emesent

DJI M210 PREPARATION FOR HOVERMAP OPERATION

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Using this manual

Hovermap is a powerful system that can be used as a Lidar mapping payload but also as an advanced autopilot for drones. It is therefore recommended to read the user manual thoroughly to make use of all its capabilities in a safe and productive way.

Disclaimer and safety guidelines

This product is not a toy and must not be used by any person under the age of 18. It must be operated with caution, common sense, and in accordance with the instructions in the user manual. Failure to operate it in a safe and responsible manner could result in product loss or injury.

By using this product, you hereby agree that you are solely responsible for your own conduct while using it, and for any consequences thereof. You also agree to use this product only for purposes that are in accordance with all applicable laws, rules and regulations.

The use of Remotely Piloted Aircraft Systems (RPAS) may result in serious injury, death, or property damage if operated without proper training and due care. Before using an RPAS, you must ensure that you are suitably qualified, have received all necessary training, and read all relevant instructions, including the user manual. When using an RPAS, you must adopt safe practices and procedures at all times.

Warnings

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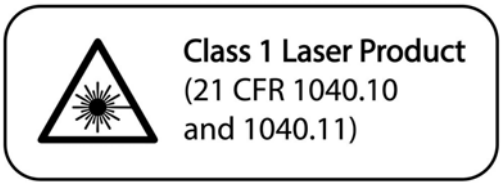
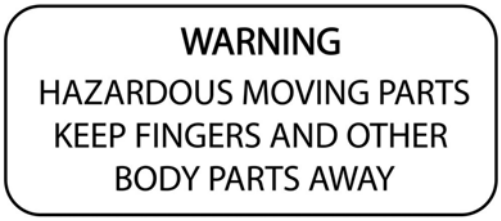
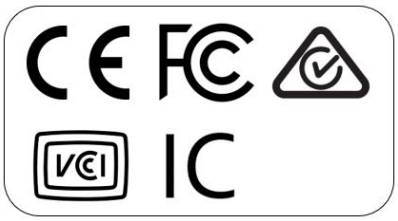
- Always be aware of moving objects that may cause serious injury, such as spinning propellers or other components. *Never* approach a drone while the propellers are spinning or attempt to catch an airborne drone.





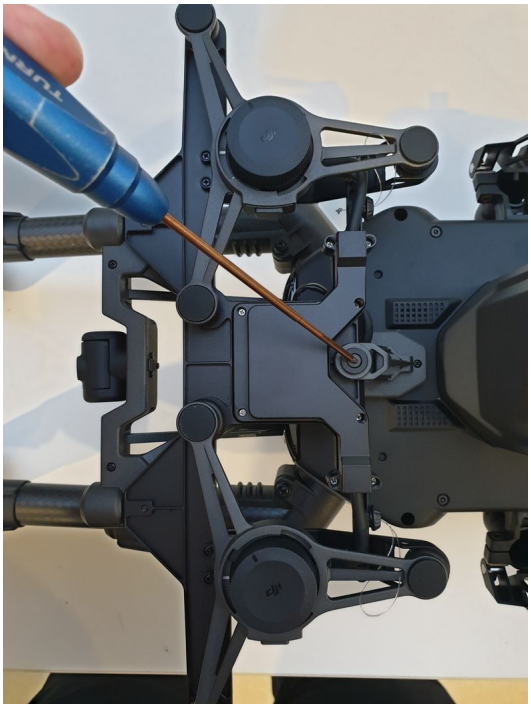


Contents

1. DJI M210 setup

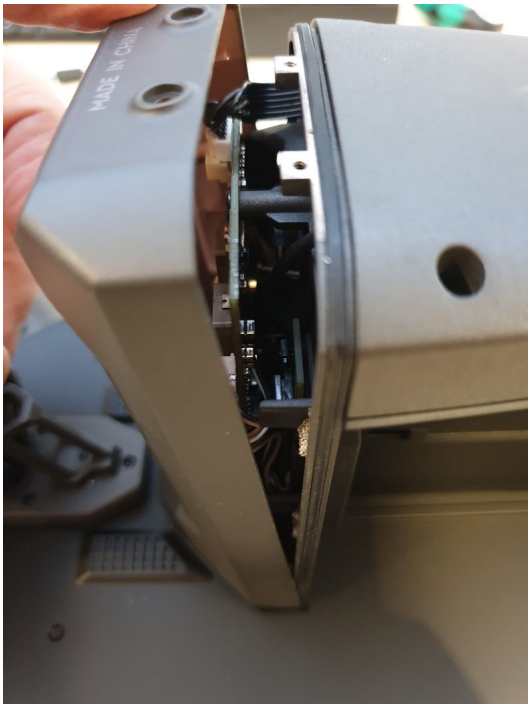
Install the power tap cable as follows:

1. Remove all unnecessary equipment (props, landing gear, batteries).
2. Position the DJI M210 upside down on your workbench.
3. Remove the standard camera gimbal from the front of the DJI M210.
4. Using a 2.0 mm hex driver, remove the three screws, one from the bottom and two from the top.
5. Carefully lift the gimbal mount away from the DJI M210. Refer to the following images.

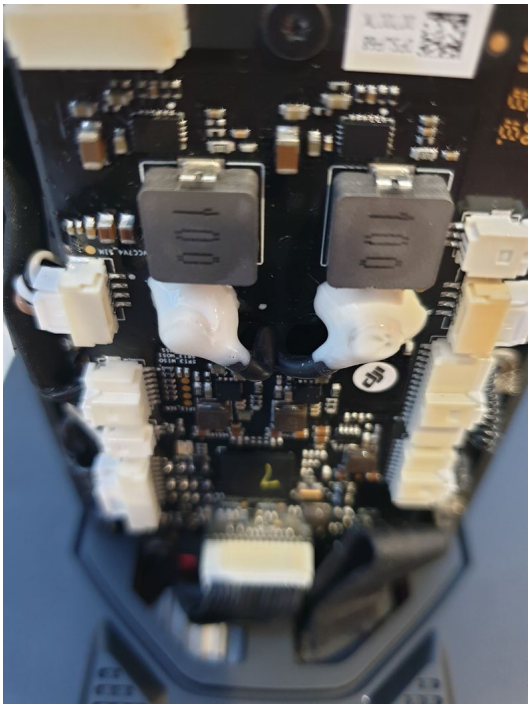


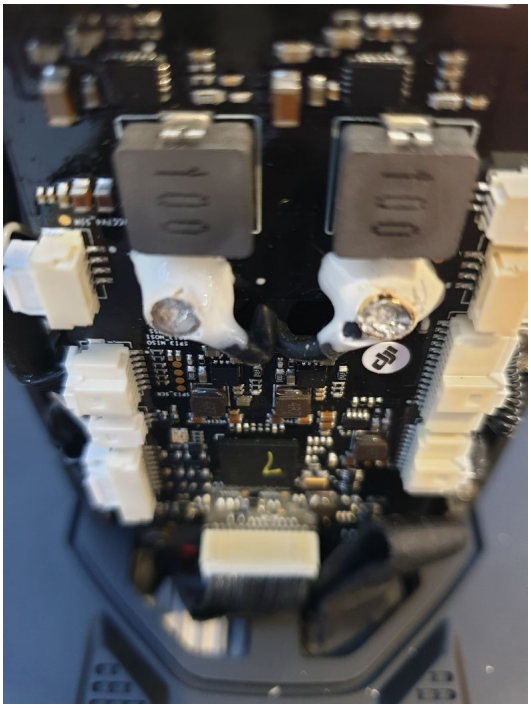
6. Remove the six PH#0 fasteners from inside both sides of the battery tray (three per side).
7. Remove the two TX-6 fasteners from under the battery tray.

8. Remove the cover plate from the power distribution board (PDB) by pulling up and away from the drone.



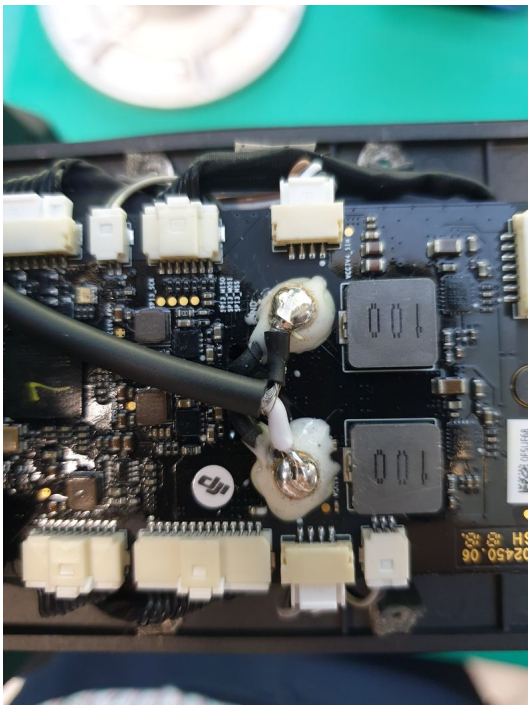
9. Locate the power terminals on the PDB. Identify which is VCC and which is GND. If the solder cups are obscured by insulating glue, uncover them with a pointy implement.





10. Strip 20 mm of insulation from the outside of the supplied coaxial power cable, being careful not to damage the shielding.
11. Strip 5 mm of insulation from the core conductor. Twist and tin the core conductor and the shield.

12. Trim the core conductor to a suitable length, and solder to the VCC terminal on the PDB.
13. Position the cable between the two large inductors to ensure it is central.
14. Trim the shield conductor to a suitable length and solder to the GND terminal.



15. On the inside of the plastic PDB cover plate, locate the ejection pin mark around the middle of the cover.
16. Drill it out using a 6 mm drill bit. Use a 3 mm pilot hole to prevent the plastic from cracking.
17. Insert the supplied 5.5 mm grommet and feed the power cable through. Use silicone oil to lubricate if the cable binds in the grommet.
18. Once the power cable has been pulled the whole way through, strip 20 mm of insulation from the outside of the power cable, and 5 mm from the core conductor, making sure not to damage the shield.
19. Twist and tin the conductors.
20. Solder the wires to the correct terminals on the PDB.
21. Secure and insulate the cable inside the housing by covering the terminals and the cable run between them with a suitable insulating glue (hot glue, epoxy, silicone).
22. Reinstall the PDB cover plate using the two TX-6 fasteners on the outside, and six PH#0 inside the battery tray.

2. Set up the mount for the Samsung Galaxy tablet

Attach the mount receiver to the Samsung Galaxy tablet case as follows:

> **Note**
> The Samsung Galaxy tablet is shipped with an Australian power adapter. If you are not located in Australia, you can charge the tablet through the controller.

1. Bring together the following components:
   - The case
   - Aluminum mount
   - M3 x 6 mm screws (provided)
   - A drill
2. Print and follow the instructions in the drill template to drill holes in the correct location on the case.
3. Screw on the mount, as shown in the following images.

4. Clip your case back onto your tablet. You will now be able to either mount your tablet to the controller (via the clamp-mount) or hold it comfortably by the velcro strap. Refer to the following images.

5. Connect the tablet to the controller using a USB cable.
6. If have any trouble completing the mounting procedure, contact Customer Success for advice.

3. Compatible drones and firmware

3.1 Drone firmware supported by Hovermap

Table 1 Hovermap-supported drone firmware

Drone	Latest approved firmware
DJI M210 v1	V01.02.0450 (10 December 2019)
DJI M210 RTK	V01.02.0450 (10 December 2019)

3.2 DJI M210 drone activation

If you are using a new drone, it needs to be activated, configured, and prepared for standard operations, as per the DJI instructions. We recommend that you read DJI's user manual, and ensure that you have a good working knowledge of local and federal regulations for safe operations in your region.

Warning

- Drone settings may be reset after a DJI firmware update.
- Do not upgrade your drone beyond the Emesent-approved firmware version.
- Recheck all settings after updating firmware.
- You are responsible for safe operation and compliance with local regulations.

3.2.1 Install DJI Assistant 2

The DJI onboard software development kit (SDK) enables communication between the Hovermap and the drone. To enable this, you will need to do the following:

1. Download the DJI Assistant 2 software from the DJI website and install it on your computer.
2. Log into your DJI account
3. Ensure that the first four options under the settings tab are turned on.
4. Go to the Settings tab and turn on the following options:
    - User account information
    - DJI device serial number
    - Payload SDK Product ID and License information
    - Onboard SDK APP ID

3.2.2 DJI SDK configuration

Configure the onboard SDK for the DJI M210 as follows:

1. Connect the drone to your computer with the DJI-supplied USB cable.
2. Toggle the **USB Mode Switch** at the back of DJI M210 to the left (laptop icon) to power on the drone.
3. Launch DJI Assistant 2.
4. Click on the drone name to configure the settings.
5. On the **Firmware** tab, ensure that the drone has the latest firmware that is supported by Hovermap. Refer to Table 1.
    a. If the drone's firmware version is *behind* the version supported by Emesent, log in to your DJI account and click **Upgrade**.
    b. If the drone's firmware version is *ahead* of the version supported by Emesent, downgrade to the one supported by Emesent, if possible, or contact Customer Success.
6. On the **SDK** tab, configure the following settings:
    - **Enable API Control:** Checked
    - **Ground Station Status:** Checked
    - **Enable SDK Failsafe Action:** Checked

- **Baud Rate:** 921600
- **Remote Controller Channel Data:** 50 Hz
- **SDK Failsafe Action:** Return Home

7. All other parameters are set by Hovermap when it is turned on.
8. In DJI Assistant 2, click **Back**.
9. Reboot the drone.
10. Restart DJI Assistant 2.
11. Check that the SDK settings have been saved.

3.2.3 Initial DJI settings

1. Use DJI Go 4.0 to connect to the drone.
2. On the DJI CrystalSky, launch DJI Go 4.0.
3. Allow any updates during start-up.
4. In the three-dot menu at the top-right of the screen, set the following:
   a. On the **Main Controller Settings** tab:
      i. **Multiple flight modes:** On
      ii. **Set Max Height:** 119 m
   b. On the **Visual Navigation Settings** tab, disable all functions.
   c. On the **Aircraft Battery** tab, disable **Smart Return to Home**.
5. Close DJI Go 4.0.

3.2.4 DJI SDK activation

SDK activation only needs to be done once per drone. Register and activate the onboard SDK application as follows:

1. Connect the DJI CrystalSky to the controller.
2. Power on the controller.
3. Connect the DJI CrystalSky to Wi-Fi.
4. Power on the drone.
5. Connect the drone with Hovermap using the Emesent-supplied serial and power cables.

6. On the DJI CrystalSky, open DJI Go 4.0.
7. Press the power button on the Hovermap to start a scan.
8. Let the scan run for 2 minutes.
9. Wait for the **DJI Onboard SDK Activation Successful** message.
10. Power off the drone and the controller.
11. Power on the drone again.

3.2.5 Mobile SDK activation

SDK activation only needs to be done once per mobile device. Perform the activation as follows:

1. Power on the device.
2. Install the Emesent Hovermap App.
3. Connect the device to an internet-accessible network.
4. Open the Hovermap App. Ensure that you use the correct version for your device.
5. Fill out the End User License Agreement.
6. Wait for the **Mobile SDK Activation Successful** message.
7. Connect to Hovermap Wi-Fi.

3.3 Sanity check for Hovermap communications

Perform a quick sanity check to ensure that the drone, Hovermap, and controllers are configured correctly, and that communications between the drone and Hovermap have been established.

1. Mount Hovermap to the drone and connect the power and the serial cables.
2. For operations in Autonomous Waypoint mode, connect the Samsung Galaxy tablet to the controller.
3. Power up the controller.
4. Power up the drone.
5. Wait for the DJI happy chirp, and then power on the Hovermap.
6. When prompted, open the Hovermap App, or touch once and select **Only once**.
7. Connect to the Hovermap Wi-Fi network and start a scan.

8. Ensure that the correct status is indicated in the top-right corner. If there are any error messages, resolve these as required. It should say:
    - For Mapping mode: **AL0 - Mapping** (shown on a gray background).
    - For Pilot Assist mode and Autonomous Waypoint mode: **Ready-SLAM** (shownon a blue background).

> **Note**
> The blue **Ready-SLAM** status can take up to a minute. It may cycle through several different statuses beforehand.

The drone and Hovermap are now ready to fly.

3.4 Troubleshooting

Table 2 Hovermap Supported Aircraft Firmware

Problem	Solution
120 m AGL warning	This warning occurs when the ceiling height has been set to 120 m above ground level (AGL). To solve this, change the height setting to 119 m.
If unsuccessful	Click the status indicator in the top-right corner. Take a photo of any warnings or cautions. Contact Customer Success, attaching the photo.

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