

S1D13746 TV-Out Graphics Engine

August 2007

The S1D13746 is an extremely low cost, low pin-count device providing direct support for TV from a standard memory-mapped frame-buffer. Internal high quality scaling algorithms allow for low resolution input to be smoothly scaled to the full resolution as determined by either PAL or NTSC standards. The S1D13746 is the ideal solution for cellular phone markets where TV-output is a requirement.

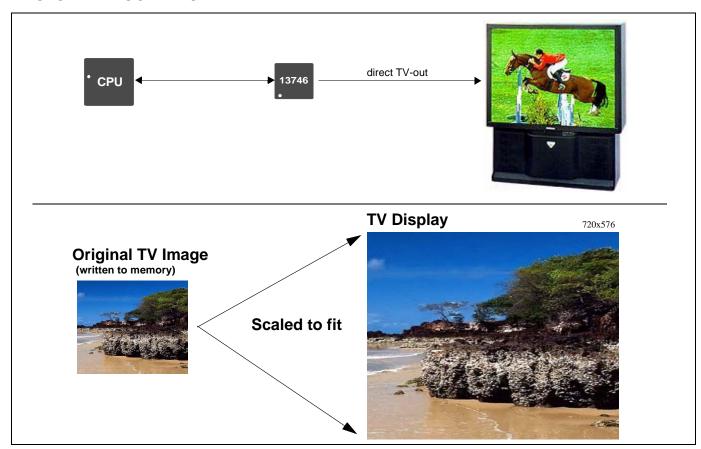
The S1D13746 contains 312K bytes of embedded SRAM. Input data can be double-buffered, thereby acting as a frame rate converter and preventing any visual tearing during streaming input. The minimal feature set and high level of integration (embedded high output DAC) provides a low cost, low power, single chip solution to meet the demands of embedded markets requiring Digital Video, such as Mobile Communications devices.

■ FEATURES

- Embedded 312K byte SRAM
- Double-buffered for streaming video
- Low Operating Voltage
- Serial / Parallel Host Interface
- Parallel RGB Interface
- Multiple Input Data formats
- High Output DAC
- Input Image Rotation (SwivelViewTM 90/180/270°)

- Bi-Cubic Scalar from input to output
- PAL and NTSC output
- Automatic Border
- Auto-Centering
- Destructive Windows (Overlays) with transparency function
- Software Initiated Power Save Mode
- Internal PLL or Digital Clock Input

SYSTEM BLOCK DIAGRAM



GRAPHICS

S1D13746



DESCRIPTION

Integrated Frame Buffer

312K byte SRAM

CPU Interface

- Parallel Indirect Interface (Intel 80)
- Serial Interface
 - 3-wire (9-bit)
 - 4-wire (8-bit SPI)
- Parallel RGB Interface

Input Formats

- RGB: 3:3:2, 5:6:5, 6:6:6, 8:8:8
- YUV: 4:2:0, 4:2:2
- All input formats are converted and stored as YUV 4:2:0
- Input image can be rotated (SwivelView 90/180/270°)

Input Scalar

- Bi-Cubic, 9-bit, non-integer based
- Arbitrary Horizontal / Vertical settings
- Automatic scaling based on input/output window settings

TV Output

- Composite PAL/NTSC output
- S-Video PAL/NTSC output
- Programmable Chrominance / Luminance Filters
- 3x3 Pixel filter
- Auto-Border / Auto-Center
- Wide-Screen Signalling Support (ETSI EN 300 294 compliant)
- Closed Caption Support (CEA-608-B)
- Macrovision Protection support (bond out option)
- Test Pattern Generator
- Supports Destructive Windows (overlays) with transparency function

Miscellaneous

- Internal PLL or digital clock input
- Software initiated power save mode
- CORE_{VDD} 1.5 Volts and IO_{VDD} 1.8 to 3.3 Volts
- Package: PFBGA 100-pin (7mm x 7mm)

■ THEORY OF OPERATION

The S1D13746 contains it's own frame-buffer memory where image data can be stored and displayed from. Input images larger than the memory size are automatically scaled down using a Bi-cubic method before being stored. All images can be stored using a double-buffered architecture to prevent any visual tearing and act as a rate converter. All stored images can be further scaled up/down for display on the TV. If the resulting scaled image does not fit the maximum resolution as defined by the TV standard, the image is auto-centered and bordered. The 3x3 pixel filter and programmable chrominance / luminance filters are provided to generate a high quality resulting image.

The S1D13746 supports Wide-Screen Signalling, Closed Captioning, includes a built-in Test Pattern Generator, and has a bond-out option available for Macrovision Protection

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 S1D13746 Technical Documentation CPU Independent Software Utilities • S1D13746 Evaluation

Royalty Free source level driver code

Japan

Seiko Epson Corporation IC International Sales Group 421-8, Hino, Hino-shi Tokyo 191-8501, Japan Tel: 042-587-5812 Fax: 042-587-5564 http://www.epson.co.jp/

Hong Kong

Epson Hong Kong Ltd. 20/F., Harbour Centre 25 Harbour Road Wanchai, Hong Kong Tel: 2585-4600 Fax: 2827-4346 http://www.epson.com.hk/

North America

Epson Electronics America, Inc. 2580 Orchard Parkway San Jose, CA 95131, USA Tel: (408) 922-0200 Fax: (408) 922-0238 http://www.eea.epson.com/

Europe

Epson Europe Electronics GmbH Riesstrasse 15 80992 Munich, Germany Tel: 089-14005-0 Fax: 089-14005-110 http://www.epson-electronics.de/

Taiwan

Epson Taiwan Technology & Trading Ltd. 14F, No. 7
Song Ren Road
Taipei 110
Tel: 02-8786-6688
Fax: 02-8786-6677
http://www.epson.com.tw/

Singapore

Epson Singapore Pte Ltd 1 HarbourFront Place #03-02 HarbourFront Tower One Singapore, 098633 Tel: (65) 6586-5500 Fax: (65) 6271-3182 http://www.epson.com.sg/

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2 Revision 1.03 X74A-C-001-01