Domain Technologies, incorporated in 1991, offers over 10 years of experience in the field of emulation and debug tools for a wide variety of industry standard and proprietary 8, 16, 24, and 32-bit microcontroller, RISC, and DSP architectures.

Our products are a vital part of your company’s DSP development infrastructure! We are committed to improving the efficiency of embedded software development for our customers. Providing emulators and evaluation boards as well as boundary scanning and debugging software, our products promote cost reduction through time-to-market savings. Utilize our comprehensive debugging tools in conjunction with our boards for scalable and flexible testing of single DSPs, multiple DSPs, local access to multiple devices, and remote access to multiple devices.

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1 Introduction

Use the A3P-OLED evaluation board when designing and developing your microcontroller applications. The A3P-OLED evaluation board supports designing and developing of customized Silicon Laude SL8051 or Actel Core8051 microcontroller applications. As shown above, the board features the SL8051 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.

1.1 Package Contents

The A3P-OLED board ships with the following:

- USB Cable
- Installation CD with OLED Image Transfer GUI and Users Guide

1.2 Features

The A3P-OLED has the following features:

- Re-programmable Actel ProASIC3 A3P250 or A3P1000, Flash Based, FPGA
- 512 kbytes 35ns Non-volatile MRAM
- 128x128x18 Color OLED Display
• 2 RS-232 Ports
• 4 User LEDs
• 3-position Navigation Switch
• User Reset Button
• Up to 36 User I/Os
• Integrated USB-JTAG Interface
• USB-powered with External 5 Volt Option
• Dimensions 3"x2"

The A3P-OLED C Source code has the following features:
• Initializes SL8051 or Core8051 CPU and OLED
• Compiles with keil C51 and SDCC C Compilers
• Monitors Navigation Switch and Responds
• Blinks User LEDs
• Bit-mapped Text Tables
• Included Functions:
  o Printing Text to OLED
  o Drawing Lines
  o Drawing Circles
  o Drawing Rectangles
  o Block Copy
  o Moving
  o Display Scrolling

1.3 Related Components
Use Domain Technologies BoxView IDE in conjunction with the A3P-OLED’s JTAG interface to the FPGA, allowing for device reprogramming and debugging of the loaded processor core.

Domain Technologies also has the A3P-OLED-BASE board to provide a prototype area for circuit development. The base board schematics are included in the appendix for this document. For more information contact Domain Technologies or review www.domaintec.com.
2 Installation

Included with the A3P-OLED is a USB cable and installation CD. Verify they have been delivered with the module. The installation CD contains the image transfer GUI program.

Insert the installation CD into your CD ROM drive. If auto detect is enabled in your system environment setup, then the installation program will automatically launch. Otherwise, double-click the A3POLEDinstall.exe file located on the CD drive from within Windows Explorer. Follow the steps through the program to perform the installation of the A3P-OLED supporting software.

3 A3P-OLED Board Functionality

The A3P-OLED is a stand-alone multi-purpose controller module. It features a re-programmable FPGA, which can be programmed with the SL8051 (Silicon Laude) Core8051 (Actel) 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:
- 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.
- Quad LEDs providing simple status display.
- A three position navigation switch.
- 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.
4 Image Transfer GUI

The convenient OLED Image Transfer GUI properly formats and then transfers 128 x 128 pixel color bit-mapped images from the PCs disk drive to the OLED board's memory via the MRAM8051 OLED board'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 board's memory in any order. After loading, the MRAM8051 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.
Appendix A: Schematics

A3P-OLED Top:

Mini-B USB-JTAG STAPL Player and HMDX Interface

Actel A3P1000 FBGG256 FPGA

Push-Button Reset (underneath)

+5V SUPPLY GND
+3.3V VCCIO RESERVED RESERVED

4-Position Navigation Switch

4 User LEDs

128 x 128 x 18 Color Graphic OLED Display
A3P-OLED Bottom:
A3P-OLED-Base Board: