

Datasheet

Freescale i.MX51-based ARM Cortex-A8 Processor Module

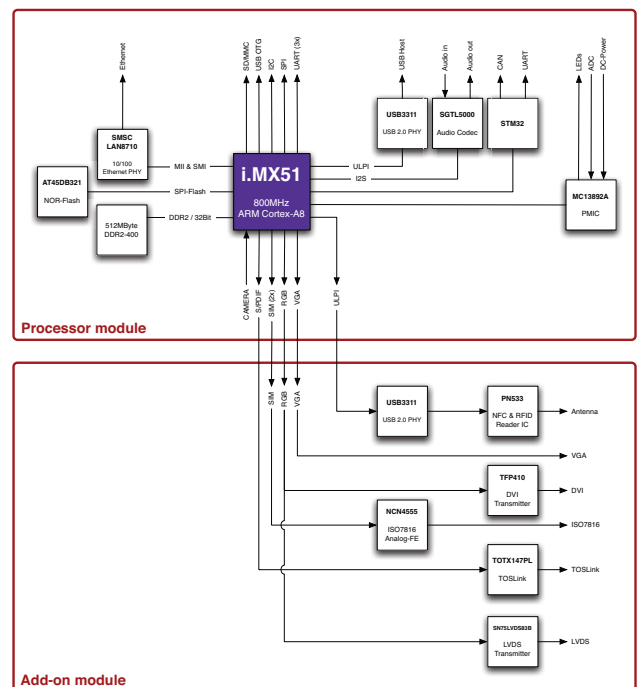
With 10/100 Ethernet, USB 2.0 high-speed Host/Device/OTG, high-resolution video, up to 800MHz

Features EPC-PROC51-FSL-iMX51

- :: 55mm x 75mm (36mm x 75mm active area) EPC form-factor
- :: Freescale MCIMX515 Processor
 - :: Core Complex
 - :: 800MHz ARM Cortex-A8 CPU
 - :: 32KB Level-1 and 256KB Level-2 cache
 - :: VFP3 vector floating point unit
 - :: NEON SIMD media accelerator
 - :: Integrated peripherals
 - :: Multimedia
 - :: OpenGL ES 2.0 and OpenVG 1.1
 - :: HD 1080p video decoder and D1 video encoder
 - :: 24-bit primary display support up to WXGA
 - :: Analog 720p output (integrated RAMDAC)
 - :: 4 video planes plus hardware cursor
 - :: Communications interfaces
 - :: 802.3 Ethernet MAC
 - :: I²C at up to 3.4MBit/s
 - :: keypad controller for up to 8x8 keys
 - :: synchronous serial interface
 - :: SPI interface with 4 channels and up to 66MHz
 - :: Security
 - :: symmetric ciphers and cryptographic hashing
 - :: high-assurance boot options with integrated e-fuses
 - :: ARM TrustZone technology
 - :: advanced power management and touch-screen interface
 - :: SMSC LAN8710 Fast-Ethernet (10/100) PHY
 - :: UARTs, SPI, I²C, PWM, GPIO available to applications
 - :: Display interface (DVI, VGA and LVDS) on add-on board
 - :: TFP410 DVI transmitter
 - :: SN75LVDS83B LVDS transmitter
 - :: ISO7816-3 compliant (smart-card) interfaces
 - :: NFC/RFID reader IC on add-on board
 - :: audio input and output support
 - :: camera sensor interface
 - :: 512MB DDR2 memory on-module through a 32-bit bus
 - :: 4MByte SPI Flash with security-features on-module

Overview

The Freescale i.MX51 ARM Cortex-A8 Processor Module is based on Freescale's i.MX51 multimedia applications processor. The i.MX51 family of processors represents an advanced and power-efficient implementation of the ARM Cortex-A8 core. Freescale's i.MX51 products provide high-performance processing optimized for the lowest power consumption for a number of application spaces where performance and power



are critical. The consumer versions of the i.MX51 run at 800 MHz while the industrial versions run at 600 MHz.

Optimized for low power consumption, the i.MX51 is targeted to drive customer applications, including mobile Internet devices, ebooks, digital photo frames, gaming devices, human machine interface (HMI) applications, portable navigation devices, portable medical solutions and many others. With dynamic voltage and frequency scaling (DVFS), the same core can scale down from 800 MHz to 200 MHz for significant power reduction.

Most peripherals provided by the i.MX515 are available on the board-to-board connectors, including Ethernet, video, audio and a wide range of communications interfaces (SPI, UARTs, USARTs, S/PDIF, PWM, GPIO, I²C). The optional add-on board conveniently provides access to the video output signals and adds smart-card and NFC/RFID connectivity. A major strength of the i.MX51 is the flexible boot option, including booting from USB, UARTs, SD/MMC-cards, SPI-flash and NOR-flash. These options are fully supported with the module design and ease the integration into customer solutions.

Software Options

Boot Loaders:

- :: U-Boot

Hard real-time operating systems:

- :: FreeRTOS (royalty free)

General purpose operating systems:

- :: Linux (royalty free)
- :: Windows CE (provided by Freescale Semiconductor)
- :: CriolloOS: a 3rd-generation microkernel operating system for high-assurance applications from Theobroma Systems

i.MX51 family processor options

The Freescale i.MX51 ARM Cortex-A8 Processor Module is compatible with the entire range of i.MX51-family processors for consumer, industrial and automotive applications:

	CPU speed		
	consumer	industrial	automotive
i.MX512	up to 800MHz	up to 600MHz	n/a
i.MX513	up to 800MHz	up to 600MHz	n/a
i.MX514	n/a	n/a	up to 600MHz
i.MX515	up to 800MHz	up to 600MHz	n/a
i.MX516	n/a	n/a	up to 600MHz

Powerful power management

The MC13892 is a Power Management and User Interface component for Freescale's i.MX51 application processors, targeting personal media players and personal navigation devices.

The MC13892 is well-suited for industrial applications, as it combines the system power supply in a small package and provides interfaces for touch-screens, LED drivers and analog-to-digital conversion:

- :: battery charger for wall charging and USB charging
- :: 8-channel 10-bit ADC with 3 general-purpose inputs
- :: coulomb counter support module
- :: 4 adjustable output buck converters
- :: 12 adjustable output LDOs
- :: 2 boost converters for supplying LCD backlight and LEDs

- :: serial backlight drivers for displays and keypad
- :: RGB LED drivers
- :: power-control logic with processor interface and wake-up
- :: real-time clock, with coin-cell backup
- :: touch-screen interface
- :: SPI/I²C interface for control and register access

SGTL5000 audio codec

The SGTL5000 is a low-power stereo codec that includes headphones and is designed to provide a comprehensive audio solution for portable products that require line-in, mic-in, line-out, headphone-out and digital I/O.

Security options

All Freescale i.MX51 ARM Cortex-A8 Processor modules can be configured for high-assurance boot and will be provided with a trusted boot-loader in the on-module SPI-Flash. All processor modules are preloaded with this security option.

The system integrator merely needs to configure their module to activate the security features and customize their module with cryptographic keys. Our security solution restricts any attempts by end-users to boot unauthorized firmware.

To further enhance security, JTAG can be disabled under control of the firmware when putting the boards into "field-mode".

Customization, design services and support

Theobroma Systems Design und Consulting GmbH is a Freescale Design Alliance member and fully supports the Freescale i.MX51 ARM Cortex-A8 Processor Module and the i.MX51 platform through training, software development and turnkey product realization services.

With expertise in developing board-support packages and turnkey solutions for customers, Theobroma Systems offers a fully supported solution that enables a rapid design start. Our i.MX51 processor module is backed by an experienced engineering team ready to solve even the most demanding engineering problems both for module customers and customization projects. Our know-how enables customers to quickly integrate networking, security and human-interface onto the basic module design: together with our customers, we build a highly customized platform and assist in the development of customer-platforms based on our reference design.