EBV ARM Guide

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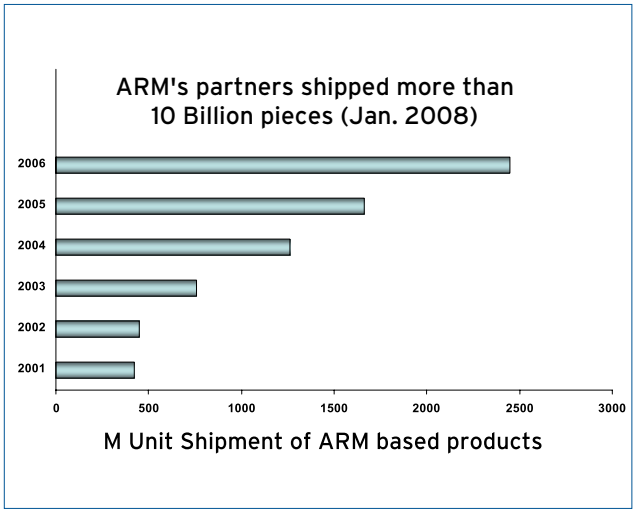
The trend in the consumer electronics sector is shifting towards complex products, with many electronic devices working together more effectively.

ARM is a proven architecture based on more than 10 years' experience. Today, ARM leads the world in 32-bit RISC microprocessor cores and is rapidly becoming the volume global standard for applications requiring the optimum mix of price, performance and power efficiency.

GOOD REASONS TO USE ARM

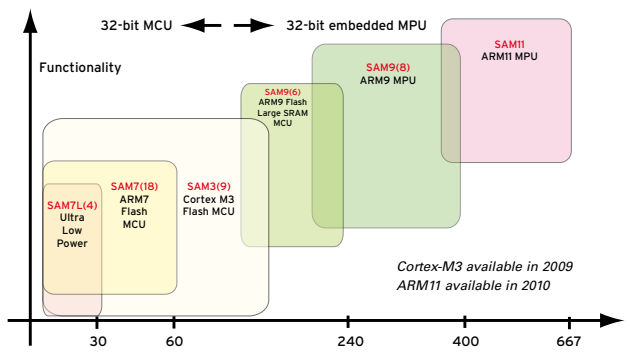
- Most popular 32-bit core
  - Gaining more and more popularity in industrial applications
- Flexibility in system design
  - Compatible core roadmap: easy migration from ARM7, Cortex-M3 ARM9/11 to Cortex-A8
- Wide core performance
  - Wide speed range: 1...600 MHz
- Built-in architecture extensions
  - More efficient processing of algorithms to save CPU overhead, memory and power
  - Thumb® 2 – greatly improved code density
  - DSP – signal processing directly in the RISC core
  - Jazelle® – Java acceleration
- Low power consumption
  - ARM microprocessor solutions offer the industry's lowest power consumption and highest Mips per watt
- Ease of access
  - Multiple vendors means a large choice. EBV Elektronik provides access to the largest ARM suppliers: Atmel, Freescale Semiconductor, NXP Semiconductors, STMicroelectronics, Texas Instruments and Toshiba Microelectronics
- Rapid time to market
  - Highly trained ARM engineers in the market
  - 3rd party HW and SW
  - Widest range of HW and SW
  - Wide range of OS: Linux, Windows, Palm OS,...
  - ARM Connected Community: extensive choice of multimedia codec solutions optimised for ARM processors
- Low cost
  - 32-bit devices at 8-bit prices



ARM Cores	Bus Interface	Thumb	DSP	Jazelle	Supplier
ARM Cortex-M3	3x AHB-Lite + APB	Yes	No	No	STM
ARM Cortex-A8	AMBA 3 AXI	Yes	Yes	Yes	TI
ARM7TDMI	Yes	Yes	No	No	Atmel, STM
ARM7TDMI-S	Yes	Yes	No	No	NXP
ARM720-T	AHB	Yes	No	No	NXP
ARM920T	AHB	Yes	No	No	Atmel, NXP, Freescale
ARM922T	AHB	Yes	No	No	NXP
ARM926EJ-S	2x AHB	Yes	Yes	Yes	Atmel, NXP, Freescale
ARM966E-S	AHB	Yes	Yes	No	STM
ARM1136J(F)-S	5x AHB	Yes	Yes	Yes	Freescale

ATMEL

Atmel has a proven track record as a market leading ARM MCU and MPU vendor, a developer of high bandwidth architectures, an innovator of low power microcontrollers and a facilitator of software portability.



Roadmap

- The broadest software compatible ARM MCU & embedded MPU portfolio
- Optimal peripheral mix, memory footprint, low power and performance
- 200+ Mips 32-bit Flash MCU (SAM9XE)
- Highest SRAM integration (SAM7X512, SAM9261)
- Lowest power standby modes on 32-bit MCU (SAM7L)
- Tightly integrated development suites and software packages
- Software reuse between different members of the family
- Highest bandwidth architectures allowing selection of lower cost MCU range

ARM7

The AT91SAM7 family is based on the ARM7TDMI®-core. They include embedded Flash and SRAM memories together with a number of peripherals and standard communications and networking interfaces. This qualifies them as system-on-a-chip devices. Several different families are available.

AT91SAM7A

General-purpose microcontroller, particularly suited to real-time embedded industrial control applications that require CAN networking.

AT91SAM7L (Low Power) Series

Ultra-low power microcontrollers; embedding power switches controlling multiple power islands and programmable voltage regulators to reduce power consumption in active and standby modes.

AT91SAM7S Series

General-purpose microcontroller with a 400 segment LCD controller, providing an ideal migration path for 8-bit applications requiring additional performance, USB connectivity and extended memory.

AT91SAM7SE Series

General-purpose microcontroller with external memory bus (SAM7S + external memory bus), particularly suited to applications requiring high performance, USB connectivity and extended on- and off-chip memory.

AT91SAM7X Series

General-purpose microcontroller, particularly suited to real-time embedded control applications that require USB connectivity as well as Ethernet, CAN and/or ZigBee networking. For the AT91SAM7X-EK board EBV can provide the reference software from Sevenstax, demonstrating TCP/IP and Ethernet, ZeroConf, Webserver and JAVA Toolbox, SMTP (for sending E-Mails), TFTP and Telnet. You can download the software, see **www.ebv.com/products**.

ARM9

There are many different ARM9 devices in Atmel's portfolio, based on ARM920 and ARM926-EJ core. The SAM9 family is designed to reuse the maximum of the peripherals and technology developed for Atmel´s ARM7-based SAM7 family. In addition, the same support infrastructure is used for both the SAM7 and the SAM9 series, making the migration between both microcontroller families smooth and easy.

AT91SAM9 Series

The AT91SAM9 family is based on the ARM926EJ-S processor, with a clock speed up to 400 MHz. It features up to 32 Kbytes instrution and 32 Kbytes data cache memories. The AT91SAM9 has a fully featured system controller for efficient system management, including a reset controller, shutdown controller, clock management, advanced interrupt controller (AIC), debug unit (DBGU), periodic interval timer, watchdog timer and real-time timer. Atmel and TimeSys have announced a free Linux Board Support Package (BSP) for Atmel's ARM9-based AT91SAM9 Microcontrollers. The introductory-level Atmel/TimeSys Linux Board Support Package can be downloaded from **www.timesys.com/atmel**.

For the AT91SAM9260/9263-EK boards EBV provides an Embedded Linux Evaluation BSP designed by emlix GmbH. The Board Support Package is created for the immediate evaluation of a development project. Furthermore emlix offers a Professional Edition, which is supported and can be used for the application in production systems. It permits hardware/software codesign. Both editions can function as a basis for customised solutions. For more information about emlix visit **www.emlix.com**.

AT91SAM9XE Series

The AT91SAM9XE family is a monolithic ARM9-based Flash microcontroller that combines a 200-Mips ARM926EJ-S processor core with up to 512 Kbytes of high-performance on-chip Flash. The SAM9XE provides multiple networking/connectivity options. It offers an unrivalled combination of performance and functionality on a single chip, making these Flash microcontrollers ideal for space-constrained applications where high performance is required.

Tools

For each family Atmel provides evaluation boards for easy integration and development.

NXP SEMICONDUCTORS

ARM7-LPC2000

- The LPC2000 is based on the ARM7TDMI-S core up to 75 MHz
- Wide range of peripherals including USB FS and USB HS, I²C, CAN, I²S, 10-bit ADC, fast I/Os
- 32-bit timers
- The LPC2000 features low power consumption
- Highest reliability (error-correction circuit for memory)
- Code execution from Flash without wait states
- High performance, low power consumption, low price and small footprint packages

ARM7 – LPC23xx/24xx

- The LPC23xx/LPC24xx series operates at 72 MHz with up to 512 KB of zero-wait state on-chip flash based on ARM7TDMI-S
- The industry's only 2 AHB bus architecture in an ARM7 based MCU with the ability to simultaneously run the application, USB FS, CAN and Ethernet
- Optional LCD controller supporting STN and TFT panel up to 24-bit true color

ARM7-LH7xxxx

- 84 MHz, 32-bit ARM7TDMI-S™ (LH754xx)
- 77 MHz, 32-bit ARM720T™ (LH7952x)
- MMU (Memory Management Unit)
- Integrated LCD controller
  - Support for STN, CSTN, TFT and AD-TFT
  - Resolutions up to 1024 x 768
  - 16-level greyscale or up to 64k colors
- Extensive selection of serial interfaces, including SSI/SSP, multiple UARTs, IrDA, I²C-bus, I²S, CAN 2.0B, USB 2.0 device, 10/100 Base-T Ethernet MAC
- 5 V tolerant I/O
- Integrated touch screen controller
- 16 or 32-bit external bus with optional SDRAM controller and NAND Flash boot capability

Cortex-M3

The LPC1700 family, a low power solution with rev2 core will be available in spring 2009.

Tools

Hitex Starterkits (HI-EBV-LPC2148SK*, HI-EBV-LPC2138SK*) for 125 €, include:

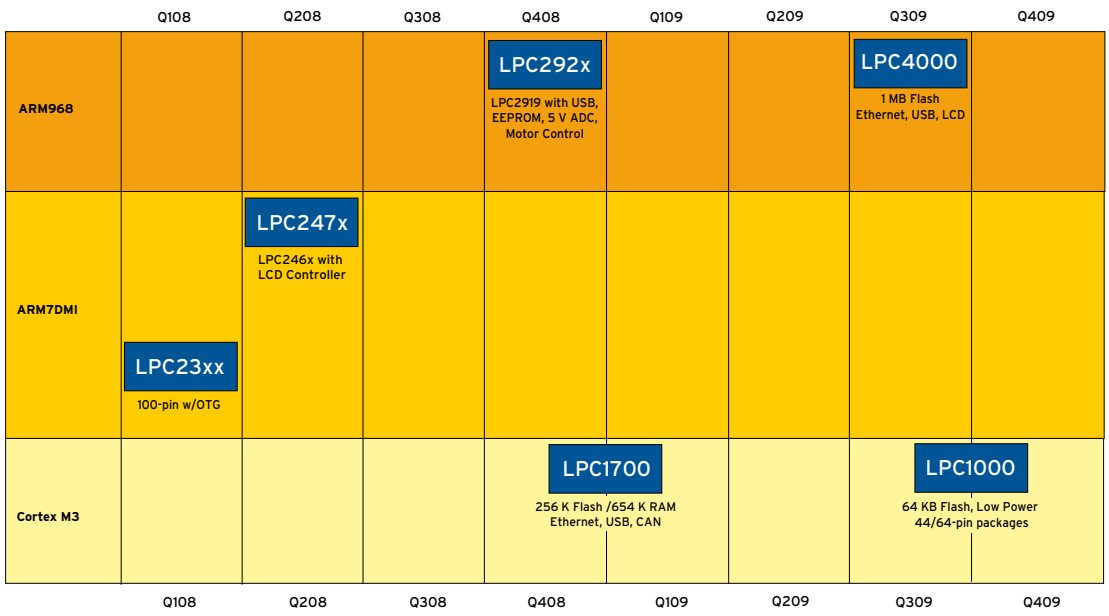
- TantinoARM7-9 JTAG debugger
- Installation CD HiTOP IDE and user interface (32k code size limited)
- HiSIM instruction set ARM simulator
- Extensive Flash features (internal & external) including patching
- GNU compiler
- Eval-board Keil MCB 2140 incl. power supply
- Examples, incl. USB (HID)
- Quick start guide
- Cable set

Special offer upgrades to TantoARM** and HITOP full version inside the kit

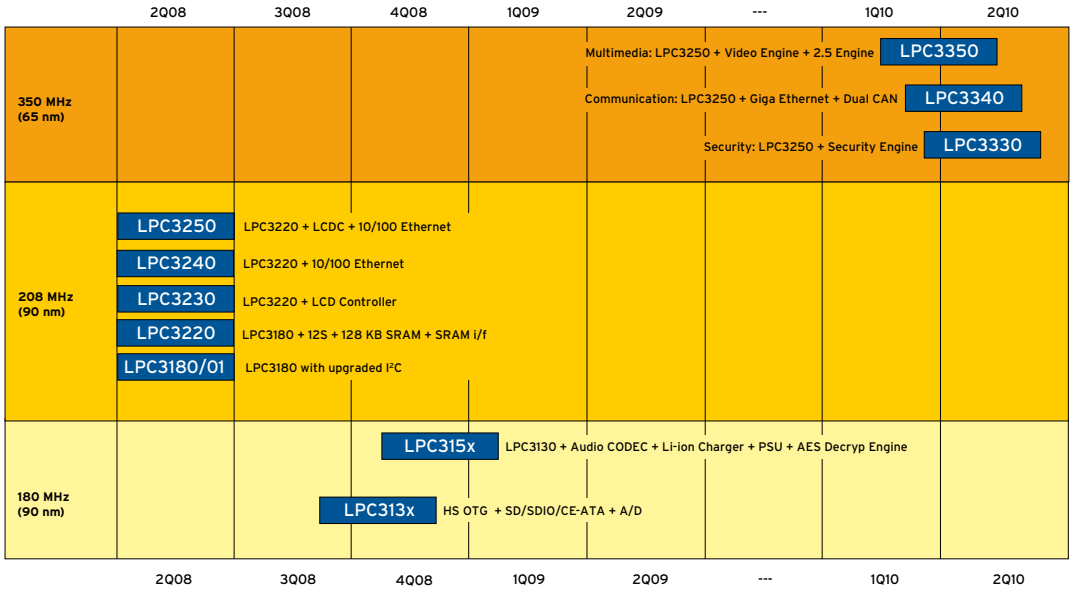
** Subject to prior sales*

*** full support of ETM (Embedded Trace Macrocell) for high-end debugging, real-time programming and data capture incl. extensive filter feature*

There are other Starterkits from several suplliers, like Keil, IAR etc. available. For details please contact your local sales office.



2-track development building on LPC23/24xx



High End MCU

ARM9-LPC29xx

- ARM968E operating up to 80 MHz (starting Q1/2009 new devices will be available operating up to 125 MHz)
- Up to 768 KB embedded Flash memory and 80 KB RAM (incl. 2 x 16 KB TCM)
- 32-bit external memory controllers that support static memory devices
- Two CAN 2.0B controllers and two LIN master controllers
- Multiple serial communication interfaces increase design flexibility, provide larger buffer size and deliver higher processing power
- 32-bit timers with capture/match-channels for pulse measurements, four six-channel, 32-bit PWMs, and a watchdog timer

ARM9 – LH7A40x

- The LH7A40x series is an ARM922-T microcontroller up to 266 MHz
- MMU (Memory Management Unit)
- Equipped with LCD controller
  - Support for STN, CSTN, TFT and AD-TFT
  - Resolution up to 1024 x 768
  - 16-level greyscale or up to 64k colors
- 32-bit external bus with SDRAM controller and NAND Flash boot capability
- CompactFlash, SD/MMC/SDIO, PS/2, audio codec (AC97), and PCMCIA interfaces

LPC3180/01-LPC313x-LPC32x0

- High-performance ARM926EJ-S core up to 208 MHz
- Up to 256 KB SRAM and 32 KB I-cache/32 KB D-cache
- Vector floating-point coprocessor, decreases typical processing time and power consumptions for complex calculations by a factor of four to five. Embedded ROM memory supports booting from SPI Flash, NAND Flash, SDHC/MMC cards, UART and USB
- Integrated USB On-The-Go (OTG), Ethernet and LCD controller. (LPC3180/02 and LPC32x0)
- New derivatives with HS USB 2.0 OTG with on-chip PHY and dedicated PLL (LPC313x)
- 10-bit A/D converter with touch-screen interface
- Comprehensive set of serial interfaces (I²C, I²S, SD/MMC, UARTs, others)
- Flexible power management enables high peak performance. Dynamic clock gating and scaling
- Operates in ultra-low power mode (down to 0.9 V)
- Memory Management Unit (MMU) supports major operating systems, including Linux – the leading OS for embedded applications
- On-chip Java byte-code co-processor supports basic security and authentication applications
- Similar peripheral IP blocks implemented from NXP ARM7 into ARM9
  - Minimal learning required, so faster time to market
  - Possibility for reuse of LPC2000 tool chain and software code

Third-Party Development Tools

Through third-party suppliers, NXP offers a range of development and evaluation tools for our microcontrollers. For the most current listing, please visit **www.nxp.com/microcontrollers** or contact your local EBV sales office.

STMICROELECTRONICS

ARM Cortex-M3

- The STM32 family of 32-bit Flash microcontrollers is based on the breakthrough ARM Cortex-M3 core – a core specifically developed for embedded applications. STM32 family is starting from 16 K embedded Flash up to 512 K
- The Cortex-M3 brings enhancements, including Harvard architecture and the Thumb-2® instruction-set to deliver improved performances combined with better code density. The core delivers 1.25 DMips/MHz while using only 0.19 mW/MHz
- Applications will benefit of the tightly coupled nested vector interrupt controller for significantly faster response-time and of the HW divide single-cycle multiply for processing-speed
- The Performance Line, STM32F103, operates up to 72 MHz, with more on-chip RAM, USB and CAN peripherals, also 12-bit ADC, 12-bit DAC and external memory interface (FSMC). It is able to perform high-end computation
- The Access Line, STM32F101, operates up to 36 MHz. It is the entry point of the STM32 family. It has the power of the 32-bit MCU but at a 16-bit MCU cost
- The USB Access Line, STM32F102, operates with 48 MHz and is dedicated to USB applications available in LQFP48 and LQFP 64 package
- All lines are pin-to-pin and software-compatible, offer the same embedded Flash options and run from 2.0...3.6 V supply with 5 V tolerant I/Os
- Specific care has been taken to reach high energy efficiency in run-mode, to allow battery operation and to offer low-power modes in µA range
- STM32 is the optimal platform choice to cover applications with reduced memory and pin requirements to larger needs, performance demanding to battery operated and simple cost-sensitive to complex high-value

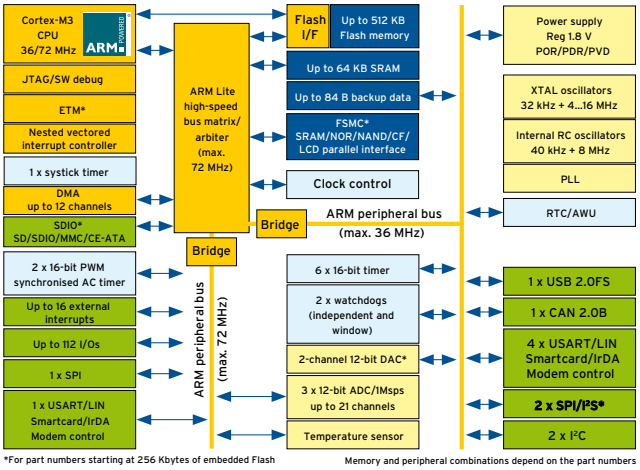
STM32 removes the last obstacles to 32-bit wide usage that are:

- Integration
- Low power
- Real time performance
- Cost

The STM32-PerformanceStick

- Low-cost evaluation and development package
- Fast and easy introduction to STM32 family
- Included applications and GUI (controls the application, show behaviour of the STM32 like performance, low power and wake up time)
- Sample applications (RTC, timer, USB, CAN, ADC...), C source code is provided
- Unlimited Hitex tool chain with the tasking ARM compiler tailored to the STM32-stick is provided

See also Raisonance Kit on next page; more development tools are available, e.g. from Keil and IAR. Please contact your local sales office.



Blockdiagram STM32

ARM7

- STR71x, STR73x and STR75x Flash microcontrollers combine the leading ARM7TMDI architecture with embedded Flash and powerful peripherals functions
- Extensive software and tool support with the complete STR7 library supporting all peripherals including USB, dramatically reduces development time and increases ease-of-use
- High-endurance embedded flash with low latency for deterministic behaviour in real-time applications
- Industrial temperature range (-40...+85 °C and +105 °C) and choice of 3.3 or 5.0 V native devices provides flexible application options
- The largest choice of on-chip peripherals including up to 3 CAN, USB, SPI, I²C, 4 UART, 20 timers – reduces the system cost
- Flexible power and clock management allow full control over power consumption and performance/power trade-offs

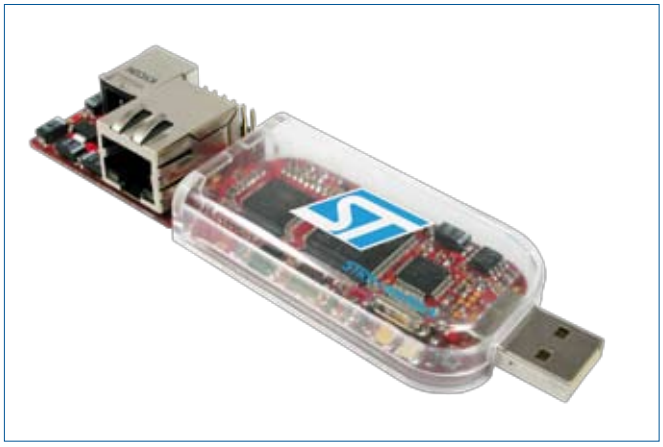
ARM9

- The STR91xFA family (ARM966E-S® core) of MCUs delivers up to 96 Mips
- Executes single-cycle DSP instructions
- Includes Ethernet, USB and CAN interfaces
- Flash memory sizes reaching 2 MB plus a vast 96 KByte SRAM
- Free Ethernet software stack available (Please contact your local sales office)
- Flexible power and clock management with multiple low power modes and a low power real-time clock with programmable wake-up features
- Extensive firmware support and tool options
- The STR91xFA library is freely distributed from ST
- Natural extension to STM's successful STR7XX series of ARM7TDMI-based MCUs

Tools

STR9-COMSTICK

The STR9-comStick is a complete, low-cost evaluation and development package that provides a fast and easy introduction to the networking features of STR9 family of microcontrollers. It is specifically designed to help application designers learn about STR9 features supporting 10/100 Ethernet, USB 2.0 full speed and CAN connectivity.

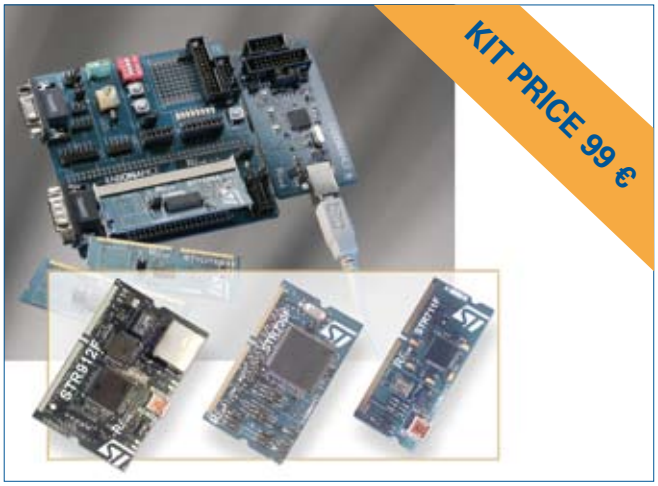


The STR9-COMSTICK includes:

Sample applications implementing device peripherals (Ethernet, USB, CAN, ADC...) plus a web server application. The C source code for all sample applications is included. The software package includes an unlimited Hitex toolchain tailored to the STR9-COMSTICK.

Software tools include an unlimited GNU C/C++ compiler for ARM to build/rebuild the sample applications and Hitex HiTOP5 development environment for code editing, device programming and application debugging.

Raisonance Starter Kit



STEBV-SK RAI for 99 €*, includes:

Hardware:

- Main board (REva)
- STR711 (USB) daughter board
- STR730 (CAN) daughter board
- STR750 (USB, CAN) daughter board
- STM32 (Cortex-M3) daughter board
- STR912 (Ethernet, USB) daughter board
- ST7LITE3 daughter board
- All cables
- RLink debugging and programming tool

Software:

- Raisonance software CD with:
  - RIDE integrated development environment for STR7/9 ST7 and uPSD (debug code up to 16 KB, no limits on compiling and programming)
  - GNU C/C++ compiler for ARM core-based mircrocontrollers
- ST 8-,16- and 32-bit microcontroller mini-ROM

With the STEBV-SK RAI you can evaluate the complete available ARM7 and ARM9 series from ST and in addition the ST7Lite devices (8-bit).

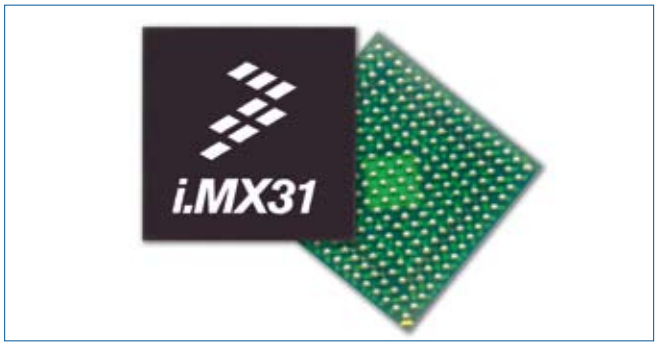
Upgrade kit to the Raisonance Professional Kit

(RKITPSTRXUPGRAD) for 399 €*, includes:

- CD-ROM with unlimited toolset including RIDE, RFlasher, GNU C/C++ compiler
- RLink-Pro with unlimited debugging for STR7 and STR9

**Subject to prior sales*

FREESCALE



i.MX Family

Based on ARM® core technology, Freescale's *i*.MX family of multimedia applications processors is designed to offer low power consumption with real-world power performance and a high degree of integration to reduce your design time significantly.

Freescale's *i*.MX family is based on high performance ARM9™ and ARM11™ processor cores and offers an exceptional multimedia experience at low power. The processors target a broad range of consumer, industrial and general purpose applications, especially those with larger displays where rich, crisp video and 3D graphics are desired.

The widely-adopted *i*.MX31 multimedia processors provide:

- A rich set of connectivity peripherals (USB OTG up to High Speed, 2 x MMC/SD, 2 x memory stick Pro™, ATA-6 (HDD) interface, PCMCIA/CF, configurable SPI x 2, SSI/I²S x 2, UART x 5)
- An enhanced Multimedia Accelerator (eMMA), CMOS sensor interface for image capture
- Peripheral set that includes LCD controller up to SVGA resolution
- Advanced power management:
  - Automatic Dynamic Voltage and Frequency Scaling (DVFS)
  - Dynamic Process and Temperature Compensation (DPTC)

The *i*.MX Family supports a broad range of industry leading platforms such as those based on Microsoft® Mobile, Microsoft Windows® CE, Linux® OS and a number of leading RTOS.

Apps Processor	Tools available
i.MXS	M9328MXLADS/B
	MXSDVK
i.MXL	M9328MXLADS/B
	M9328MXLLITEKIT
i.MX21	M9328MX21ADSE
i.MX21S	M9328MX21ADSE
i.MX27L/*i*.MX27	IMX27LITEKIT
i.MX31L/*i*.MX31	MCIMX31LPDK/MCIMX31WPDK
	MCIMX31ADSE/C
	MCIMX31LITEKITC

The *i*.MX31 PDK, with Smart Speed™ technology, is a completely integrated hardware and software solution that simplifies product development so you can focus on your critical differentiation needed for market success. Reduce development time, and design products that have power to spare, even when running multiple applications simultaneously. Receive stellar image and graphic performance in a system design that dramatically reduces power consumption.

	i.MXS	*i*.MXL
CPU	ARM920T™	ARM920T
Speed (CPU/System)	150/96 MHz	150...200/96 MHz
i-Cache/D-Cache	16/16 KB	16/16 KB
Floating Point		
Direct Memory Access (DMA)	11 channels	11 channels
Smart Speed™ Switch		
Embedded SRAM		
Double Data Rate Memory		
Flash Boot	NOR	NOR
Multiplier-Accumulator (MAC), Discrete Cosine Transformation/Inverse Discrete Cosine Transformation (DTC/iDCT), Hardware Accelerator		Yes
Video Acceleration		DCT/iDCT Hardware Accelerator
Image Pre- and Post-Processor		
2-D/3-D Graphics		2-D/3-D Graphics through Software
Security		
Liquid Crystal Display Controller (LCDC) Display Site = Typical	Super Twisted Nematic (STN), Color STN (CSTN), Thin FIlm Transistor (TFT) 320 x 240	STN, CSTN, TFT 320 x 240
Camera Interface		CCIR601
Universal Asynchronous Receiver/ Transmitter (UART)	2	2
IrDA	Serial Infrared (SIR)	SIR
Serial Peripheral Interface (SPI)	1 Configurable SPI (CSPI)	1 SPI + 1 CSPI
Synchronous Serial Interface Inter-Integrated Circuit Sound (SSI/I²S)	1	1
Inter-Integrated Circuit (I²C)	2	2
Single-Wire Interface		
Wi-Fi® Support	Host interface through PCMCIA	Host interface through PCMCIA
Universal Serial Bus (USB)	Device	Device
Ethernet		
Multimedia Card/Secure Digital (MMC/SD) Controller		1
PCMCIA/Compact Flash		
Memory Stick® Controller		
Hard Disk Drive Interface	Via EIM (Memory Bus)	Via EIM (Memory Bus)
Smart Card Interface Module (SIM)		
Timer	2	2
Watchdog Timer	Yes	Yes
Real-Time Clock	1	1
Pulse Width Modulation (PWM)	1	1
Package	225 MAPBGA 13 x 13 mm 0.8 mm pitch	225/256 MAPBGA 13 x 13/14 x 14 mm 0.8 mm pitch
Process Technology	180 nm	180 nm

LiteKits

High-performance application development kit. Expanding on the Freescale offering of low-cost, high-performance application development kits, Freescale introduces the *i*.MX LiteKits. The LiteKit provides a product-ready software and hardware platform for developers.

ADS

Application Development System (ADS). This is a development tool which is designed to run software applications designed for the i.MX processors.

i.MX21S	*i*.MX21	*i*.MX27L	*i*.MX27	*i*.MX31L	*i*.MX31
ARM926EJ-S™	ARM926EJ-S	ARM926EJ-S	ARM926EJ-S	ARM1136JF-S™	ARM1136JF-S
266/133 MHz	266...350/133 MHz	266...400/133 MHz	266...400/133 MHz	400...532/133 MHz	400...532/133 MHz
16/16 KB	16/16 KB	16/16 KB	16/16 KB	16/16 KB + Unified 128 KB L2	16/16 KB + Unified 128 KB L2
				Vector Floating Point Unit	Vector Floating Point Unit
16 channels	16 channels	16 channels	16 channels	32 channels	32 channels
6 x 4	6 x 4	6 x 3	6 x 3	6 x 5	6 x 5
6 KB	6 KB	45 KB	45 KB	16 KB	16 KB
		Yes	Yes	Yes	Yes
NAND or NOR	NAND or NOR	NAND or NOR	NAND or NOR	NAND or NOR	NAND or NOR
ARM MAC	ARM MAC	ARM MAC	ARM MAC	ARM Dual MAC	ARM Dual MAC
	MPEG4 CIF 30 fps Encode and Decode		H.264, MPEG-4 H.263 HW Encoder and Decoder 30 fps D1 Resolution Half Duplex 24 fps VGA Resolution Full Duplex	MPEG4 VGA 30 fps Encode	MPEG4 VGA 30 fps Encode
	Color Space Conversion De-Block De-Ring, Resize		Color Space Conversion De-Block De-Ring, Resize	Color Space Conversion De-Block, De-Ring, Resize, Rotation	Color Space Conversion De-Block, De-Ring, Resize, Rotation
	2-D/3-D Graphics with External Accelerator (Bus Master Interface Connection)				Integrated 2-D/3-D Processing Unit with OpenGL® Support, Vector Floating Point Unit
		Hardware Accelerator	Hardware Accelerator	Hardware Accelerator	Hardware Accelerator
Standard and Smart 720 x 480	Standard and Smart 720 x 480	Standard and Smart 720 x 480	Standard and Smart 720 x 480	Smart, Serial and Parallel Panels, TV out, 2 Simultaneous Displays 800 x 600	Smart, Serial and Parallel Panels, TV out, 2 Simultaneous Displays 800 x 600
	CCIR656	CCIR656	CCIR656	CCIR656	CCIR656
3	4	6	6	5	5
SIR, Medium Infrared (MIR), Fast Infrared (FIR)	SIR, MIR, FIR	SIR	SIR	SIR, MIR, FIR	SIR, MIR, FIR
2 CSPI	3 CSPI	3 CSPI	3 CSPI	3 CSPI	3 CSPI
2	2	2	2	2	2
2	1	2	2	1	1
Yes	Yes	Yes	Yes	Yes	Yes
Host Interface through SDIO or PCMCIA	Host Interface through SDIO or PCMCIA	Host Interface through SDIO CF or USB	Host Interface through SDIO CF or USB	Host Interface through SDIO	Host Interface through SDIO
Full-Speed On-The-Go and 1 Full-Speed Host	Full-Speed On-The-Go and 1 Full-Speed Host	High-Speed On-The-Go High-Speed Host and Full-Speed Host	High-Speed On-The-Go High-Speed Host and Full-Speed Host	High-Speed On-The-Go High-Speed Host and Full-Speed Host	High-Speed On-The-Go High-Speed Host and Full-Speed Host
		Yes	Yes		
2	2	3	3	2	2
Yes	Yes	Yes	Yes	Yes	Yes
			Yes	2 Pro	2 Pro
Via PCMCIA	Via PCMCIA		Advanced Technology Attachment-6 (ATA-6)	Advanced Technology Attachment-6 (ATA-6)	ATA-6
				1	1
3	3	6	6	3	3
Yes	Yes	Yes	Yes	Yes	Yes
1	1	1	1	1	1
1	1	1	1	1	1
289 MAPBGA 14 x 14 mm, 0.65 mm pitch 17 x 17 mm, 0.8 mm pitch	289 MAPBGA 14 x 14 mm, 0.65 mm pitch 17 x 17 mm, 0.8 mm pitch	404 MAPBGA 17 x 17 mm, 0.65 mm pitch	404 MAPBGA 17 x 17 mm, 0.65 mm pitch	457 MAPBGA 14 x 14 mm, 0.5 mm pitch 473 MAPBGA 19 x 19 mm, 0.8 mm pitch	457 MAPBGA 14 x 14 mm, 0.5 mm pitch 473 MAPBGA 19 x 19 mm, 0.8 mm pitch
130 nm	130 nm	90 nm	90 nm	90 nm	90 nm

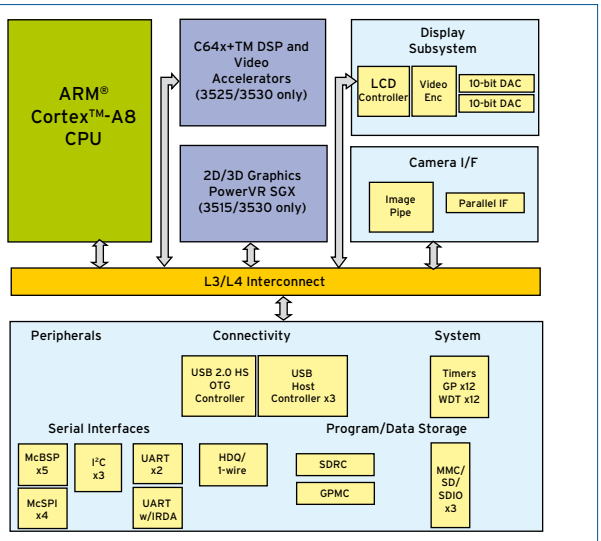
TEXAS INSTRUMENTS

OMAP35x™ Application Processors

OMAP35x processors are the first to market with the high-performing ARM® Cortex™-A8 core offering 600 MHz for four times performance improvement over today's ARM9 devices. TI offers four new OMAP35x application processors for a wide range of possible applications including portable infotainment and industrial devices, point of sale, digital signage, human-machine interfaces, low-power medical devices, industrial automation and many more.

Key Features

- Application processors based on the superscalar ARM® Cortex™-A8 core offering 4x performance over ARM9 devices
- Scalable platform of processors available with multimedia rich peripherals, OpenGLES 2.0 compatible graphics engine and DaVinci™ technology for digital video capabilities
- Optimised laptop-like performance at handheld power levels in a single chip
- Utilise TI's SmartReflex™ technology for even greater power savings
- Evaluation module, Linux and Windows® CE board support package and OMAP Developer Network help take designs from concept to production quickly and efficiently



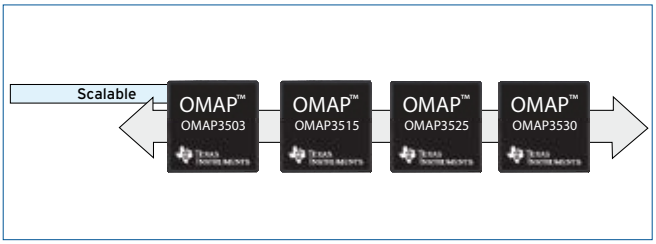
OMAP35x Processor

Laptop-like Performance at Handheld Power Levels

The OMAP35x processors leverage TI's SmartReflex™ technologies to dynamically control voltage, frequency and power based on the device activity, modes of operation, process technology and temperature variation. This capability lowers the overall power consumption and lengthens a battery life, letting applications be more easily incorporated into existing product designs as well as allowing thinner and lighter designs that require less power consumption.

OMAP35x Processors: A Complete Product Portfolio

OMAP35x processors are scalable to provide the best graphics, multimedia and high-performance embedded processing in any combination for automotive, infotainment, consumer, industrial and medical applications. All OMAP35x processors are pin-for-pin compatible.



The OMAP35x Generation of Processors is available NOW

- OMAP3503 – The OMAP3503 features the Cortex-A8 core at 600 MHz, plus a rich set of peripherals and memory. Delivers exceptional performance at the lowest power consumption, allowing you to design highly integrated powerful devices with low power figures
- OMAP3515 – same Cortex-A8 core and peripheral set as the OMAP3503, OpenGL ES graphics engine with an Imagination Technologies PowerVR SGX graphics accelerator to achieve PC gaming-quality graphics
- OMAP3525 – same features as the OMAP3503, integrates a C64x+ DSP and video accelerator along with TI's DaVinci technology for audio, video, imaging, and multimedia acceleration capabilities
- OMAP3530 – this superset device has the integrated Cortex-A8 core, DSP core, graphics engine, DaVinci technology and peripheral set in a single chip to bring high-performance, power-efficient productivity and multimedia applications to life

OMAP™ Processors

Part Number	CPU	Frequency (MHz)*	L1P (Bytes)	L1O (Bytes)	L2 (Bytes)	RAM (Bytes)	ROM (Bytes)	External Memory I/F	DMA	Timers
OMAP3530	C64x+ARM Cortex-A8	430 600	32 K 16 K	32 K + 48 K SRAM 16 K	32 K + 48 K shared SRAM 256 K	64 K	16 K 112 K	LPDDR, SDRAM DDR1, RAM, NOR NAND, OneNAND	64 Ch 32 Ch	12 GP, 2 WDT
OMAP3525	C64x+ARM Cortex-A8	430 600	32 K 16 K	32 K + 48 K SRAM 16 K	32 K + 48 K shared SRAM 256 K	64 K	16 K 112 K	LPDDR, SDRAM DDR1, RAM, NOR NAND, OneNAND	64 Ch 32 Ch	12 GP, 2 WDT
OMAP3515	ARM Cortex-A8	600	16 K	16 K	256 K	64 K	112 K	LPDDR, SDRAM DDR1, RAM, NOR NAND, OneNAND	64 Ch 32 Ch	12 GP, 2 WDT
OMAP3503	ARM Cortex-A8	600	16 K	16 K	256 K	64 K	112 K	LPDDR, SDRAM DDR1, RAM, NOR NAND, OneNAND	64 Ch 32 Ch	12 GP, 2 WDT

OMAP35x™ Development Tools

- Begin your software development and evaluation today with the OMAP35x Evaluation Module (EVM). With an open development environment, the OMAP35x EVM enables you to use leading operating systems, such as Linux, Windows® CE, etc. A Linux Board Support Package (BSP) is included with the EVM
- This board is based on OMAP35x silicon and includes a VGA touch screen LCD and 128 MB of LPDDR and 128 MB of OneNAND memory
- The Evaluation Module is shipping today and includes non commercial Linux OS and drivers along with code sourcery tools
- Reference schematics and Gerber files are available
- This EVM can be used to evaluate OMAP3503, OMAP3515, OMAP3525, and OMAP3530
- Windows® CE is available today through TI, and additionally will be made available via software-download Q4 2008
- The basic OS and drivers for Windows® and Linux are offered in source code. No additional licensing fee or royalty is required to TI for use of the code (Windows® requires Microsoft license)
- Extensive support through the OMAP Developer Network allows you to speed development and bring your products to market faster while lowering development costs

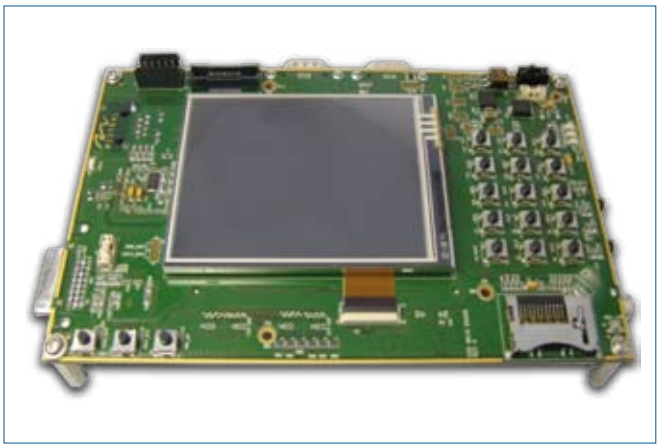
To learn how OMAP technology can inspire innovation in the broad market, visit **www.ti.com/omap35x**.

First Broad Availability of ARM Cortex-A8 Core

- 600 MHz offering 4x performance improvement over current ARM9 solutions and 1.7x over ARM11 based processors
- Dual-issue ARMv7 compliant superscalar core, delivering 2.0 DMips/MHz
- Industry's best performance/power ratio
- NEON signal processing extensions to accelerate performance of multimedia and signal processing applications such as video encoding/decoding, 3D graphics, audio, image or speech, including support for high-performance floating point operations
- Jazzelle® RCT technology for efficient compilation of Java or other bytecode languages

High Performance Multimedia Capabilities

- Multiformat video processing up to HD quality 720p MPEG4 decode at 30 frames per second
- First application processor integrating openGL ES 2.0 graphics acceleration to more than 10 million polygons per second
- Integrated display subsystem with LCD and TV interface up to high definition resolution
- The camera interface subsystem supports CCD and CMOS Interfaces and provides dedicated hardwire for video capture preprocessing



	Applications Software Compatibility	Shared Peripheral Set	2D/3D Graphics Compatibility	DSP Procesing & Multimedia Software Compatibility
OMAP3530	ARM Cortex-A8 600 MHz	Peripherals	Graphics OpenGL® ES 2.0	C64x + DSP & Video Accelerator
OMAP3525	ARM Cortex-A8 600 MHz	Peripherals		C64x + DSP & Video Accelerstor
OMAP3515	ARM Cortex-A8 600 MHz	Peripherals	Graphics OpenGL® ES 2.0	
OMAP3503	ARM Cortex-A8 600 MHz	Peripherals		

Serial Ports	Voltage	Voltage (V)		1 KU Packaging
		Core*	I/O	
5 McBSP, 4McSPI, 3 I²C, 1 HS USB OTG 1 HS USB Host (3 port), 1 HDQ/1-Wire, 3 UART (1 IrDA+CIS)	HW Video Accelerator,NEON Coprocessor, Graphic Accelerator, LCD, TV out, Camera I/F, MMU 3 MMC/SD/SDIO, 196 GPIO (shared)	1.35	1.8/3.3	0.4 mm 515-pin pBGA (12 x 12 mm) 0.65 mm 423-pin pBGA (16 x 16 mm)
5 McBSP, 4McSPI, 3 I²C, 1 HS USB OTG 1 HS USB Host (3 port), 1 HDQ/1-Wire, 3 UART (1 IrDA+CIS)	HW Video Accelerator,NEON Coprocessor, LCD, TV out, Camera I/F, MMU 3 MMC/SD/SDIO, 196 GPIO (shared)	1.35	1.8/3.3	0.4 mm 515-pin pBGA (12 x 12 mm) 0.65 mm 423-pin pBGA (16 x 16 mm)
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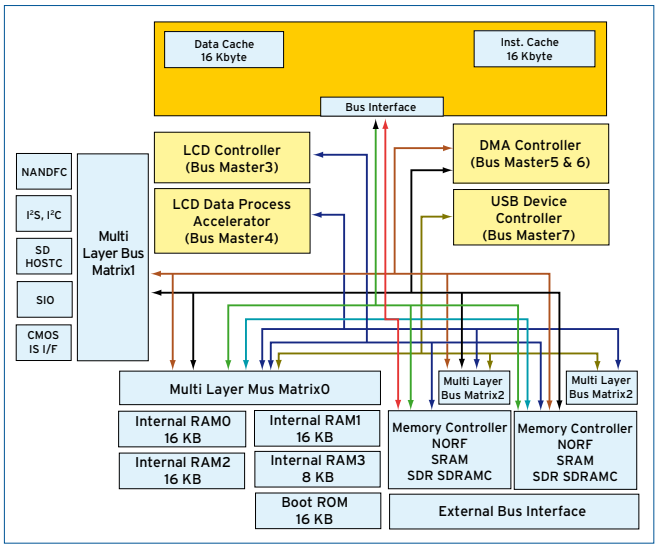
TOSHIBA

The Toshiba TMPA910CRAXBG is a low power ARM-based microprocessor that combines a high-performance 32-bit core with comprehensive graphics control, processing functionality and a variety of on-board connectivity and peripheral options. The new device will considerably reduce the development time and component count of applications requiring basic multimedia functionality.

- TMPA910 is based on the ARM926EJ-S™ core
- Up to 200 MHz with I-cache 16 KB/ D-cache 16 KB
- Seven layer multibus architecture:
  - This architecture significantly improves performance compared to other devices operating at similar processor speeds



- Comprehensive graphics control, processing functionality and a variety of on-board connectivity and peripheral options
- LCD Data Process Accelerator
  - Scaling function (expansion/reduction)
  - Filter function (bi-cubic convolution)
  - Image blending function (font blending)
- Built-in LCD controller offers support for TFT and STN display sizes up to 800 x 480 pixels. An LCD data processor accelerator delivers image scaling, filtering and blending functions and offers real time processing for movies at speeds up to 30 frames per second
- CMOS image sensor interface that simplifies the implementation of applications requiring image capture
- A touchscreen interface further reduces the need for external components in Man Machine Interface (MMI) designs
- Additional connectivity includes SPI, UART, I²C, I²S and a high-speed USB device (480 Mbps)
- 56 KB of built-in embedded RAM for program, data and display memory, boot ROM, and a memory controller that supports SDR and DDR SDRAM
- Up to 2.5 GB of linear access space can be addressed
  An SD host controller supports high-speed mode
  SD cards with capacities up to 32 GB
- Extensive software support that includes graphics libraries

Tools

Toshiba's BMSKTOPASA910 'Plug & Play' Starter Kit brings together all of the hardware and software needed to develop and test applications based on the TMPA910CRAXBG.

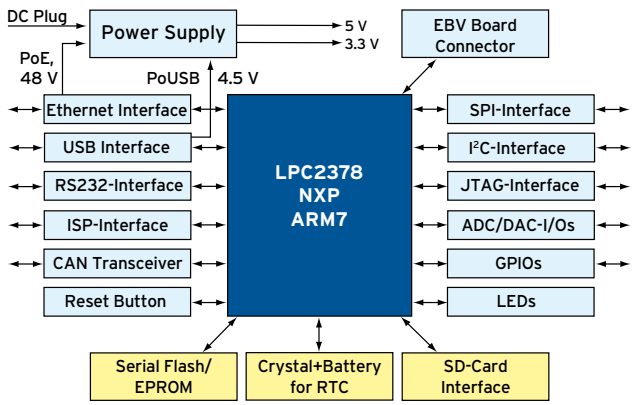
The Starter Kit's hardware development PCB measures just 110 x 150 mm. In addition to the TMPA910CRAXBG processor, onboard functionality includes a 3.5-inch display with a touch screen, Ethernet connectivity, a 480 Mbps USB 2.0 interface and an RS232 connector. An audio DAC, connected to the processor I²S bus, provides the ability to output excellent sound quality, while board memory comprises 512-Mbit SDRAM, 256-Mbit NOR Flash and 2-Gbit NAND Flash. An SD card socket facilitates the use of portable storage. Tools are available from third party suppliers (e.g. as trial versions), while extensive software support for graphics libraries and embedded operating systems is also guaranteed via third parties such as SEGGER (www.segger.com). The CD-ROM supplied with the Starter Kit includes schematics and PCB layout data, which can be freely re-used. The board features a JTAG interface for ease of debugging and can be supplied with a wide variety of software examples to further speed the development and prototyping process.

- The Starter Kit will be delivered with a full working J-Link. This enables easy H/W and S/W development
- Linux support for the BMSKTOPASA910(DCE) Starter Kit incl. kernel, device drivers, etc. is available from Bplan (**www.bplan-gmbh.de**)
- Many S/W examples: From 'Hello World' to slideshow S/W and integration of MPlayer for multimedia applications (e.g. Video) PC software: VMware + dedicated Linux distribution, no special 'Linux' configured PC is required

In Q1/2009 Cortex-M3 devices will be launched

CHAMELEONARM

EBV Reference Design, based on NXP LPC2388 ARM7 MCU

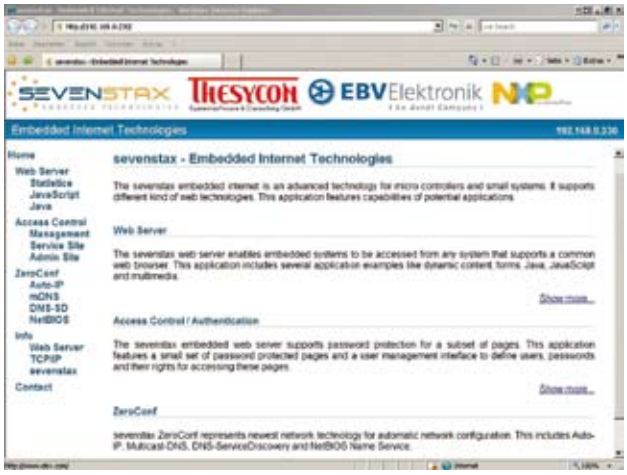


Block Diagram

This Reference Design is a joint project between NXP and EBV with several partners for Hardware and Software like Fraunhofer IMS, Sevenstax and Thesycon.

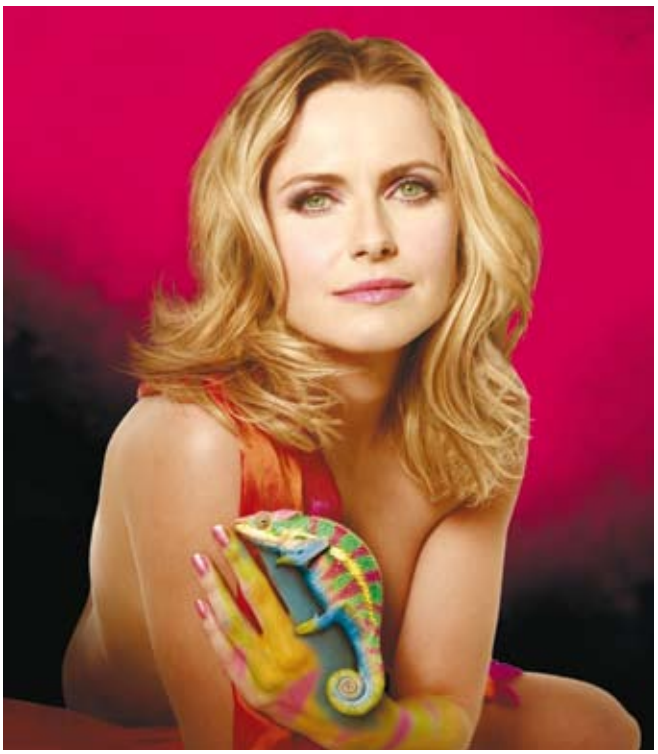
Main Features

- Flexible power supply from USB, Power-over-Ethernet or DC jack
- Multiple communication interfaces:
  - USB Host/OTG (On-the-Go), CAN
  - Ethernet, up to 4 UARTs
  - I²C, SPI, I²S...
- Internal ADC and DAC
- LEDs and buttons
- JTAG debug interface
- EBV standard expansion connectors (compatible with COBRA)
- Demo applications available for
  - TCP/IP over USB (RNDIS)
  - Embedded webserver
  - Auto-IP/ZeroConf/DHCP
  - Name service (MDNS, netbios) etc.



Webserver Screenshot

The ChameleonARM kit contains the Chameleon2388 Board, power plug and power supply cables (RS232, USB and Ethernet), 512 MB SD Card and CD with documentation and reference software from Thesycon for the RNDIS USB driver, from Sevenstax for the TCP/IP and reference software for various interfaces.



ChameleonARM

NXP ARM7 Reference Platform Presented by EBV Elektronik

- LPC23xx single-chip ARM7 microcontroller, 72 MHz with USB, CAN and Ethernet
- Dual AHB bus architecture, simultaneous Ethernet DMA,USB DMA and program execution from on-chip flash memory
- ChameleonARM 299 €, including the installed demo software like TCP/IP and USB

For more information see also: www.ebv.com/chameleonarm or contact your local EBV office.
The ChameleonARM Board is available for 299 € with order-nr. Chameleon2388

ABOUT THE PARTNER COMPANIES

About Atmel

Atmel is a worldwide leader in the design and manufacture of microcontrollers, advanced logic, mixed-signal, nonvolatile memory and radio frequency (RF) components. Leveraging one of the industry's broadest intellectual property (IP) technology portfolios, Atmel is able to provide the electronics industry with complete system solutions focused on consumer, industrial, security, communications, computing and automotive markets.

 For more information about Atmel visit **www.atmel.com**.

About NXP Semiconductors

NXP is a top-10 semiconductor company founded by Philips more than 50 years ago. Headquartered in the Netherlands, the company has 38,000 employees working in 26 countries across the world. NXP creates semiconductors, system solutions and software that deliver better sensory experiences in mobile phones, personal media players, TVs, set-top boxes, identification applications, cars and a wide range of other electronic devices. For more information about NXP Semiconductors visit **www.nxp.com**.

About STMicroelectronics

STMicroelectronics is a global leader in developing and delivering semiconductor solutions across the spectrum of microelectronics applications. An unrivalled combination of silicon and system expertise, manufacturing strength, intellectual property (IP) portfolio and strategic partners positions the company at the forefront of system-on-chip (SoC) technology and its products play a key role in enabling today's convergence markets. The company's shares are traded on the New York Stock Exchange, on Euronext Paris and on the Milan Stock Exchange. In 2006, the company's net revenues were US$ 9.85 billion and net earnings were US$ 782 million. For more information about STMicroelectronics visit **www.st.com**.

About Texas Instruments

TI provides innovative DSP and analogue technologies to meet real-world signal processing requirements across all industry sectors. In addition to its semiconductor arm, the company also runs an education technology business unit. TI is headquartered in Dallas, Texas, and has manufacturing, design and sales operations in more than 25 countries. Texas Instruments is traded on the New York Stock Exchange under the symbol TXN. For more information about Texas Instruments visit **www.ti.com**.

About Toshiba Electronics

Toshiba offers the latest in semiconductor technology, such as Silicon-on-Insulator (SOI), for implementing motion control systems that can be optimized to particular applications. Demand for BLDC motors is growing, driven as much by such factors as inherent hardware reliability and dynamic response, as by commercial, environmental and legislative pressure for improved efficiency and a steady fall in prices. Toshiba has a comprehensive range of motor drive and control ICs and SOI single-chip inverter ICs for stepper motors and BLDC designs for sensor-based and sensorless control. These feature on-chip PWM support for optimal efficiency and sine wave options to minimize acoustic and electrical noise. Applications range from industrial and consumer fans and pumps through air conditioners to home appliances. For more information about Toshiba Electronics visit **www.toshiba-components.com**.

ABOUT EBV ELEKTRONIK

EBV Elektronik, an Avnet (NYSE:AVT) company, was founded in 1969 and is the leading specialist in European semiconductor distribution. EBV maintains its successful strategy of personal commitment to customers and excellent services. 250 Technical Sales Specialists provide a strong focus on a selected group of long-term manufacturing partners. 120 continuously trained Application Specialists offer extensive application know-how and design expertise. Warehouse operations, complete logistics solutions and value-added services such as programming, taping & reeling and laser marking are fulfilled by Avnet Logistics, EBV's logistical backbone and Europe's largest service centre. EBV operates from 60 offices in 28 countries throughout EMEA (Europe – Middle East – Africa). For more information about EBV Elektronik, please visit **www.ebv.com**.

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