

# Embedded Software Design Platform

## XPO-Simputer



### ➤ Salient Features

- Aesthetically designed injection moulded enclosure.
- Intel 200MHz PXA255 RISC processor with 32MB Flash Memory and 64MB SDRAM.
- Xscale architecture suitable for mobile computing technology (HDD) and facilitates Kernel space programming as compared to user space programming available on competing models.
- User's/Student's (Application programming Guide) Guide provided with emphasis on Embedded Linux C programming & OS architecture.
- Supported system programming by interfacing PC to Simputer kit through serial port.
- Simputer fills the gap between Industry demand (Linux based embedded) & student exposure levels.



### ➤ Technical Specifications for Simputer

<b>User Manual</b>	Set of Manuals: Student Workshop, Instructor Guide and technical Reference, Sample programs on floppy /CD.
<b>Speed</b>	32MHz crystal to drive power, RTC and interrupt controller.
<b>Smartcard Interface</b>	ISO 7816 Smartcard Interface.
<b>Serial Interface</b>	A) 1 full serial port (with flow control) at RS232 level B) 1 3 wire serial port at RS232 levels.
<b>Connectivity Options</b>	USB Master, RS232 Communication.
<b>Display</b>	Advanced TFT color with LED backlight 240*320 LCD color with EL backlight.
<b>Key Board</b>	Touch tablet overlay on LCD.
<b>System Software</b>	<ul style="list-style-type: none"> <li>◆ Linux kernel 2.4.25</li> <li>◆ Xwindows</li> <li>◆ GTK Support</li> <li>◆ TCP/IP,FTP,Telnet</li> <li>◆ SCEZ Smartcard Framework</li> <li>◆ PC Sync Software</li> </ul>
<b>Power Supply</b>	SMPS 5V needed, Ext AC adaptor
<b>Additional Resources</b>	<ul style="list-style-type: none"> <li>◆ 24 pin 3V tolerant GPIO Interface, Vcc, GND pins provided.</li> <li>◆ Payflex of 1K RAM Smartcard</li> <li>◆ Application Boards interfacing with GPIOs.</li> <li>◆ External Audio I/O and O/P.</li> </ul>
<b>Mechanical Details</b>	250 x 250 x 60mm
<b>Controller Device</b>	Intel PXA 255 , 32 bit processor.
<b>Manufacturer</b>	Intel

<b>Package</b>	256-pin PBGA
<b>Capacity Ram Flash /Eeprom</b>	2 SDRAM Banks of 64MBytes 32MBytes
<b>Operating Freq.</b>	32MHz
<b>Ethernet</b>	10/100 Ethernet Support
<b>USB</b>	A) 2 USB 1.1 Downstream (Master) Ports (1 internal ) B) 1 USB UPSTREAM (Slave) Port
<b>Audio</b>	On board speaker and support for external speaker/ mic via head phone sockets. audio support through ac97 codec.
<b>Kit Operating System</b>	Red hat Linux 2.4.25 for PXA
<b>Communication Port</b>	Com Port
<b>HOST (Native) (Not in scope of supply)</b>	P4 PC with PATA or IDE HDD (20MB), 128 MB RAM min for Linux, Linux operating system Red hat 2.4.25 onwards or Fedora 4 onwards.
<b>General Purpose IOs</b>	24 pin IOs with Vcc and GND for different applications.
<b>Execution Method</b>	From Flash
<b>Programming Language +</b>	C Language and GTK Programming Student workbook.
<b>PXA Cross-Compilation Tool chain</b>	Provided in SDK CD to cross compile applications and kernel.
<b>Applications Source Code and Linux and Smartcard PDFs</b>	Provided in the Application CD.

## ➤ List of Experiments

**Orientation:** Simple GTK programming, cross compiling, downloading into Simputer. There is layered study of Linux OS internals i. e. from top(user) to bottom(H/w),divided into following parts .

- Learn different Linux commands.
- Understand hierarchy of Linux OS.
- Learn an example of Embedded System.

### 1. Simple GTK applications: (User space programming)

- Create GTK window consisting of buttons and handle the signal events.
- Draw various types of arrows.
- Display the color selection window to change background color of window.
- Create Spin buttons and Radio buttons.
- Create Textbox and Menu bars using GTK.

### 2. Smartcard applications:(Interface between user and kernel space)

- Check the type of inserted smartcard.
- Read from smartcard and write to smartcard.

### 3. GPIOs and char driver:(kernel space programming)

- Configure GPIOs for different applications.
- How to write a char driver to read from and write into the memory.

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