

MSPM0 DAC module introduction

—— MSPM0 peripheral training series

Presented by Yuhao Zhao

MCU level overview

MSPM0Lxx series

MSPM0L13x3/4/5/6

CPU
ARM Cortex-M0+
32 MHz

NVIC / 3-ch DMA

On-chip Memory

8, 16, 32 or 64 kB flash
2 or 4 kB SRAM

Data Integrity & Security

CRC accelerator (16 and 32 bit)

Programming & Debug

ARM SWD interface
ROM UART & I2C BSL

Power & Clocking

POR / BOR / SVS
Internal LF 32kHz (5%)
Internal HF 4-32MHz (1%)

Communication

UART w/ LIN (1)
UART (1)
SPI (1)
I2C (2) w/ FastMode+

IO

Up to 28 GPIO
Up to 2 low Ib OPA inputs

Precision Analog

12-bit SAR ADC 1Msps (1)
ULP/HS Comparator (1)
8-bit reference DAC (1)
Zero-drift chopper op-amps (2)
General purpose amp (1)
Internal ADC reference (2.5%)
Temperature sensor

Timers

General purpose 16-bit 2 CC (4)
Windowed watchdog

1.62 - 3.6V
-40 to 125 C

Leaded packages: SOT-16, VSSOP-20/28
No-lead packages: WQFN-16, VQFN-24/32

32 MHz MCU with up to 64kB flash, 32 pins, 12-bit ADC, dual zero-drift OPA/PGA, COMP

MSPM0Gxx series

MSPM0G350x/310x/150x/110x

CPU
Arm Cortex-M0+
80 MHz

NVIC / MPU / 7-ch DMA

Accelerators

Math (DIV, SQRT, TRIG, MAC)

On-chip Memory

32, 64, or 128 kB flash [ECC]
16 or 32 kB SRAM [ECC]

Data Integrity & Security

CRC accelerator (16 and 32 bit)
AES256 accelerator + TRNG

Programming & Debug

ARM SWD interface
UART & I2C bootloader

Power & Clocking

POR / BOR / SVS
External LF 32kHz XTAL
External HF 4-48MHz XTAL
Internal LF 32kHz (3%)
Internal HF 4-32MHz (1%)
PLL (up to 80 MHz)

Communication

UART w/ LIN (1)
UART (3)
SPI (2)
I2C (2) w/ FastMode+
CAN-FD (1)

IO

Up to 60 GPIO

Precision Analog

12-bit ADC 4Msps (9-ch)
12-bit ADC 4Msps (8-ch)
Comparators w/ 8-bit DACs (3)
12-bit 1Msps buffered DAC (1)
Zero-drift chopper op-amps (2)
Internal reference (1.5%)
General purpose amp (1)
Temperature sensor

Timers

Advanced control 16-bit 4 CC (1)
Advanced control 16-bit 2 CC (1)
General purpose 32-bit 2 CC (1)
General purpose 16-bit 2 CC (2)
Low power 16-bit 2 CC (2)
Windowed watchdog (2)
Real-time clock (1)

1.62 - 3.6V
-40 to 125 C

Leaded packages: VSSOP-20/28, LQFP-48/64
No-lead packages: VQFN-24/32/48, nFBGA-64, WCSP-28

80 MHz MCU with up to 128kB flash, 64 pins, advanced analog, AES/TRNG, CAN-FD

TEXAS INSTRUMENTS

2

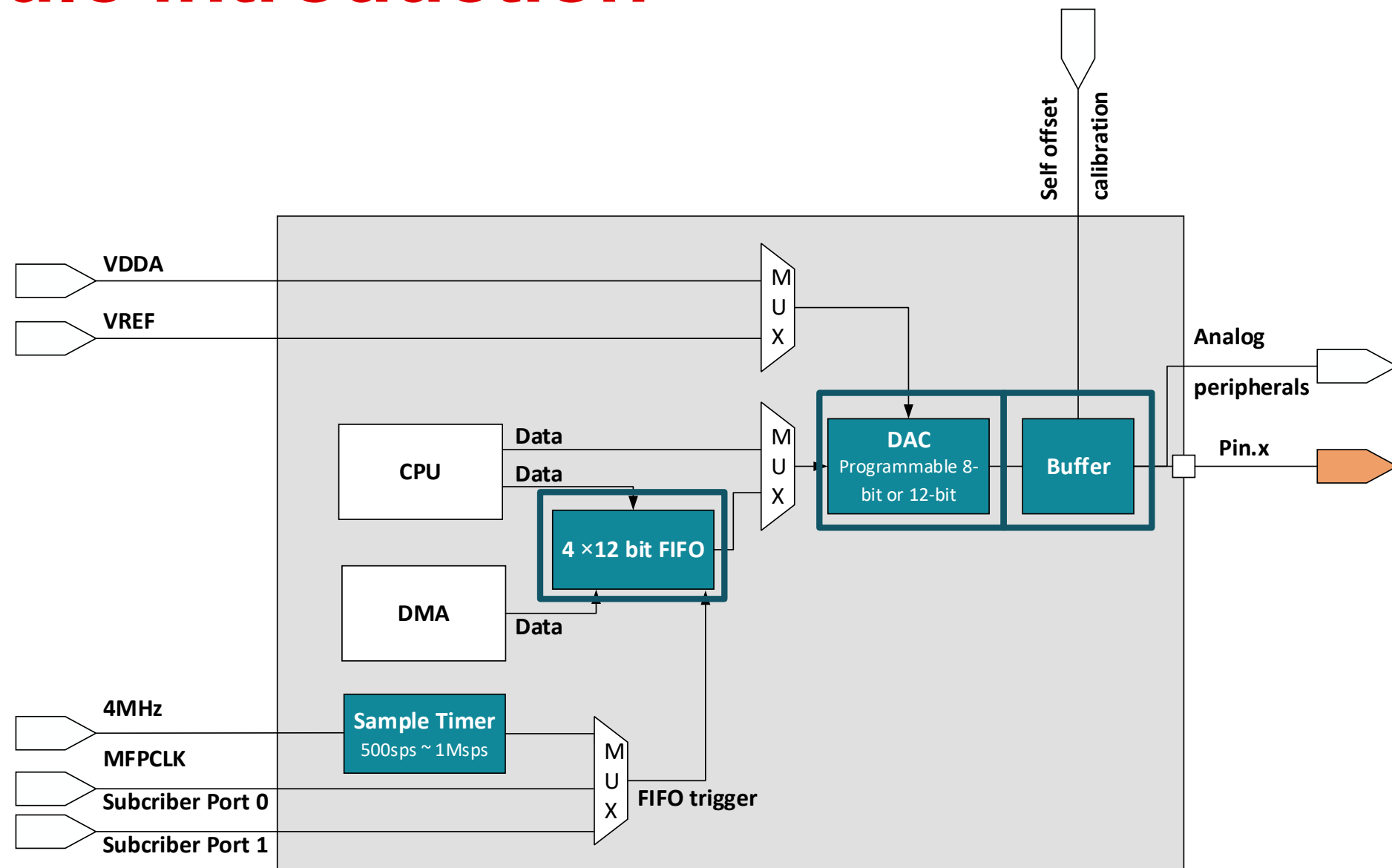
MSPM0 DAC12 module introduction

Key Features

- **8-bit or 12-bit** voltage-output resolution
- Predefined sampling rates with Internal sample timer
- **4x12-bits internal FIFO** for data flow rate control
- **Self-calibration** option for offset error correction
- Output internally connected to analog modules like OPA, ADC and COMP

Differences between G and L MCUs

- MSPM0G350x MCUs have DAC12



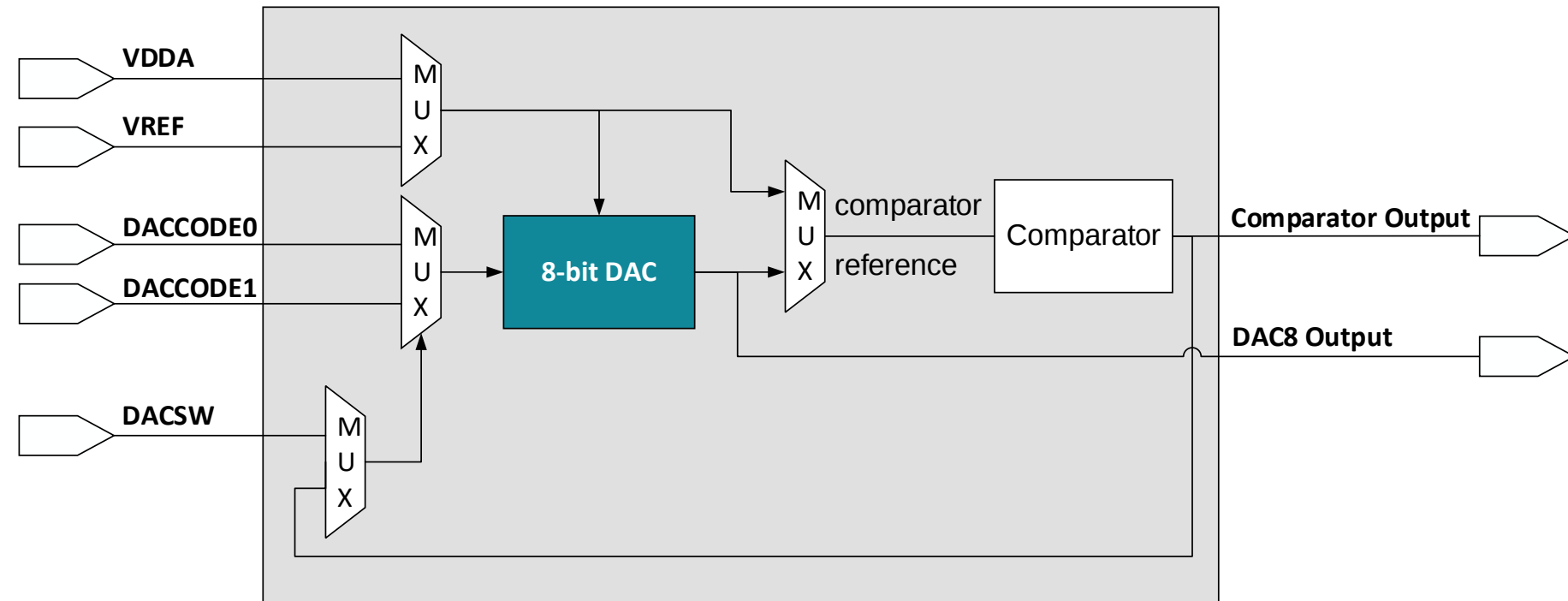
MSPM0 DAC8 module introduction

Key Features

- Reference Generator including **8bit** DAC
- Output internally connected to analog modules like OPA, and COMP

Differences between G and L MCUs

- MSPM0G350x MCUs' DAC8 get voltage from Vref or VDD
- MSPM0L130x MCUs' DAC8 get voltage from VDD



DAC module quick start

Academy

[DAC introduction lab](#)

Driverlib Examples

MSPM0G350x:

- comp_dac_to_timer_event
- comp_hs_dac_vref_external
- comp_lp_dac_vref_internal
- dac12_dma_sampletimegen
- dac12_fifo_sampletimegen
- dac12_fifo_timer_event
- dac12_fixed_voltage_vref_internal
- opa_dac8_output_buffer
- opa_inverting_pga_with_dac

MSPM0L13xx:

- comp_dac_to_timer_event
- comp_hs_dac_vref_external
- opa_dac8_output_buffer

Related Links

[MSPM0 online resource](#)

[MSPM0 quick start guide](#)

[MSPM0 Sysconfig user's guide](#)

[MSPM0G350x datasheet](#)

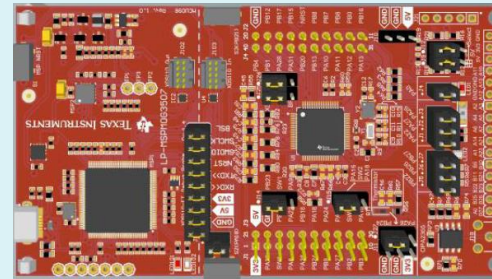
[MSPM0L13xx datasheet](#)

[MSPM0Gxx technical reference manual](#)

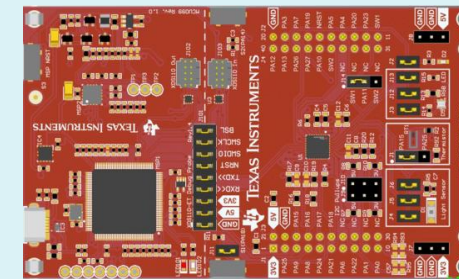
[MSPM0Lxx technical reference manual](#)

Launchpad

[LP-MSPM0G3507](#)



[LP-MSPM0L1306](#)



Sysconfig Entrance for DAC Setting

Step1:

Step2:

The screenshot shows the Sysconfig GUI for configuring the DAC12 module. On the left, the 'MSPM0 DRIVER LIBRARY' tree is expanded, and 'DAC12' is selected. On the right, the 'DAC12 (1 of 1 Added)' section shows 'DAC12_0' added. The 'Quick Profiles' section is expanded, and 'Basic Operation Configuration' is selected.

To find more MSPM0 training series, please visit:

- [Tl.com.cn](http://ti.com.cn)
- [WeChat \(德州仪器公众号\)](#)
- [Bilibili](#)
- [21IC](#)