

3MCR neX+ Stack

Overview

The 3MCR neX+ Stack is a production ready stack for Arasan's 3MCR (SD/SDIO/MMC) Host Controller IP that is used to connect to SD, MMC or SDIO devices. The stack can also be used for validating a device during its development and integration life cycles thereby helping designers to reduce the time to market for their product.

The modular neX+ stack is architected to be OS and platform independent which eases porting effort. It has a thin OS and hardware abstraction layers making it highly portable. The neX+ stack provides a generic API set to access, control and configure the bus driver, host controller driver and the underlying hardware. The stack include functions for initialization, sending of commands, data transfer, power management, SDIO interrupt handling, bus configuration, client driver matching, host controller hardware configuration and shutdown.

The neX+ stack can support a single host controller with multiple slots or multiple host controllers with multiple slots. The stack complies with the latest SD, MMC and SDIO standards. It supports eSD and eMMC cards with the option for a device to boot directly from these cards using the boot mode feature.

Features

Compliance

- SD Host Controller Spec. v3.0* (SDXC)
- SDIO Spec. v2.0
- SD Memory Spec. v3.0
- eSD Memory Spec. v2.1
- MMC Spec. v4.4 (eMMC)

Software/IP Features

- Multiple host controllers support
- Multiple slots per host controller
- 1bit, 4bit SD modes
- 1 bit, 4bit and 8 bit MMC modes
- High speed mode up to 208MHz SD host clock
- High Capacity Class 2, 4 and 6 SD cards
- MMCplus and MMCmobile cards
- Non DMA, Single operation DMA and ADMA modes
- Supports byte and block mode transfers
- Card auto detection (Insertion / removal)
- Card bounce condition handling
- eSD and eMMC cards boot mode support

API Interface

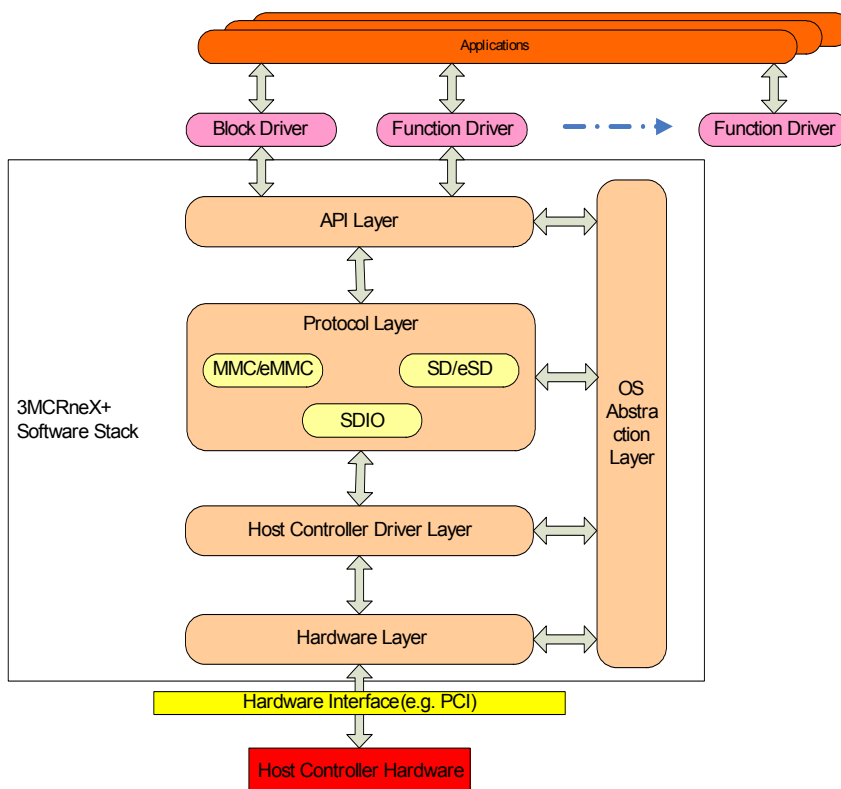
- Generic API interface abstracting protocol specific details
- Non-blocking data transfer APIs

Development Environment

- Linux Fedora 7 kernel version 2.6.21
- x86 PC
- Arasan 3MCR Host Controller

* Supports pre-release v3.0 spec. Compliant with v2.0

3MCR neX+ Stack - System View



System View

The Arasan 3MCR neX+ Stack consists of the a) Application Interface Layer (API Layer), b) Protocol Layer, c) Host Controller Driver Layer, d) Hardware Specific Layer and e) OS Abstraction Layer. The layered architecture allows for easy porting to various operating systems and various platforms.

Client applications such as the block driver and SDIO function drivers interface with the API layer to use the device. The low level details of the protocol is abstracted for the end-user and is handled in the software stack. A set of well defined APIs are provided at this layer. The SDIO client applications using different SDIO functions such as Bluetooth, Wifi, UART etc. can register with the neX+ stack. The block driver integrates the flash devices such as SD, MMC memory cards to the Linux file system.

Application Interface Layer

This layer provides a generic set of APIs for device operations. It abstracts the underlying protocol to the user application. This layer provides APIs to configure a device, register callback handler, read device specific parame-

ters, transfer data and send commands to the device.

Protocol Layer

This layer implements the SD/eSD, SDIO, MMC/eMMC protocol. The protocol specific requests are created and sent to the device. The response received from device is also analyzed and accordingly indicated to the application layer. This layer maintains the state machine for the protocol used.

Host Controller Driver Layer

The layer implements APIs to access, control and configure the hardware.

Hardware Layer

This layer abstracts the hardware specific features. This layer handles the interrupts from the hardware and the calls made to the hardware from upper layers.

OS Abstraction Layer

This layer abstracts OS resources (memory management, threads, spinlocks etc.) to other layers.

Benefits:

- Developed in ANSI C
- OS and platform agnostic stack
- Portable - independent HW and OS layers
- Easy-to-use interface for application development
- Fully documented API
- Production ready block driver on FC7 Linux 2.6.x
- Premier direct support from Arasan engineering team

Deliverables:

- Full software stack - source code in C
- User Documentation
 - API User's Guide
 - User's Manual
 - FAQ
- Sample block driver
- Sample SDIO-UART application

Applications:

- SDIO-WiFi, SDIO-BlueTooth, SDIO-UART to an embedded or x86 based platform
- Validate a SDIO device during development and integration
- Integrate support for SD/MMC cards and their advanced versions to an embedded platform.



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Data Sheet Link:

3MCR neX+ Stack:
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