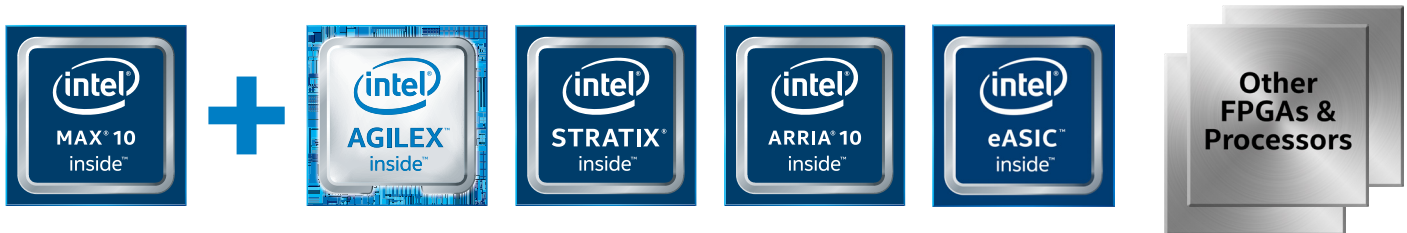


# Multi-Rail Power Sequencer and Monitor

Correctly sequence and monitor power rails for FPGA, ASIC, SoC, CPU, etc.



## Why is Power Sequencing Required for FPGA, ASIC, CPU, and other processors?

- To avoid contention on signals as the board is powered on and off
- To prevent excessive current draw
- To prevent latch-up, reduced reliability, or damage to devices
- To address power-down sequencing requirements during sudden loss of power, or brownout

## What is the Intel® Multi-Rail Power Sequencer and Monitor?

It is a programmable module residing in the Intel® MAX® 10 device providing the ability to monitor and correctly sequence power rails for FPGAs, ASICs, SoCs, CPUs, and other processors.

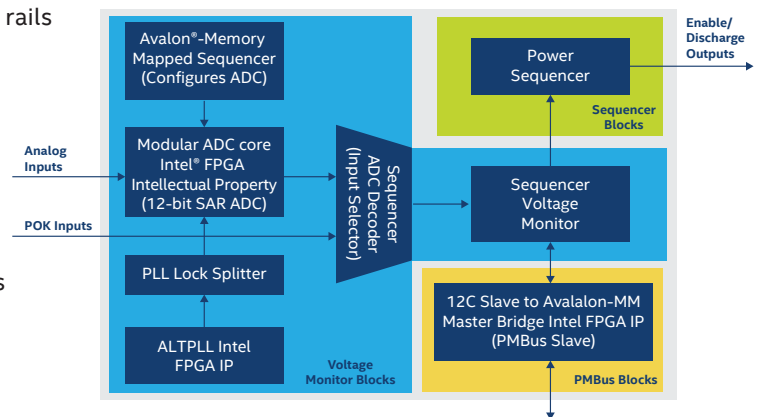
### Features:

- Ability to sequence and monitor any combination of up to 144 rails
- Easily configurable via the Platform Designer graphical user interface (GUI)
- Scalable design with multiple levels of functionality allowing flexibility between cost and functionality
- PMBus™ 1.2 compliant slave interface to provide real-time information about your system
- Configurable delays between sequencing of rails, qualification window, and retries

## What are the competitive advantages of the Intel Multi-Rail Power Sequencer and Monitor?

It is a programmable module residing in the Intel® MAX® 10 device providing the ability to monitor and correctly sequence power rails for FPGAs, ASICs, SoCs, CPUs, and other processors.

- Cost competitive<sup>1</sup>
- Up to 144 power rails can be controlled and monitored
- Unique ability to simulate power sequencer behavior
- Options to add in other functions to the FPGA (more functions / less devices)
  - Ability to address unique power control requirements
  - Custom security control
  - Fan speed and case temperature monitoring
  - Watchdog timers
  - And more...



<sup>1</sup>If not implementing voltage monitoring, then the GUI can be used in Intel FPGAs other than the Intel MAX 10 FPGA. Pricing compared to competition is based on DigiKey, quantity of 1 as of August 2019.

## Example Pricing for Intel® MAX® 10 FPGAs

Intel® MAX® 10 FPGA Part Number <sup>2</sup>	Price <sup>3</sup> <i>Based on quantity of 1</i>	Price <sup>3</sup> <i>Based on quantity of 500</i>
10M02DCV36C8G	\$3.78	\$2.84
10M02DCV36C7G	\$4.20	\$3.15
10M04SCU169C8G	\$9.60	\$7.22
10M04SCM153C8G	\$10.89	\$8.17

<sup>2</sup>The part numbers provided here are by no means exclusive. Please refer to the Intel MAX 10 FPGA page to view a full list of available devices and to determine which one best meets your needs.

<sup>3</sup>Pricing as of December 2019. See legal disclaimers below.

## Resources

Learn more about Intel® MAX 10 FPGAs: [www.intel.com/max10](http://www.intel.com/max10)

Download the Multi-Rail Power Sequencer and Monitor GUI:

[https://plan.seek.intel.com/psg\\_WW\\_psgao3\\_LPPD\\_EN\\_2019\\_GUIDownload](https://plan.seek.intel.com/psg_WW_psgao3_LPPD_EN_2019_GUIDownload)

Read the App Note: <https://www.intel.com/content/dam/www/programmable/us/en/pdfs/literature/an/an896.pdf>

Learn more about powering your systems easily with Intel® Enpirion® Power: [www.intel.com/power](http://www.intel.com/power)



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<sup>†</sup> Tests measure performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit [www.intel.com/benchmarks](http://www.intel.com/benchmarks).

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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