A3P-OLED
FPGA Evaluation Board with Color Display

A3P-OLED Features:
- 512 kbytes 35ns Non-volatile MRAM
- Available FPGA:
  - Actel ProASIC A3P250
  - Actel ProASIC A3P1000
- Integral 128 x 128 x 18 Color Graphic OLED Display
- (2) RS-232 ports
- (4) user LEDs
- 3-position navigation switch
- User reset button
- Up to 36 user I/Os
- USB-Powered with External 5-volt Option

Overview:
The A3P-OLED evaluation board supports designing and developing of customized Core8051 microcontroller applications. As shown above, the board features the Core8051 SoftCore implemented in an Actel ProASIC3 re-programmable FPGA, 512 kbytes of non-volatile Magneto-resistive Random Access Memory (MRAM), integral color OLED display, thirty-six undedicated user I/O’s, and an on-board USB-JTAG interface for programming the device as well as debugging the resulting microcontroller application.

Product Description:
A3P-OLED is a stand-alone multi-purpose controller module. It features a re-programmable FPGA, which can be programmed with the Core8051 microcontroller. The external 512 KB of MRAM allows for non-volatile storage of the controller data. The user program loaded on the module will always be available on power-up. The MRAM allows for very fast writing and read back of the contents; this provides an advantage over Flash memory which requires very long programming cycles.

The user interface consists of:
1. The OLED display module: a 128x128 pixel, 18-bit color device, with built-in controller interface, providing all the logic to control the display through the simple frame buffer interface to the microcontroller.
2. Quad LEDs providing simple status display.
3. A three position navigation switch.
4. A push-button which can be used for system reset or other function.

The microcontroller has direct control of four 8-bit bidirectional GPIO ports and dual RS-232 transceivers for optional serial port logic which could be implemented on the FPGA. The built-in USB microcontroller provides a JTAG interface to the FPGA, allowing for device reprogramming and debugging of the loaded processor core. This functionality is compatible with Actel's SoftConsole development system for Core8051.

The A3P-OLED is available with either the re-programmable Actel ProASIC3 A3P 250 or the A3P 1000 FPGA.
OLED Image Transfer GUI

Shipped with the A3P-OLED evaluation board is a convenient bitmap image transfer GUI that properly formats and then transfers 128 x 128 pixel color bit-mapped images from the PCs disk drive to the OLED card's memory via the Core8051 OLED card's USB-JTAG interface. Original images to be transferred can be easily cropped and re-sampled to the above format and then saved under a unique filename using commonly available tools such as Corel PhotoPaint, for example.

With the transfer GUI, up to 16 color images can be stored in the OLED card's memory in any order. After loading, the Core8051 demo software will display the last viewed image when powered up, and allow the user to navigate up or down through the images in the order loaded. Pressing in on the navigation switch will print a text menu of several choices for actions that can be selected by once again depressing the navigation switch.

OLED C Source Code:
- Initializes Core8051 CPU and OLED
- Compiles with Keil C51 and SDCC C Compilers
- Only for Use with A3P-OLED Card
- Monitors Navigation Switch and Responds
- Blinks User LEDs
- Bit-mapped Text Tables
- Included Functions:
  - Printing Text to OLED
  - Drawing Lines
  - Drawing Circles
  - Drawing Rectangles
  - Block Copy
  - Moving
  - Display Scrolling

Bitmap Image Transfer GUI

OLED Controller

Image: C:\BoxView\images\BURA
Font: 0
Position: 0
Load Image
Write Image
Read Image
Short Font
Long Font
Draw Foreground
Draw Background
Clear
Exit

USB ENUM DLL Win 32-bit
USBenumot 1.10.16 [Jul 24 2006]
FW ver: 1.49
Loaded images:
0: >>Tekmos<<
1: >>MAK04<<
2: >>PR0022<<
3: >>BURA<<
4: >>guage<<
5: >>DomTech<<
6: >>Rover<<
Opened: C:\BoxView\images\BURA.bmp
File size: 0x4436 [17462]
width: 128, Height: 128, Bits: 8
Offset: 0x436
Before colors read: 0x36; colorGrn: D x100
After colors read: 0x436
Current offset: 0x49 [126]