



california micro devices

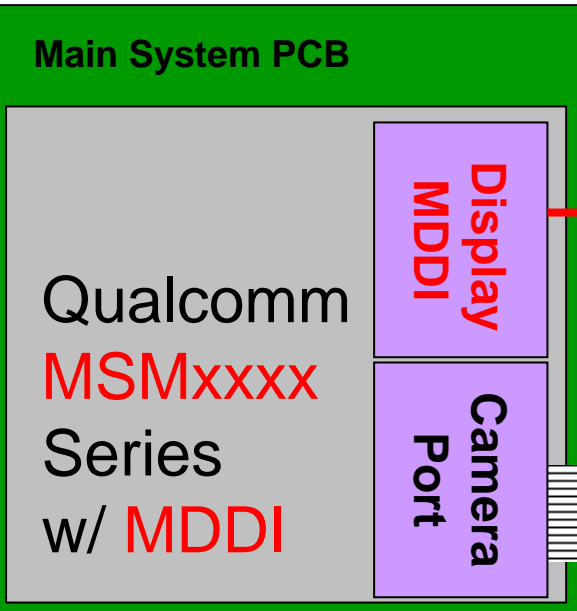
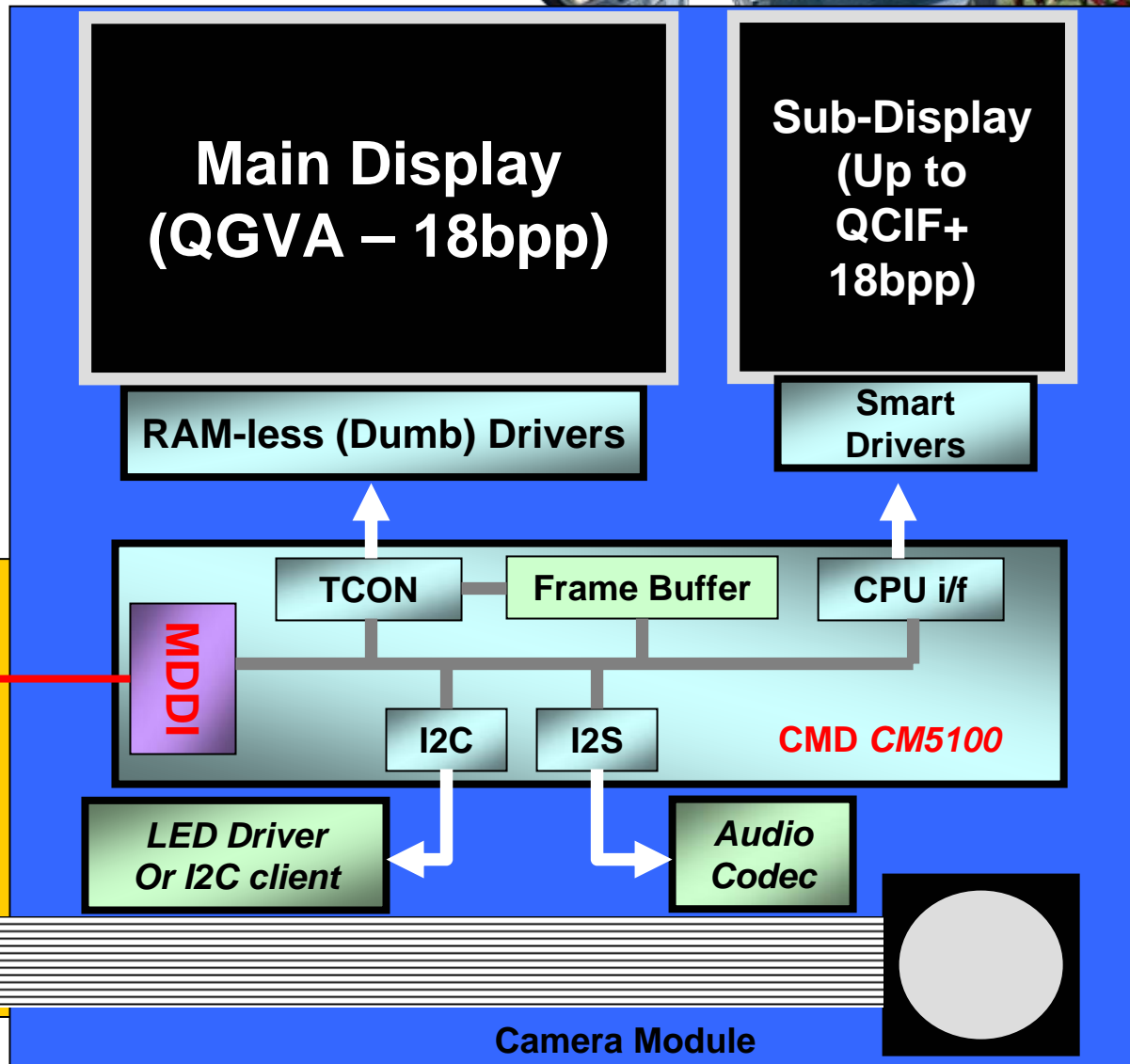


# CM5100

## MDDI Client Solution Dual Display and Audio Controller

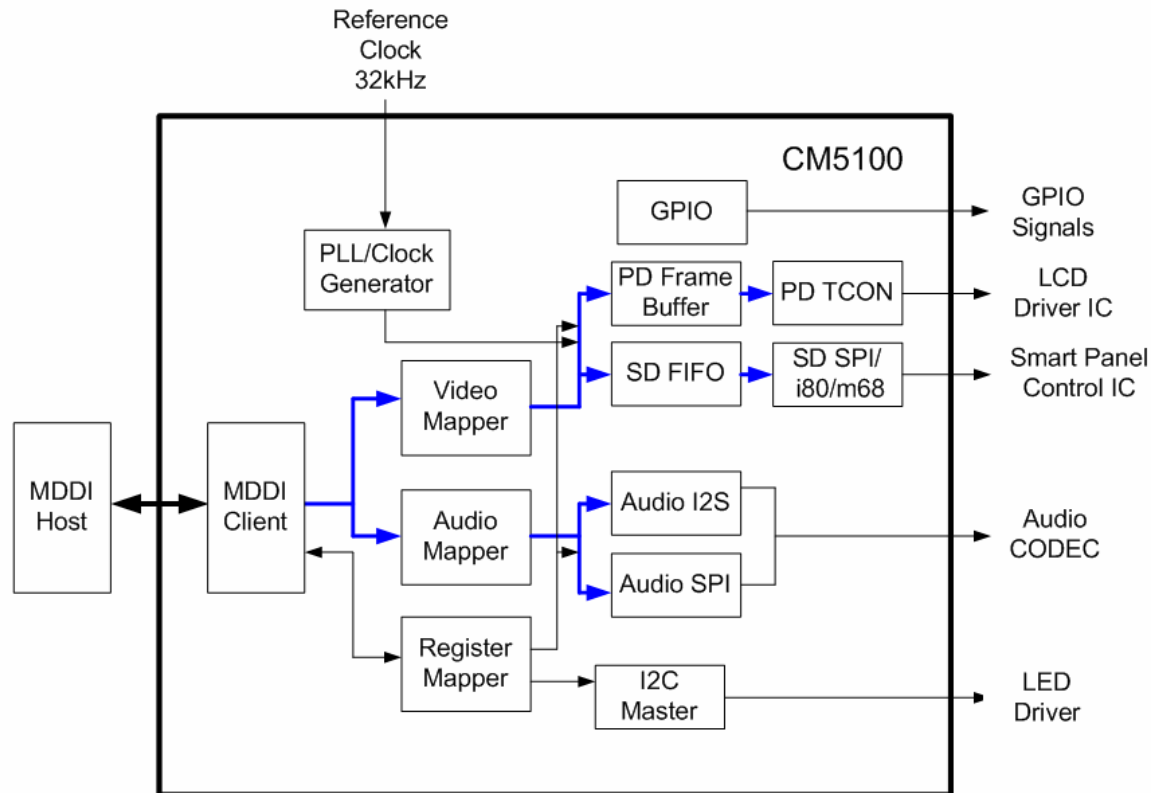


# MDDI Hub CM5100





# CM5100 Block Diagram





# Key Features 1/2

- Fully MDDI-compliant dual display controller
- MDDI Type-I client interface (single data and strobe pair)
- Supports data rate of up to 385Mbps
- MDDI “internal mode” (maximum cable length of 15cm)
- Data Packet Types Supported:
  - Sub-frame Header
  - Filler
  - Register Access
  - Round Trip Delay Measurement
  - Reverse Link Encapsulation
    - Client Capability
    - Client Request & Status
    - Client Return Register Read Data
  - Forward Video
  - Forward Audio



## Key Features 2/2

- Supports 16-bit and 18-bit active matrix panels
- Primary display resolution of up to QVGA (320 x 240), through RGB interface or CPU i/f
- Secondary display resolution of up to QCIF+ (220 x 176), through CPU i/f (i80, M68) or SPI
- Embedded memory to support refresh of the primary display up to QVGA resolution at 18bpp
- I2S interface to stream PCM audio to an external audio Codec
- I2C Host interface to support an external LED driver companion chip
- SPI interface
- Dedicated I2C interface for debug purposes
- Extensive power saving modes (Shutdown mode, Hibernate mode)
- Small form-factor Wafer Level CSP package



# CM5100 MDDI HUB

- CM5100 MDDI Multimedia Hub for Mobile Phones
- Features
  - Primary Display Controller support
    - Up to QVGA (320x240) Resolution for Main Display
    - Sub Display : Resolution depends upon Smart Panel
    - Integrated Frame Buffer for Main Display
  - Streaming Audio/Video Support with Synchronization
  - SPI/I2C and I2S connectivity
  - Max MDDI Serial Throughput 385 Mbs
- Physical
  - 100 pin Ultra-CSP 0.5mm pad pitch Package
  - Package Dimensions 5.0 mm x 5.0 mm (0.5 mm pad pitch)



# Secondary Display Interface

- Interfaces to Smart Panels
  - I80
  - M68
  - SPI
- Data Bus 9/8 bits Parallel
- RGB Color Depth 18/16/12



# Other Interface

- Audio Codec Interface
  - I2S for 16 bit PCM Audio
  - SPI or I2C for Control
- General Purpose I/O
  - Depending upon the mode a minimum of 6 up to a maximum of 32 GPIO signals available
- I2C and SPI



# Supplies and Clocks

- Operating Voltages
  - Digital I/O = 2.6V
  - Core = 1.8 V (Logic)
  - MDDI = 2.6 V
- External Clock Source
  - 32Khz Clock Oscillator or 6-14 Mhz Clock Osc/XTAL
  - No External Capacitors required for Loop Filter



# Power Consumption

- Shutdown mode < 3uW
- Power Consumption Refresh (QVGA, 30fps, MDDI Hibernate mode) = 4mW
- Operating Mode (MDDI active, QVGA main display, 30fps + sub-display) < 20mW



# Value Proposition

- Fully MDDI-compliant media hub (Type I, internal)
- End-to-end Solution between the MDDI pipe and the panels/drivers
- Allows the use of RAM-less (dumb) drivers
- Minimizes redundancy on the display module
- Support of audio stream through I2S to external audio Codec
- Control interface (I2C) to PhotonIC solution (highly integrated LED driver)



# The Benefits of CM5100

- CM5100 is a Complete Solution supporting Video for both Displays, Audio and Control streams
- It manages the refresh and the Frame Buffer is integrated in a fine geometry process
- Management of Audio and Video Synchronization
- Extremely Small Footprint: CSP 5mm x 5mm
- Low power Process Technology
- Extensive Power Saving Modes