

# ***Product Selector Guide***

**July 2011**



FPGA • CPLD • MIXED SIGNAL • INTELLECTUAL PROPERTY • DEVELOPMENT KITS • DESIGN TOOLS

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Lattice Semiconductor designs, develops and markets a diverse portfolio of low-power, high-value, programmable solutions. Lattice is committed to offering engineers a complete support ecosystem for their system designs, including silicon, design software tools, IP cores, reference designs, development kits and evaluation boards.

### **FPGA, PLD and Mixed Signal Products**

Lattice FPGA (Field Programmable Gate Array) solutions deliver unique features, low power, and excellent value for FPGA designs. We are also the leading supplier of low-density CMOS PLDs, and our CPLD and SPLD solutions deliver an optimal fit for a variety of PLD design challenges.

Our Power Manager II and ispClock™ mixed signal product families feature a combination of programmable logic and programmable analog circuitry that allows system designers to reduce system cost and design time by quickly and easily integrating a wide variety of power and clock management functions within a single integrated circuit. These products can replace numerous discrete components, reducing cost and conserving board space, while providing users with additional design flexibility and time-to-market benefits.

### **Software and Intellectual Property**

Our Lattice Diamond development tool suite, PAC-Designer software, and IP core program allow users to easily design and configure our devices for their unique system requirements.

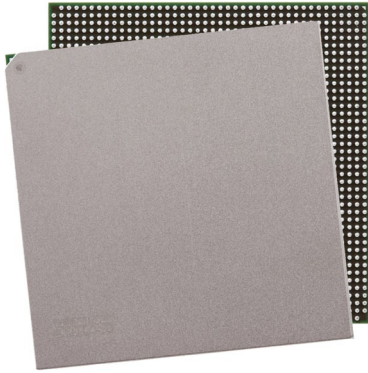
Lattice Diamond software tools enable users to synthesize a design, perform analysis, debug, and download a logic configuration to our FPGA devices, while PAC-Designer software is used in the design of our mixed signal products.

Lattice's IP core program, LatticeCORE™, provides pre-tested, reusable functions, allowing designers to focus on their unique system architectures. These IP cores provide industry-standard functions including PCI Express, DDR, Ethernet, CPRI, Serial RapidIO 2.1, SPI4, and embedded microprocessors. In addition, a number of independent IP providers have teamed with Lattice to offer additional high quality, reusable IP cores. Partners are selected for their industry leadership, high development standards, and commitment to customer support.

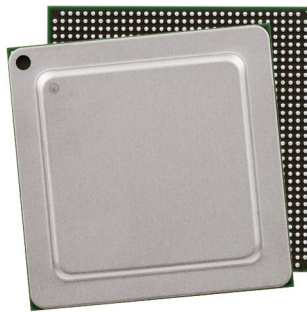
For more information go to [latticesemi.com](http://latticesemi.com)

## Organic Flip Chip BGA

**1704-Ball  
Organic fcBGA**  
42.5 x 42.5 mm  
2.90 mm height  
1.00 mm pitch



**1152-Ball  
Organic fcBGA**  
35 x 35 mm  
3.15 mm height  
1.00 mm pitch

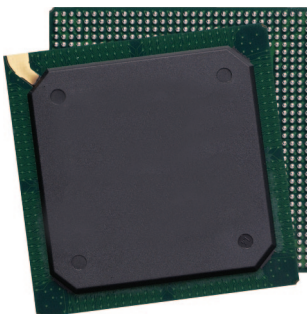


**1020-Ball  
Organic fcBGA  
Revision 2**  
33 x 33 mm  
2.90 mm height  
1.00 mm pitch

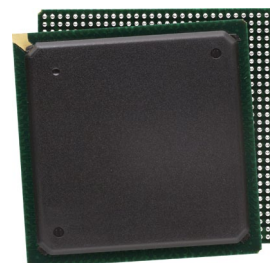


## Fine Pitch BGA

**1152-Ball fpBGA  
1156-Ball fpBGA**  
35 x 35 mm  
2.25 mm height  
1.00 mm pitch

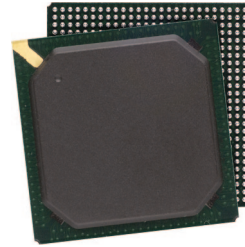


**900-Ball fpBGA**  
31 x 31 mm  
2.15 mm height  
1.00 mm pitch

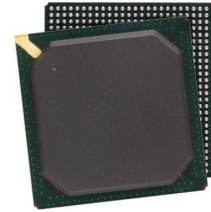


## Fine Pitch BGA

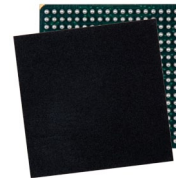
**672-Ball fpBGA**  
27 x 27 mm  
2.15 mm height  
1.00 mm pitch



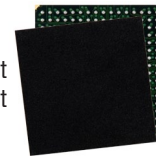
**484-Ball fpBGA**  
23 x 23 mm  
2.15 mm height  
1.00 mm pitch



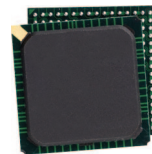
**324-Ball ftBGA**  
19 x 19 mm  
1.50 mm height  
1.00 mm pitch



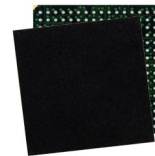
**256-Ball ftBGA**  
17 x 17 mm  
Option 1: 1.50 mm height  
Option 2: 1.70 mm height  
1.00 mm pitch



**256-Ball fpBGA**  
17 x 17 mm  
1.70 mm height  
1.00 mm pitch

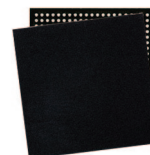


**208-Ball ftBGA**  
17 x 17 mm  
1.50 mm height  
1.00 mm pitch

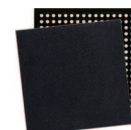


## Chip Array BGA

**332-Ball caBGA**  
17 x 17 mm  
1.50 mm height  
0.80 mm pitch



**256-Ball caBGA**  
14 x 14 mm  
1.50 mm height  
0.80 mm pitch



Note: Packages shown actual size.

## QFNs

### 64-Pin QFNs

9 x 9 mm  
0.90 mm height  
0.50 mm pitch



### 48-Pin QFNs

7 x 7 mm  
0.90 mm height  
0.50 mm pitch



### 32-Pin QFNs

5 x 5 mm  
0.85 mm height  
0.50 mm pitch



### 24-Pin QFNs

4 x 4 mm  
0.90 mm height  
0.50 mm pitch



## Chip Scale BGA

### 100-Ball csBGA 132-Ball csBGA

8 x 8 mm  
1.23 mm height  
0.50 mm pitch



### 144-Ball csBGA

7 x 7 mm  
1.00 mm height  
0.50 mm pitch



### 56-Ball csBGA

6 x 6 mm  
1.23 mm height  
0.50 mm pitch



### 64-Ball csBGA

5 x 5 mm  
1.00 mm height  
0.50 mm pitch



## Ultra Chip Scale BGA

### 132-Ball ucBGA

6 x 6 mm  
1.00 mm height  
0.40 mm pitch



### 64-Ball ucBGA

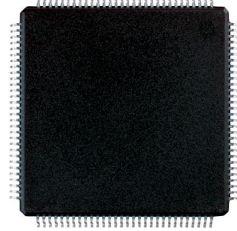
4 x 4 mm  
1.00 mm height  
0.40 mm pitch



## TQFP/PQFP

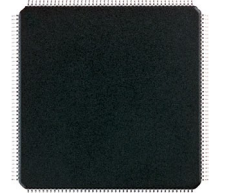
### 208-Pin PQFP

28 x 28 mm (body)  
3.40 mm height  
0.50 mm pitch



### 176-Pin TQFP

24 x 24 mm (body)  
1.40 mm height  
0.50 mm pitch



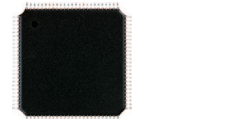
### 144-Pin TQFP

20 x 20 mm (body)  
1.40 mm height  
0.50 mm pitch



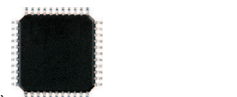
### 100-Pin TQFP

14 x 14 mm (body)  
1.4 mm height  
0.50 mm pitch (100 TQFP)  
0.40 mm pitch (128 TQFP)



### 44-Pin TQFP 64-Pin TQFP

10 x 10 mm (body)  
1.00 mm height (44 TQFP)  
1.40 mm height (44 TQFP)  
1.40 mm height (64 TQFP)  
0.80 mm pitch (44 TQFP)  
0.50 mm pitch (64 TQFP)



### 48-Pin TQFP

7 x 7 mm (body)  
1.00 mm height  
1.40 mm height  
0.50 mm pitch



## Wafer Level Chip Scale

### 49-Ball WLCSP

3.1 x 3.1 mm  
0.59 mm height  
0.40 mm pitch



### 25-Ball WLCSP

2.5 x 2.5 mm  
0.59 mm height  
0.40 mm pitch



## RoHS Compliant and Halogen-Free Packaging



Lattice Semiconductor is a leader in the development of lead-free and halogen-free packaging solutions. Both are RoHS compliant.

For further information, see the RoHS Compliant Packaging web page at: [www.latticesemi.com/rohs](http://www.latticesemi.com/rohs).

Users requiring leaded packaging are requested to contact their local Lattice sales office.

## Package Diagrams

For detailed package schematics, download the *Package Diagrams* document at [www.latticesemi.com/packaging](http://www.latticesemi.com/packaging).

## Reflow Guidelines & Moisture Sensitivity

For information on solder reflow and rework processes for Lattice surface mount products, download TN1076, *Solder Reflow Guide for Surface Mount Devices* from the Lattice web site at [www.latticesemi.com/solderreflow](http://www.latticesemi.com/solderreflow).

## Board Layout Recommendations



TN1074, *PCB Layout Recommendations for BGA Packages*, describes some of the most common problems encountered when working with BGA packages and provides tips for avoiding them at the design stage. Download TN1074 from the Lattice web site at [www.latticesemi.com/boardlayout](http://www.latticesemi.com/boardlayout).

For more information and design examples see the PCB Design Support web page at [www.latticesemi.com/pcbdesignsupport](http://www.latticesemi.com/pcbdesignsupport).

Note: Packages shown actual size.

# FPGA Products

Product Family	Device	K LUTs	EBR SRAM		Distrib. RAM	UFM	sysDSP™ Blocks		SERDES		PLL + DLL	DDR Support	External Boot Flash	Internal Boot Flash	Dual Boot	Bitstream Encryption	Embedded Function Blocks	Process	
			# Blocks	kbits	kbits		kbits	18x18 #Blocks	Multipliers	Max. Chan.									Max. Rate
LatticeECP3™	LFE3-17EA	17	38	700	36		12	24	4		2+2	DDR3 800 DDR2 533 DDR 400	✓		✓	✓		65nm	
	LFE3-35EA	33	72	1,327	68		32	64		4+2									
	LFE3-70EA	67	240	4,420	145		64	128	12		10+2								
	LFE3-95EA	92	240	4,420	188		64	128											
	LFE3-150EA	149	372	6,850	303		160	320	16										
LatticeECP2/M	LFE2M20E/SE	19	66	1,217	41		6	24	4		3.2G	8+2	DDR2 533 DDR 400	✓		SE only		90 nm	
	LFE2M35E/SE	34	114	2,101	71		8	32											
	LFE2M50E/SE	48	225	4,147	101		22	88	8										
	LFE2M70E/SE	67	246	4,534	145		24	96											
	LFE2M100E/SE	95	288	5,308	202		42	168	16										
	LFE2-6E/SE	6	3	55	12		3	12											
	LFE2-12E/SE	12	12	221	24		6	24											
	LFE2-20E/SE	21	15	276	42		7	28		2+2									
	LFE2-35E/SE	32	18	332	64		8	32											
	LFE2-50E/SE	48	21	387	96		18	72		4+2									
LFE2-70E/SE	68	60	1,032	136		22	88		6+2										
LatticeECP/EC	LFEC1E	1	2	18	6						2+0	DDR 400	✓				130nm		
	LFEC3E	3	6	55	12														
	LFEC6E	6	10	92	25			4	16										
	LFECP6E																		
	LFEC10E	10	30	276	41			5	20										
	LFECP10E																		
	LFEC15E																		
	LFECP15E	15	38	350	61			6	24										
	LFEC20E																		
	LFECP20E	20	46	424	79			7	28										
LFEC33E																			
LFECP33E	33	54	498	131			8	32											
LatticeSC/M	LFSC3GA15E	15	56	1,030	240				8									4	90nm
	LFSCM3GA15EP1																		
	LFSC3GA25E	25	104	1,920	410				16									6	90nm
	LFSCM3GA25EP1																		
	LFSC3GA40E	40	216	3,980	650				32									10	90nm
	LFSCM3GA40EP1																		
	LFSC3GA80E	80	308	5,680	1,280													10	90nm
	LFSCM3GA80EP1																		
	LFSC3GA115E	115	424	7,800	1,840													12	90nm
LFSCM3GA115EP1																			
LatticeXP2™	LFXP2-5E	5	9	166	10		3	12			2+0	DDR/2 400	✓	✓	✓	✓		90nm	
	LFXP2-8E	8	12	221	18		4	16											
	LFXP2-17E	17	15	276	35		5	20		4+0									
	LFXP2-30E	29	21	387	56		7	28											
	LFXP2-40E	40	48	885	83		8	32											
LatticeXP2 Automotive	LAXP2-5E	5	9	166	10		3	12			2+0	DDR/2 400	✓	✓	✓	✓		90nm	
	LAXP2-8E	8	12	221	18		4	16											
	LAXP2-17E	16	15	276	35		5	20		4+0									
NEW MachXO2™	LCMXO2-256	256	0	0	2	0						DDR266 DDR2-266 LPDDR266	✓	✓	Dual Boot supported with external boot flash.	i²C (2) SPI (1) Timer (1)	65nm		
	LCMXO2-640	640	2	18	5	24													
	LCMXO2-640U	640	7	64	10	64				1+2									
	LCMXO2-1200	1280	7	64	10	64				1+2									
	LCMXO2-1200U	1280	8	74	16	80				1+2									
	LCMXO2-2000	2112	8	74	16	80				1+2									
	LCMXO2-2000U	2112	10	92	34	96				2+2									
	LCMXO2-4000	4320	10	92	34	96				2+2									
	LCMXO2-7000	6864	26	240	54	256				2+2									
MachXO™	LCMXO256E	256			2.0													130nm	
	LCMXO256C																		
	LCMXO640E																		
	LCMXO640C	640			6.1													130nm	
	LCMXO1200E																		
	LCMXO1200C	1200	1	9.2	6.4							1+0						130nm	
	LCMXO2280E																		
LCMXO2280C																			
MachXO Automotive	LAMXO256E	256			2.0													130nm	
	LAMXO256C																		
	LAMXO640E																		
	LAMXO640C	640			6.1												130nm		
	LAMXO1200E																		
	LAMXO2280E	2280	3	27.6	7.7							1+0					130nm		
LAMXO2280C																			

\* Contact your Lattice sales representative for the support of WLCSPP packages.



# CPLD Products

Parameter	ispMACH® 4000ZE				ispMACH 4000V/B/C <sup>1</sup>					
	4032ZE	4064ZE	4128ZE	4256ZE	4032V/B/C	4064V/B/C	4128V/B/C	4256V/B/C	4384V/B/C	4512V/B/C
Macrocells	32	64	128	256	32	64	128	256	384	512
Embedded Oscillator	✓	✓	✓	✓						
t <sub>PD</sub> (ns)	4.4	4.7	5.8	5.8	2.5	2.5	2.7	3.0	3.5	3.5
t <sub>CO</sub> (ns)	3.0	3.2	3.8	3.8	2.2	2.2	2.7	2.7	2.7	2.7
t <sub>S</sub> (ns)	2.2	2.5	2.9	2.9	1.8	1.8	1.8	2.0	2.0	2.0
f <sub>MAX</sub> (MHz)	260	241	200	200	400	400	333	322	322	322
V <sub>CC</sub> (Volts)	1.8	1.8	1.8	1.8	3.3/2.5/1.8	3.3/2.5/1.8	3.3/2.5/1.8	3.3/2.5/1.8	3.3/2.5/1.8	3.3/2.5/1.8
I/O Standard Support	1.8	2.5	3.3		1.5	1.8	2.5	3.3		
Typ. Standby Current <sup>2</sup>	10 µA	11 µA	12 µA	13 µA	1.3 mA	1.5 mA	1.5 mA	2.0 mA	2.5 mA	3.0 mA
Package	I/Os + Inputs <sup>3</sup>				I/Os + Inputs					
Bare Die	✓	✓	✓	✓	Contact Lattice Sales for details					
44-Pin TQFP					30 + 2	30 + 2				
48-pin TQFP	32 + 4	32 + 4			32 + 4	32 + 4				
64-ball csBGA	32 + 4	48 + 4								
64-ball ucBGA		48 + 4								
100-pin TQFP		64 + 10	64 + 10	64 + 10		64 + 10	64 + 10	64 + 10		
128-pin TQFP							92 + 4			
132-ball ucBGA			96 + 4							
144-ball csBGA		64 + 10	96 + 4	108 + 14						
144-pin TQFP			96 + 4	96 + 4			96 + 4 <sup>4</sup>	96 + 4 <sup>4</sup>		
176-pin TQFP								128 + 4	128 + 4	128 + 4
256-ball ftBGA								128 + 4 / 60+4 <sup>5</sup>	192 + 4	208 + 4

1) V=3.3V, B=2.5V, C=1.8V core supply. 2) Typical standby current for ispMACH 4000V/B/C at 1.8V. 3) Pb-free only. 4) 3.3V only. 5) 128 and 160 I/O options.

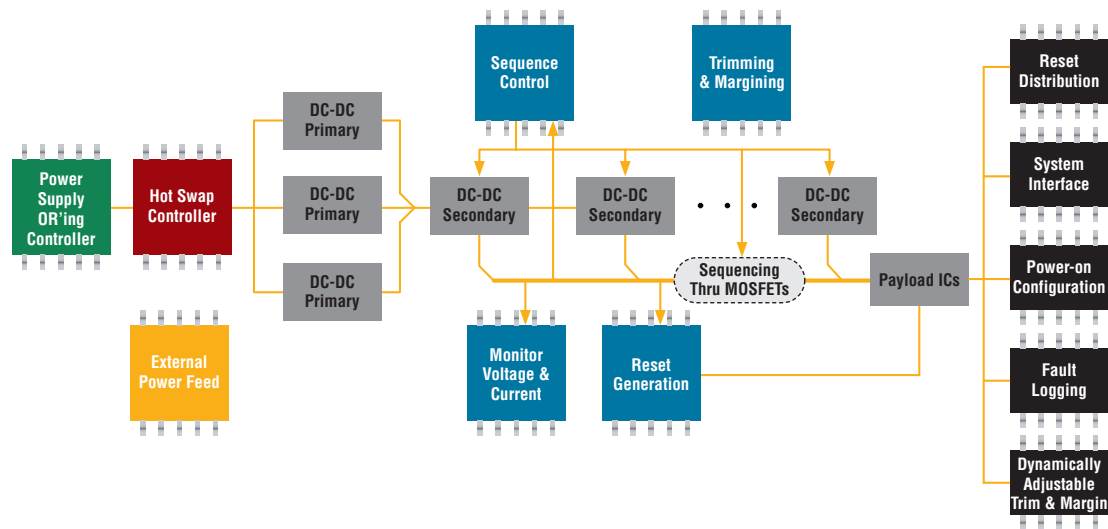
# ispClock Products

Feature	ispClock5400D		ispClock5600A		ispClock5300S				
	5406D	5410D	5610A	5620A	5304S	5308S	5312S	5316S	5320S
Outputs	6	10	10	20	4	8	12	16	20
Input Operating Frequency Range	50 to 400MHz		8 to 400MHz		8 to 267MHz				
Output Operating Frequency Range	50 to 400MHz		4 to 400MHz		5 to 267MHz				
VCO Operation	400 to 800MHz		320 to 800MHz		160 to 400MHz				
Spread Spectrum Compatibility	Yes		Yes		Yes				
Single-Ended Fan-out Buffer Interfaces	None		LVTTTL, LVCMOS, HSTL, eHSTL, SSTL		LVTTTL, LVCMOS, HSTL, eHSTL, SSTL				
Single-Ended Clock Reference and Feedback Interfaces	LVCMOS		LVTTTL, LVCMOS, SSTL, HSTL		LVTTTL, LVCMOS, HSTL, eHSTL, SSTL				
Differential Fan-out Buffer Interfaces	LVDS, LVPECL, HSTL, SSTL, HCSSL, MLVDS		SSTL, HSTL, LVDS, LVPECL		None				
Differential Clock Reference and Feedback Interfaces	LVDS, LVPECL, HSTL, SSTL, HCSSL, MLVDS		HSTL, SSTL, LVDS, LVPECL		LVDS, LVPECL, HSTL, SSTL				
Type of PLL Feedback	Internal/External		Internal/External		External				
M, N Dividers	None		Count from 1 to 40		None				
Number of V Dividers	4		5		3				
V Divider Count Range	2 to 16 (in powers of 2)		2 to 80 (in steps of 2)		1 to 32 (in powers of 2)				
Maximum Cycle-Cycle Jitter	29ps (peak-peak)		70ps (peak-peak)		70ps (peak-peak)				
Maximum Period Jitter (RMS)	2.5ps		12ps		12ps				
Maximum Phase Jitter (RMS)	6ps Typ.		50ps		50ps				
Maximum Static Phase Offset	-5ps to 95ps		-100ps to 200ps		-40ps to 100ps				
Frequencies Generated	4		5		3				
Programmable Phase Skew	156ps to 12ns		156ps to 12ns		156ps to 5ns				
Programmable Time Skew	0 to 288ps		None		None				
Fan-out Buffer Mode	Yes		No		Yes				
Programmable Termination	None		40 to 70Ω & 20Ω Setting		40 to 70Ω & 20Ω Setting				



# Platform and Power Management Products

## Integrated Platform and Power Management Functions (Shown in ICs)



## Platform Manager™ and Power Manager II Applications Cross Reference

	Function	ProcessorPM	POWR607	POWR1014	POWR1014A	POWR1220AT8	LPTM10-1247	LPTM12-12107
Hot Swap	-48V Hot-Swap Controller (Payload - isolated)		✓					
	+12 / 24V Hot swap Controller		✓	✓	✓	✓	✓	✓
	Low Voltage Positive Supply 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 Power Management	Reset Generation	✓	✓	✓	✓	✓	✓	✓
	Voltage Supervision	✓	✓	✓	✓	✓	✓	✓
	Watchdog Timer	✓	✓	✓	✓	✓	✓	✓
	Voltage Monitoring and Supply Sequencing	✓	✓	✓	✓	✓	✓	✓
	Voltage Measurement Using ADC				✓	✓	✓	✓
	Power Supply Margining				✓	✓	✓	✓
	Power Supply Voltage Trimming					✓	✓	✓
Digital Management Functions	Reset Distribution						✓	✓
	Power-on Config						✓	✓
	System Interface						✓	✓
	Fault Log						✓	✓

## Platform Manager and Power Manager II Device Selector Guide

Parameter	NEW Platform Manager		Power Manager II				
	LPTM10-1247	LPTM10-12107	POWR1220AT8	POWR1014/A	POWR607	ProcessorPM™ - POWR605	POWR6AT6
Precision Voltage Monitors	12	12	12	10	6	6	6
Window Comparators	24	24	24	20	6	6	
CPLD Macrocells	48	48	48	24	16	16	
FPGA LUTs	640	640					
Digital I/O	31	91					
Dedicated Outputs	16 & 6 trim outputs	16 & 8 trim outputs	20 & 8 trim outputs	14	7	5	6 trim outputs
FET Drivers	4	4	4	2	2		
Trim Outputs (DAC)	6	8	8	None			
ADC (10-Bit)	Yes	Yes	Yes	Yes*	No	No	No
Package	128-pin TQFP	208-ball ftBGA	100-pin TQFP	48-pin TQFP	32-pin QFNS	24-pin QFNS	32-pin QFNS

\* ispPAC-POWR1014A Only

# Lattice IP Cores and Reference Designs

## LatticeCORE and ispLeverCORE™ IP Cores

	IP Core	ECP3	ECP2M	ECP2	ECP/EC	SC	XP2	MachX02
<b>Communications</b>	Tri-Speed Ethernet MAC	✓	✓	✓	✓	✓	✓	
	2.5 Gigabit Ethernet MAC					✓		
	10+ Gigabit Ethernet MAC	✓	✓	✓		✓		
	HiGig™ Ethernet MAC	✓				✓		
	SGMII & Gigabit Ethernet PCS	✓	✓			✓		
	CPRI	✓	✓			✓		
	SRIO 2.1	✓						
	SPI4.2	✓				✓		
	XAUI 10GbE	✓	✓					
<b>Connectivity</b>	DVB-ASI	✓						
	JESD204A	✓						
	PCI Target 32-bit	✓	✓	✓	✓	✓	✓	✓
	PCI Target 64-bit	✓	✓	✓	✓	✓	✓	
	PCI Master/Target 32-bit	✓	✓	✓	✓	✓	✓	✓
	PCI Master/Target 64-bit	✓	✓	✓	✓	✓	✓	
	PCI Express x1 Endpoint	✓	✓	✓	✓	✓	✓	
	PCI Express x1, x4 Root Complex Lite	✓						
	PCI Express x4 Endpoint	✓	✓	✓	✓	✓	✓	
	PCI Express x4 PCS Pipe	✓	✓					
	Tri-Rate SDI PHY	✓						
<b>Digital Signal Processing</b>	Block Convolutional Encoder	✓	✓	✓	✓	✓	✓	
	Block Viterbi Decoder	✓	✓	✓	✓	✓	✓	
	Cascaded Integrator-Comb (CIC) Filter	✓	✓	✓	✓	✓	✓	
	CORDIC	✓	✓	✓	✓	✓	✓	
	Correlator		✓	✓	✓	✓	✓	
	Display Interface Multiplexer							✓
	Distributed Arithmetic (DA) FIR Filter	✓	✓	✓	✓	✓	✓	
	Dynamic Block Reed-Solomon Decoder	✓	✓	✓	✓	✓	✓	
	Dynamic Block Reed-Solomon Encoder	✓	✓	✓	✓	✓	✓	
	FFT Compiler	✓	✓	✓	✓		✓	
	FIR Filter Generator	✓	✓	✓	✓		✓	
	Gamma Corrector		✓	✓				
	Interleaver/De-interleaver	✓	✓	✓	✓	✓	✓	
	Multi-Rate SDI PHY		✓					
	Numerically-Controlled Oscillator	✓	✓	✓	✓	✓	✓	
	Turbo Decoder		✓	✓	✓	✓	✓	
Turbo Encoder			✓	✓	✓	✓		
<b>Processor, Controller &amp; Peripheral</b>	LatticeMico32™ Soft Microprocessor	✓	✓	✓	✓	✓	✓	
	LatticeMico8™ Soft Microcontroller							✓
	DDR SDRAM Controller-Pipelined	✓	✓	✓	✓	✓	✓	✓
	DDR2 SDRAM Controller-Pipelined	✓	✓	✓		✓	✓	✓
	DDR3 SDRAM Controller-Pipelined	✓						
	LPDDR SDRAM Controller							✓
	Scatter Gather DMA Controller	✓	✓	✓		✓	✓	

Notes: LatticeSCM™ MAC0®-based IP cores are not included in this table. MachX0 IP: PCI Target 32-bit and PCI Master/Target 32-bit. Measurements as of April 2010. Performance may vary when using a different software version or targeting a different device density or speed grade within the various FPGA families.

# IP Suites

Lattice IP suites provide many of the functions required to develop a total solution for common FPGA applications. In addition, multiple Lattice FPGA families are supported with each IP suite, so designers can develop solutions across multiple Lattice families, taking advantage of the best features of each. The following table summarizes which IP cores are included in each IP suite, and which FPGA families are supported.

	IP Core	ECP3	ECP2/M	EC/ECP	SC/M	XP2	X02	X0	Suite (One Year Node Locked Subscription)	Annual License Node Locked Renewal (After First Year)
IP Value Suite	DDR	✓	✓	✓	✓	✓	✓		Order #: DS-VAL-ST-U1	Order #: DS-VAL-ST-UR1
	DDR2	✓	✓		✓	✓	✓			
	DDR3	✓								
	LPDDR						✓			
	FFT Compiler	✓	✓	✓		✓				
	FIR Filter	✓	✓	✓						
	Tri-Speed Ethernet MAC	✓	✓	✓	✓	✓				
System Design Suite	DDR	✓	✓	✓	✓	✓	✓		Order #: DS-SYS-ST-U1	Order #: DS-SYS-ST-UR1
	DDR2	✓	✓		✓	✓	✓			
	DDR3	✓								
	LPDDR						✓			
	PCI MT 32-bit/64-bit, 33 MHz/66 MHz	✓	✓	✓	✓	✓	✓	✓		
	PCI T 32-bit/64-bit, 33 MHz/66 MHz	✓	✓	✓	✓	✓	✓	✓		
	PCIe x1	✓	✓							
	PCIe x4	✓	✓							
Scatter-Gather DMA Controller	✓	✓		✓	✓					
WiMAX Design Suite	Block Convolutional Encoder	✓	✓	✓	✓	✓			Order #: DS-WMX-ST-U1	Order #: DS-WMX-ST-UR1
	Block Viterbi Decoder	✓	✓	✓	✓	✓				
	Dynamic Block RS Decoder	✓	✓	✓		✓				
	Dynamic Block RS Encoder	✓	✓	✓		✓				
	FFT Compiler	✓	✓	✓		✓				
	FFT Compiler		✓	✓		✓				
DSP Design Suite	CIC	✓	✓	✓	✓	✓			Order #: DS-DSP-ST-U1	Order #: DS-DSP-ST-UR1
	DA-FIR	✓	✓	✓		✓				
	FFT Compiler	✓	✓	✓		✓				
	FIR Filter	✓	✓	✓						
	NCO	✓	✓	✓		✓				
1 GbE Design Suite	DDR	✓	✓	✓	✓	✓			Order #: DS-1GE-ST-U1	Order #: DS-1GE-ST-UR1
	DDR2	✓	✓	✓	✓	✓				
	DDR3	✓								
	SGMII & GbE	✓	✓		✓					
	Tri-Speed Ethernet MAC	✓	✓	✓	✓	✓				
10 GbE Design Suite	DDR	✓	✓	✓	✓	✓			Order #: DS-XGE-ST-U1	Order #: DS-XGE-ST-UR1
	DDR2	✓	✓		✓	✓				
	DDR3	✓								
	10GbE MAC	✓	✓		✓					
	SPI-4.2				✓					

# MachX02, MachX0 and LatticeXP2 Reference Designs

Name	Reference Design Number	MachX02	MachX0	LatticeXP2	WISHBONE Compatible	Format	
						Verilog	VHDL
Arbitration and Switching Between Bus Masters	RD1067		✓	✓		✓	✓
BSCAN - Multiple Scan Port Addressable Buffer (BSCAN1)	RD1001		✓	✓			
BSCAN - Multiple Scan Port Linker (BSCAN 2)	RD1002		✓	✓			
CompactFlash Controller	RD1040	✓	✓	✓	✓	✓	✓
Control Link Serial Interface	RD1051	✓	✓	✓		✓	✓
Display Interface	RD1093	✓				✓	
Fast Page Mode DRAM Controller	RD1014	✓	✓	✓		✓	✓
Flash Memory Controller with Wear Leveling	RD1102	✓	✓			✓	
FPGA Loader	AN8077		✓				
GPIO Expander	RD1065		✓	✓		✓	✓
HDLC Controller	RD1038		✓	✓		✓	✓
I <sup>2</sup> C (Inter-Integrated Circuit) Bus Controller for Serial EEPROMs	RD1006	✓	✓	✓		✓	✓
I <sup>2</sup> C (Inter-Integrated Circuit) Bus Master	RD1046	✓	✓	✓	✓	✓	✓
I <sup>2</sup> C (Inter-Integrated Circuit) Bus Master	RD1005		✓	✓			✓
I <sup>2</sup> C (Inter-Integrated Circuit) Slave / Peripheral	RD1054		✓	✓		✓	✓
I <sup>2</sup> C Slave to SPI Master Bridge	RD1094		✓			✓	✓
I2S Controller	RD1101	✓	✓			✓	✓
IDE/ATA Interface Controller	RD1095		✓		✓	✓	
LED/OLED Driver	RD1103	✓	✓			✓	
LCD Controller	RD1053	✓	✓	✓	✓	✓	✓
LPC (Low Pin Count) Bus Controller	RD1049	✓	✓	✓		✓	✓
MDIO Peripheral	RD1074		✓		✓	✓	✓
NAND Flash Memory Controller	RD1055	✓	✓	✓		✓	✓
NOR Flash Memory Controller	RD1087	✓	✓		✓	✓	✓
PCI to NOR Flash Interface	RD1050		✓	✓		✓	✓
PCI Target 32-bit/33MHz	RD1008		✓	✓		✓	✓
PCI/WISHBONE Bridge	RD1045		✓	✓	✓	✓	✓
Power Manager II Bus Controller	RD1100	✓	✓			✓	✓
Power Manager II Fault Logger	RD1062		✓	✓		✓	✓
PWM Fan Controller	RD1060	✓	✓	✓	✓	✓	✓
Read and Write Usercode	RD1041		✓			✓	✓
SD Flash Controller	RD1048		✓	✓	✓	✓	
SD Flash Controller Using SD Bus	RD1088	✓	✓			✓	
SDR SDRAM Controller – Advanced	RD1010	✓	✓	✓		✓	✓
Simple Sigma-Delta ADC	RD1066	✓	✓	✓		✓	✓
Single Wire Interface	RD1099	✓	✓			✓	
SM Bus Controller	RD1098	✓	✓			✓	✓
SPI GPIO Expander	RD1073		✓			✓	
SPI (Serial Peripheral Interface) Controller	RD1044	✓	✓	✓	✓	✓	✓
SPI (Serial Peripheral Interface) Peripheral	RD1075		✓			✓	✓
UART (Universal Asynchronous Receiver/Transmitter)	RD1011		✓	✓			✓
UART (Universal Asynchronous Receiver/Transmitter)	RD1042	✓	✓	✓	✓	✓	✓
Wake on LAN	RD1096		✓			✓	✓

## ispMACH 4000 Reference Designs

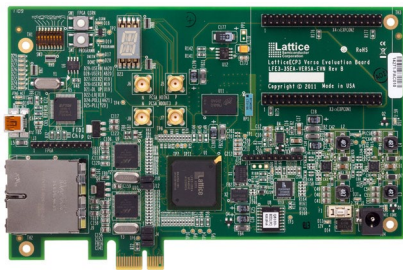
Name	Reference Design Number	WISHBONE Compatible	Format			Included in Development Kit
			Verilog	VHDL	BLIF NGO	Pico
8b/10b Encoder/Decoder	RD1012				✓	
Arbitration and Switching Between Bus Masters	RD1067		✓	✓		
Fast Page Mode DRAM Controller	RD1014		✓			
GPIO Expander	RD1065		✓	✓		
HDLC Controller	RD1009				✓	
I <sup>2</sup> C (Inter-Integrated Circuit) Bus Controller for Serial EEPROMs	RD1006	✓	✓		✓	
I <sup>2</sup> C (Inter-Integrated Circuit) Bus Master	RD1005	✓			✓	✓
I <sup>2</sup> C (Inter-Integrated Circuit) Slave / Peripheral	RD1054	✓				✓
LPC (Low Pin Count) Bus Controller	RD1049	✓	✓		✓	
Multiple Scan Port Addressable Buffer (BSCAN1)	RD1001	✓				
Multiple Scan Port Linker (BSCAN 2)	RD1002				✓	
PCI Target 32-bit/33MHz	RD1008		✓	✓		
PWM Fan Controller	RD1060		✓	✓		
Read and Write Usercode	RD1041		✓	✓		
SDR SDRAM Controller - Advanced	RD1010	✓	✓		✓	
SPI GPIO Expander	RD1073		✓			
SPI (Serial Peripheral Interface) Controller - WISHBONE Compatible	RD1044	✓	✓	✓		
SPI (Serial Peripheral Interface) Peripheral	RD1075	✓	✓		✓	
UART (Universal Asynchronous Receiver/Transmitter)	RD1011	✓				
Wake on LAN	RD1096		✓	✓		

## Mixed Signal Reference Designs

Name	Reference Design Number	Format	Included in Development Kit			
			Power Manager II Hercules	Platform Manager	ProcessorPM	ispClock 5400D
5V and 3.3V Hot Swap Controller	RD1057	PAC-Designer	✓			
Supervisor, WDT and Reset Generation with ProcessorPM	RD1056	PAC-Designer	✓		✓	
Redundant Power Supply Management	RD1064	PAC-Designer	✓			
12V Hot Swap Control	RD1068	PAC-Designer	✓			
AMC Module Power Management	RD1070	PAC-Designer				
Voltage Monitoring for Fault Logging	RD1072	PAC-Designer	✓			
Single-Ended Clock Source from ispClock5400D Differential Clock Buffers	RD1069	PAC-Designer				✓
Temperature Monitor	RD1080	VHDL				
Fault Logging and Monitoring	RD1077	VHDL		✓		
BSCAN1 - Multiple Scan Port Addressable Buffer	RD1001	VHDL				
BSCAN2 - Multiple Scan Port Linker	RD1002	VHDL				
Enhanced Closed-Loop Trim with I <sup>2</sup> C Control	RD1078	VHDL		✓		
GPIO Expander	RD1065	VHDL				
I <sup>2</sup> C Master Controller	RD1005	VHDL				
I <sup>2</sup> C Slave/Peripheral	RD1054	VHDL				
I <sup>2</sup> C Slave to SPI Master Bridge	RD1094	VHDL				
Long Delay Timers	RD1079	VHDL		✓		
Power Management Bus	RD1100	VHDL				
PWM Fan Controller	RD1060	VHDL				
SPI GPIO Expander	RD1073	VHDL				
Serial Peripheral Interface	RD1075	VHDL				
Universal Asynchronous Receiver/Transmitter	RD1011	VHDL				

## LatticeECP3 Versa Development Kit

Industry's lowest cost platform for designing PCI Express and Gigabit Ethernet based systems. The kit includes free demos and reference designs.



### Features

- The LatticeECP3 Versa Evaluation Board:
  - PCI Express 1.1 x1 Edge Connector Interface
  - Two Gigabit Ethernet Ports (RJ45)
  - 4 SMA Connectors for SERDES Access
  - USB Mini for FPGA Programming
  - LatticeECP3 FPGA: LFE3-35EA-FF484
  - 64 Mbit Serial Flash memory
  - 1 Gbit DDR3 Memory
  - 14-segment alpha-numeric display
  - Switches and LEDs for demos
  - SERDES Eye Quality Demo
- 4 PCI Express Demos
- Gigabit Ethernet MAC Demo using Mico32
- DDR3 Memory Controller Demo

Ordering Part Number	Price
LFE3-35EA-VERSA-EVN	\$99*

\* This kit is available for a special price of \$99 until December 31, 2011. Standard list price: \$299.

## HDR-60 Video Camera Development Kit

A fully production ready High Dynamic Range (HDR) camera, designed to fit into commercially available camera housings. Supports full 1080p resolution at 60 frames per second in streaming mode through the FPGA, without the need for an external frame buffer.



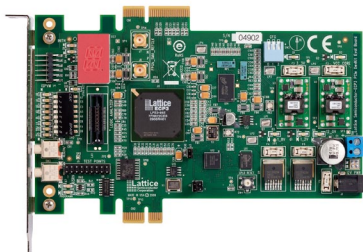
### Features

- FPGA-based Image Signal Processing
- Fully Production-Ready HDR Camera Design
- 1080p Capable @ 60 frames per second
- Supports up to 16 Megapixel Sensors
- Supports up to two sensors simultaneously
- Full 60fps in streaming mode needs no external frame buffer
- Fast Auto Exposure Instantly Adjust to Changing Light
- Greater than 120 dB High Dynamic Range (HDR) Performance
- Direct HDMI/DVI output from FPGA
- Extremely Low-Latency
- Comprehensive Image Processing IP Library
- On-board Broadcom® Broadreach™ PHY Enables IP over Coax
- On-board FTDI Chip provides easy programming via low cost USB cable

Ordering Part Number	Price
LFE3-70EA-HDR60-DKN	\$399

## LatticeECP3 PCI Express Development Kit

Develop PCIe-based platforms using a low-cost, low-power SERDES-based FPGA with proprietary and Lattice provided designs.



### Features

- LatticeECP3 PCI Express x1/x4 Solutions Board
  - PCI Express x1 and x4 edge connector interfaces
  - On-board Boot Flash
  - Both Serial SPI Flash and Parallel Flash via MachXO programming bridge
  - Shows interoperation with a high performance DDR2 memory component
  - Switches, LEDs, displays for demo purposes
  - Input connection for lab-power supply
- Power connections and power sources
- ispVM™ programming support
- On-board and external reference clock sources
- Available on Windows and Linux platforms
- Software and IP with a 60-day license (Windows or Linux)
- Variety of demos
- USB download cable

Ordering Part Number	Price
LFE3-95EA-PCIE-DKN	\$895

## LatticeXP2 Brevia Development Kit

Easy-to-use, low-cost platform for evaluating and designing with LatticeXP2 FPGAs.



### Features

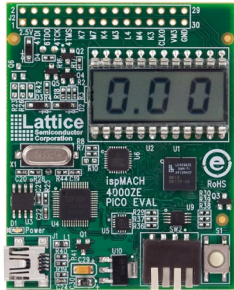
- LatticeXP2 FPGA: LFXP2-5E-6TN144C
- 2 Mbit SPI Flash Memory
- 1 Mbit SRAM
- Programmed via Parallel JTAG or Lattice USB Cable
  - Parallel JTAG Cable (Included with the Kit)
  - Lattice USB Cable (Part Number: HW-USBN-2A)
- Serial RS-232 Interface
- JTAG Interface
- 2x20 and 2x5 Expansion Headers
- Push buttons for General Purpose I/O and Reset
- 4-bit DIP Switch for user-defined inputs
- 8 Status LEDs for user-defined outputs
- One Parallel JTAG Programming Cable
- One Serial RS-232 DB9 null modem Cable
- AC Adapter
- QuickSTART Guide

Ordering Part Number	Price
LFXP2-5E-B-EVN	\$49

# Development Kits

## ispMACH 4000ZE Pico Development Kit

Battery-powered, low-cost platform to accelerate the evaluation of ispMACH 4000ZE CPLDs.

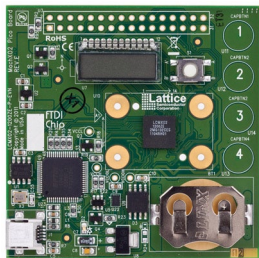


### Features

- Pre-programmed Pico Power Demo
- ispMACH 4000ZE device (LC4256ZE-5MN144C)
- Power Manager II device (ispPAC-POWR6AT6-01SN32I)
- LCD panel
- USB mini jack socket for power, JTAG programming, and I<sup>2</sup>C interface
- 2X15 header landing for off-board expansion provides access to LC4256ZE GPIOs, POWR6AT6 VMON inputs, I<sup>2</sup>C, and JTAG chain
- Push-button for global reset
- 4-bit DIP switch to user-defined inputs
- 3.3V and 2.5V supply rails
- Current and voltage sensor circuits
- Battery or USB power source
- RoHS-compliant packaging and process
- Marked for CE, China RoHS Environmental-Friendly Use Period (EFUP) and Waste Electrical and Electronic Equipment (WEEE) Directives
- One USB connector cable
- QuickSTART Guide

Ordering Part Number	Price
LC4256ZE-P-EVN	\$69

## MachXO2 Pico Development Kit



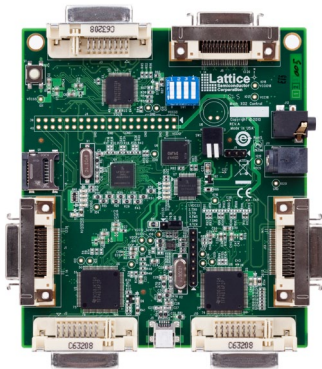
### Features

- MachXO2 LCMXO2-1200ZE
- 4-character 16-segment LCD display
- 4 capacitive touch sense buttons
- 1 Mbit SPI Flash
- I<sup>2</sup>C temperature sensor
- Current and voltage sensor circuits
- Expansion header for JTAG, I<sup>2</sup>C
- Standard USB cable for device programming and I<sup>2</sup>C communication
- RS-232/USB & JTAG/USB interface
- RoHS-compliant packaging and process
- Watch battery
- QuickSTART Guide

Ordering Part Number	Price
LCMXO2-1200ZE-P-EVN	\$29*

\* This kit is available for a special price of \$29 until December 31, 2011. Standard list price: \$49.

## MachXO2 Control Development Kit



### Features

- MachXO2 LCMXO2-1200HC
- Power Manager II ispPAC-POWR1014A
- 128Mbit LPDDR memory, 4Mbit SPI Flash
- Current and voltage sensor circuits
- SD memory card socket
- Microphone
- Audio Amplifier and Delta-Sigma ADC
- Up to two DVI sources and one DVI output.
- Up to two Display Inputs (7:1 LVDS) and one Display Output (7:1 LVDS)
- Audio output channel
- Expansion header for JTAG, SPI, I<sup>2</sup>C and PLD I/Os.
- LEDs & switches
- Standard USB cable for device programming
- RS-232/USB & JTAG/USB interface
- RoHS-compliant packaging and process
- AC adapter (international plugs)
- QuickSTART Guide

Ordering Part Number	Price
LCMXO2-1200HC-C-EVN	\$189

## MachXO Mini Development Kit

An easy-to-use, low-cost platform to accelerate the evaluation of MachXO PLDs.



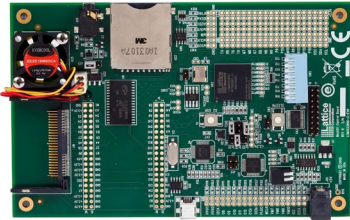
### Features

- MachXO PLD: LCMXO2280C-4TN144C
- 2 Mbit SPI Flash memory
- 1 Mbit SRAM
- I<sup>2</sup>C temperature sensor
- USB mini jack sockets for power, JTAG programming, and RS-232 debugging
- 2X16 header for off-board expansion provides access to top and right side MachXO banks
- Push-buttons for sleep mode and reset
- 4-bit DIP switch to user-defined inputs
- ADC/DAC circuit
- Sleep circuit
- 8 LEDs for user-defined outputs
- RoHS-compliant packaging and process
- Two USB connector cables
- QuickSTART Guide

Ordering Part Number	Price
LCMXO2280C-M-EVN	\$89

## MachXO Control Development Kit

A platform for rapidly prototyping system control designs using MachXO PLDs.



### Features:

- Preloaded Control SoC Demo
- MachXO LCMXO2280
- Power Manager II ispPAC-POWR1014A
- 2Mbit SPI Flash & 1Mbit SRAM
- I<sup>2</sup>C temperature sensor
- Current and voltage sensor circuits
- On-board fan
- Interface to 16 x 2 LCD panel\*
- SD memory and Compact Flash memory card sockets\*
- Audio output channel
- Expansion header for SPI & I<sup>2</sup>C

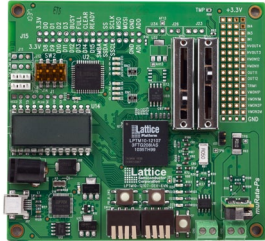
- LEDs & switches
- Standard USB cable for device programming and I<sup>2</sup>C communication
- RS-232/USB & JTAG/USB interface
- 3" x 1" prototyping area
- RoHS-compliant packaging and process
- AC adapter (international plugs)
- QuickSTART Guide

\* LCD panel and SD/Compact Flash memory not included in the development kit

Ordering Part Number	Price
LCMXO2280C-C-EVN	\$165

## Platform Manager Development Kit

A versatile, ready-to-use hardware platform for evaluating and designing with Platform Manager devices.



### Features

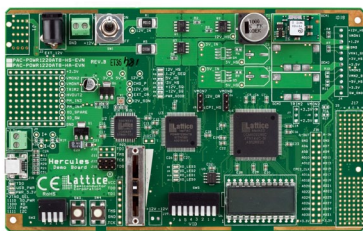
- Preloaded Power Management Demo
- LPTM10-12107, Platform Manager, 208-ball ftBGA package
- 35mm slide pots to emulate supply rail variations
- Pads for user I/O, LED, and switches
- JTAG and I<sup>2</sup>C interface headers
- USB Cable
- AC adapter with international plugs

- Programmable with ispVM System software
- QuickSTART Guide

Ordering Part Number	Price
LPTM10-12107-DEV-EVN	\$109

## Power Manager II Hercules Development Kit

Versatile, ready to use hardware platforms for evaluating and designing with Power Manager II devices. A Standard and Advanced Edition of each kit is available.



### Features

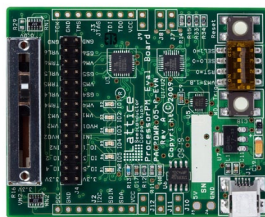
- The Standard Edition Hercules Development Kit features the following:
  - Preloaded Board Digital Management Demo
  - Hercules Standard Edition evaluation board
  - Power Manager II ispPAC-POWR1220AT8 and MachXO LCMXO2280 PLD
- The Advanced Edition Hercules Development Kit features the following:
  - Preloaded Board Digital Management Demo

- Hercules Advanced Edition evaluation board with CompactPCI headers
- Power Manager II ispPAC-POWR1220AT8 and MachXO LCMXO2280 PLD
- Backplane accessory evaluation board and power supply for live hot-swap
- AC adapter (international plugs)
- USB Connector Cable
- RoHS-compliant packaging and process

Ordering Part Number	Price
PAC-POWR1220AT8-HS-EVN	\$109

## ProcessorPM Development Kit

Versatile, ready-to-use hardware platform for evaluating and designing with ProcessorPM power management devices.



### Features

- Pre-configured Processor Support Demo
- ProcessorPM-POWR605
- Power Manager II POWR6AT6
- 3.3V, 2.5V, and 1.8V supply rails
- LEDs
- Slide potentiometer
- 2x14 expansion header
- USB mini jack socket (program/power)
- 2 Push-Buttons

- 4-Bit DIP Switch
- JTAG and I<sup>2</sup>C Header Landings
- RoHS-compliant packaging and process
- USB connector cable
- QuickSTART Guide

Ordering Part Number	Price
PACPOWR605-P-EVN	\$49



## Breakout Board Evaluation Kits

Breakout Board Evaluation Kits for select MachXO, ispMACH 4000ZE, Power Manager II devices offer a convenient way to conduct hardware evaluations by providing easy hand-access to densely-spaced PLD I/Os.



### Features:

- Preprogrammed with hardware test program LCMXO2280C-FTN256C PLD (MachXO2280 Breakout Board), POWR1014A-02TN48I (POWR1014A Breakout Board), or LC4256ZE-TN144C CPLD (ispMACH 4256ZE Breakout Board)
- LEDs
- Expansion Header Landings
- Prototyping Area
- USB Mini Jack Socket (Program/Power)
- JTAG Header Landing
- RoHS-compliant packaging and process
- USB connector cable

Ordering Part Number	Price
LCMXO2280-B-EVN	\$29.99
LC4256ZE-B-EVN	\$29.99
POWR1014A-B-EVN	\$29.99

# FPGA & CPLD Development Kits and Evaluation Boards

Product	Part Number	PCIe Edge	PCI Edge	Ethernet	SMAs	Memory	Prototype Area	Utility LEDs, Switches	Additional Features
<b>Development Kits</b>									
LatticeECP3 Versa	LFE3-35EA-VERSA-EVN	x1		10/100/1000	SERDES	1G DDR3	Expansion Connectors	✓	
LatticeECP3 HDR-60 Video Camera	LFE3-70EA-HDR60-DKN			IP Over Coax		DDR2	Expansion Connectors	✓	1080p/60fps HDR video, HDMI
LatticeECP3 AMC Evaluation Platform	LFE3-150EA-AMC-DKN			10/100/1000		DDR2		✓	AMC PCB card edge interface
LatticeECP3 PCIe	LFE3-95EA-PCI-E-DKN	x1, x4				DDR2		✓	
LatticeECP2M PCIe	DK-PCI-E-ECP2M-011	x1, x4				DDR2		✓	
LatticeXP2 Brevia	LFXP2-5E-B-EVN							✓	
LCD-Pro	LFE2-50E-LCDPRO-EVN							✓	7" WVGA touch display, IP
ispMACH 4000ZE Pico	LC4256ZE-P-EVN							✓	Battery powered with current metering
MachX02 Pico	LCMX02-1200ZE-P-EVN							✓	
MachX02 Control	LCMX02-1200HC-C-EVN					LPDDR		✓	
MachX0 Mini	LCMX02280C-M-EVN							✓	Mini System-On-Chip design, terminal program interface
MachX0 Control	LCMX02280C-C-EVN								Fan control, power supply mgmt and LCD panel interface
<b>High-Performance FPGA Evaluation Boards</b>									
LatticeSC Communications	LFSC25E-H-EV				SERDES, LVDS, PLL	DDR SO-DIMM		✓	300-MSA, High-Speed LVDS Connector.
LatticeSC PCIe x1	LFSC25E-P1-EV	x1		10/100/1000	SERDES, LVDS, PLL	QDR2, RDRAM2		✓	SFP, RS-232, I <sup>2</sup> C
LatticeSC PCIe x4	LFSC80E-P4-EV	x4			SERDES, LVDS, PLL	DDR2		✓	Mictor Connector, PCIe Cable Connector.
<b>Non-Volatile FPGA Evaluation Boards</b>									
LatticeXP2 Standard	LFXP2-17E-L-EV						✓	✓	DAC/ADC, RS-232, SRAM, Compact Flash (CF) Connector
LatticeXP2 Advanced	LFXP2-17E-H-EV		64-bit	10/100/1000	LVDS, PLL	DDR2 SO-DIMM	✓	✓	DAC/ADC, RS-232, MDR-26, USB2.0, PS2 I/O, CF Connector
MachX02280 Breakout Board	LCMX02280-B-EVN						✓	✓	
LatticeXP Standard	LFXP10C-L-EV or LFXP10E-L-EV						✓	✓	
LatticeXP Advanced	LFXP10C-H-EV		64-bit	10/100/1000	PLL	DDR SO-DIMM	✓	✓	
<b>Low-Cost FPGA Evaluation Boards</b>									
LatticeECP3 Serial Protocol	LFE3-95EA-SP-EVN	x4		10/100/1000	SERDES, LVDS, PLL	DDR2, DDR3		✓	Serial ATA
LatticeECP3 I/O Protocol	LFE3-150EA-IO-EVN			10/100/1000	SERDES, LVDS, PLL	2x DDR3 DIMM	✓	✓	HMZD Conn., Logic Analyzer Probe Connector.
LatticeECP3 Video Protocol	LFE3-95EA-V-EVN	x4				DDR2		✓	BNCs for SD/HD/3G-SDI, DisplayPort, ChannelLink, CameraLink, DVI
LatticeECP2M PCIe x4	LFE2M50E-P4-EV	x4			SERDES, LVDS, PLL	DDR2		✓	
LatticeECP2M SERDES	LFE2M50E-S-EV	x1			SERDES, LVDS, PLL	DDR2		✓	SFP
LatticeECP2™ LatticeMico32/ DSP	LFE2-50E-D-EV			10/100		DDR SO-DIMM	✓	✓	DAC/ADC, RS-232, SRAM, USB1.0
LatticeECP2 Standard	LFE2-50E-L-EV		64-bit				✓	✓	RS-232, CF Connector
LatticeECP2 Advanced	LFE2-50E-H-EV			10/100/1000		2x DDR2 SO-DIMM	✓	✓	High-Speed LVDS Connector., USB, CF Connector
<b>CPLD Evaluation Boards</b>									
ispMACH 4000ZE	LC4064ZE-EVN						✓	✓	
ispMACH 4000ZE	LC4256ZE-EVN						✓	✓	
ispMACH 4256ZE Breakout Board	LC4256ZE-B-EVN						✓	✓	
<b>Interface Hardware</b>									
TI ADS6000 Interface	LFE2-H-IC-EV								Interface with LFE2-50E-H-EV
LatticeECP3 I/O Protocol ADC-DAC Interface	LFE3-ADC-DAC-EVN								Connects LatticeECP3 I/O Protocol Board to 3rd party ADC and DAC boards.
7:1 LVDS Video Dev Kit (with ECP2 Advanced)	LFE2-50E-VID-EV			10/100/1000		2x DDR2 SO-DIMM	✓	✓	High-Speed LVDS Conn., Video Demo, MDR-26, 7:1 LVDS
7:1 LVDS Video Interface Kit (without ECP2 Advanced)	HW-VID-KIT								High-Speed LVDS Connector., Video Demo, MDR-26 7:1 LVDS

# Mixed Signal Development Kits and Evaluation Boards

Board	Device	Package	I/O Access	LEDs and Switches	Special Circuits	Included Hardware
<b>Development Kits</b>						
<b>Platform Manager Development Kit</b>	LPTM10-12107	208 ftBGA	USB, PCB test points, header, power terminals	LCD, DIP switches, button and slide potentiometer	Temperature measurement, power supply margin and trim, fault logging, reset distribution, I <sup>2</sup> C/SPI interfaces, voltage scaling	USB cable, wall adapter power supply
<b>Power Manager II Hercules Development Kit</b>	ispPAC-POWR1220AT8 MachXO2280	100 TQFP 144 TQFP	USB, PCB test points, header, power terminals	LCD, DIP switches, button and toggle switches, slide potentiometer	12V hot swap and power OR'ing, power supply margin and trim, fault logging, reset distribution, I <sup>2</sup> C/SPI interfaces, voltage scaling	USB cable, wall adapter power supply
<b>ProcessorPM Development Kit</b>	ispPAC-POWR605	24 QFN	12V DC wall adapter	Status LEDs, DIP switch	USB interface, voltage measurements	USB cable, wall power supply
<b>Evaluation Boards</b>						
<b>ispPAC-POWR607 Evaluation Board</b>	ispPAC-POWR607	32 QFN	PCB test points	LEDs, push-buttons		9V DC wall adapter, DB25 parallel programming cable
<b>ispPAC-POWR1220AT8 Evaluation Board</b>	ispPAC-POWR1220AT8	100 TQFP	PCB test points I <sup>2</sup> C header	Status LEDs, DIP switch slide potentiometers	Banana jack or AC power supply	DB25 parallel programming cable wall adapter power supply (US standard, 300mA)
<b>ispClock5312S Evaluation Board</b>	ispClock5312S	48 TQFP	SMA	Status LEDs, DIP switch	Integrated power supply	DB25 parallel programming cable wall adapter power supply (US standard, 300mA)
<b>ispClock5620A Evaluation Board</b>	ispClock5620A	100 TQFP	SMA	Status LEDs, DIP switch		DB25 parallel programming cable wall adapter power supply (US standard, 300mA)
<b>POWR1014A Breakout Board</b>	ispPAC-POWR1014A	48 TQFP	PCB test points	Status LEDs		USB cable

## Programming Hardware

Product	Part Number	Description
<b>Download Cable (1.8V to 5V Parallel Port Programming Cable)</b>	HW-DLN-3C	Parallel port programming cable
<b>Download Cable (1.2V to 5V USB Programming Cable)</b>	HW-USBN-2A	USB programming cable
<b>Model 300 Desktop Programmer</b>	pDS4102-PM300	Enables prototype programming of all Lattice JTAG non-volatile programmable logic products (1.8V, 2.5V, 3.3V, and 5V programming voltages).
<b>Desktop Programming Socket Adapters</b>	—	Adapters are specific for the device/package combination required. See the Lattice web site for a complete list of adapters available.

# Lattice Diamond and ispLEVER Classic Design Software

		Lattice Diamond 1.3 (Subscription License) Windows/Linux	Lattice Diamond 1.3 (Free License) Windows/Linux	ispLEVER Classic 1.4 Windows
<b>FPGA/CPLD Support</b>	LatticeECP3	✓		
	LatticeECP2M/S	✓		
	LatticeECP2S	✓		
	LatticeSC/M	✓		
	MachXO2	✓	✓	
	MachXO	✓	✓	
	LatticeXP2	✓	✓	
	LatticeECP2	✓	✓	
	LatticeECP/EC	✓	✓	
	LatticeXP	✓	✓	
	ispMACH 4000B/C/V/Z/ZE			✓
	ispMACH 5000VG			✓
	ispXPGA®			✓
	ORCA® FPGA			✓
	ORCA FPSC			✓
	ispXPLD® 5000MX			✓
	MACH4A3/4A5			✓
	ispLSI® 2000/5000			✓
ispGDX2™ and ispGDX®			✓	
ispGAL™ and GAL®			✓	
<b>Software Features</b>	Design Exploration	✓	✓	
	Project Management	✓	✓	✓
	VHDL & Verilog Support	✓	✓	✓
	EDIF Support	✓	✓	✓
	Schematic Support	✓	✓	✓
	sysDSP™ Library for MATLAB/Simulink/ispLeverDSP	✓	✓	
	ABEL			✓
	Synopsys® Synplify Pro™ for Lattice-Synthesis	✓	✓	✓
	Lattice Synthesis Engine (LSE)	MachXO2/MachXO Only	MachXO2/MachXO Only	
	IP and Module Configuration	✓	✓	Module Only
	Power Estimation & Calculation	✓	✓	
	Timing Analysis	✓	✓	✓
	Integrated HDL Analysis	✓	✓	
	Floorplanning	✓	✓	✓
	EPIC Device Editor	✓	✓	ORCA FPGA Only
	On-Chip Debug	✓	✓	ispXPGA Only
TCL Scripting Dictionaries	✓	✓		
Aldec® Active-HDL Lattice Edition Simulation	Windows Only	Windows Only		
Aldec Active-HDL Lattice Web Edition Simulation			✓	
<b>Operating Systems</b>	Windows 7/XP/Vista (32-bit and 64-bit)	✓	✓	32-Bit Only
	Linux (Red Hat Enterprise v4, v5; 32-bit and 64-bit)	✓	✓	
<b>Licensing &amp; Updates</b>	License Terms	One Year Subscription	One Year – Renewable	One Year – Renewable
	Node-Locked License	✓	✓	✓
	Floating License	✓		

## PAC-Designer — Mixed-Signal Design Software

Device Support	Design Entry	Simulation	Programming Mgmt.	License	Operating System
<b>Platform Manager</b>	Schematic, LogiBuilder, Design Utilities	Waveform Simulation Active-HDL	PAC-Designer and ispVM System	Single User, Floating	Windows 7/Vista/XP/2000
<b>ProcessorPM</b>					
<b>Power Manager II</b>					
<b>Power Manager</b>					
<b>ispClock5600A</b>					
<b>ispClock5300S</b>					
<b>ispClock5600V</b>					

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Additionally, customers can receive technical support for Lattice's Programmable Logic Products from our Asia based applications group, by contacting Lattice Asia applications during the hours of 8:30 a.m. to 5:30 p.m. Beijing Time (CST) +0800 UTC (Chinese and English language only).

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