# S5U13781R01C100 Shield TFT Board Overview

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The **Epson S5U13781R01C100 Shield TFT Board** connects to an Arduino Due board to provide support for up to WQVGA TFT graphics. It includes two FPC connectors (40-pin and 54-pin) which can be used to connect to a WQVGA or QVGA TFT panel available separately. Epson provides a software library for use with the Arduino Sketch IDE with hardware IO, simple graphics, and text drawing functions.

S5U13781R01C100 Shield

Arduino Due
(sold separately)
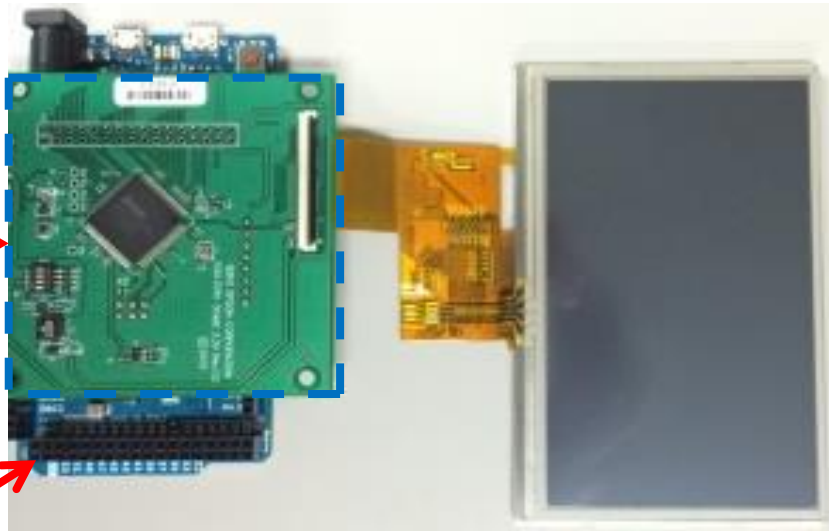
Typical Assembled Platform
S1D13781 Shield
+
Arduino Due
+
TFT Panel

LCD Panel Options
(sold separately)

OR

Newhaven
NHD-3.5-320240MF-ATXL#-1 (or compatible)
(3.5", 320x240 QVGA, 54-Pin)

Newhaven
NHD-4.3-480272EF-ATXL#(-T) (or compatible)
(4.3", 480x272 WQVGA, 40-Pin)

Epson P/N: *S5U13781R01C100*
Available: August 2015
Doc#: X94A-C-004-01 (Rev 1.0) Remove # if Modified

S5U13781R01C100 Shield TFT Board Hardware Description
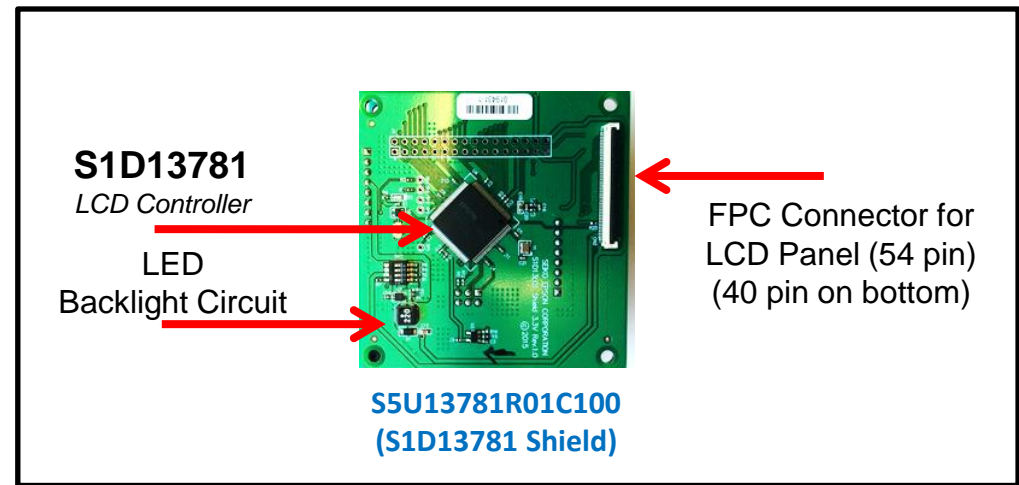
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The S5U13781R01C100 Shield TFT Board adds support for up to WQVGA TFT graphics to the Arduino Due. It is designed to provide evaluation of the S1D13781 LCD controller and enables rapid prototyping on the Arduino Due board. It uses the Arduino Due's standard SPI interface, providing a simple hardware connection which is powered by the Arduino Due board. The S1D13781 Shield board includes two FPC connectors (40-pin and 54-pin) which can be used to connect a WQVGA or QVGA TFT panel, available separately.

The S5U13781R01C100 Shield TFT Board integrates a S1D13781 LCD controller which is a simple, multi-purpose Graphics LCD Controller designed to support RGB interface TFT panels. It includes a 384KByte embedded SRAM display buffer which allows up to WQVGA displays. A typical implementation is 480x272 at 24bpp, or 480x272 at 16bpp (Main Layer) and 480x272 at 8bpp (PIP Layer) for two layer display. The S1D13781 is a flexible, low power, single chip solution designed to meet the demands of embedded markets and devices where total system cost and battery life are major concerns.

The S5U13781R01C100 features:
- Simple connection with Arduino Due using SPI
- Graphics Library for use with Arduino Sketch IDE
- 40-pin FPC Connector for 480x272 TFT
- 54-pin FPC Connector for 320x240 TFT
- LED Backlight Driver included on Shield board
- 3.3V IO
- Integrated Epson S1D13781 LCD Controller with:
  - 384KByte Embedded Memory
  - Multiple Window (Layer) support for Main and PIP
  - Rotation (SwivelView™) 90°, 180°, 270°
  - Alpha Blending, Transparency, Flashing

S1D13781
LCD Controller

LED Backlight Circuit

FPC Connector for LCD Panel (54 pin) (40 pin on bottom)

S5U13781R01C100 (S1D13781 Shield)

Note:
The S1D13781 Shield TFT Board can also be used to evaluate the low cost S1D13L01 LCD Controller which shares the same features as the S1D13781 except for BitBLT functionality. Refer to the S1D13781 and S1D13L01 Hardware Specifications for a complete feature list.

S5U13781R01C100 Shield TFT Board Software Library

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The S5U13781R01C100 Shield Graphics Library is designed for use with the Arduino Sketch IDE. It provides hardware access/control and simple graphics routines which enable users to quickly display graphics and text to a TFT panel connected to the S5U13781R01C100 Shield TFT Board.

The S5U13781R01C100 Shield Graphics Library consists of a collection of C++ methods organized into 2 classes which provide hardware IO access to the S1D13781, simple graphics functions such as pixel draw, line draw, and rectangle draw, and basic text display using a customizable font.

Full source code and documentation is provided allowing easy customization and modification by the user.

Graphics Library Functions:

- Direct Hardware Access – routines for Register and Memory IO, and functions to control S1D13781 features
- Fill Window – fills the display with a selected color
- Draw Pixel – draws pixel at specified x,y location using selected color
- Draw Line – draws line between specified x,y locations using selected color
- Draw Rectangle – draws rectangle (or filled rectangle) using selected color
- Draw Text – draws text and multiline text to the specified window using a customizable font
- Copy Area – routine which uses the BitBLT function to copy image data to another area of the display

Graphics Library Example Display