Application Note

AM263x 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 ensured 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. This spreadsheet can be downloaded from the web at: https://www.ti.com/lit/zip/SPRR464.

Note

This is a preliminary tool and TI is continuing to characterize more devices; therefore, data is updated and the Power Estimation Tool (PET) revised along with new findings.

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1 Using the Power Estimation Tool

The input part of the spreadsheet consists of following 3 sections: Processing Elements, Interfaces and Power Report.

To use the input part the spreadsheet, users must modify the fields with their appropriate usage parameters. Cells designed for user input are in Yellow. Fields that cannot be modified are Gray. Fields in blue are the output calculated power. Configure the yellow cells to a value most closely aligned with your intended scenario.

The purpose of each of these sections is:

- Processing Elements:
  - Configure frequency of operation for R5F Dual Core 0, R5F Dual Core 1, HSM M4, ICSSM and CPSW
  - Mode of operation for R5F and HSM (Hardware Security Module)
  - User estimated percent utilization of each core
- Interfaces
  - Subset of commonly used major Interfaces with selectable mode
  - Subset of commonly used major Interfaces with percent utilization
- Power Report:
  - Selectable VDD, VDD_SRAM, VDDA
  - Power estimation output by rail
  - Power rails are aligned with AM263x Control card design

2 Processing Elements

This section allows you to set the operating frequency, mode and load each compute core with utilization between 0%-100% (inclusive). Table 2-1 lists the selectable options.

Table 2-1. Selectable Options for Frequency, Mode and Utilization

Processing Element	Frequency	Mode	Utilization
HSM (Hardware Security Module)	N/A	Secure Boot, Run Time Services	0% – 100%
R5F Dual Core 0	400 MHz, 200 MHz, 0 MHz	Dual, Lockstep	0% – 100%
R5F Dual Core 1	400 MHz, 200 MHz, 0 MHz	Dual, Lockstep	0% – 100%
ICSSM	200 MHz	N/A	0% – 100%
CPSW	200 MHz	N/A	0% – 100%

3 Interfaces

This section lets you select both modes and utilization of subset of the commonly used interfaces on AM263x including CMPSS, DAC, ADC, QSPI, PWM, Ethernet, MCAN, MCSPI. Table 3-1 lists the selectable options.

Table 3-1. Selectable Options of Mode and Utilization

Interface	Mode	Utilization
CMPSS	on_3p3v, unused, off	0%-100%
ADC	on_3p3v, unused, off	0%-100%
DAC	on_3p3v, unused, off	0%-100%
Ethernet_0 & Ethernet_1	RGMII, RMII, MII, 10, 100, 3.3 V, Off, Unused	0%-100%
QSPI	Controller, Peripheral, 80 MHz, 60 MHz, 40 MHz	0%-100%
GPMC	16b, 3v3 100 Mhz	0%-100%
ECAP	Capture, PWM Out , 3v3	0%-100%
EPWM	on_3p3v, unused, off	0%-100%
MCAN	250 kbps, 1,5, 8 mbps, 3.3 V, Off, Unused	0%-100%
MCSPI	Controller, Peripheral, 1.563, 2.083, 3.125, 6.25, 12.5, 25, 40 mbps, 3.3 V, Off, Unused	0%-100%

4 Power Report

The power estimation tool generates a power analysis report in this section. 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 AM263x CC/LP design.

There is a selectable field for the junction temperature configuration:

Temperature (T_j °C): -40, 0, 25, 85, 105, 125, 140, 150.

Also, Table 4-1 shows the selectable fields for the following power rails options.

Table 4-1. Selectable Fields for Power Rails

Voltage Rail	Selectable Options (V)
VDD	1.15, 1.175, 1.20,1.23, 1.25,1.28, 1.30
VDD_SRAM	1.15, 1.175, 1.20,1.23, 1.25,1.28, 1.30
VDDA	3.135,3.3,3.465

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