

EMBEDDED SOFTWARE DESIGN PLATFORM (Model : XPO-SIMPUTER)



TECHNICAL SPECIFICATIONS FOR SIMPUTER

User Manual	Set of Manuals: Student Workshop, Instructor Guide and technical Reference, Sample programs on floppy /CD.
Speed	32MHz crystal to drive power, RTC and interrupt controller.
Smartcard Interface	ISO 7816 Smartcard Interface.
Serial Interface	A) 1 full serial port (with flow control) at RS232 level B) 1 3 wire serial port at RS232 levels.
Connectivity Options	USB Master, RS232 Communication.
Display	Advanced TFT color with LED backlight 240*320 LCD color with EL backlight.
Keyboard	Touch tablet overlay on LCD.
System Software	<ul style="list-style-type: none"> ● Linux kernel 2.4.25 ● Xwindows ● GTK Support ● TCP/IP,FTP,Telnet ● SCEZ Smartcard Framework ● PC Sync Software
Power Supply	SMPS 5V needed, Ext AC adaptor
Additional Resources	<ul style="list-style-type: none"> ● 24 pin 3V tolerant GPIO Interface, Vcc, GND pins provided. ● Payflex of 1K RAM Smartcard ● Application Boards interfacing with GPIOs. ● External Audio I/O and O/P.
Mechanical Details	250 x 250 x 60mm
Controller Device	Intel PXA 255, 32 bit processor or better
Manufacturer	Intel
Package	256 - pin PBGA
Capacity Ram Flash / Eeprom	2 SDRAM Banks of 64MBytes 32 Mbytes
Operating Freq.	32MHz
Ethernet	10/100 Ethernet Support
USB	A) 2 USB 1.1 Downstream (Master) Ports (1 internal) B) 1 USB UPSTREAM (Slave) Port

Audio	On board speaker and support for external speaker/ mic via head phone sockets. audio support through ac97 codec.
Kit Operating System	Red hat Linux 2.4.25 for PXA
Communication Port	Com port
HOST (Native) (Not in scope of supply)	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.
General Purpose IOs	24 pin IOs with Vcc and GND for different applications.
Execution Method	From Flash
Programming Language +	C Language and GTK Programming Student workbook.
PXA Cross-Compilation Tool chain	Provided in SDK CD to cross compile applications and kernel.
Applications Source Code and Linux and Smartcard PDFs	Provided in the Application CD

List of Experiments

Orientation: Learn different Linux commands on Simputer Kit terminal and write Simple C/GTK applications, cross compile & 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.

Note : These are the startup programs to study and understand mobile handheld device. Students can go to depth and complexity to build applications.

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 smart card,
 - Implementation of smartcard Reader/Write.
3. GPIOs and char driver:(kernel space programming)
 - Write a GPIO char device driver (kernel level programming)
 - Write a user space program, to access GPIO's for various applications
 - Write a char driver to read from it and write into char memory for ARM based embedded system.
4. Add & Remove kernel modules: (kernel space programming)
 - Write a Linux kernel module for simputer kit kernel and add or remove it dynamically.

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.

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