

## S1D13700 Embedded Memory Graphics LCD Controller

The S1D13700 Embedded Memory Graphics LCD Controller can display both text and graphics on an LCD panel. The S1D13700 allows layered text and graphics, scrolling of the display in any direction, and partitioning of the display into multiple screens. It includes 32K bytes of embedded SRAM display memory which is used to store text, character codes, and bit-mapped graphics. The S1D13700 handles display controller functions including: transferring data from the controlling microprocessor to the buffer memory, reading memory data, converting data to display pixels, and generating timing signals for the LCD panel.

The S1D13700 is designed with an internal character generator which supports 160, 5x7 pixel characters in internal mask ROM (CGROM) and 64, 8x8 pixel characters in character generator RAM (CGRAM). When the CGROM is not used, up to 256, 8x16 pixel characters are supported in CGRAM.

Designed as a functional replacement to the S1D13305, the S1D13700 has an expanded feature set which includes; direct support of the Motorola MC68K microprocessor family, embedded display buffer, increased clock speeds, increased grayscale depths, lower power technology and smaller packages.

### ■ FEATURES

#### CPU Interface

- 8-bit CPU data bus interface
- Direct Address Bus support for:
  - Generic (Z80/8080 family) bus interface
  - Motorola MC68K family bus interface
- Indirect Address Bus support for:
  - Generic (Z80/8080 family) bus interface
  - Motorola MC68K family bus interface
  - Motorola M6800 family bus interface

#### Memory Interface

- Embedded 32K byte SRAM display buffer

#### Display Support

- 4-bit monochrome LCD interface
- Programmable Display Resolutions:

Typical resolutions include:

640x240 at 1 bpp  
320x240 at 2 bpp  
240x160 at 4 bpp

- 1/2-duty to 1/256-duty LCD drive

#### Character Generation

- 160, 5x7 pixel characters in embedded mask-programmed character generator ROM
- Up to 256, 8x16 pixel characters in embedded character generator RAM

#### Display Modes

- Gray Shade Support for:
  - 1/2/4 bit-per-pixel (up to 16 gray shades)
- Text, graphics, and combined text/graphics display modes
- Three overlapping screens in graphics mode
- Programmable cursor control (Hardware Cursor)
- Smooth horizontal and vertical scrolling of all or part of the display

#### Power

- Software initiated Power Save Mode
- Low power consumption
- Flexible Power Supply configuration:

CORE  $V_{DD}$  3.0 to 3.6 volts.  
NIO  $V_{DD}$  3.0 to 5.5 volts (LCD interface).  
HIO  $V_{DD}$  3.0 to 5.5 volts (CPU interface).

#### Clock Source

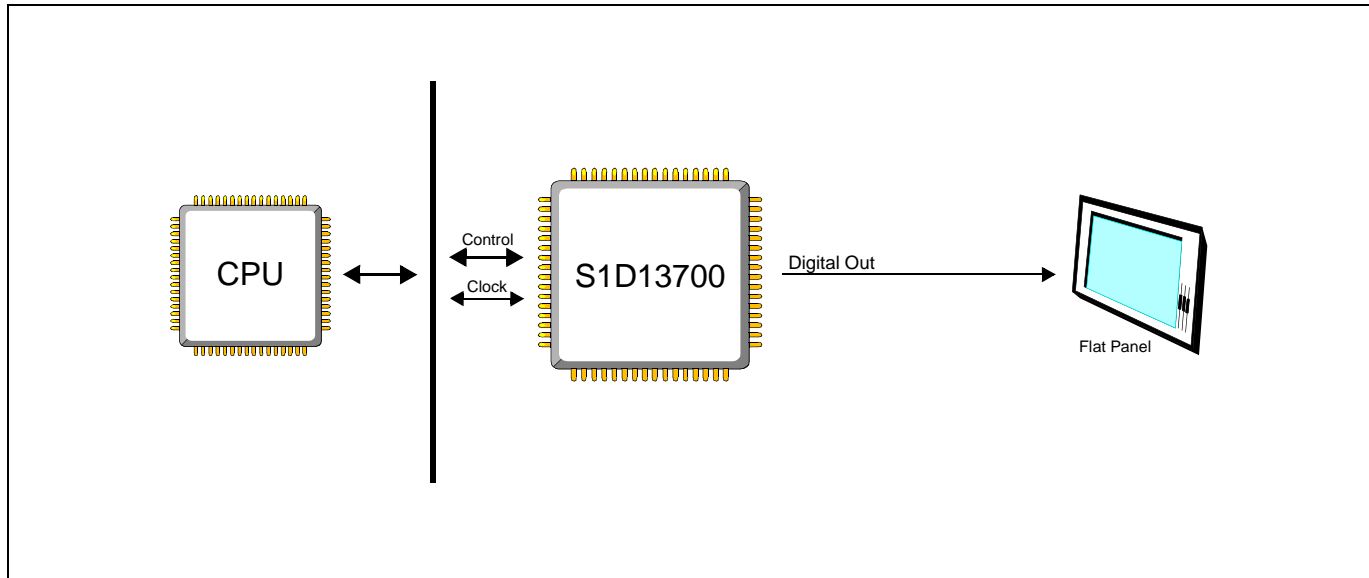
- Two terminal crystal or Single Oscillator input  
Input clock maximum of 60MHz

#### Package

- TQFP13-64pin

## S1D13700

### SYSTEM BLOCK DIAGRAM



### CONTACT YOUR SALES REPRESENTATIVE FOR THESE COMPREHENSIVE DESIGN TOOLS:

- S1D13700 Technical Manual
- S1D13700 Evaluation Boards
- Software Utilities

#### 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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