

Rally Car V2.5 User Manual

This manual contains instructions to operate the rally car v2.0 powered by the NVIDIA Jetson TX2.

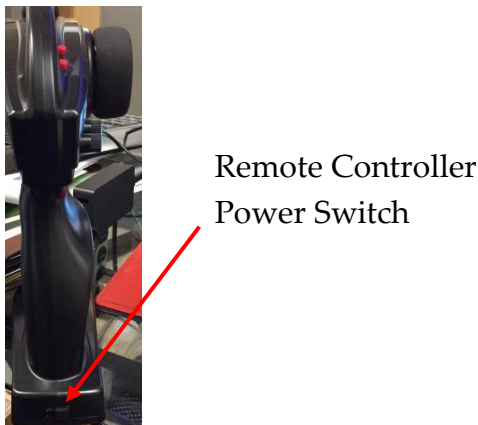
Once powered up, the steering servo and the throttle motor immediately start responding to any serial commands sent over the serial port by the NVIDIA Jetson TX2. However, the remote control (which serves as an “Emergency Power Off” – EPO) must be on and linked to the car.

To power up the Rally Car:

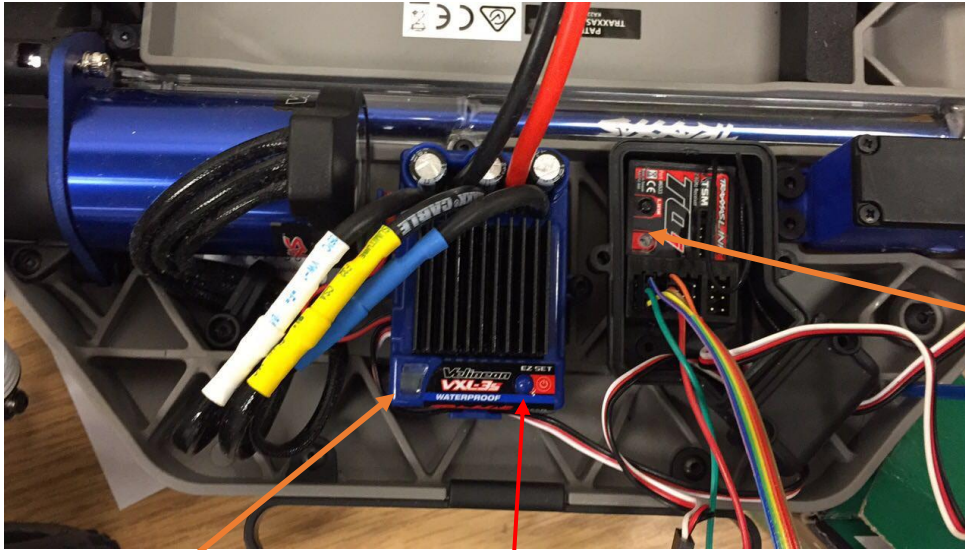
1. For initial testing, lift the Rally Car wheels off the ground and keep all wires clear of the wheels.
2. Turn the “Steering Trim” knob on the remote control all the way counter-clockwise. (This is the “emergency power off” position.)



3. Turn on the remote control power switch. The remote green LED should come on. (Always turn on the remote control before you power on the car)



4. Turn on the power button on the main amplifier. Then you can see a solid red/green LED on the main amplifier and a green LED on the radio receiver.

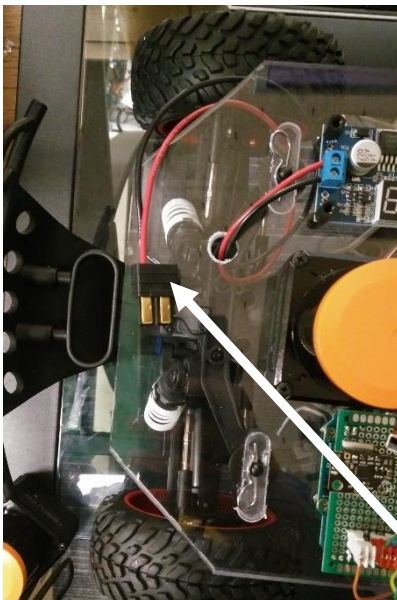


Main Amplifier LED

Main Amplifier
Power Switch

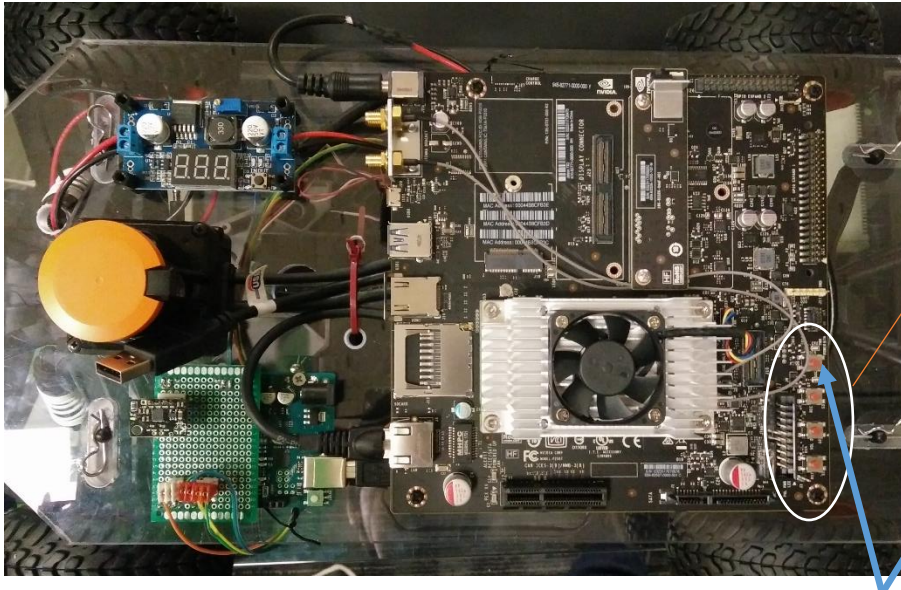
Radio Receiver LED

5. Connect the LiPo battery to the supply power connector. This powers both the Hokuyo Lidar and the Jetson TX2. Press the power button on the Jetson TX2 to boot the system.

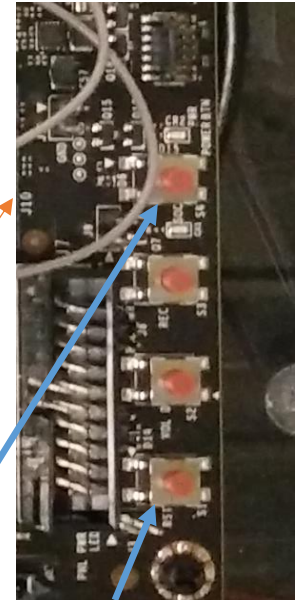


LiPo battery. Connect LiPo
connector to this battery.

LiPo connector on Car.



The Power button



Reset

6. The Jetson boots into a custom built Ubuntu 16.04. This takes around 30s. Your code starts running immediately after the system boot. Now, turn up the Steering Trim knob (EPO) to approximately 20%. This truncates the “gas pedal” command sent by the Jetson TX2.
The steering trim defines the maximum throttle possible.
If you want to restart the Jetson press the reset button on the board.
7. In emergency, turn the Steering Trim knob all the way counter-clockwise. This should turn the motors off in case of emergency. (Test this each use and report problems!)

Trouble Shooting:

1. Rally Car

If you see a red LED flashing slowly on the main amplifier, it means the battery is low. Please charge it or change to a charged one. (Reference about the LED indicators on main amplifier, https://traxxas.com/sites/default/files/3355X_3350X_manual_1.pdf)

(Reference on rally car - <https://traxxas.com/sites/default/files/74076-1-OM-EN-R01-Rally.pdf>)

If you see a red LED on radio receiver, it means it doesn't match to the remote controller. Re-bind the transmitter to the receiver.

To bind :

- Turn off the receiver and the transmitter.
- Hold the 'SET' button and turn on the transmitter. The LED on transmitter should be red and blinking.
- Then, hold the 'LINK' button on the receiver pressed and turn on the power on the main amplifier.
- Now the LED on receiver should be red and blinking. It should turn static green within 2s if it detects the transmitter.
- The LED on the transmitter also changes to static green. This means the binding was successful.

2. Jetson TX2

If it is not powering up, the battery may be low. Check the battery voltage. If the battery is fine, the Jetson TX2 may be broken. Disconnect the battery and hand over the car to Mythra.

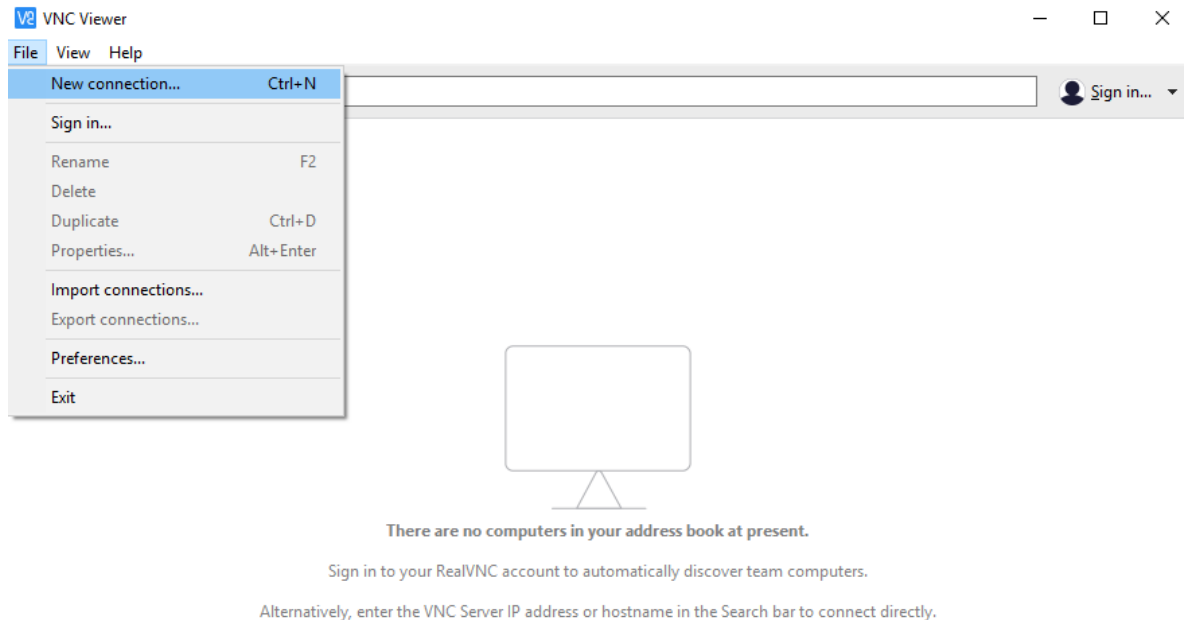
3. Arduino, IMU and wires

Please don't try to fix it yourself if you are not sure of what you are doing. Disconnect both batteries and hand over the car to Mythra.

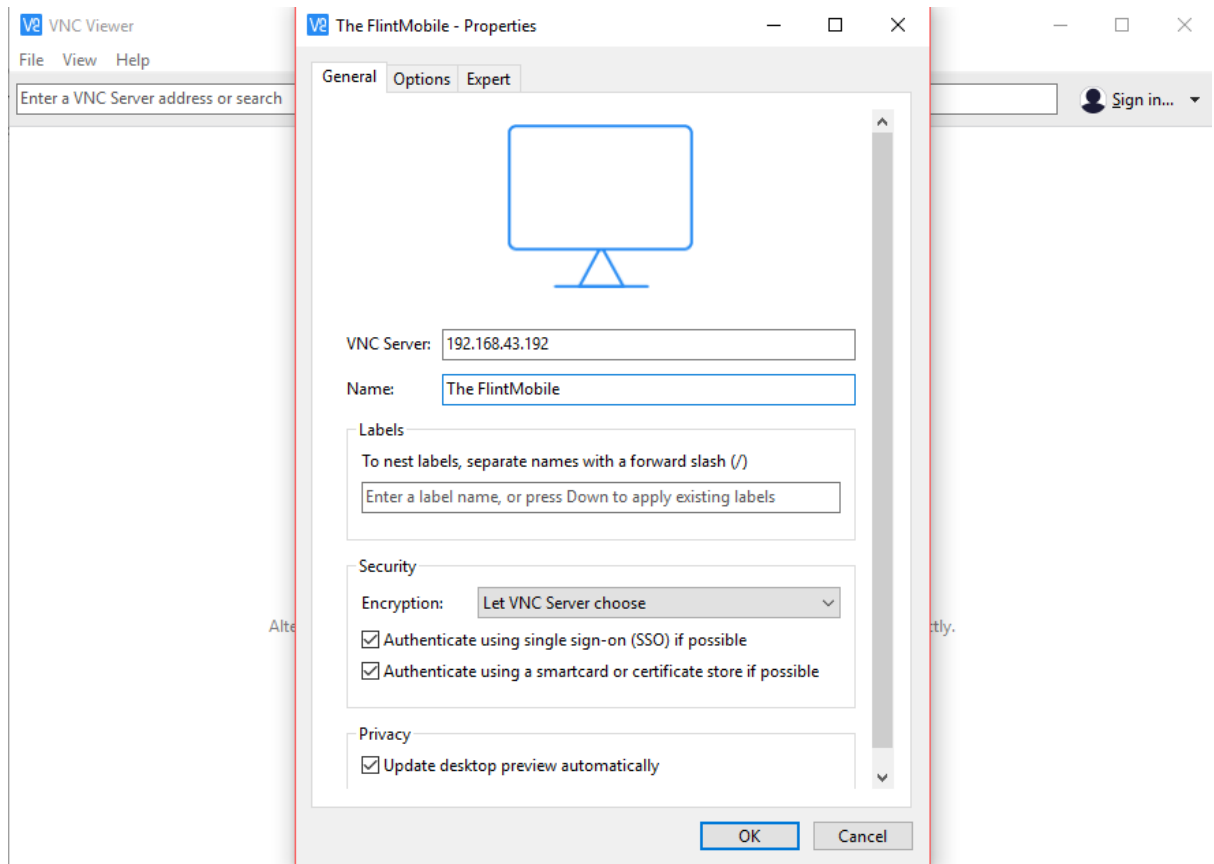
Procedure for remote desktop to rally cars

1. For systems running Windows:

- Install a VNC viewer (Real VNC Viewer)
- Run the VNC viewer, and setup a new connection with the following settings,



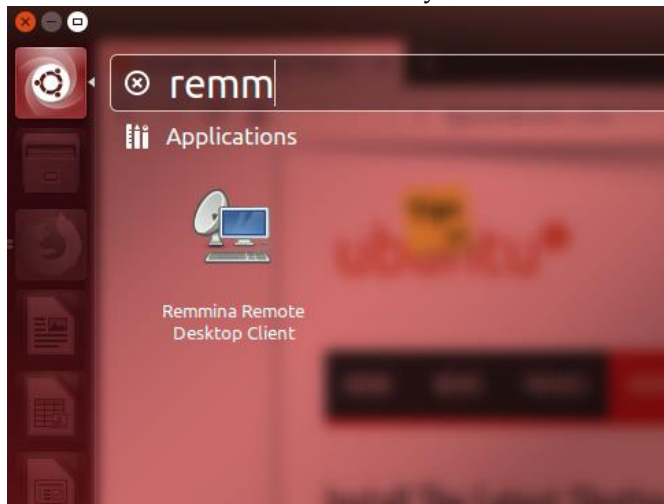
- Setup the connection using these settings,
 - VNC Server - IP address: Car 1) 192.168.43.192,
Car 2) 192.168.43.193,
Car 3) 192.168.43.194,
 - Name – Give some identifiable name (Team 1 Rally Car)
 - Switch to the 'Options' tab and set the Picture quality to low (This increases the speed of remote desktop significantly)
 - Click 'Ok', now the connection settings are setup.



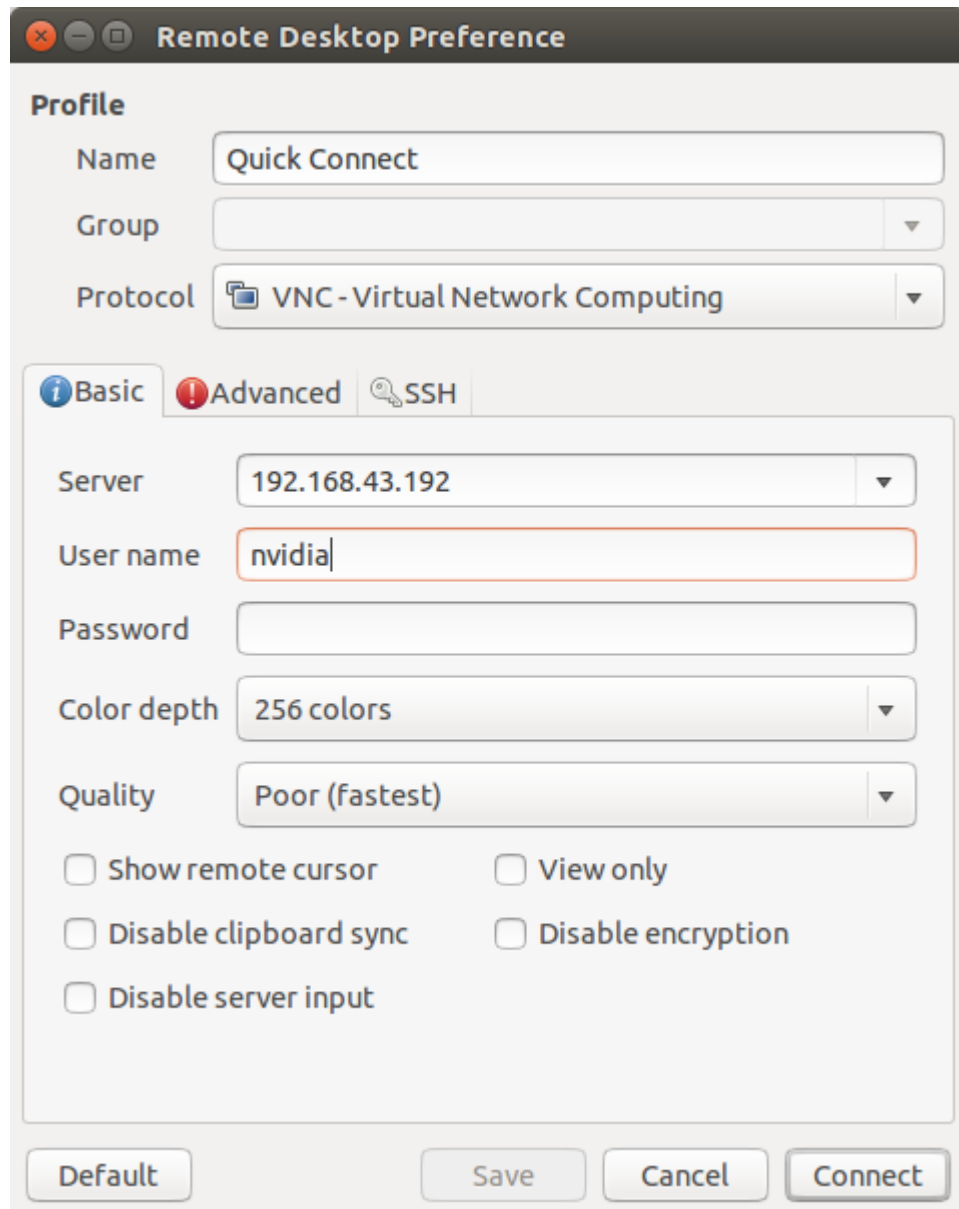
- Right click on the new connection you have setup and select 'Connect'
- It will pop up a new window asking for password. Enter the password according to the car you are working with.
- Now you are connected.

2. On Linux based Systems (Ubuntu):

- Ubuntu 14.04 and later have a pre-installed remote desktop software called Remmina remote desktop client
- Use this software to connect to the rally car
- Launch Remmina from the unity launcher



- From the 'Connection menu' select New
- Use the following settings to setup the connection
 - Protocol: Select 'VNC – Virtual Network Computing' as the protocol
 - Server: Enter the IP address of the car you are connecting to
 - Username: nvidia
 - Quality: Poor



- Now click connect, you should get a pop up window saying connecting and then asks for the password to connect to the car.
- Enter the password appropriate for the car you are connecting to.
- Now you should be connected
 - (Enable keyboard events if you want keyboard events to be transmitted)