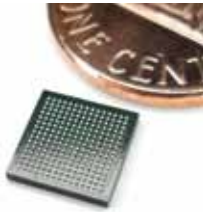


Custom Mobile Devices for Smartphones and Tablets



iCE40LP8K-CM225
225-ball Chip-Scale BGA
Package (7x7 mm footprint,
0.4 mm pitch)

SiliconBlue's iCE40™ Los Angeles mobileFPGA™ family is designed for sensor management, video and imaging, custom connectivity, and memory/storage expansion for Custom Mobile Device™ solutions.

Fabricated on a 40-nm low-power, standard CMOS process, the Los Angeles family has been optimized for mobile consumer applications such as smartphones, tablets, digital still cameras (DSCs), e-book readers, and portable navigation devices (PNDs). The Los Angeles family comes in two power/performance variants:

- **LP Series** Smartphone-targeted series optimized for low power
- **HX Series** Tablet-targeted series optimized for higher performance

KEY FEATURES AND BENEFITS

Sensor Management

- Battery and audio insertion detection with high-speed comparators
- Support of MIPI SLIMbus interface
- Interrupt filtering, interrupt aggregation, auto polling for AP offload

Video and Imaging

- High-speed LVDS channels up to 525 Mbps per channel
- Supports displays up to WUXGA (1920x1200 resolution) dual LVDS
- Supports 720p 30/60 Hz or 1080p 30 Hz video single lane LVDS
- Supports MIPI DBI and MIPI DPI video interface standards
- Ideal for 3D solutions

Custom Connectivity

- High speed USB 2.0 host and device controllers
- ULPI/UTMI interface support

Faster Performance

- LP Series: Up to 50% faster performance compared to iCE65™ devices
- HX Series: Up to 80% faster performance compared to iCE65 devices

Ultra-Low Power

- As low as 15 µA static current for extended battery life
- iCEgate™ latch allows user to selectively freeze inputs on a pin by pin basis to reduce switching power

Industry's Broadest Portfolio of 0.4mm Pitch BGAs

- Footprints as small as 2.5x2.5 mm
- Suited for smartphone and tablet applications

Single Chip

- SiliconBlue's proprietary, on-chip Non-Volatile Configuration Memory (NVCM) enables your design to be securely stored on-chip

Low Cost

- 40nm standard CMOS technology enables ASIC-like cost

Advanced Information

		LP Series (Low Power)					HX Series (High Performance)				
Features		LP640	LP1K	LP4K	LP8K	LP16K	HX640	HX1K	HX4K	HX8K	HX16K
Logic Cells		640	1,280	3,520	7,680	16,192	640	1,280	3,520	7,680	16,192
Embedded RAM Bits		32K	64K	80K	128K	384K	32K	64K	80K	128K	384K
Phase-Locked Loops		1	1	2	2	2	1	1	2	2	2
Core Power @ 0 KHz ¹		15 µW	20 µW	70 µW	80 µW	150 µW	120 µW	160 µW	400 µW	660 µW	1500 µW
Package ²	Footprint	User I/O (Differential Pairs)									
CM36 ³	2.5x2.5 mm	25 (3)	25 (3)								
CM49	3x3 mm	35 (5)	35 (5)								
CM81	4x4 mm	63 (8)	63 (8)	63 (9) ⁴							
CM121	5x5 mm		95 (12)	93 (13)	93 (13)						
CM225	7x7 mm			167 (20)	178 (23)	178 (23)				178 (23)	
QN84 ³	7x7 mm		67 (7)								
CB132	8x8 mm							97 (11)	95 (12)	95 (12)	
CB284	12x12 mm										222 (25)
CT256	14x14 mm									206 (26)	206 (26)
VQ100 ³	14x14 mm						67 (8)	72 (9)			
TQ144	20x20 mm							96 (12)	107 (14)		

Note 1: At 1.0V VCC

Note 2: Packages: CB–0.5 mm pitch Chip-Scale Ball Grid Array, CM–0.4 mm pitch Chip-Scale Ball Grid Array, CT–0.8 mm pitch Ball Grid Array, TQ–Thin Quad Flat Pack, VQ–Very Thin Quad Flat Pack

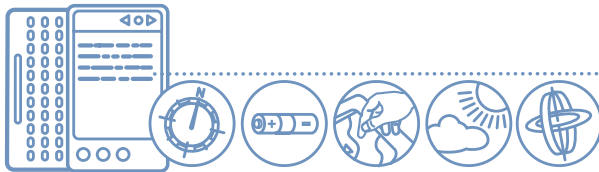
Note 3: No PLL Available

Note 4: Only 1 PLL Available

iCE40™ “Los Angeles” Family

ADVANCED PRODUCT BRIEF : REV1.9 : JANUARY 2012

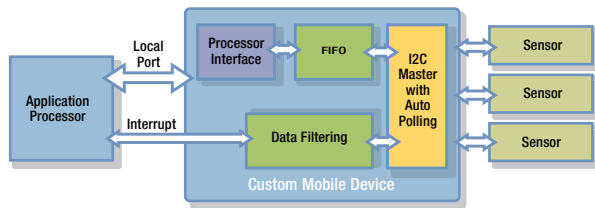
Custom Mobile Devices Solutions



Sensor Management in Smartphones

Sensors are changing the landscape of today's smartphones. Today's high-end smartphones can contain as many as 20 different sensors. Managing all these sensors while meeting power and performance targets can be a daunting task for smartphone designers. By using a Custom Mobile Device as a companion chip to an application processor (AP), various sensor related functions can be performed including:

- Sensor Detection: Perform battery insertion detection and audio insertion detection
- Sensor Expansion: Add sensors with different interfaces such as I²C, SPI, and SLIMbus
- Event Filtering: Use intelligent conditional filtering to only send interrupts to the processor under specific conditions
- Interrupt Aggregation: Collect interrupts from sensors and combine them into efficient summaries to the processor
- Auto Polling: Periodically seek sensor data while keeping the processor in low-power mode



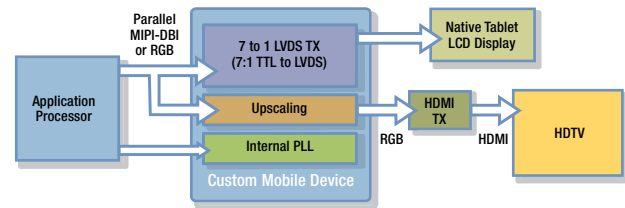
Battery-powered applications can save on power by using a SiliconBlue Custom Mobile Device to offload sensor management functions from the processor, keeping the processor in a low-power sleep mode as much as possible.



Video and Imaging in Tablets

Application processors (APs) used in tablets were originally designed for notebooks or smartphones. Many smartphone APs support only a single video output stream. With only one video stream, a problem arises when a tablet needs to drive an external display in addition to the local LCD. By using a Custom Mobile Device as a companion chip to an application processor, two video displays can be driven from the same video source. Typical video functions that can be supported include:

- Video Scaling: Upscaling or downscaling
- Color Space Conversion: YCbCr to RGB
- Parallel-to-serial or serial-to-parallel conversion
- 3D Video
- Image Rotation
- High Definition Video: Bandwidth of up to 525 Mbps, capable of supporting HD 720p @ 30/60 Hz or HD 1080p @ 30 Hz



Tablet applications can easily drive both the native LCD display as well as an external display by using a Custom Mobile Device to convert a single video output from the application processor to two video outputs.



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For more information, scan this
QR code with your mobile phone.

