

NUC123 CMSIS BSP Directory

Directory Introduction for 32-bit NuMicro™ Family

Directory Information

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

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

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1 Document Information

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

2 Library Information

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

3 Sample Code Information

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| \SampleCode\Hard_Fault_Sample | Show hard fault information when hard fault happened. |
| \SampleCode\Template | Software Development Template. |
| \SampleCode\Semihost | A sample code to show how to debug with semihost message print. |
| \SampleCode\RegBased | The sample codes which access control registers directly. |
| \SampleCode\StdDriver | NUC123 Driver Samples |

4 \SampleCode\RegBased

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| ADC_ContinuousScanMode | Demonstrate how to use continuous scan mode and finishes two cycles of conversion for the specified channels. |
| ADC_PwmTrigger | Demonstrate how to trigger ADC by PWM. |
| ADC_MeasureAVDD | Demonstrate how to measure AVDD voltage by ADC. |
| 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. |
| CRC_8 | Perform CRC-8 operation and get the CRC checksum result. |
| CRC_CCITT | Perform CRC-CCITT operation and get the CRC checksum result. |
| FMC_RW | Demonstrate how to read/program embedded flash by ISP function. |
| GPIO_EINT | Demonstrate how to use GPIO external interrupt 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. |
| GPIO_SwDebounce | Demonstrate how to imeplement software debounce with GPIO interrupt and timer. |
| 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 |

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| | 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_Loopback | Demonstrate how to set I2C Master and Slave mode, and show how a Master access Slave. |
| 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. This sample code is EEPROM like and only support 256 bytes. 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. |
| I2S_Master | Demonstrate how I ² S works in master mode. This sample code needs to work with I2S_Slave sample code. |
| I2S_Slave | Demonstrate how I ² S works in slave mode. This sample code needs to work with I2S_Master sample code. |
| PDMA | Demonstrate how to use PDMA channel 0 to transfer data from memory to memory. |
| PS2 | Demonstrate how to control PS/2 mouse movement on the screen. |
| PWM_Capture | Demonstrate how to use PWMA Channel 0 captures PWMA 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. |
| SPI_Loopback | Demonstrate SPI master loop back transfer. This sample |

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| | code needs to connect SPI0_MISO0 pin and SPI0_MOSI0 pin together. It will compare the received data with transmitted data. |
| SPI_MasterDualIOMode | Demonstrate how to communicate with an off-chip SPI slave device with Dual I/O mode and FIFO mode. This sample code needs to work with SPI_SlaveDualIOMode sample code. |
| 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_SlaveDualIOMode | Demonstrate how to communicate with an off-chip SPI master device with Dual I/O mode and FIFO mode. This sample code needs to work with SPI_MasterDualIOMode 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. |
| SYS | Demonstrate how to change system clock to different PLL frequency and output system clock from CLK0 pin. |
| 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. |
| 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. |

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| 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_PDMA | Transmit and receive UART data with PDMA. |
| 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. |
| 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. |
| WWDT_CompareINT | Select one WWDT window compare value to generate window compare match interrupt event. |

5 \SampleCode\StdDriver

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| ADC_SingleMode | Demonstrate how to use single mode and finishes the conversion of the specified channel. |
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| GPIO_SwDebounce | Demonstrate how to implement software debounce with GPIO interrupt and timer. |
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| | interface. |
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| I2C_GCMode_Slave | Demonstrate how to receive Master data in GC (General Call) mode. Needs to work with I2C_GCMode_Master sample code. |
| I2C_Loopback | Demonstrate how to set I2C Master and Slave mode, and show how a Master access Slave. |
| I2C_Master | Demonstrate how a Master access Slave. Needs to work with I2C_Slave sample code. |
| I2C_MultiBytes_Master | Demonstrate how a Master access Slave use multi bytes write and multi-bytes read. Needs to work with I2C_Slave sample code. |
| I2C_SingleByte_Master | Demonstrate how a Master access Slave use single byte write and single byte read. 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. This sample code is EEPROM like and only support 256 bytes. Needs to work with I2C_Master sample code. |
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| 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. |
| I2S_Master | Demonstrate how I ² S works in master mode. This sample code needs to work with I2S_Slave sample code. |
| I2S_Slave | Demonstrate how I ² S works in slave mode. This sample code needs to work with I2S_Master sample code. |

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| 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_SlaveDualIOMode | Demonstrate how to communicate with an off-chip SPI master device with Dual I/O mode and FIFO mode. This sample code needs to work with SPI_MasterDualIOMode 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. |
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| 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_PDMA | Transmit and receive UART data with PDMA. |
| 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. |
| USBD_Audio_HID_NAU8822 | Demonstrate how to implement a USB audio class device with HID key. NAU8822 is used in this sample code to play the audio data from Host. It also |

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| | supports to record data from NAU8822 to Host. |
| USBD_Audio_HID_Transfer | A composite device sample code for USB audio class with HID data transfer function. |
| USBD_Audio_NAU8822 | Demonstrate how to implement a USB audio class device. NAU8822 is used in this sample code to play the audio data from Host. It also supports to record data from NAU8822 to Host. |
| USBD_HID_Keyboard | Demonstrate how to implement a USB keyboard device. It supports to use GPIO to simulate key input. |
| USBD_HID_Mouse | Demonstrate how to implement a USB mouse device. The mouse cursor will move automatically when this mouse device connecting to PC by USB. |
| USBD_HID_Mouse2 | Demonstrate how to implement a USB mouse device. It use PC0 ~ PC5 to control mouse direction and mouse key. It also supports USB suspend and remote wakeup. |
| USBD_HID_MouseKeyboard | <p>Demonstrate how to implement a USB mouse function and a USB keyboard on the same USB device. The mouse cursor will move automatically when this mouse device connecting to PC.</p> <p>This sample code uses a GPIO to simulate key input.</p> |
| USBD_HID_Transfer | Demonstrate how to transfer data between USB device and PC through USB HID interface. A windows tool is also included in this sample code to connect with USB device. |
| USBD_HID_Transfer_and_Keyboard | Demonstrate how to implement a composite device (HID Transfer and keyboard). Transfer data between USB device and PC through USB HID interface. A windows tool is also included in this sample code to connect with USB device. |
| USBD_HID_Transfer_and_MSC | Demonstrate how to implement a composite device. (HID Transfer and Mass storage) . Transfer data between USB device and PC through USB HID interface. A windows tool is also included in this sample code to connect with a USB device. |

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| USBD_MassStorage_CDROM | Demonstrate how to simulate a USB CD-ROM device. |
| USBD_MassStorage_DataFlash | Demonstrate how to implement a USB Mass-Storage. It uses embedded data flash as storage. |
| USBD_Micro_Printer | Show how to implement a USB micro printer device. |
| USBD_Printer_and_HID_Transfer | Demonstrate how to implement a composite device (USB micro printer device and HID Transfer). Transfer data between USB device and PC through USB HID interface. A windows tool is also included in this sample code to connect with a USB device. |
| USBD_VCOM_and_HID_Keyboard | Implement a USB composite device with virtual COM port and keyboard functions. |
| USBD_VCOM_and_HID_Transfer | Demonstrate how to implement a composite device.(VCOM and HID Transfer). It supports one virtual COM port and transfers data between USB device and PC through USB HID interface. A windows tool is also included in this sample code to connect with a USB device. |
| USBD_VCOM_and_MassStorage | Implement a USB composite device. It supports one virtual COM port and one USB Mass-Storage device. |
| USBD_VCOM_DualPort | Demonstrate how to implement a USB dual virtual COM port device. |
| USBD_VCOM_SinglePort | Demonstrate how to implement a USB virtual com port device. t supports one virtual comport. |
| 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. |
| WWDT_CompareINT | Select one WWDT window compare value to |

generate window compare match interrupt event.

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