

Freescle IMX51CEC 多媒体应用处理方案

Freescle 公司的 IMX51CEC 是消费类电子和工业领域的应用处理器,采用 ARM Cortex A8™ 内核,工作频率高达 800MHz,多达 200MHz DDR2,支持移动 DDR DRAM 时钟速率,主要应用在网上网,MID,PMP,PND 和高端 PDA 以及游戏机.本文介绍 i.MX51 主要特性,功能方框图,以及 i.MX51 开发板(EVK)的硬件性能,包括开发板方框图, i.MX51 和 DDR II , SPI NOR FLASH 和 SGTL5000 连接图, USB 连接图, VGA 和 DVI 连接图, LCD 连接框图以及 SD/MMC 连接器连接图与 FEC 连接图, 电源方框图.

i.MX51 Applications Processors for Consumer and Industrial Products

The i.MX51 multimedia applications processors represent Freescle Semiconductor's latest addition to a growing family of multimedia-focused products offering high performance processing optimized for lowest power consumption.

The i.MX51 processors feature Freescle's advanced and power-efficient implementation of the ARM Cortex A8™ core, which operates at speeds as high as 800 MHz. Up to 200 MHz DDR2 and mobile DDR DRAM clock rates are supported. These devices are suitable for applications such as the following:

- Netbooks (web tablets)
- Nettops (internet desktop devices)
- Mobile internet devices (MID)
- Portable media players (PMP)
- Portable navigation devices (PND)
- High-end PDAs
- Gaming consoles
- Automotive navigation and entertainment (see automotive data sheet, IMX51AEC) Features include the following:
 - Smart Speed Technology—The heart of the i.MX51 processors is a level of power management throughout the device that enables the rich suite of multimedia features and peripherals to achieve minimum system power consumption in both active and various low-power modes. Smart Speed Technology enables the designer to deliver a feature-rich product that requires levels of power that are far less than typical industry expectations.

- Applications Processor—i.MX51 processors boost the capabilities of high-tier portable applications by providing for the ever-increasing MIPS needs of operating systems and games.

Freescale's Dynamic Voltage and Frequency Scaling (DVFS) allows the device run at much lower voltage and frequency with sufficient MIPS for tasks such as audio decode resulting in significant power reduction.

- Multimedia Powerhouse—The multimedia performance of the i.MX51 processors is boosted by a multi-level cache system and further enhanced by a Multi-Standard Hardware Video Codec, autonomous Image Processing Unit, SD and HD720p Triple Video (TV) Encoder with triple video DAC, Neon (including Advanced SIMD, 32-bit Single-Precision floating point support and Vector Floating Point co-processor), and a programmable smart DMA (SDMA) controller.

- Powerful Graphics Acceleration—Graphics is the key to mobile game navigation, web browsing, and other applications. The i.MX51 processors provide two independent, integrated Graphics Processing Units: OpenGL ES 2.0 3D graphics accelerator (27 Mtri/s, 166 Mpix/s) and OpenVG 1.1 2D graphics accelerator (166 Mpix/s).

- Interface Flexibility—The i.MX51 processor interface supports connection to all popular types of external memories: DDR2, Mobile DDR, NOR Flash, PSRAM, Cellular RAM, NAND Flash (MLC and SLC) and OneNAND. Designers seeking to provide products that deliver a rich multimedia experience find a full suite of on-chip peripherals: LCD controller and CMOS sensor interface, High-Speed USB On-The-Go with PHY, and three High-Speed USB hosts, multiple expansion card ports (High-Speed MMC/SDIO Host and others), 10/100 Ethernet controller, and a variety of other popular interfaces (PATA, UART, I2C, I2S serial audio, and SIM card, among others).

- Increased Security—Because the need for advanced security for mobile devices continues to increase, the i.MX51 processors deliver hardware-enabled security features that enable secure e-commerce, digital rights management (DRM), information encryption, secure boot, and secure software downloads.

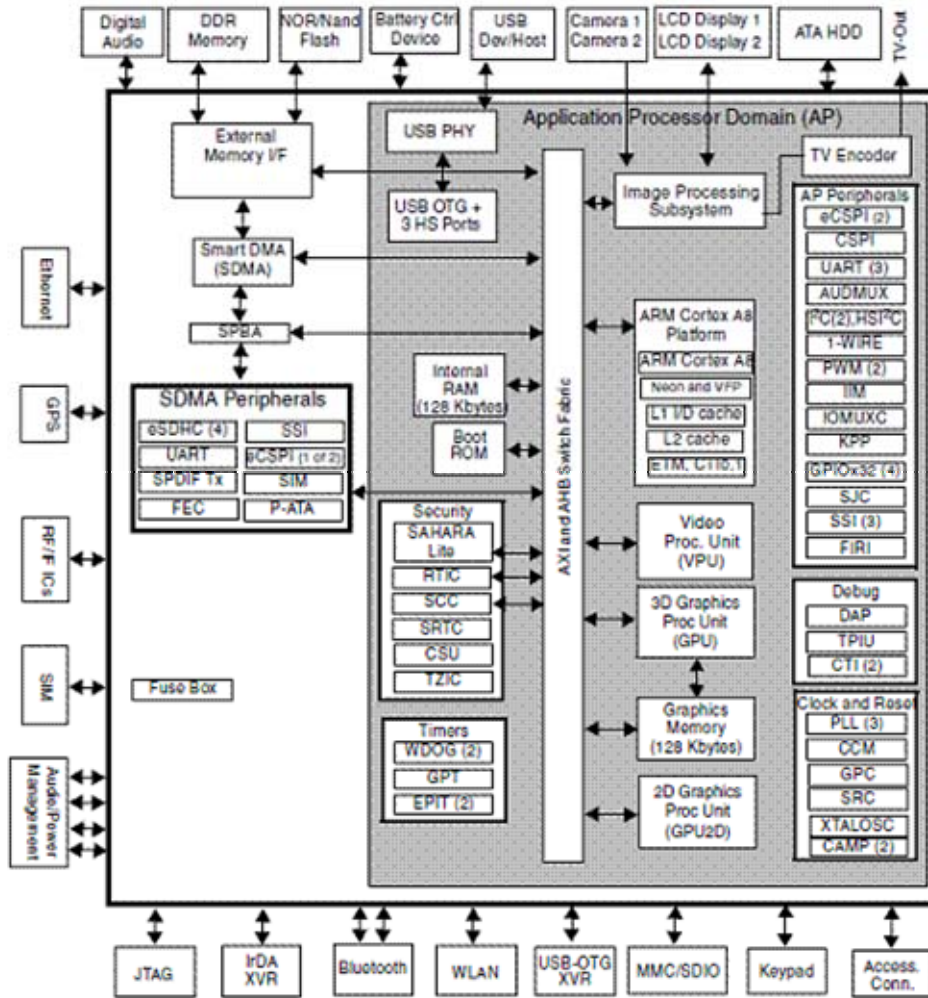


图 1.i.MX51 功能方框图

i.MX51 EVK 硬件

i.MX51 EVK Hardware

The i.MX51 EVK architecture is different from 3DS. It is only one board including CPU and other peripheral blocks. Also it can connect many peripheral cards for expansion functions.

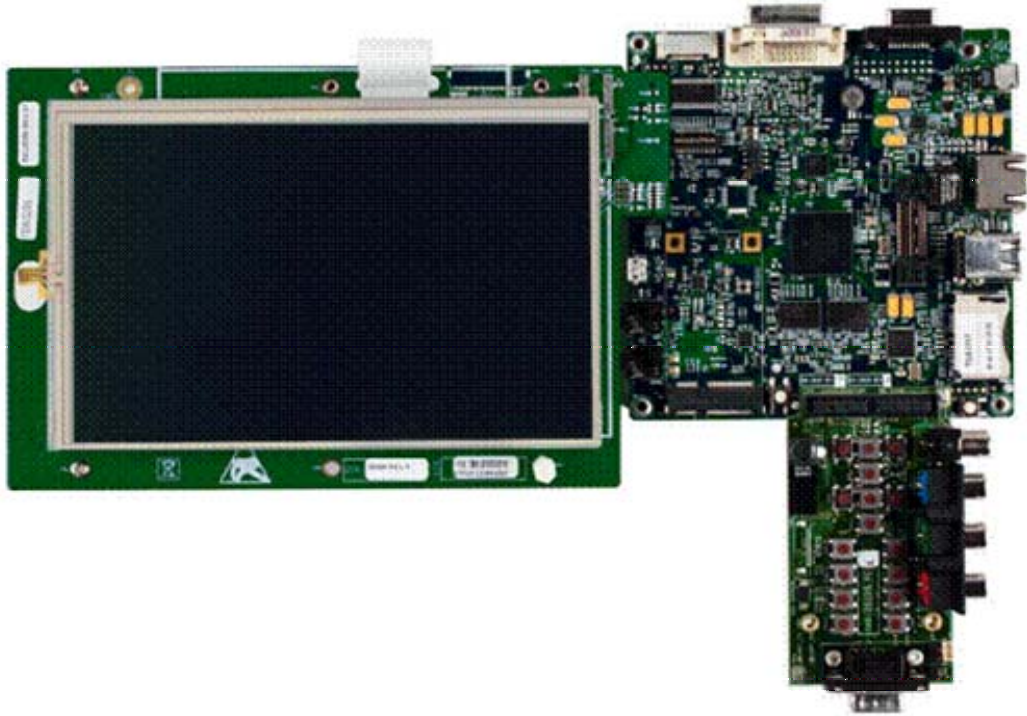


图 2.i.MX51 EVK 开发板架构

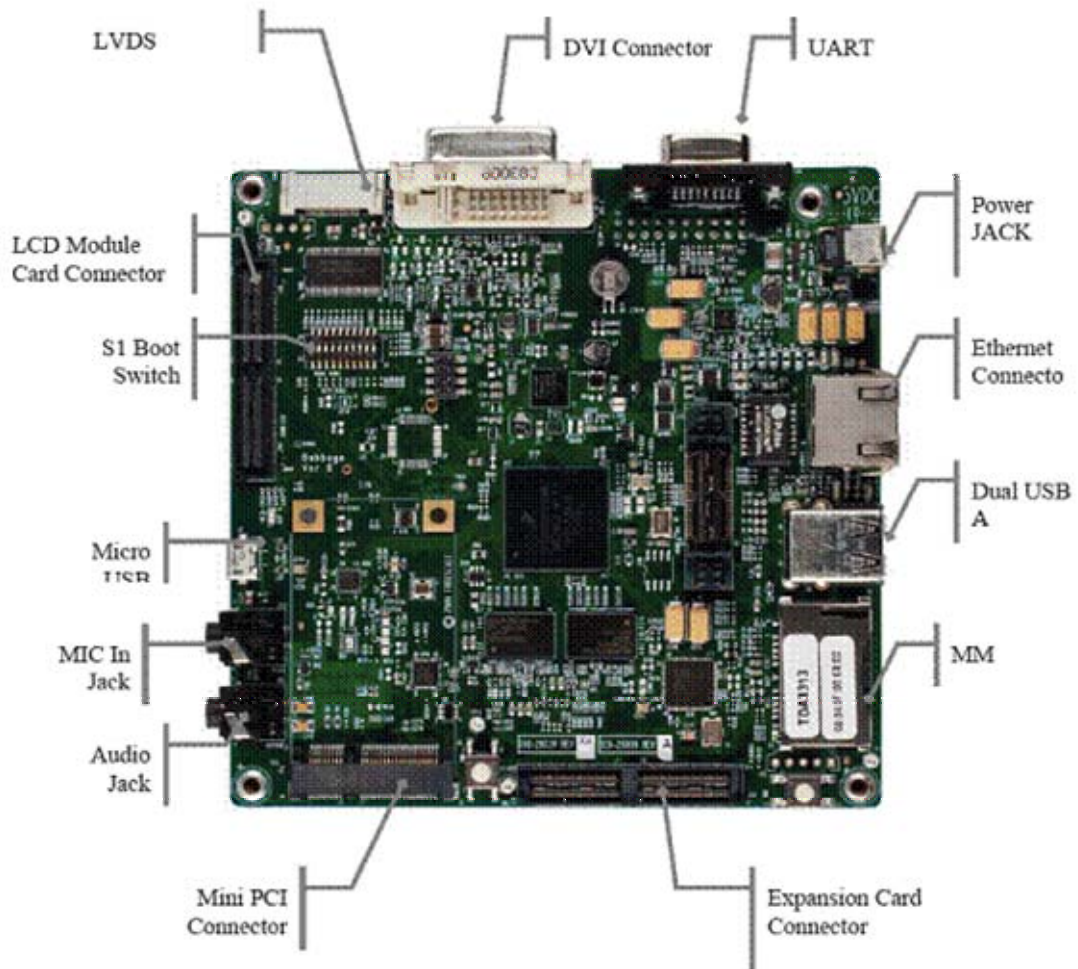


图 3.i.MX51 EVK 开发板顶视图

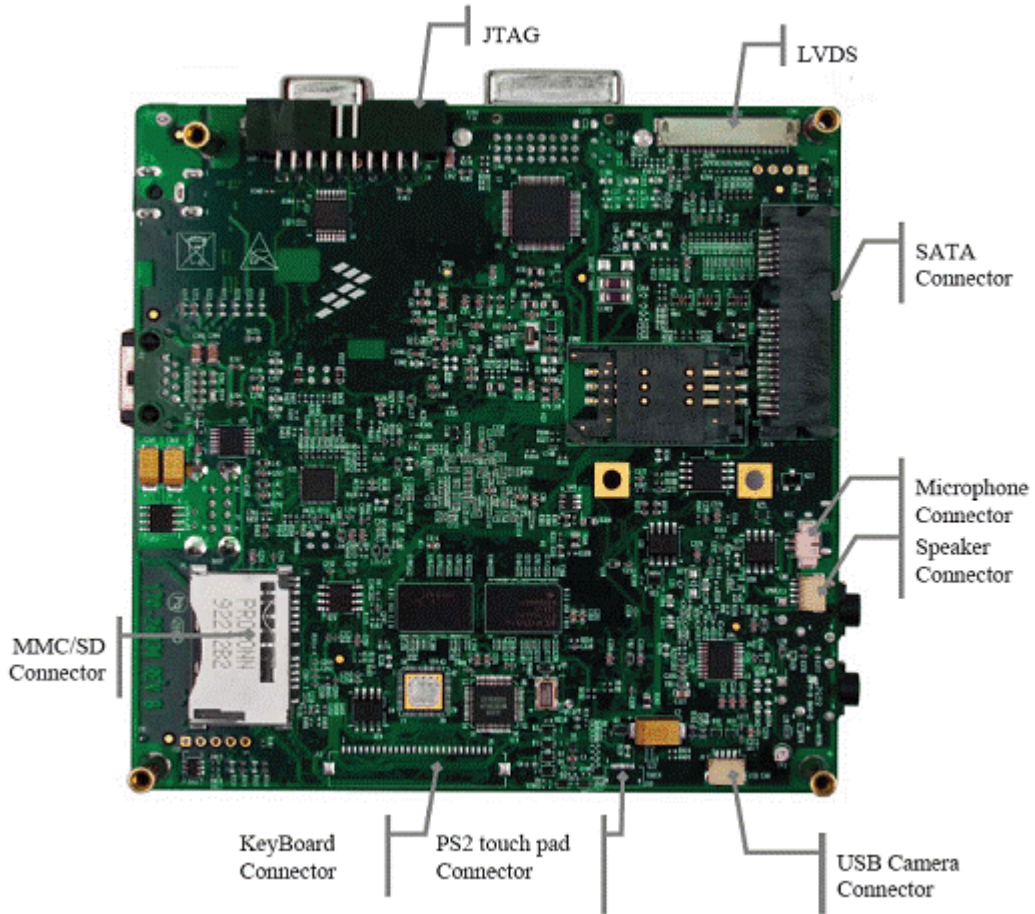


图 4.i.MX51 EVK 开发板底视图

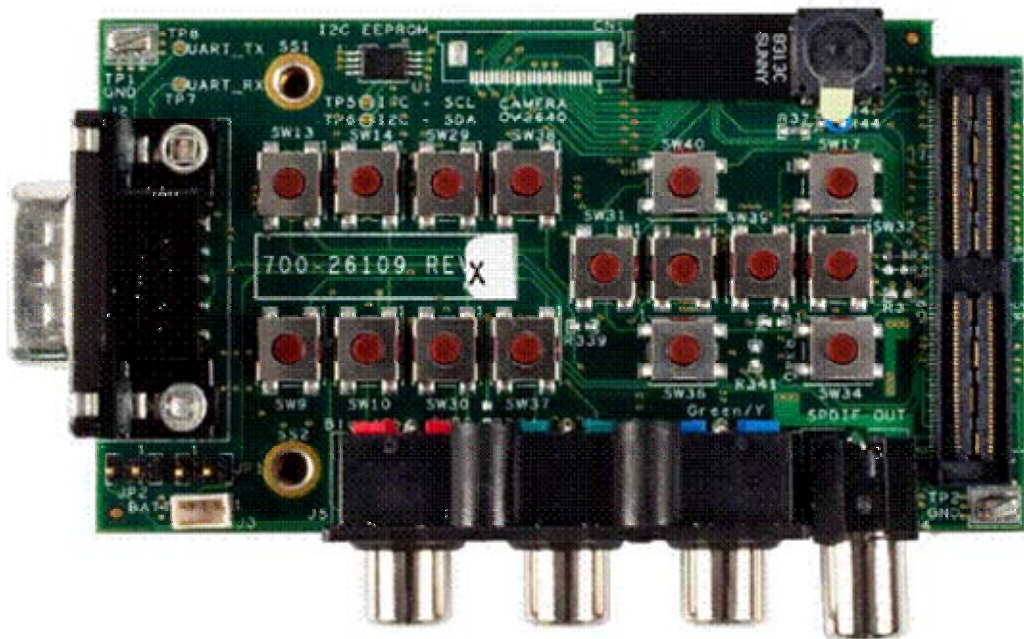


图 5.i.MX51 EVK 开发板扩展板外形图



图 6.i.MX51 EVK 开发板 LCD 模块卡外形图

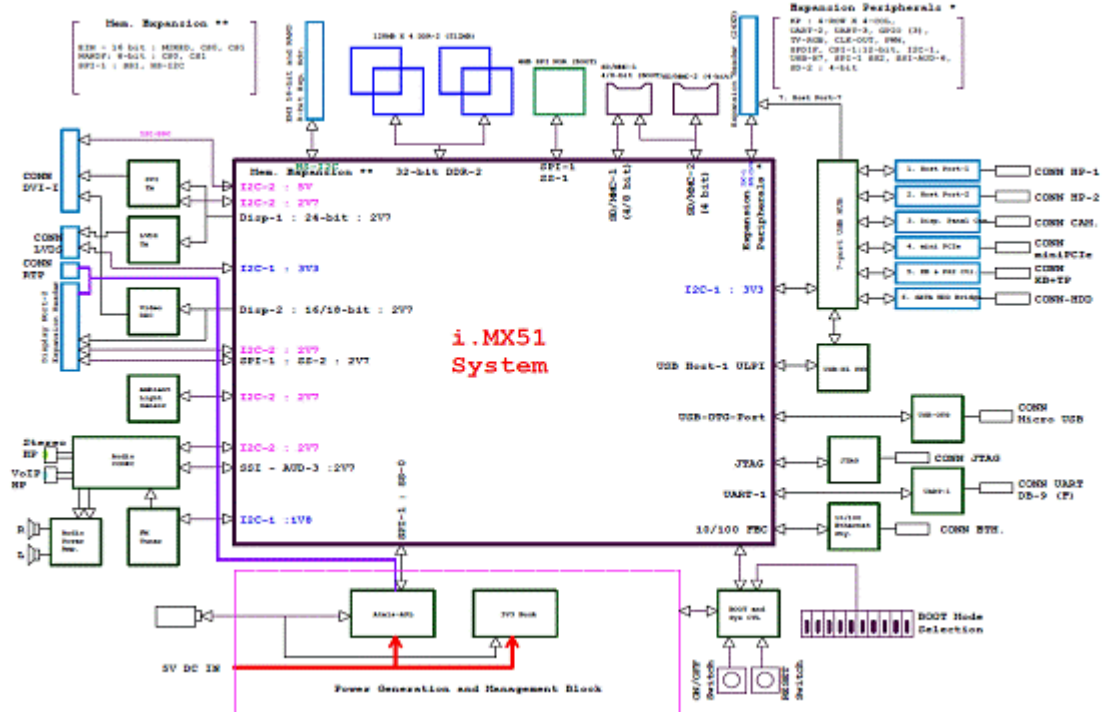


图 7.i.MX51 EVK 开发板方框图

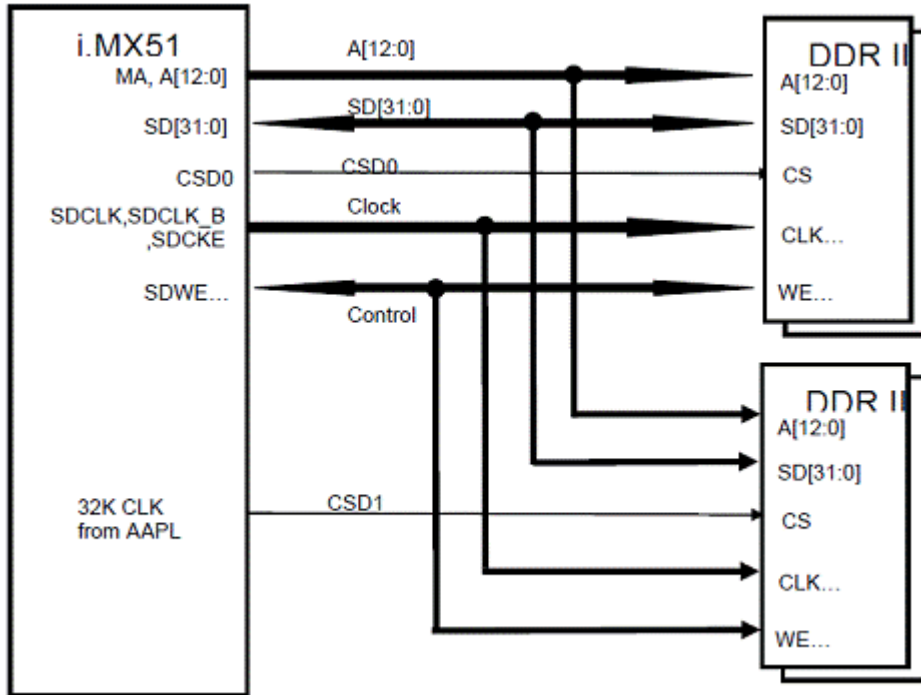


图 8. i.MX51 和 DDR II 连接图

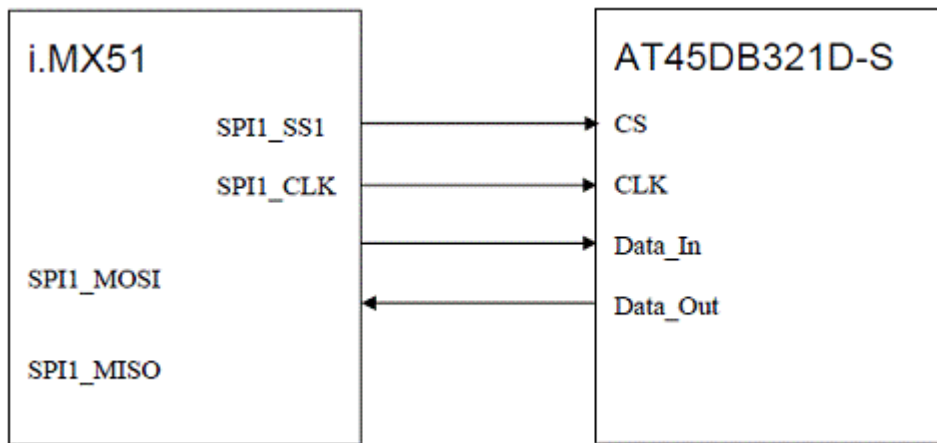


图 9. i.MX51 和 SPI NOR FLASH 连接图

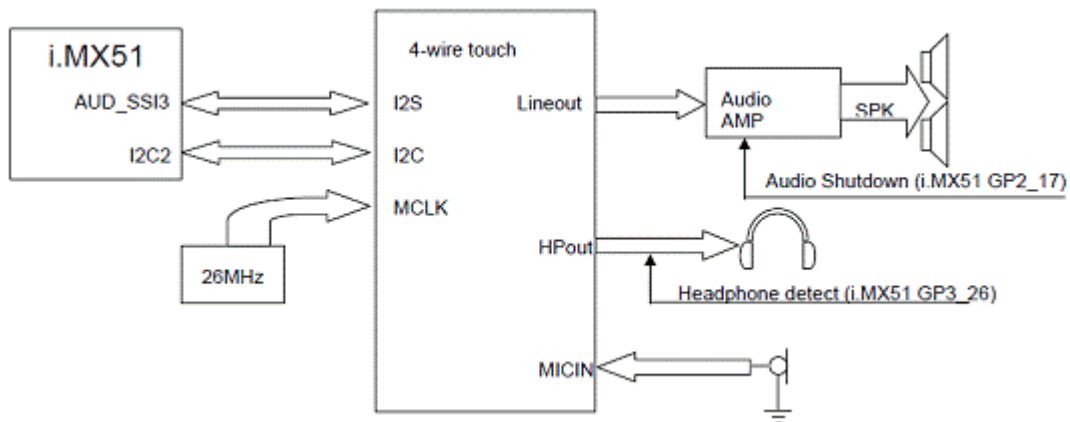


图 10. i.MX51 和 SGTL5000 连接图

The SGTL5000 is a low power stereo codec with integrated headphone amplifier. It is designed to provide a complete audio solution for portable products needing line-in, mic-in (mic bias only available in 32QFN version), line-out, headphone-out, and digital I/O.

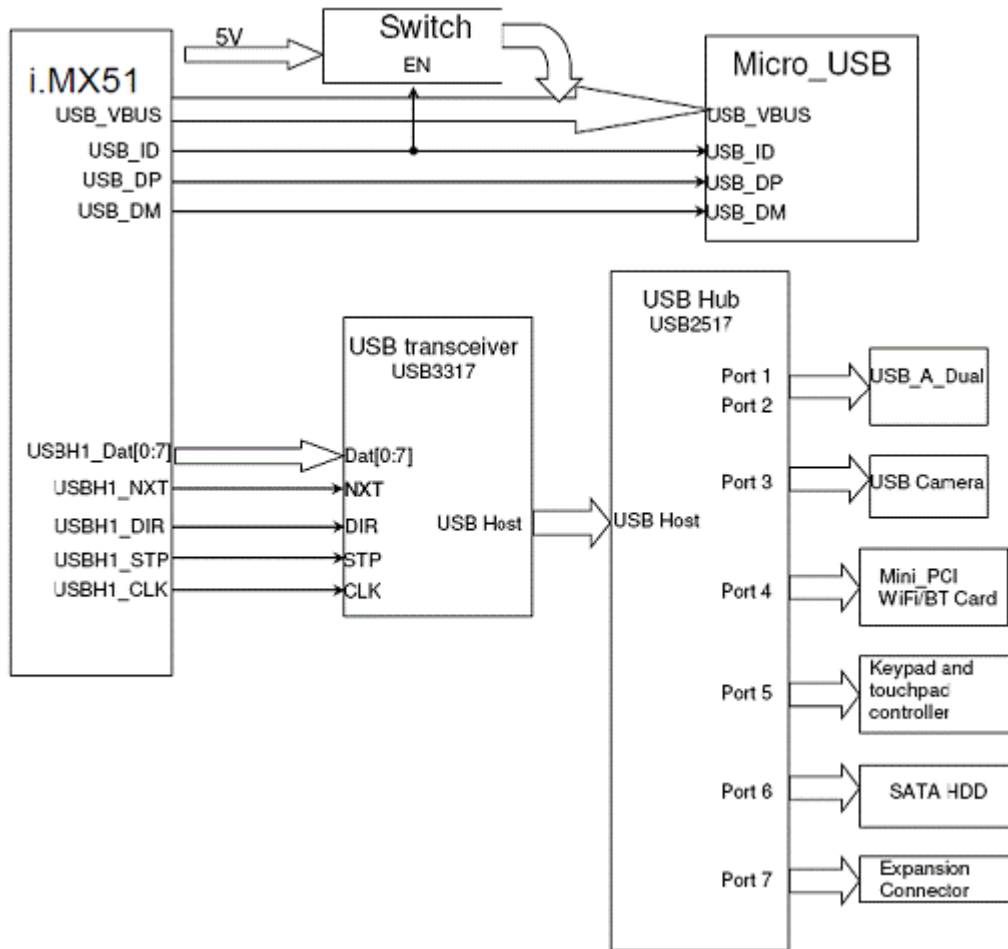


图 11. i.MX51 EVK USB 连接图

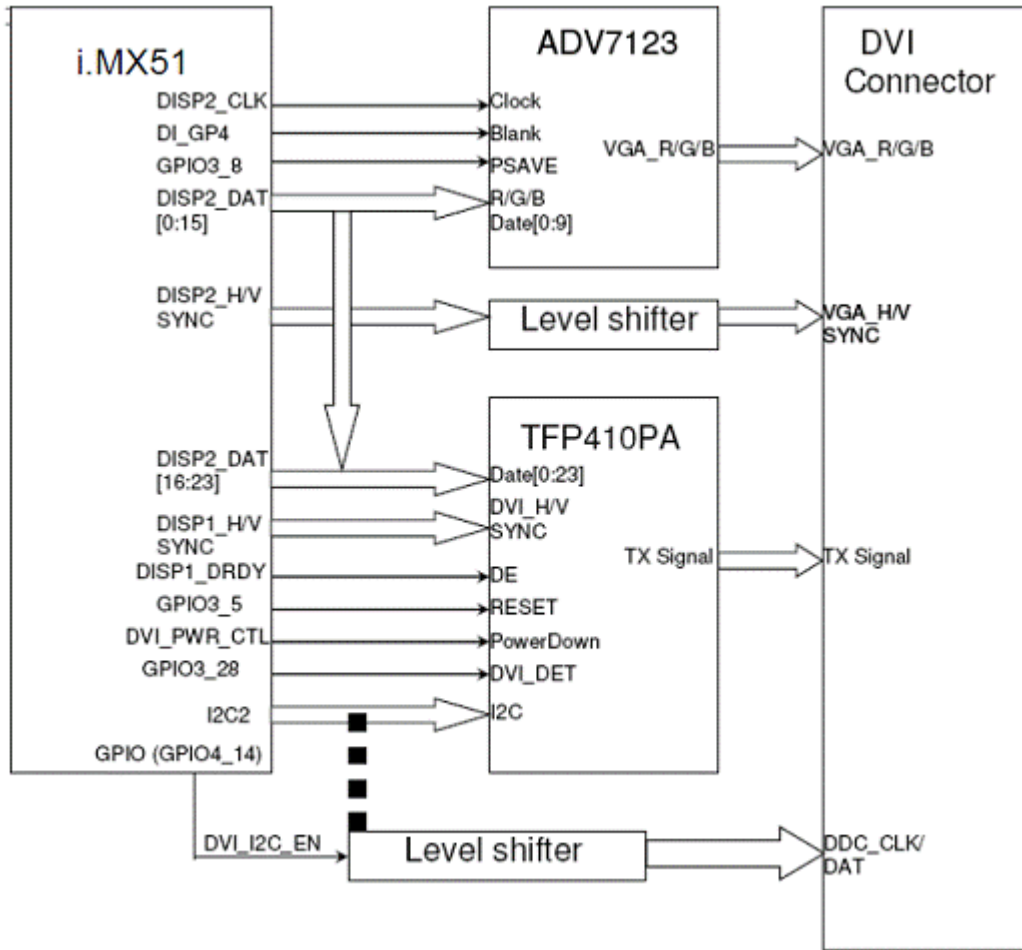


图 12. VGA 和 DVI 连接图

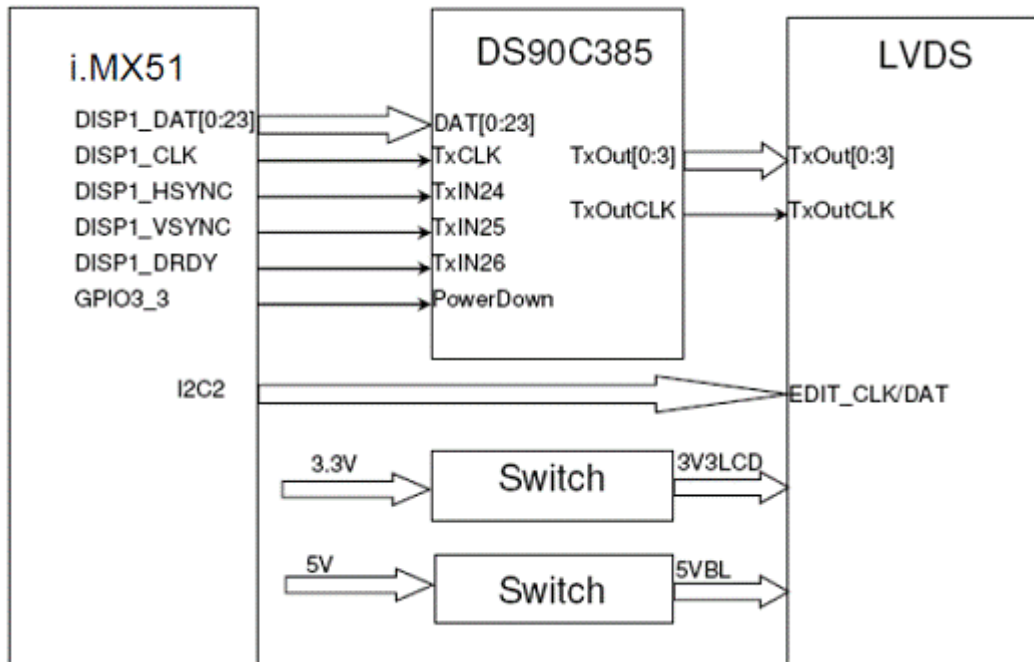


图 13. LCD 连接框图

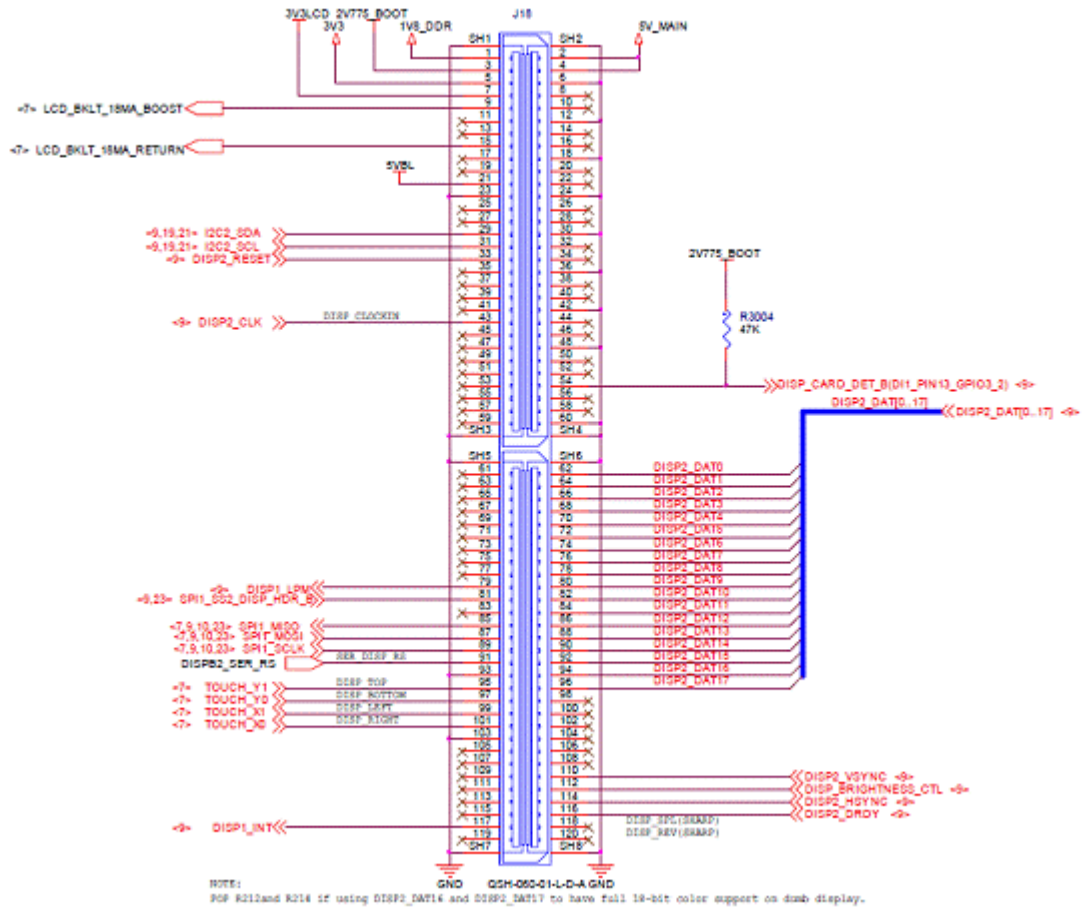


图 14. UI 扩展连接器接口定义图

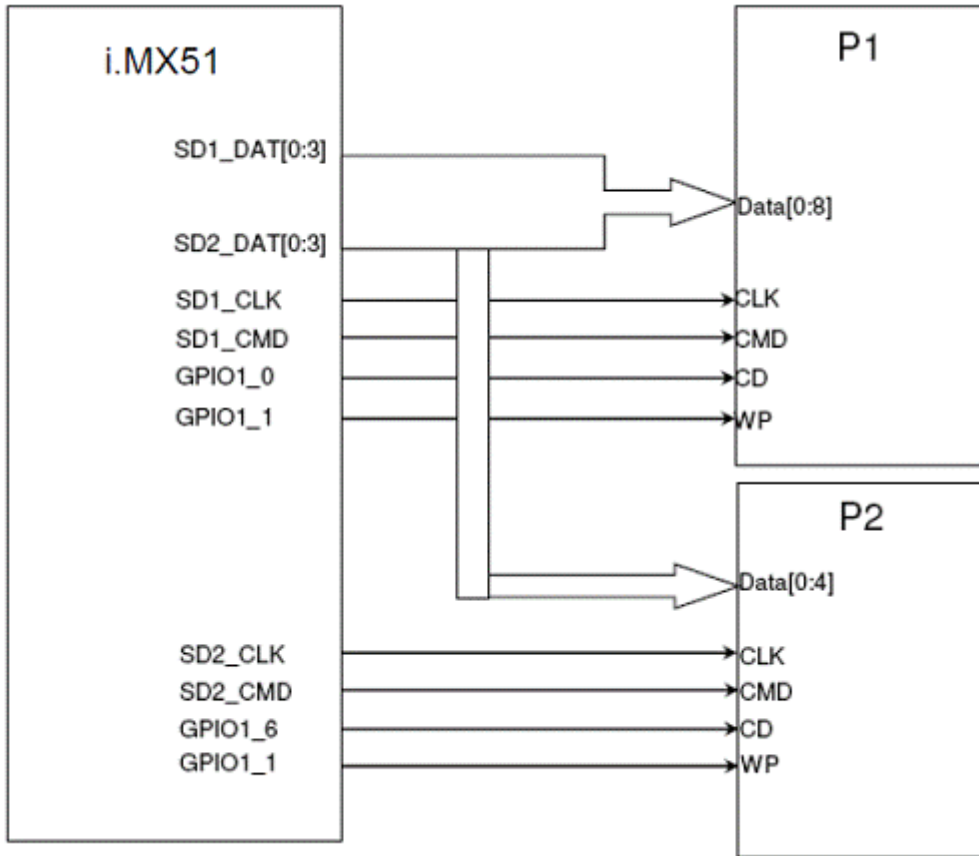


图 15. SD/MMC 连接器连接图

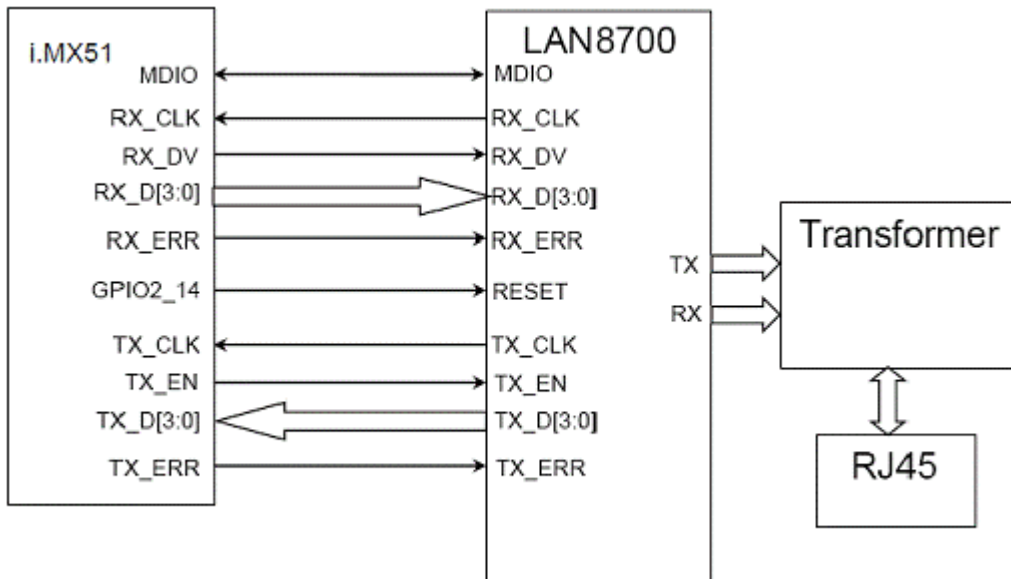


图 16. FEC 连接图

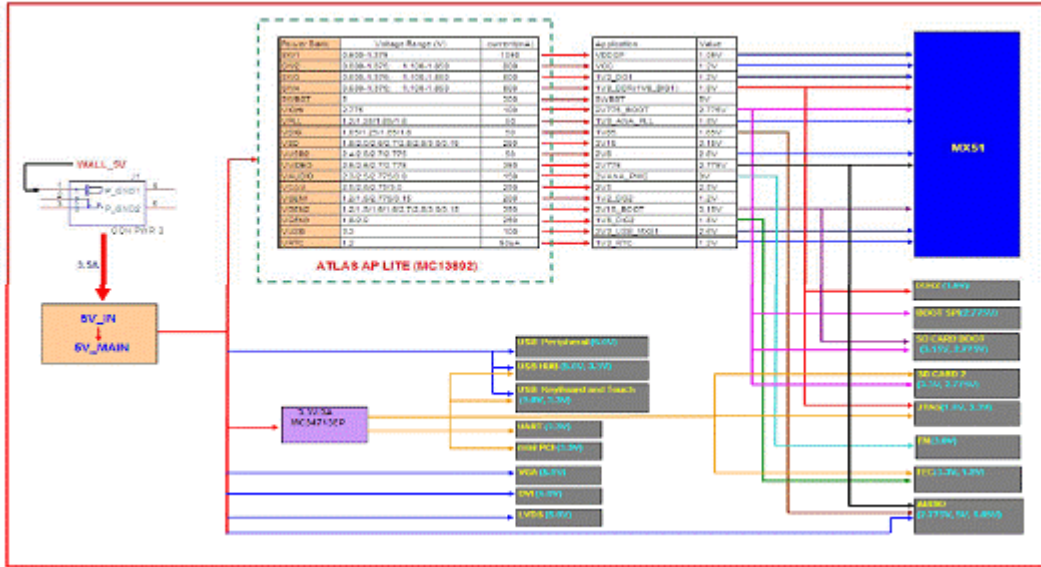


图 17. 电源方框图