Quickstart Guide

3.2" TFT LCD with SD and Touch for Arduino Mega with adjustable TFT shield

Product Name
—SKU 20-011-C45

Getting Started:

Congratulations on your purchase of the SainSMART 3.2" TFT with touch screen and SD reader for Arduino Mega.. These items have been paired to provide you with a working solution to quickly create your Arduino display project

First, unpack your items and inspect for damage. The LCD module docks onto the shield which then plugs directly onto the Arduino Mega board. Use caution when inserting and removing the modules to prevent damage to the interface pins. The LCD will function when the Arduino is powered from either the USB interface or external power adapter.

Next, you will need to download and install the needed libraries found in the list to the right. While not mandatory, these libraries will allow to you get up and running with your LCD quickly and provide an easy way to interface to the hardware through the Arduino IDE.

Visit http://arduino.cc/en/Guide/Libraries for information about installing additional Arduino libraries.

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The Arduino libraries needed to use this display can be downloaded as a single package at:
https://www.dropbox.com/s/egguwqx49qr143i/3_2_LCD_Libraries.zip?dl=0

-UTFT
The UTFT library by Henning Karlsen provides an easy way to interface with many popular TFT modules.

- ITDB02_Touch
ITDB02_Touch is the legacy version of Henning Karlsen's UTouch library. The UTouch library does not function properly with the touch controller used on the 3.2" TFT.

-UTFT_SDRaw
UTFT_SDRaw is an alternative to Henning Karlsen's UTFT_TinyFAT and allows the loading of raw bitmap images to the LCD from the SD card. It uses the standard SdFat Arduino library for card access.
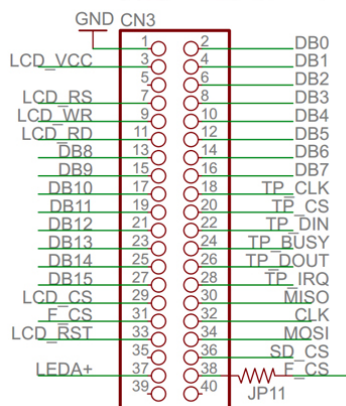
-UTFT_Buttons_ITDB
UTFT_Buttons_ITDB is a modified version of Henning Karlsen's Buttons library that has been adjusted to work with the ITDB02_Touch library

LCD and Shield pinouts:

LCD:

Pin Descriptions:

Pin(s)	Description
LCD_VCC	+5V supply
GND	LCD ground bus
LEDA+	LCD backlight supply
DB0—DB15	LCD 16-bit parallel data interface
LCD_RS, LCD_WR, LCD_RD, LCD_CS, LCD_RST	LCD data flow control lines
TP_CLK, TP_CS, TP_DIN, TP_BUSY, TP_DOUT, TP_IRQ	Touch Panel data flow control lines
SD_CS, MISO, CLK, MOSI	SD card slot data control lines (SPI)

Shield:

Note: The F_CS pins are not used, as the 3.2" LCD does not come with the flash chip. All unlabeled pins are NC (not connected)

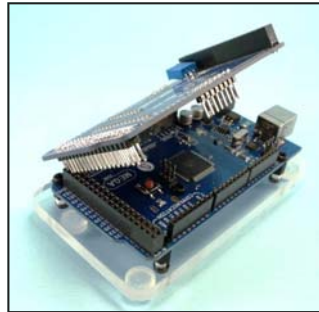| Pin(s)- Arduino pin in ()	Description
+3V3 (3.3V), +5V (5V)	+3.3V and +5V supply
GND (GND)	LCD ground bus
LEDA+ (5V)	LCD backlight supply
DB0—DB15 (D37-D30, D22-D29)	LCD 16-bit parallel data interface
LCD_RS (D38), LCD_WR (D39), LCD_RD (3.3V), LCD_CS (D40), LCD_RST (D41)	LCD data flow control lines
TP_CLK (D6), TP_CS (D5), TP_DIN (D4), TP_BUSY (D7), TP_DOUT (D3), TP_IRQ (D2)	Touch Panel data flow control lines
SD_CS (D53), MISO (D50), CLK (D52), MOSI (D51)	SD card slot data control lines (SPI)

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Assembling the shield and LCD to the Mega:

Begin by carefully starting the rear connector of the TFT shield onto the Arduino Mega. Go slowly and ensure that all pins are inserted correctly and are straight.
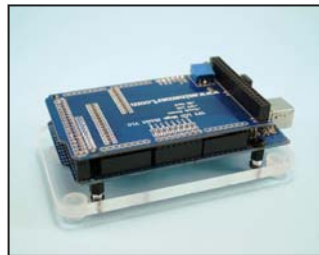
Press down on the shield to seat all three connectors fully onto the Arduino Mega. Check to ensure all pins are seated fully.

Start the LCD display connector into the 40-pin header on the TFT shield, ensuring that all pins are properly aligned.
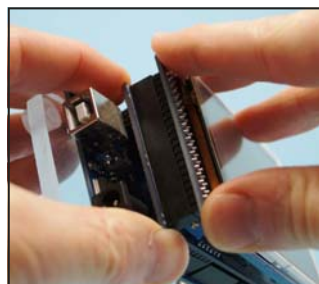
While applying pressure to the underside of the TFT shield, fully seat the LCD connector onto the TFT shield header using a slight rocking motion.
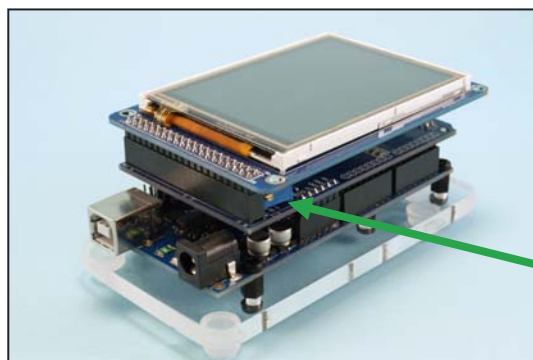
Finished! Your LCD is now ready to use.

To adjust the backlight: using a non-conductive tuning wand or screwdriver, turn the potentiometer screw on the TFT shield while the unit is powered to achieve the desired brightness level.

Using the LCD: UTFT example sketch

The UTFT library is used to display content to the LCD. UTFT alone does not handle any of the touch or SD card access functions.
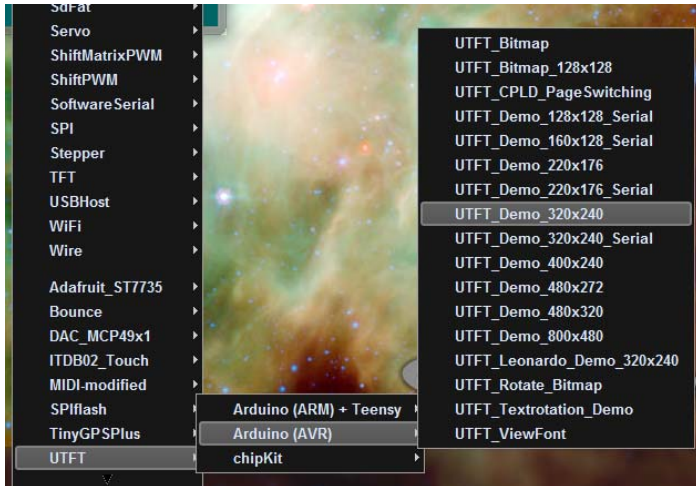
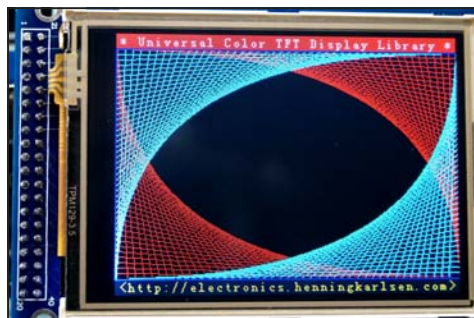**From the Arduino IDE,** open the UTFT_Demo_320x240 sketch from the AVR category.

The configuration of the example sketch from the download link on page 1 should be correct for this type of display. Line 31 declares the display model for UTFT (for more information on the supported displays, see the UTFT documentation). This will allow UTFT to correctly communicate with this LCD.

```
31 UTFT myGLCD(SSD1289,38,39,40,41);
```

*SSD1289— declares the type of display

*38, 39, 40, 41— defines the pins UTFT should use

Select the correct board and port from the Arduino IDE in the 'Tools' menu. Upload the sketch and if all goes well, the LCD demo should run in a loop.

Additional Resources

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# Using the Touch Panel: ITDB02_Touch example sketch

ITDB02_Touch example

The ITDB02_Touch_Button_Test example sketch will allow you to test operation of the touch panel and ensure that your libraries are properly installed.

Extending the program

Once you can use the buttons in the demo sketch, read through the ITDB02_Touch documentation to learn how to take touch input from your new project.

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Do you have a great new idea but don't know where to turn? At SainLABS, we offer services to help inventors get products to market through our own factories. Visit http://sainlabs.org for more information.
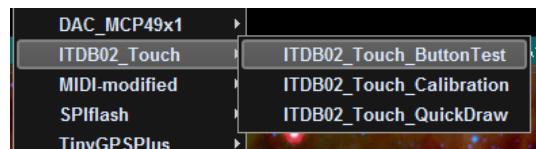
From the Arduino IDE, open the ITDB02_Touch_Button_Test sketch from File -> Examples -> ITDB02_Touch

The configuration of the example sketch from the download link on page 1 should be correct for this type of display. Lines 22 and 23 declare the display model and touch pins for UTFT and ITDB02_Touch. Lines 37 and 40 set the correct display and touch orientation so that the LCD and touch panel are in sync.

```
22 UTFT myGLCD(SSD1289, 38, 39, 40, 41);
23 ITDB02_Touch myTouch(6, 5, 4, 3, 2);

—————

37 myGLCD.InitLCD(LANDSCAPE);

—————

40 myTouch.InitTouch(LANDSCAPE);
```

TIP: If you do not see line numbers in the IDE— click File, then choose Preferences. Be sure that 'display line numbers' is checked.

Select the correct board and port from the Arduino IDE in the 'Tools' menu. Upload the sketch and if all goes well, you will see a button matrix and entry display. Typing numbers and pressing 'Enter' will empty the buffer and start a new line. Tap away!

Reading from SD: UTFT_SDRaw example

NOTE: SD card access can be achieved with the standard SDFat Arduino library alone. UTFT_SDRaw allows an easy way to also load bitmap images directly to the LCD from SD card. Images must be in '565' .raw format. The UTFT library includes an image converter in the 'Tools' folder within the library. Images must be uploaded to a FAT formatted SD card prior to inserting into the LCD card slot.
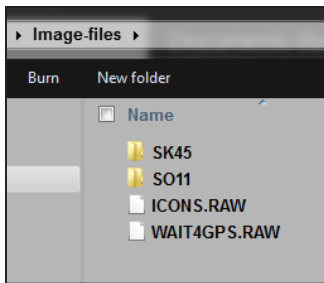
Prepare your SD card for this demo by ensuring that is formatted with the FAT file system. Then copy the contents of the 'Image-files' folder from the library download to the SD card. This will allow the demo sketch access
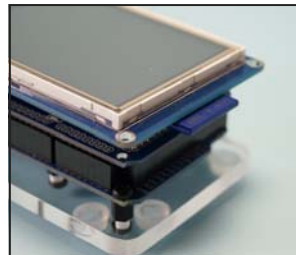
With the SD contacts facing up, carefully insert the SD card into the slot on the back of the LCD and ensure that it is fully seated.
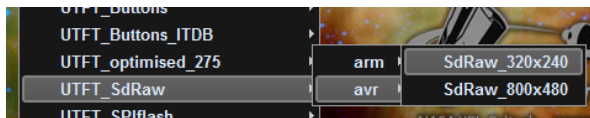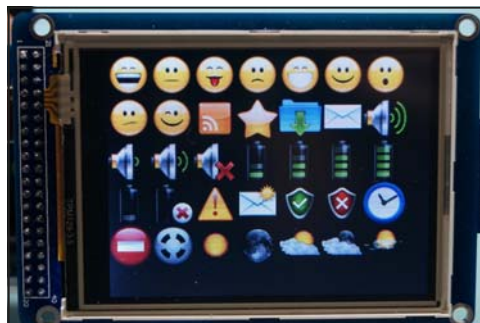

From 'Examples' in the Arduino IDE, open the SdRaw_320x240 test sketch.

The configuration of the example sketch from the download link on page 1 should be correct for this type of display. Lines 33 and 50 declare the display model and touch pins for UTFT and ITDB02_Touch. Line 81 sets the correct touch orientation.

```
33 UTFT myGLCD(SSD1289, 38, 39, 40, 41);
————
50 ITDB02_Touch myTouch(6, 5, 4, 3, 2);
————
81 myTouch.InitTouch(LANDSCAPE);
```

Select the correct board and port from the Arduino IDE in the 'Tools' menu. Upload the sketch and if all goes well you will see the demo play, loading images from the SD card.

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