

Microcontrollers

Product and Tool Selection Guide

Technical Supporting Web

NuMicro™

▶ www.nuvoton.com/NuMicro

ARM7 / ARM9

▶ www.nuvoton.com/ARM7_9

80C51

▶ www.nuvoton.com/80C51

Nuvoton MCU Forum

▶ www.nuvoton-m0.com

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nuvoton

Nuvoton Technology Corp. was established as a spin-out of Winbond Electronics' Logic business group, starting operation in July, 2008 and completed its IPO in September, 2010. Nuvoton Technology focuses on R&D and sales in logic ICs, and leads global market shares of microcontrollers, ISD ChipCorder®, Speech ICs and computer related application ICs. Nuvoton owns a six-inch wafer fab, featuring in special niche process. Besides in-house IC products, the wafer fab also provides part of its capacity for foundry services. Nuvoton Technology provides high cost performance products for its customers by means of flexible technology innovation capabilities, full product solutions and excellent integration of technology synergy. Nuvoton offers superior services based on existing solid foundation and continues to realize its vision: "Be an indispensable partner to industry leaders." Nuvoton values the long-term relationship with its partners and customers; the company has established subsidiaries in the USA, China and Israel to strengthen regional customer support and global management. For more information, please visit www.nuvoton.com.

Nuvoton MCU

Microcontrollers (MCUs) have become very popular and are widely used by all kinds of products, from low-cost consumer gizmos to highly sophisticated industrial control systems. Recognizing the demand for increased performance and peripherals, Nuvoton continues to invest significantly in microcontrollers to provide a broad product portfolio with 8051, ARM7, ARM9, and Cortex™-M0 core, all with rich on-chip peripherals to meet the needs of our existing and future customers. Nuvoton's microcontroller portfolio comprises three product lines: ARM7/ARM9 MCUs, 32-bit NuMicro™ MCUs with ARM® Cortex™-M0, and 8-bit 8051 compatible MCUs, which have been widely adopted by customers in a variety of applications including touch panels, network equipment, POS, home appliances, security systems, etc.

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NuMicro™ Family

NuMicro™ is Nuvoton's brand-new 32-bit Microcontroller (MCU) family powered by the ARM® Cortex™-M0 processor - the smallest, lowest power and most energy-efficient ARM processor optimized for a variety of MCU applications. Nuvoton's NuMicro™ family, which is ready for mass-production now, includes NUC100 series, NUC120/122/123 series with USB full-speed 2.0 device, NUC130/140 series embedded with Controller Area Network (CAN) 2.0B licensed from BOSCH, M051 series, Mini51 series, and Nano100 Ultra-Low Power series targeting at battery powered applications. With a variety of product offerings, the NuMicro™ family is ideal for use in industrial control systems, industrial automation, consumer products, embedded network control, energy, power systems, motor control, and many more. Moreover, with the integration of the industry leading ARM® Cortex™-M0 microprocessor, the NuMicro™ family brings 32-bit performance at a cost equivalent to traditional 8-bit microcontrollers.

NUC100 Series

The NuMicro™ NUC100 series embedded with the ARM® Cortex™-M0 core runs up to 72 MHz with 32K/64K/128K bytes Flash Program memory, 4K/8K/16K/20K bytes SRAM, and 4K bytes Flash loader memory for In System Programming (ISP). The NUC100 series also comes equipped with a variety of peripherals, such as GPIOs, Timers, Watchdog Timer, RTC, PDMA, UART, SPI/MICROWIRE, I²C, I²S, PWM, LIN, CAN, PS/2, USB 2.0 FS Device, 12-bit ADC, Analog Comparator, Low Voltage Reset and Brown-out Detector.

Key Features: Operable at 2.5V to 5.5V and -40°C to +85°C with separate Program Flash (32 KB ~ 128 KB), Data Flash* (4 KB) and ISP loader (4 KB) and PDMA (*: 128 KB version configurable)

Potential Applications: Industrial Control, Security System, Motor Control, Communication System, etc.

NUC100 Advanced Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						I ² S	PWM	ADC	Comp.	RTC	EBI	PDMA	ISO-7816-3	ICP ISPIAP	IRC 22MHz	Package
							UART	SPI	I ² C	USB	LIN	CAN											
Low Density																							
NUC100LC1DN	32K	4K	4K	4K	37	4x32-bit	2	1	2	-	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC100LD1DN	64K	4K	4K	4K	37	4x32-bit	2	1	2	-	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC100LD2DN	64K	8K	4K	4K	37	4x32-bit	2	1	2	-	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC100RC1DN	32K	4K	4K	4K	51	4x32-bit	2	2	2	-	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC100RD1DN	64K	4K	4K	4K	51	4x32-bit	2	2	2	-	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC100RD2DN	64K	8K	4K	4K	51	4x32-bit	2	2	2	-	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
Medium Density																							
NUC100LD3DN	64K	16K	4K	4K	37	4x32-bit	2	1	2	-	-	-	1	6x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC100LE3DN	128K	16K	Configurable	4K	37	4x32-bit	2	1	2	-	-	-	1	6x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC100RD3DN	64K	16K	4K	4K	51	4x32-bit	3	2	2	-	-	-	1	6x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC100RE3DN	128K	16K	Configurable	4K	51	4x32-bit	3	2	2	-	-	-	1	6x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC100VD2DN	64K	8K	4K	4K	84	4x32-bit	3	4	2	-	-	-	1	8x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP100
NUC100VD3DN	64K	16K	4K	4K	84	4x32-bit	3	4	2	-	-	-	1	8x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP100
NUC100VE3DN	128K	16K	Configurable	4K	84	4x32-bit	3	4	2	-	-	-	1	8x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP100

NUC120 USB Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						I ² S	PWM	ADC	Comp.	RTC	EBI	PDMA	ISO-7816-3	ICP ISPIAP	IRC 22MHz	Package
							UART	SPI	I ² C	USB	LIN	CAN											
Low Density																							
NUC120LC1DN	32K	4K	4K	4K	33	4x32-bit	2	1	2	1	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC120LD1DN	64K	4K	4K	4K	33	4x32-bit	2	1	2	1	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC120LD2DN	64K	8K	4K	4K	33	4x32-bit	2	1	2	1	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC120RC1DN	32K	4K	4K	4K	47	4x32-bit	2	2	2	1	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC120RD1DN	64K	4K	4K	4K	47	4x32-bit	2	2	2	1	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
NUC120RD2DN	64K	8K	4K	4K	47	4x32-bit	2	2	2	1	-	-	1	4x16-bit	8x12-bit	2	√	√	9	√	√	√	LQFP64
Medium Density																							
NUC120LD3DN	64K	16K	4K	4K	33	4x32-bit	2	1	2	1	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC120LE3DN	128K	16K	Configurable	4K	33	4x32-bit	2	1	2	1	-	-	1	4x16-bit	8x12-bit	1	√	-	9	√	√	√	LQFP48
NUC120RD3DN	64K	16K	4K	4K	47	4x32-bit	2	2	2	1	-	-	1	6x16-bit	8x12-bit	2	√	-	9	√	√	√	LQFP64
NUC120RE3DN	128K	16K	Configurable	4K	47	4x32-bit	2	2	2	1	-	-	1	6x16-bit	8x12-bit	2	√	-	9	√	√	√	LQFP64
NUC120VD2DN	64K	8K	4K	4K	81	4x32-bit	3	4	2	1	-	-	1	8x16-bit	8x12-bit	2	√	-	9	√	√	√	LQFP100
NUC120VD3DN	64K	16K	4K	4K	81	4x32-bit	3	4	2	1	-	-	1	8x16-bit	8x12-bit	2	√	-	9	√	√	√	LQFP100
NUC120VE3DN	128K	16K	Configurable	4K	81	4x32-bit	3	4	2	1	-	-	1	8x16-bit	8x12-bit	2	√	-	9	√	√	√	LQFP100

NUC122 USB Line (Low Power)

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						I ² S	Comp.	PWM	ADC	RTC	EBI	PDMA	ISP ICP	IRC 22MHz	Package
							UART	SPI	I ² C	USB	LIN	CAN										
NUC122ZC1AN	32K	4K	4K	4K	18	4x32-bit	1	2	1	1	-	-	-	-	-	-	-	-	-	√	√	QFN33
NUC122ZD2AN	64K	8K	4K	4K	18	4x32-bit	1	2	1	1	-	-	-	-	-	-	-	-	-	√	√	QFN33
NUC122LC1AN	32K	4K	4K	4K	30	4x32-bit	2	2	1	1	-	-	-	-	4x16-bit	-	√	-	-	√	√	LQFP48
NUC122LD2AN	64K	8K	4K	4K	30	4x32-bit	2	2	1	1	-	-	-	-	4x16-bit	-	√	-	-	√	√	LQFP48
NUC122SC1AN	32K	4K	4K	4K	41	4x32-bit	2	2	1	1	-	-	-	-	4x16-bit	-	√	-	-	√	√	LQFP64*
NUC122SD2AN	64K	8K	4K	4K	41	4x32-bit	2	2	1	1	-	-	-	-	4x16-bit	-	√	-	-	√	√	LQFP64*

LQFP64* : 7 x 7mm

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NUC123 USB Line (Low Power)

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						i ² S	Comp.	PWM	ADC	RTC	EBI	ISP ICP IAP	IRC 22MHz	PDMA	Package
							UART	SPI	i ² C	USB	LIN	CAN										
NUC123ZC2AN1	36K	12K	Configurable	4K	20	4x32-bit	1	3	1	1	-	-	1	-	2x16-bit	-	-	-	√	√	6	QFN33
NUC123ZD4AN0	68K	20K	Configurable	4K	20	4x32-bit	1	3	1	1	-	-	1	-	2x16-bit	-	-	-	√	√	6	QFN33
NUC123LC2AN1	36K	12K	Configurable	4K	36	4x32-bit	2	3	2	1	-	-	1	-	4x16-bit	8x10-bit	-	-	√	√	6	LQFP48
NUC123LD4AN0	68K	20K	Configurable	4K	36	4x32-bit	2	3	2	1	-	-	1	-	4x16-bit	8x10-bit	-	-	√	√	6	LQFP48
NUC123SC2AN1	36K	12K	Configurable	4K	47	4x32-bit	2	3	2	1	-	-	1	-	4x16-bit	8x10-bit	-	-	√	√	6	LQFP64*
NUC123SD4AN0	68K	20K	Configurable	4K	47	4x32-bit	2	3	2	1	-	-	1	-	4x16-bit	8x10-bit	-	-	√	√	6	LQFP64*

LQFP64* : 7 x 7 mm

NUC130 Automotive Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						i ² S	PWM	ADC	Comp.	RTC	EBI	PDMA	ISO-7816-3	ICP ISP	IRC 22MHz	Package
							UART	SPI	i ² C	USB	LIN	CAN											
NUC130LC1CN	32K	4K	4K	4K	35	4x32-bit	3	1	2	-	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC130LD2CN	64K	8K	4K	4K	35	4x32-bit	3	1	2	-	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC130LE3CN	128K	16K	Configurable	4K	35	4x32-bit	3	1	2	-	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC130RC1CN	32K	4K	4K	4K	49	4x32-bit	3	2	2	-	2	1	1	6x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC130RD2CN	64K	8K	4K	4K	49	4x32-bit	3	2	2	-	2	1	1	6x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC130RE3CN	128K	16K	Configurable	4K	49	4x32-bit	3	2	2	-	2	1	1	6x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC130VE3CN	128K	16K	Configurable	4K	80	4x32-bit	3	4	2	-	2	1	1	8x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP100

NUC140 Connectivity Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity						i ² S	PWM	ADC	Comp.	RTC	EBI	PDMA	ISO-7816-3	ICP ISP	IRC 22MHz	Package
							UART	SPI	i ² C	USB	LIN	CAN											
NUC140LC1CN	32K	4K	4K	4K	31	4x32-bit	2	1	2	1	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC140LD2CN	64K	8K	4K	4K	31	4x32-bit	2	1	2	1	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC140LE3CN	128K	16K	Configurable	4K	31	4x32-bit	2	1	2	1	2	1	1	4x16-bit	8x12-bit	1	√	-	9	-	√	√	LQFP48
NUC140RC1CN	32K	4K	4K	4K	45	4x32-bit	3	2	2	1	2	1	1	4x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC140RD2CN	64K	8K	4K	4K	45	4x32-bit	3	2	2	1	2	1	1	4x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC140RE3CN	128K	16K	Configurable	4K	45	4x32-bit	3	2	2	1	2	1	1	4x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP64
NUC140VE3CN	128K	16K	Configurable	4K	76	4x32-bit	3	4	2	1	2	1	1	8x16-bit	8x12-bit	2	√	√	9	-	√	√	LQFP100

NUC200 Series

The NuMicro™ NUC200 series embedded with the ARM® Cortex™-M0 core runs up to 50 MHz with 32K/64K/128K bytes Flash program memory, 8K/16K bytes SRAM, and 4K bytes Flash loader memory for In System Programming (ISP) and In Application Program (IAP). The NUC200 series also comes equipped with a variety of peripherals, such as GPIOs, Timers, Watchdog Timer, RTC, PDMA, UART, SPI/MICROWIRE, i²C, i²S, PWM, ISO-7816-3 smart card interface, PS/2, USB 2.0 FS Device, 12-bit ADC, Analog Comparator, Low Voltage Reset, and Brown-out Detector.

Key Features: Operable at 2.5V to 5.5V and -40°C to +85°C with separate Program Flash (32 KB ~ 128 KB), Data Flash* (4 KB) and ISP loader (4 KB) and PDMA (*: 128 KB version configurable)

Potential Applications: Industrial Control, Security System, Motor Control, Communication System, etc.

NUC200 Advanced Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity				i ² S	PWM	ADC	Comp.	RTC	PDMA	ISO-7816-3	CRC	VBAT Supply	ICP ISP,IAP	IRC 22MHz	Package
							UART	SPI	i ² C	USB												
NUC200LC2AN	32K	8K	4K	4K	35	4x32-bit	2	1	2	-	1	6x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC200LD2AN	64K	8K	4K	4K	35	4x32-bit	2	1	2	-	1	6x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC200LE3AN	128K	16K	Configurable	4K	35	4x32-bit	2	1	2	-	1	6x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC200SC2AN	32K	8K	4K	4K	49	4x32-bit	3	2	2	-	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC200SD2AN	64K	8K	4K	4K	49	4x32-bit	3	2	2	-	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC200SE3AN	128K	16K	Configurable	4K	49	4x32-bit	3	2	2	-	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC200VE3AN	128K	16K	Configurable	4K	83	4x32-bit	3	4	2	-	1	8x16-bit	8x12-bit	2	√	9	3	√	√	√	√	LQFP100

LQFP64* : 7 x 7 mm

NUC220 USB Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity				i ² S	PWM	ADC	Comp.	RTC	PDMA	ISO-7816-3	CRC	VBAT Supply	ICP ISP,IAP	IRC 22MHz	Package
							UART	SPI	i ² C	USB												
NUC220LC2AN	32K	8K	4K	4K	31	4x32-bit	2	1	2	1	1	4x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC220LD2AN	64K	8K	4K	4K	31	4x32-bit	2	1	2	1	1	4x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC220LE3AN	128K	16K	Configurable	4K	31	4x32-bit	2	1	2	1	1	4x16-bit	7x12-bit	1	√	9	2	√	√	√	√	LQFP48
NUC220SC2AN	32K	8K	4K	4K	45	4x32-bit	2	2	2	1	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC220SD2AN	64K	8K	4K	4K	45	4x32-bit	2	2	2	1	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC220SE3AN	128K	16K	Configurable	4K	45	4x32-bit	2	2	2	1	1	6x16-bit	7x12-bit	2	√	9	2	√	√	√	√	LQFP64*
NUC220VE3AN	128K	16K	Configurable	4K	79	4x32-bit	3	4	2	1	1	8x16-bit	8x12-bit	2	√	9	3	√	√	√	√	LQFP100

LQFP64* : 7 x 7 mm

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M051 Series

The NuMicro M051™ series embedded with the ARM® Cortex™-M0 core runs up to 50 MHz with 8K/16K/32K/64K bytes Flash program memory, 4K bytes SRAM, and 4K bytes Flash loader memory for In System Programming (ISP). The M051 series also comes equipped with a variety of peripherals, such as GPIOs, Timers, UART, SPI, I²C, PWM, ADC, Comparator, Watchdog Timer, Low Voltage Reset, Brown-out Detected Reset, and supports 96-bit Unique ID and 128-bit Unique Customer ID.

Key Features: Operable at 2.5V to 5.5V and -40°C to +85°C with separate Program Flash (8 KB ~ 64 KB), Data Flash (4 KB) and ISP loader (4 KB)

Potential Applications: Industrial Control, Security System, Communication System, Motor Control, etc.

M051 Base Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity			PWM	ADC	Comp.	EBI	ICP ISP	IRC 22MHz	Package
							UART	SPI	I ² C							
M052LCN	8K	4K	4K	4K	40	4x32-bit	2	2	2	8x16-bit	8x12-bit	2	√	√	√	LQFP48
M052ZCN	8K	4K	4K	4K	24	4x32-bit	2	1	2	5x16-bit	5x12-bit	2	-	√	√	QFN33
M054LCN	16K	4K	4K	4K	40	4x32-bit	2	2	2	8x16-bit	8x12-bit	2	√	√	√	LQFP48
M054ZCN	16K	4K	4K	4K	24	4x32-bit	2	1	2	5x16-bit	5x12-bit	2	-	√	√	QFN33
M058LCN	32K	4K	4K	4K	40	4x32-bit	2	2	2	8x16-bit	8x12-bit	2	√	√	√	LQFP48
M058ZCN	32K	4K	4K	4K	24	4x32-bit	2	1	2	5x16-bit	5x12-bit	2	-	√	√	QFN33
M0516LCN	64K	4K	4K	4K	40	4x32-bit	2	2	2	8x16-bit	8x12-bit	2	√	√	√	LQFP48
M0516ZCN	64K	4K	4K	4K	24	4x32-bit	2	1	2	5x16-bit	5x12-bit	2	-	√	√	QFN33

Mini51 Series

The NuMicro™ Mini51 series embedded with the ARM® Cortex™-M0 core runs up to 24 MHz with 4K/8K/16K bytes Flash program memory, 2K bytes SRAM and 2K bytes Flash loader memory for In System Programming (ISP). The Mini51 series also comes equipped with a variety of peripherals, such as GPIOs, Timers, UART, SPI, I²C, PWM, ADC, Comparator, Watchdog Timer, Low Voltage Reset, Brown-out Detected Reset, and supports 96-bit Unique ID and 128-bit Unique Customer ID.

Key Features: Operable at 2.5V to 5.5V and -40°C to +85°C with separate Program Flash (4 KB ~ 16 KB) and ISP loader (2 KB), RTC, and Internal RC trimmed to 1% accuracy with external 32K crystal

Potential Applications: Auto-control System, Data Communication, Industrial Control, etc.

Mini51 Base Line

Part No.	Flash	SRAM	Data Flash	ISP ROM	I/O	Timer	Connectivity			PWM	ADC	Comp.	ICP ISP	IRC 22MHz	Package
							UART	SPI	I ² C						
MINI51LBN	4K	2K	Configurable	2K	30	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	LQFP48
MINI51ZBN	4K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33*
MINI51TBN	4K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33**
MINI52LBN	8K	2K	Configurable	2K	30	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	LQFP48
MINI52ZBN	8K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33*
MINI52TBN	8K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33**
MINI54LBN	16K	2K	Configurable	2K	30	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	LQFP48
MINI54ZBN	16K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33*
MINI54TBN	16K	2K	Configurable	2K	29	2x32-bit	1	1	1	6x16-bit	8x10-bit	2	√	√	QFN33**

QFN33* : 5 x 5mm
QFN33** : 4 x 4mm








Contact us: NuMicro@nuvoton.com

Development Tools for NuMicro™ Family

SDK (Software Development Kit)				
<ul style="list-style-type: none"> • IAR EWARM / Keil RVMDK available on IAR / Keil website • Support CoCoX CoIDE • Support On-line ICP (In-Circuit Programming) 				
Ordering No.	Content	Supported Device	Evaluation / Development Kit for	Picture
NuTiny-SDK-Mini51	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-Mini51 • USB Cable 	Mini51 Mini52 Mini54	Mini51 Series by Mini54LAN	
NuTiny-SDK-M051	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-M051 • USB Cable 	M052 M054 M058 M0516	M051 Series by M0516LBN	
NuTiny-SDK-NUC100	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC100 • USB Cable 	NUC100	NUC100 Series by NUC100LE3AN	
NuTiny-SDK-NUC120	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC120 • USB Cable 	NUC120	NUC120 Series by NUC120LE3AN	
NuTiny-SDK-NUC122	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC122 • USB Cable 	NUC122	NUC122 Series by NUC122SD2AN	
NuTiny-SDK-NUC123	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC123 • USB Cable 	NUC123	NUC123 Series by NUC123SD4AN0	
NuTiny-SDK-NUC140	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC140 • USB Cable 	NUC130 NUC140	NUC130/140 Series by NUC140VE3CN	
NuTiny-SDK-NUC200	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC200 • USB Cable 	NUC200	NUC200 Series by NUC200VE3AN	
NuTiny-SDK-NUC220	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-NUC220 • USB Cable 	NUC220	NUC220 Series by NUC220VE3AN	
NuTiny-SDK-Nano100	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-Nano100 • USB Cable 	Nano100	Nano100 Series by Nano100KE3BN	
NuTiny-SDK-Nano120	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-Nano120 • USB Cable 	Nano120	Nano120 Series by Nano120KE3BN	
NuTiny-SDK-Nano130	<ul style="list-style-type: none"> • Nu-Link-ME • NuTiny-EVB-Nano130 • LCD Module • USB Cable 	Nano110 Nano130	Nano130 Series by Nano130KE3BN	
Learning Board (LB) <ul style="list-style-type: none"> • A Starter Kit made by Nuvoton • IAR EWARM (evaluation version) and Keil RVMDK (evaluation version) included • Support CoCoX CoIDE • Examples with source code included 				
Ordering No.	Content	Supported Device	Evaluation / Development Kit for	Picture
Nu-LB-NUC140	<ul style="list-style-type: none"> • Nu-LB-NUC140 • Nu-Link-ME on board • USB Cable • NuMicro Family CD 	NUC100 NUC120 NUC130 NUC140	<ul style="list-style-type: none"> • SD Card • USB • CAN & LIN • EEPROM & Flash Memory • Display • Audio via NAU8822 	
Nu-LB-M051	<ul style="list-style-type: none"> • Nu-LB-M051 • Nu-Link-ME on board • USB Cable • NuMicro Family CD 	M052 M054 M058 M0516	<ul style="list-style-type: none"> • EEPROM & Flash Memory • Display • EBI Interface 	
Nu-LB-Mini51	<ul style="list-style-type: none"> • Nu-LB-Mini51 • Nu-Link-ME on board • USB Cable • NuMicro Family CD 	Mini51 Mini52 Mini54	<ul style="list-style-type: none"> • EEPROM & Flash Memory • Display 	
Nu-LB-Nano130	<ul style="list-style-type: none"> • Nu-LB-Nano130 • Nu-Link-ME on board • LCD Module • USB Cable • NuMicro Family CD 	Nano100 Nano110 Nano120 Nano130	<ul style="list-style-type: none"> • SD Card • USB • Touch Key • 3.5" TFT Color Display • Smart Card Reader • Audio via NAU8822 	
Nu-Link				
Ordering No.	Content	Supported Device	Description	Picture
Nu-Link	• Nu-Link	NuMicro Family	<ul style="list-style-type: none"> • USB → SWD bridge • Support On-line and Off-line ICP (In-Circuit Programming) • USB Plug & Play 	
Nu-Link-Pro	• Nu-Link-Pro	NuMicro Family	<ul style="list-style-type: none"> • USB → SWD bridge • Support On-line and Off-line ICP (In-Circuit Programming) • USB Plug & Play • Programmable output VDD: 1.8V, 2.5V, 3.3V, 5.0V • Wide target VDD input level: 1.8V~5.5V 	

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Development Tools for NuMicro™ Family

Ordering No.	Content	Supported Devices	Description	Picture
3rd Party Starter Kit (SKT)				
Nu-IAR-SKT	<ul style="list-style-type: none"> • NUC140-SK • USB Cable • NuMicro Family CD 	NUC100 NUC120 NUC130 NUC140	<ul style="list-style-type: none"> • Starter Kit made by IAR • IAR EWARM (evaluation version) included • IAR C/C++ Compiler included • USB Plug & Play 	
Nu-Keil-SKT	<ul style="list-style-type: none"> • U-LINK-ME • MCBNUC1XX • USB Cable • NuMicro Family CD 	NUC100 NUC120 NUC130 NUC140	<ul style="list-style-type: none"> • Starter Kit made by Keil • Keil RVMDK (evaluation version) included • ARM C/C++ Compiler included • USB Plug & Play 	
NuMicro Mini51 Series Gang Writer (NuGang)				
NuGang-Mini51T-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Mini51T Mini52T Mini54T	<ul style="list-style-type: none"> • Support Mini51 series 4 chips at one time • USB to PC/Laptop interface • Support Off-line copy function * T: QFN33 4x4mm * Z: QFN33 5x5mm * L: LQFP48 7x7mm 	
NuGang-Mini51Z-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Mini51Z Mini52Z Mini54Z		
NuGang-Mini51L-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Mini51L Mini52L Mini54L		
NuMicro M051 Series Gang Writer (NuGang)				
NuGang-M051Z-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	M052Z M054Z M058Z M0516Z	<ul style="list-style-type: none"> • Support M051 series 4 chips at one time • USB to PC/Laptop interface • Support Off-line copy function * Z: QFN33 5x5mm * L: LQFP48 7x7mm 	
NuGang-M051L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	M052L M054L M058L M0516L		
NuMicro NUC100 Series Gang Writer (NuGang)				
NuGang-NUC100L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC100L NUC120L NUC130L NUC140L	<ul style="list-style-type: none"> • Support NUC100 series 4 chips at one time • USB to PC/Laptop interface • Support Off-line copy function * Z: QFN33 5x5mm * L: LQFP48 7x7mm * S: LQFP64 7x7mm * R: LQFP64 10x10mm * V: LQFP100 14x14mm 	
NuGang-NUC100R-LQFP64	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC100R NUC120R NUC130R NUC140R		
NuGang-NUC100V-LQFP100	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC100V NUC120V NUC130V NUC140V		
NuGang-NUC122Z-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC122Z		
NuGang-NU122L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC122L		
NuGang-NUC122S-LQFP64	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC122S		
NuGang-NUC123Z-QFN33	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC123Z		
NuGang-NU123L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC123L		
NuGang-NUC123S-LQFP64	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC123S		
NuMicro NUC200 Series Gang Writer (NuGang)				
NuGang-NUC200L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC200L NUC220L	<ul style="list-style-type: none"> • Support NUC200 series 4 chips at one time • USB to PC/Laptop interface • Support Off-line copy function * L: LQFP48 7x7mm * S: LQFP64 7x7mm * V: LQFP100 14x14mm 	
NuGang-NUC200S-LQFP64	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC200S NUC220S		
NuGang-NUC200V-LQFP100	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	NUC200V NUC220V		
NuMicro Nano100 Series Gang Writer (NuGang)				
NuGang-Nano100L-LQFP48	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Nano100L Nano120L	<ul style="list-style-type: none"> • Support Nano100 series 4 chips at one time • USB to PC/Laptop interface • Support Off-line copy function * L: LQFP48 7x7mm * S: LQFP64 7x7mm * K: LQFP128 14x14mm 	
NuGang-Nano100S-LQFP64	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Nano100S Nano110S Nano120S Nano130S		
NuGang-Nano100K-LQFP128	<ul style="list-style-type: none"> • User Manual • 4-chip Gang Programming Board • USB Cable 	Nano100K Nano110K Nano120K Nano130K		

ARM7 / ARM9 MCU

Nuvoton provides a series of network connected processors with feature rich peripherals based on ARM7TDMI and ARM926 to let customers implement their innovative products in a timely manner. A complete development environment is provided for each platform. The source code of BSP drivers under Linux/WinCE are all provided to shorten the design cycle times. The targeted applications range from devices that require network connectivity, USB connectivity, user interface devices, and industrial control, such as POS, HMI, IP camera, industrial control, etc. The NUC501 is an ARM7TDMI-based MCU, specifically designed to offer low cost and high performance for various applications, such as 2.4G RF wireless applications, thermal printer, barcode reader, and home appliances.

NUC ARM

Part No.	Core				Memory I/F		Storage		MAC	USB			GFX	LCD	Timer	Analog				Peripheral							Power		Package												
	Max Speed (MHz)	CPU	I-Cache (KB)	D-Cache (KB)	SRAM (KB)	Security against piracy	SPRAM	NOF Flash	NAND Flash, No. of I/O Pins	NAND Flash, No. of EGC bits	ATAP1	SD / SDIO	Ethernet 10/100 MAC	USB 1.1 Host (12M bps)	USB 2.0 Host (480M bps)	USB 2.0 FS Device	USB 2.0 HS Device	2D Graphics	STN LCD	TFT LCD	Real-Time Clock (RTC)	PWM	No. of Channels	ADC (10-bit)	16-bit DAC Channels	Touch Screen Controller	LVD/LVR	External Bus Interface	JTAG	GPIO (Max)	UART	I ² C	SPi	KPI	PS2	I ² S/AC97	PCI Master	Core Voltage (V)	I/O Voltage (V)	Built-in LDO	Operating Temperature ¹
NUC501A/B	80	ARM7TDMI	-	-	32	√	-	2	-	-	-	-	-	-	1	-	-	-	√	4	8	400K	-	1	√	√	-	26	1	2	1	2	-	-	-	-	1.8	3.3	√	E	LQFP-48 LQFP-64
NUC710A	80	ARM7TDMI	4	4	-	√	√	1	-	-	1	1	2	1	-	-	-	√	√	√	4	-	-	-	-	√	√	71	4	2	1	√	1	1	-	1.8	3.3	-	I	LQFP-176	
NUC740A	80	ARM7TDMI	8	2	-	√	√	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	√	21	1	-	-	-	-	-	-	1.8	3.3	-	C	LQFP-176		
NUC745A	80	ARM7TDMI	4	4	-	√	√	1	-	-	1	2	1	2	1	-	-	-	-	-	4	-	-	-	-	√	√	31	4	2	1	√	1	1	-	1.8	3.3	-	I	LQFP-128	
NUC910A	200	ARM926EJ	8	8	-	√	√	1	4	√	2	1	2	1	-	1	√	-	√	√	4	8	300K	√	-	√	√	92	5	2	1	√	2	1	3	1.8	3.3	-	I	PBGA-324	
NUC920A	200	ARM926EJ	8	8	-	√	√	1	-	√	1	1	2	1	-	1	-	-	-	√	4	8	300K	√	-	√	√	92	3	2	1	√	2	1	3	1.8	3.3	-	I	PBGA-324	
NUC945A	200	ARM926EJ	8	8	-	√	√	-	-	-	1	1	1	1	-	1	-	-	-	-	-	-	-	-	-	√	√	34	1	-	-	-	-	-	1.8	3.3	-	C	LQFP-128		
NUC946A	200	ARM926EJ	8	8	-	√	√	√	-	-	1	1	2	1	-	1	-	-	-	-	-	-	-	-	-	√	√	37	2	2	1	-	-	-	-	1.8	3.3	-	I ²	LQFP-128	
NUC950A	200	ARM926EJ	8	8	-	√	√	1	4	-	1	1	1	2	-	1	√	-	√	-	4	-	-	-	-	√	√	52	3	2	1	√	-	1	-	1.8	3.3	-	I ²	LQFP-216	
NUC951A	200	ARM926EJ	8	8	-	√	√	√	4	-	2	1	2	1	√	-	√	-	√	√	4	-	-	-	-	√	√	63	3	2	1	√	√	1	-	1.8	3.3	-	I ²	LQFP-216	
NUC960A	200	ARM926EJ	8	8	-	√	√	1	-	-	-	1	2	1	-	1	-	-	-	-	-	-	-	-	-	√	√	51	3	2	1	-	-	2	1.8	3.3	-	I ²	LQFP-216		
NUC970A	300	ARM926EJ	16	16	32	√	√	√	1	24	-	1	2	2	-	1	√	-	√	√	4	8	1M	√	-	√	√	?	8	2	2	√	-	√	-	1.2	3.3	-	I	LQFP-216	

¹Under development, available in 2Q, 2013.

1. Commercial (C) is 0 to +70°C, Industrial (I) is -40 to +85°C, Extended (E) is -40 to +105°C.

2. VDD18 for IO Buffer: 1.8V±10%, VDD33 for Core Logic: 3.3V±5%, USBVDDCO/USBVDDC1/USBVDDT0/USBVDDT1 for USB: 3.3V±5%, PLLVDD18 for PLL: 1.8V±10%

ARM Development Tools

ARM7				
Part No.	NUC740	NUC710	NUC745	NUC501
SDK	ARM ADS 1.2	ARM ADS 1.2	ARM ADS 1.2	ARM ADS 1.2 / Keil / IAR / GNU
uClinux	uClinux 2.4.20	uClinux 2.6.38	uClinux 2.6.38	Driver Library, Driver Sample Code, USB Device Samples, PLL Generator Tool, Writer Tool, User's Manual, Quick Start Guide, Application Note
ARM9				
Part No.	NUC910	NUC945/946	NUC950/951	NUC960
SDK	ARM ADS 1.2	ARM ADS 1.2	ARM ADS 1.2	ARM ADS 1.2
WinCE 5.0 / 6.0 BSP	√	-	√	-
Linux	Linux 2.6.17 Linux 2.6.35	Linux 2.6.17 Linux 2.6.35	Linux 2.6.17 Linux 2.6.35	Linux 2.6.17 Linux 2.6.35

Contact us: MicroC-32bit@nuvoton.com

80C51 MCU

As a leading supplier of 8051 microcontrollers (MCUs), Nuvoton offers a variety of products with the best-in-class price/performance critical to the success of consumers and industrial products. The 8-bit MCU comes equipped with rich peripherals to meet various system requirements and is supported by the tool chain from word leading tool makers for rapid product development.

6T/12T 80C51 Series

Key Features: Operable at 2.4V ~ 5.5V and -40°C ~ +85°C with UART, SPI, Internal RC and ISP

Potential Applications: Bar Code Reader, Key Phone, KVM, 2.4G Wireless Keyboard, IPC, Monitor, Security System, etc.

W78 Standard Line

Part No.	Flash	SRAM	ISP Loader ROM	I/O	Timer	Connectivity			Comp.	PWM	ADC	INT	ISP ICP	Special Function	Package
						UART	SPI	I ² C							
W78E052D	8K	256	2K	36	3x16-bit	1	-	-	-	-	-	4	ISP	6T/12T option, Extra I/O port	PDIP40/PLCC44/PQFP44/LQFP48
W78E054D	16K	256	2K	36	3x16-bit	1	-	-	-	-	-	4	ISP	6T/12T option, Extra I/O port	PDIP40/PLCC44/PQFP44/LQFP48
W78E058D	32K	512	4K	36	3x16-bit	1	-	-	-	-	-	4	ISP	6T/12T option, Extra I/O port	PDIP40/PLCC44/PQFP44/LQFP48
W78E516D	64K	512	4K	36	3x16-bit	1	-	-	-	-	-	4	ISP	6T/12T option, Extra I/O port	PDIP40/PLCC44/PQFP44/LQFP48
W78ERD2A	64K	256+1K	4K	36	3x16-bit	1	-	-	-	5x8-bit	-	4	ISP	PCA, 6T/12T option, Extra I/O port	PDIP40/PLCC44/PQFP44
W78E858A	32K	768	4K	36	3x16-bit	1	-	-	-	4x8-bit	-	10	ISP	128B EE, Extra I/O port	PDIP40/PLCC44/PQFP44
W78C032	-	256	-	32	3x16-bit	1	-	-	-	-	-	2	-	Extra I/O port	PDIP40/PLCC44/PQFP44
W78C438	-	256	-	40	3x16-bit	1	-	-	-	-	-	4	-	1MB external memory space	PQFP100

N78/W78 Industrial Line

Part No.	Flash	SRAM	Data Flash	ISP Loader ROM	I/O	Timer	Connectivity			Comp.	PWM	ADC	INT	ISP ICP	Special Function	Package
							UART	SPI	I ² C							
N78S052	8K	256+1K	8K	2K	46	4x16-bit	2	1	1	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 2 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
N78S054	16K	256+1K	Share AP ROM	2K	46	4x16-bit	2	1	1	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 2 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
N78E055A	16K	256+1K	4K	2.5K	40	3x16-bit	1	1	-	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 4 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
N78E059A	32K	256+1K	4K	2.5K	40	3x16-bit	1	1	-	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 4 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
N78E517A	64K	256+1K	Share AP ROM	2.5K	40	3x16-bit	1	1	-	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 4 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
N78E366A	64K	256+1K	-	2.5K	40	3x16-bit	1	1	-	-	5x8-bit	-	4	ISP	6T/12T option, Extra I/O port, internal 22MHz RC, 4 level BOR	PDIP40/PLCC44/PQFP44/LQFP48
W78IRD2A	64K	256+1K	-	4K	36	3x16-bit	1	-	-	-	5x8-bit	-	4	ISP	PCA, 6T/12T option, Extra I/O port	PDIP40/PLCC44

*Under development, available in 2Q, 2013.

4T 80C51 Series

Key Features: 4T 80C52 Core integrated with Data Flash, 2* I²C, 2* UART, SPI, PWM(QEI), ADC and ISP operating at 2.4V ~ 5.5V and -40°C ~ +85°C

Potential Applications: IPC, Communication Equipment, Security/Alarm System, LCD TV, Motor Applications, Power Management, etc.

W77 Turbo Line

Part No.	Flash	SRAM	ISP Loader ROM	I/O	Timer	Connectivity			Comp.	PWM	ADC	INT	ISP ICP	Special Function	Package
						UART	SPI	I ² C							
W77E058A	32K	256+1K	-	36	3x16-bit	2	-	-	-	-	-	6	-	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77L058A	32K	256+1K	-	36	3x16-bit	2	-	-	-	-	-	6	-	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77E516A	64K	256+1K	4K	36	3x16-bit	2	-	-	-	-	-	6	ISP	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77L516A	64K	256+1K	4K	36	3x16-bit	2	-	-	-	-	-	6	ISP	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77E532A	128K	256+1K	4K	36	3x16-bit	2	-	-	-	-	-	6	ISP	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77L532A	128K	256+1K	4K	36	3x16-bit	2	-	-	-	-	-	6	ISP	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77C032A	-	256+1K	-	36	3x16-bit	2	-	-	-	-	-	6	-	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44
W77L032A	-	256+1K	-	36	3x16-bit	2	-	-	-	-	-	6	-	Dual DPTR, Extra I/O port	PDIP40/PLCC44/PQFP44

N79/W79 Enhanced Turbo Line

Part No.	Flash	SRAM	Data Flash	ISP Loader ROM	I/O	Timer	Connectivity			Comp.	PWM	ADC	INT	ISP ICP	Special Function	Package
							UART	SPI	I ² C							
N79E352R	8K	256	128	-	38	3x16-bit	1	-	1	-	2x8-bit	-	2	ICP	internal 22MHz, KBI, BOR	PDIP40/PLCC44/PQFP44/LQFP48
W79E201A	16K	256	-	4K	33	3x16-bit	1	-	-	-	6x8-bit	8x10-bit	2	ISP	JTAG interface	PLCC44/PQFP44/LQFP48
W79E632A	128K	256+1K	-	4K	36	3x16-bit	1	-	-	-	6x8-bit	-	2	ISP	Extra I/O port	PLCC44/PQFP44
W79L632A	128K	256+1K	-	4K	36	3x16-bit	1	-	-	-	6x8-bit	-	2	ISP	Extra I/O port	PLCC44/PQFP44
W79E633A	128K	256+1K	-	4K	36	3x16-bit	1	-	2	-	6x8-bit	4x10-bit	2	ISP	Extra I/O port	PLCC44
W79L633A	128K	256+1K	-	4K	36	3x16-bit	1	-	2	-	6x8-bit	4x10-bit	2	ISP	Extra I/O port	PLCC44
W79E658A	128K	256+1K	-	4K	60	3x16-bit	1	-	2	-	6x8-bit	8x10-bit	2	ISP	JTAG interface, Extra I/O port	PQFP100
W79L658A	128K	256+1K	-	4K	60	3x16-bit	1	-	2	-	6x8-bit	8x10-bit	2	ISP	JTAG interface, Extra I/O port	PQFP100
W79E659A	32K	256+1K	-	4K	60	3x16-bit	1	-	2	-	6x8-bit	8x10-bit	2	ISP	JTAG interface, Extra I/O port	PQFP100
W79L659A	32K	256+1K	-	4K	60	3x16-bit	1	-	2	-	6x8-bit	8x10-bit	2	ISP	JTAG interface, Extra I/O port	PQFP100

Contact us: MicroC-8bit@nuvoton.com

80C51 LPC (Low Pin Count) Series

Key Features: 4T 80C82 Core integrated with Data Flash, ADC, BOR, I²C, UART, SPI, internal RC and ICP/ISP operating at 2.4V ~ 5.5V and -40°C ~ +85°C

Potential Applications: Temperature Sensor, iPod Docking, Projector, DVD Player, E-balance, Security, Power Control, Small HA, etc.














N79/W79 LPC Series - Industrial Line

Part No.	Flash	SRAM	Data Flash	ISP Loader ROM	I/O	Timer	Connectivity			Comp.	PWM	ADC	INT	ICP ISP,IAP	Special Function	Package
							UART	SPI	I ² C							
*N76E885	18K	512	Share AP ROM	√	26	3x16-bit	2	2	1	-	6x10-bit	8x10-bit	2	ISP ICP IAP	1T 8051, internal 22MHz RC, KBI, BOR	TSSOP28
*N76E884	8K	512	8K	√	26	3x16-bit	1	1	1	-	6x10-bit	8x10-bit	2	ISP ICP IAP	1T 8051, internal 22MHz RC, KBI, BOR	TSSOP16/MSOP10
N79E855	16K	512	Share AP ROM	2K	25	3x16-bit	2	2	1	-	4x10-bit	8x10-bit	2	ISP ICP	internal 22MHz RC, KBI, BOR	TSSOP28/SOP28
N79E854	8K	512	4K	2K	25	3x16-bit	2	2	1	-	4x10-bit	8x10-bit	2	ISP ICP	internal 22MHz RC, KBI, BOR	TSSOP28/SOP28
N79E845	16K	512	Share AP ROM	2K	17	3x16-bit	1	1	1	-	4x10-bit	7x10-bit	2	ISP ICP	internal 22MHz RC, KBI, BOR	TSSOP20/SOP20
N79E844	8K	512	4K	2K	17	3x16-bit	1	1	1	-	4x10-bit	7x10-bit	2	ISP ICP	internal 22MHz RC, KBI, BOR	TSSOP20/SOP20
N79E8432	4K	512	4K	2K	13	3x16-bit	1	-	1	-	4x10-bit	4x10-bit	2	ISP ICP	internal 22MHz RC, KBI, BOR	SOP16
N79E825	16K	256	256	-	18	2x16-bit	1	-	1	2	4x10-bit	4x10-bit	2	ICP	internal 6MHz RC, KBI, BOR	SSOP20/SOP20/PDIP20
N79E824	8K	256	256	-	18	2x16-bit	1	-	1	2	4x10-bit	4x10-bit	2	ICP	internal 6MHz RC, KBI, BOR	SSOP20/SOP20/PDIP20
N79E823	4K	256	256	-	18	2x16-bit	1	-	1	2	4x10-bit	4x10-bit	2	ICP	internal 6MHz RC, KBI, BOR	SSOP20/SOP20/PDIP20
N79E822	2K	256	256	-	18	2x16-bit	1	-	1	2	4x10-bit	4x10-bit	2	ICP	internal 6MHz RC, KBI, BOR	SSOP20/SOP20/PDIP20
W79E4051	4K	256	128	-	17	2x16-bit	1	-	-	1	1x10-bit		2	ICP	internal 22MHz RC, 4 level BOR	SSOP20/SOP20/PDIP20
W79E2051	2K	256	128	-	17	2x16-bit	1	-	-	1	1x10-bit		2	ICP	internal 22MHz RC, 4 level BOR	SSOP20/SOP20/PDIP20
W79E8213	4K	128	128	-	18	2x16-bit	-	-	-	-	4x10-bit	8x10-bit	2	ICP	internal 20MHz RC, KBI, 3 input capture, High sink (40mA) port, Buzzer, BOR	SSOP20/SOP20/PDIP20
N79E342	2K	128	128	-	14	2x16-bit	-	-	-	-	-	4x10-bit	2	ICP	dual clock, internal 455KHz RC, KBI, BOR	SOP16/PDIP16
N79E875	16K	512	128	-	36	3x16-bit, 1x12-bit	1	1	1	2	8x12-bit	8x10-bit	2	ICP	internal 22MHz RC, KBI, OP, 3 level BOR	LQFP48
N79E235	16K	512	256	-	36	3x16-bit, 1x12-bit	1	1	1	2	8x12-bit	8x10-bit	2	ICP	internal 22MHz RC, KBI, 3 level BOR	LQFP48
N79E234	8K	512	256	-	36	3x16-bit, 1x12-bit	1	1	1	2	8x12-bit	8x10-bit	2	ICP	internal 22MHz RC, KBI, 3 level BOR	LQFP48

*Under development, available in 2Q, 2013.

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Development Tools for 80C51 MCU

Ordering Part No.	Description	Supported Devices	Picture
NuGang-N79E8432-SOP16	4-chip Gang Programming Board	N79E8432	
NuGang-N79E85X-TSSOP28	4-chip Gang Programming Board	N79E855/854	
NuGang-N79E84X-TSSOP20	4-chip Gang Programming Board	N79E845/844	
NuGang-STD 8051-LQFP48	4-chip Gang Programming Board	W78E052/054/058/516 N78E366/517/059/055	
NuGang-STD 8051-PQFP44	4-chip Gang Programming Board	W78E052/054/058/516 N78E366/517/059/055	
NuGang-STD 8051-DIP40	4-chip Gang Programming Board	W78E052/054/058/516 N78E366/517/059/055	
NuGang-STD 8051-PLCC44	4-chip Gang Programming Board	W78E052/054/058/516 N78E366/517/059/055	
NuTiny-N79E85J	N79E85x/84x ICE	N79E85x/84x series	
NWR-005	ISP+ICP programmer	Nuvoton 8-bit MCU	
NWR-002	Writer	Nuvoton 8-bit MCU	
NWR-002-PLCC44	Adapter PLCC 44	Nuvoton 8-bit MCU	
NWR-002-PQFP44	Adapter PQFP 44	Nuvoton 8-bit MCU	
NWR-002-LQFP48	Adapter LQFP 48	Nuvoton 8-bit MCU	

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Features of NUC100 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K/128K bytes program memory (APROM) (128K bytes only for NUC100 Medium Density)
- 4K bytes loader memory (LDROM)
- Configurable data flash address and size for 128K bytes system, fixed 4K bytes data flash (DataFlash) for the 32K bytes and 64K bytes system
- 4K/8K/16K bytes embedded SRAM (16K bytes only for NUC100 Medium Density)
- PDMA mode
- In-Application-Programming (IAP) update APROM

◆ Clock Control

- Flexible selection from different clock sources
- 22.1184 MHz internal oscillator (trimmed to 1%) for system operation, and low-power 10 kHz internal 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

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Independent clock source for each timer
- One-shot, periodic, toggle and continuous counting operation modes (NUC100 Medium Density only for one-shot and periodic mode)
- Event counting function (NUC100 Low Density only)

◆ PWM

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

◆ ADC

- 12-bit SAR ADC with 600 Ksps
- Up to 8-ch single-end input or 4-ch 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
- Temperature sensor with 1°C resolution
- PDMA mode

◆ Communication Interface

- 3 UARTs, up to 1 Mbps with flow control
- 4 SPIs, clock up to 36 MHz (Master at 5V), 18 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ I²S

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

◆ Analog Comparator

- Up to 2 analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change

◆ 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)

◆ EBI Bus

(External bus interface only for NUC100 Low Density 64-pin package)

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width
- Byte write in 16-bit data width mode

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 84 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (10x10mm)
- LQFP100 (14x14mm)

Features of NUC120 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K/128K bytes program memory (APROM) (128K bytes only for NUC100 Medium Density)
- 4K bytes loader memory (LDRAM)
- Configurable data flash address and size for 128K bytes system, fixed 4K bytes data flash (DataFlash) for the 32K bytes and 64K bytes system
- 4K/8K/16K bytes embedded SRAM (16K bytes only for NUC120 Medium Density)
- PDMA mode
- In-Application-Programming (IAP) update APROM

◆ Clock Control

- Flexible selection from different clock sources
- 22.1184 MHz internal oscillator (trimmed to 1%) for system operation, and low-power 10 kHz internal 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

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Independent clock source for each timer
- One-shot, periodic, toggle and continuous counting operation modes (NUC120 Medium Density only for one-shot and periodic mode)
- Event counting function (NUC120 Low Density only)

◆ PWM

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

◆ ADC

- 12-bit SAR ADC with 600 Ksps
- Up to 8-ch single-end input or 4-ch 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

◆ Communication Interface

- 3 UARTs, up to 1 Mbps with flow control
- 4 SPIs, clock up to 36 MHz (Master at 5V), 18 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ I²S

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

◆ USB 2.0 Full-Speed Device

- One set of USB 2.0 FS Device
- On-chip USB Transceiver
- 1 interrupt source with 4 interrupt events
- Control, Bulk, Interrupt and Isochronous transfers
- 6 programmable endpoints
- 512 bytes internal SRAM as USB buffer included
- Remote wake-up capability

◆ Analog Comparator

- Up to 2 analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change

◆ 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)

◆ EBI Bus

(External bus interface only for in NUC120 Low Density 64-pin package)

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width
- Byte write in 16-bit data width mode

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 80 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (10x10mm)
- LQFP100 (14x14mm)

Features of NUC122 series

◆ Core

- ARM® Cortex™-M0 core running up to 60 MHz
- One 24-bit system timer
- Low-power sleep mode
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K bytes program memory (APROM)
- 4K bytes data memory (DataFlash)
- 4K bytes loader memory (LDROM)
- 4K/8K bytes embedded SRAM
- In System Programming (ISP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDROM or DataFlash
- Fast parallel programming mode to update APROM or LDROM or DataFlash

◆ Clock Control

- Flexible selection from different clock source
- 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 60 MHz, for high performance system operation
- 4 ~ 24 MHz external crystal input for USB and precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

◆ Timers

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

◆ PWM

- Two 16-bit PWM generators with four PWM outputs or two complementary paired PWM outputs
- Each PWM generator equipped 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 Interface

- 2 UARTs, up to 1 Mbps with flow control
- 2 SPIs, clock up to 25 MHz (Master at 5V), 12 MHz (Slave at 5V)
- 1 I²C
- IrDA (SIR) and RS485

◆ USB 2.0 Full-Speed Device

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

◆ 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)

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 41 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

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

◆ Packages (RoHS)

- QFN33 (5x5mm)
- LQFP48 (7x7mm)
- LQFP64 (7x7mm)

Features of NUC123 series

◆ Core

- ARM® Cortex™-M0 core running up to 72 MHz
- One 24-bit system timer
- Low-power sleep mode
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/ 4 breakpoints

◆ Memory

- 36K/68K bytes program memory (APROM)
- 4K bytes loader memory (LDROM)
- 12K/20K bytes embedded SRAM
- In System Programming (ISP) and In Application Programming (IAP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDROM or DataFlash
- Fast parallel programming mode to update APROM or LDROM or DataFlash

◆ Clock Control

- Flexible selection from different clock source
- 22.1184 MHz internal oscillator for system operation
 - Trimmed to $\pm 1\%$ at $+25^{\circ}\text{C}$ and $VDD = 3.3\text{V}$
 - Trimmed to $\pm 5\%$ at $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ and $VDD = 2.5\text{V} \sim 5.5\text{V}$
- 10 kHz internal low-power oscillator for Watchdog Timer and Wake-up operation
- One PLL, up to 144 MHz, for high performance system operation
- 4 ~ 24 MHz external crystal input for USB and precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

◆ PDMA (Peripheral DMA)

- 6 channels PDMA for automatic data transfer between SRAM and peripherals such as SPI, UART, I²S, USB 2.0 FS device, PWM and ADC
- CRC calculation with four common polynomials, CRC-CCITT, CRC-8, CRC-16 and CRC-32

◆ Timers

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

◆ PWM

- Two 16-bit PWM generators with four PWM outputs or two complementary paired PWM outputs
- Each PWM generator equipped 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 Interface

- 2 UARTs, up to 1 Mbps with flow control
- 3 SPIs, clock up to 32 MHz (Master at 5V), 16 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ USB 2.0 Full-Speed Device

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

◆ I²S

- Interface with external audio CODEC
- Operate 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 150 Ksps
- Up to 8-ch single-end input or 4-ch 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

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 47 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 Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- QFN33 (5x5mm)
- LQFP48 (7x7mm)
- LQFP64 (7x7mm)

Features of NUC130/140 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes loader memory (LDRROM)
- Configurable data flash address and size for 128K bytes system, fixed 4K bytes data flash (DataFlash) for the 32K bytes and 64K bytes system
- 4K/8K/16K bytes embedded SRAM
- PDMA mode

◆ Clock Control

- Flexible selection from different clock source
- 22.1184 MHz internal oscillator (trimmed to 1%) for system operation, and 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

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Independent clock source for each timer
- One-shot, periodic, toggle and continuous counting operation modes
- Event counting function
- Input capture function

◆ PWM

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

◆ ADC

- 12-bit SAR ADC with 700 Ksps
- Up to 8-ch single-end input or 4-ch 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

◆ Communication Interface

- 3 UARTs, up to 1 Mbps with flow control
- 4 SPIs, clock up to 32 MHz (Master at 5V), 10 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ I²S

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

◆ USB 2.0 Full-Speed Device (NUC140 only)

- One set of USB 2.0 FS Device
- On-chip USB Transceiver
- 1 interrupt source with 4 interrupt events
- Control, Bulk, Interrupt and Isochronous transfers
- 6 programmable endpoints
- 512 bytes internal SRAM as USB buffer included
- Remote wake-up capability

◆ CAN 2.0

- CAN protocol version 2.0 part A and B
- Bit rates up to 1 Mbps
- 32 Message Objects
- Each message object has its own identifier mask
- Programmable FIFO mode (concatenation of Message Object)
- Maskable interrupt
- Disabled Automatic Re-transmission mode for Time Triggered CAN applications
- Power down wake-up function

◆ Analog Comparator

- Up to 2 analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change
- Power down wake-up

◆ 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)

◆ EBI Bus (100-pin and 64-pin package only)

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width
- Byte write in 16-bit data width mode

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 80 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (10x10mm)
- LQFP100 (14x14mm)

Features of NUC200 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes loader memory (LDROM)
- 8K/16K bytes embedded SRAM
- In System Programming (ISP) and In Application Programming (IAP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDROM or DataFlash
- Fast parallel programming mode to update APROM or LDROM or DataFlash

◆ Clock Control

- Flexible selection from different clock source
- 22.1184 MHz internal oscillator for system operation
 - Trimmed to $\pm 1\%$ at +25°C and VDD = 3.3V
 - Trimmed to $\pm 5\%$ at -40°C ~ +85°C and VDD = 2.5V ~ 5.5V
- 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

◆ PDMA (Peripheral DMA)

- 6 channels PDMA for automatic data transfer between SRAM and peripherals such as SPI, UART, I2S, PWM and ADC
- CRC calculation with four common polynomials, CRC-CCITT, CRC-8, CRC-16 and CRC-32

◆ Timers

- 4 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 equipped with one clock source selector, one clock divider, one 8-bit pre-scale and one Dead-Zone generator for complementary paired PWM
- Four 16-bit digital capture timers (shared with PWM timers) with four rising/falling capture inputs
- Capture interrupt

◆ Communication Interface

- 3 UARTs, up to 1 Mbps with flow control
- 4 SPIs, clock up to 36 MHz (Master at 5V), 18 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ Smart Card Host (SC)

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

◆ I²S

- Interface with external audio CODEC
- Operate 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-ch single-end input or 4-ch 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
- Built-in temperature sensor with 1°C resolution

◆ Window Watchdog Timer

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

◆ 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 2 analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 83 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 Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

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

Features of 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes loader memory (LDROM)
- 8K/16K bytes embedded SRAM
- In System Programming (ISP) and In Application Programming (IAP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDROM or DataFlash
- Fast parallel programming mode to update APROM or LDROM or DataFlash

◆ Clock Control

- Flexible selection from different clock source
- 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

◆ PDMA (Peripheral DMA)

- 6 channels PDMA for automatic data transfer between SRAM and peripherals such as SPI, UART, I²S, PWM and ADC
- CRC calculation with four common polynomials, CRC-CCITT, CRC-8, CRC-16 and CRC-32

◆ Timers

- 4 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 four complementary paired PWM outputs
- Each PWM generator equipped 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 Interface

- 3 UARTs, up to 1 Mbps with flow control
- 4 SPIs, clock up to 36 MHz (Master at 5V), 18 MHz (Slave at 5V)
- 2 I²Cs
- IrDA (SIR) and RS485

◆ USB 2.0 Full-Speed Device

- One set of USB 2.0 FS Device
- On-chip USB Transceiver
- 1 interrupt source with 4 interrupt events
- Control, Bulk, Interrupt and Isochronous transfers
- Auto suspend function when no bus signaling for 3 ms
- 6 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

◆ I²S

- Interface with external audio CODEC
- Operate 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-ch single-end input or 4-ch 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°C resolution

◆ Window Watchdog Timer

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

◆ 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 2 analog comparators
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change

◆ Brown-out Detector

- With 4 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 Range

- 2.5V to 5.5V

◆ Operating Temperature

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

◆ Packages (RoHS)

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

Features of M051 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 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints/4 breakpoints

◆ Memory

- 8K/16K/32K/64K bytes program memory (APROM)
- 4K bytes data memory (DataFlash)
- 4K bytes loader memory (LDRM)
- 4K bytes embedded SRAM
- In System Programming (ISP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDRM or DataFlash
- Fast parallel programming mode to update APROM or LDRM or DataFlash

◆ Clock Control

- Programmable system clock source
- 4 ~ 24 MHz external crystal input
- 22.1184 MHz internal oscillator (trimmed to 1% accuracy at room temp.)
- 10 kHz internal low-power oscillator for Watchdog timer and Wake-up in sleep mode
- PLL allows CPU operation up to the maximum 50 MHz

◆ Timers

- 4 sets of 32-bit timers, one 8-bit pre-scale counter with 24-bit up-timer for each timer
- Independent clock source for each timer
- 24-bit timer value is readable through TDR (Timer Data Register)
- One-shot, periodic and toggle operation modes
- Event counter function
- External capture/reset counter function equivalent to 8051 Timer2

◆ PWM

- Four 16-bit PWM generators with eight PWM outputs or four complementary paired PWM outputs
- Individual clock source, clock divider, 8-bit pre-scale and Dead-Zone generator for each PWM generator
- PWM interrupt synchronized to PWM period
- 16-bit digital capture timers (shared with PWM timers) with rising/falling capture inputs
- Capture interrupt, edge or center alignment

◆ ADC

- 12-bit SAR ADC with 760 Ksps
- Up to 8-ch single-ended input or 4-ch differential input
- Single mode/ burst mode/ single-cycle scan mode/ continuous scan mode
- 2' complement/ un-signed format in differential mode conversion result
- Each channel with an individual result register
- Conversion value monitoring (or comparison) for threshold voltage detection
- Conversion can be started either by software trigger or external pin trigger

◆ Communication Interface

- 2 UARTs, up to 1 Mbps with flow control
- 2 SPIs, clock up to 16 MHz (Master at 5V), 10 MHz (Slave at 5V)
- 1 I²C
- IrDA (SIR) and RS485, LIN

◆ Analog Comparator

- 2 comparator analog modules
- External input or internal band-gap voltage selectable at negative node
- Interrupt when compare results change
- Power down wake-up

◆ Wake-up Sources

- Watchdog timer, all GPIOs, UARTs, Comparators, BOD

◆ EBI Bus

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-bit/16-bit data width
- Byte-write in 16-bit data width

◆ Brown-out Detector

- With 4 levels: 4.5V / 3.8V / 2.7V / 2.2V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 40 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- QFN33 (4x4mm)
- QFN33 (5x5mm)
- LQFP48 (7x7mm)

Features of Mini51 series

◆ Core

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

◆ Memory

- 4K/8K/16K bytes program memory (APROM)
- Configurable 0/1/2/4K bytes data memory (DataFlash)
- 2K bytes loader memory (LDROM)
- 2K bytes embedded SRAM
- In System Programming (ISP) update APROM
- 2-wire In Circuit Programming (ICP) update APROM or LDROM or DataFlash
- Fast parallel programming mode to update APROM or LDROM or DataFlash

◆ Clock Control

- Programmable system clock source
 - Switch clock sources on-the-fly
- 4 ~ 24 MHz external crystal input
- 22.1184 MHz internal oscillator (trimmed to 1% accuracy at room temp.)
 - Dynamic calibrating the 22.1184 MHz RC OSC to +/-1% from -40°C to 85°C by external 32.768 kHz external crystal input
- 10 kHz internal low-power oscillator for Watchdog timer and Idle mode wake-up
- 32.768 kHz external crystal input

◆ Timers

- 2 sets of 32-bit timers, one 8-bit pre-scale counter with 24-bit up-timer for each timer.
- Event counter mode
- Toggle output mode
- Pulse width capture mode for frequency or pulse width measurement

◆ PWM

- Three 16-bit PWM generators with six PWM outputs or three complementary paired PWM outputs
- Individual clock source, clock divider, 8-bit pre-scale and Dead-Zone generator for each PWM generator
- PWM interrupt synchronized to PWM period
- Edge or center alignment
- Fault detection

◆ ADC

- 10-bit SAR ADC with 150 Ksps
- Up to 8-ch single-ended input and one internal input from band-gap
- Conversion can be started either by software or external pin trigger

◆ Communication Interface

- 1 UART
- 1 SPI, clock up to 24 MHz (Master at 5V), 4 MHz (Slave at 5V)
- 2 I²Cs Master/Slave
- IrDA (SIR) and RS485, LIN

◆ Analog Comparator

- 2 analog comparators with programmable 16-level internal voltage reference
- External input or internal band-gap voltage selectable at negative node

◆ Wake-Up Sources

- Timer, Watchdog timer, all GPIOs, UARTs, Comparators, BOD

◆ Brown-out Detector

- With 3 levels: 3.8V / 2.7V / 2.0V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 30 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

◆ Wide Operating Voltage Range

- 2.5V to 5.5V

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- QFN33 (5x5mm)
- LQFP48 (7x7mm)

Features of Nano100 series

◆ Core

- ARM® Cortex™-M0 core running up to 42 MHz
- One 24-bit system tick timer
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watch points / 4 breakpoints

◆ Ultra Low Power Features

- Single power supply: 1.8V ~ 3.6V
- Normal mode: 200 μ A/MHz
- Idle mode: CPU stop, 75 μ A/MHz
- Power-down mode: CPU and all clocks stop, RAM retention
 - 1 μ A, 32.768 kHz RTC OFF
 - 2.5 μ A, 32.768 kHz RTC ON
- Wake-up time: 7 μ s
(from wake-up event to first ARM® Cortex™-M0 core valid clock)

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes flash loader memory (LDROM)
- 512 bytes page erase for flash memory
- 8K/16K bytes embedded SRAM
- Configurable data flash size (data flash shared with APROM)

◆ Clock Control

- On-chip PLL, up to 120 MHz for high performance system operation
- 12 MHz internal oscillator
 - $\pm 2\%$ at - 40°C ~ 85°C, 1.8V ~ 3.6V
 - $\pm 0.25\%$ at - 40°C ~ 85°C, 1.8V ~ 3.6V by 32.768 kHz crystal auto calibration
- 10 kHz internal low-power oscillator for Watchdog timer and low-power operation system
- 4 ~ 24 MHz external crystal input for precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Watchdog timer with 8-bit selectable time out period
- Event counter, pulse width capture mode and inter-timer trigger mode

◆ DMA

- 8 channels DMA (6-channel PDMA, 1-channel VDMA, and 1-channel CRC) for peripheral timers, UARTs, SPIs, I²S, ADC, DAC and PWM

◆ 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)
- 80 byte backup register with snoop pin detection

◆ PWM/Capture

- 8 channels 16-bit PWM
- 8 channels 16-bit digital capture timers with eight capture inputs (rising, falling or both)
- Dead-Zone generator for complementary paired PWM

◆ ADC/DAC

- 12 channels 12-bit SAR ADC up to 2 Msps
- Two 12-bit DACs up to 400 Ksps
- Three reference voltage sources from V_{REF} pin, Internal reference voltage (Int_V_{REF}) and AVDD
- Internal reference voltage (Int_V_{REF}) with two output voltage options: 1.8V / 2.5V
- On-chip temperature sensor

◆ Communication Interface

- 5 UARTs (2 dedicated UARTs with flow control), up to 1 Mbps
- 3 SPIs, clock up to 32 MHz (Master at 3V), 16 MHz (Slave at 3V)
- 2 I²Cs
- 3 ISO7816-3 (Smart card interface)
- RS485, LIN and IrDA (SIR)

◆ I²S

- 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

◆ Capacitive Touch Key

- Up to 16 touch keys

◆ Wake-up Sources

- Timers, RTC, Watchdog timer, all GPIOs, UARTs, SPIs

◆ EBI Bus

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width

◆ Brown-out Detector

- With 3 levels: 1.7V / 2.0V / 2.5V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 86 general-purpose I/O (GPIO) pins
- Three I/O modes: Push-Pull output, Open-Drain output, Input only with high impedance
- All inputs with Schmitt trigger and programmable hardware de-bounce
- All I/O pins can be configured as interrupt source with edge/level setting
- Input 5V tolerance

◆ Wide Operating Voltage Range

- 1.8V to 3.6V

◆ Unique ID (UID)

- 96-bit UID

◆ Operating Temperature

- - 40°C ~ 85°C

◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (7x7mm)
- LQFP128 (14x14mm)

Features of Nano110 series

◆ Core

- ARM® Cortex™-M0 core running up to 42 MHz
- One 24-bit system tick timer
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watch points / 4 breakpoints

◆ Ultra Low Power Features

- Single power supply: 1.8V ~ 3.6V
- Normal mode: 200 μ A/MHz
- Idle mode: CPU stop, 75 μ A/MHz
- Power-down mode: CPU and all clocks stop, RAM retention
 - 1 μ A, 32.768 kHz RTC OFF
 - 2.5 μ A, 32.768 kHz RTC ON
 - 8 μ A, 32.768 kHz RTC ON, LCD ON without panel loading
- Wake-up time: 7 μ s (from wake-up event to first ARM® Cortex™-M0 core valid clock)

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes loader memory (LDROM)
- 512 bytes page erase for flash memory
- 8K/16K bytes embedded SRAM
- Configurable data flash size (data flash shared with APROM)

◆ Clock Control

- On-chip PLL, up to 120 MHz for high performance system operation
- 12 MHz internal oscillator
 - $\pm 2\%$ at -40°C ~ 85°C, 1.8V ~ 3.6V
 - $\pm 0.25\%$ at -40°C ~ 85°C, 1.8V ~ 3.6V by 32.768 kHz crystal auto calibration
- 10 kHz internal low-power oscillator for Watchdog timer and low-power operation system
- 4 ~ 24 MHz external crystal input for precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Watchdog timer with 8-bit selectable time out period
- Event counter, pulse width capture mode and inter-timer trigger mode

◆ DMA

- 8 channels DMA (6-channel PDMA, 1-channel VDMA, and 1-channel CRC) for peripheral timers, UARTs, SPIs, I²S, ADC, DAC and PWM

◆ 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)
- 80 byte backup register with snoop pin detection

◆ PWM/Capture

- 8 channels 16-bit PWM
- 8 channels 16-bit digital capture timers with eight capture inputs (rising, falling or both)
- Dead-Zone generator for complementary paired PWM

◆ ADC/DAC

- 12 channels 12-bit SAR ADC up to 2 Msps
- Two 12-bit DACs up to 400 Ksps
- Three reference voltage sources from V_{REF} pin, Internal reference voltage (Int_V_{REF}) and AVDD
- Internal reference voltage (Int_V_{REF}) with two output voltage options: 1.8V / 2.5V
- On-chip temperature sensor

◆ LCD Driver

- Up to 160 dots (4 Com x 40 Segment) or 228 dots (6 Com x 38 Segment)
- R and C type driver
- Adjustable contrast and blinking
- Selection 1/2, 1/3, 1/4, 1/5, 1/6 duty and statics, 1/2, 1/3 bias
- Configurable Charge pump frequency

◆ Communication Interface

- 5 UARTs (2 dedicated UARTs with flow control), up to 1 Mbps
- 3 SPIs, clock up to 32 MHz (Master at 3V), 16 MHz (Slave at 3V)
- 2 I²Cs
- 3 ISO7816-3 (Smart card interface)
- RS485, LIN and IrDA (SIR)

◆ I²S

- 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

◆ Capacitive Touch Key

- Up to 16 touch keys

◆ Wake-up Sources

- Timers, RTC, Watchdog timer, all GPIOs, UARTs, SPIs

◆ EBI Bus

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width

◆ Brown-out Detector

- With 3 levels: 1.7V / 2.0V / 2.5V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 86 general-purpose I/O (GPIO) pins
- Three I/O modes: Push-Pull output, Open-Drain output, Input only with high impedance
- All inputs with Schmitt trigger and programmable hardware de-bounce
- All I/O pins can be configured as interrupt source with edge/level setting
- Input 5V tolerance

◆ Wide Operating Voltage Range

- 1.8V to 3.6V

◆ Unique ID (UID)

- 96-bit UID

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- LQFP64 (7x7mm)
- LQFP128 (14x14mm)

Features of Nano120 series

◆ Core

- ARM® Cortex™-M0 core running up to 42 MHz
- One 24-bit system tick timer
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with 4-levels of priority
- Serial Wire Debug (SWD) interface and 2 watchpoints / 4 breakpoints

◆ Ultra Low Power Features

- Single power supply: 1.8V ~ 3.6V
- Normal mode: 200 uA/MHz
- Idle mode: CPU stop, 75 uA/MHz
- Power-down mode: CPU and all clocks stop, RAM retention

■ 1 uA, 32.768 kHz RTC OFF

- 2.5 uA, 32.768 kHz RTC ON
- Wake-up time: 7us (from wake-up event to first ARM® Cortex™-M0 core valid clock)

◆ Memory

- 32K/64K/128K bytes program memory (APROM)
- 4K bytes loader memory (LDROM)
- 512 bytes page erase for flash memory
- 8K/16K bytes embedded SRAM
- Configurable data flash size (data flash shared with APROM)

◆ Clock Control

- On-chip PLL, up to 120 MHz for high performance system operation and USB application (48 MHz)
- 12 MHz internal oscillator
 - $\pm 2\%$ at -40°C ~ 85°C, 1.8V ~ 3.6V
 - $\pm 0.25\%$ at -40°C ~ 85°C, 1.8V ~ 3.6V by 32.768 kHz crystal auto calibration
- 10 kHz internal low-power oscillator for Watchdog timer and low-power operation system
- 4 ~ 24 MHz external crystal input for precise timing operation
- 32.768 kHz external crystal input for RTC function and low-power operation system

◆ Timers

- 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Watchdog timer with 8-bit selectable time out period
- Event counter, pulse width capture mode and inter-timer trigger mode

◆ DMA

- 8 channels DMA (6-channel PDMA, 1-channel VDMA, and 1-channel CRC) for peripheral timers, UARTs, SPIs, I²S, USB, ADC, DAC and PWM

◆ 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)
- 80 byte backup register with snoop pin detection

◆ PWM/Capture

- 8 channels 16-bit PWM
- 8 channels 16-bit digital capture timers with eight capture inputs (rising, falling or both)
- Dead-Zone generator for complementary paired PWM

◆ ADC/DAC

- 12 channels 12-bit SAR ADC up to 2 Msps
- Two 12-bit DACs up to 400 Ksps
- Three reference voltage sources from V_{REF} pin, Internal reference voltage (Int_V_{REF}) and AVDD
- Internal reference voltage (Int_V_{REF}) with two output voltage options: 1.8V / 2.5V
- On-chip temperature sensor

◆ USB 2.0 Full-Speed Device

- One set of USB 2.0 FS Device
- On-chip USB Transceiver
- Control, Bulk, Interrupt and Isochronous transfers
- 8 programmable endpoints
- 512 bytes internal SRAM as USB buffer
- On-chip 5V to 3.3V LDO for USB transceiver

◆ Communication Interface

- 5 UARTs (2 dedicated UARTs with flow control), up to 1 Mbps
- 3 SPIs, clock up to 32 MHz (Master at 3V), 16 MHz (Slave at 3V)
- 2 I²Cs
- 3 ISO7816-3 (Smart card interface)
- RS485, LIN and IrDA (SIR)

◆ I²S

- 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

◆ Capacitive Touch Key

- Up to 16 touch keys

◆ Wake-up Sources

- Timers, RTC, Watchdog timer, all GPIOs, UARTs, SPIs, USB

◆ EBI Bus

- Accessible space: 64K bytes in 8-bit mode or 128K bytes in 16-bit mode
- 8-/16-bit data width

◆ Brown-out Detector

- With 3 levels: 1.7V / 2.0V / 2.5V
- Brown-out interrupt and reset option

◆ GPIOs

- Up to 86 general-purpose I/O (GPIO) pins
- Three I/O modes: Push-Pull output, Open-Drain output, Input only with high impedance
- All inputs with Schmitt trigger and programmable hardware de-bounce
- All I/O pins can be configured as interrupt source with edge/level setting
- Input 5V tolerance

◆ Wide Operating Voltage Range

- 1.8V to 3.6V

◆ Unique ID (UID)

- 96-bit UID

◆ Operating Temperature

- -40°C ~ 85°C

◆ Packages (RoHS)

- LQFP48 (7x7mm)
- LQFP64 (7x7mm)
- LQFP128 (14x14mm)

Features of Nano130 series

- ◆ **Core**
 - ARM® Cortex™-M0 core running up to 42 MHz
 - One 24-bit system tick timer
 - Single-cycle 32-bit hardware multiplier
 - NVIC for 32 interrupt inputs, each with 4-levels of priority
 - Serial Wire Debug (SWD) interface and 2 watchpoints / 4 breakpoints
- ◆ **Ultra Low Power Features**
 - Single power supply: 1.8V ~ 3.6V
 - Normal mode: 200 μ A/MHz
 - Idle mode: CPU stop, 75 μ A/MHz
 - Power-down mode: CPU and all clocks stop, RAM retention
 - 1 μ A, 32.768 kHz RTC OFF
 - 2.5 μ A, 32.768 kHz RTC ON
 - 10 μ A, 32.768 kHz RTC ON, LCD ON without panel loading
 - Wake-up time: 7 μ s (from wake-up event to first ARM® Cortex™-M0 core valid clock)
- ◆ **Memory**
 - 32K/64K/128K bytes program memory (APROM)
 - 4K bytes loader memory (LDROM)
 - 512 bytes page erase for flash memory
 - 8K/16K bytes embedded SRAM
 - Configurable data flash size (data flash shared with APROM)
- ◆ **Clock Control**
 - On-chip PLL, up to 120 MHz for high performance system operation and USB application (48 MHz)
 - 12 MHz internal oscillator
 - $\pm 2\%$ at - 40°C ~ 85°C, 1.8V ~ 3.6V
 - $\pm 0.25\%$ at - 40°C ~ 85°C, 1.8V ~ 3.6V by 32.768 kHz crystal auto calibration
 - 10 kHz internal low-power oscillator for Watchdog timer and low-power operation system
 - 4 ~ 24 MHz external crystal input for precise timing operation
 - 32.768 kHz external crystal input for RTC function and low-power operation system
- ◆ **Timers**
 - 4 sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
 - Watchdog timer with 8-bit selectable time out period
 - Event counter, pulse width capture mode and inter-timer trigger mode
- ◆ **DMA**
 - 8 channels DMA (6-channel PDMA, 1-channel VDMA, and 1-channel CRC) for peripheral timers, UARTs, SPIs, I²S, USB, ADC, DAC and PWM
- ◆ **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)
 - 80 byte backup register with snoop pin detection
- ◆ **PWM/Capture**
 - 8 channels 16-bit PWM
 - 8 channels 16-bit digital capture timers with eight capture inputs (rising, falling or both)
 - Dead-Zone generator for complementary paired PWM
- ◆ **ADC/DAC**
 - 12 channels 12-bit SAR ADC up to 2 Msps
 - Two 12-bit DACs up to 400 Ksps
- Three reference voltage sources from V_{REF} pin, Internal reference voltage (Int_V_{REF}) and AVDD
- Internal reference voltage (Int_V_{REF}) with two output voltage options: 1.8V / 2.5V
- On-chip temperature sensor
- ◆ **LCD Driver**
 - Up to 160 dots (4 Com x 40 Segment) or 228 dots (6 Com x 38 Segment)
 - R and C type driver
 - Adjustable contrast and blinking
 - Selection 1/2, 1/3, 1/4, 1/5, 1/6 duty and statics, 1/2, 1/3 bias
 - Configurable Charge pump frequency
- ◆ **USB 2.0 Full-Speed Device**
 - One set of USB 2.0 FS Device
 - On-chip USB Transceiver
 - Control, Bulk, Interrupt and Isochronous transfers
 - 8 programmable endpoints
 - 512 bytes internal SRAM as USB buffer
 - On-chip 5V to 3.3V LDO for USB transceiver
- ◆ **Communication Interface**
 - 5 UARTs (2 dedicated UARTs with flow control), up to 1 Mbps
 - 3 SPIs, clock up to 32 MHz (Master at 3V), 16 MHz (Slave at 3V)
 - 2 I²Cs
 - 3 ISO7816-3 (Smart card interface)
 - RS485, LIN and IrDA (SIR)
- ◆ **I²S**
 - 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
- ◆ **Capacitive Touch Key**
 - Up to 16 touch keys
- ◆ **Wake-up Sources**
 - Timers, RTC, Watchdog timer, all GPIOs, UARTs, SPIs, USB
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- ◆ **Unique ID (UID)**
 - 96-bit UID
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 - - 40°C ~ 85°C
- ◆ **Packages (RoHS)**
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 - LQFP128 (14x14mm)

Note

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