APPLICATION NOTES

4D SYSTEMS
TURNING TECHNOLOGY INTO ART

Picadillo UECIDE Hello World

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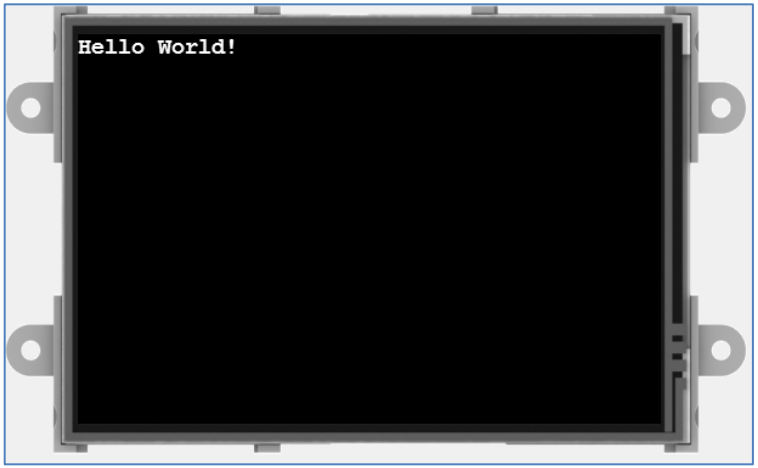
DOCUMENT REVISION: **1.1**

Description

This application note shows how to program the Picadillo-35T using the Universal Embedded Computing IDE (UECIDE) in Windows to make it print a string on the screen.



Before getting started, the following are required:

- The Picadillo-35T
- The UECIDE (Universal Embedded Computing IDE)
- A USB-to-mini-USB cable
- When downloading an application note, a list of recommended application notes is shown. It is assumed that the user has read or has a working knowledge of the topics discussed in these recommended application notes.
- This application note requires that the reader has a basic knowledge of any programming language such as C and C++.

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Application Overview

The objective of this application note is to present to the user the basic procedure for setting up the UECIDE and the procedure for programming the Picadillo-35T. After reading this application note, the user shall be able to program the Picadillo-35T to make it print a string on the display.

Setup Procedure

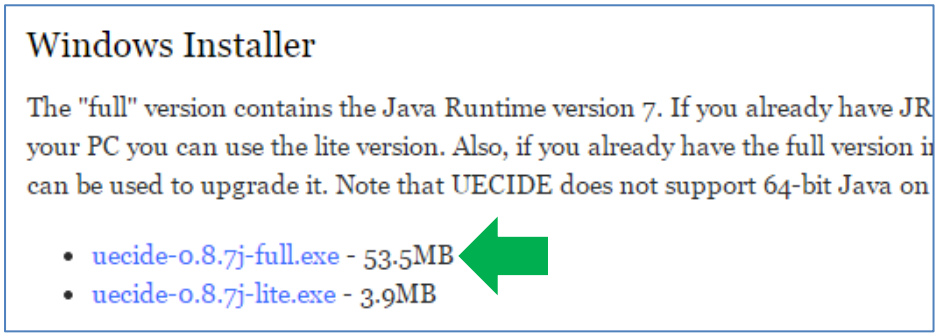
The UECIDE Software

Information about the UECIDE can be found here: http://uecide.org/

Download and Install the UECIDE Software

The download page for the UECIDE is: http://uecide.org/download

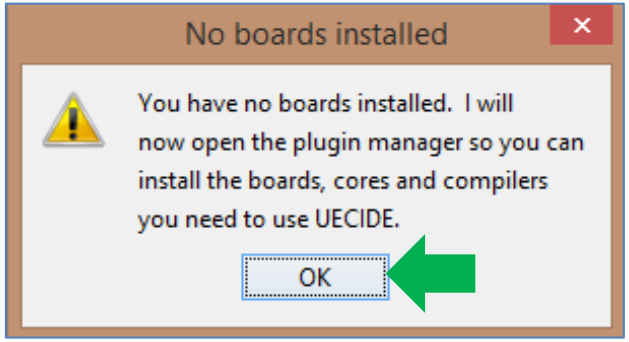
For this application note, a Windows PC was used and the “full” version of the installer was selected.



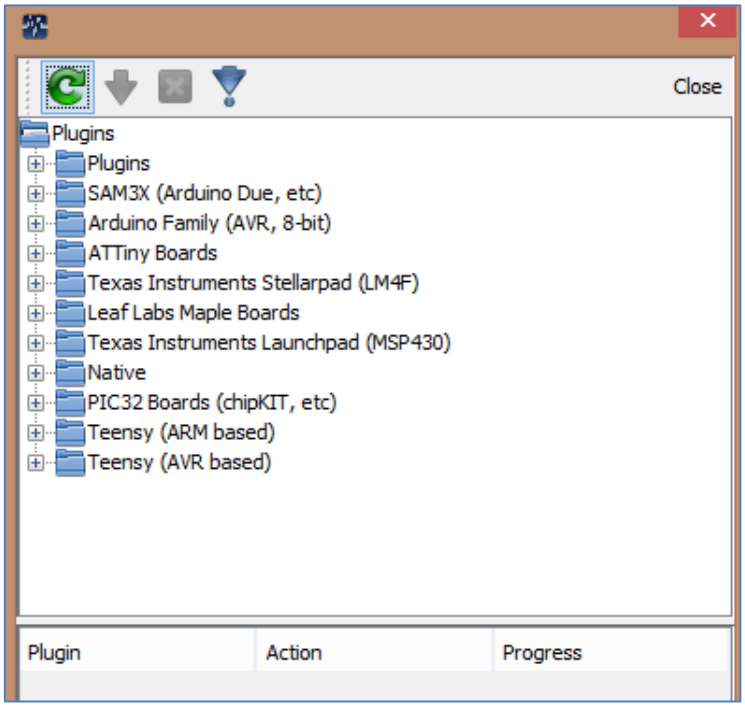
After a successful download and installation, open the UECIDE. Additional plugins will need to be installed. The following procedures will need an Internet connection.

Install the Picadillo-35T Board

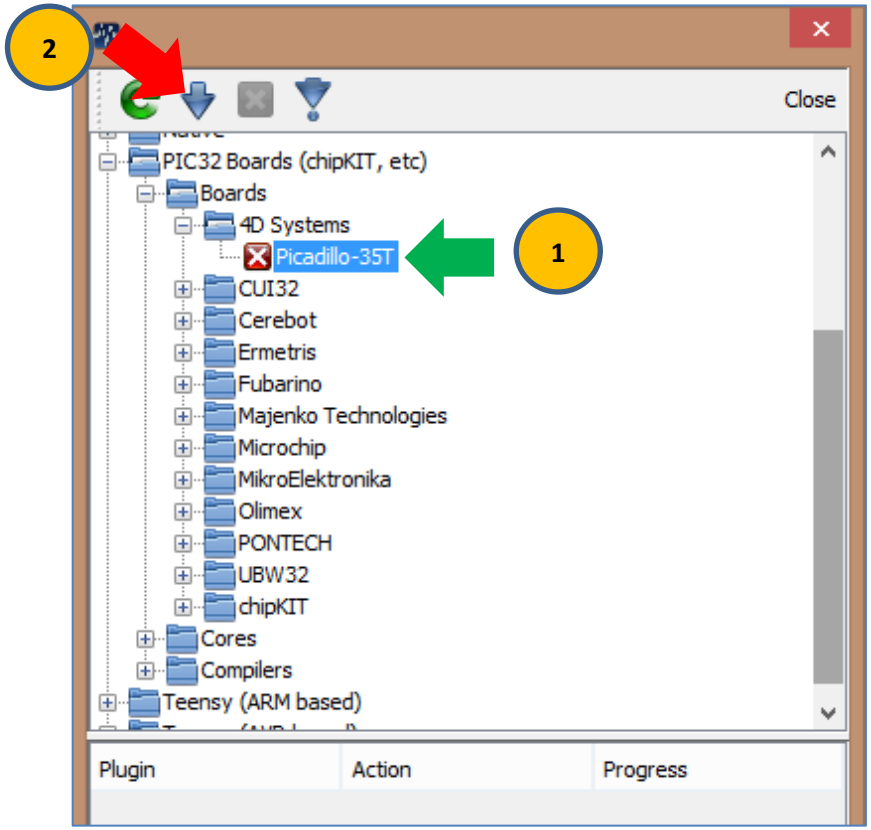
When it is opened for the first time, the UECIDE will display the information shown below. Click OK.



The plugin manager now appears.

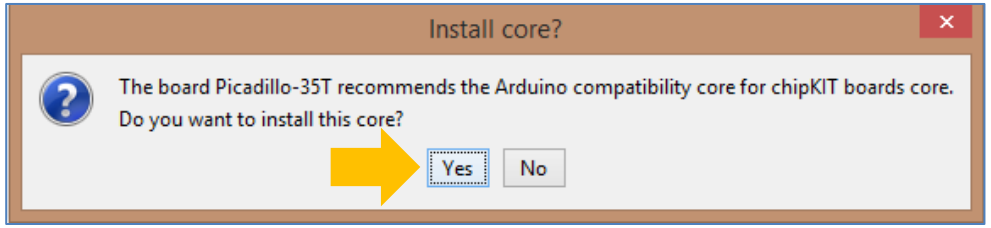


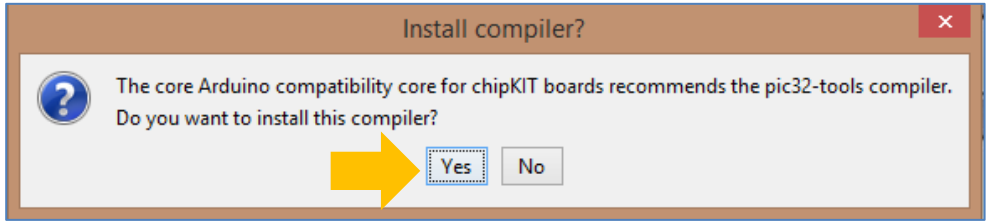
The Picadillo-35T board is under PIC32 Boards (chipKIT, etc), as indicated below. Select it and click on the Install Plugin button.



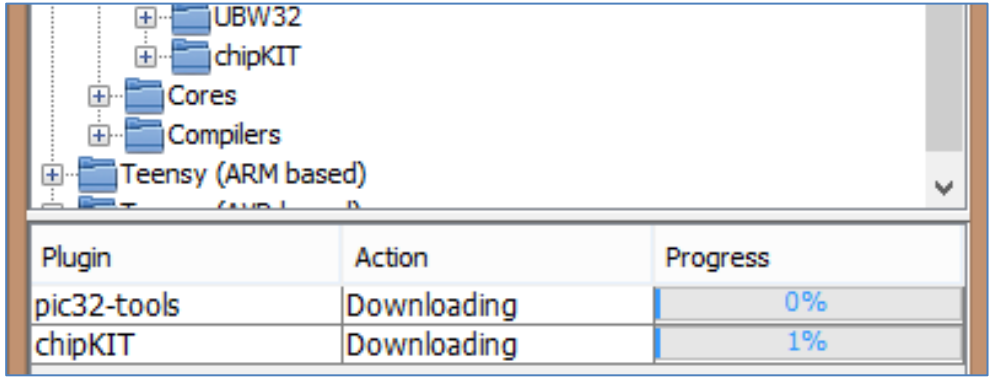
Install the ChipKIT Core and the pic32-tools Compiler

Along with the plugin for the Picadillo-35T board, the plugins for the chipKIT core and the pic32-tools compiler will also need to be installed. UECIDE will ask permission for the installation of these plugins. Click Yes.

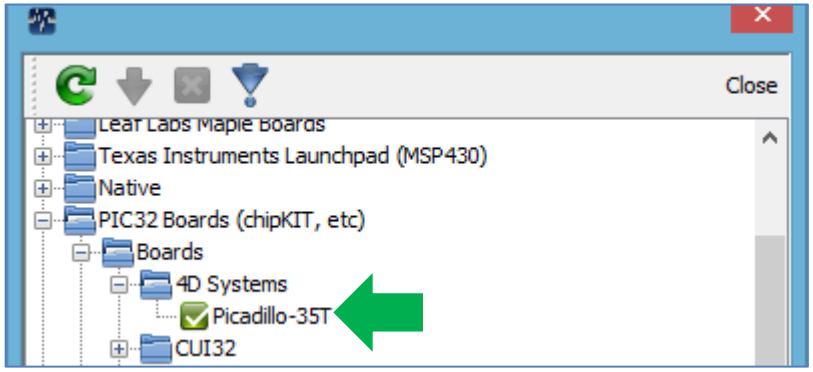


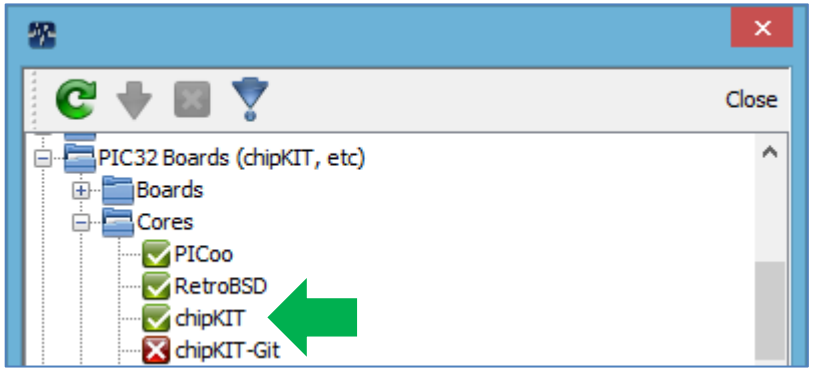


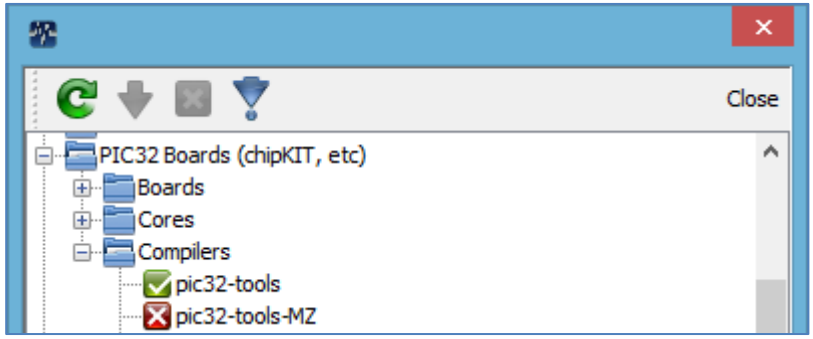
Download and installation of the plugins will now begin.



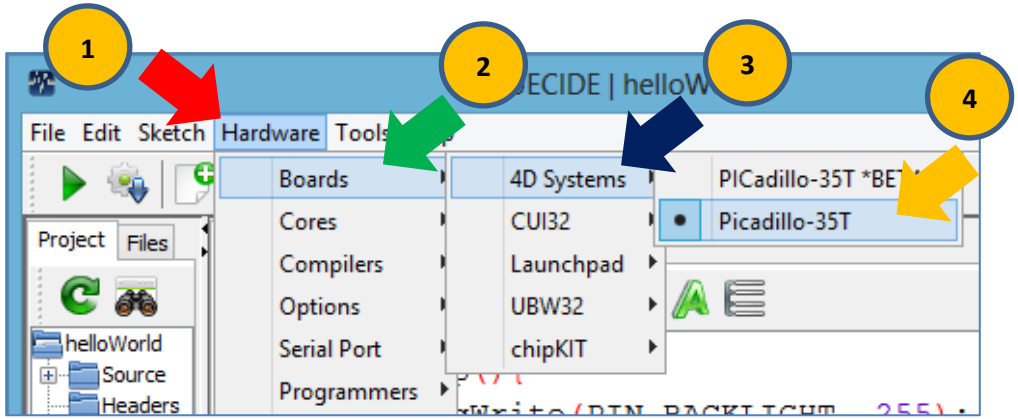
When done, the plugin manager shall now indicate that the plugins are installed.



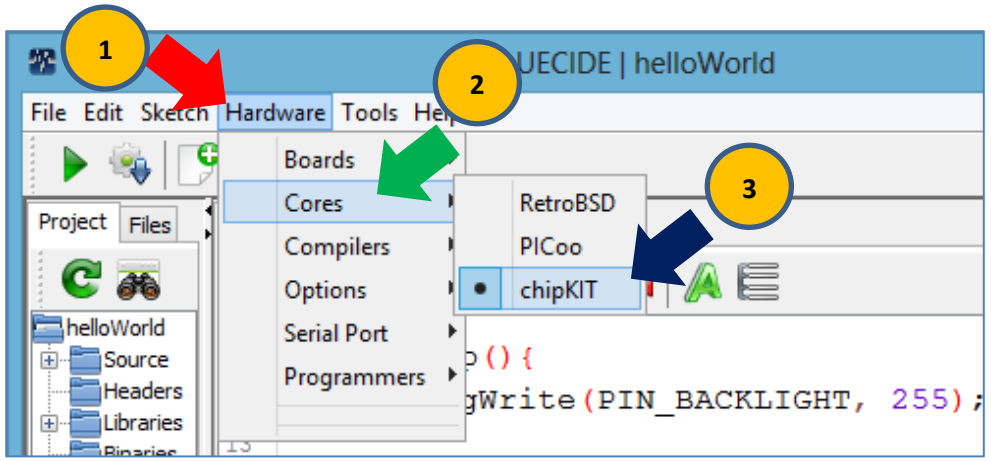




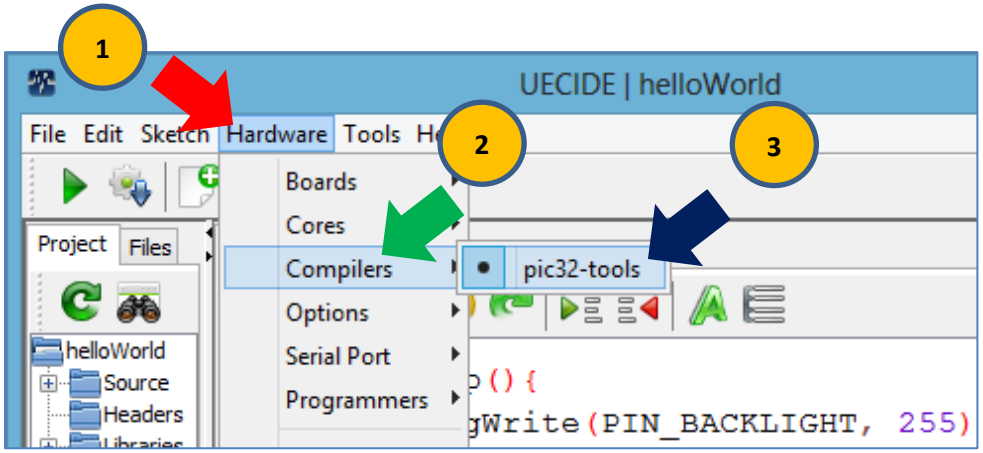
Select the Picadillo-35T Board



Select the chipKIT Core



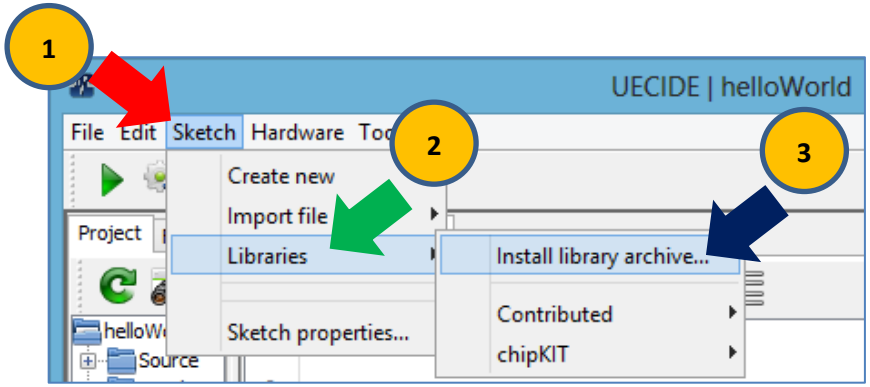
Set the Compiler



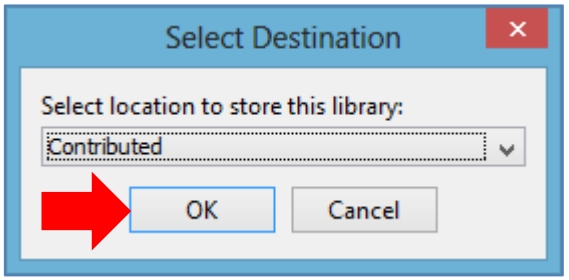
Install the TFT Library

The TFT library available from Majenko Technologies fully supports the TFT screen on the Picadillo-35T. The TFT library can be downloaded from GitHub.
https://github.com/TFTLibraries/TFT

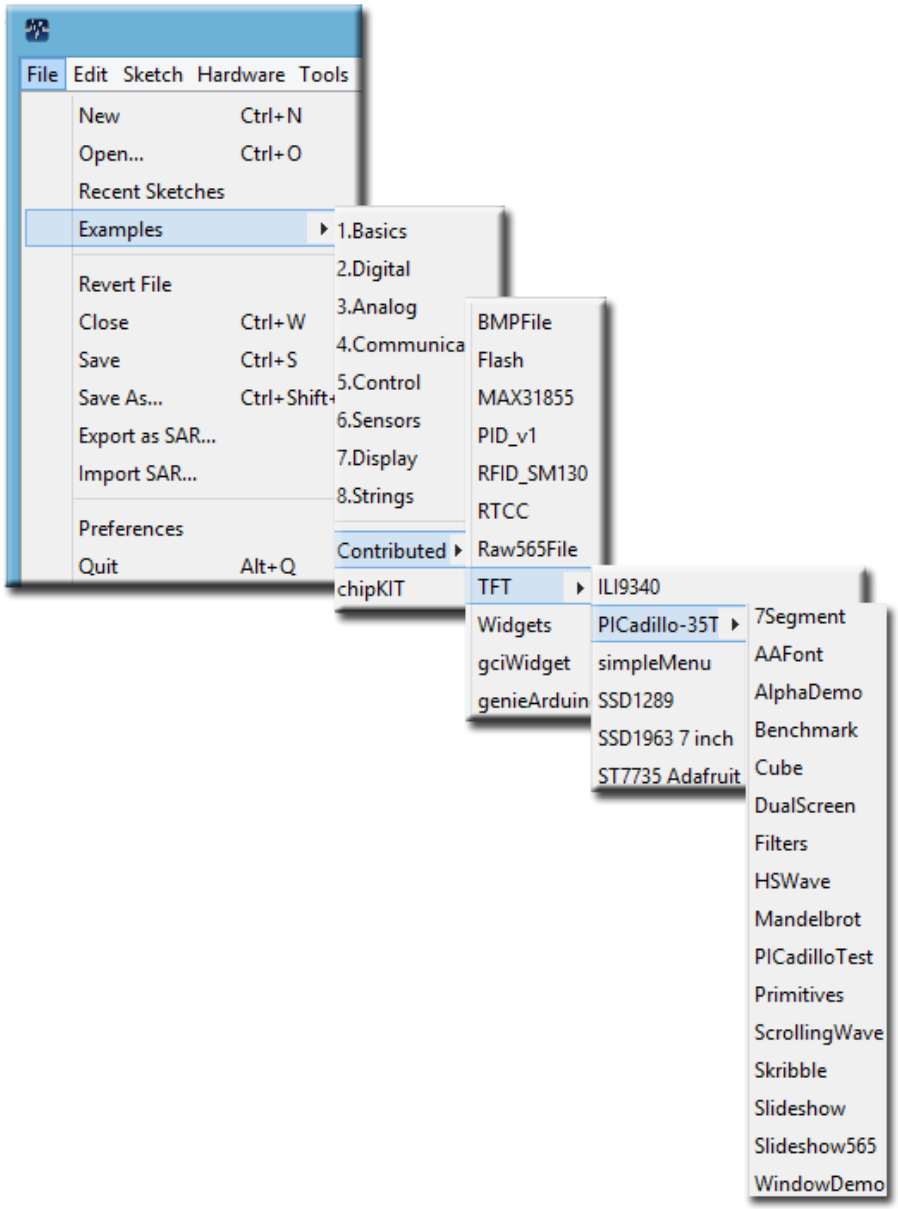
After downloading the library as a zipped file, it can now be installed in the UECIDE.



After the downloaded library zip file is selected, the UECIDE will ask for the destination. Select “Contributed” then click OK.

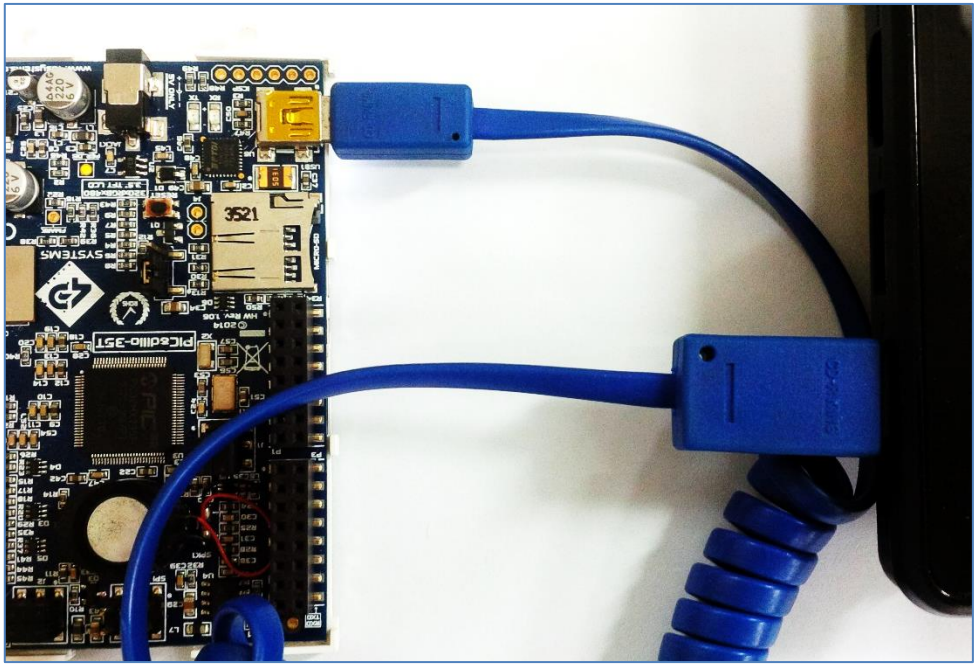


After a successful installation of the library, the TFT library examples should now be available under the file menu.

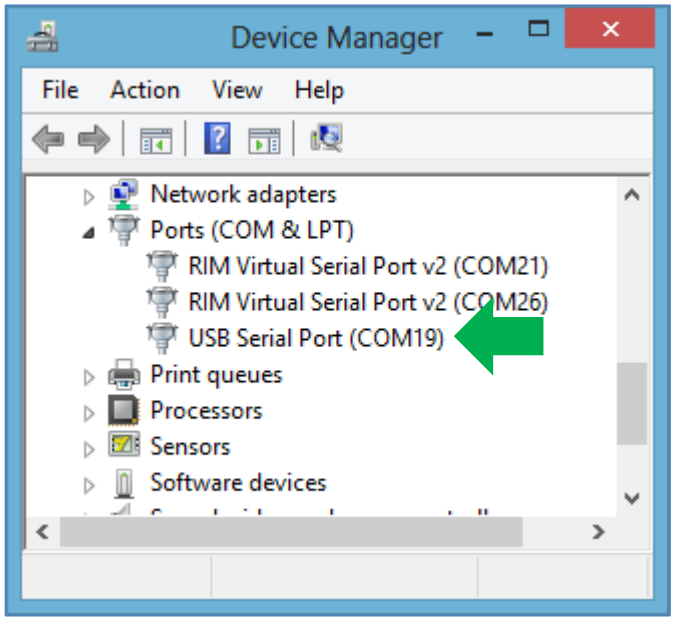


Picadillo-35T USB Driver Download and Installation

The USB drivers for the Picadillo-35T are available on its product page: http://www.4dsystems.com.au/product/Picadillo_35T/downloads. The user will be further pointed to an FTDI download page for the drivers and installation guides. The Picadillo-35T uses an on-board FTDI USB-to-TTL converter chip for programming. After a successful installation of the driver, connect the Picadillo-35T to a USB port of your PC using a USB-to-mini-USB cable.



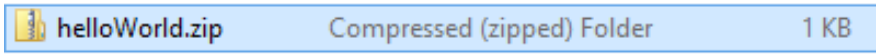
The device should now be listed in the device manager. Here, the port for the Picadillo-35T is COM 19.



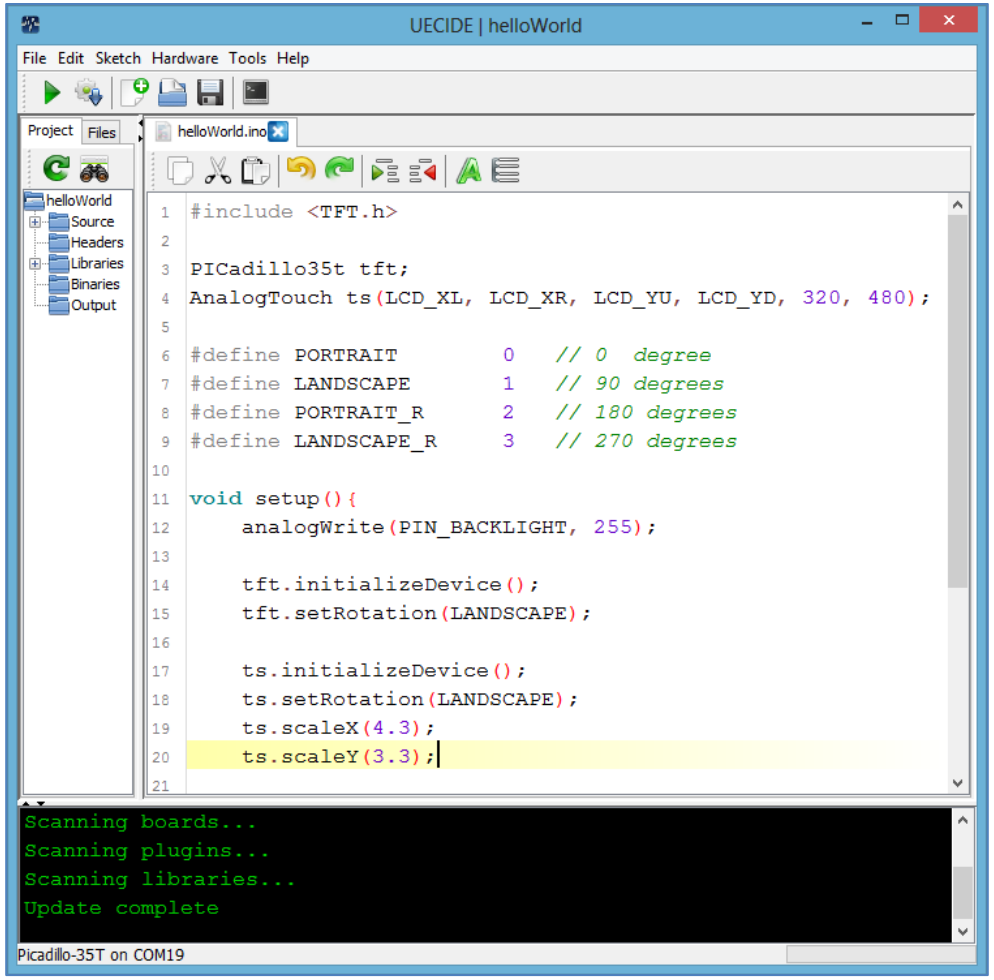
If the COM port is not available, ensure that the driver is installed properly. Also, try replacing the USB cable as some cables transfer power only and not data. Voltage drop can also be significant in longer cables. For other issues encountered during installation of the drivers, contact the FTDI support site.

Open the Attached Sketch

This document comes with a demo UECIDE sketch in a zip file.



In the file explorer window, extract the content of the zip file to a desired location then open the sketch in the UECIDE.



The Hello World Program

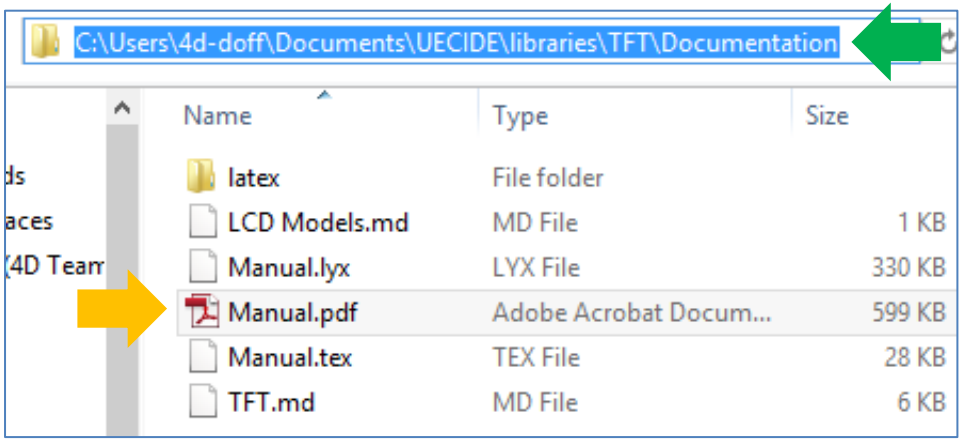
The TFT Library

The TFT library available from Majenko Technologies fully supports the TFT screen on the Picadillo-35T.

```
#include <TFT.h>

PICadillo35t tft;
AnalogTouch ts(LCD_XL, LCD_XR, LCD_YU, LCD_YD, 320, 480);
```

The documentation for the TFT library can be found in the UECIDE library folder.



The manual can also be downloaded from GitHub.

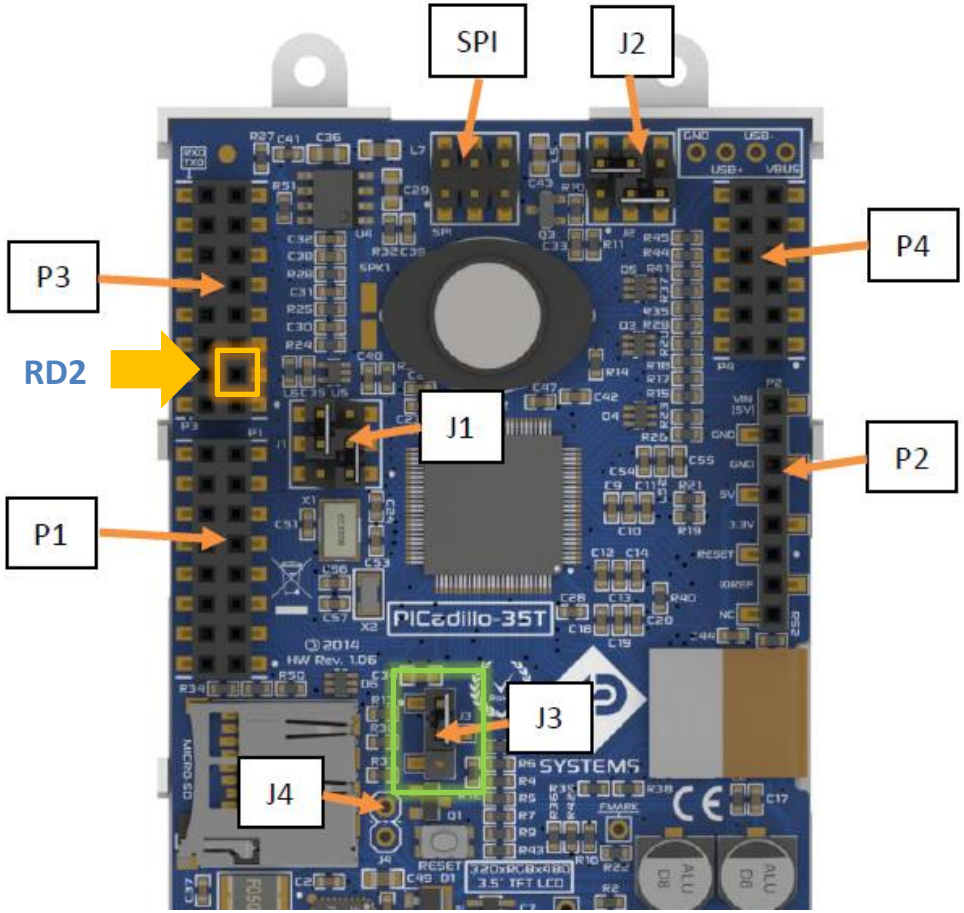
https://github.com/TFTLibraries/TFT

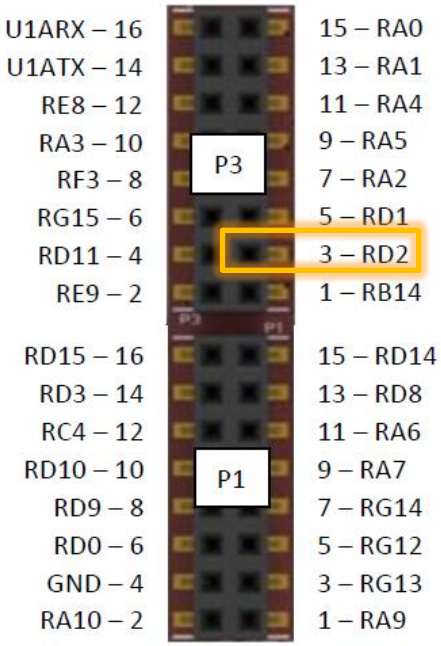
Backlight Control

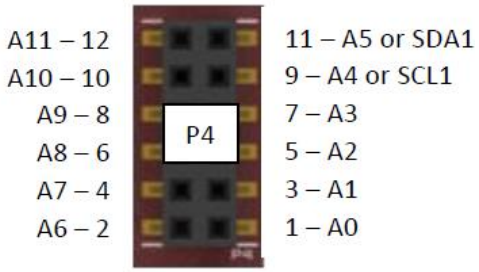
The brightness of the backlight can be controlled thru PWM.

```
10
11  void setup(){
12      analogWrite(PIN_BACKLIGHT, 255);
```

PIN_BACKLIGHT is a constant whose value is internally defined as “32”. This is the IDE pin 32 or RD2 of the Picadillo-35T. Below is the pin configuration of the Picadillo-35T from its datasheet (**section 3 Pin Configuration and Summary**).





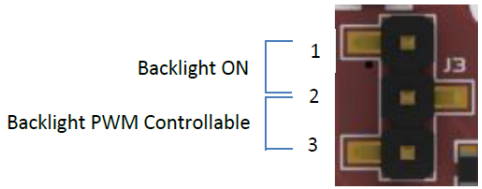


P3 Pinout (Top Left)					
Pin	Symbol	IDE Pin	Chip Pin	I/O	Description
3	RD2	32	77	I/O	General Purpose I/O. This pin is 5.0V tolerant. This pin is PWM Capable. OC3/RD2

Jumper J3 needs to be set correctly for backlight control thru software. Below is a description for jumper J3 taken from section **3.2 Jumper Pinout Summary** of the datasheet.

J3 Jumper Pinout (Central)				
Pin	Symbol	Chip Pin	I/O	Description
1	+3.3V	-	P	When the Jumper is placed between Pin1 and Pin2, the backlight will be forced on 100%, and not controllable by software
2	BACKLITE	-	-	This pin is connected to the backlight circuitry
3	RD2	77	I/O	When the Jumper is placed between Pin2 and Pin3, the backlight will be connected to RD2 which is PWM capable, so the backlight can be dimmed with software. RD2 is still connected to P3 Pin 3, so be weary of this.

I = Input, O = Output, P = Power, A = Analog Input



Thus, for backlight control thru software to work, the connector for J3 should short pins 2 and 3.

Initialize the Display

```
14      tft.initializeDevice();
```

The display is configured and made ready to work. This function must be called before anything can happen on the screen, and it should be called before any other function.

Set the Orientation of the Display

```
15      tft.setRotation(LANDSCAPE);
```

This rotates the screen. Value is between 0 and 3, for 0°, 90°, 180° or 270°.

Constants were defined for these values at the start of the sketch.

```
6   #define PORTRAIT      0   // 0   degree
7   #define LANDSCAPE     1   // 90  degrees
8   #define PORTRAIT_R    2   // 180 degrees
9   #define LANDSCAPE_R   3   // 270 degrees
```

Landscape

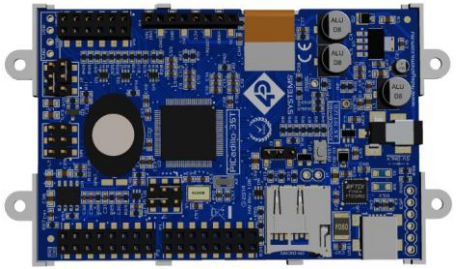
Front

Back

Landscape Reversed

Front

Back



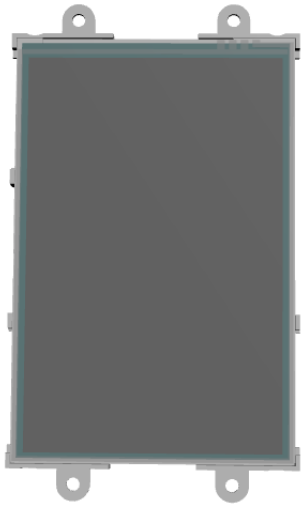
Portrait

Front

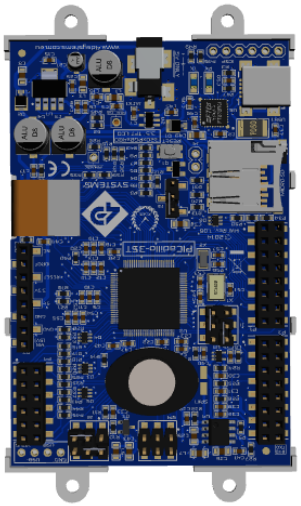
Back

Portrait Reversed

Front



Back



Initialize the Touch Screen

```
17      ts.initializeDevice();
```

This configures and enables the touch screen device. It should be called before any other touch screen functions.

Set the Orientation of the Touch Screen

```
18      ts.setRotation(LANDSCAPE);
```

This sets the screen orientation of the touch screen. It should be set to the same orientation as that used for the screen.

Set the Touch Screen Area X and Y Scale Parameters

```
19      ts.scaleX(4.3);
20      ts.scaleY(3.3);
```

Fill the Screen with a Colour

```
22      tft.fillScreen(Color::Black);
```

This function fills the entire screen with a solid colour.

Set the Text Foreground Colour

```
23      tft.setTextColor(Color::White);
```

This sets the foreground colour of all future printing to white. To set both the foreground and background colours,

```
23      tft.setTextColor(Color::White, Color::Blue);
```

The second parameter is the text background colour.

Set the Text Font

```
24      tft.setFont(Fonts::Default);
```

The current font is set to the font provided. A font is a byte array of data with metric information embedded in it. For a repository of Fonts for the TFT Library, please visit https://github.com/TFTFonts .

Scale the Text Font

```
25      tft.setFontScaleX(2);
26      tft.setFontScaleY(2);
```

A font can be stretched in either of the X or Y coordinates to make it bigger than normal.

Print a String

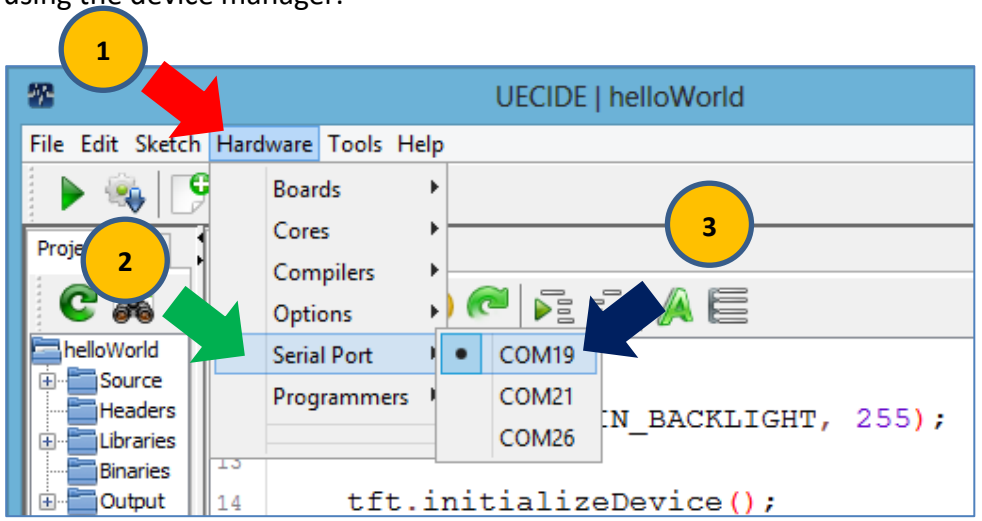
```
27      tft.print("Hello World!\n");
```

Finally, this line prints a string.

Compile and Upload

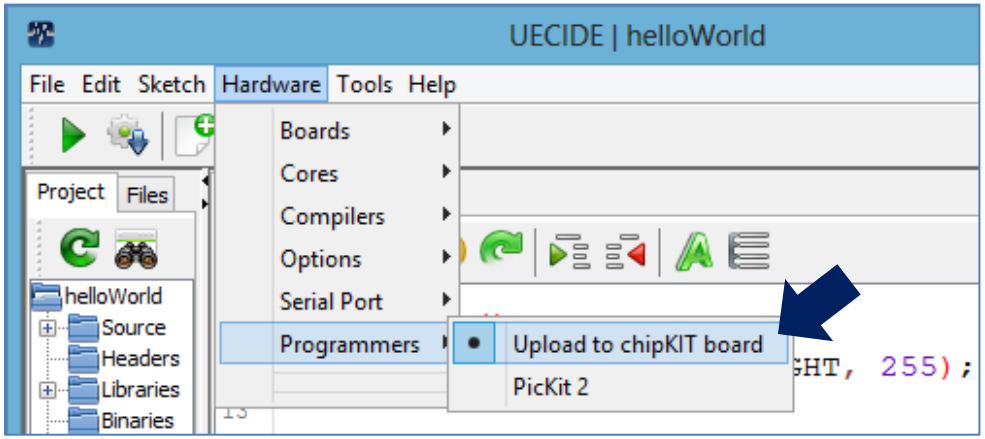
Set the Serial Port

Select the correct COM port for the Picadillo-35T. This can be confirmed using the device manager.

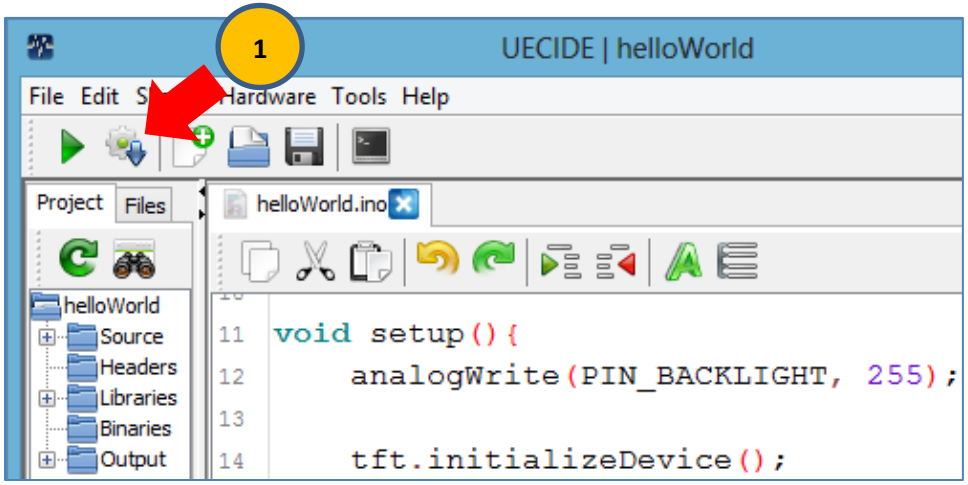


If the COM port is not available, ensure that the driver is installed properly. Also, try replacing the USB cable as some cables transfer power only and not data. Voltage drop can also be significant in longer cables.

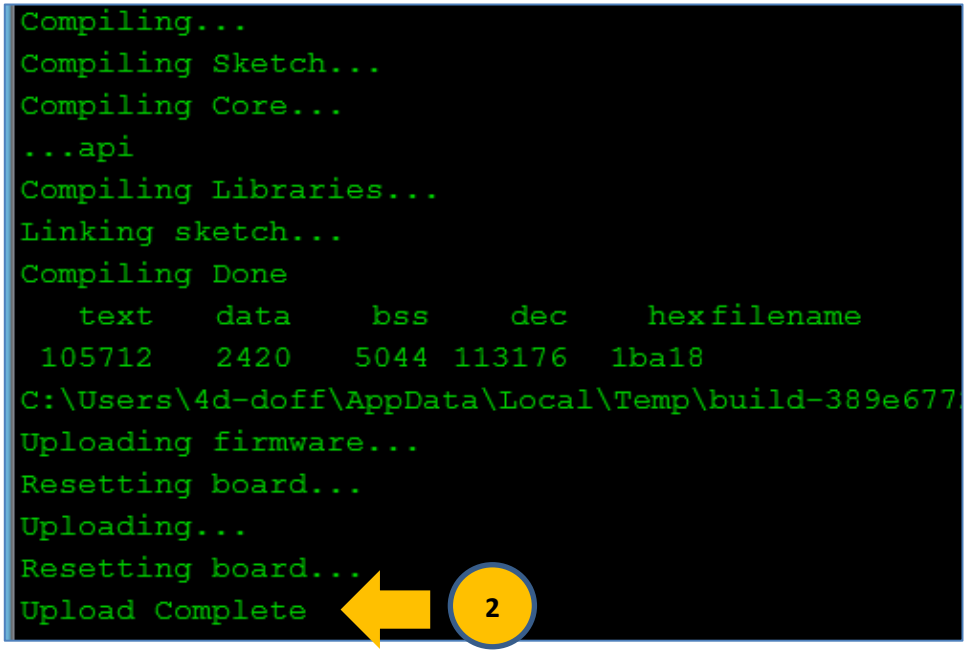
The programmer setting is shown below.



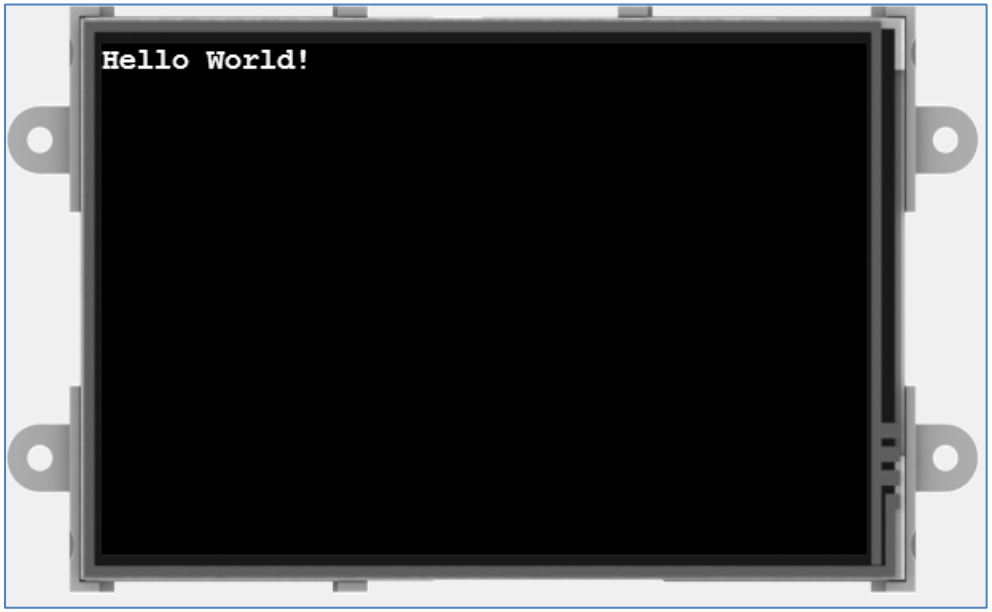
Upload the Program



Wait for the process to complete.



The program now runs on the Picadillo-35T.



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