

Solutions for Handheld Portable Applications

The Future of Handheld Electronics is in Your Hands

Quick Tips for Handheld Portable Designs

- Use low-power FPGAs optimized for battery-operated and portable electronics
- Optimize total system power using low-power, single-chip, small footprint FPGAs with portable-friendly power profiles
- Extend battery life with low-power modes
- Optimize for dynamic power using low-power layout
- Use on-chip flash memory to enable power-down and power-off modes of operation
- Use level 0 live-at-power-up (LAPU) nonvolatile FPGAs for quick system start-up tasks, system configuration, and supervision during voltage ramp-up
- Utilize the most secure programmable logic technology available for optimal IP protection
- Simplify your board design and lower your BOM with small footprint FPGAs
- Offload power-hungry functions to small power-optimized FPGAs to extend battery life

Driven by the benefits of convenience and increased productivity, the portable electronics market is booming. The continuing demand for smaller, more portable devices poses design challenges as end-users want more features, improved performance plus longer battery life. Actel's nonvolatile flash FPGAs are unique in their ability to meet all the demands of the portable electronics designer: low active and static power consumption, small footprint packages, design security, higher integration, and live at power-up operation.

Portable Friendly FPGAs

Extend Battery Life

Based on the Actel nonvolatile flash technology, IGLOO[®] FPGAs provide 1.2 V / 1.5 V operating voltage—the industry's lowest power consumption—as low as 2 μ W. IGLOO devices extend the battery life in portable electronics over 10x more than the nearest competitor.

Minimize Board Space Requirements

Actel supports a wide selection of small size packages, as small as 3x3 mm, that offer high I/O density in a minimal board space for the most space-constrained portable applications.

Protect Your Intellectual Property

Actel flash FPGAs support a built-in AES decryption engine and industry-leading flash-based AES-128 key for secure remote field updates over public networks with encrypted bitstream, protecting your design from invasive and noninvasive attacks.

Ready at Power-Up

No need for an external configuration device: Actel flash-based FPGAs are live at power-up to assist in system start-up tasks, system configuration, and supervision during voltage ramp-up.

Integration

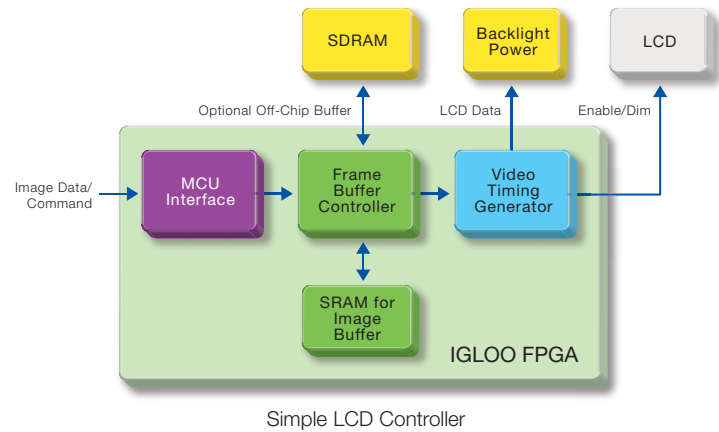
ARM[®] Cortex[™]-M1, the industry's most popular microcontroller for portable applications, integrates configurable analog, large flash memory blocks, comprehensive clock generation and management circuitry, plus low-power FPGA technology, and high-reliability programmable logic in a single device. Actel Fusion[®] mixed-signal FPGAs offer the only single-chip system management solution. This integration delivers cost and space savings of 50 percent or greater compared to discrete device system management implementations.

Display and Imaging

The variety of preferences and differing pricing requirements creates a need for many types of liquid crystal displays (LCD) in portable electronics. The resulting design challenge is to support all types of displays using a modular board.

Actel FPGA-based display solutions enable:

- Ability to drive different display panels regardless of interface, resolution, and manufacturer
- Wide selection of functions, such as color space conversion, scaling, alpha blending, onscreen display (OSD), frame buffer controller, and video timing generator



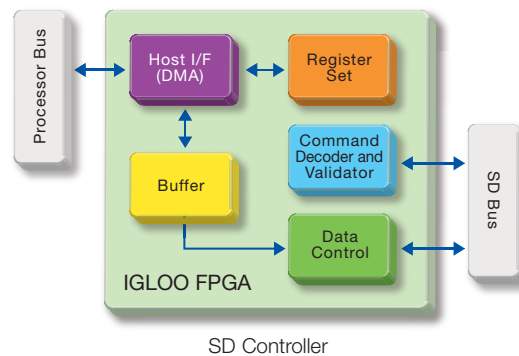
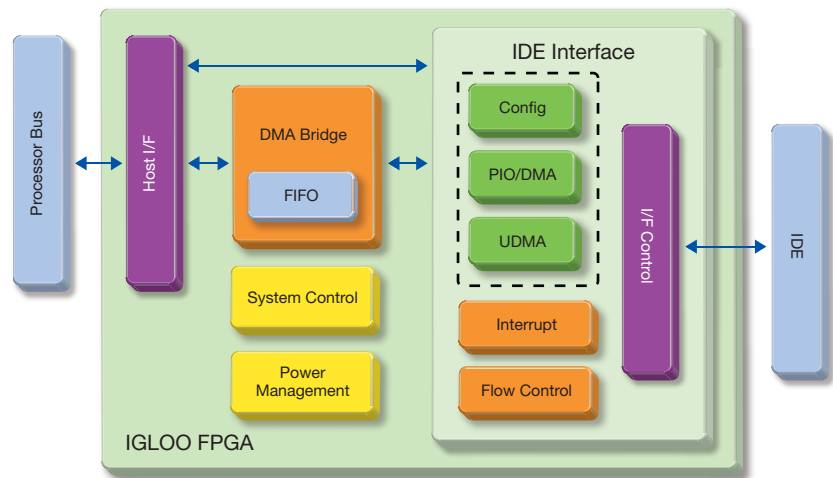
➔ For more information regarding display and imaging solutions, refer to www.actel.com/products/solutions/display

Storage

Rapid advances in and ready availability of small form factor hard disk drives and flash storage devices are driving the explosion of portable devices in the market place.

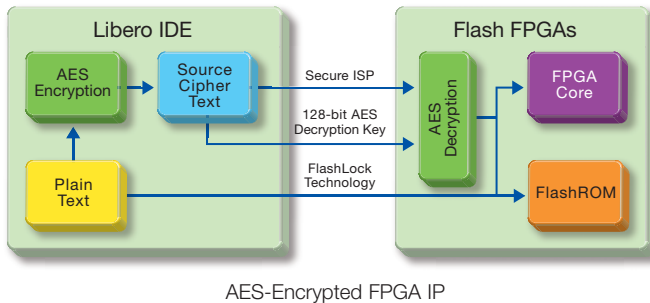
Actel FPGA-based storage solutions enable:

- Ability to support different storage interfaces on the same hardware platform, helping designers target multiple markets by changing only the FPGA configuration
- Controllers for popular storage interface standards such as SD, SDIO, microSD, MMC, and CE-ATA, which are optimized for low power



➔ For more information regarding storage solutions, refer to www.actel.com/products/solutions/storage

IP Protection



Some portable applications require the use of data or voice encryption for secured communication. Actel's technology and solutions secure your design against the most common attacks and significant threats to embedded systems: overbuilding, cloning, reverse engineering, and denial of service (DoS).

Actel FPGA-based design security solutions enable:

- A degree of flexibility and security unrivaled by SRAM FPGAs in the market today
- Integration of customer proprietary IP and security keys in one device, utilizing secure FlashLock® technology and user nonvolatile memory

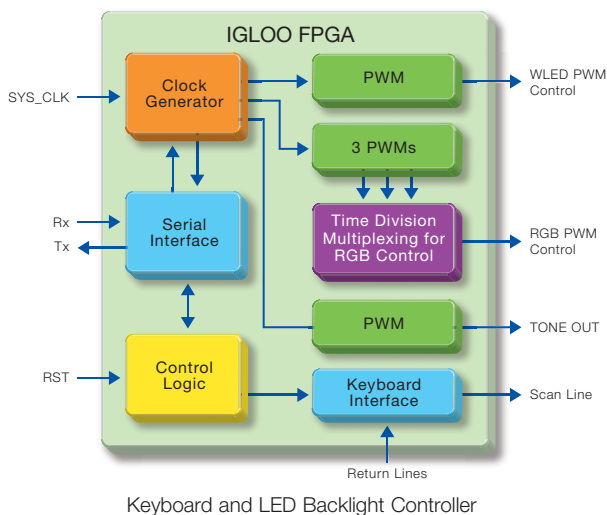
➔ For more information regarding IP protection solutions, refer to www.actel.com/products/solutions/security

Human Machine Interface

The interface between a system and its users (the human-machine interface or HMI) such as alphanumeric or QWERTY keypads, touch keypads and displays, and scroll wheels is a crucial design consideration in newer handheld portable devices.

Actel FPGA-based HMI solutions enable:

- Integration of several HMI control functions in a single, low-cost and small form factor FPGA
- Customized HMI controllers for functions such as keypad control, brightness control, color mixing, and tone generation



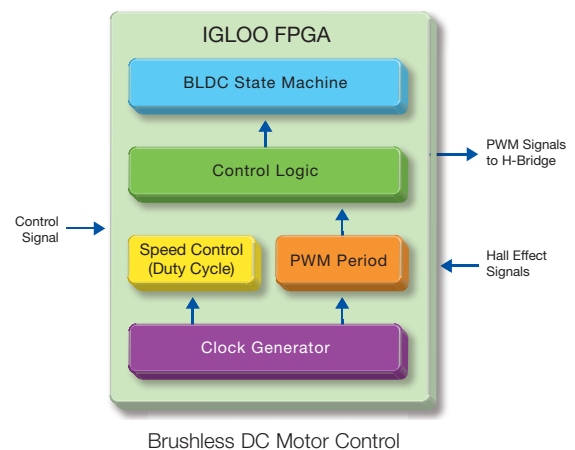
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Motor Control

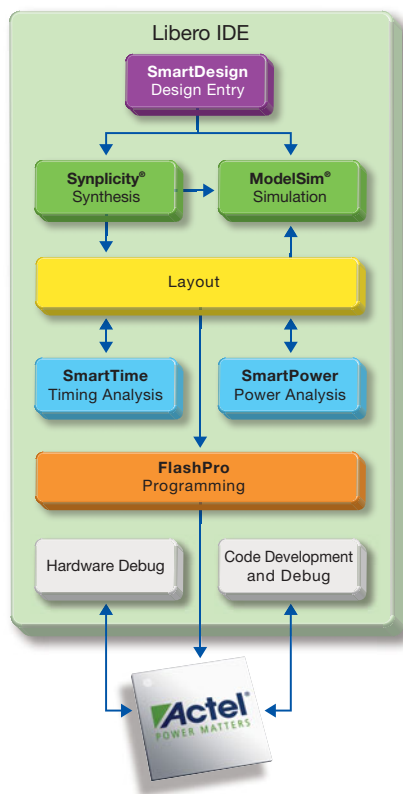
Stepper motors, servo motors, and actuators are used in many portable applications that require precise movement.

Actel FPGA-based motor control solutions enable:

- Motor control circuitry with increased reliability, smaller form factor, and reduced board space
- Robust, customizable pulse-width modulation (PWM) for more precise control algorithms



➔ For more information regarding motor control solutions, refer to www.actel.com/products/solutions/motorcontrol



Libero® Integrated Design Environment

Actel's Libero Integrated Design Environment (IDE) is a comprehensive design and physical implementation software suite that provides start-to-finish tools and design flow guidance for users at all levels. Libero IDE easily manages the entire FPGA design flow from design creation, synthesis, and simulation, through floorplanning, place-and-route, timing-constraint generation and analysis, power analysis, program file generation, and hardware debug.

Comprehensive Power Analysis Tools

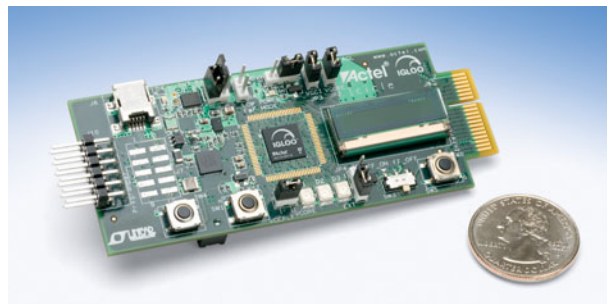
Actel provides accurate, comprehensive power analysis tools for its FPGAs to help you meet your portable system needs. The pre-netlist PowerCalculator tool helps in analyzing design implementation options for rapid power analysis scenarios and design partitioning. The netlist-based SmartPower tool can help in quickly managing and optimizing the portable design to the product's lowest power capabilities. This power analysis tool provides a comprehensive interface to easily realize the static power performance of the portable design. A design-level power summary includes average switching activity, ambient temperature, and junction temperature readings, offering the ability to optimize FPGA power and behavior to reduce total system power.

→ For more information regarding Libero IDE, refer to www.actel.com/products/software/libero

IGLOO Icicle Kit—Get Started Now!

Actel's IGLOO Icicle Kit, based on the 5 µW IGLOO device, is a low-cost, portable, low-power demonstration platform powered by built-in rechargeable Lithium-ion battery, USB cable, or external power. The Icicle evaluation board enables you to measure power consumption (dynamic, static, and Flash*Freeze™) with the core operating at either 1.2 V or 1.5 V. When using it in conjunction with Actel's power analysis tools, you will have a clear picture of application power consumption at each stage in your design.

Call your local sales rep or distributor now.



IGLOO Icicle Board

→ For more information regarding Actel's IGLOO Icicle Kit, refer to www.actel.com/products/hardware/devkits_boards/igloo_icicle.aspx

Actel is the leader in low-power FPGAs and mixed-signal FPGAs and offers the most comprehensive portfolio of system- and power-management solutions. Power Matters. Learn more at www.actel.com



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