

## M051 Series BSP Directory

Directory Introduction for 32-bit NuMicro™ Family

### Directory Information

<b>Document</b>	Driver reference manual and revision history.
<b>Library</b>	Driver header and source files.
<b>SampleCode</b>	Driver sample code.

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

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## 1 Document Information

Revision History.pdf	Show all the revision history about specific BSP.
NuMicro M05xxDN_DE Driver Reference Guide.chm	Describe the definition, input and output of each API.

## 2 Library Information

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

### 3 Sampel Code Information

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

## 4 \SampleCode\RegBased

<b>ACMP</b>	Demonstrate how ACMP <sup>[1]</sup> works with internal band-gap voltage.
<b>ACMP_Wakeup</b>	Show how to wake up MCU from Power-down mode by ACMP wake-up function.
<b>ADC_BurstMode</b>	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.
<b>ADC_ContinuousScanMode</b>	Perform A/D Conversion with ADC continuous scan mode.
<b>ADC_PwmTrigger</b>	Demonstrate how to trigger ADC by PWM.
<b>ADC_ResultMonitor</b>	Monitor the conversion result of channel 2 by the digital compare function.
<b>ADC_SingleCycleScanMode</b>	Perform A/D Conversion with ADC single cycle scan mode.
<b>ADC_SingleMode</b>	Perform A/D Conversion with ADC single mode.
<b>EBI_NOR</b>	Configure EBI interface to access W39L040P (NOR Flash) on EBI interface.
<b>EBI_SRAM</b>	Configure EBI interface to access BS616LV4017 (SRAM) on EBI interface.
<b>FMC_IAP</b>	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.
<b>FMC_MultiBoot</b>	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.
<b>FMC_MultiBoot_SwReset</b>	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.
<b>FMC_RW</b>	Show how to read/program embedded flash by ISP function.

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

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

<b>UART_LIN</b>	Transmit LIN frame including header and response in UART LIN mode.
<b>UART_RS485_Master</b>	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Slave.
<b>UART_RS485_Slave</b>	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Master.
<b>UART_TxRx_Function</b>	Transmit and receive data from PC terminal through RS232 interface.
<b>UART_Wakeup</b>	Show how to wake up system form Power-down mode by UART interrupt.
<b>WDT_PowerDown</b>	Use WDT time-out interrupt event to wake-up system.
<b>WDT_TimeoutINT</b>	Implement periodic WDT time-out interrupt event.
<b>WDT_TimeoutReset</b>	Show how to generate time-out reset system event while WDT time-out reset delay period expired.
<b>WWDT_CompareINT</b>	Show how to reload the WWDT counter value.

[1] Analog Comparator (ACMP).



## 5 \SampleCode\StdDriver

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<b>ADC_ContinuousScanMode</b>	Perform A/D Conversion with ADC continuous scan mode.
<b>ADC_PwmTrigger</b>	Demonstrate how to trigger ADC by PWM.
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	input/output control.
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<b>I2C_GCMode_Slave</b>	Show a Slave how to receive data from Master in GC(General Call) mode. This sample code needs to work with I2C_GCMode_Master.
<b>I2C_Master</b>	Show a Master how to access Slave. This sample code needs to work with I2C_Slave.
<b>I2C_Slave</b>	Show how to set I2C in Slave mode and receive the data from Master. This sample code needs to work with I2C_Master.
<b>I2C_Wakeup_Master</b>	Show how to wake up MCU from Power-down. This sample code needs to work with I2C_Wakeup_Slave.
<b>I2C_Wakeup_Slave</b>	Show how to wake up MCU from Power-down mode through I <sup>2</sup> C interface. This sample code needs to work with I2C_Wakeup_Master.
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<b>UART_RS485_Slave</b>	Transmit and receive data in UART RS485 mode. This sample code needs to work with UART_RS485_Master.
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