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LILYGO®
LILYGO T-WATCH
S3 Smart Watch

LILYGO T-WATCH S3 Smart Watch User Guide

Contents

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LILYGO T-WATCH S3 Smart Watch

Specifications

- Product Name: T-WATCH S3
- Version: V1.0
- Date: 2024.06
- Processor: ESP32-S3 module
- Development Environment: Arduino

Product Usage Instructions

Introduction
The T-WATCH S3 is a hardware platform for developing applications using the ESP32-S3 module with Arduino.

Get Started
Follow the instructions in this guide to set up the software development environment for T-WATCH S3.

Configure
Configure the development environment settings as per the guide for smooth operation.

Connect
Connect the T-WATCH S3 hardware to your computer using appropriate cables.

Test Demo
Test the demo applications to ensure proper functionality of the hardware and software setup.

Upload Sketch

Use Arduino to build, flash, and monitor the sketches for your applications on the T-WATCH S3.

Build and Flash

Compile your Arduino sketches and flash them onto the ESP32-S3 module.

Monitor

Monitor the behavior of your application running on the T-WATCH S3.

SSC Command Reference

Refer to the command reference for detailed information on various operations supported by the T-WATCH S3.

op

Description of op command.

Frequently Asked Questions (FAQ)

Q: What is the purpose of T-WATCH S3?

A: The T-WATCH S3 is a hardware platform for developing applications using the ESP32-S3 module with Arduino.

About This Guide

This document is intended to help users set up the basic software development
environment for developing applications using hardware based on the T-WATCH S3. Through a simple example, this document illustrates how to use Arduino, including the menu based configuration wizard, compiling the Arduino and firmware download to the ESP32-S3 module.

Release Notes

Date	Version	Release notes
2024.06	V1.0	First release.

Introduction

T-WATCH S3

- T-WATCH S3 is a development Watch. It can work independently.
- It consists of ESP32-S3 MCU supporting Wi-Fi + BLE communication protocol, LoRa chip , motherboard PCB and Watch Shell.
- And this Watch has a 1.54-inch LCD screen.
- For applications ranging from low-power sensor networks to the most demanding tasks.
- At the core of this module is the ESP32-S3 chip.
- ESP32-S3 integrates Wi-Fi (2.4 GHz band) and BLE5 solutions on a single chip, along with dual high performance cores and many other versatile peripherals. Powered by 40 nm technology, ESP32-S3 provides a robust, highly integrated platform to meet the continuous demands for efficient power usage, compact design, security.
- Xinyuan provides the basic hardware and software resources that empowers application developers to build their ideas around the ESP32-S3 series hardware. The software development framework provided by Xinyuan is intended for rapidly developing Internet-of-Things (IoT) applications, with Wi-Fi, Bluetooth, flexible power

management and other advanced system features.

Arduino
A set of cross-platform applications written in Java. The Arduino Software IDE is derived from the Processing programming language and the integrated development environment of the Wiring program. Users can develop applications in Windows/Linux/MacOS based on Arduino. It is recommended to use Windows 10. Windows OS has been used as an example in this document for illustration purposes.

Preparation
To develop applications for ESP32-S3 you need:

- PC loaded with either Windows, Linux or Mac operating system
- Toolchain to build the Application for ESP32-S3
- Arduino that essentially contains API for ESP32-S3 and scripts to operate the Toolchain
- The ESP32-S3 board itself and a USB cable to connect it to the PC

Get Started

Download the Arduino Software
The quickest how to install the Arduino Software (IDE) on Windows machines

Quick Start Guide
The website provides a quick start tutorial

- Windows: **https://www.arduino.cc/en/Guide/Windows**
- Linux: **https://www.arduino.cc/en/Guide/Linux**
- Mac OS X: **https://www.arduino.cc/en/Guide/MacOSX**

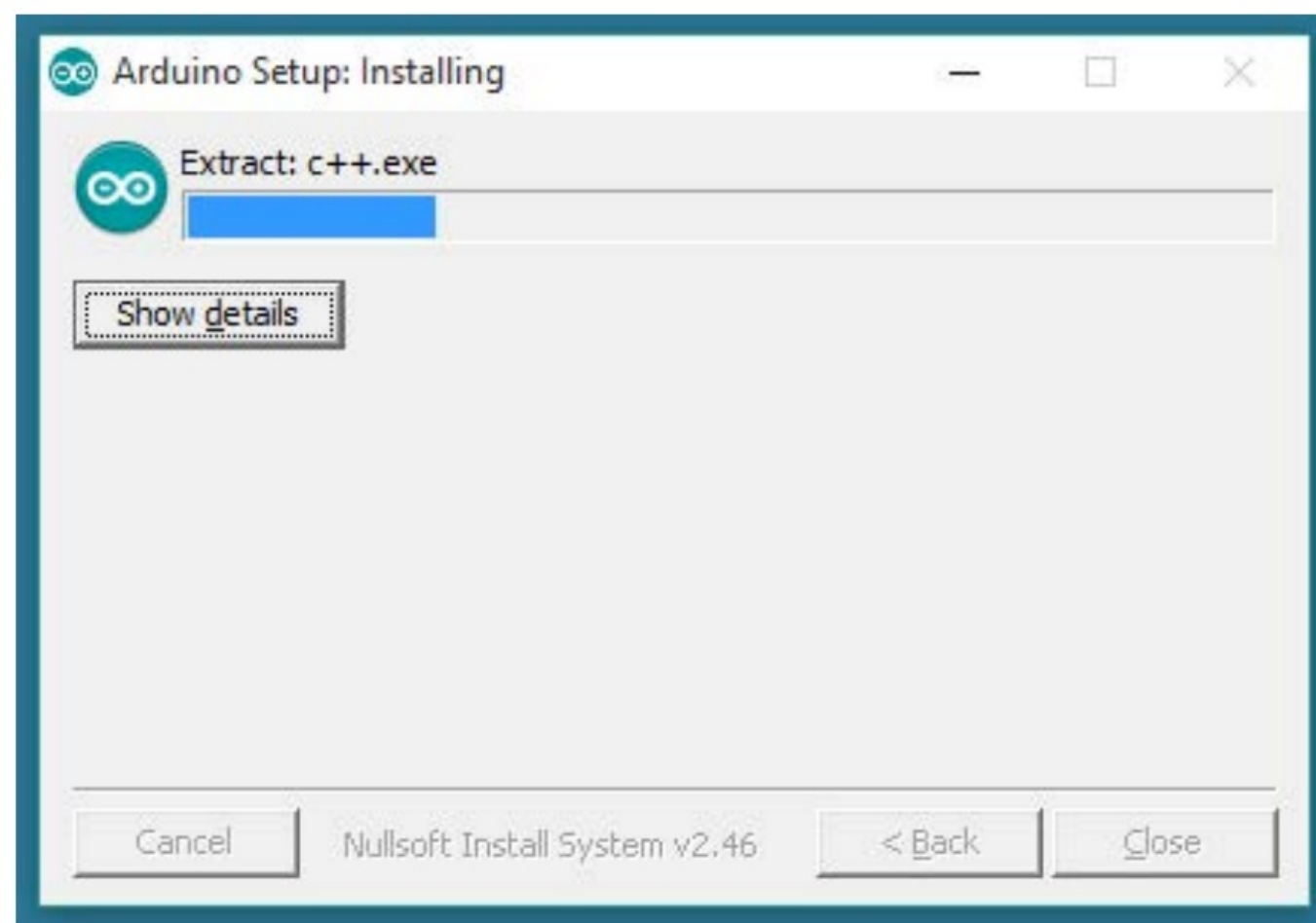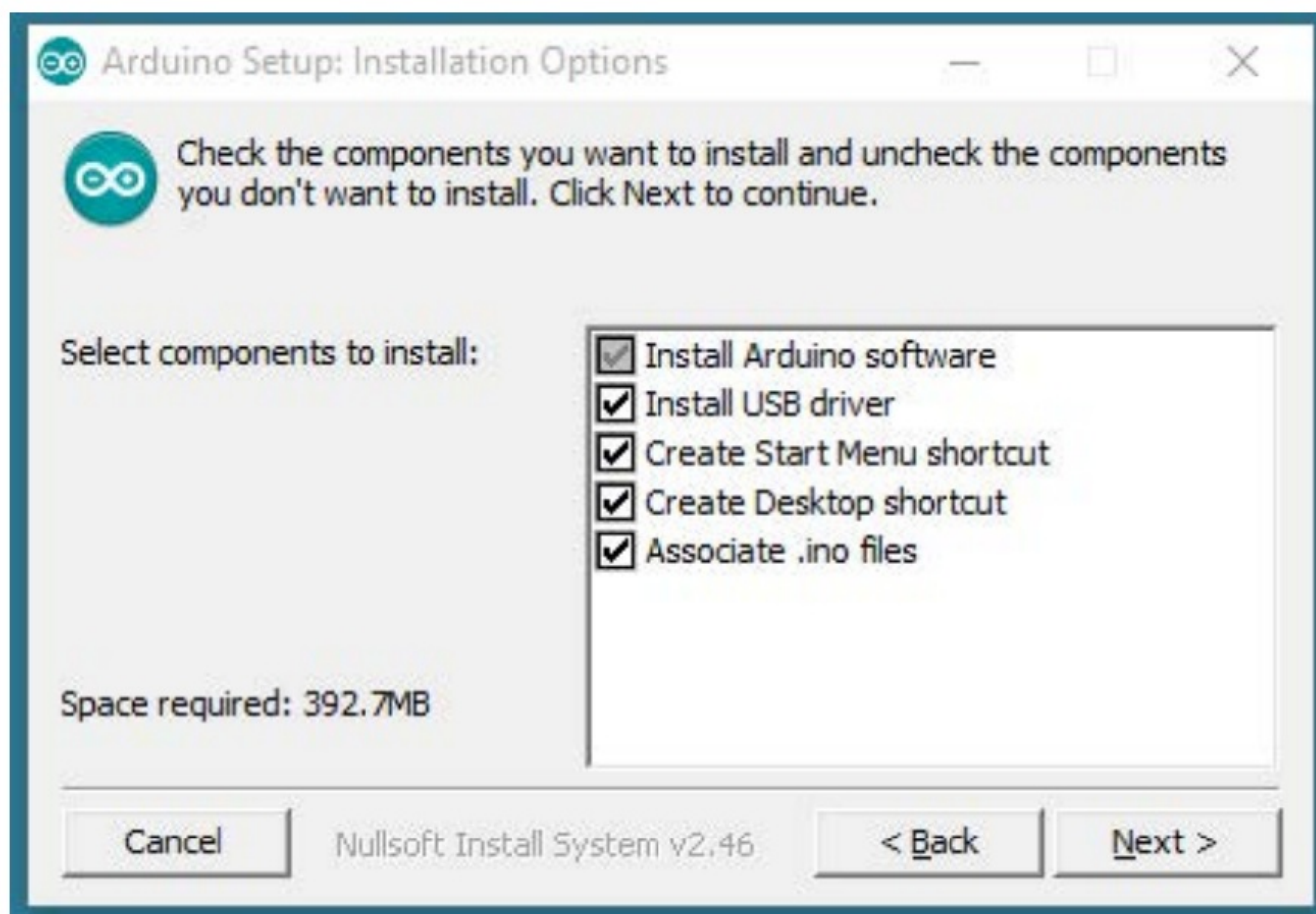**Installation steps for Windows platform Arduino**

ARDUINO 1.8.1

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board. Refer to the Getting Started page for Installation instructions.

Windows Installer
Windows ZIP file for non admin install

Windows app Get ▦

Mac OS X 10.7 Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM

Release Notes
Source Code
Checksums (sha512)

Connect, Collaborate, Create. Learn more about the Create platform.

Try out the new
Arduino Web Editor

Enter the download interface, select **Windows installer** to install directly
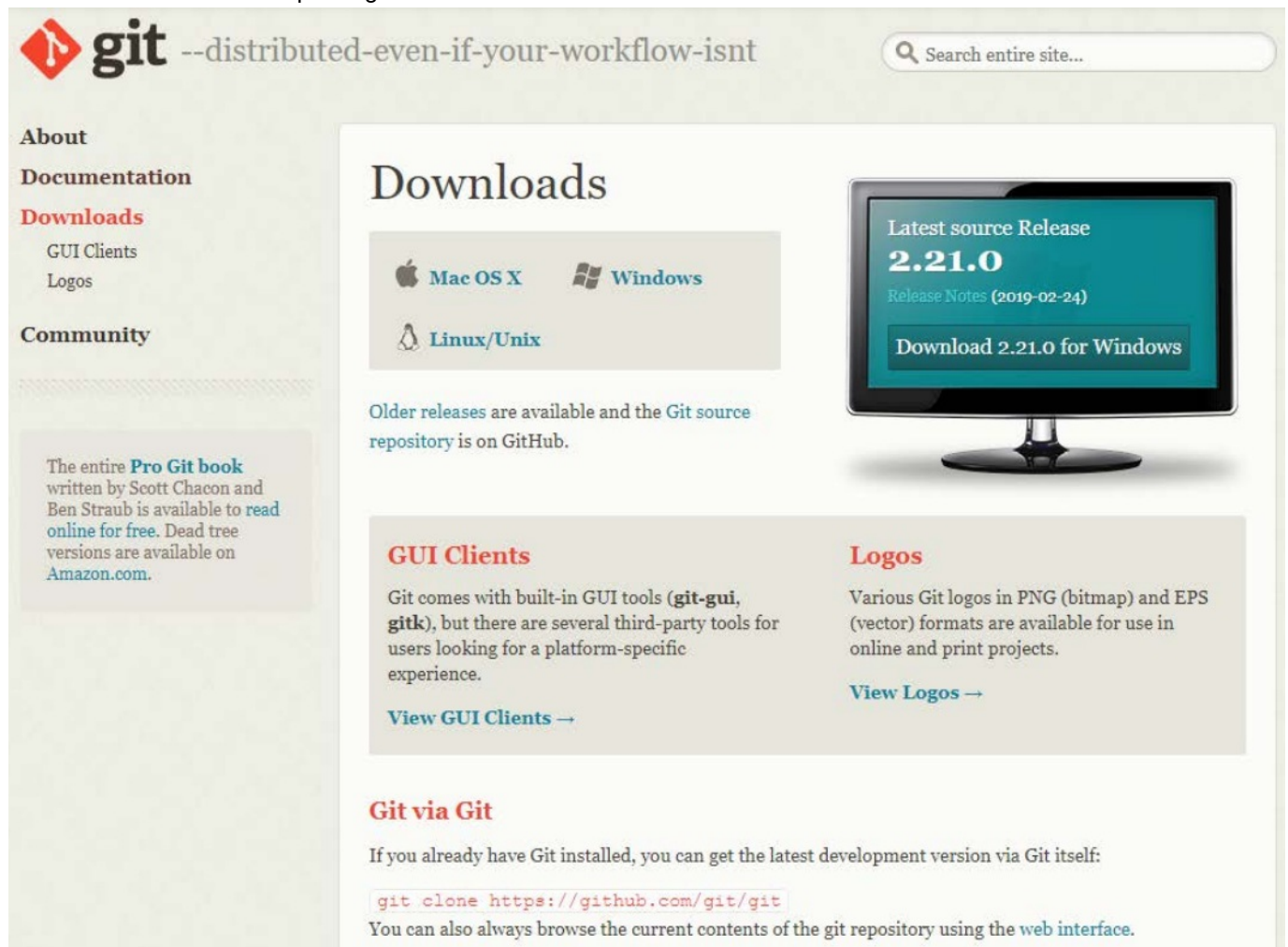
Install the Arduino Software

Wait for installation

Configure

Download Git
Download the installation package Git.exe

Pre-build configuration
Click Arduino icon, then right click and select "Open folder where " Select hardware ->
Mouse ** Right click ** ->
Click Git Bash Here

Cloning a remote repository

- $ mkdir espressif

- $ cd espressif

- $ git clone –recursive **https://github.com/espressif/arduino-esp32.git** esp32

Connect

You are almost there. To be able to proceed further, connect ESP32-S3 board to PC, check under what serial port the board is visible and verify if serial communication works.

Test Demo
Select File>>Example>>WiFi>>WiFiScan
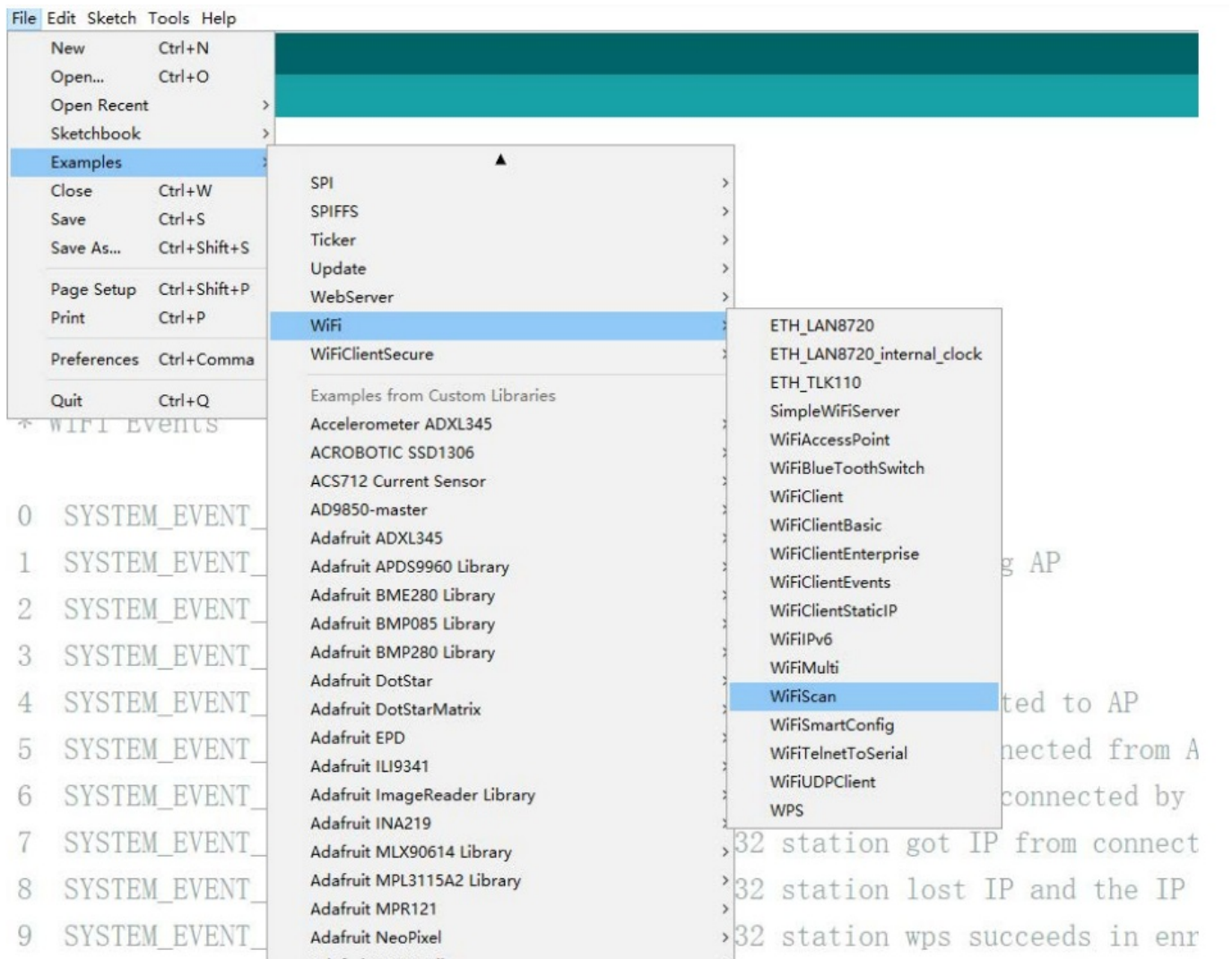
Upload Sketch

Select Board
Tools<<Board<<ESP32-S3 Dev Module

Upload
Sketch << Upload

Serial Monitor
Tools << Serial Monitor

```
COM4                                                      —  □  ×

|                                                            [ Send ]

scan start
scan done
2 networks found
1: MEO-620B4B (-39)*
2: MEO-WiFi (-39)

scan start
scan done
2 networks found
1: MEO-620B4B (-38)*
2: MEO-WiFi (-38)

☑ Autoscroll                     Both NL & CR  ⌄   115200 baud ⌄
```

SSC Command Reference

Here lists some common Wi-Fi commands for you to test the module.

op
Description
op commands are used to set and query the Wi-Fi mode of the system.

Example

- op -Q
- op -S -o wmode

Parameter

Table 6-1. op Command Parameter

-Q	Query Wi-Fi mode.
-S	Set Wi-Fi mode.
wmode	There are 3 Wi-Fi modes: • mode = 1: STA mode • mode = 2: AP mode • mode = 3: STA+AP mode

sta

Description

sta commands are used to scan the STA network interface, connect or disconnect AP, and query the connecting status of STA network interface.

Example

- sta -S [-s ssid] [-b bssid] [-n channel] [-h] sta -Q
- sta -C [-s ssid] [-p password]
- sta -D

Parameter

Table 6-2. sta Command Parameter

Parameter	Description
-S scan	Scan Access Points.

-s ssid	Scan or connect Access Points with the ssid.
-b bssid	Scan the Access Points with the bssid.
-n channel	Scan the channel.
-h	Show scan results with hidden ssid Access Points.
-Q	Show STA connect stutus.
-D	Disconnected with current Access Points.

ap
Description
ap commands are used to set the parameter of AP network interface.

Example

- ap -S [-s ssid] [-p password] [-t encrypt] [-n channel] [-h] [-m max_sta]
- ap –Q

- ap –L

Parameter

Table 6-3. ap Command Parameter

-S	Set AP mode.
-s ssid	Set AP ssid.
-p password	Set AP password.
-t encrypt	Set AP encrypt mode.
-h	Hide ssid.
-m max_sta	Set AP max connections.
-Q	Show AP parameters.
-L	Show MAC Address and IP Address of the connected station.

mac
Description
mac commands are used to query the MAC address of the network interface.

Example
mac -Q [-o mode]

Parameter

Table 6-4. mac Command Parameter

-Q	Show MAC address.
-o mode	- mode = 1: MAC address in STA mode. - mode = 2: MAC address in AP mode.

dhcp
Description
dhcp commands are used to enable or disable dhcp server/client.

Example

- dchp -S [-o mode]
- dhcp -E [-o mode]
- dhcp -Q [-o mode]

Parameter

Table 6-5. dhcp Command Parameter

-S	Start DHCP (Client/Server).
-E	End DHCP (Client/Server).
-Q	show DHCP status.
-o mode	- mode = 1 : DHCP client of STA interface. - mode = 2 : DHCP server of AP interface. - mode = 3 : both.

ip
Description
ip command are used to set and query the IP address of the network interface.

Example
ip -Q [-o mode] ip -S [-i ip] [-o mode] [-m mask] [-g gateway]

Parameter

Table 6-6. ip Command Parameter

-Q	Show IP address.
-o mode	- mode = 1 : IP address of interface STA. - mode = 2 : IP address of interface AP. - mode = 3 : both
-S	Set IP address.
-i ip	IP address.
-m mask	Subnet address mask.
-g gateway	Default gateway.

reboot
Description
reboot command is used to reboot the board.

Example
reboot

ram
ram command is used to query the size of the remaining heap in the system.

Example
ram

Fcc Statment

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
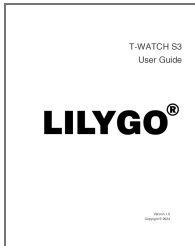
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC radiation exposure requirement set forth for an uncontrolled environment.

Documents / Resources

T-WATCH S3 User Guide **LILYGO®** Version 1.0 Copyright © 2024	**LILYGO T-WATCH S3 Smart Watch** [pdf] User Guide 2ASYE-T-WATCH-S3, 2ASYETWATCHS3, T-WATCH S3 Smart Watch, T-WATCH S3, Smart Watch, Watch

References

- ⊚ **arduino.cc/en/Guide/Linux**
- ⊚ **arduino.cc/en/Guide/MacOSX**
- ⊚ **arduino.cc/en/Guide/Windows**
- **User Manual**