GODIYMODULES ST7789

GODIYMODULES 1.54 Inch 240x240 IPS TFT Display Module ST7789 User Manual

1. Introduction

This manual provides comprehensive instructions for the GODIYMODULES 1.54 Inch Full Color TFT Display Module, featuring an HD IPS LCD LED screen with a 240x240 resolution and an ST7789 controller. Designed for integration with microcontrollers such as Arduino, ESP32, Raspberry Pi, 8051, PIC, and AVR, this module utilizes a Serial Peripheral Interface (SPI) for communication. This document covers product overview, setup, wiring, operation, specifications, troubleshooting, and maintenance to ensure proper use and functionality.

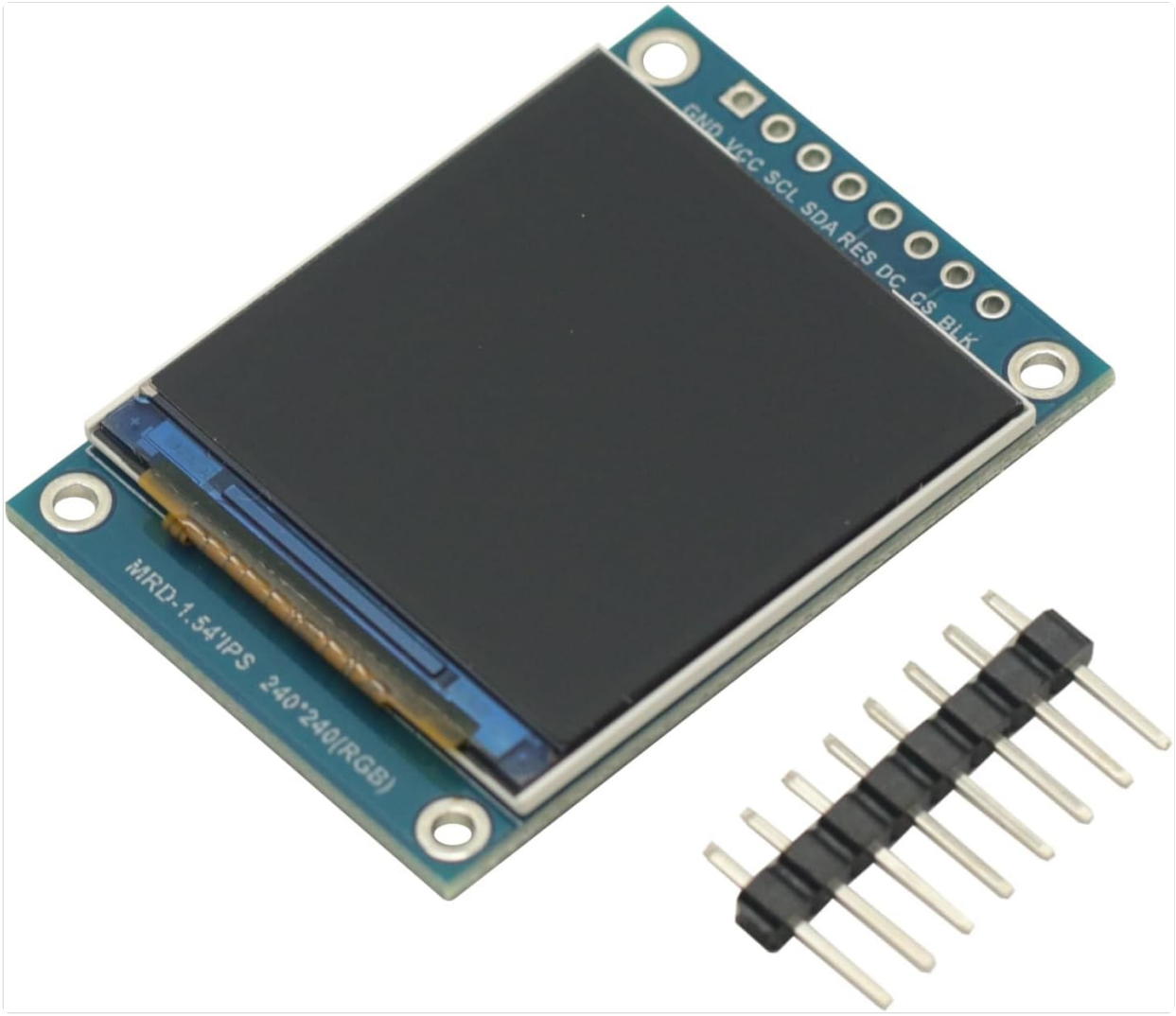


Figure 1: Front view of the 1.54-inch TFT display module, showing the screen and the included male header pins for connection.

2. Product Overview

2.1 Key Features

- **Display Type:** 1.54-inch Full Color TFT IPS LCD
- **Resolution:** 240x240 pixels
- **Controller IC:** ST7789
- **Interface:** Serial Peripheral Interface (SPI)
- **Compatibility:** Designed for use with various Microcontroller Units (MCUs) including Arduino, ESP32, Raspberry Pi, 8051, PIC, and AVR.
- **Display Quality:** HD IPS panel for superior viewing angles and vibrant colors.

2.2 Components Included

- 1 x GODIYMODULES 1.54 Inch TFT Display Module
- 1 x Male Header Pin Strip (for soldering)

3. Setup and Wiring

The 1.54-inch TFT display module communicates via SPI. Proper wiring is essential for correct operation.

The module requires soldering the included header pins before use.

3.1 Pinout Description

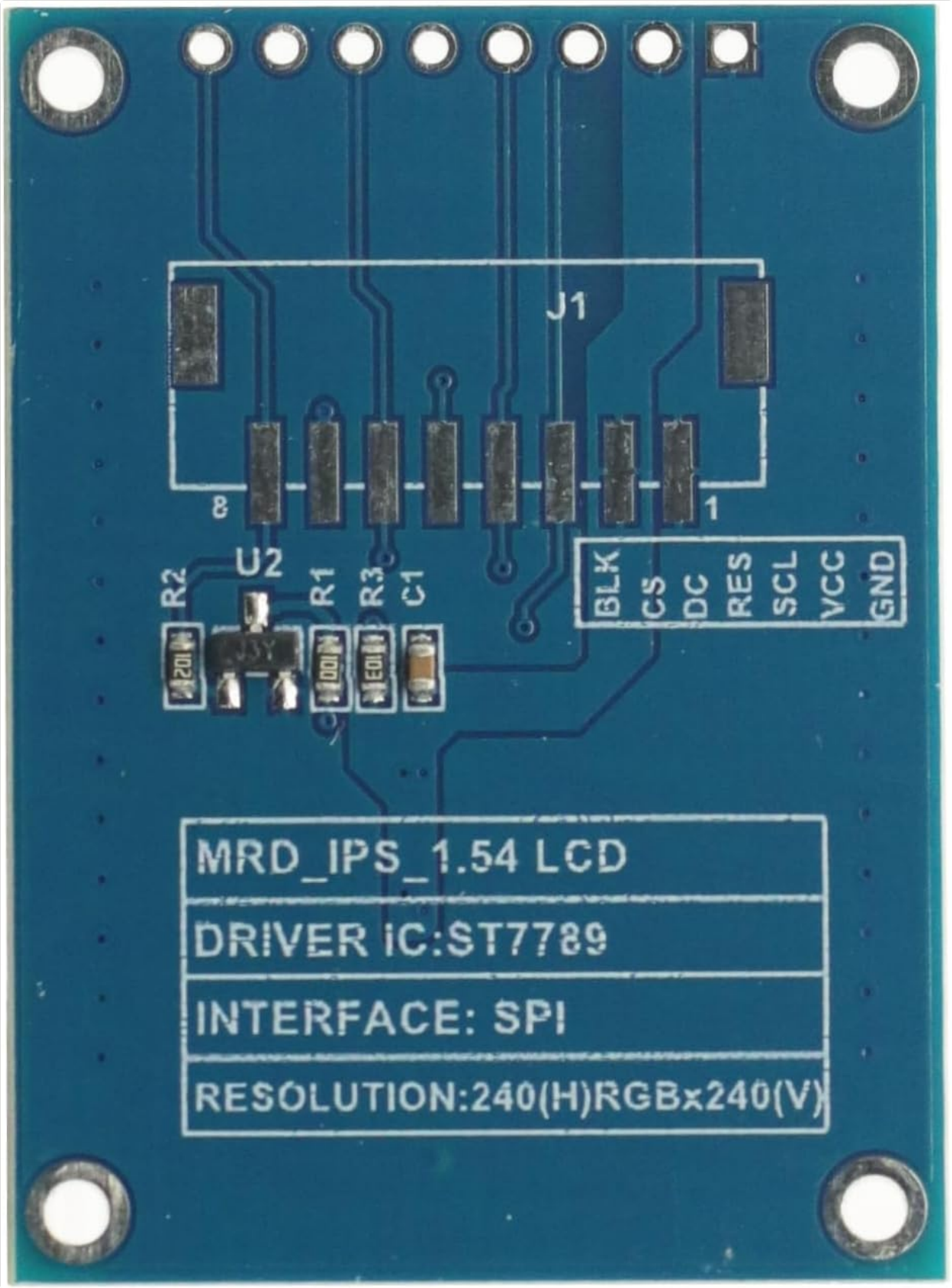


Figure 2: Rear view of the display module circuit board, detailing the ST7789 driver IC and connection pins.

Table 1: Display Module Pinout

Pin Label	Description
GND	Ground connection.

Pin Label	Description
VCC	Power supply (typically 3.3V or 5V, refer to MCU specifications).
SCL	Serial Clock (SPI Clock).
SDA	Serial Data (SPI MOSI - Master Out Slave In).
RES	Reset pin.
DC	Data/Command selection pin.
CS	Chip Select pin.
BLK	Backlight control (can be left unconnected if not used).

3.2 Wiring Diagram for Arduino

Below is a typical wiring configuration for connecting the display module to an Arduino board. Note that specific pin assignments may vary slightly depending on the Arduino model (e.g., Uno, Nano, ESP32). Always consult your MCU's documentation for hardware SPI pins.

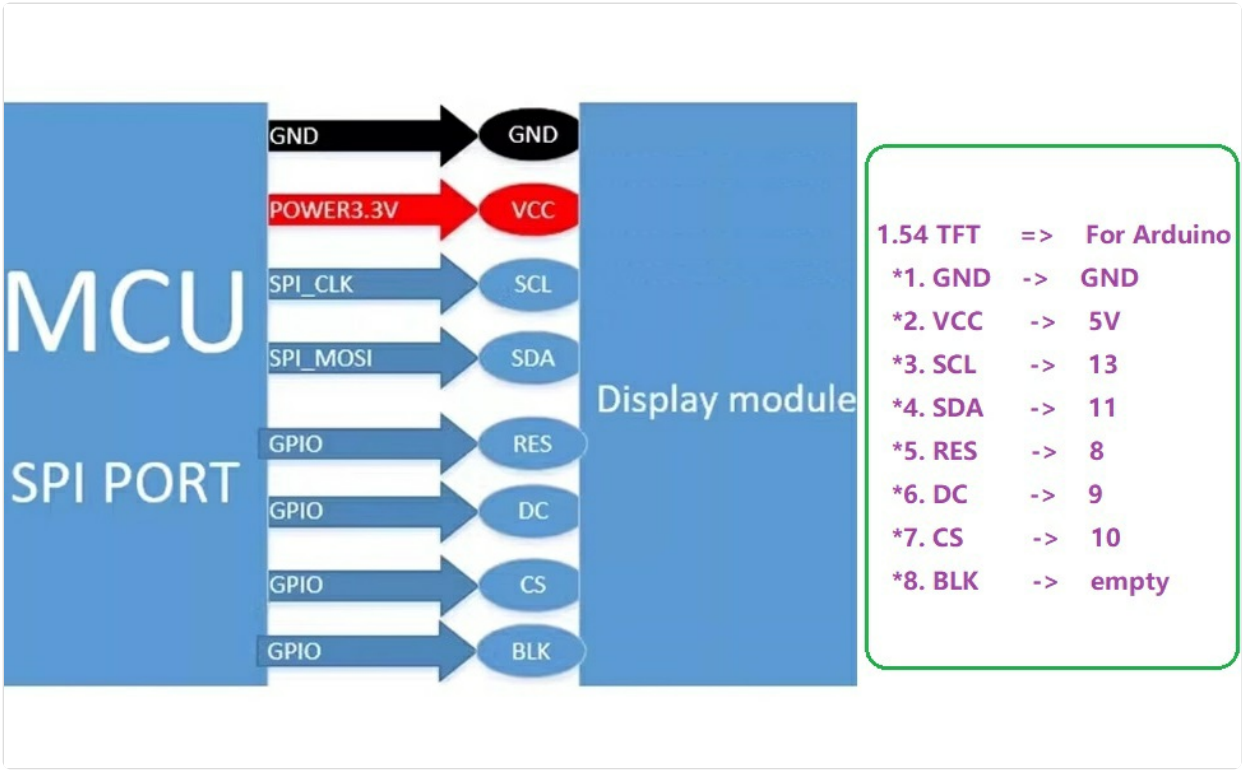


Figure 3: Wiring diagram showing connections between an MCU (e.g., Arduino) and the 1.54-inch TFT display module.

Table 2: Example Arduino Wiring (Arduino Nano/Uno)

Display Pin	Arduino Pin	Notes
GND	GND	Common ground.
VCC	5V	Power supply for the module.
SCL	D13 (SCK)	SPI Clock pin.
SDA	D11 (MOSI)	SPI Master Out Slave In pin.

Display Pin	Arduino Pin	Notes
RES	D8	Digital pin for Reset.
DC	D9	Digital pin for Data/Command selection.
CS	D10	Digital pin for Chip Select.
BLK	(Optional)	Can be left unconnected or connected to a digital pin for backlight control.

Note: The silkscreen labels on the module for SCL and SDA refer to SPI communication, not I2C. Do not confuse them with I2C pins (e.g., A4 & A5 on some Arduinos).

4. Operating Instructions

To operate the display module, you will typically use a compatible library for your chosen microcontroller. For Arduino, libraries such as Adafruit GFX Library and Adafruit ST7789 Library are commonly used.

4.1 Software Setup (Arduino Example)

1. **Install Libraries:** Open your Arduino IDE. Go to**Sketch > Include Library > Manage Libraries...**Search for "Adafruit GFX" and "Adafruit ST7789" and install them.
2. **Include Headers:** In your Arduino sketch, include the necessary headers:

```
#include <Adafruit_GFX.h>
#include <Adafruit_ST7789.h>
```

3. **Define Pins:** Define the pins connected to the display module in your sketch. For example, using the pins from Table 2:

```
#define TFT_CS    10
#define TFT_DC    9
#define TFT_RST   8  // Or set to -1 if you share Arduino reset pin
```

4. **Initialize Display:** Initialize the display object in your setup function:

```
Adafruit_ST7789 tft = Adafruit_ST7789(TFT_CS, TFT_DC, TFT_RST);

void setup() {
  tft.init(240, 240); // Initialize ST7789 screen
  tft.setRotation(2); // Adjust rotation as needed
  tft.fillScreen(ST77XX_BLACK);
  tft.setTextWrap(false);
  tft.setTextColor(ST77XX_WHITE);
  tft.setTextSize(1);
  tft.setCursor(0, 0);
  tft.print("Hello, World!");
}
```

5. **Drawing Functions:** Use the GFX library functions to draw text, shapes, and images on the display. Refer to the Adafruit GFX library documentation for a full list of functions.

5. Specifications

Table 3: Technical Specifications

Feature	Detail
Display Size	1.54 inches
Resolution	240x240 pixels
Display Type	Full Color TFT IPS LCD
Driver IC	ST7789
Interface	SPI (Serial Peripheral Interface)
Operating Voltage	Typically 3.3V or 5V (VCC)
Compatible Devices	Arduino, Raspberry Pi, ESP32, 8051, PIC, AVR
Item Weight	0.634 ounces (approx. 18 grams)
Package Dimensions	5.63 x 4.88 x 1.38 inches

6. Troubleshooting

- **Display is blank or shows garbage:**
  - *Check Wiring:* Verify all connections (GND, VCC, SCL, SDA, RES, DC, CS) are secure and correctly connected to the appropriate microcontroller pins as per the wiring diagram. Pay close attention to SPI pin assignments (SCL/SCK, SDA/MOSI).
  - *Power Supply:* Ensure the VCC pin receives the correct voltage (typically 3.3V or 5V, depending on your MCU's logic level and the module's tolerance).
  - *Library Installation:* Confirm that all necessary libraries (e.g., Adafruit GFX, Adafruit ST7789) are correctly installed in your IDE.
  - *Initialization Code:* Double-check your code for correct pin definitions and display initialization parameters (e.g., `tft.init(240, 240)`).
  - *SPI vs. I2C Confusion:* This module uses SPI. Ensure you are not attempting to connect it using I2C pins or I2C libraries, despite some pin labels potentially causing confusion.
- **Colors are incorrect or washed out:**
  - *Rotation Setting:* Incorrect `setRotation()` might affect how colors are interpreted or displayed. Experiment with different rotation values.
  - *Library Version:* Ensure you are using up-to-date libraries.
- **Display works on one MCU (e.g., ESP32) but not another (e.g., Arduino):**
  - *Pin Compatibility:* Verify that the SPI pins and other control pins are correctly mapped for the specific MCU you are using. Pin numbers for SPI can differ between Arduino boards (Uno, Nano, Mega) and other platforms like ESP32 or Raspberry Pi.
  - *Logic Levels:* Ensure voltage compatibility. Some MCUs operate at 3.3V logic, while others use 5V. The display module typically supports both, but incorrect voltage levels can cause issues.

7. Maintenance

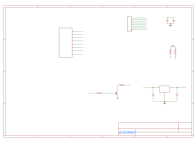
The 1.54-inch TFT display module is a delicate electronic component. Follow these guidelines for proper maintenance:

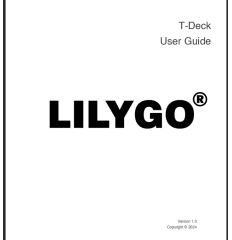
- **Handling:** Always handle the module by its edges to avoid touching the screen surface or electronic components.
- **Cleaning:** If necessary, gently clean the screen with a soft, lint-free cloth. Avoid abrasive materials or harsh chemical cleaners.
- **Storage:** Store the module in an anti-static bag in a dry, cool environment away from direct sunlight and extreme temperatures.
- **Soldering:** When soldering header pins, use appropriate soldering techniques to prevent damage to the board or components.

8. Warranty and Support

Specific warranty information for this product is not provided in the available documentation. For any technical support, warranty claims, or further inquiries, please contact the seller or manufacturer directly through the platform where the product was purchased.

Related Documents - ST7789

	2.25 inch TFT Display Schematic with XC6206 Voltage Regulator and S8550 Transistor Schematic diagram detailing the connection of a 2.25-inch TFT display, an XC6206P332MR-MS voltage regulator, and an S8550 transistor for backlight control. Includes IIC circuit and power filtering.
	E32R32P & E32N32P 3.2-inch IPS ESP32-32E Display Module User Manual Comprehensive user manual for the E32R32P & E32N32P 3.2-inch IPS ESP32-32E Display Module, covering resource descriptions, software instructions, and detailed hardware explanations.
	E32R32P & E32N32P 3.2-inch IPS ESP32-32E Display Module User Manual This user manual provides a comprehensive guide to the E32R32P and E32N32P 3.2-inch IPS ESP32-32E Display Modules. It covers resource descriptions, software and hardware instructions, detailed explanations of schematic diagrams, and precautions for use. The manual details the module's components, including the LCD screen, resistive touch screen, ESP32-WROOM-32E module, various interface circuits, and power management.

	[LILYGO T-Deck ESP32-S3 User Guide for Arduino Development] Comprehensive user guide for the LILYGO T-Deck development board, detailing setup of the Arduino IDE, ESP32-S3 configuration, Wi-Fi and LoRa functionality, and SSC command reference for IoT applications.
	[Blockstream Jade V1.1 Technical Overview and Specifications] A technical overview of the Blockstream Jade V1.1, detailing its hardware composition, functional description, CPU and memory, storage, and power management features. Includes FCC compliance information.