NK9312 Evaluation Board

➢ A Complete Evaluation Kit for Cirrus Logic EP9312/EP9315 ARM920T Microcontroller
➢ RS232, USB Host, 10/100M Ethernet, LCD Interface, VGA, IIS, DMA, AC97...
➢ Capable of supporting Linux, WinCE or any embedded operating system

The NK9312 Evaluation Board is a full-featured evaluation board using the Cirrus Logic EP9312/EP9315 processor, which are the ones in a series of ARM920T-based processors. The ARM920T microprocessor core with separate 16 Kbyte 64-way set-associative instruction and data caches is augmented by the MaverickCrunch™ co-processor. The proprietary MaverickKey™ unique hardware programmed IDs provide an excellent solution to the growing concern over secure Web content and commerce.

The ARM920T on the EP9312/EP9315 functions with a maximum operating clock rate of 200MHz. A high performance 1/10/100 Mbps Ethernet Media Access Controller (EMAC) is included along with external interfaces to SPI and I2S Audio, Raster/LCD (with touch screen interface), IDE storage peripherals, and keyboard or keypad peripherals. A three-port USB host and three UARTs are included as well.

The NK9312 Evaluation Board is a convenient and easy-to-operate evaluation platform. The NK9312 EVB provides the user with the ability to evaluate the EP9312/EP9315 capabilities; image quality and

NK9312 Evaluation Board with EP9312 Processor

feature set that is delivered through a system oriented evaluation development board. Peripheral devices such as an IDE interface, VGA, LCD interface, video encoder, USB ports, analog audio input, analog audio output, AC97 codec, 10/100 Ethernet, RS-232, and PS-2 keyboard interface provide an effective way to evaluate the EP9312/EP9315 in a complete system environment. The board with EP9315 processor has a PCMCIA interface on the rear of the board which supports one 16-bit PCMCIA PC Card to add memory, mass storage and I/O capabilities to computer systems and thus can be used to further broaden the options of a designer's platform while with EP9312 processor will not support. The LCD and Raster interface of EP9315 is with a graphics accelerator which is used in the system to off load graphics operations from the processor.

The software included with the development kit is WINCE.net 4.2 BSP / Embedded Linux 2.4.21 source code and a download utility. The WINCE.net BSP source code provides the user with the ability to test some of the subsystems such as IDE interface, LCD/VGA, Ethernet, PS/2, UART, USB Host, IIS, AC97, etc. on the NK9312 Evaluation Board. What we provide along with embedded Linux 2.4.21 kernel source code are redboot, QT demo and Linux cross-compilation tool chain. The download utility provides a means to program a binary image into the flash memory on the NK9312 Evaluation Board.

Moreover an optional LCD display with touch-screen hardware is available for this development board and can be easily connected to an existing interface. Source code of WinCE.net 4.2 BSP for this device is also provided.

NK9312 Evaluation Board with EP9315 processor and a PCMCIA interface on the rare of the board

Application Development

The NK9312 Evaluation Board is an ideal platform on which to develop application code for an ARM920T processor target. The Embest Integrated Development Environment is an inexpensive, full-featured development tool that runs under Windows, providing an excellent software development capability for any sized initial application. After building your image, you can use one of Embests' JTAG In Circuit Emulation tools or Flash Programmer to download the image onto the NK9312 Evaluation Board.

Optional Development Tools

✓ *Integrated Development Environment*: The IDE includes editor, GNU ARM compiler, debugger, project manager, Flash Programmer, simulator and JTAG emulator. It supports all ARM7 and ARM9 processor families, runs under Windows and supports both ANSI C and ARM assembly language.

✓ *Flash Programmer*: A powerful tool for programming on-chip or external flash memory. It supports all targets based on ARM7 and ARM9 core processors and virtually nearly all manufacture's flash chips.

✓ *ARM Emulator*: A standard parallel port JTAG Emulator for the ARM processor.

✓ *PowerICE*: An enhanced parallel port JTAG Emulator that operates at 120Kbs.

✓ *UnetICE*: This ICE connects to your USB or Ethernet port to the ARM JTAG interface, allowing both flash programming and debugging (up to 800kbps).

Hardware Description

The Cirrus Logic EP9312 processor consists of 32-bit RISC (ARM920T) CPU core, separate 16KB instruction cache and 16KB data cache, MMU to handle virtual memory management, EIDE, Ethernet, three-port USB2.0 host, three UARTs, IrDA Interface, LCD& touch screen interface, SPI port, AC97 interface, IIS interface, 32-bit SDRAM interface, 32/16/8 SRAM/Flash/ROM interface, Serial EEPROM interface, Real-time clock with software trim, 12-ch DMA, Boot ROM, Dual PLLs control all clock domains, Watchdog timer, 16 enhanced GPIOs including interrupt capability and 31 additional optional GPIOs multiplexed on peripherals. The EP9315 processor has all features of EP9312 and additionally its peripheral devices include a PCMCIA interface while EP9312 is without.

The NK9312 Evaluation Board exposes many of these features to the user in support of developing specific solutions. This board is characterized as follows:

- ✓ Dimensions: 140x200mm
- ✓ Processor: Cirrus Logic EP9312 based on 32-bit ARM920T core microcontrollers (optional for EP9315)
- ✓ Power input: DC12.0V
- ✓ 32M NOR Flash Memory
- ✓ 64M 32bit SDRAM
- ✓ 12 CHANNELS DMA
- ✓ LCD Display and Touch-Screen interface
- ✓ Analog VGA connection
- ✓ Composite Video and S-Video Output Connections
- ✓ IDE Interface
- ✓ Triple Port USB Host
- ✓ 20pin standard JTAG interface
- ✓ Real-Time Clock
- ✓ I2S Interface
- ✓ AC97 Module
- ✓ 8*8 Keyboard interface
- ✓ PS/2 Interface
- ✓ 3 UARTs. One is RS485, and the other two are RS232.
- ✓ 10/100Mbps Ethernet Interface
- ✓ PCMCIA interface (for EP9315)

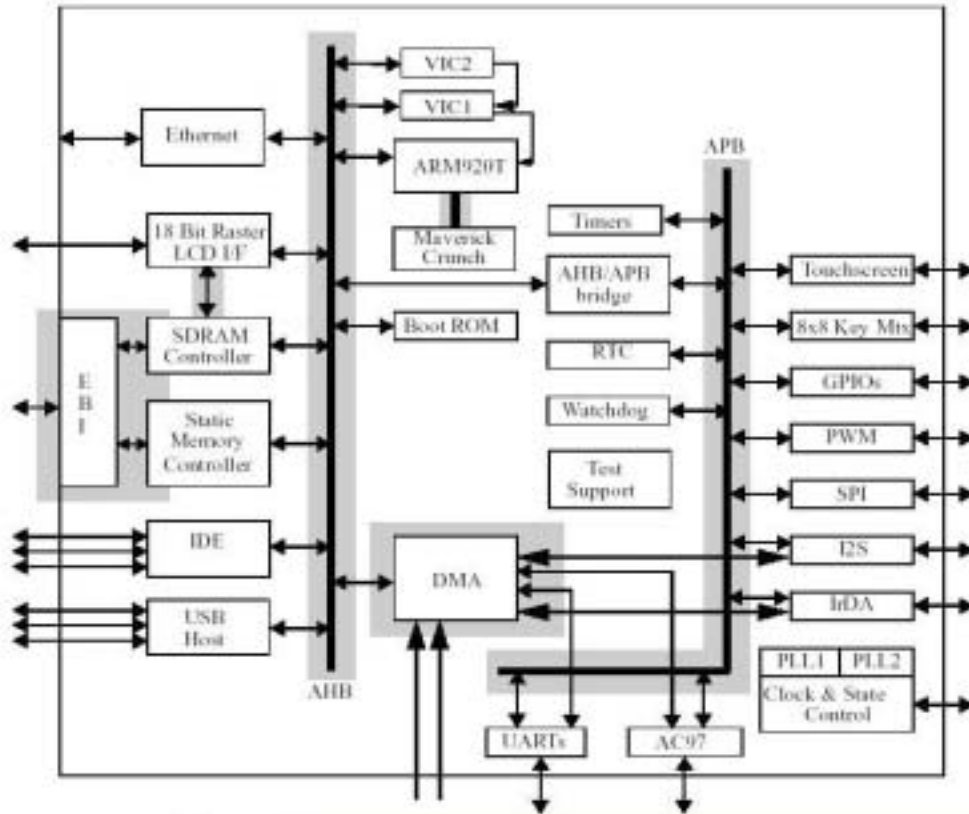*EP9312 Block Diagram*
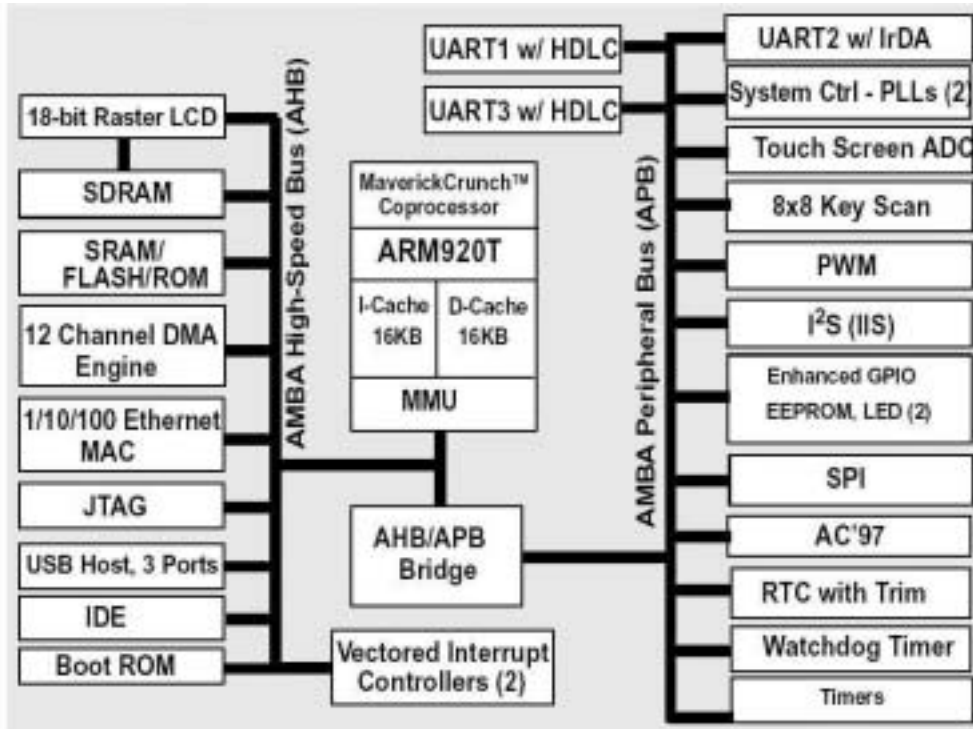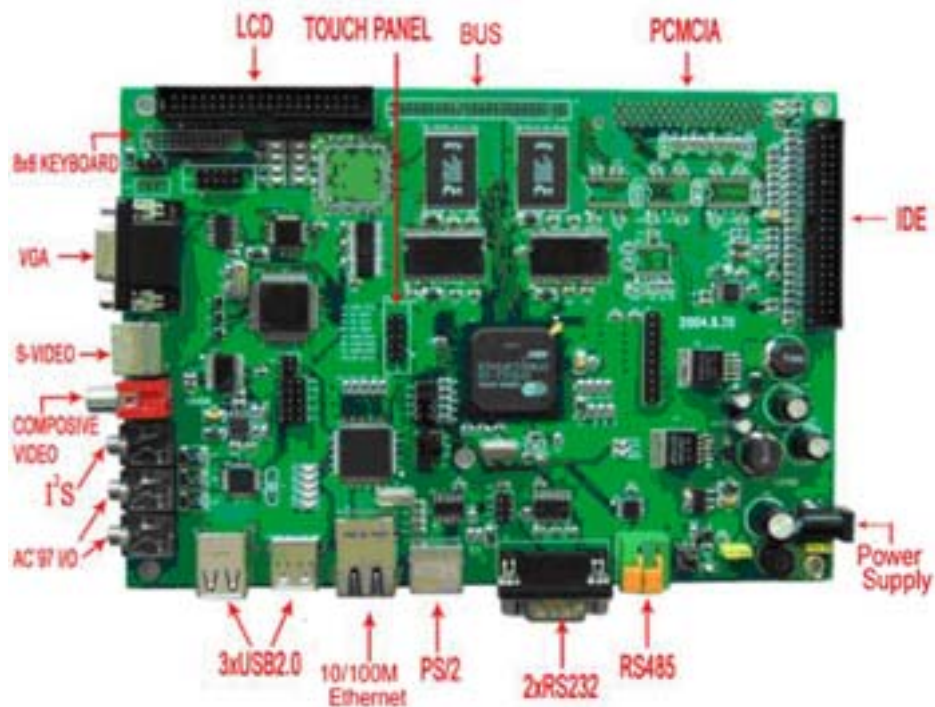

EP9312 Block Diagram
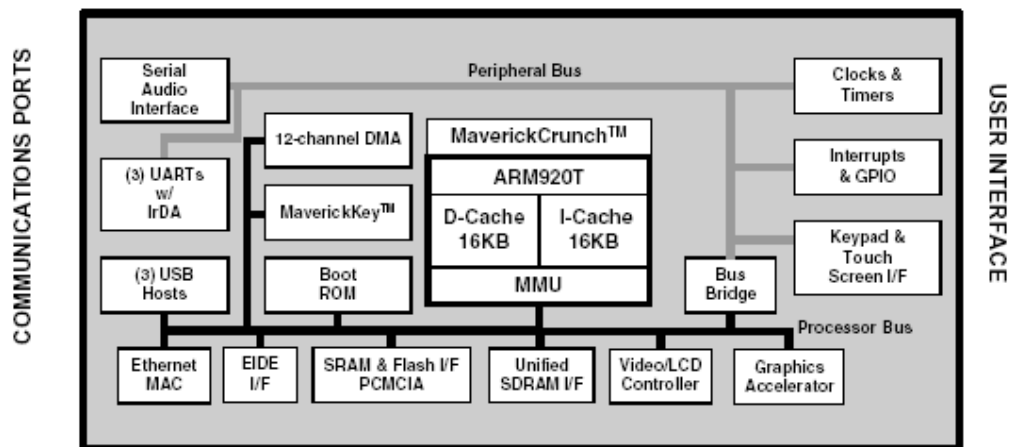
EP9315 Block Diagram

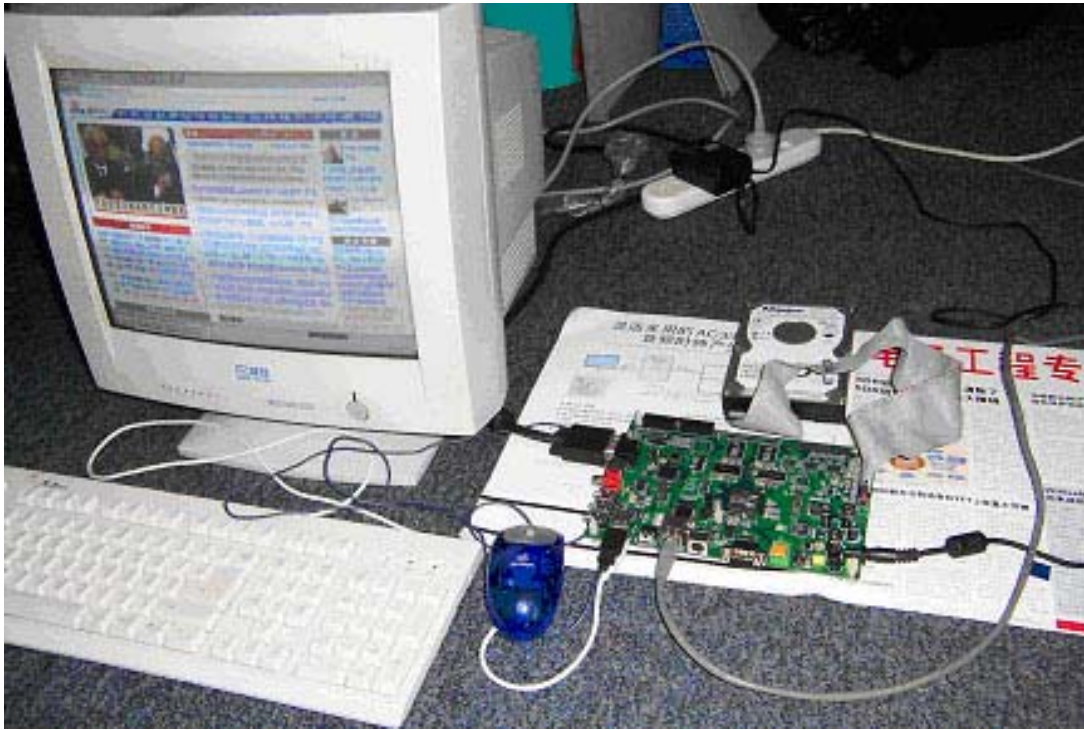**EP9315 Block Diagram**

EP9312 Main Data Paths

EP9312 Main Data Paths

Embest NK9312 Main Interfaces Introduction
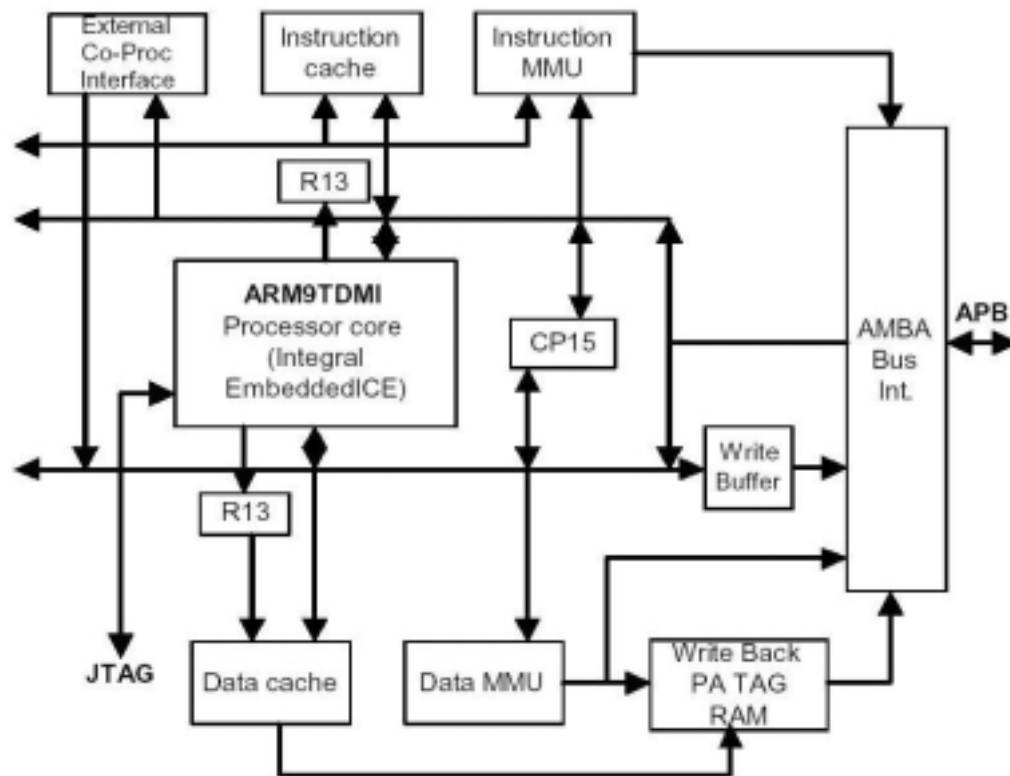
Connect to PC

(VGA 800x600x16bitx75fps, 80G Hard disc, USB, keyboard, mouse, WINCE, website view)

Connect to TV

ARM920T Block Diagram

Software Description

The software included with the development kit are WINCE.net 4.2 BSP / Embedded Linux 2.4.21 kernel and a download utility. All of that are in source code. The WINCE.net BSP provides the user with the ability to test some of the subsystems such as IDE interface, LCD/VGA, Ethernet, PS/2, UART, USB Host, IIS, AC97, etc. of the NK9312 Evaluation Board. What we provide along with Embedded Linux 2.4.21 kernel are drivers, redboot and Linux cross-compilation tool chain.

More information of software resource provided can be found at the following details:

- ✓ WinCE.net 4.2 BSP (all in source code), it includes:
  - ➢ Eboot for WinCE
  - ➢ Hardware drivers, include:
    - ◆ ATAPI/IDE driver
    - ◆ Accelerated Display driver
    - ◆ Flat Display driver
    - ◆ Ep931x Internal Ethernet Debug driver
    - ◆ PS/2 keyboard driver
    - ◆ Cherry keyboard/Keypad driver
    - ◆ Serial mouse driver
    - ◆ Serial driver
    - ◆ Wave device driver
    - ◆ Internal Ethernet NDIS driver

◆ USB driver
- ✓ ARM Linux for EP9312/EP9315 kernel 2.4.21 (source code)
- ✓ Linux Cross-Compiler tool chain 2.95.3
- ✓ Redboot for Linux
- ✓ Drivers under Linux (all in source code)
- ✓ PC Downloader

Order Information

NK9312 Evaluation Board Kit contains an NK9312 Evaluation Board, complete development tools and software resource in a low price.

Order No.	EBD2_1	EBD2_2
Item	NK9312 Evaluation Board	
Description	Board with EP9312 processor	Board with EP9315 processor
CD-ROM	• WinCE.net 4.2 BSP • ARM Linux for EP9312/EP9315 kernel 2.4.21 • PC downloader • user manual • circuit schematic drawing	
Development tools	• Linux cross-compiler tool	
Others	• Serial Cable • Ethernet Cable • 12V DC power supply	
Optional hardware	• 640 x 480 6.4" TFT LCD & Touch Screen for NK9312 board, with a tiny board to supply backlight power.	
Option Tools	Embest IDE for ARM Development Tools Suite I, II or III includes: • IDE, editor, GNU ARM Compiler and Linker, debugger, full registered version • Embest PowerICE or Embest Emulator, Embest UnetICE • Embest Flash Programmer	

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