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EMBADDED SYSTEM TRAINER

HBE-EMPOS II

- Equipped with 400MHz high-performance, low-electricity 32bit rISC processor PXA255

- Suitable for diverse applied software development with plentiful memory of 128MByte

- Network application with two 10/100 Base-T Ethernets

Features

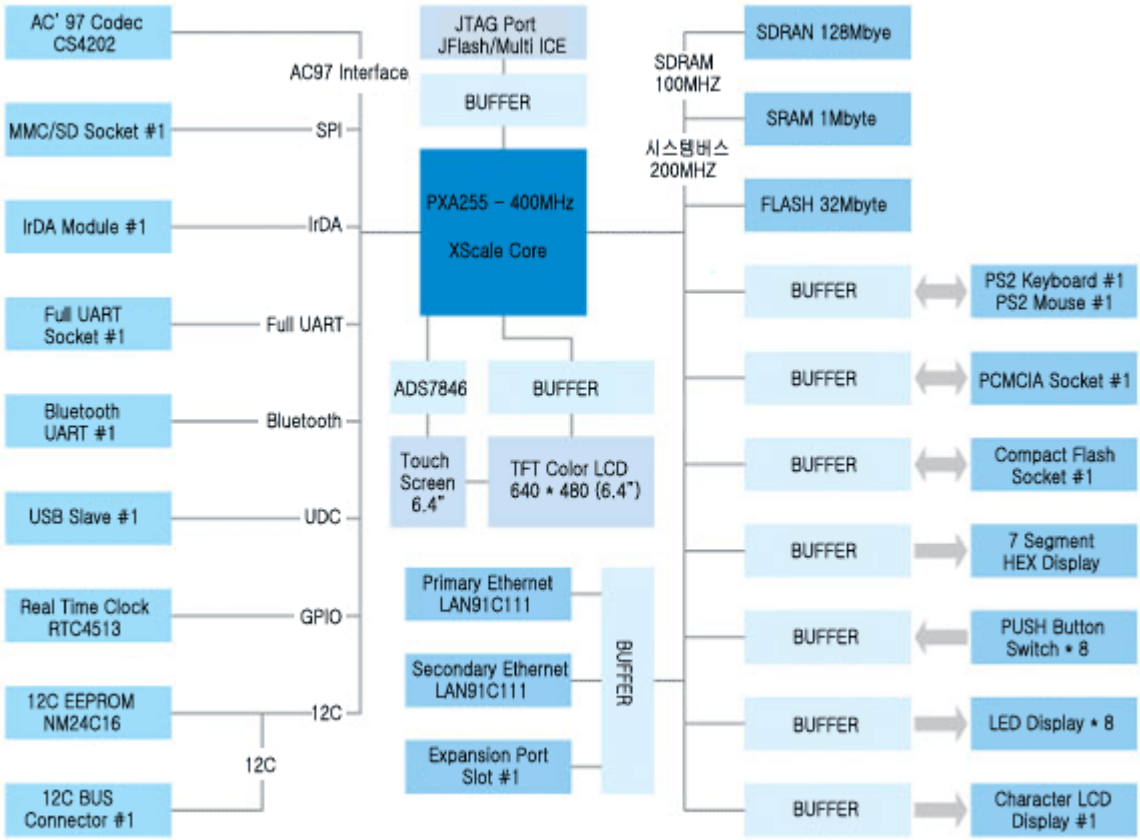
1. The latest processor of Intel Corporation, X scale(PXA255) embedded processor that present cutting edge devices(PDA, industrial use and board, etc) are equipped with is not restricted to the embedded processor related education but applied to the actual product development
2. Equipped with SRAM such as Intel Strata Flash Memory of 32MByte and SDRAM, 1Mbyte of 128Mbyte, applied programs are realized in the plentiful memory environment.
3. Capable of utilizing in diverse forms of multimedia application programs by being basically equipped with 6.4 inch color TFT LCD. As the touch screen environment is also provided, it is used as the environment of PDA application program development
4. Phonetic and music-related multimedia programs can be used with a stereo codec.
5. Applied program environment in network and Internet setting can be developed and utilized through tow 10/100Mbps Ethernet environment provided by this equipment. Besides, one-to-one high-speed communication is possible as USB(Host/Slave) is built in it.
6. By providing such comparatively controllable diverse input and output devices as TEXT LCD, 7 Segment, LED, Push Button Switch, GPIO to the beginners of the embedded system, the system is made easily accessible to them. And separate extension port is provided.
7. Web server can be applied as various kinds of web programs including the embedded web server is possible and real time data processing is also possible
8. Practices of embedded Linux, WinCE and Real-time OS are possible
9. Practices of logic circuit and Soc development through FPGA 120,000 gate extension module.
10. Various application practices using image sensor (CIS camera module) are possible (security system, media player, etc)
11. Tests of convenient development environment and diverse application exercises by using PS2 & USB Mouse, Keyboard are possible

Practice Themes

1. Linux command
2. Linux utilization
3. Series communication environment setting
4. bootp, tftp, nfs environment setting
5. Cross compiler environment construction
6. Boot loader usage and image fusing
7. Input and output device control by using boot loader
8. Kernel patch and kernel image generation
9. RAM disk generation
10. Approach to the virtual address through mmap
11. LED control program
12. 7 segment control program
13. TEXT LCD control program
14. Hello device driver module
15. LED device driver module
16. 7 segment device driver module
17. TEXT LCD device driver module
18. Push button device driver module
19. GPIO LED Push button device driver module
20. LED control using system calling
21. Web server porting
22. HTML/CGI program
23. Socket programming
24. Talk programming
25. Linkage of USB storage device
26. USB key board
27. LCD control using frame buffer
28. Qt/E program
29. Qt/E applied program
30. Qtopia establishment
31. Qtopia window manager

SPECITICATION

ITEM	Specification	ITEM	Specification
CPU	Intel XScale PXA-255 (400MHz)	Expansion	Intel StrongARM SA1111 extension port
Memory	FLASH 32MByte (32bits Access)	Debugging	JTAG (PC Interface)
	Intel Strata Flash (capable of extending 64MByte)	PS2 Port	Port for the connection of either keyboard or mouse
	SDRAM 128MByte (32bits Access)	Touch Screen	Burr Brown ADS7846
	SRAM 1MByte (32Bits Access)	PCMCAI	1 Slot
Display	TFT Graphic LCD (6.4inch,16bit Color, 640×480)	CF	1 Slot
	Touch Pad (6.4inch, over 1000×1000)	MMC/SD	1 Slot
	2Lines×20Character Text LCD (Back Light)	RTC	Epson RTC4513 Real Time Clock Module
Ethernet	10/100Mbps Ethernet (SMSC LAN91C111)	IrDA	HDSL3600
Serial	Full Function UART Slot Bluetooth UART 1 Slot	I2C	I2C EEPROM I2C Bus Connector
Audio	Cirrus CS4202	Others	- Electric power source (AC 85~264V Free Voltage Input) - Cable (Power, Parallel, Serial, Ethernet, USB) - JTAG Download cable - Touch screen input tool(Stylus pen) - Software, manual CD
USB	Slave (PC Connectivity)		
LED	Four 7-Segment LED Eight LED		



Software Environment

. Boot loader development environment
. Cross compiler (ARM Tool Chain)
. Hardware monitoring [Minicom(Linux),HyperTerminal(Windows)]
. JTAG Interface (JTAG Write Program)
. QT/Embedded GUI development environment
. Web & CGI development environment

Software Specifications

EMBEDDED LINUX (OS)	. Boot loader Source(Monitor Program) & image	
	. Linux Kernel 2.4.19 (Xscale & EMPOSII Patch) source & image	
	. Root File System Ramdisk (Busy Box) source & Image	
	. Network Application Source	chat server & client talk server & client
	. Qt/Embedded source & image	Address Book, Media Player, Terminal Image viewer, Calendar, Graphic games Clock, Spreadsheet, Text Editor Control Panel, Virtual keyboard, Handwriting etc..
	. Graphic & Text Display Control, Application Source	
	. I/O Interface Application Source	8Bit Button Switch, LED, 7-Segment Control Source
	. UART Application Source (Boot loader)	
	. Web Service	Goahead Embedded Webserver porting CGI/HTML (I/O Device Control Source)

EMBEDDED LINUX (OS)	. 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	
	USB Host Driver Source	Provide USB Mass Storage USB Keyboard & Mouse Application source
	. Text web browser lynx, links	
	. Java Virtual machine - blackdown 1.1.8	
	. Network Analyzer - tcpdump	
Win CE.NET 4.2 (OS)	. Win CE.NET 4.2 boot loader porting	
	. Win CE.NET 4.2 kernel porting	
	. Touch screen device driver	
	. Network device driver	
	. USB Client(Active Sync) device driver	
	. Sound device driver	
	. CF device driver	
	. PCMCIA(wireless LAN) device driver	
	. Application : USB Active Sync	
Realtime OS C/OS-II	. I/O Device Controller	Text LCD, LED, 7SEGMENT, GPIO LED
Network Security	. OpenSSH	
	. Tcpdump(network monitoring)	
	. VNC(remote control)	

Extension Board

[HBE – EMP2CYC]

1. FPGA module with diverse functions used in connection with EMPOS II
2. Independent FPGA experiment separated from EMPOS II (provide +5VDC adaptor)
3. Equipped with Altera FPGA Cyclone 120,000 gate
4. Provision of VHDL practice code, Dot Matrix, Text LCD, LED, Step Motor, KeyPAD, camera (CMOS Image Sensor) application
5. Built-in USB 1.1 Host
6. 12bit AD/DAC (ADC 8 channel, DAC 2 channel)
7. Capable of linking CMOS camera
8. Basic equipment of SRAM (256x16 bit)
9. Provide 50 pin extension port
10. Built-in 16keypad(4x4)
11. Built-in 16x2 letter-type LCD
12. Built-in Dot Matrix LED of 10x7
13. Software design environment practice of ALTERA Quartus II

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[Wireless]

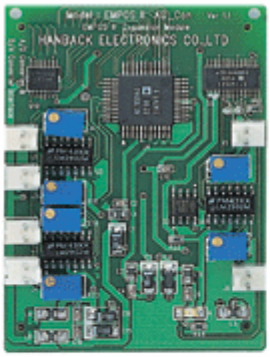
1. Provide diverse wireless environment
2. Equipped with Bluetooth, RF, GPS

■ Bluetooth specifications

1. Use AT command
2. 99% reception rate within 30m
3. 99% reception rate within 30m
4. UART interface
5. PDA Compatibility

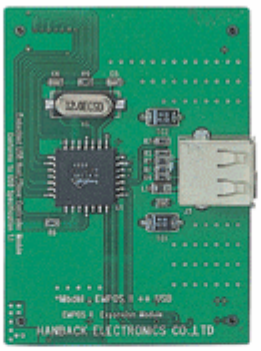
■ RF specifications

1. Maximum 230K bps
2. Provide 2.4GHz Zigbee(IEEE 802.15.4)



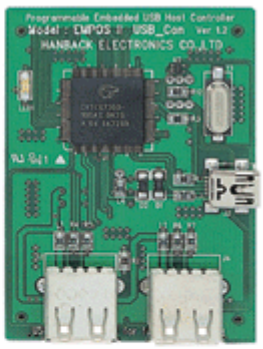
[ADC/DAC]

1. ADC 12bit
2. DAC 12bit
3. Provide ADC scope realization exercises
4. Provide function generator realization exercises



[USB 1.1 Host]

1. Use of SL811HS chip
2. Memory card, keyboard and mouse providing COMB: SiRF Binary Protocols(38,400)



[USB 2.0 Host]

1. Cypress CY7C67300
2. Provide hard disk, memory card, Bluetooth, keyboard, mouse