



Nuvoton NuMicro™ Family

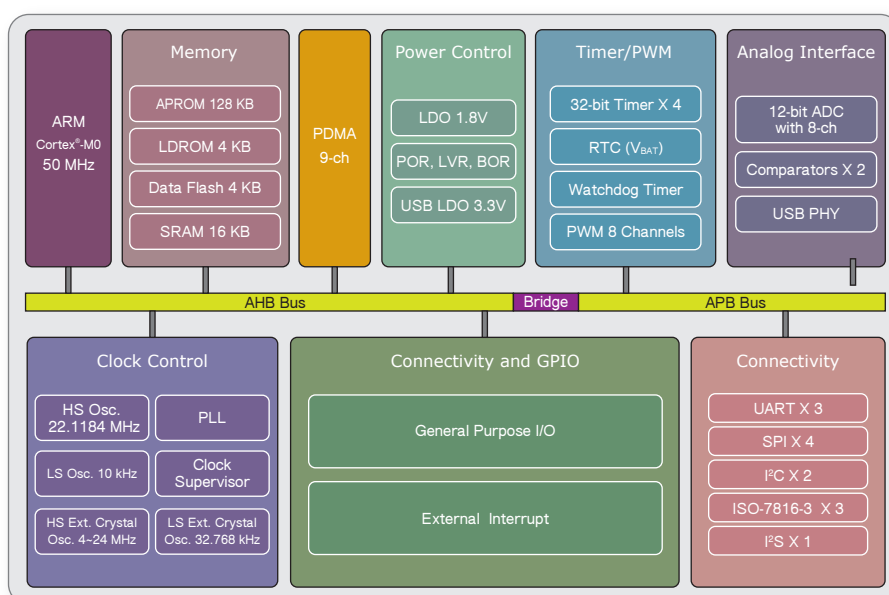
# NuMicro™ NUC220 Series



## Multi-connectivity Cortex®-M0 USB Device MCU

### Applications

- ◆ Security Alarm System
- ◆ Industrial Control
- ◆ Communication System
- ◆ USB Device Application
- ◆ General Purpose Control



### Selection Guide

Part No.	Flash (Kbytes)	SRAM (Kbytes)	Data Flash (Kbytes)	ISP ROM (Kbytes)	I/O	Timer (32-bit)	Connectivity						I <sup>2</sup> S	PWM (16-bit)	ADC (12-bit)	Comp.	RTC	PDMA	ISO- 7816-3	CRC	RTC (V <sub>BAT</sub> )	ICP ISP IAP	IRC 22 MHz	Package	Operating Temp. Range(°C)
							UART	SPI	I <sup>2</sup> C	USB	LIN	CAN													
NuMicro™ NUC220 USB Series																									
NUC220LC2AN	32	8	4	4	31	4	2	1	2	1	-	-	1	4	7	1	✓	9	2	✓	✓	✓	✓	LQFP48	-40 to +85
NUC220LD2AN	64	8	4	4	31	4	2	1	2	1	-	-	1	4	7	1	✓	9	2	✓	✓	✓	✓	LQFP48	-40 to +85
NUC220LE3AN	128	16	Configurable	4	31	4	2	1	2	1	-	-	1	4	7	1	✓	9	2	✓	✓	✓	✓	LQFP48	-40 to +85
NUC220SC2AN	32	8	4	4	45	4	2	2	2	1	-	-	1	6	7	2	✓	9	2	✓	✓	✓	✓	LQFP64*	-40 to +85
NUC220SD2AN	64	8	4	4	45	4	2	2	2	1	-	-	1	6	7	2	✓	9	2	✓	✓	✓	✓	LQFP64*	-40 to +85
NUC220SE3AN	128	16	Configurable	4	45	4	2	2	2	1	-	-	1	6	7	2	✓	9	2	✓	✓	✓	✓	LQFP64*	-40 to +85
NUC220VE3AN	128	16	Configurable	4	79	4	3	4	2	1	-	-	1	8	8	2	✓	9	3	✓	✓	✓	✓	LQFP100	-40 to +85

LQFP64\*: 7x7mm

Contact us: NuMicro@nuvoton.com

## ❖ Features of NuMicro™ NUC220 Series

### ◆ Core

- ARM® Cortex®-M0 core running up to 50 MHz
- One 24-bit system timer
- Low-power Sleep mode
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with four levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

### ◆ Memory

- 32/64/128 Kbytes program memory (APROM)
- 4 Kbytes loader memory (LDROM)
- 8/16 Kbytes embedded SRAM
- Supports In-System-Program (ISP) and In-Application-Program (IAP) application code update
- Supports 2-wired ICP update through SWD/ICE interface
- Supports fast parallel programming mode by external programmer

### ◆ Clock Control

- Flexible selection from different clock sources
- 22.1184 MHz internal oscillator for system operation
  - Trimmed to  $\pm 1\%$  at  $+25^{\circ}\text{C}$  and  $V_{DD} = 3.3\text{V}$
  - Trimmed to  $\pm 5\%$  at  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$  and  $V_{DD} = 2.5\text{V} \sim 5.5\text{V}$
- 10 kHz internal low-power oscillator for Watchdog Timer and Wake-up operation
- One PLL, up to 50 MHz, for high performance system operation
- 4 ~ 24 MHz external crystal input for precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

### ◆ Peripheral DMA

- 6 channels PDMA for automatic data transfer between SRAM and peripherals such as SPI, UART, I<sup>2</sup>S, PWM and ADC
- CRC calculation with four common polynomials, CRC-CCITT, CRC-8, CRC-16 and CRC-32

### ◆ Timers

- Four sets of 32-bit timers with 24-bit counters and one 8-bit pre-scale counter
- Counter auto reload

### ◆ PWM

- Four 16-bit PWM generators with eight PWM outputs or complementary paired PWM outputs
- Each PWM generator with one clock source selector, one clock divider, one 8-bit pre-scale and one Dead-zone generator for complementary paired PWM
- Up to four 16-bit digital capture timers (shared with PWM timers) with four rising/falling capture inputs
- Capture interrupt

### ◆ Communication Interfaces

- Three UARTs, up to 1 Mbps with flow control
- Four SPIs, clock up to 36 MHz (Master at 5V), 18 MHz (Slave at 5V)
- Two I<sup>2</sup>Cs
- IrDA (SIR) and RS485

### ◆ USB 2.0 Full-Speed Device

- One set of USB 2.0 FS Device
- On-chip USB Transceiver
- One interrupt source with 4 interrupt events
- Control, Bulk, Interrupt and Isochronous transfers
- Auto suspend function when no bus signaling for 3 ms
- Six programmable endpoints
- 512 bytes internal SRAM as USB buffer included
- Remote wake-up capability

### ◆ Smart Card Host (SC)

- Compliant to ISO-7816-3 T=0, T=1
- Three ISO-7816-3 ports

### ◆ I<sup>2</sup>S

- Interface with external audio CODEC
- Operates as either Master or Slave mode
- Capable of handling 8-, 16-, 24- and 32-bit word sizes
- Mono and stereo audio data

### ◆ ADC

- 12-bit SAR ADC with 760 KSPS
- Up to 8 channels single-end input or 4 channels differential input
- Single scan/single cycle scan/continuous scan
- Each channel with individual result register
- Threshold voltage detection
- Conversion started by software programming or external input
- PDMA mode
- Temperature sensor with  $1^{\circ}\text{C}$  resolution

### ◆ Window Watchdog Timer

- 6-bit down counter with 11-bit prescale for wide range window time selection

### ◆ RTC

- Software compensation by setting frequency compensate register (FCR)
- RTC counter (second, minute, hour) and calendar counter (day, month, year)
- Alarm registers (second, minute, hour, day, month, year)

### ◆ Analog Comparator

- Up to two analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change

### ◆ Brown-out Detector

- Four levels: 4.5V/3.8V/2.7V/2.2V
- Brown-out interrupt and reset option

### ◆ GPIOs

- Up to 79 general-purpose I/O (GPIO) pins
- Four I/O modes:
  - Quasi bi-direction
  - Push-Pull output
  - Open-Drain output
  - Input only with high impedance
- TTL/Schmitt trigger input selectable
- All GPIO pins can be configured as interrupt source with edge/level setting

### ◆ Operating Voltage

- 2.5V to 5.5V

### ◆ Operating Temperature

- $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

### ◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (7x7mm)
- LQFP100 (10x10mm)