RYZE RMTTOC2010 Robomaster TT Minor Controller User Guide

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Contents

Disclaimer

It is not recommended for children under the age of 14 to use this product without adult supervision. Please note that in Japan the recommended age is 15 years. Adults should keep the aircraft out of the reach of children and

exercise caution when operating this aircraft in the presence of children.

This product incorporates various advanced control technologies. However, inappropriate use of the product could result in personal injury or property damage. Please read the materials associated with the product before your first use of the product. These documents are included in the product package and/or are available online on the SZ RYZE TECHNOLOGY CO., LTD (“Ryze Tech”) website (**http://www.ryzerobotics.com**).

This product is a flying camera that offers easy flight when in good working order as set forth below.Visit **http://www.ryzerobotics.com** for the most current instructions and warnings. Users operating their aircraft in the United States should visit http://knowbeforeyoufly.org for more information about flight safety and compliance.

The information in this document affects your safety and your legal rights and responsibilities. Read this entire document carefully to ensure proper configuration before use. Failure to read and follow the instructions and warnings in this document may result in serious injury to yourself or others, damage to or loss of your Ryze Tech product, or damage to other objects in the vicinity.

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Ryze Tech accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of this product. The user shall observe safe and lawful practices including, but not limited to, those set forth in these Safety Guidelines. You shall be solely responsible for all your behaviors when flying Tello.

Warnings

1. Stay away from rotating propellers and motors.
2. DO NOT touch the underside of the aircraft as it may be hot.
3. Never use non-Ryze Tech batteries and DO NOT short-circuit the Flight Battery.
4. Important information is included on the product package and in the documentation included in the product

package. Read all of this information carefully and retain the product package and documentation for future reference.

5. Always use an FCC/CE (depending on location) certified USB adapter that is rated at 5 V and 1.5 A or above.
6. Ensure the aircraft is powered off before charging.It cannot be charged when it is powered on.
7. DO NOT charge a Flight Battery immediately after flight, because its temperature may be too high. DO NOT charge a Flight Battery until it cools down to near room temperature.
8. Charge the Flight Battery in the temperature range 41° to 113° F (5° to 45° C). The ideal charging temperature range is 72° to 82° F (22° to 28° C).
9. If a low battery warning appears, charge the Flight Battery until the Flight Battery level reachesbetween 30 and 60 % for long-time storage.
10. Discharge Flight Batteries to the range 40 to 65% if they will NOT be used for 10 days or more. This can greatly extend battery life.

Regulations

To avoid serious injury and property damage, observe the following rules

1. DO NOT operate in the vicinity of manned aircraft, regardless of altitude. (Land immediately if necessary.)
2. DO NOT fly the aircraft in or at densely populated areas including cities, sporting events, exhibitions, and performances.
3. DO NOT fly the aircraft above the relevant maximum altitude set forth in your local laws and regulations.
4. Remain well clear of and DO NOT interfere with manned aircraft operations. Be aware of and avoid other aircraft and obstacles at all times.
5. DO NOT fly the aircraft near or inside no fly zones specified by local laws and regulations. The no fly zone list includes: airports, borders between two sovereign countries or regions, and major cities/regions, and is continuously updated. DO NOT fly around sensitive infrastructure or property such as power stations, water treatment facilities, correctional facilities, heavily traveled roadways, government facilities, or military zones.
6. Maintain visual line of sight with your aircraft at all times and use an observer to assist if needed.
7. NEVER use the aircraft to carry illegal or dangerous goods/payloads.
8. Make sure you understand the nature/type of your flight operation (such as for recreation, for public use, or for commercial use) and have obtained corresponding approval and clearance from the related government agencies before flight. Consult with your local regulators for comprehensive definitions and specific requirements. Users operating their aircraft in the United States should first visit **http://www.knowbeforeyoufly.org** and take the most appropriate action for their circumstances.
9. Please note that remote-controlled aircraft may be banned from conducting commercial activities in certain territories and regions. Check and follow all local laws and regulations before flying as those rules may differ from those stated here.
10. Respect the privacy of others when using the camera. Make sure you comply with local privacy laws, regulations, and moral standards. DO NOT conduct surveillance operations such as image capture or video recording on any person, entity, event, performance, exhibition, or property without authorization or where there is an expectation of privacy, even if the image or video is captured for personal use.
11. Please be advised that in certain areas, the recording of images and videos from events, performances, exhibitions, or commercial properties by means of a camera may contravene copyright or other legal rights, even if the image or video is shot for personal use.

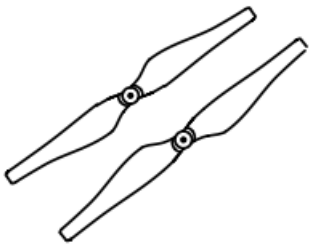
Flight Limit

1. Fly NO higher than 33 ft (10 m) above ground level and stay away from any surrounding obstacles.
2. The Vision Positioning System is only effective when the aircraft is at altitudes of 1.0 to 98.4 ft (0.3 to 30 m) and works best at altitudes of 1.0 to 19.7 ft (0.3 to 6 m).
3. The performance of the Vision Positioning System is affected by the surface being flown over. The aircraft automatically changes to Attitude mode when the Vision Positioning System is unavailable. In Attitude mode the aircraft is not able to position itself. Operate the aircraft with great caution in the following situations, which may cause the aircraftto enter Attitude mode:
   a. Flying at high speed below 2 ft (0.5 m).
   b. Flying over monochrome surfaces (e.g. pure black, pure white, pure red, pure green).
   c. Flying over highly reflective surfaces.
   d. Flying over water or transparent surfaces.
   e. Flying over moving surfaces or objects.
   f. Flying in an area where the lighting changes frequently or drastically.
   g. Flying over extremely dark (< 10 lux) or bright (> 100,000 lux) surfaces or towards bright sources of light (e.g. towards sunlight). h. Flying over surfaces without clear patterns or texture.
   i. Flying over surfaces with identical repeating patterns or textures (e.g. tiling).
   j. Flying over small and fine objects (e.g. tree branches or power lines).
   k. Flying at speeds of over 11 mph (18 kph) at 3.5 ft (1 m) or lower.
4. If the aircraft's Vision Positioning system fails for 3 seconds when its flying altitude is above 20 ft (6 m), Failsafe Protection will automatically initiate landing. If the Vision Positioning system recovers during landing, Failsafe Protection will shut off and the aircraft will hover.
5. The Vision Positioning System may not be able to recognize patterns on the ground in very dark (< 100 lux) environments. DO NOT take off if there is a warning prompt in the Tello app telling you that the environment is too dark.

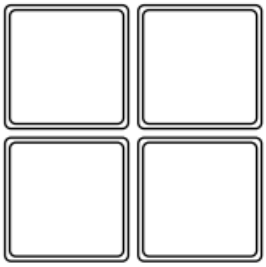
In the Box

- Aircraft ×1 (Propellers and Propeller Guards included*)

- Spare Propeller ×2 (pair)

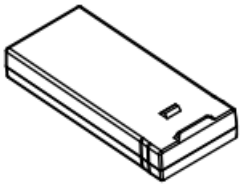


- Mission Pad ×4

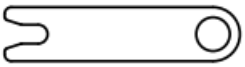


- Micro USB Cable ×1

- Flight Battery ×1

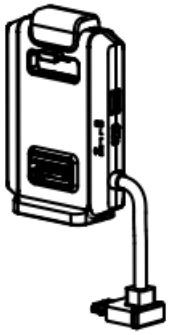


- Propeller Removal Tool ×1

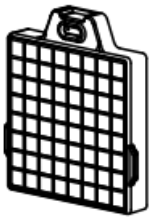


- Quick Start Guide × 1

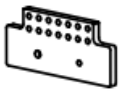
- Open-Source Controller ×1



- Dot-Matrix Display & Distance Sensing Module ×1



- Extension Board ×1

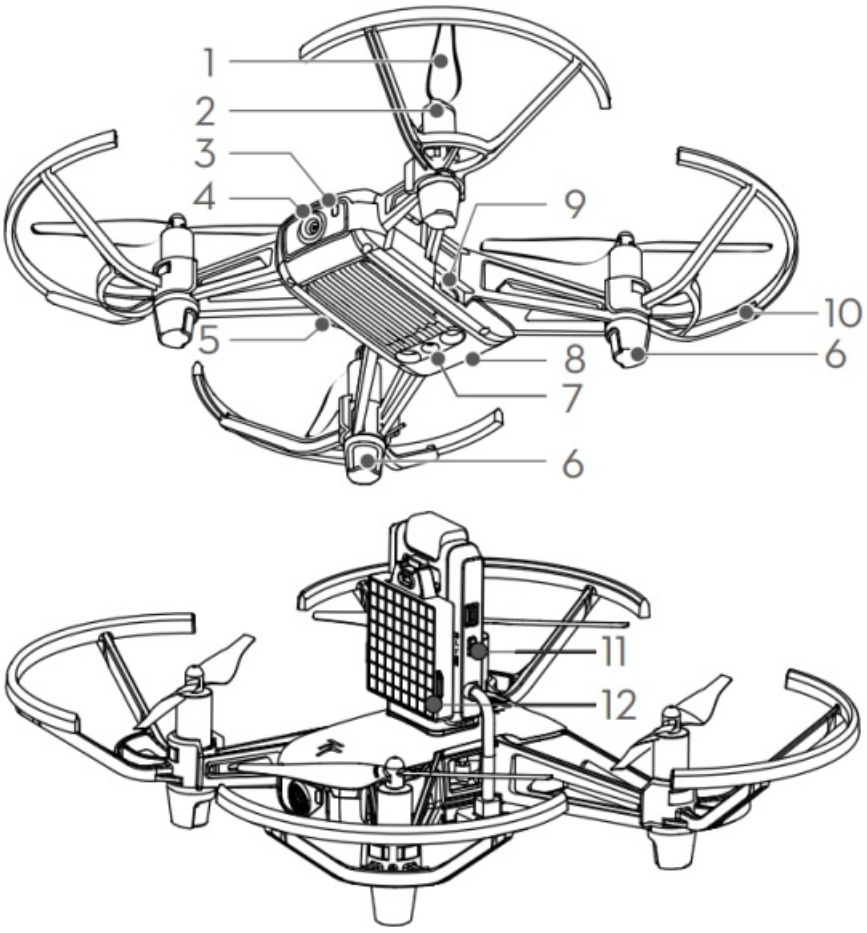


The diagrams in this document are for reference only and may differ from the actual product.

Introduction

ROBOMASTERTM TT TELLOTM Talent includes the aircraft and the Expansion Kit. Tello is a small quadcopter that features a Vision Positioning System and an onboard camera. Using its Vision Positioning System and advanced flight controller, it can hover in place and is suitable for flying indoors. Advanced features like Bounce mode, 8D Flips, and EZ Shots make using Tello fun. Tello captures 5 megapixel photos and streams 720p live video to the Tello app on a mobile device. Its maximum flight time is approximately 13 minutes*

Experience DIY flight with an Expansion Kit that includes an open-source controller, dot-matrix display & distance-sensing module, and extension board, which support programming with Arduino, Scratch, MicroPython, and more.



1. Propellers

2. Motors
3. Aircraft Status Indicator
4. Camera
5. Power Button
6. Antennas
7. Vision Positioning System
8. Flight Battery
9. Micro USB Port
10. Propeller Guards
11. Open-Source Controller
12. Dot-Matrix Display & Distance Sensing Module

The maximum flight time was tested in windless conditions flying at a consistent 9 mph (15 kph) and without the expansion kit mounted. This value should be taken for reference only.

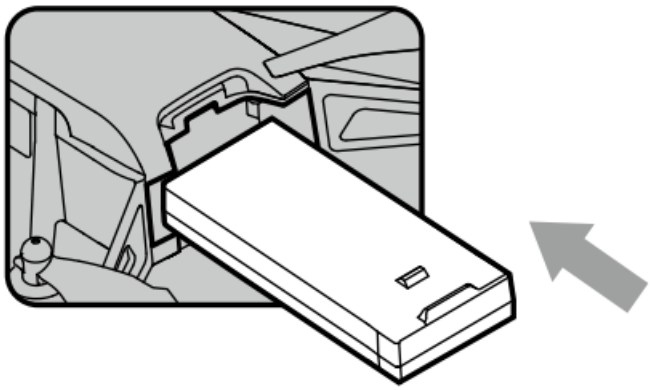
Downloading the Tello App and Watching Tutorial Videos

Search for “Tello” on the App Store or Google Play or scan the QR code to download the app on your mobile device. To ensure flight safety, watch the tutorial videos on the official Ryze Tech website (**http://www.ryzerobotics.com**) before your first flight.

Operating system compatibility: iOS v9.0 or later; Android v4.4 or later.
Only use the Tello app for activation.

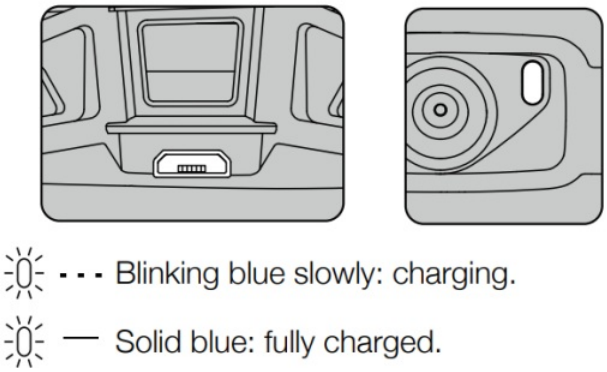
Charging the Battery

Insert the Flight Battery into the aircraft as shown.



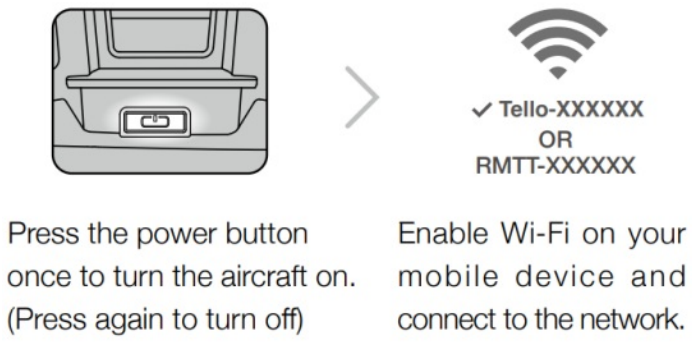
To charge the Flight Battery connect the Micro USB port on the aircraft to a USB adapter (not provided) using a standard Micro USB cable.

Charging time: Approx. 1 hour and 30 minutes.



- Always use an FCC/CE (depending on location) certified USB adapter that is rated at 5 V and 1.5 A or above.
- Ensure the aircraft is powered off before charging. It cannot be charged when it is turned on.

Preparing for Takeoff



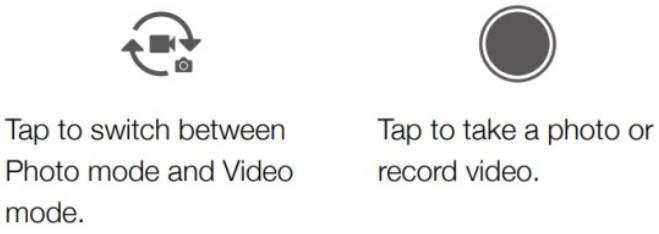
- With the open-source controller connected, the Wi-Fi network is RMTT-XXXXXX. The Wi-Fi network is Tello-XXXXXX without the open-source controller connected.
- Launch the Tello app. Connection has been established when the Aircraft Status Indicator blinks yellow slowly and the live camera view is shown on your mobile device.

Flight

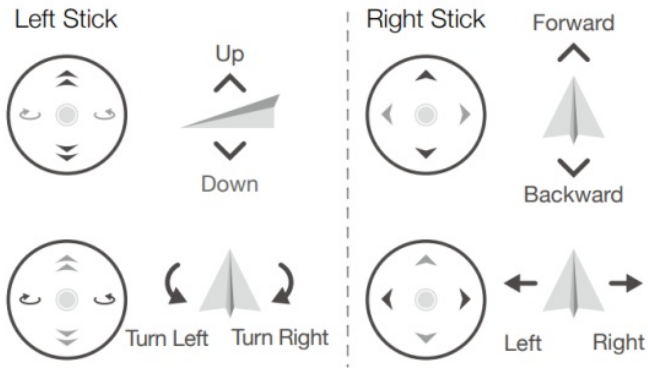
In the Tello app:

- Auto Takeoff and Auto Landing

- Taking Photos and Recording Videos



- Use the Virtual Joysticks in the app to control the aircraft (the default control stick mode is known as Mode 2)



Programming with Tello

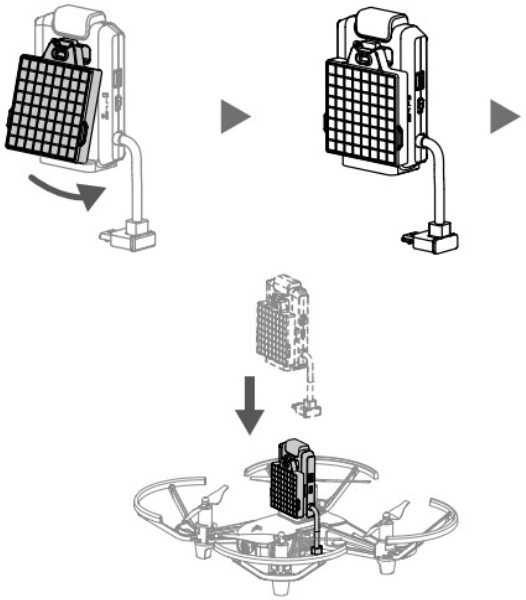
The RoboMaster TT Tello Talent can be programmed in several ways. Use the Tello EDU app for programming when using a mobile device. Scan the QR code to download the app on your mobile device or search for “Tello EDU” on the App Store or Google Play. Visit **https://www.dji.com/robomaster-tt** for more information about using computer program software to program the RoboMaster TT.

- The Tello Edu app is compatible with iOS 10.0 (or later) or Android 4.4 (or later).
- Users should be confident flying a Tello before they use the Tello Edu app to learn about programming. Please note that the Tello app and Tello Edu app cannot connect to the Tello simultaneously. Exit one app before using

the other.

Using the Open-Source Controller and Dot-Matrix Display & Distance-Sensing Module

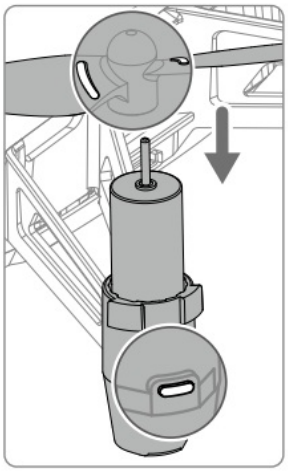
Attach the dot-matrix display & distance-sensing module to the open-source controller and attach the opensource controller to the aircraft. Program via the Tello EDU app or computer program software for DIY flight.



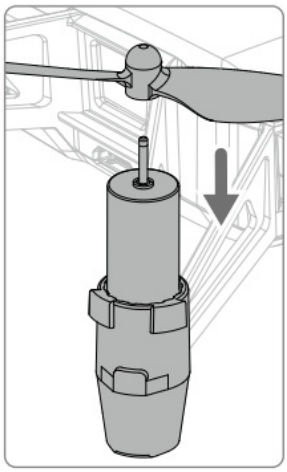
Installation Notes

Installing the Propellers

When mounting, ensure that the gap between the bottom of the propeller cap and the motor is no bigger than needed to insert the propeller removal tool.



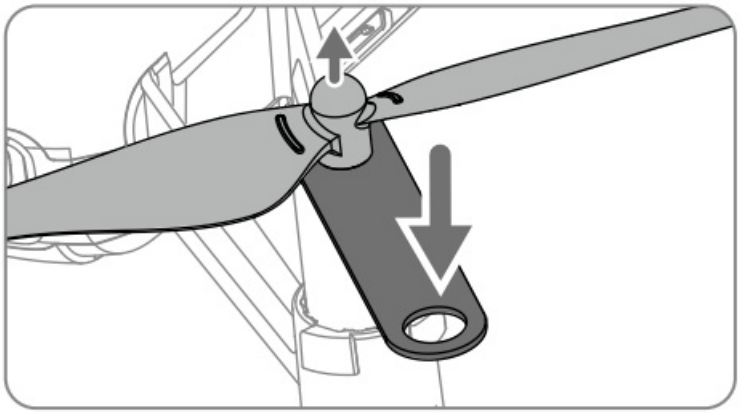
Mount **marked propellers** on the motors with **marked** landing gear.



Mount **unmarked propellers** on the motors with **unmarked** landing gear.

Detaching the Propellers

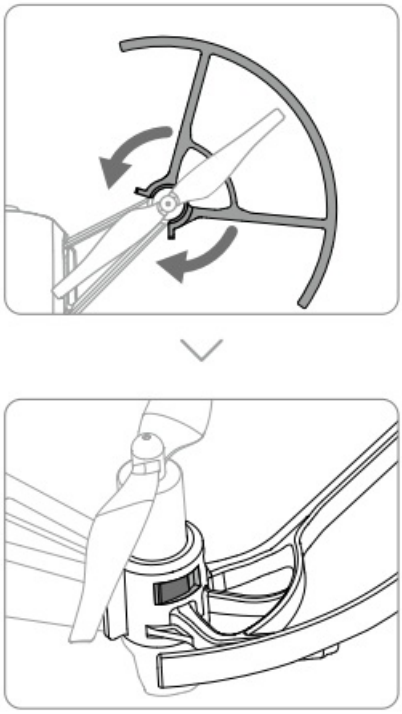
Insert the propeller removal tool between the propeller cap and the motor. Be sure to hold the motor while detaching the propeller.



Always detach the propellers using the propeller removal tool. DO NOT remove the propellers by hand, or you may be seriously hurt, and may damage the motors.

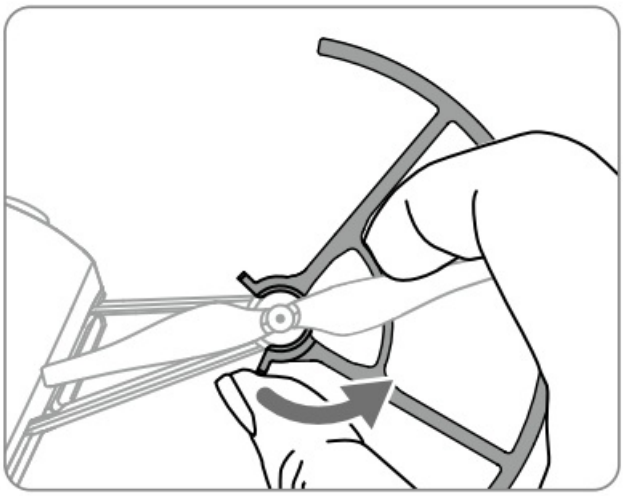
Installing the Propeller Guards

Push each propeller guard inwards to wrap it around the landing gear. Make sure it clicks into position and that the protruding parts of the landing gear securely fit into the notches on the propeller guards.



Detaching the Propeller Guards

To remove a propeller guard place your finger and thumb as shown in the figure below. With your thumb, gently apply a twisting force to the lip that protrudes from the propeller guard where it wraps around the landing gear.



DO NOT use excessive force when removing propeller guards as doing so may damage the aircraft's arms and you may get hurt.

Specifications

Aircraft

Tello (Model: TLW004)

- Weight (Propeller Guards Included): 87 g
- Max Speed 17.8 mph (28.8 kph)
- Max Flight Time 13 minutes (0 wind at a consistent 9 mph (15 kph))
- Operating Temperature 32° to 104° F (0° to 40° C)
- Operating Frequency 2.4 to 2.4835 GHz
- Transmitter (EIRP)
  20 dBm (FCC)
  19 dBm (CE)
  19 dBm (SRRC)

Camera

- Max Image Size 2592×1936
- Video Recording Modes HD: 1280×720 30p
- Video Format MP4

Flight Battery

- Capacity 1100 mAh
- Voltage 3.8 V
- Battery Type LiPo
- Energy 4.18 Wh
- Net Weight 25±2 g
- Charging Temperature Range 41° to 113° F (5° to 45° C)

- Max Charging Power 10 W

Expansion Kit

Open-Source Controller

- Model RMTTOC
- Operating Mode Direct Connection Mode, Router Mode
- Wi-Fi 2.4 GHz , 5.8 GHz*
- Transmitter (EIRP) 2.4 GHz:
  <18.5 dBm(FCC/SRRC/ MIC)
  <17 dBm(CE)
  5.8 GHz:
  <15 dBm(FCC/SRRC)
  <13 dBm(CE)
- Bluetooth 2.4 GHz
- MCU ESP32-D2WD, Dual-Core Main Frequency: 160 MHz, Calculation ability: 400 MIPS
- Open-Source Supports SDK, Arduino, Scratch and MicroPython
- Expansion 14-pin expansion port (I2C, UART, SPI, GPIO, PWM, power source)
- LED Full Color LED

Dot-Matrix Display & Distance Sensing Module

- Dot-Matrix LED Red and blue LED 8×8
- Dot-Matrix Driver function IIC data port, auto dotmatrix scan, adjustable 256 global brightness, adjustable single-pixel red and blue LED 256 brightness
- Distance Sensing Module TOF
- Maximum Sensing Distance of TOF 1.2 m (indoors with white wall)

Extension Board

- **DIY Connection :** 14-pin extension port to 2×7 pin, 2.54mm dual in-line package, two reserved positions for 5V/3.3V power indicators, two reserved positions for test indicators

Only 2.400-2.4835GHz available in Japan.

For more information, read the User Manual:
https://www.dji.com/robomaster-tt

This content is subject to change without prior notice.

Documents / Resources

	RYZE RMTTOC2010 Robomaster TT Minor Controller [pdf] User Guide RMTTOC2010, SS3-RMTTOC2010, SS3RMTTOC2010, RMTTOC2010 Robomaster TT Minor Controller, RMTTOC2010, Robomaster TT Minor Controller

References

- Home - Know Before You Fly
- Tello Official Website-Shenzhen Ryze Technology Co.,Ltd.
- RoboMaster TT - DJI
- RoboMaster TT - DJI