SM502

Mobile Multimedia Companion Chip

Overview

The SM502 is a Mobile Multimedia Companion Chip (MMCC™) device packaged in a 297-pin Ball Grid Array and is backward-compatible with the SM501. Designed to comply with needs of the embedded sector, the SM502 has video and 2D capabilities. To decrease system costs, the SM502 supports a diverse array of I/Os, including analog RGB and digital LCD Panel interfaces, an 8-bit parallel interface, USB, UART, IrDA, two Zoom Video (ZV) interfaces, AC97 or I-S, SSP, PWM, and I-C. The additional GPIO bits that can be utilized to interface with external devices.

The 2D engine has front-end color space conversion with 4:1 and 1:8 scaling support. The video engine supports two different video outputs (Dual Monitor) at 8, 16, or 32-bit per pixel and a 3-color hardware cursor per video output. The LCD Panel video pipe supports back-end YUV color space conversion with 4:1 and 1:212 scaling. A ZV port is also included as an interface for external circuitry for MPEG decoding or TV input.

Key Features

- PCI/32bit host bus support for the processor interface (SH-4, Power PC, Xscale, MIPS, ARM)
- 200 MHz DAC support 1280×1024 resolution
- Supports 18/24-bit TFT panel and 8/12-bit CSTN panel
- 128-bit 2D graphic engine
- 0/8MB embedded SDRAM
- Supports seven layers of display frames (2 hardware cursors, primary graphics, video, video alpha, alpha, and secondary graphics)
- Supports two 8-bit ports or one 16-bit port/ITU601 ZV capture port
- USB1.1 host and slave, UART/IrDA, I2C
- AC97
- 2 DMA controllers support
- 8051 u-controller embedded
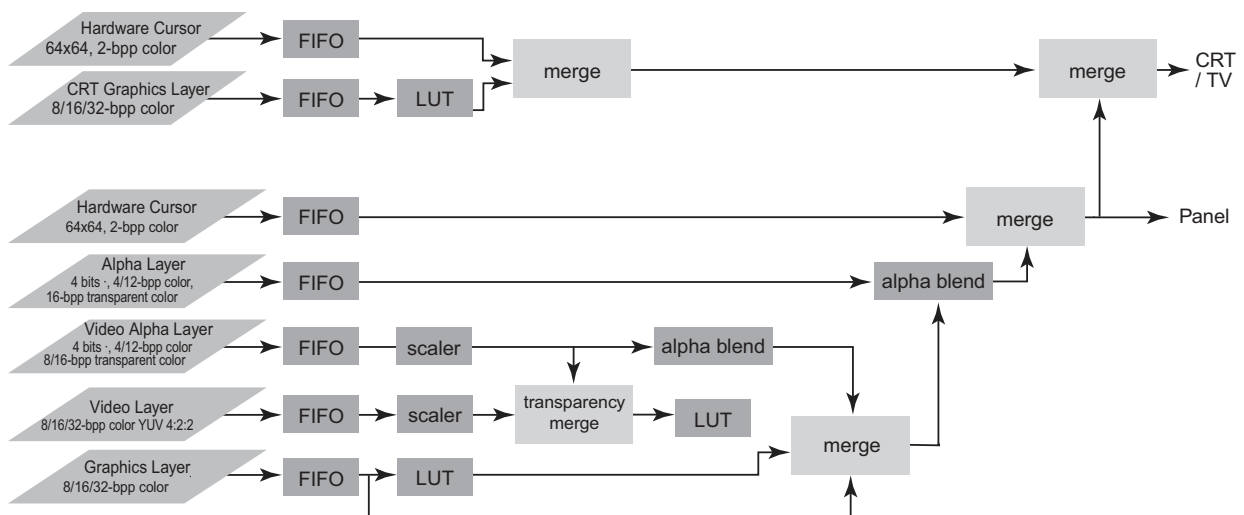- Power consumption < 500mW

Applications

- Thin client
- UMPC
- Medical patient monitors
- Embedded product monitors
- Military PDA
- Education machine
- Surveillance
- IPC
- Signage

Packaging

- 297-pin BGA (19mm×19mm)

Video Layers and Data Processing

SM502 Block Diagram

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  ┌───────────┐  ┌───────┐  ┌──────────────┐  ┌───────────┐
  │ GPIO (64b)│  │  USB  │  │ I/O Interface│  │  SSP (2x) │
  └─────▲─────┘  └───▲───┘  └──────▲───────┘  └─────▲─────┘
        │            │             │ 8b             │
┌──────────────────────────────────────────────────────────────┐
│                              8051 µ-controller                 │
│  ┌─────────┐                                                   │
│  │ Host CPU│  Host or PCI                              Digital │  ┌──────────┐
│  │(Intel   │◄──32b──►                               ◄─────────►│  │ LCD Panel│
│  │ XScale, │                                                   │  └──────────┘
│  │ MIPS or │                SM502 Core                         │
│  │ Hitachi │                                                   │
│  │  SH4)   │                                                   │
│  └─────────┘                                                   │
│  ┌─────────┐  ZV Port                                Analog    │  ┌──────────┐
│  │ MPEG/TV │◄────────►                             ◄──────────►│  │Analog LCD│
│  └─────────┘                                                   │  │ or CRT   │
│  ┌─────────┐  ZV Port                                          │  └──────────┘
│  │ MPEG/TV │◄────────►                                         │
│  └─────────┘                                                   │
└────────▲──────────────────────▲──────────────────────▲────────┘
     AC97│                       │                      │32b
  or I²S │                       │                      │
  ┌──────▼──────┐        ┌───────▼───────┐      ┌───────▼───────┐
  │    Audio    │        │   UART (2x)   │      │    SDRAM      │
  │    CODEC    │        │  or IrDA (2x),│      │  2 to 64 MB   │
  └─────────────┘        │     I²C       │      └───────────────┘
                         └───────────────┘
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