Welcome!

And thank you for purchasing our AZ-Delivery SPI 1.8" TFT display! On the following pages, we will take you through the first steps from connecting the display to displaying text and graphics.

Have fun!

http://flyt.it/TFT_1-8

The AZ-Delivery TFT display is a practical and energy-saving module for displaying multi-line information, graphics or simple animations without having to use powerful computing technology. For example, sensor values can be read out from an Nano V3.0 or other microcontroller and displayed directly. The SD card reader integrated on the back also makes it possible to display images.

The most important information in brief

» RGB-Display with 6 bit color depth (262.144 Colors) » Resolution: 128 x 160 Px

» Dimensions (LxBxH)
   » Board: 34,5 x 58 x 7,5 mm
   » Display size: 34,5 x 46,5 x 2,4 mm
   » Display area: 32 x 38 mm

» Power consumption
   » up to 50mA with max. Backgroundlight

» ST7735 Display driver
» SPI Interface

On the next pages you will find information about the
   » **Connection with a controller**
and instructions for the
   » Control through two libraries.

Useful links at one glance

ST7735 Datasheet:

» *http://pdf1.alldatasheetde.com/datasheet pdf/view/326213/SITRONIX/ST7735.html*

Programming environments:

» Arduino IDE: *https://www.arduino.cc/en/Main/Software* » Web-Editor: *https://create.arduino.cc/editor*

Arduino Libraries:

» TFT LCD Library: *https://www.arduino.cc/en/Reference/TFTLibrary*

» Adafruit ST7735 Library: *https://github.com/adafruit/Adafruit-ST7735-Library* » Adafruit GFX Library: *https://github.com/adafruit/Adafruit-GFX-Library*

Interesting things from AZ-Delivery

» AZ-Delivery GPS-Modul: *https://az-delivery.de/products/neo-6m-gps-modul* » Other microcontroller accessories: *https://www.az-delivery.de/en/collections/weiteres-zubehoer* » AZ-Delivery G+Community: *https://plus.google.com/communities/115110265322509467732* » AZ-Delivery on Facebook: *https://www.facebook.com/AZDeliveryShop/*

Connection with a controller

The TFT display is on a board that already has all the

necessary inputs and outputs for connection to a microcontroller via a pin strip.

The connections for the SD card reader are also implemented, but do not have any pins. You can decide for yourself whether you want to solder pins or connecting cables.

To use all functions, connect the connectors to your controller as follows. Since the data input and the clock for data transmission are the same for both the TFT and the card reader, we recommend using a breadboard. An AZ-Delivery microcontroller is used as the controller in these instructions.

MC > TFT

3.3 V – LED (Hintergrundbeleuchtung)
13 – SCK (Takt)
11 – SDA (MOSI)
9 – A0
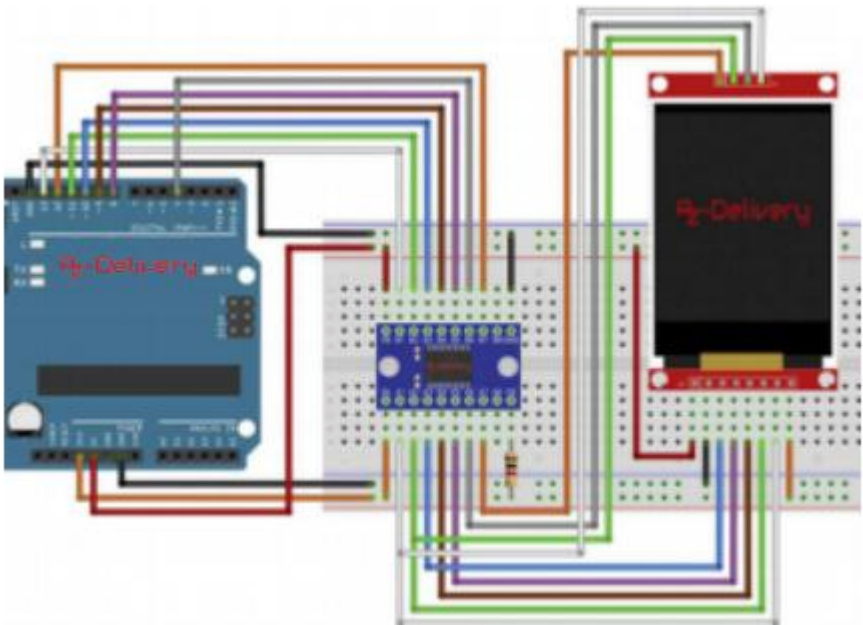8 – RESET
10 – CS (Chip Select / Adresse)
GND – GND
5 V – VCC

MC > SD-Kartenleser

4 – SD_CS (Chip Select / Adresse)
11 – SD_MOSI
12 – SD_MISO
13 – SD_SCK (Takt)

Font and graphics with the standard library

The ST7735 display driver built into the AZ-Delivery SPI 1.8"
TFT is so popular that it can be controlled via the TFT library
installed directly with the Arduino IDE on your computer.
Accordingly, you can already load a ready-made sketch onto
your controller, for example "**TFTGraph**":
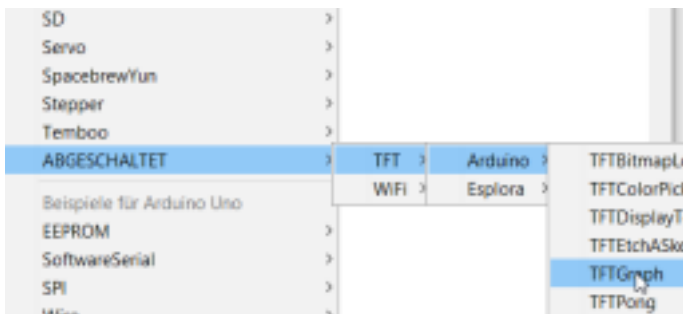
If you look at the code of the example ketches, you
will see that you can already output individual

graphics and texts with the following commands:

```
// Hintergrundfarbe (RGB):
TFTscreen.background(250, 16, 200);
// Linienfarbe (RGB):
TFTscreen.stroke(250, 180, 10);

// Linie von Punkt zu Punkt zeichnen
TFTscreen.line(x1, y1, x2, y2);

// Text schreiben
TFTscreen.text("Hier steht der Text", x,

y);
```

Displaying a Bitmap Image

The TFT library not only supports the display, but also the integrated SD card reader. To test this, open the sample sketch "TFTBitmapLogo".
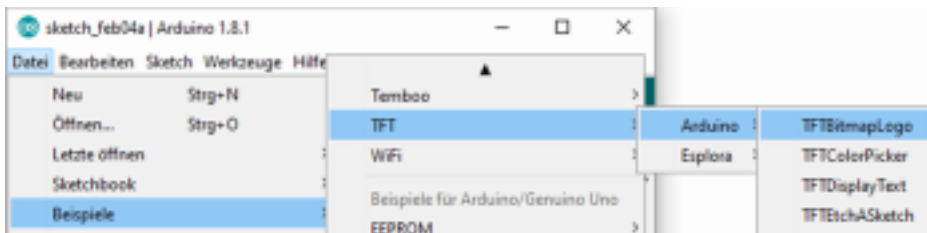
The wiring on the previous page is compatible with this sketch. What you need to do to make it work properly is to format an SD card as FAT or FAT32 and save a bmp file on it in landscape

format with a resolution of 160 x 128 px. Then, in line 83 of the sketch, rename the name of the image to be loaded to that of your saved file.

```
81  // now that the SD card can be access, try to load the
82  // image file.
83  logo = TFTscreen.loadImage("mein_bild.bmp");
84  if (!logo.isValid()) {
85    Serial.println(F("error while loading arduino.bmp"));
86  }
87 }
```

After you have loaded the sketch onto the microcontroller, you will see how the image is built up on the display. Congratulations!

Advanced graphics functions

If you want more options for creating your displays, you can use the GFX library from Adafruit. To use it with the display, install the "**Adafruit GFX Library**" and the "**Adafruit ST7735 Library**" via the Library Manager:
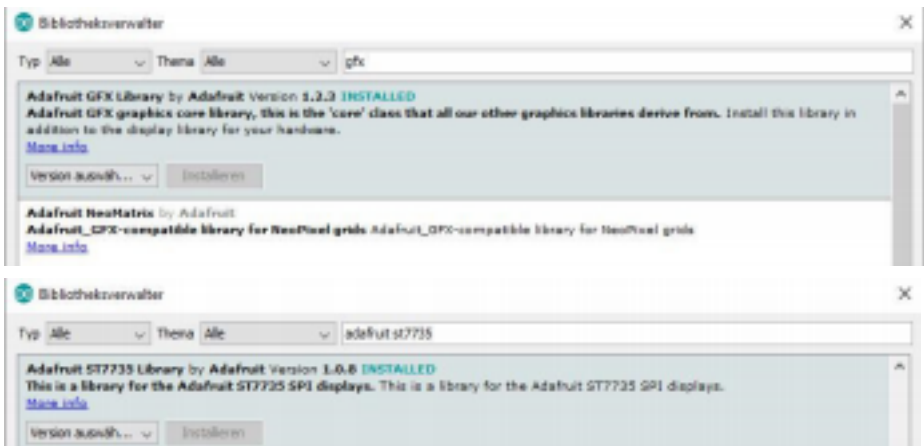
If you now open the sketch "**graphictest**", you will find lots of

design options from the definition of a single pixel to lines and rectangles to prefabricated more complex shapes such as the media buttons.
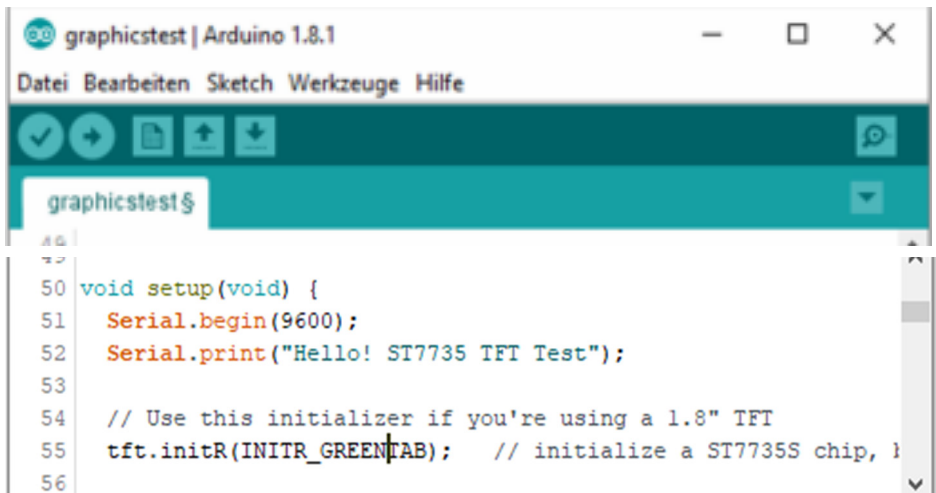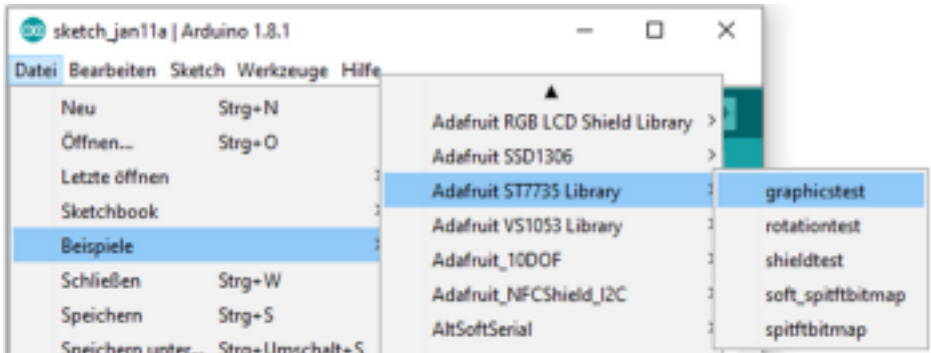

In order for the code to work, you still have to make a small change, as Adafruit's **pins 8 and 9** are reversed compared to the TFT library. Just change **lines 32 and 34** according to your circuit.

```
29 // For the breakout, you can use any 2 or 3 pins
30 // These pins will also work for the 1.8" TFT shield
31 #define TFT_CS    10
32 #define TFT_RST   8   // you can also connect this to the Ardu
33                       // in which case, set this #define pin
34 #define TFT_DC    9
35
```

Now you can upload the sketch or take a look at the code and create your own.

Information:

In rare cases, it can happen with this library that the display gets a luminous border. If this is the case with yours, change the variable "**INITR_BLACKTAB**" to "**INITR_GREENTAB**" in the setup() method in line 55.

```
  graphicstest | Arduino 1.8.1                              —   □   ✕
 Datei  Bearbeiten  Sketch  Werkzeuge  Hilfe

  ✓  ➡  ▤  ⬆  ⬇                                              ⌕

    graphicstest §                                          ▼

 50  void setup(void) {
 51    Serial.begin(9600);
 52    Serial.print("Hello! ST7735 TFT Test");
 53
 54    // Use this initializer if you're using a 1.8" TFT
 55    tft.initR(INITR_GREENTAB);   // initialize a ST7735S chip, 
 56
```

You did it! Congratulations!

From now on it's learning time. With the help of the **AZ Delivery SPI 1.8" TFT display**, you can not only visualise static images, graphics or texts, but also make visible what your connected sensors have to tell you without having to rely on a connection to a computer! And of course you can get these sensors and other hardware at your online shop:

https://az-delivery.de

Have Fun!
Impressum

https://az-delivery.de/pages/about-us