S1D13716 Mobile Graphics Engine
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The S1D13716 is a Low cost, Full featured Mobile Graphics Engine providing support for the digital video revolution in mobile products. Providing support for YUV digital camera input as well as containing a JPEG Codec, the S1D13716 is the ideal solution for cellular phone markets where multimedia messaging (MMS) is required. The S1D13716 is designed specifically for architectures based on serial / InDirect communications to and from the Host processor, while also supporting a serial and parallel LCD Module. The rich feature set of the S1D13716 was chosen to off-load graphics drawing functions and streaming video from the host processor or Base Band Engine.

The S1D13716 provides impressive support for graphic intensive functions like; JPEG Encode of camera image, full VGA JPEG Encode + Overlay, Rotated / Mirrored JPEG Encode of camera image + Overlay, JPEG Encode of RGB image, JPEG or RGB Overlay support, JPEG Decode from a Host image, JPEG Decode from memory, Image rotation, Mirror display, YUV to RGB Converter, etc.
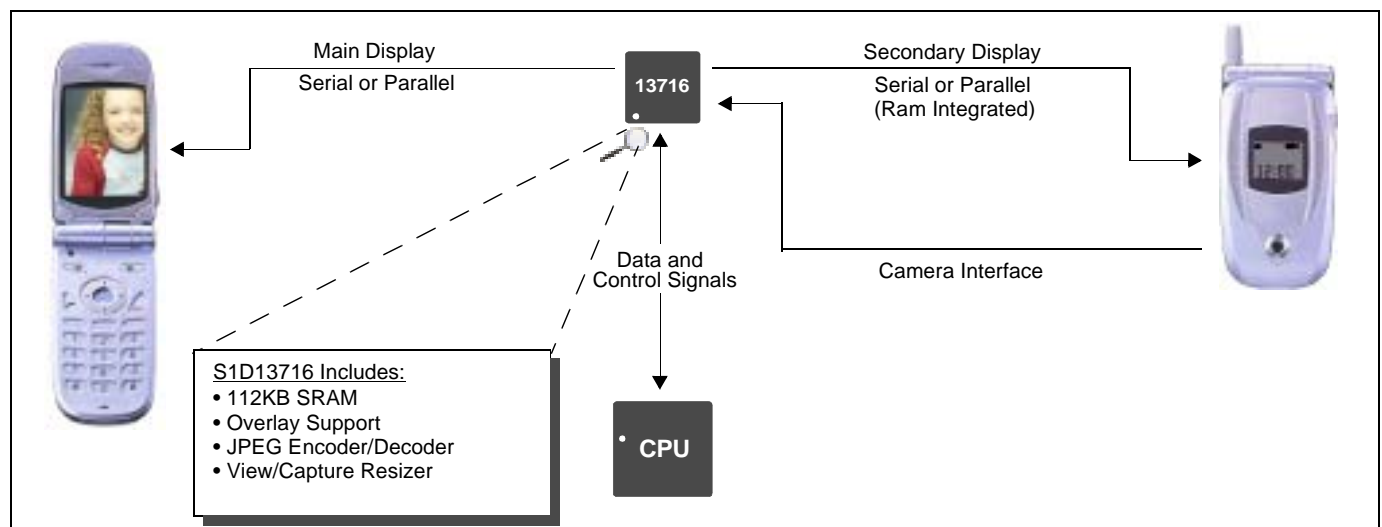
The S1D13716 contains 112K bytes of embedded SRAM which is used as the image, video and overlay buffer, and supports both Serial and Parallel LCD Modules. This level of integration provides a low cost, low power single chip solution to meet the demands of embedded markets requiring Digital Video, such as Mobile Communications devices.

■ FEATURES

- Embedded 112K byte SRAM Display Buffer
- Low Operating Voltage
- Serial Host Interface
- 8-bit Parallel Host Interface
- 1 Serial and 2 Parallel Interface LCD Panels
- Digital Clock Input
- Hardware JPEG Encoder/Decoder
- SwivelView™ (90°, 180°, 270° hardware rotation of displayed image)
  - (Patent # 5,734,875 - Patent # 5,956,049 - Patent #6,262,751)

- YUV Digital Camera Interface
- YUV to RGB Converter
  - Converter can be bypassed to allow storage of 'raw' camera data
- View/Capture Resizer
- Overlay Support (RGB or JPEG data formats supported)
- I2C Interface
- PWM Outputs (4 programmable outputs intended for LED use)
- Strobe Flash Output
- Software Initiated Power Save Mode

■ SYSTEM BLOCK DIAGRAM

■ DESCRIPTION

Integrated Display Buffer

- 112K bytes of embedded SRAM

CPU Interface

- Serial
- 8-bit Parallel
- 54 MHz operation
- Host can write LCD data directly (716 bypass mode)

Panel Support

- Supports 8-bit Parallel panels (Ram integrated)
- Supports Serial LCD Modules (Ram Integrated)

Miscellaneous

- Software initiated power save mode
- Multiple General Purpose IO pins
- Programmable PWM Outputs
- Strobe Flash Output
- CORE$_{VDD}$ 1.8 volts and IO$_{VDD}$ 3.0 volts
- Package: 100 pin PFBGA (0.65 mm ball pitch)

Digital Video

- Camera Interface: YUV 4:2:2 (ITU-R-BT656) w/resize function
- View / Capture hardware resizer with trimming and reduction functions
- YUV to RGB converter
- Video Streaming
  - Camera data is written to LCD Module independent of Host
- Hardware JPEG Encoder/Decoder
  - Encode incoming camera image for Host read
  - Encode RGB image in memory
  - Decode incoming Host image for LCD display
  - Decode JPEG image stored in memory
  - Host can also send RGB data directly to the 713 display buffer.
- RGB or JPEG Overlay Support
  - Overlay data is stored as either RGB or JPEG
  - Overlay can be combined with the Camera image
  - Overlay can be automatically scaled to VGA for VGA JPEG Encode.

CONTACT YOUR SALES REPRESENTATIVE FOR THESE COMPREHENSIVE DESIGN TOOLS

- S1D13716 Technical Manual
- S5U13716 Evaluation Boards
- CPU Independent Software Utilities
- Royalty Free source level driver code

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