• Embedded &
Microprocessor Control

IsoTest®

EMBEDDED & DSP DESIGN PLATFORM

ED-DAVINCI

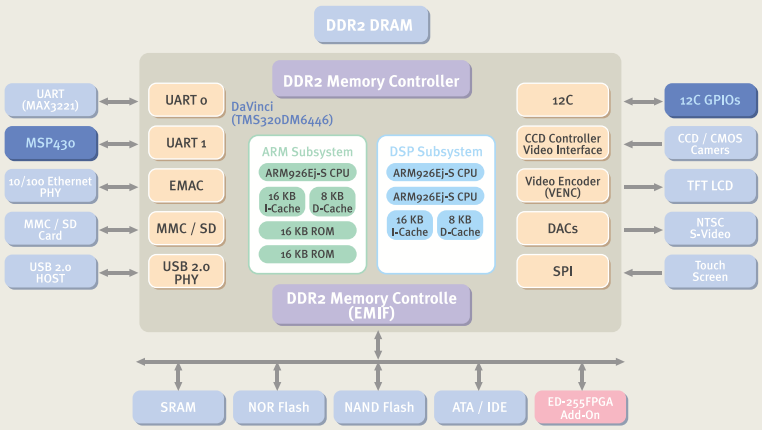
- One-stop training kit for Embedded System, DSP and FPGA
- Texas Instruments' Davinci Processor containing the built-in ARM Core and DSP Core
  - 297MHz ARM926EJ-S™ ARM Core
  - 594MHz TMS320C64x+™ DSP Core
- ALTERA Cyclone 120,000Gate, a FPGA Chip, mounted for interlocking experiments on SoC
- Embedded System gearing with DSP and FPGA
- Embedded LINUX for basic to advanced courses
- 7″ Wide TFT LCD, 10/100 Ethernet 1Port, Serial 1Port, SD/MMC, and other interfaces

> SPECIFICATIONS

- **CPU**
  - » TMS320DM6446
    - › ARM926EJ-S™(297MHz) ARM Core
    - › TMS320C64x+™(594MHz) DSP Core
- **Memory**
  - » DDR2 DRAM 256MByte
  - » NOR FLASH 32MByte
  - » NAND FLASH 64MByte
  - » SRAM 4MByte
- **Display**
  - » 7″ Wide TFT-LCD, PD064VT2
  - » 7″ Wide Touch Screen
- **Serial Communication** : UART 1Port
- **Ethernet** : 10/100 Ethernet 1Port
- **USB 2.0** : HOST 1Port
- **IDE** : 44Pin IDE Connector
- **Card Slot** : SD/MMC - 1Slot
- **IrDA** : TSOP34840
- **Video**
  - » Video In : NTSC
  - » Video Out : DAC, TFT LCD
- **Audio**
  - » Audio In : MIC Line
  - » Audio out : Headphone, Stereo
- **LED** : I2C-GPIO LED
- **Add-on Board** : ED-255FPGA Board
- **Expansion Connector** : 160-pin Expansion Connector(80 x 2)
- **Debug** : PC Interface 10-pin Connector
- **Input Voltage** : AC 220V
- **Dimension** : 490(W) x 160(H) x 320(D)mm, 15kg

ACCESSORIES

- AC Power Cord : 1ea
- Cable(JTAG, Serial, UTP) : 1set
- Source Data CD : 1ea
- User Manual



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CYCLONE II NIOS II DEVELOPMENT PLATFORM

ED-SOPC

- The NIOS II Development platform consists of the "Base Board" and "Cyclone II Mother Board"
- The Base Board provides human interface, display, clocking, expansion connectors, and communication ports
- The Mother Board provides FPGA resources, memory, and additional communication port
- NIOS II Platform is ideal for Embedded System, SoC, and EDA circuit designs

• EDA
- » Graphics input circuit design based on QUARTUSII
- » Gray coder design based on VHDL
- » Counter design contains asynchronism clear and synchronization enable
- » Dynamic display circuit design of 8-bit 7-segment numeric tubes
- » Design of numerical control frequency division machine
- » Mixture input circuit design of graph and VHDL
- » Design of 4-bit parallel multiplication
- » Design of basic trigger
- » Design of 4-bit full-adder
- » Design of matrix keyboard display circuit
- » Display experiment of 16*16 lattice display
- » Design of controllable pulse generator
- » Design of positive and negative pulse-wide signal generation by digital control method
- » Experiment on DC motor rotate speed measuring
- » Experiment on traffic light control circuit
- » Design of multiple function digital clock
- » Design of sequential detector
- » Design of digital stopwatch
- » Design of taxi accounting-fee machine
- » Design of VGA color strip signal generator

• NIOSII32
- » Hello Nios II
- » Switch, Key-press and LED
- » The design of timer
- » Keyboard scan and the display of 7-segment
- » The UART communication
- » The serial ADC and DAC
- » IIC EEPROM
- » The digital Thermometer of 1-Wire
- » SDRAM
- » DMA Controller
- » The Read-write of NAND Flash
- » The Display of LCD
- » RTC real time clock
- » The Enumeration of USB1.1
- » Audio Frequency CODEC
- » PS/2 Keyboard
- » PS/2 mouse
- » IrDA Infrared communication
- » Ethernet Network Port Communication

• DSP Builder
- » From DSP Builder to HDL-signal generator based on DSP Builder
- » From DSP Builder to SOPC Builder-Signal generator controlling by software
- » IP nucleus application based on DSP Builder-example of FFT nucleus

• Comprehensive design experiment
- » SD card read and write experiment
- » CF card read and write experiment
- » Design closed-loop controller of DC motor
- » Design simple digital oscillograph
- » Design simple spectrum analyzer
- » USB download text reader(download text from PC with USB interface, show in LCD screen, control by keyboard)
- » Show video collection
- » MP3 decoder based on VHDL language
- » Touch-screen graphics experiment based on NIOSII
- » Design calculator based on NIOSII
- » Design greedy snake game based on NIOSII

CYCLONE II NIOS II DEVELOPMENT PLATFORM

ED-SOPC

> SPECIFICATIONS

- **Platform**
  - » Cyclone II EP2C35F672C8 FPGA
  - » 640xx 480 Pixel 9˚Color LCD with touch screen
  - » RTC
  - » DC-Motor/Step-Motor
  - » VGA interface
  - » x1 channel video output
  - » x1 RS232 port
  - » x1 Ethernet Interface (RTL8019AS)
  - » x1 USB1.1 Interface(PDIUSBD12)
  - » SD Card Interface (for SD/MMC Cards)
  - » SPI/IIC Interface for Audio CODEC Module
  - » x2 PS2 Interface
  - » CF Card/IDE Hard Disk Module
  - » 12bit Serial ADC/DAC (SPI)
  - » 8bit parallel ADC/DAC (40MSample/s)
  - » Touch Screen Controller
  - » IIC Interface EEPROM
  - » 1-Wire Digital thermometer sensor
  - » Expansion Interface
  - » x1 IrDA Module
  - » x1 Digital (supports 24MHz, 12MHz , 6MHz, 1MHz, 100KHz, 10KHz, 1KHz, 100Hz, 10Hz and 1Hz clocks)
  - » x1 Analog Signal (support 80~8KHz, amp 0~3.3V adjust Sine/Square/Sawtooth Wave)
  - » x1 16 x 16 matrix LED
  - » x1 4 x 4 Keypad
  - » x8 bit 7-seg LED
  - » x8 lamps LED
  - » x8 Dip Switch
  - » x8 Lamps Button

- **Mother Board**
  - » Altera Cyclone II EP2C35F672C8
  - » Configure chip EPCS16
  - » 1MB(256K x 32) SRAM
  - » 8MB NOR Flash ROM
  - » 32MB SDRAM
  - » 64MB NAND Flash ROM
  - » Audio CODEC I/O Interface
  - » USB2.0 Interface
  - » RS232 Interface
  - » 10/100M Ethernet Interface
  - » 50MHz System clock
  - » x4 User LED
  - » x4 User Keypad
  - » x1 7-Seg LED
  - » x1 Reset button
  - » x2 expansion Interface
  - » AS mode/JTAG mode Interface

GENRAL CHARACTERISTICS

- Dimension : 340(W) x 140(H) x 480(D)mm
- Weight : 5.5Kg

ACCESSORIES

- Mother Board and Experiment platform
- Sample Code(with Quartus II 5.0 Software and NIOSII IDE)
- USB Download JTAG Cable
- Serial1 Cable
- USB Cable
- Power Cable
- Ethernet Cross Cable
- USB-Blaster User guide
- Mother board Hardware Guide

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EMBEDDED SOFTWARE DESIGN MULTI PLATFORM

ED-270M

- Foundation for the Ubiquitous System Build
- Intel PXA 270 high performance processors
- 6.4″ TFT LCD, Ethernet 3Port, Serial 3Port, PCMCIA/CF/MMC interfaces
- FPGA Chip Altera Cyclone 4,000 LEs(12,000 LEs Option) for SoC courses
- Processor Core Board & CMOS Image Sensor
- Various types of application modules such as Bluetooth, GPS, IrDA, RF, Voice Recognition, Ultrasonic, Robot Arm, 485 Communication Modules(Options)

> I/O MODULE(OPTION)

- Refer to page 21 on of ED-255EK Model

> APPLICATION MODULES (OPTIONS:11EA)

- RS-485 Receiver
- RS-485 Transreceiver
- IrDA Receiver
- IrDA Transreceiver
- RF Receiver
- RF Transreceiver
- Blutooth
- GPS
- Voice
- Ultra Wave
- Robot Arm

> SPECIFICATIONS

Hardware

- **CPU**
  - » CPU
    - › ED-270M : PXA270(520MHz)
- **Memory**
  - » FLASH
    - › ED-270M : 32MByte
  - » 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)-2port
    - › 10Mbps Ethernet(CS8900A)-1port
  - » Serial Port
    - › Full Function UART-1port, Standard UART-1port
    - › Bluetooth UART-1port
  - » USB 1.1 : Host(SL811HST), Client
  - » USB 2.0 : TD242LP(HOST, OTG)
  - » PS/2 Port : Keyboard, Mouse
  - » Touch-Screen : ADS7846
  - » Slot : PCMCIA - 1slot, CF-1slot, MMC/SD-1slot
  - » RTC : Epson RTC4513 Real Time Clock
  - » IrDA : HDSL3600
  - » IDE : 44pin IDE Connector
  - » PCI : 32bit PCI-1slot
- **Control**
  - » LED : Status LED
- **Audio**
  - » Stereo I/O : Cirrus CS4202
- **Pin**
  - » Ext. I/O : 80pinx2 Connector
  - » App. I/O : 20pin Connector
  - » Bluetooth I/O : 6pin Connector
  - » Servo Motor : 4port
- **Debug**
  - » Multi-ICE : Multi-ICE 20Pin Connector
  - » JTAG : PC Interface 10Pin Connector
- **Basic Characteristics**
  - » Input Voltage : 220V
  - » Size : 490(W)x160(H)x320(D)mm

EMBEDDED SOFTWARE DESIGN MULTI PLATFORM

ED-270M

Software

- **OS**
  - » Qplus/ESTO : ETRI Linux & Embedded System Tool Kit
  - » WinCE, net 4.2 : Window CE
  - » Boot Loader : uboot-1.1.4
  - » Kernel : Linux-2.6.11
  - » File System : Ramdisk(Image, Source)
- **Software**
  - » Application
    - › Network Application Source
    - › Qt/Embedded Image
    - › Graphic & Text Display Control
    - › Application Source
    - › I/O Interface Application Source
  - » Device Driver
    - › 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 Download Cable : 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)

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

EMBEDDED SOFTWARE DESIGN PLATFORM

ED-255EK

> 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
  - » I²C
    - › I²C EEPROM
    - › I²C 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
  - » I²C I/O : 2pin Connecter
- **Debug**
  - » Multi-ICE : Multi-ICE 20pin Connector
  - » JTAG : PC Interface 10pin Connector
- **General**
  - » Input Voltage : AC 220V
  - » Dimension : 490(W)x160(H)x320(D)mm

Software

- **OS**
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  - » 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

EMBEDDED SOFTWARE DESIGN PLATFORM

ED-255EK

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(10x7)
  - » 4x4 Key Switch
  - » 8P DIP Switch
  - » 20x2 Line Text LCD
  - » tepping Motor
  - » Buzzer

I/O Module(Option)

- 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)