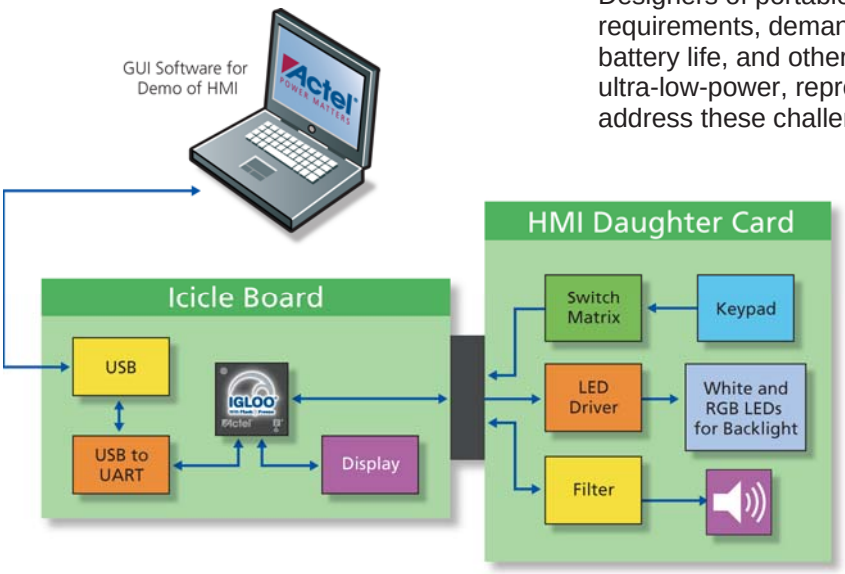
Product Brief

Human Machine Interface (HMI) Control Daughter Card for Icicle Kit

Features

- Works in Conjunction with Actel's IGLOO® Icicle Kit
- Daughter Card Contains a Standard Cell Phone Keypad, White LEDs, RGB LEDs, and a Speaker
- Powered through USB
- GUI Software Communicates with IGLOO through USB-to-UART
- Optional Hardware Control Using the Keypad
- Demonstrates
  - Keypad Control
  - Brightness Control for White LEDs
  - Color Mixing Control for RGB LEDs
- Available from Avnet http://em.avnet.com/acteligloohmicard
- Design Examples can be downloaded from the Actel website

In newer portable devices, HMI interfaces are becoming more prevalent. They are found in alphanumeric or qwerty keypads, touch keypad/displays with white or color LED backlighting, programmable keys/switches, joysticks, scroll wheels, and buzzers/speakers Designers of portable applications face rapidly changing HMI requirements, demand for very small form factors, improvements in battery life, and other complex design challenges. Actel's line of ultra-low-power, reprogrammable flash FPGAs provides solutions to address these challenges.

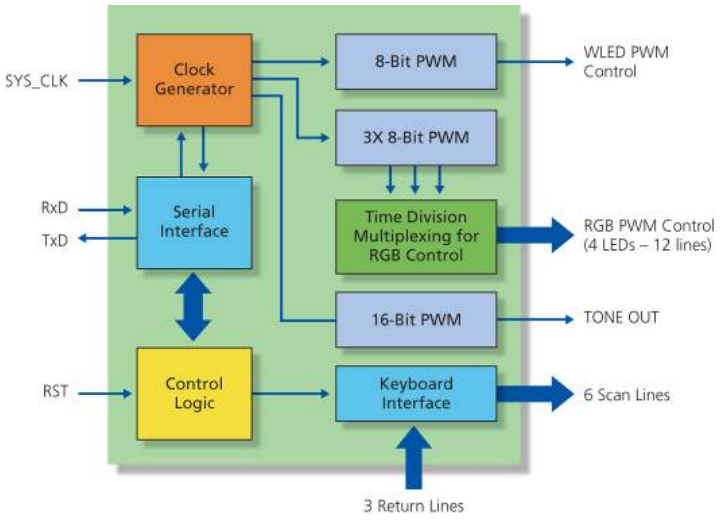


Actel flash-based FPGAs provide a multitude of advantages over standard application specific standard products (ASSP) and complex programmable logic devices (CPLD) and are an ideal choice for implementing HMI control and other control functions on a single device.

Actel offers a demonstration platform that showcases an IGLOO device as a controller for various HMI functions. The platform consists of an HMI daughter card for Actel's Icicle Kit.

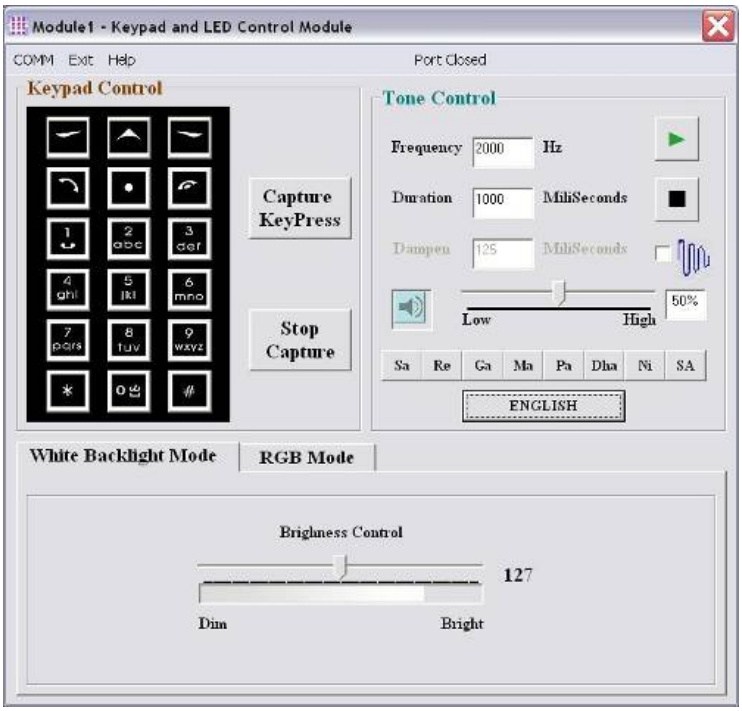
The HMI daughter card consists of a standard cell phone keypad with switches, white and RGB LEDs, and a small speaker. The figure above shows the block diagram of the Icicle board and the HMI daughter card. Actel provides a software program that runs on a PC to control different functions on the board. This software interfaces with the Icicle board through a USB cable.

HMI Control Daughter Card for Icicle Kit



Design Example

The block diagram to the left illustrates a design that is implemented on the IGLOO FPGA to control the keypad, brightness of white LEDs, color mixing for RGB LEDs, and tone generation. The keyboard control interfaces with a 6x3 keypad (18 keys). This control also contains debounce logic for the keys. The design interfaces with the LEDs and speaker via Pulse Width Modulation (PWM) logic. An 8-bit PWM is used to control brightness and dimming functions. When interfacing with the color (RGB) LEDs, three PWMs are time-division multiplexed to drive multiple LEDs simultaneously as well as reduce power consumption. The tone generator logic interfaces with a speaker on the board via a 16-bit PWM.



Software/Hardware Control and Demonstration

A Graphical User Interface (GUI) software or keypad can be used to control the HMI functions on the board. The key functions that can be demonstrated are as follows:

- Keypad sense
- White LED brightness
  - Using slide bar
- RGB color mixing
- Tone generation
  - Frequency, duration, and volume control

For more information regarding the HMI Control Daughter Card or Actel's ultra-low-power reprogrammable flash FPGAs, please contact your local Actel sales representative.

About Ishnatek

Ishnatek offers FPGA Design and hardware prototyping services. Ishnatek offers Design and Verification Services for embedded solutions. Ishnatek also offers intellectual property such as 8031, RTC, Timers, Enhanced PWM, UART/SIO/IrDA, I2C, LED Driver and Key scan, Parallel Port, ECP/EPP, etc., which can be building blocks for your embedded controller solutions.

About Actel

Attacking power consumption from both the chip and the system levels, Actel Corporation's innovative FPGAs and programmable system chip (PSC) solutions enable power-efficient design.