

New Product Update

Enabling Your Ultra-low Power
Display and Security Applications
with MSPM0Lx22x

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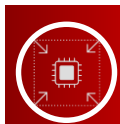
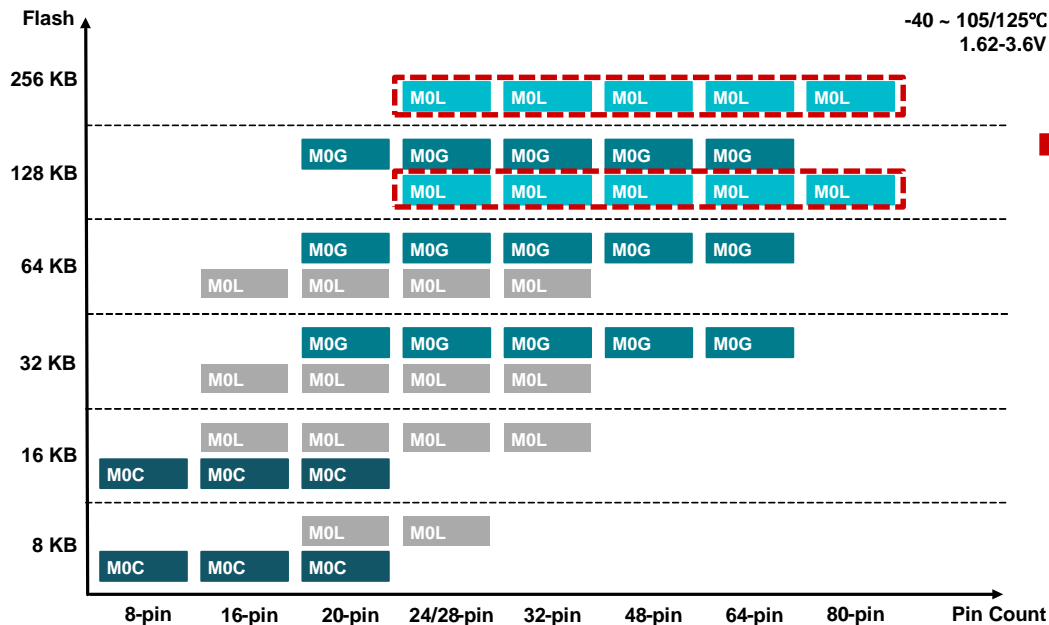
MSP HSM Product Marketing Engineer,
MSP HSM Systems Manager

Agenda

- MSPM0Lx22x Product Overview
- MSPM0Lx22x Ecosystem Overview
- MSPM0Lx22x Key Applications and Benefits

Please feel free to “chat” ***Amruta, MSP HSM Systems Manager*** who is available to answer any questions you have throughout this presentation.

MSPM0Lx22x Product Overview



M0C
Low cost
24MHz CPU



M0L
Low power
32MHz CPU



M0G
High performance
80MHz CPU

MSPM0L222x/122x			1.62 - 3.6V -40 to 125°C
CPU Arm Cortex-M0+ 32 MHz NVIC / 7-ch DMA	Power & Clocking POR / BOR / SVS External HF 4-32MHz XTAL Internal HF 4-32MHz (1%)	Analog 12-bit ADC 1.68Msps (26-ch) Comparator w/ 8-bit DAC (1) Internal reference (1.5%) Temperature sensor	
	On-chip Memory 128 or 256 kB flash (ECC) Dual-bank main flash with OTA 32 kB SRAM (ECC)	Communication UART w/ LIN (2) UART (3) SPI (2) I2C (3) w/ FastMode+	Timers Advanced control 16-bit 4 CC (1) General purpose 32-bit 2 CC (1) General purpose 16-bit 2 CC (2)
	Data Integrity & Security CRC accelerator (16 and 32 bit) AES256 (w/ key store) + TRNG Firewalls, IP protection, W*X	VBAT Island External LF 32kHz XTAL Internal LF 32kHz (3%) Independent watchdog	Low power 16-bit 2 CC (2) Windowed watchdog
	Programming & Debug ARM SWD interface UART & I2C bootloader	Real-time clock Tamper detection (3 IO) 32B backup memory Supercapacitor charging	IO Up to 73 GPIO Segment LCD (8x51, 4x55)
Ledged packages: LQFP-48/64/80 No-lead packages: VQFN-24/32/48			

- ✓ Pin-to-pin compatible
- ✓ Unified software development kit & tools
- ✓ TI multi-sourced manufacturing

MSPM0Lx22x Ecosystem Overview

You can start evaluating this device leveraging the following:

Content type	Content title	Link to content or more details
Product folder	MSPM0L2228 / MSPM0L1228 Product Folders	MSPM0L1228 data sheet, product information and support TI.com MSPM0L2228 data sheet, product information and support TI.com
Development tool or evaluation kit	LP-MSPM0L2228 Evaluation Module MSPM0-SDK Software Development Kit	LP-MSPM0L2228 Evaluation board TI.com MSPM0-SDK Software development kit (SDK) TI.com
Customer training series or webinar session	MSPM0 Academy Tutorials	MSPM0 Academy (ti.com)
Technical blog content or white paper	MSPM0Lx22x Microcontrollers Enabling Low-Power Display and Security Designs	MSPM0Lx22x Microcontrollers Enabling Low-Power Display and Security Designs (ti.com)
Selection and design tools and models	MSPM0 Landing Page – online selection tool, design & development tools, educational resources, applications	MSPM0 Landing Page

MSPM0Lx22x Ecosystem Overview

Get started at the TI Developer Zone dev.ti.com

Hardware & Partners



Low-cost Launchpad with on-board debug



Ecosystem of third-party tool partners



Software & Applications

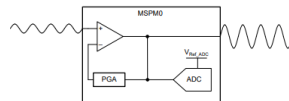


Hundreds of code examples

```
37  
38 int main(void)  
39 {  
40     SYSCFG_DL_init();  
41  
42     NVIC_EnableIRQ(ADC12_0_INST_INT_IRQN);  
43     gCheckADC = false;  
44  
45     while (1) {  
46         DL_ADC12_startConversion(ADC12_0_INST);
```

Subsystem examples for common use-cases

- UART ↔ I2C
- ADC with UART/I2C/SPI Interface
- ...



Broad selection of middleware

Motor control	Automotive	Grid	Math Libraries
Security	Building Automation	Medical	Factory Automation

Educational Resources



Learn MCU concepts with Precision Labs



Hands-on self-paced training with Academies

Task 1 - Logic Probe Captures

Build and download the program to the Launchpad. Use a Logic Probe to capture the CCR0 and CCR1 outputs. Please think about the following two questions before measuring the signals.

1. What is the right answer for?
A. 33.333 kHz
B. 33.333 MHz
C. 33.333 GHz
D. 33.333 THz



Check the CCR0 and CCR1 output signals here

The capture shows here is the CCR0 and CCR1 output P0M0 signals. Please be aware that this signal is tested with external crystal, resulting in a frequency error.



MSPM0Lx22x Ecosystem Overview

System configuration

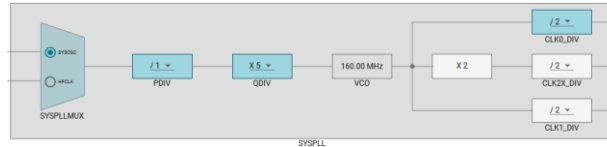
ti.com/tool/sysconfig



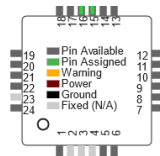
Select and set up peripherals

I2C - SMBUS	+	Target Baud Rate	115200
MCAN	+	Calculated Baud Rate	115211.52
SPI	+	Calculated Error (%)	0.01
UART	1/4 ✓ +	Word Length	8 bits
UART - LIN	+	Parity	None
TIMERS (6)		Stop Bits	One
TIMER - CAPTURE	+		

Configure & optimize clock system



Solve pin multiplexing challenges



PinMux Peripheral and Pin Configuration

UART Peripheral	Any(UART1)
RX Pin	Any(PA1/1)
TX Pin	Any(PA0/24)

MSPM0Lx22x Ecosystem Overview

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Microcontrollers (MCUs) & processors →

Arm-based microcontrollers

Arm Cortex-M0+ MCUs

Arm Cortex-M4 MCUs

Arm Cortex-R MCUs

Arm-based processors

Arm Cortex-M0+ MCUs

Columns

Result table 30 of 30 total products

Email Download Excel Log in to view inventory Log in

Product number	Images	Price/Quantity (USD)	Frequency (MHz)	Flash memory (kByte)	RAM (kByte)	ADC type	Number of ADC channels	Number of GPIOs	UART	Number of I2Cs	SPR	Package type	Pin count
<input type="checkbox"/> MSPM0L1228 - NEW Data sheet PDF HTML		\$0.640 / 1ku	32	256	32	12-bit SAR	6, 13, 21, 28	20, 28, 43, 59, 73	5	3	2	LOFP VQFN	24, 32, 48, 80
<input type="checkbox"/> MSPM0L2228 - NEW Data sheet PDF HTML		\$0.770 / 1ku	32	256	32	12-bit SAR	21, 28	43, 59, 73	5	3	2	LOFP VQFN	48, 64, 80

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Arm Cortex-M0+ MCUs

The most comprehensive portfolio of Arm® Cortex® -M0+ MCUs deliver the sensing and processing features you need.

View all products

Our scalable portfolio of Arm Cortex-M0+ microcontrollers (MCUs) have pin-to-pin compatible options to match your memory, analog and computing requirements, enabling you to reduce costs at both the component and system level without compromising performance and flexibility. Get started quickly with intuitive and user-friendly design resources, including graphical tools that streamline device configuration.

Browse by category

MSPM0C/MSPM0L series with a 32-MHz CPU, up to 64 kB of flash and 4 kB SRAM

Entry level

Simple devices for your basic applications, starting at \$0.39 in 1,000-unit quantities and multiple packaging options.

Find your device

Advanced analog and automotive

Integrate high performance analog from a broad range of device options that include zero-drift op amps, TIA, a 12-bit 1-MSPS ADC and a high-speed comparator.

Find your device

MSPM0G series with an 80-MHz CPU, up to 128 kB of flash and 32 kB SRAM

Entry level

Simple devices with increased computing performance, offered at a low cost in multiple package options.

Find your device

Advanced analog

Complete high-performance analog signal chain. Device options include multiple zero-drift op amps, dual 14-bit 250-KSPS ADCs, dual 12-bit 4-MSPS ADCs, high-speed comparators and a 12-bit 1-MSPS DAC.

Find your device

CAN controllers for industrial and automotive

Controllers Area Network (CAN) 2.0A, CAN2.0B, or CAN-Flexible Data Rate (CAN-FD) buses supporting rates as high as 5Mbps.

Find your device

MSPM0Lx22x Key Applications and Benefits



Flow Meter



Thermostat



Blood Pressure Monitor



Weigh Scale

- Energy infrastructure
- Building automation
- Medical & healthcare
- Test & measurement
- ***Unlimited possibilities!***

Up to 8x51 and 4x55 LCD displays

Suitable for multiple display applications

VBAT auxiliary supply domain

1.1µA standby current with RTC retained

Supercapacitor supply option with charging mode support

Dual-bank Flash

Supporting field firmware updates

Security

AES with KeyStore
Flexible firewalls
PSA-L1 certification...

Reliability

-40 ~ 125°C
Flash/SRAM with ECC
Independent watchdog...



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