S1D13717 Mobile Graphics Engine

The S1D13717 is an Mobile Graphics Engine solution designed with support for the digital video revolution in mobile products. The S1D13717 contains an integrated camera interface, hardware JPEG encoder/decoder and SD Memory Card interface. Seamlessly connecting to both direct and indirect CPU interfaces, it provides support for up to two LCD panels. The Mobile Graphics Engine supports all standard TFT panel types, eliminating the need for an external timing control IC. The S1D13717, with it's 224K bytes of embedded SRAM and rich feature set, provides a low cost, low power, single chip solution to meet the demands of embedded markets requiring Digital Video, such as Mobile Communications devices and Palm-size PDAs.

Additionally, products requiring a rotated display can take advantage of the SwivelView™ feature which provides hardware rotation of the display memory transparent to the software application. The S1D13717 also provides support for "Picture-in-Picture Plus" (a variable size window with overlay functions). Higher performance is provided by the Hardware Acceleration Engine which provides 2D BitBLT functions.
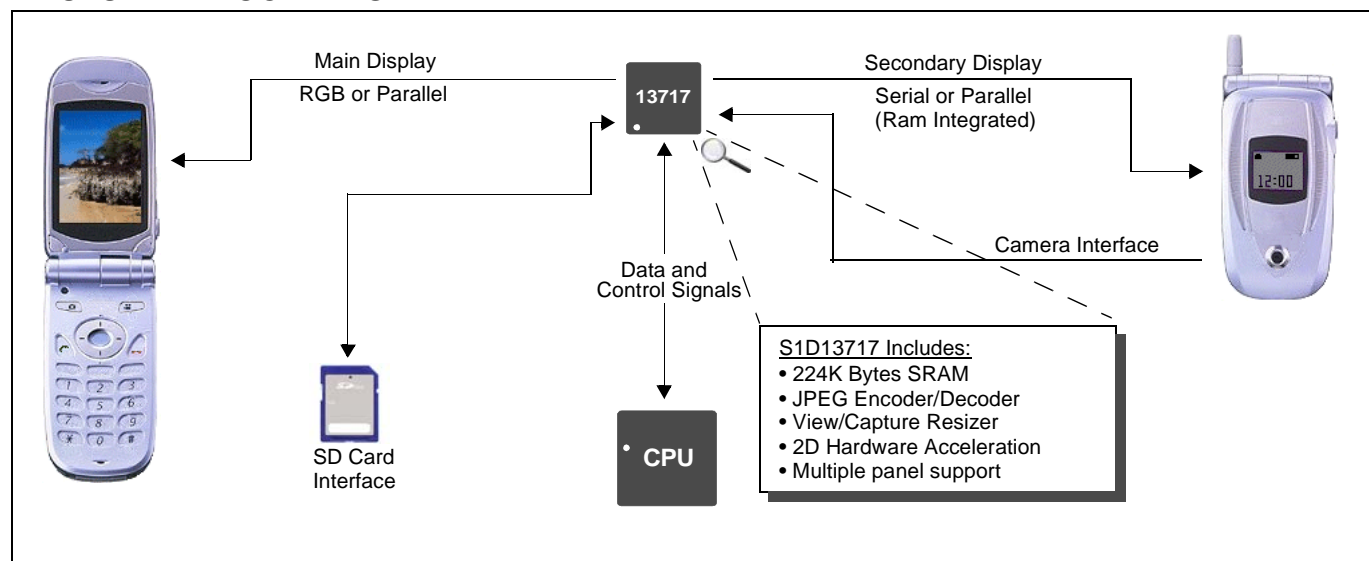
The S1D13717 provides impressive support for cellular and other mobile solutions requiring Digital Video support. However, its impartiality to CPU type or operating system makes it an ideal display solution for a wide variety of applications.

■ FEATURES

- Embedded 224K byte SRAM Display Buffer
- Low Operating Voltage
- Direct and Indirect CPU interfaces
- Programmable resolutions and color depths
- Support for 2 panels (LCD2 must be RAM integrated)
- Support for RGB, Serial and Parallel I/F Panels
- Internal PLL or digital clock input
- SD Memory Card interface

- Single port Camera interface w/resize function
- Hardware JPEG encoder/decoder
- YUV to RGB converter
- SwivelView™ (90°, 180°, 270° hardware rotation of displayed image)
  - (Patent # 5,734,875 - Patent # 5,956,049 - Patent #6,262,751)
- "Picture-in-Picture Plus"
- 2D Hardware Acceleration Engine
- Software Initiated Power Save Mode

■ SYSTEM BLOCK DIAGRAM

Main Display
RGB or Parallel

13717

Secondary Display
Serial or Parallel
(Ram Integrated)

Camera Interface

Data and
Control Signals

SD Card
Interface

CPU

S1D13717 Includes:
- 224K Bytes SRAM
- JPEG Encoder/Decoder
- View/Capture Resizer
- 2D Hardware Acceleration
- Multiple panel support

■ DESCRIPTION

Integrated Display Buffer

- 224K bytes of embedded SRAM
- Addressable as a single linear address space

CPU Interface

- 16-bit Generic Asynchronous CPU interface
- Direct and Indirect addressing

Panel Support

- Supports up to 2 LCD panels
- LCD1: 9/12/18-bit RGB panel
  LCD2: 8/9-bit Serial Ram Integrated panel
- LCD1: 8/16/18-bit Parallel Ram Integrated panel
  LCD2: 8/9-bit Serial Ram Integrated panel
- LCD1: 8/16/18-bit Parallel Ram Integrated panel
  LCD2: 8/16/18-bit Parallel Ram Integrated panel
- LCD1: 9/12/18-bit RGB panel
  LCD2: 8-bit Parallel Ram Integrated panel
- TFT, ND-TFD, and Extended TFT
- Typical resolution of:
  up to 220x176 at 32bpp
  up to 320x240 at 16 bpp

Acceleration

- 2D BitBLT Engine
- SwivelView™: 90°, 180°, 270° hardware rotation of displayed image
- Mirror Display: hardware "mirror" image of display

Display Features

- 8/16/32 bit-per-pixel (bpp) support
- Picture-in-Picture Plus: displays a variable size window overlaid over the background image
- Overlay Functions
- Pixel Doubling: doubles the effective resolution
- Video Invert: inverts display data

Digital Video

- Single port Camera Interface (YUV 4:2:2)
- Hardware JPEG Encoder (YUV 4:2:2, 4:1:1, 4:2:0)
- Hardware JPEG Decoder (YUV 4:4:4, 4:2:2, 4:1:1, 4:2:0)
- YUV Display/Capture (YUV 4:2:2, 4:2:0)
- Memory Image JPEG Encode (YUV 4:2:2, 4:1:1, 4:2:0)
- View and Capture hardware resizer with trimming and reduction functions
- YUV to RGB and RGB to YUV converters
- Support for external MPEG codec interface

Miscellaneous

- Internal PLL or digital clock input
- Software initiated power save mode
- Multiple General Purpose IO pins
- $CORE_{VDD}$ 1.8 volts and IO_{VDD} 3.0 volts
- FCBGA 161-pin package

CONTACT YOUR SALES REPRESENTATIVE FOR THESE COMPREHENSIVE DESIGN TOOLS

- S1D13717 Technical Documentation
- S1D13717 Evaluation Boards
- CPU Independent Software Utilities
- Royalty Free source level driver code

SEGGER

symbian OS

SWELL

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