

Application Report

AM64x/AM243x Power Estimation Tool



ABSTRACT

The power estimation spreadsheet provides power consumption estimates based on measured and simulated data; they are provided “as is” and are not guaranteed within a specified precision. Power consumption depends on electrical parameters, silicon process variations, environmental conditions, and use cases running on the processor during operation. Actual power consumption should be verified in the real system. This tool is meant for estimating power consumption during realistic operating modes; it is not intended for power supply sizing. This power estimation spreadsheet is preliminary and subject to change.

The spreadsheet mentioned in this document can be downloaded from [the following URL](#).

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Trademarks

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1 Using the Power Estimation Tool

The input part of the spreadsheet consists of six sections: Operating Performance Point, Processor Core Utilization, LVC MOS IO, Peripheral, Estimated Power, and General. To use the input part the spreadsheet, users must modify the fields with their appropriate usage parameters. Cells designed for user input are in blue. Fields that cannot be modified are red. Fields in green are the output calculated power. Configure the blue cells to a value most closely aligned with your intended scenario.

The purpose of each of the four sections is:

- Operating Performance Point: Configure frequency of operation for A53s, R5s, M4, and ICSSGs.
- Processor Core Utilization: User estimated percent utilization of each core.
- LVC MOS IO: Subset of commonly used IO with selectable mode and percent utilization.
- Peripherals: Other peripherals with selectable mode and percent utilization.
- General: High level system configuration.
- Estimated Power: Power estimation output by rail. Power rails are aligned with EVM design. Selectable VDD_CORE.

1.1 Operating Performance Point (OPP)

This section allows to set the operating frequency of each of the compute cores and clusters.

- A53: 25 MHz to 1000 Mhz, depending on PLL resolution frequency step.
- R5F: 25 MHz to 800 MHz, depending on PLL resolution frequency step.
- M4F: 200 MHz or 400 MHz.
- ICSSG: 200 MHz, 225 MHz, 250 MHz, or 333 MHz.

1.2 Processor Core Utilization

This section lets you load each compute core with utilization between 0%-100% (inclusive). For guidance, 0% is an “off” or “unused” state. 1% is “idle”. 100% is maximum utilization (i.e. Dhrystone). For AM243x devices, A53 utilization should be set to 0% since this domain is off.

1.3 LVC MOS IO

This section allows you to select both Mode and Utilization of a subset of commonly used IO’s on the AM64x/AM243x, including UART (3.3 V), SPI (3.3 V), Ethernet (3.3 V), OSPI (1.8 V), and GPMC (3.3 V).

Note

This is not the complete set of IO’s possible on the AM64x/AM243x, and any IO configuration must be confirmed through the [AM64x or AM243x pinmux tool](#). These are dual voltage IO domains (1.8 V or 3.3 V), but currently are fixed to match the EVM design.

- Mode: IO dependent mode and operating speed.
- Utilization (%): Specifies the utilization as a percentage of activity relative to a full load condition.
- For AM243 ALX device, use the settings in the following table.

AM243 ALX LVC MOS IO	Mode	Utilization
OSPI	Only QSPI selections valid	
GPMC	OFF	0%

1.4 Peripherals

This section allows you to select both Mode and Utilization of the other peripherals on the AM64x/AM243. Other peripherals include DDR, High Speed IO (PCIe, USB3), USB2, SD card, eMMC, and ADC.

- Mode: Peripheral dependent operating mode.
- Utilization (%): Specifies the utilization as a percentage of activity relative to a full load condition.
- For AM243 ALX device, use the settings in the following table.

AM243 ALX Peripherals	Mode	Utilization
DDR Type/Rate	OFF	0%
DDR WR%	0%	

AM243 ALX Peripherals	Mode	Utilization
High Speed IO	OFF	0%
eMMC	OFF	0%

1.5 General

This section lets you select junction temperature (not ambient temperature) and power estimation mode.

- Junction Temperature (°C): 0 to 105 approximate junction temperature
- Power Estimation Mode: Typ or Max ('Typ' is the typical power consumption of most devices. 'Max' is the worst-case possible due to silicon variation).

1.6 Estimated Power Consumption

The power estimation tool generates a power analysis report in this section. There is a selectable field for the two modes of operation of VDD_CORE. The report lists power supply name, voltage in Volts (V), and power consumption in Watts (W) per power rail groups. Power rail groups match the AM64x and AM243x EVM design.

Note

The VDD_DDR4 estimated power is from AM64x and AM243x ALV SOC only, on the EVM this rail includes both SOC and external DDR device power. The total power consumption in Watts (W) is listed at the end of the table.

- VDD_CORE: 0.75 V or 0.85 V for AM64x
- VDD_CORE: 0.85 V for AM243x

2 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from January 29, 2021 to June 30, 2021 (from Revision * (January 2021) to Revision A (June 2021))

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