capture timer1 counter value.
TIMER_Counter	Implement timer1 event counter function to count the external input event.
TIMER_PeriodicINT	Implement timer counting in periodic mode.
TIMER_PowerDown	Use timer-0 toggle-output interrupt event to wake-up system.
UART_AutoFlow_Master	Transmit and receive data with auto flow control. This sample code needs to work with UART_AutoFlow_Slave.
UART_AutoFlow_Slave	Transmit and receive data with auto flow control. This sample code needs to work with UART_AutoFlow_Master.
UART_IrDA_Master	Transmit and receive data in UART IrDA mode. This sample code needs to work with UART_IrDA_Slave.
UART_IrDA_Slave	Transmit and receive data in UART IrDA mode. This sample code needs to work with UART_IrDA_Master.

UART_LIN	Transmit LIN frame including header and response in UART LIN mode.
UART_RS485_Master	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Slave.
UART_RS485_Slave	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Master.
UART_TxRx_Function	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.
WDT_PowerDown	Use WDT time-out interrupt event to wake-up system.
WDT_TimeoutINT	Implement periodic WDT time-out interrupt event.
WDT_TimeoutReset	Show how to generate time-out reset system event while WDT time-out reset delay period expired.
WWDT_CompareINT	Show how to reload the WWDT counter value.

[1] Analog Comparator (ACMP).

6 \SampleCode\StdDriver

ACMP	Demonstrate how ACMP works with internal band-gap voltage.
ACMP_Wakeup	Show how to wake up MCU from Power-down mode by ACMP wake-up function.
ADC_BurstMode	Demonstrate A/D conversion with burst mode. In burst mode, ADC will sample and convert a specified channel continuously and store the conversion result in FIFO buffers.
ADC_ContinuousScanMode	Perform A/D Conversion with ADC continuous scan mode.
ADC_PwmTrigger	Demonstrate how to trigger ADC by PWM.
ADC_MeasureAVDD	Measure AVDD voltage by ADC.
ADC_ResultMonitor	Monitor the conversion result of channel 2 by the digital compare function.
ADC_SingleCycleScanMode	Perform A/D Conversion with ADC single cycle scan mode.
ADC_SingleMode	Perform A/D Conversion with ADC single mode.
EBI_NOR	Configure EBI interface to access W39L040P (NOR Flash) on EBI interface.
EBI_SRAM	Configure EBI interface to access BS616LV4017 (SRAM) on EBI interface.
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	Show how to read/program embedded flash by ISP function.
GPIO_EINTAndDebounce	Show the usage of GPIO external interrupt function and de-bounce function.

GPIO_INT	Show the usage of GPIO interrupt function.
GPIO_OutputInput	Show how to set GPIO pin mode and use pin data input/output control.
GPIO_PowerDown	Show how to wake up system from Power-down mode by GPIO interrupt.
HDIV	Show how to use divider API and how to use hardware divider by control registers.
I2C_EEPROM	Show how to use I2C interface to access EEPROM.
I2C_GCMode_Master	Show how a Master uses I2C address 0x0 to write data to Slave. This sample code needs to work with I2C_GCMode_Slave.
I2C_GCMode_Slave	Show a Slave how to receive data from Master in GC(General Call) mode. This sample code needs to work with I2C_GCMode_Master.
I2C_Master	Show a Master how to access Slave. This sample code needs to work with I2C_Slave.
I2C_Slave	Show how to set I2C in Slave mode and receive the data from Master. This sample code needs to work with I2C_Master.
I2C_Wakeup_Master	Show how to wake up MCU from Power-down. This sample code needs to work with I2C_Wakeup_Slave.
I2C_Wakeup_Slave	Show how to wake up MCU from Power-down mode through I ² C interface. This sample code needs to work with I2C_Wakeup_Master.
PWM	Generate different frequency(Tenor C Do ~ Si) waveform by PWM.
PWM_Capture	Capture the PWMB Channel 1 waveform by PWMB Channel 2.
PWM_DeadZone	Demonstrate how to use PWM Dead Zone function.
PWM_DoubleBuffer	Change duty cycle and period of output waveform by

	PWM Double Buffer function.
SPI_Loopback	Implement SPI Master loop back transfer. This sample code needs to connect MISO_0 pin and MOSI_0 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.
SYS	Change system clock to different PLL frequency and output system clock from CLK0 pin.
TIMER_Capture	Show how to use the timer1 capture function to capture timer1 counter value.
TIMER_Counter	Implement timer1 event counter function to count the external input event.
TIMER_PeriodicINT	Implement timer counting in periodic mode.
TIMER_PowerDown	Use timer-0 toggle-output interrupt event to wake-up system.
UART_AutoFlow_Master	Transmit and receive data with auto flow control. This sample code needs to work with UART_AutoFlow_Slave.
UART_AutoFlow_Slave	Transmit and receive data with auto flow control. This sample code needs to work with UART_AutoFlow_Master.
UART_IrDA_Master	Transmit and receive data in UART IrDA mode. This sample code needs to work with UART_IrDA_Slave.
UART_IrDA_Slave	Transmit and receive data in UART IrDA mode. This sample code needs to work with UART_IrDA_Master.
UART_LIN	Transmit LIN frame including header and response in

	UART LIN mode.
UART_RS485_Master	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Slave.
UART_RS485_Slave	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Master.
UART_TxRx_Function	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.
WDT_PowerDown	Use WDT time-out interrupt event to wake-up system.
WDT_TimeoutINT	Implement periodic WDT time-out interrupt event.
WDT_TimeoutReset	Show how to generate time-out reset system event while WDT time-out reset delay period expired.
WWDT_CompareINT	Show how to reload the WWDT counter value.

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.*