

## LILYGO T-Watch S3

# LILYGO T-Watch-S3 915Mhz User Manual

**MODEL: T-WATCH S3**

## 1. Introduction

The LILYGO T-Watch-S3 is a versatile and programmable wearable device designed for development and experimentation. It integrates an ESP32-S3 microcontroller, LoRa communication capabilities, a BMA423 3-axis acceleration sensor, and a MAX98357A audio amplifier with a microphone and speaker. This manual provides essential information for setting up, operating, maintaining, and troubleshooting your T-Watch-S3.

## 2. Setup

### 2.1 Initial Power On

Before first use, it is necessary to activate the battery by flipping its switch to the ON position. This switch is located inside the device. For prolonged storage, it is recommended to turn off this battery switch.

**Tip:** You **need to turn on the switch when you turn it on** for the **first time**, and it is recommended to turn off the battery switch when it is not used for a long time.



Figure 2.1: Steps to activate the battery switch for initial power on.

### 2.2 Charging

The T-Watch-S3 is equipped with a Micro USB port for charging. Connect the device to a standard USB power source using a compatible Micro USB cable. The charging indicator will provide feedback on the charging status.

## 2.3 Programming Environment Setup

The T-Watch-S3 supports various development platforms, including Arduino-IDE, ESP-IDF, VS Code, and Micropython. For detailed programming instructions and libraries, refer to the official GitHub repository:

[github.com/Xinyuan-LilyGO/TTGO\\_TWatch\\_Library](https://github.com/Xinyuan-LilyGO/TTGO_TWatch_Library)

## 3. Operating the T-Watch-S3

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### 3.1 Basic Functions

The device includes several onboard functions:

- **RTC (Real-Time Clock):** For accurate timekeeping.
- **Microphone:** For audio input.
- **MAX98357A Power Detection:** Integrated audio amplifier.
- **BMA423 3-axis acceleration sensor:** For motion detection and activity tracking.

### 3.2 Connectivity

The T-Watch-S3 offers multiple wireless communication options:

- **Wi-Fi:** 802.11 b/g/n for network connectivity.
- **Bluetooth:** BLE V5.0 for short-range wireless communication.
- **LoRa:** Integrated SX1262 transceiver supporting 433Mhz, 868Mhz, and 915Mhz frequencies for long-range, low-power communication.

### 3.3 Display and Interaction

The device features a 1.54-inch wide-angle IPS LCD with a resolution of 240x240 pixels and 16-bit full color. It supports capacitive touch input for user interaction.



Figure 3.1: Example of the T-Watch-S3 display interface.



Figure 3.2: Example of a menu interface on the T-Watch-S3.

### 3.4 Physical Overview and Components



Figure 3.3: Internal and external components of the T-Watch-S3.



Figure 3.4: Detailed component and pinout diagram.

## 4. Specifications

The following table outlines the key technical specifications of the LILYGO T-Watch-S3:

Feature	Specification
Model Number	T-Watch S3
MCU	ESP32-S3
Flash Memory	16 MB
PS RAM	8 MB
Display Size	1.54 Inches
Display Resolution	240x240 pixels, 16-bit full color
Touch Screen	Capacitive
Wi-Fi Standard	802.11 b/g/n
Bluetooth Standard	BLE V5.0
LoRa Transceiver	SX1262 (433Mhz, 868Mhz, 915Mhz)
Onboard Sensors	BMA423 3-axis acceleration sensor
Audio	Microphone, MAX98357A Power Detection
Battery Capacity	400 Milliamp Hours
Charging Port	Micro USB
Operating System (Default)	MicroPython
Dimensions (approx.)	47.45mm x 42.36mm x 13mm (watch body)



Figure 4.1: Physical dimensions of the T-Watch-S3.



Figure 4.2: Overview of key features and components.

## 5. Maintenance

To ensure the longevity and optimal performance of your T-Watch-S3, follow these maintenance guidelines:

- **Cleaning:** Use a soft, dry cloth to clean the device. Avoid using harsh chemicals or abrasive materials.
- **Water Resistance:** The device is not waterproof. Avoid exposure to water or high humidity.
- **Storage:** When not in use for extended periods, store the device in a cool, dry place. It is recommended to turn off the internal battery switch for long-term storage to prevent battery drain.
- **Battery Care:** Avoid fully discharging the battery frequently. Charge the device regularly to maintain battery health.

## 6. Troubleshooting

This section addresses common issues you might encounter with your T-Watch-S3.

- **Device does not power on:** Ensure the internal battery switch is in the ON position. Connect the device to a charger to confirm it has sufficient battery charge.
- **Difficulty programming:** Verify that the correct drivers are installed for your operating system. Ensure the Micro USB cable is functioning correctly and securely connected. Refer to the GitHub repository for specific programming environment setup instructions and troubleshooting tips.
- **Poor battery life:** Battery life can vary significantly based on usage, active sensors, and wireless communication (Wi-Fi, Bluetooth, LoRa) activity. Optimize your code to utilize low-power modes when possible.
- **Display issues:** If the display is unresponsive or shows artifacts, try restarting the device. Ensure your firmware is correctly configured for the ST7789V display driver.
- **Wireless connectivity problems:** Check that Wi-Fi, Bluetooth, or LoRa modules are enabled in your firmware. Ensure you are within range of the network or other devices.

## 7. Support

For further technical support, detailed documentation, and community resources, please visit the official LILYGO GitHub repository:

[github.com/Xinyuan-LilyGO/TTGO\\_TWatch\\_Library](https://github.com/Xinyuan-LilyGO/TTGO_TWatch_Library)

This repository contains source code, examples, and discussions that can assist with development and advanced usage.

## 8. Warranty Information

Specific warranty details for the LILYGO T-Watch-S3 are not provided in this manual. Please refer to the product's purchase documentation or contact your retailer for information regarding warranty coverage and terms.

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### Related Documents - T-Watch S3

<p>T-WATCH S3 User Guide</p> <p><b>LILYGO®</b></p> <p><small>Version 1.0 Copyright © 2024</small></p>	<p><a href="#"><u>LILYGO T-WATCH S3 User Guide: Setup and Development with Arduino</u></a></p> <p>Learn to develop IoT applications with the LILYGO T-WATCH S3. This guide covers setting up the Arduino IDE, programming the ESP32-S3, and using SSC commands, provided by Xinyuan.</p>
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<p>T-BEAM-S3 User Guide</p> <p><b>LILYGO®</b></p> <p>Version 1.0 Copyright © 2024</p>	<p><a href="#"><u>LILYGO T-BEAM-S3 User Guide: Setup and Development</u></a></p> <p>This user guide provides comprehensive instructions for setting up the LILYGO T-BEAM-S3 development board. Learn how to configure the software environment using Arduino IDE, connect the board, and utilize its Wi-Fi, BLE, GPS, and LoRa capabilities for IoT projects.</p>
<p>T3-S3 User Guide</p> <p><b>LILYGO®</b></p> <p>Version 1.0 Copyright © 2024</p>	<p><a href="#"><u>LILYGO T3-S3 User Guide</u></a></p> <p>User guide for the LILYGO T3-S3 development board, covering setup of the Arduino IDE, configuration, testing, and Wi-Fi command reference for the ESP32-S3 module.</p>
<p>T-Display-S3 User Guide</p> <p><b>LILYGO®</b></p> <p>Version 1.0 Copyright © 2024</p>	<p><a href="#"><u>LILYGO T-Display-S3 User Guide</u></a></p> <p>A user guide for the LILYGO T-Display-S3 development board, covering setup, Arduino IDE usage, and basic Wi-Fi commands.</p>
<p>T-Dongle-S3 User Guide</p> <p><b>LILYGO®</b></p> <p>Version 1.0 Copyright © 2024</p>	<p><a href="#"><u>LILYGO T-Dongle-S3 User Guide: Getting Started with ESP32-S3 Development</u></a></p> <p>A comprehensive user guide for the LILYGO T-Dongle-S3 development board. Learn how to set up your Arduino development environment, program the ESP32-S3 module, and explore Wi-Fi and Bluetooth features.</p>
<p>T-Deck User Guide</p> <p><b>LILYGO®</b></p> <p>Version 1.0 Copyright © 2024</p>	<p><a href="#"><u>LILYGO T-Deck ESP32-S3 User Guide for Arduino Development</u></a></p> <p>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.</p>