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› XIITIA 2.0" HD IPS TFT LCD Display Module (ST7789) User Manual

XIITIA 2.0" HD IPS TFT LCD Display Module 240x320 RGB LCD Screen ST7789 Drive SPI Interface 8pin

XIITIA 2.0" HD IPS TFT LCD Display Module User Manual

MODEL: 2.0" HD IPS TFT LCD DISPLAY MODULE (ST7789)

Brand: XIITIA

1. INTRODUCTION

This manual provides essential information for the proper use and integration of the XIITIA 2.0" HD IPS TFT LCD Display Module. This module features a 240x320 resolution, 65K RGB color display, and utilizes the ST7789 driver IC with a 4-wire SPI interface. Its IPS full viewing angle panel ensures clear visuals across a wide range of perspectives, making it suitable for various embedded projects and DIY applications.

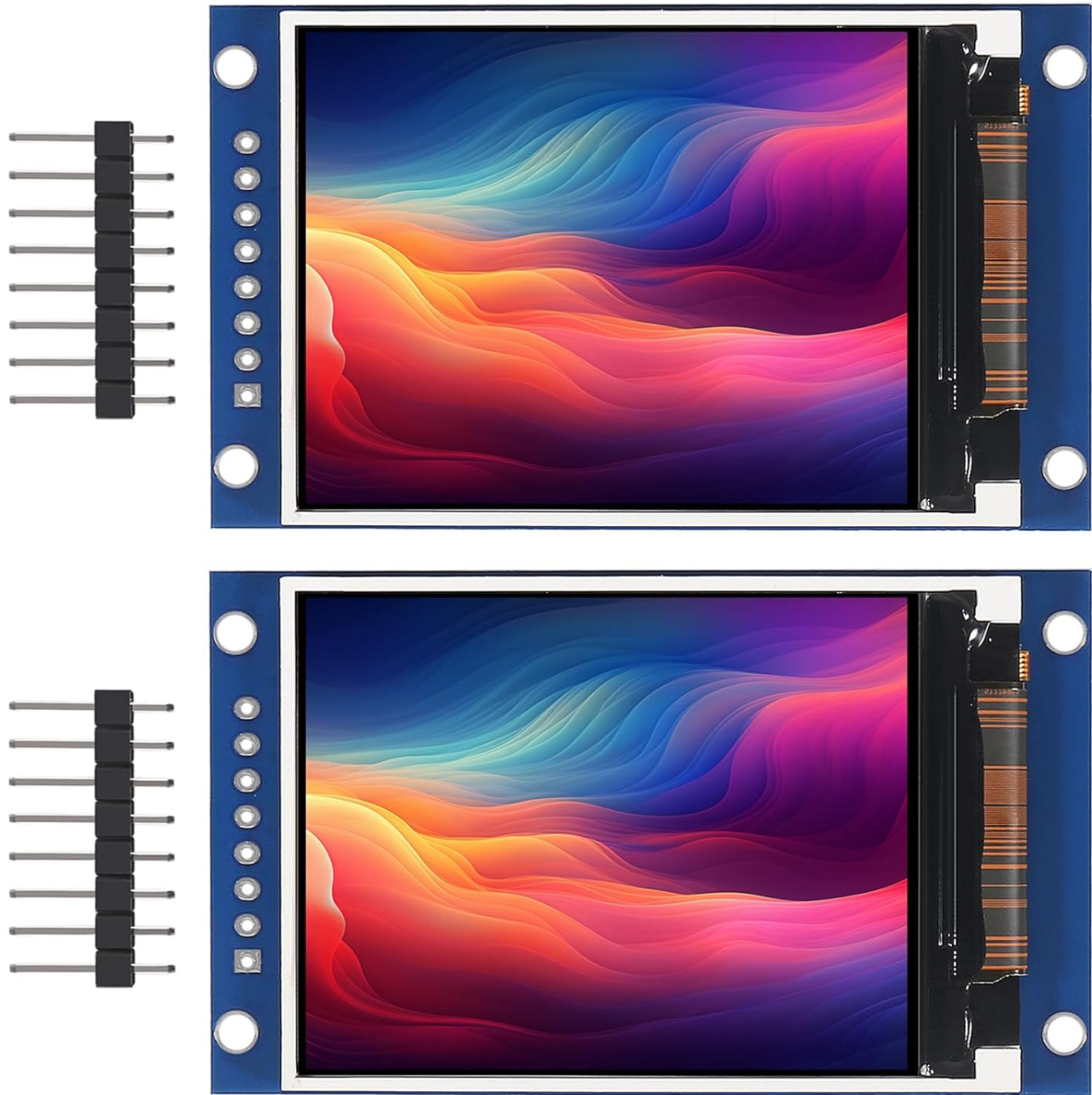


Figure 1: Two XITIA 2.0 inch HD IPS TFT LCD Display Modules. Each module features a vibrant display and comes with a separate pin header for connection.

2. FEATURES

- **Display Size:** 2.0 inches
- **Display Color:** RGB 65K Color
- **Panel Material:** IPS Full View for ultra-wide viewing angles
- **Resolution:** 240x320 pixels
- **Display Interface:** 4-wire SPI (Serial Peripheral Interface)
- **Driver IC:** ST7789
- **Effective Display Area:** 30.60 x 40.80 mm
- **Overall Dimension:** 36.48 x 61.12 mm
- **Voltage:** 3.3V operation

3. SPECIFICATIONS

Parameter	Value
Display Size	2.0 inches
Resolution	240 x 320 pixels
Color Depth	65K RGB Colors
Driver IC	ST7789
Interface	4-wire SPI
Operating Voltage	3.3V
Effective Display Area	30.60 mm (W) x 40.80 mm (H)
Overall Dimensions	36.48 mm (W) x 61.12 mm (H)
Panel Type	IPS Full View

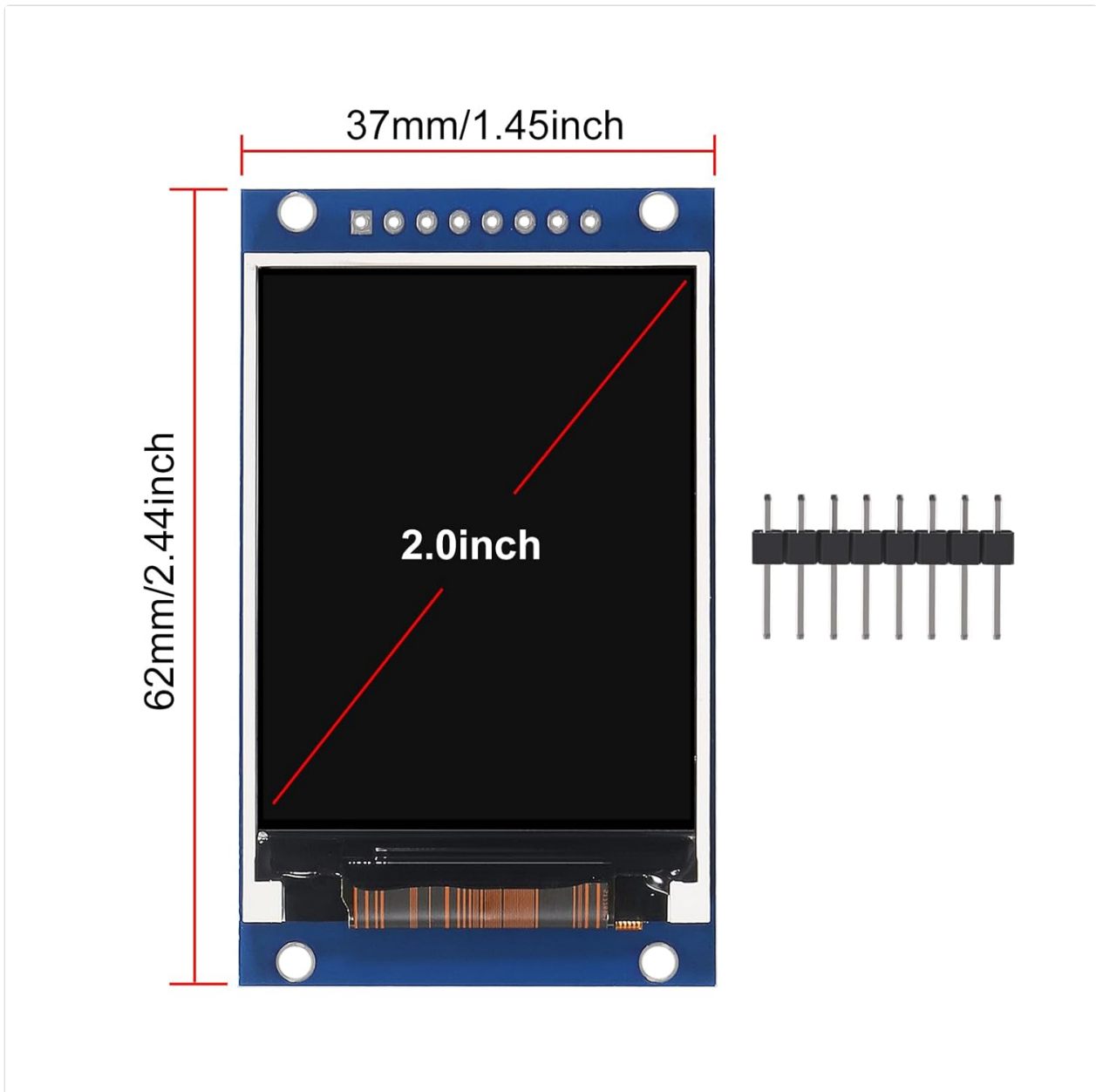
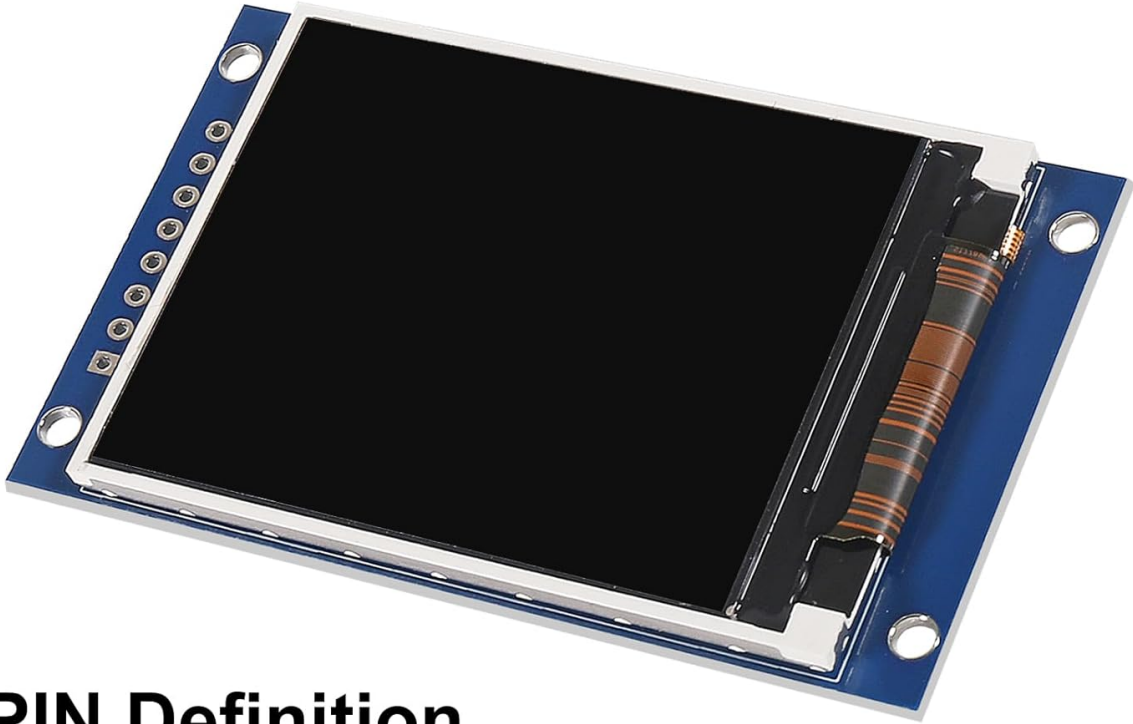


Figure 2: Physical dimensions of the display module, showing a width of 37mm (1.45 inches) and a height of 62mm (2.44 inches) for the PCB, with a 2.0 inch diagonal display area.

4. PIN DESCRIPTION

The module features an 8-pin interface for connection to a microcontroller. Understanding each pin's function is crucial for proper integration.



PIN Definition

PIN	SYMBOL	PIN	SYMBOL
1	GND	5	RST
2	VCC	6	DC
3	SCL	7	CS
4	SDA	8	BL

Figure 3: Pinout diagram and table detailing the function of each of the 8 pins on the display module.

Pin No.	Symbol	Description
1	GND	Ground connection
2	VCC	Power supply (3.3V)
3	SCL	SPI Clock Line
4	SDA	SPI Data Line (MOSI)
5	RST	Reset Pin (active low)
6	DC	Data/Command Selection Pin

Pin No.	Symbol	Description
7	CS	Chip Select Pin (active low)
8	BLK	Backlight Control Pin (usually connected to VCC for always on, or PWM for brightness control)

5. SETUP AND CONNECTION

To set up the display module, connect it to your microcontroller (e.g., Arduino, ESP32) using the 4-wire SPI interface. Ensure all connections are secure and correctly mapped according to the pin descriptions.

5.1 Wiring Diagram (Example for Arduino)

While specific pin assignments may vary based on your microcontroller, a typical connection for a 4-wire SPI display is as follows:

- **VCC** to 3.3V
- **GND** to GND
- **SCL** to SPI Clock (SCK) pin on your microcontroller
- **SDA** to SPI Data Out (MOSI) pin on your microcontroller
- **RST** to a digital I/O pin (e.g., D9)
- **DC** to a digital I/O pin (e.g., D8)
- **CS** to a digital I/O pin (e.g., D10)
- **BLK** to 3.3V (for constant backlight) or a PWM-capable digital I/O pin for brightness control.

Note: Always refer to your microcontroller's documentation for specific SPI pin assignments.

5.2 Software Setup

For programming, you will typically use a library compatible with the ST7789 driver. Popular choices include:

- **Adafruit GFX Library:** A core graphics library.
- **Adafruit ST7735/ST7789 Library:** Specific driver library for ST7789.

Install these libraries through your IDE's library manager (e.g., Arduino IDE) and use the provided examples as a starting point for initialization and drawing functions.

6. OPERATING INSTRUCTIONS

Once connected and the necessary libraries are installed, you can begin displaying graphics and text on the LCD module. The general steps involve:

1. **Initialization:** Call the display's initialization function, passing the correct pin assignments for RST, DC, and CS.
2. **Screen Orientation:** Set the desired screen orientation (portrait or landscape) using the library's rotation function.
3. **Drawing:** Use the library's functions to draw pixels, lines, rectangles, circles, text, and images.
4. **Color Management:** Utilize the 65K color support to create rich visual content. Colors are typically represented in 16-bit RGB565 format.

Refer to the examples provided with the ST7789 library for detailed code implementation.

7. MAINTENANCE

The XIITIA 2.0" HD IPS TFT LCD Display Module is a delicate electronic component. Follow these guidelines for proper maintenance:

- **Handling:** Avoid touching the display surface directly. Handle the module by its edges or PCB.
- **Cleaning:** If necessary, gently clean the display surface with a soft, lint-free cloth. Do not use abrasive cleaners or excessive pressure.
- **Storage:** Store the module in an anti-static bag in a dry, cool environment when not in use.
- **Power Supply:** Ensure a stable 3.3V power supply. Incorrect voltage can damage the module.
- **ESD Protection:** Always take precautions against electrostatic discharge (ESD) when handling the module.

8. TROUBLESHOOTING

If you encounter issues with your display module, consider the following troubleshooting steps:

- **No Display/White Screen:**
 - Check all wiring connections, especially VCC, GND, and BLK.
 - Verify the 3.3V power supply is stable.
 - Ensure the display initialization code is correct and executed.
 - Confirm the RST pin is correctly toggled during initialization.
- **Garbled Display:**
 - Double-check SPI connections (SCL, SDA, CS, DC).
 - Ensure the correct ST7789 library is used and configured for your specific module.
 - Verify the SPI clock speed is compatible with your microcontroller and display.
- **Incorrect Colors:**
 - Confirm that your color data is in the correct 16-bit RGB565 format.
 - Check if the library's color definitions match your expectations.
- **Display Not Responding:**
 - Ensure the microcontroller is powered and running your code.
 - Check for any short circuits or loose connections.

9. APPLICATION EXAMPLES

The versatility of the 2.0" HD IPS TFT LCD Display Module allows for its integration into a wide range of projects and products:

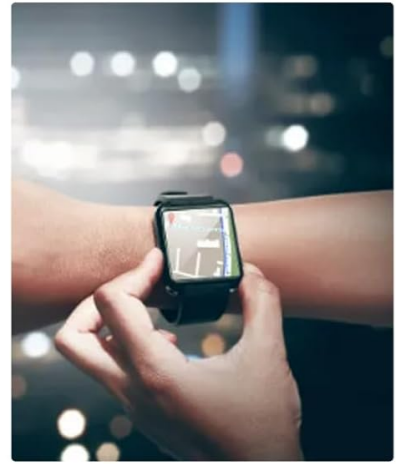
APPLICATION



GPS Navigator



Household Appliances



Smartwatches



POS System



Dashboard



Industrial Equipment

Figure 4: Visual examples of where this type of display module can be applied, such as in GPS navigators, smartwatches, and industrial control panels.

- **GPS Navigators:** Compact and clear display for mapping and directions.
- **Household Appliances:** User interfaces for smart home devices, coffee makers, etc.
- **Smartwatches:** Small, high-resolution screen for wearable technology.
- **POS Systems:** Displaying transaction information or product details.
- **Car Dashboards:** Auxiliary displays for vehicle information.
- **Industrial Equipment:** Control panels and status indicators in machinery.

10. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the product's purchase documentation or contact XIITIA customer service directly. Keep your purchase receipt for warranty claims.

