

## EMBEDDED SOFTWARE DESIGN PLATFORM

# ED-255EK

- Basic to advanced learning courses for Embedded Linux
- Intel PXA255(400MHz) high-performance microprocessor
- 6.4" TFT LCD, Ethernet 2port, Serial 3port, PCMCIA/CF/MMC interfaces
- FPGA Chip(Altera Cyclone 120,000Gate) mounted for SoC experiments
- Reliable hardware and abundant experiment contents for programming



### > EXPERIMENTS

- **Development Environment**
  - » Target Board, Host PC setup and connection
  - » Host PC's Development Tool setup, Environment setup (minicom, bootp, tftp, nfs, etc.)
  - » Cross Compiler and ARM Tool Chain setup
- **Boot Loader**
  - » u-boot compile and Boot Loader image creation
  - » Boot Loader's function and command processing
  - » Memory map setup and Boot Loader porting
  - » Hardware debugging method through Boot Loader
  - » Board porting using Boot Loader and JTAG
  - » Overview and structure of Linux Kernel
- **Kernel**
  - » Kernel source download and composition
  - » TFTP/NFS server build
  - » Embedded Linux porting and Kernel environment configuration
  - » Porting to device such as TFT LCD, Ethernet, Serial, PCMCIA, USB, CF, MMC/SD, AC97, etc.
- **File System**
  - » Embedded Linux compile
  - » Composition of Linux file system
  - » NFS Booting used at a development stage
- **Development stage**
  - » Ramdisk creation
  - » Ramdisk booting for completion of development
  - » Creation and mount of JFFS2 file system
- **FPGA/IO Module Device Driver**
  - » Concept of Device Driver
  - » Basic Character Device Driver
  - » LED Device Driver
  - » Six-FND Device Driver
  - » 20x2 Line Text LCD Device Driver
  - » 4x4 Key Switch Device Driver
  - » FPGA Design and Device Driver
  - » CMOS Camera Device Driver
- **Application Program**
  - » Program Compile using Development Utilities
  - » Device Driver application program(Programming)
  - » TCP/IP program(Programming)
  - » Goahead Web Server porting
  - » Board Control using CGI
- **GUI Program**
  - » Qt
  - » Qt/E and Qtopia
  - » Qt Development Environment setup
  - » Qtopia Compile
  - » Porting to a target board and testing program using NFS server
  - » System Packaging

## > APPLICATION

- Embedded System applications and experiments
- Web Server, Temperature Control, Control Program, Ubiquitous Applications
- Embedded Linux and WinCE experiments
- PDA, Set-top-box, Medical equipment, POS system, FA system, ATM equipment

## > CONFIGURATION

- ED-255EK : 1ea
- FPGA Module : 1ea
- Accessories(Cables, Stylus Pen, CD, User Manual)
- 11 Application Modules(options)

### Hardware

- **CPU**
  - » CPU : Intel XScale PXA255(400MHz)
- **Memory**
  - » FLASH : 32MByte(32bits access)
  - » SDRAM : 128MByte(32bits access)
  - » SRAM : 1MByte(32bits access)
- **Display**
  - » TFT LCD : Touch Pad(6.4inch), 16bits color, 640x480
- **Interface**
  - » Ethernet
    - › 10/100Mbps Ethernet(SMSC LAN91C111)-1port
    - › 10Mbps Ethernet(CS8900A)-1port
  - » Serial Port
    - › Full Function UART 1port
    - › Bluetooth UART 1port
  - » USB : Host(SL811HST), Client
  - » PS/2port : Keyboard, Mouse
  - » Touch-screen : ADS7846
  - » Slot : PCMCIA-1 Slot, CF-1 Slot, MMC/SD-1slot
  - » RTC : Epson RTC4513 Real Time Clock
- » IrDA : HDSL3600
- » I<sup>2</sup>C
  - › I<sup>2</sup>C EEPROM
  - › I<sup>2</sup>C Bus Connector
- **Control**
  - » LED : Status LED
- **Audio**
  - » Stereo I/O : Cirrus CS4202
- **Expansion Pin**
  - » Ext. I/O : 80pin x 2 Connector
  - » App. I/O : 20pin Connector
  - » Bluetooth I/O : 4Pin Connector
  - » Servo Motor : 4port
  - » I<sup>2</sup>C I/O : 2pin Connector
- **Debug**
  - » Multi-ICE : Multi-ICE 20pin Connector
  - » JTAG : PC Interface 10pin Connector
- **General**
  - » Input Voltage : AC 220V
  - » Dimension : 490(W) x 160(H) x 320(D)mm

### Software

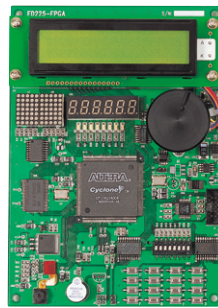
- **OS**
  - » Qplus/ESTO : ETRI Linux & Embedded System Tool Kit
  - » WinCE, net 4.2 : Windows CE
  - » Boot Loader : uboot-1.0.0
  - » Kernel : Linux-2.4.19
  - » File System
    - › Ramdisk : Image, Source
- **Software**
  - » Applications
    - › Network Application Source
    - › Qt/Embedded Image
    - › Graphic & Text Display Control
    - › Application Source
    - › I/O Interface Application Source
  - » Devices
    - › 8 bits LED
    - › 7-segment Control Source
    - › UART Application Source(Bootloader)
    - › Web Service & Remote Control Source
    - › AC97 Audio Codec Driver Source
    - › ADS7846 Touch-screen Driver Source
    - › PCMCIA Device Driver Source
    - › RTC4513 Device Driver Source
    - › IrDA Device Driver Source
    - › MMC/SD Device Driver Source
    - › CF Card Device Driver Source
    - › LAN91C111 Device Driver Source
    - › LAN CS8900A Device Driver Source

**ACCESSORIES**

- Cable(Parallel, Serial, Ethernet, USB) : 1set
- JTAG DownloadCable : 1ea
- Touch Screen Pen(Stylus Pen) : 1ea
- CD(Program Source, Circuit Diagram) : 1ea
- User Manual
- AC Power Cord : 1ea

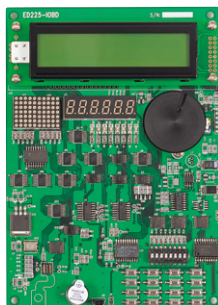
**OPTIONS**

- I/O Module(1ea)
- Application Module(11ea)
- Carrying case for Application Module(1ea)

**ED-255FPGA Module**

- ED-255FPGA Module has standalone power supply capability and is made up independently from the embedded system for performing FPGA experiments. Capable of application design for CMOS Camera Module, Text-LCD, 7-Segment, LED, Dot Matrix, Buzzer, Step Motor, ADC/DAC on the Board.

- ED-255FPGA Module can be used independently or link to the ED-255EK Embedded System
- Altera FPGA Chip(Cyclone 120,000 Gate) is mounted for the SoC learning courses. Reliable hardware and abundant programming contents
- Capable of remote control using GoAhead WebServer for ED-255FPGA board devices
- Communicates with Intel PXA255 for device control
- Altera FPGA Cyclone 120,000 gates
- VHDL code programming experiments by linking to PXA255 or as standalone(independently)
  - » CMOS Camera
  - » AD/DA Converter
  - » Dot Matrix(10 x 7)
  - » 4x4 Key Switch
  - » 8P DIP Switch
  - » 20x2 Line Text LCD
  - » tapping Motor
  - » Buzzer

**I/O Module(Optional)**

- It's one of the system's 12 application modules
- Direct control by Intel PXA255 system
- Same devices as listed for FPGA module (excluding CMOS Camera)