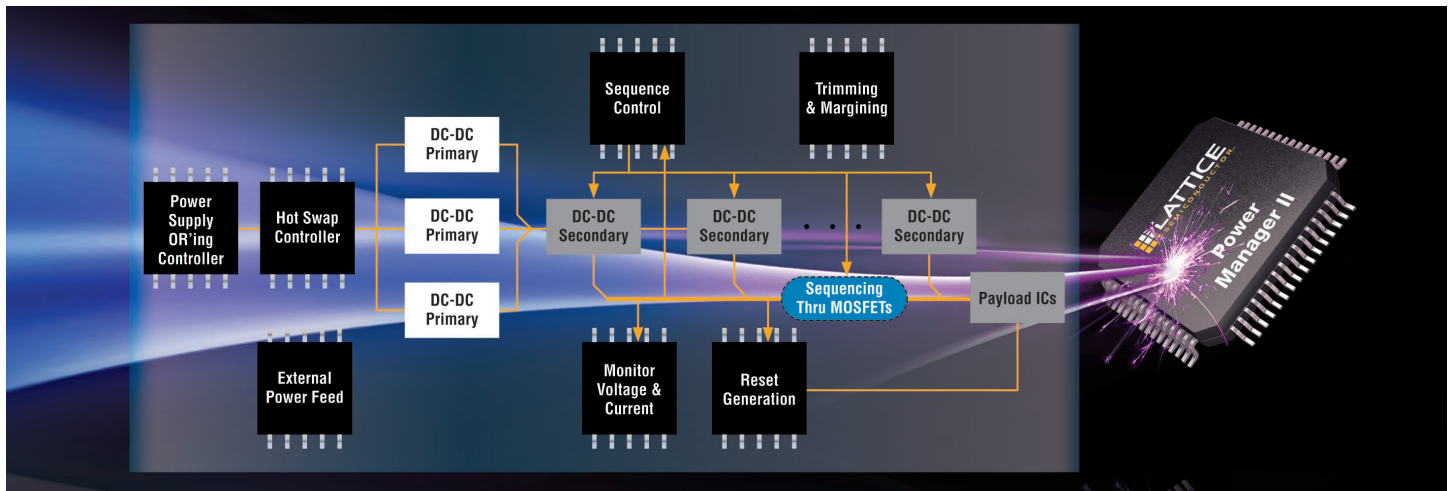


Power Manager II

Integrate Common Board Power Management Functions



Lattice's Power Manager II devices feature an innovative programmable core and precision analog sensors to reduce component count and increase reliability. Power Manager II devices significantly reduce cost by integrating power management board functions such as hot-swap controllers, power supply OR'ing, sequencing, voltage monitoring, reset generation, trimming, margining, and more. The resulting solution can be customized to meet the needs of a wide variety of circuit boards as opposed to using many types of single function ICs. And Lattice programmability enables power management designs to meet changing requirements without major circuit redesign or a board re-spin.

Power Manager II – A Superior Solution

■ Cost Savings Through Integration

- Significantly reduce cost per function by integrating hot-swap controller, OR'ing controller, power feed, sequencing controller, reset generator, voltage/current measurement and trimming and margining functions

■ Increased Reliability

- Supervise every supply
- 0.2% accuracy (typ.)
- Differential measurement
- Respond to events in <65µs
- Reduced component count
- Power management algorithm is ruggedized through simulation

■ Reduced Risk

- Device configuration stored in on-chip non-volatile memory
- Change trip points, timing and sequencing without board re-spins
- Use JTAG to make updates after assembly
- Power management algorithm is implemented using software

Key Features and Benefits

- **Up to 12 Differential Voltage Sensors for Monitoring**
 - Immune to noise on ground plane
 - Improved monitoring and measurement accuracy
 - Power supply voltage trimming to within 1%
- **Dual, Precision Programmable Comparator per Input**
 - Reliable board operation and fast fault detection
 - Over-voltage, under-voltage and window flags
- **Ruggedized CPLD with Up to 48 Macrocells for Sequencing and Supervisory Signal Logic**
 - Large operating power supply range (3.3V + 20% to 3.3V - 15%)
 - High glitch immunity
 - Efficient logic implementation
 - Able to integrate multiple power management functions
- **Up to 4 High-Voltage MOSFET Driver Outputs**
 - Provide power supply ramp rate control
 - Implement hot swap, OR'ing and power feed functions
- **Voltage Measurement with 10-bit ADC through I2C**
 - Used for digital closed loop trimming
- **Up to 8 On-chip DACs for Margining and Trimming**
 - Convenient supply trimming/margining control
 - Increase output voltage accuracy to 1%
- **I2C Bus Interface**
 - Control power supply sequence
 - Measure voltage through ADC
 - Closed loop power supply control via DAC
- **32-Pin QFN, 48-Pin TQFP, 100-Pin TQFP Industrial Temperature**
- **JTAG In-System Programmable with Non-Volatile E2CMOS® Configuration Storage**

Power Manager II Selector Guide

Application Cross Reference Guide by Device

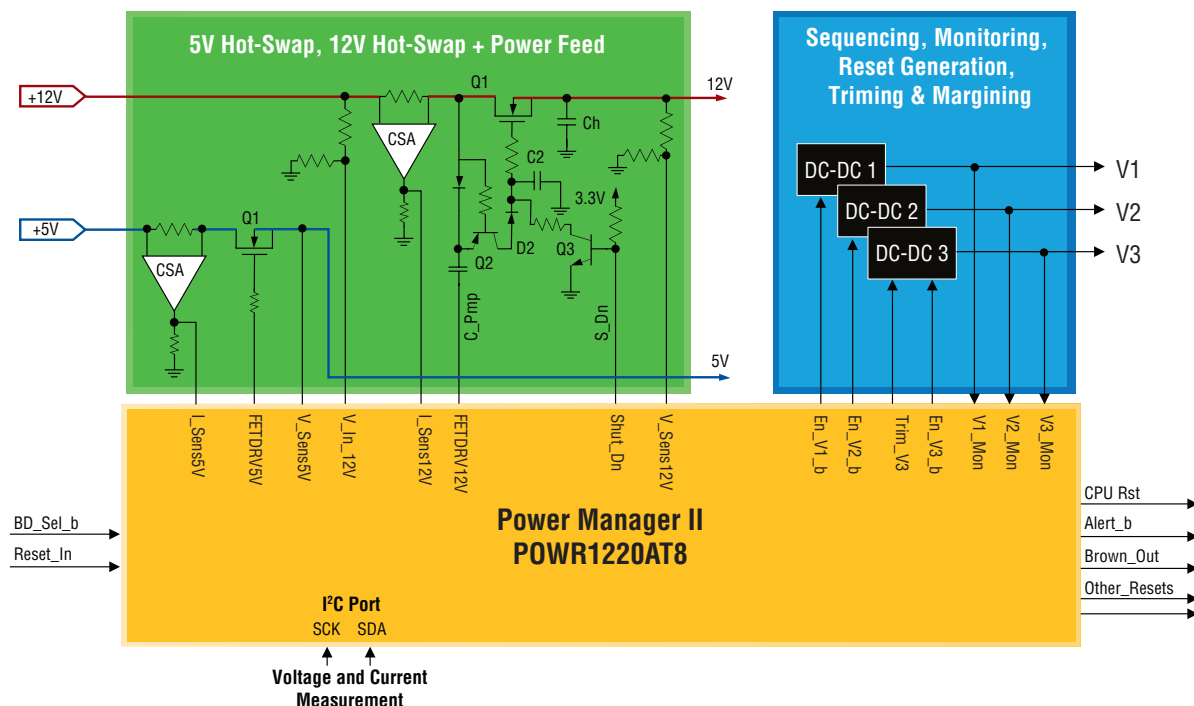
		Power Manager II Device Family				
	Function	ProcessorPM	POWR607	POWR1014	POWR1014A	POWR1220AT8
Hot Swap to External Systems	-48V Hot-Swap Controller (Payload - isolated)		✓			
	+12 / 24V Hot-Swap Controller		✓	✓	✓	✓
Power Feed to External Systems	-48V Supply Feed		✓			
	+12/24V Supply Feed		✓	✓	✓	✓
Redundant Supply Selection	-48V Supply OR'ing Using MOSFET (Payload - Isolated)		✓			
	+12/24V Supply OR'ing Using MOSFET		✓	✓	✓	✓
Payload (Secondary) Power Management	Supply Sequencing		✓	✓	✓	✓
	Voltage Supervision	✓	✓	✓	✓	✓
	Reset Generation	✓	✓	✓	✓	✓
	Watchdog Timer	✓	✓	✓	✓	✓
	Voltage Measurement Using ADC				✓	✓
	Power Supply Margining					✓
	Power Supply Voltage Trimming					✓

Power Manager II Device Selection by Number of Rails

		Number of Rails on Board				Comments
Function		<3	3 to 5	5 to 8	>8	
Reset Generation		-	ProcessorPM™	POWR1014	POWR1220AT8	Power Manager II devices in these rows can integrate all functions listed above in their respective column
Voltage Supervision		-	ProcessorPM	POWR1014	POWR1220AT8	
Watchdog Timer		-	ProcessorPM	POWR1014	POWR1220AT8	
Minimal Sequencing <3 Groups		-	ProcessorPM	POWR1014	POWR1220AT8	
Individual Supply Sequencing Control		ProcessorPM	POWR607	POWR1220AT8	POWR1220AT8	
Hot-Swap Controller +5 or 12 or 24V		POWR607	POWR1014	POWR1220AT8	POWR1220AT8	
Redundant Power Management 5/12/24V		POWR607	POWR1014	POWR1220AT8	POWR1220AT8	
I ² C, ADC Measurement		POWR1014A	POWR1014A	POWR1220AT8	POWR1220AT8	
Supply Margining/Trimming		POWR1220AT8	POWR1220AT8	POWR1220AT8	POWR1220AT8	
-48V Primary Supply Management	Hot-Swap Controller -48V	POWR607	POWR607	POWR607	POWR607	-
	Redundant Power Management -48V	POWR607	POWR607	POWR607	POWR607	-
	Power Feed -48V	POWR607	POWR607	POWR607	POWR607	-

Applications

Power Manager II Application Example



Hot-Swap Controller Features

Low starting current, backplane voltage dip upon card insertion – almost eliminated, reduced hold-off capacitor size, short circuit protection, over current protection, retry on fault, isolate card upon secondary fault, operating power measurement.

Power Feed Features

Over current protection, fast shut down (<1μs) under short circuit conditions, over/under current fault indication, retry on fault.

Voltage and Current Monitoring Features

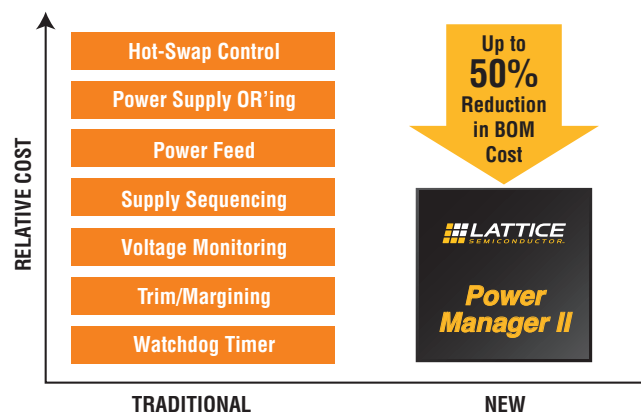
Programmable thresholds with an accuracy of 0.2% (typ.), detects faults on any rail (up to 12) in less than 64μs, monitors voltages down to 0.67V – immune to ground voltage differences due to differential sensing.

Supply Sequencing Features

Completely programmable power up and power down sequencing, shutdown sequencing upon fault, event driven sequencing, programmable thresholds, time periods.

Power Manager II Integration

Function	% of Total Cost (1KU)
Hot-Swap	30%
Supply OR'ing	16%
Power Feed Control	13%
Supply Sequencing	31%
Voltage Monitoring	7%
Watchdog Timer	3%
Traditional Solution Total Cost	100%
Power Manager II Based Solution Cost	50%



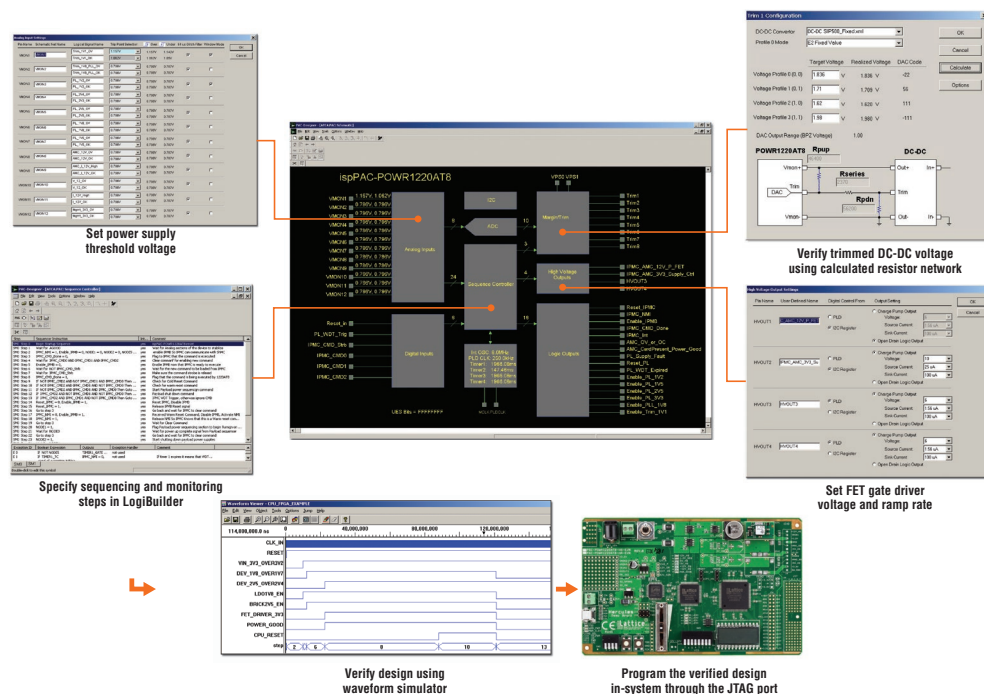
Power Manager II Family

Parameter	POWR1220AT8	POWR1014A	POWR1014	POWR607	ProcessorPM
Number of Analog Input Pins	12	10	10	6	6
Number of Programmable Comparators	24	20	20	6	6
Trip Points per Input	368	368	368	192	192
Typical Precision	0.2%	0.3%	0.3%	0.5%	0.5%
Lowest Supply Voltage Monitored	0.7V	0.7V	0.7V	0.7V	0.7V
Power-off Detection	75mV	75mV	75mV	75mV	75mV
Number of CPLD Macrocells	48	24	24	16	16
Number of Outputs	20 + 8 Trim Outputs	14	14	7	5
Number of FET Drivers	4	2	2	2	—
Number of TrimCells	8	—	—	—	—
ADC Resolution	10 Bits	10 Bits	—	—	—
I ² C Support	Yes	Yes	—	—	—
Operating Voltage	2.8V to 3.9V	2.8V to 3.9V	2.8V to 3.9V	2.6V to 3.9V	2.6V to 3.9V
Package	100-Pin TQFP	48-Pin TQFP	48-Pin TQFP	32-Pin QFN	24-Pin QFN
Ordering Part Number	ispPAC®-POWR 1220AT8-02T100I	ispPAC-POWR 1014A-02T48I	ispPAC-POWR 1014-02T48I	ispPAC-POWR 607-01N32I	ispPAC-POWR 605-01N24I

Design Made Simple with PAC-Designer Software

PAC-Designer® software supports the Power Manager II family of devices and includes both the digital logic fitter and waveform simulators, offering the convenience of design and verification

of the power sequencing and monitoring circuit using PC-based software. The verified design can be downloaded into a Power Manager II device through the PC's USB port using a USB Cable.



Applications Support
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July 2013
Order #: I0178G