

# Using Manifold to Control Matrice 100

This article provides information about how to control Matrice 100 via the Manifold and procedure on how to using the UART port on Manifold to acquire data from Matrice 100.

## How to Connect

Connect the Manifold to the Matrice 100 via the supplied 6-pin UART cable. Connect the UART 2 port on the Manifold to the UART\_CAN 2 port on the Matrice 100.

## Downloading Drivers and Installer

Visit <https://developers.dji.com/> , download and install the following applications before using the Manifold and Matrice 100 for development.

### 1. DJI WIN Driver Installer

Connect Matrice 100 to a computer via a USB cable before launching the WIN Driver Installer.

### 2.DJI PC Simulator Installer

Install DJI PC Simulator on the computer to run simulation for app that is intended to deploy on the Matrice 100 and Manifold. DJI PC Simulator provides a virtual environment to reflect how the Matrice 100 will behave when it is being controlled by the DJI SDK.

### 3. N1 Assistant Installer

Enable DJI SDK API and set up UART frequency rate on the Matrice 100 from the NA Assistant.

## Demo

Set up the work space according to the instructions at the ROS official website([http://wiki.ros.org/catkin/Tutorials/create\\_a\\_workspace](http://wiki.ros.org/catkin/Tutorials/create_a_workspace) ). Run the following commands to download and compile the demo.

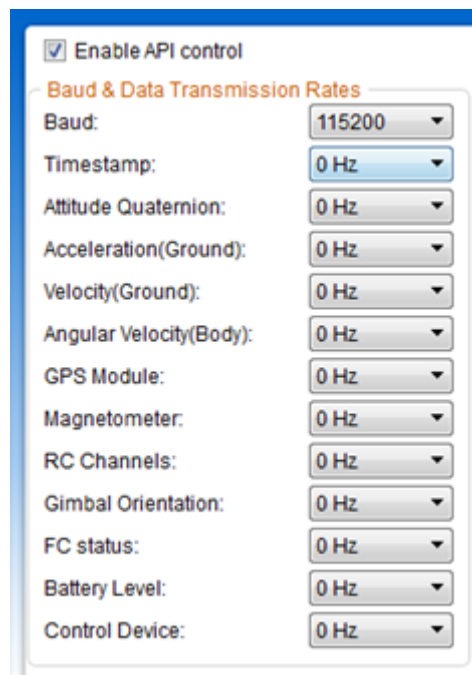
```
$ cd ~/Downloads
$ git clone https://github.com/dji-sdk/Onboard-SDK.git
onboard
$ cp -R
onboard/Onboard_SDK_Sample/DJI_Onboard_API_ROS_Sample
~/catkin_ws/src/dji_ros
$ cd ~/catkin_ws
$ catkin_make
```

## Preparing the Matrice 100

Maintain the connection from the Matrice 100 to the Manifold while running the demo. Ensure that the UART port on the Manifold is connected to the UART\_CAN2 port on the Matrice 100.

## Enabling DJI SDK API

Power on the Matrice 100 and connect it to a computer. Launch N1 Assistant from the computer, locate the following page from the main GUI.



It takes approximate 1 minute to load all the values.

## Setting Demo

Download the demo program from this link (<https://developer.dji.com/manifold/downloads/>). Note that DJI SDK activation information is required when configuring the demo app. Following the steps below to configure the demo.

1. Locate the “sdk\_demo.launch” file and open it:

```
$ rosd dji_ros sdk_demo.launch
```

Locate the <launch>tag:

```
<launch>
  <node pkg="dji_ros" type="dji_ros" name="dji_ros"
    output="screen">
    <!-- node parameters -->
    <param name="serial_name" type="string"
value="/dev/ttyUSB0"/>
    <param name="baud_rate" type="int" value="230400"/>
    <param name="app_id" type="int" value="10086"/>
    <param name="app_api_level" type="int" value="2"/>
    <param name="app_version" type="int" value="1"/>
    <param name="app_bundle_id" type="string"
value="12345678901234567890123456789012"/>
  </node>
</launch>
```

```
<param name="enc_key" type="string" value="DJI-DEMO
AES256 KEY-lala-haha-MA"/>
</node>
</launch>
```

Set appropriate values for the following tag to accommodate your development requirements:

- **"serial\_name"**: Device name for the serial port. The default device name of serial port is /dev/ttyTHS1.
- **"baud\_rate"** : Fill in value that matches with the value set in the DJI OnBoard SDK configuration file. The default value is 230400.
- **app\_id, enc\_key, app\_api\_level**: Fill in the App ID and Encryption Key and Level of the corresponding DJI Developer account.
- **app\_version** and **app\_bundle\_id** is reserved value.

## Launching Matrice 100

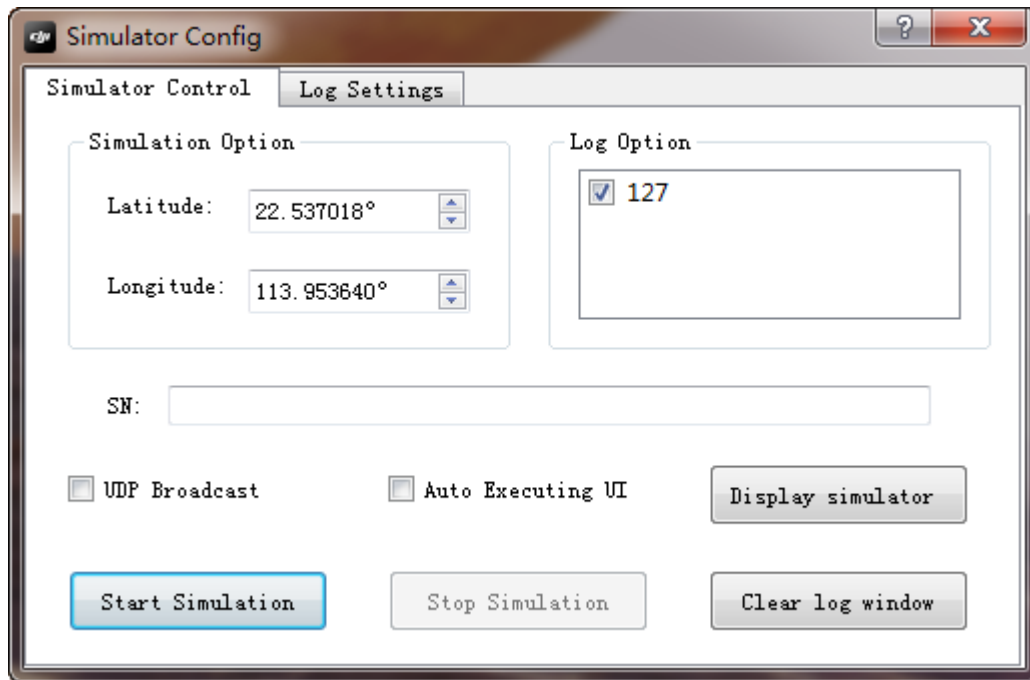
### Connecting DJI GO app

Install the latest version of DJI GO app to the mobile device and then connect it to the remote controller.

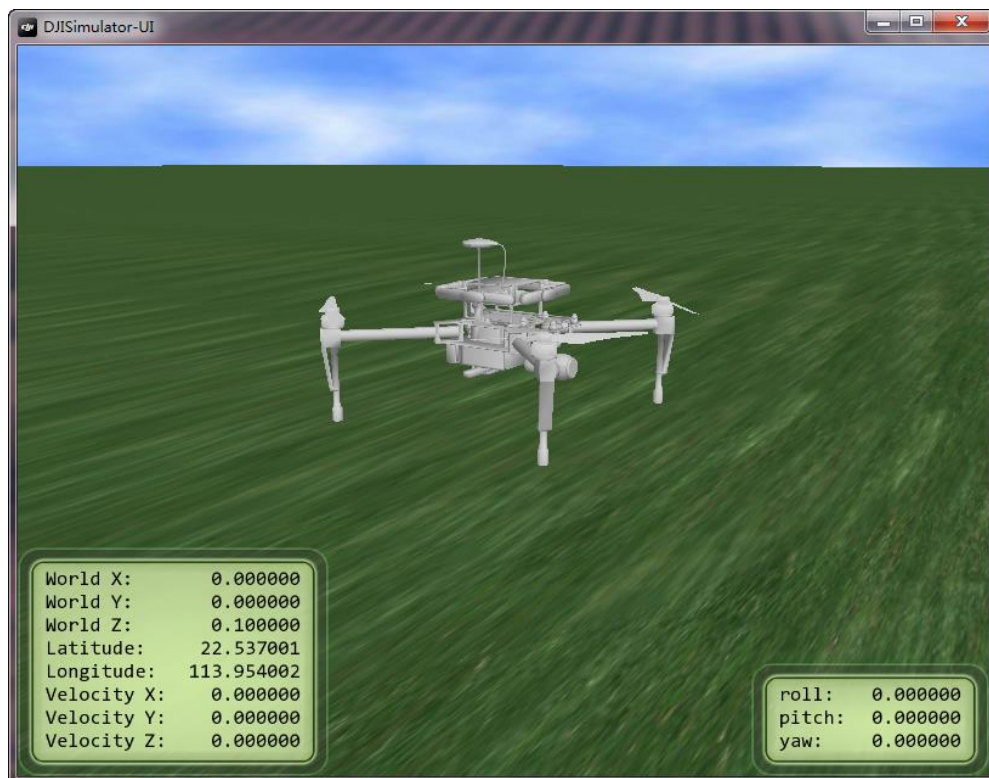
- Launch DJI GO app and enable the Intelligent Flight Mode from the camera view.
- Upon using the DJI SDK, the app sends activation request to DJI designated server through the DJI GO app. Hence it is required that the DJI GO app is installed on the remote controller and the mobile device is connected to the Internet.
- The developers are responsible for creating their own activate method and it is required to call DJI SDK interface to initiate the activation process. The DJI GO app only works as the channel between the activate program and the DJI SDK server. Ensure the DJI GO app is running at the foreground during the activation process.
- Only a single access from the Matrice 100 to the DJI SDK server is required. Matrice 100 stores the activation information after the activation is completed. There is no need to connect the Matrice 100 to the DJI GO app after the activation is completed.

### Connecting DJI PC Simulator

Connect the Matrice 100 to the computer through a USB cable. Launch the DJI PC Simulator from the computer, the following page prompts:



Click “Display simulator” button follow by “Start Simulation” button, the following page prompts:



The user should be able to control the aircraft in the DJI PC Simulator by now. Otherwise, check the connection between the Matrice 100 and the computer. The DJI PC Simulator reflects the aircraft movements and behaviors in a virtual environment. Always run a simulation from the DJI PC Simulator for your application before apply the application in physical environment.

## Running Demo Application

Root user privilege is required since the demo application needs access to the hardware device. It is recommended to add the account to dialout group.

```
$ sudo usermod -a -G dialout $USER
```

## Running ROS

```
$ roslaunch dji_ros sdk_demo.launch
```

Serial communication port will be enabled and activated after the node is launched. The following message is displayed when the communication link is working normally.

```
=====
Serial port: /dev/ttyUSB0
Baudrate: 230400
=====
Activation Successfully
```

Otherwise, check the account information or the Internet connection in the DJI GO app.

Matrice 100 will start broadcasting system status after it is activated. View the Matrice 100 system status by executing “rostopic echo” command:

```
$ rostopic echo /DJI_ROS/attitude_quad
```

```
header:
  seq: 69396
  stamp:
    secs: 1444804135
    nsecs: 369351961
  frame_id: /world
ts: 845310
q0: 0.999999642372
q1: 4.11160363001e-06
q2: 3.89829074265e-06
q3: 0.000908283982426
wx: -0.0270305760205
wy: 0.00479770218953
wz: -0.0172597616911
---
```

The attitude values change when the Matrice 100 has changed its position. Use these data to verify that the connection to verify that Matrice 100 is working normally.

## Running Client Node

Execute the following command to run the client node.

```
$ rosrun dji_ros dji_ros_client  
[ INFO] [1444802750.114888658]: sdk_service_client_test
```

```
----- < Main menu > -----
```

```
[a] Request to obtain control  
[b] Release control  
[c] Takeoff  
[d] Landing  
[e] Go home  
[f] Gimbal control sample  
[g] Attitude control sample  
[h] Draw circle sample  
[i] Draw square sample  
[j] Take a picture  
[k] Start video  
[l] Stop video  
[m] Exit
```

input a/b/c etc..then press enter key

use `rostopic echo` to query drone status

```
-----
```

input:

To control the Matrice 100, toggle the Flight Mode Switch on the remote controller to “F” . And select option “[a]” from the terminal. The following message is displayed:

```
Request ControlDJI_Pro_Control_Management_Callback,line  
511, obtain control successfully
```

To takeoff the aircraft from the simulator, select option “[c]”. Draw the flight path by selecting “[h]” or “[i]” option.

## References

Refer to the following links for more information about how to use DJI SDK API and how to run the DJI SDK demos and DJI SDK documentation.

- [1] <https://developer.dji.com/cn/matrice-100/>
- [2] <https://developer.dji.com/>
- [3] <https://developer.dji.com/onboard-sdk/downloads/>
- [4] [http://wiki.ros.org/catkin/Tutorials/create\\_a\\_workspace](http://wiki.ros.org/catkin/Tutorials/create_a_workspace)
- [5] [https://developer.dji.com/onboard-sdk/documentation/Onboard\\_API\\_introduction/#Quick%20Start](https://developer.dji.com/onboard-sdk/documentation/Onboard_API_introduction/#Quick%20Start)