Embedded Systems Development Kit

Product Brief

Version 01
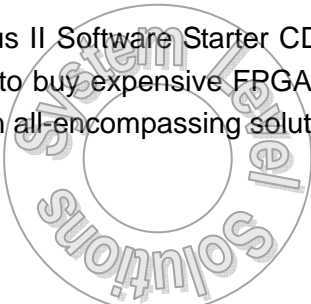
Introduction

The Embedded Systems Development kit provides a powerful, low-cost solution for prototyping and rapidly developing products. The board serves as an excellent means for system prototyping, emulation and hardware as well as software development. The board comes with a powerful Altera Cyclone FPGA. It gives scope to a hardware design engineer to design, prototype and test IP cores or any hardware design using HDLs like Verilog or VHDL. Along with that one can simulate and test ìCî or assembly code also. The entire environment helps to quickly implement any processor as well as any real time operating system on the ESDK. To show case the environment, SLS provides a powerful 8051 IDE (Integrated Development Environment) with the IP for an 8051 micro controller. The IP for an 8051 micro controller is pre-built and may be loaded into the FPGA. Then using the IDE, programs may be downloaded and executed on the system. The board has industry standard interconnections, Memory Subsystem, Multiple clocks for system design, JTAG Configuration, expansion headers for greater flexibility and capacity and additional user interface features. The board can be used for DSP applications by interfacing directly to a DSP processor or implementing DSP functions inside the FPGA. In short, it is a dual-purpose kit, which can be used for prototyping and developing VLSI designs as well as designing and developing microprocessor based embedded system designs.

The kit ships with Altera Quartus II Software Starter CD and Download cable so there is no need to buy expensive FPGA design software. Hence, the kit provides an all-encompassing solution.

Features:

1. Powerful Development Board for embedded system FPGA deigns

- Features an Altera EP1C6Q240 Device and EPCS1 Configuration device.5980 Logic Elements and 20 RAM Blocks, 2 PLLs, Maximum 185 user I/Os.

- Supports intellectual property based (IP-based) design both with and without a microprocessor.

2. Industry- standard interconnections

- USB 1.0 (full & low speed)

- Two RS 232 Ports with support for third also

- Parallel Port (IEEE1284)

- PS/2 Port

3. Memory Sub System

- 1Mbytes of SRAM

- 2Mbytes of FLASH

- 2Kbytes of I2C PROM

4. Multiple Clocks for system design

- 100/66 MHz CPU clock

- 33.33 MHz PCI clock

- 48 MHz USB clock

- 14.318 basic clock

5. JTAG and Active Serial download capability for ALTERA FPGA

6. Expansion headers for greater flexibility and capacity

- 5V Santa Cruz long Expansion Card Header provides more than 72 I/O for the development of additional boards providing various functionality

7. Additional user interface features

- One user-definable 4- bit switch block

- Four user-definable push button switches, and one global reset switch
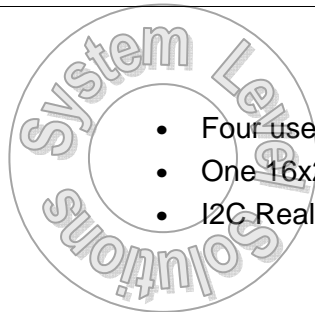
- Four user-definable LEDs
- One 16x2 character display LCD Module
- I2C Real time Clock

8051 IDE

In order to enhance the student experience with the ESDK, the IP for an 8051 microcontroller is pre-built and may be loaded into the FPGA. Then using the IDE, programs may be downloaded and executed on the system.

FIGURE 1. IDE
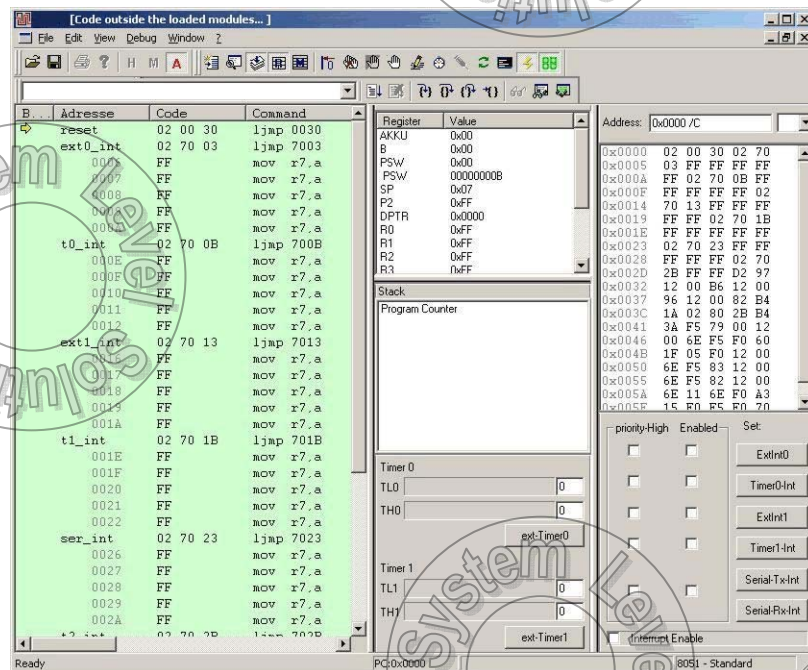
Features:

1. Cross Compiler
2. Assembler.

   Supports mixed language ('C' + Assembly) programming and in-line assembly also
3. Simulator
4. Emulator

   Download Intel Hex file,

   Run / single step through your source program etc
5. Many, many other features

How the ESDK is helpful?

ESDK board is a general-purpose board with lot may peripheral support.

1. With FPGA on the board, user can test any program written in Hardware Description Languages.
2. All the peripherals on the board are connected to the I/O lines of the FPGA, so user can download and test any application related to the available peripherals on the board.
3. Parallel port and serial port applications are most common and the board provides a parallel port and two serial ports. So user can test his applications on this board.
4. Apart from the parallel port and serial port application user can test his applications based on USB, PS2, and I2C etc.
5. With PS2 support user can interface a keyboard with the ESDK.
6. The board is also having a 16X2 character LCD, which can be used in the application.

7. User can test his memory related application as this board is having 1 M byte of SRAM and 2 M byte of FLASH and also 2 K byte of I2C PROM.

8. Apart from all these FPGA related programming and testing, ESDK board ships with the pre-built 8051 IP core. So any application that can be done with 8051 family micro controllers, can be tested and developed using this board.

9. With pre-built 8051 IP core ESDK comes with IDE software. Integrated Development Environment is set of tools for micro-controller application testing and development. IDE includes Cross Compiler, Assembler, Simulator and Emulator.

- Cross Compiler and Assembler:

Supports Assembly, C and mixed language (ëCí + Assembly) programming and creates ROMable code / Intel HEX format file

- Simulator:

SLS 8051 IDE Simulator provides all the necessary features to simulate user code. The figure above shows the main window of the IDE simulator.

- Emulator:

SLS 8051 IDE Emulator provides all the necessary features. Some of them are listed below:

1. Read and modify internal registers (registers and SFRs)

2. Read and modify external RAM locations

3. Run from a memory location

4. Load RAM with an Intel Hex file from the host computer

5. Single-step through a program

6. Call a user program as a subroutine.

7. Dump memory data to a terminal

8. Set up to 4 breakpoints

Apart from written over here there are lot many things that can be done using the ESDK board.

ESDK BOARD TOP VIEW

FIGURE 2. Embedded Systems Development Board Block Diagram.
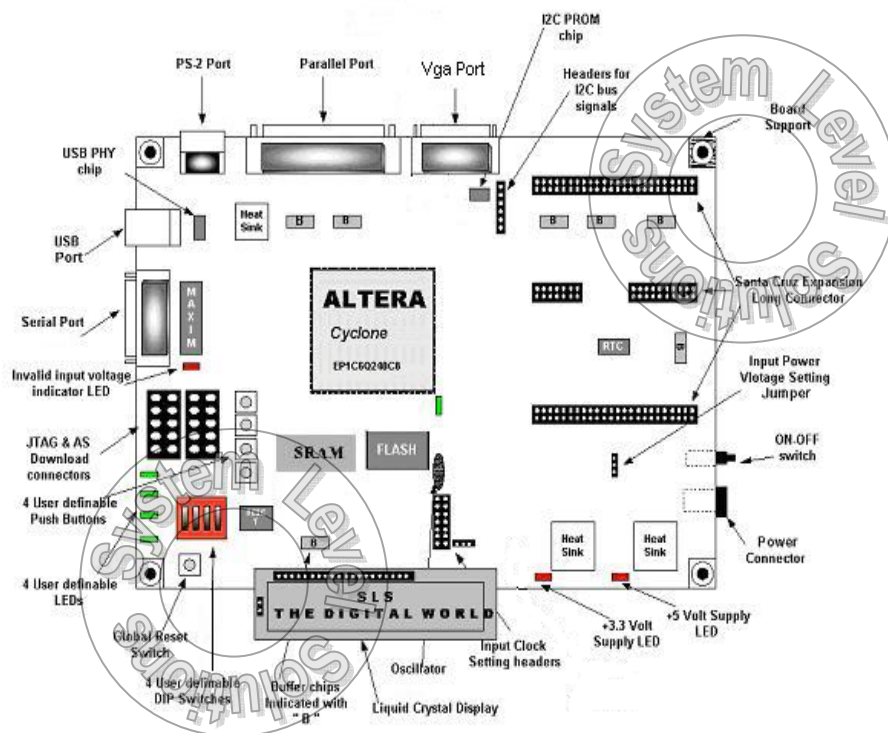
Minimum System Requirements

- Pentium class processor (faster systems give better software performance)
- SVGA monitor
- CD-ROM drive
- Parallel port for Byte Blaster(TM) II download cables
- Serial Port to operate Emulator of 8051 IP serial version
- TCP/IP networking protocol installed
- Windows 2000, Windows NT 4.0 with Service Pack 3 or later, or Windows XP
- At least 400MB free space on Hard Disk

Why SLS ESDK?

SLS offers the best value for the price as many features are extra add-ons for other competitor products or simply not available.

TABLE 1.

THE SLS SYSTEM SHIPS WITH	Features / Individual Price of the Hardware / Software offered by SLS competitors	Price offered by SLS
Altera QUARTUS II starter CD (for HDL coding, Schematic entry, State machine entry, synthesis, Simulation, Place and route, downloading program into powerful Cyclone FPGA chip)	Free Web Edition	INR 00.00
At least 2 hrs training	INR 2,000.00	INR 00.00

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THE SLS SYSTEM SHIPS WITH	Features / Individual Price of the Hardware / Software offered by SLS competitors	Price offered by SLS
IDE environment includes: Cross compiler Assembler Simulator, Emulator	INR 15,000.00 from S.P.J. Systems	INR 00.00
Byte Blaster II downlaod cable	$150.00 ~ INR 6,750.00 (from ALTERA's site which doesn't include ship-ping charges)	INR 00.00
8051 IP	Approx. INR 3,000.00 from any other vendor (a 8051 board and no VLSI IP)	INR 00.00
Serial Cable (Full Modem)	INR 60.00	INR 00.00
LCD display	available	INR 00.00
LED on board	available	INR 00.00
Serial port (Full modem)	available	INR 00.00
Parallel port	not available	INR 00.00
USB port	not available	INR 00.00
PS2 port	not available	INR 00.00
74 I/Os	not available	INR 00.00
128 KB SRAM	not available	INR 00.00
2 MB Flash	not available	INR 00.00
8 MB SDRAM	not available	INR 00.00
	INR 26,810.00	INR 00.00

SLS provides an additional value worth INR 26,810.00 and lot more unseen value which can be experienced only after using the ESDK.
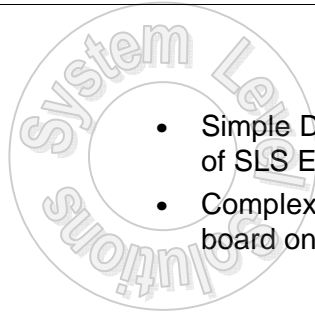
- Simple DSP applications can be implemented within the FPGA of SLS ESDK.
- Complex DSP applications can be implemented using snap on board on the SLS ESDK.