

NuMicro® M5531 Series

High-Performance Cortex®-M55 MCU
with Helium™ and Advanced Security



► Product Description

The NuMicro® M5531 series is a 32-bit microcontroller based on Arm® Cortex®-M55 core, with Helium™ M-profile vector extension and double-precision FPU. The M5531 series runs up to 220 MHz, and features 1.71 V to 3.6 V wide operating voltage, -40°C to +105 °C wide operating temperature, and excellent high immunity characteristics by ESD HBM 3 KV and EFT 4.4 KV.

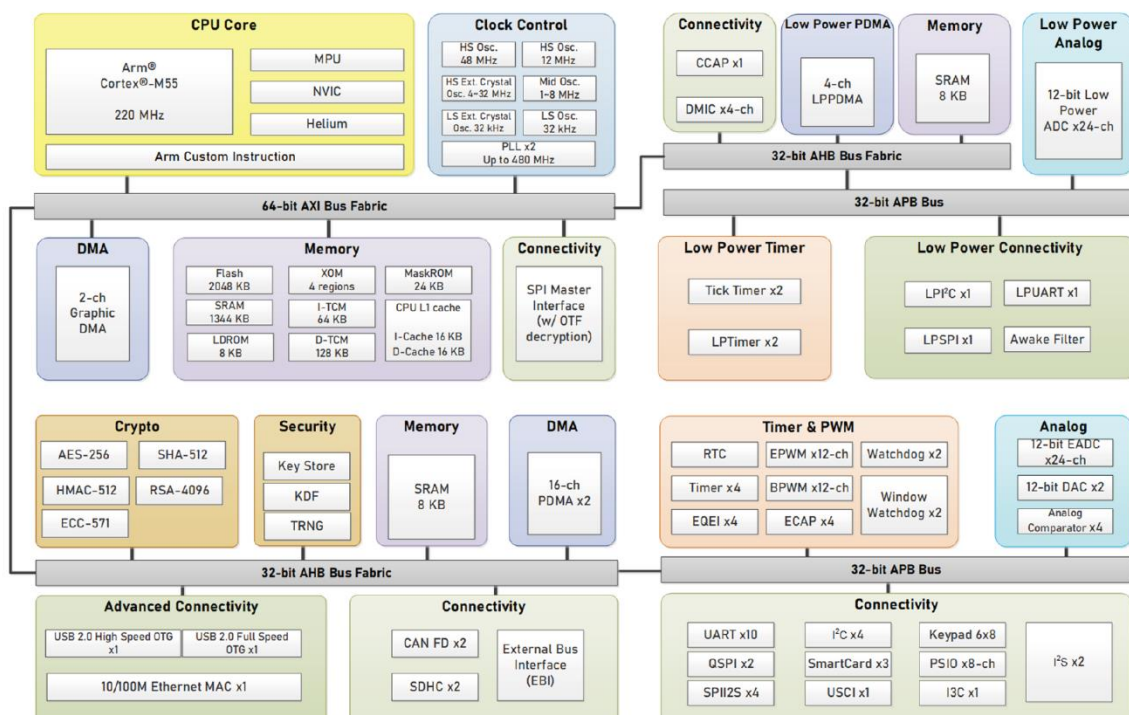
► Key Features

- Core: Arm® Cortex®-M55 220MHz
- On-chip memory: 1.5 MB SRAM and 2 MB dual bank Flash
- Hardware accelerators: Helium, double precision FPU, PDMA, GDMA, LPPDMA, and crypto engine
- Advanced architecture: 64 KB I-TCM, 128 KB D-TCM, and AXI Bus
- Enhanced security: TrustZone®, secure boot, key store, key derivation function, TRNG, crypto engine, eExecute-Only-Memory (XOM), and tamper detection pin
- Connectivity: Ethernet 10/100, CAN FD, USB HS, USB FS, I3C, DMIC, etc
- Analogs: 12-bit SAR ADC, 12-bit DAC, analog comparator
- Low power consumption: 94.5µA/MHz (typical)
- RTOS Support: FreeRTOS, Zephyr, and RT Thread
- GUI Library Support: emWin, LVGL, and Qt for MCU

► Applications

- Industrial IoT
- Industrial Automation
- Smart Building
- Human Machine Interface
- Sensor Fusion

► Block Diagram

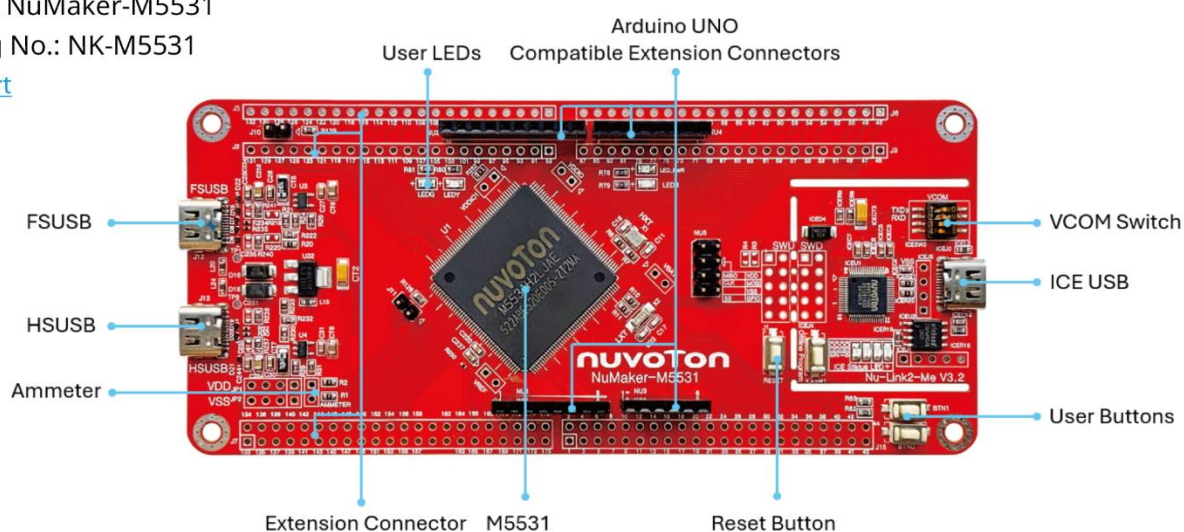


► Support for development

Item	Name	Features
IDE & Compiler	Keil MDK IAR EWARM VSCode NuEclipse	NuMicro® M5531 series is supported by Keil, IAR EWARM, and VSCode. NuEclipse is Nuvoton's proprietary IDE which integrates SDCC with free license.
Debugger & Programmer	Nu-Link2-Me Nu-Link-Pro Nu-Link2-Pro	Debugging, online programming, offline programming (optional), VCOM port, ISP Firmware upgrade.
Board Software Package	NuMicro BSP	The BSP mainly includes the device drivers, library, sample codes and documents.

► Evaluation board

- Part No.: NuMaker-M5531
- Ordering No.: NK-M5531
- [Quick Start](#)



► Product Selection Guide

Part No.	System							Memory							Timer			Analog			Connectivity										Security			Package		Status	Tool					
	Core	Operating Frequency	Operating Voltage (min)	Operating Voltage (max)	Operating Temperature (min)	Operating Temperature (max)	GPIO	LDROM Flash	APROM Flash	SRAM	PDMA	GDMA	LPDMA	Timer (32N/bit)	PWM	RTC (Vbat)	EADC (12N/bit)	LPADC (12N/bit)	DAC (12N/bit)	Analog Comparator	ISIC	UART + LPUART	SP/PS + LPSPI	OSPI	PC + LPPC	USCI	FS	CAN FD	SDHC	USB HS + FS	Ethernet 10/100	DMIC (4-ch)	EBI	EQEI	Secure Boot	Crypto Engine	Key Store	Package Type	Package Size	Mass Production	EVB	MP Programmer
M5531 H2LJAE	Cortex-M55	220	1.71	3.6	-40	105	142	8	2048	1552	32	2	4	4	24	v	24	24	2	4	1	10	4	2	4	1	2	2	2	1	1	1	1	4	✓	✓	✓	LQFP 176	24x24	✓	NK-M5531	NLG-176H2
M5531 K2LJAE	Cortex-M55	220	1.71	3.6	-40	105	97	8	2048	1552	32	2	4	4	24	v	24	24	2	4	1	10	4	2	4	1	1	2	2	1	1	1	-	4	✓	✓	✓	LQFP 128	14x14	✓	NK-M5531	NLG-128K2
M5531 R2LJAE	Cortex-M55	220	1.71	3.6	-40	105	39	8	2048	1552	32	2	4	4	24	v	18	18	2	4	1	9	4	1	3	1	2	2	2	1	1	1	-	4	✓	✓	✓	LQFP 64	10x10	✓	NK-M5531	NLG-64R2

For more details, please visit <https://www.nuvoton.com/products/microcontrollers/arm-cortex-m55-mcus/m5531-series/>

