

NuMicro[®] MG51 Series Industrial 8051 MCU



► PRODUCT DESCRIPTION

The NuMicro MG51 series stands as an industrial-grade 8051-based microcontroller, offering a wide operational range of both voltage and temperature. With robust immunity to ESD and EFT, it is well-suited for challenging industrial environments. The microcontroller boasts ample on-chip SRAM and flash memories, along with a diverse set of peripherals, all packaged in a compact form, making it an ideal choice for industrial applications.

► KEY FEATURES

- Operating voltage: 2.4V ~ 5.5V, Operating temperature: -40°C ~ +105°C
- 1T 8051-based fully static CPU, running up to 24 MHz.
- 256 bytes on-chip RAM and 4 KB auxiliary RAM (XRAM)
- Up to 64 KB Flash Memory for storing program.
- Up to 4 KB LDRAM flash memory dedicated for storing boot loader that supports ISP
- Internal clocks of 16 MHz/24 MHz HIRC, 10 kHz LIRC.
- 12-bit, 500 Ksps, 15 single-ended channel SAR ADC
- 16-bit, 24 MHz, 12 output channel PWM
- Supports Power-on reset, Brown-out detector, Low-voltage reset
- Strong immunity. ESD HBM: ±7 kV, ESD CDM: ±1 kV, EFT: ±4.4 kV

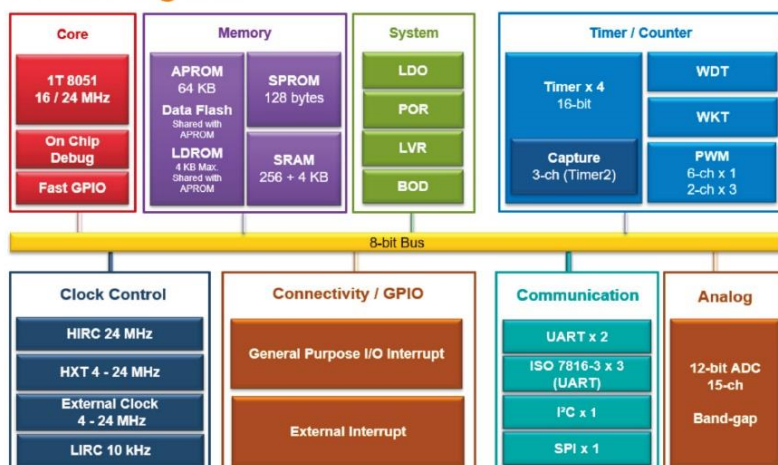
NuMicro[®] MG51 Series Key Features Table

Product Line	UART	PC	SPI	Timer	PWM	ADC
MG51	2	1	1	4	12	15

► APPLICATIONS

- Home appliances
- LED lighting
- Power measurement
- Industrial automation
- Remote controller
- BMS
- User Interface
- Battery charger

► Block Diagram



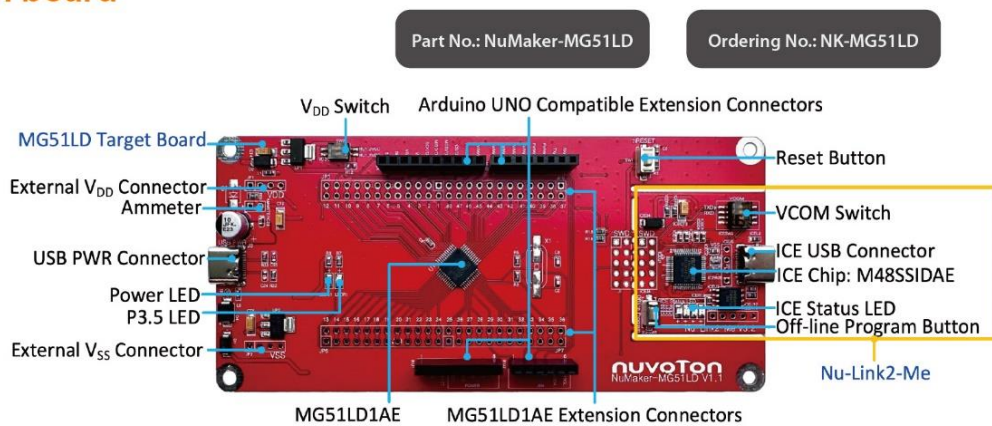
► Portfolio and Packages

Pin Count	Type	I/O Pin	Lead Pitch	Dimensions (mm)
20	TSSOP	18	0.65	4.4x6.5
20	QFN	18	0.4	3x3
28	TSSOP	26	0.65	4.4x9.7
32	LQFP	30	0.8	7x7
32	QFN	30	0.4	4x4
48	LQFP	46	0.5	7x7

► Support for development

Item	Name	Features
IDE & compiler	Keil PK51 IAR EW8051 NuEclipse	MG51 is supported by Keil and IAR's C compilers for 8051-based MCU. NuEclipse is Nuvoton's proprietary IDE which integrates SDCC compiler for 8051-based MCU with free license.
Evaluation board	NuMaker EVB	NuMaker evaluation board with on-board debugger/programmer (Nu-Link2-Me)
Debugger & Programmer	Nu-Link2-Me Nu-Link-Pro Nu-Link2-Pro	Debugging, online programming, offline programming (optional), VCOM port, ISP Firmware upgrade
Software Tools	NuTool Suite	NuTool-PinConfigure, NuTool-USB to serial port
BSP	NuMicro BSP	The BSP includes the device drivers, library, sample codes and documents.

► Evaluation board



► Product Selection Guide

Part Number	Flash Memory (KB)	SRAM (KB)	LDROM (KB) ^[1]	I/O	Timer	PWM	Connectivity				ADC (12-bit)	Package
							ISO 7816-3 ^[2]	UART	SPI	I ² C		
MG51XB9AE	16	1	4	18	4	6	-	2	1	1	8-ch	QFN20
MG51FB9AE	16	1	4	18	4	6	-	2	1	1	8-ch	TSSOP20
MG51FC9AE	32	1	4	18	4	6	-	2	1	1	8-ch	TSSOP20
MG51XC9BE	32	1	4	18	4	6	-	2	1	1	8-ch	QFN20
MG51EC1AE	32	4	4	26	4	12	3	2	1	1	15-ch	TSSOP28
MG51TC1AE	32	4	4	30	4	12	3	2	1	1	15-ch	QFN32
MG51PC1AE	32	4	4	30	4	12	3	2	1	1	15-ch	LQFP32
MG51LC1AE	32	4	4	46	4	12	3	2	1	1	15-ch	LQFP48
MG51TD1AE	64	4	4	30	4	12	3	2	1	1	15-ch	QFN32
MG51PD1AE	64	4	4	30	4	12	3	2	1	1	15-ch	LQFP32
MG51LD1AE	64	4	4	46	4	12	3	2	1	1	15-ch	LQFP48

Note:

1. ISP ROM programmable 1/2/3/4 KB Flash Memory for user program loader (LDROM) shared from ARPOM.
2. ISO 7816-3 configurable as UART function; GPIO defined as UART2 to UART4.

