ROS Hyundai driver and simulator installation manual

Installing the Hyundai Simulator

The Hyundai simulator is called HRSpace. You can download it by using the link below:

https://www.dropbox.com/s/xyn3ys1t3vy8q1t/HRSpace_v3_83b1.zip?dl=1

Note, that Windows is required to install this software. Please start the installation. Please make sure, that you also install the Visual C++ 2008 Redistributable package. If this package is missing, the simulator won't start. The zip file downloaded above contains the Korean version of this package, you might want to get the package that fits your operating system language.

Installing the sample config

We have prepared a sample config, so it's easy to test the initial settings. Please download using the link below:

http://git.ppm.no/Repository/2eb91bcd-2def-4672-8b4e-22f73840972e/master/Download/hyundai

Extract the downloaded files anywhere on your computer. Then open the config.hrs file found in this folder using a text editor, like notepad or notepad++ and find the following line:

```
IpAddrExt=192.168.56.1
```

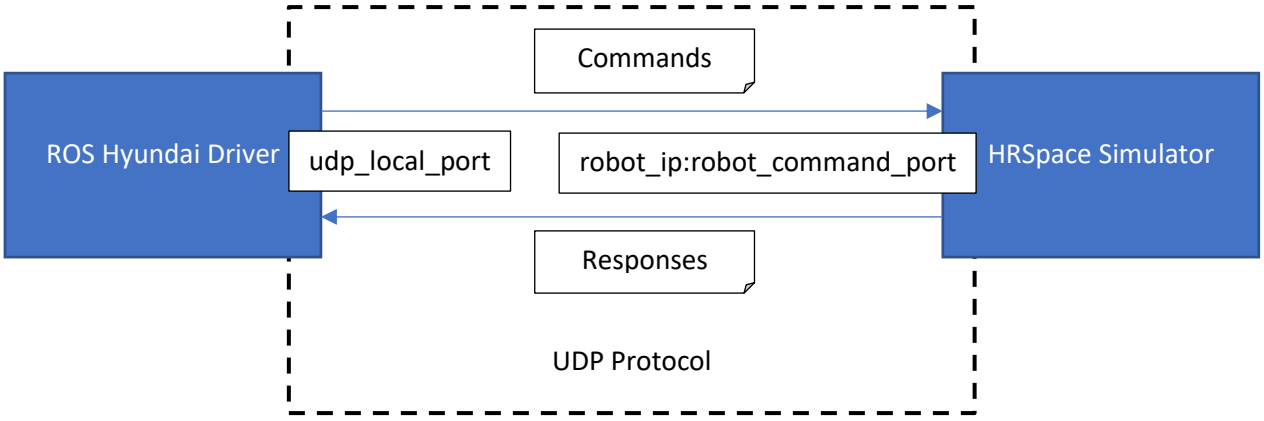
Please change the IP address to the IP of your own PC, where you are running this simulator. Save the file and close it.

Note: you can find your IP using the command:

```
ipconfig
```

In your command prompt.

Main program for command processing



The robot programs are stored inside the "robot" folder, next to the config file. Open the folder, and the 0001.JOB file in it. Look for the following lines:

```
REM This IP is the controller IP
ENET1.IP="192.168.56.1"
ENET1.RPORT=12349
ENET1.LPORT=12340
```

Modify the IP address to the IP of your PC, where the simulator is running. Also modify the ports, if you don't want to use the default configuration. RPORT means remote port, the port, where the ROS Hyundai Driver is listening (udp_local_port in rosparam). LPORT is the local port, where the simulator will listen (robot_command_port in rosparam).

Now look for the following lines:

```
REM This IP is the other party's IP
ENET1.IP="192.168.56.100"
```

And modify the IP to the address, where the ROS Hyundai Driver is running.

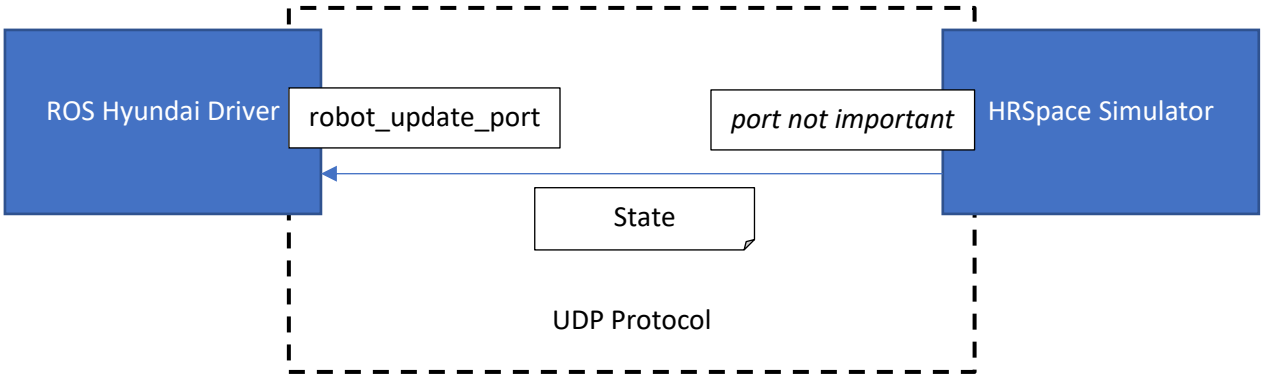
Save the file and close it.

Please note, that the default IP, where the ROS Hyundai Driver sends the data is " 192.168.1.143". If you want to use another address, use the following command to set it:

```
rosparam set robot_ip "x.x.x.x"
```

Please replace the x.x.x.x to your robot's IP address. This value is not saved, when ROS is restarted, please make sure, you save and load rosparams or include this value into your launch file.

State update program



Open now the 0002.JOB, and find the following lines:

```
REM This IP is the other party's IP
ENET2.IP="192.168.56.100"
ENET2.RPORT=12350
ENET2.LPORT=12341
```

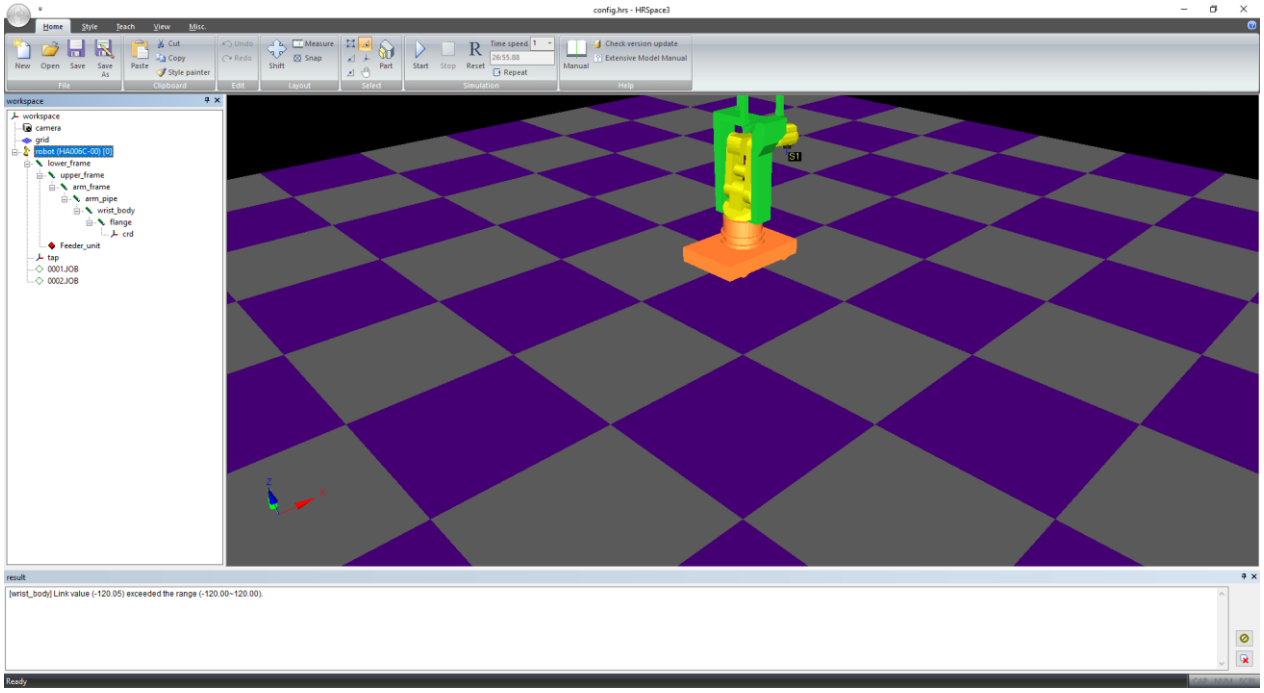
Modify the IP to the address, where the ROS Hyundai Driver is running. Also, you can modify the ports, if you don't want to use the default configuration. RPORT means remote port, the port, where the ROS

Hyundai Driver is listening (robot_update_port in rosparam). LPORT is the local port, where the simulator will listen (the value is not important, because there is no message coming).

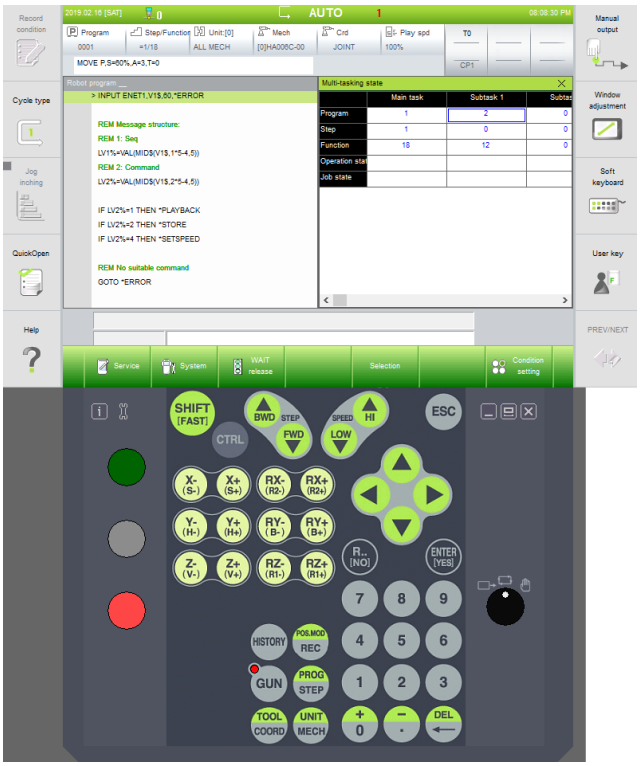
Save the file and close it.

Starting the simulation

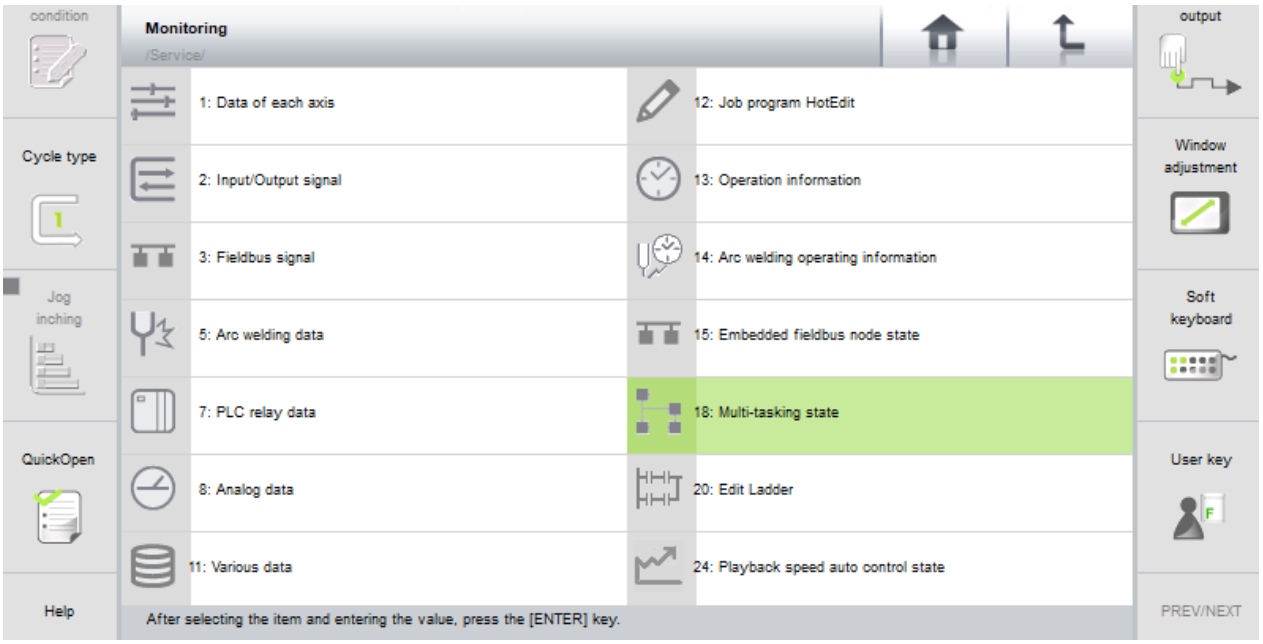
Now start the HRSpace, and open the config.hrs in it. You should see the following:



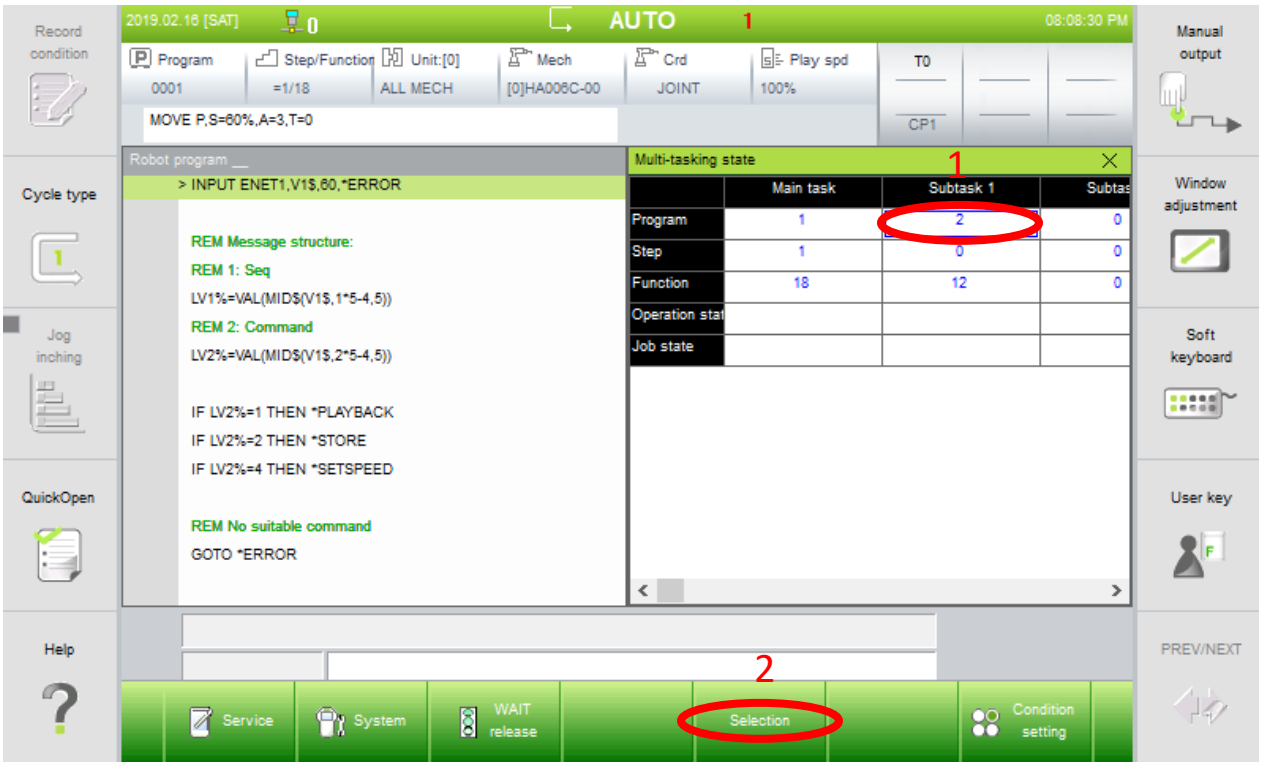
Start also the Hi5a virtual teach pendant, which will be used to control the robot. The teach pendant looks like this:



If you don't have the multi-tasking state panel on the right side, you need to enable it first by selecting the Service/Monitoring/Multi-tasking state:

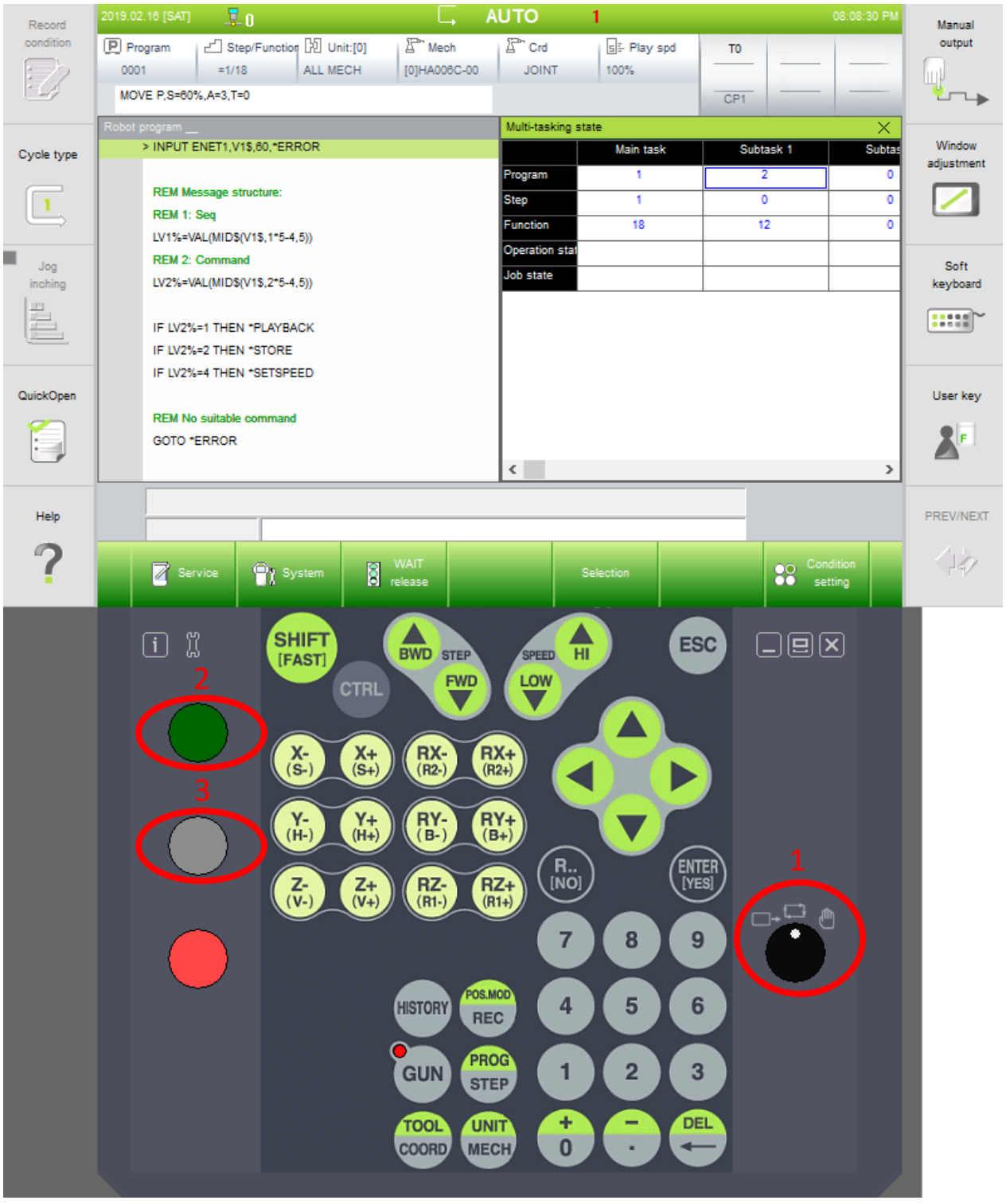


To select, which programs to run, simply click on the program of subtask 2, then the selection softkey:



Selecting the Main task will reset the subtasks, so select the main task first. Alternatively, you can use the main program selector on the soft keyboard, to select the main task.

To start both programs, switch to playback mode, start the motors, then start the execution:



If the program execution is on the line visible on the picture above (green), that means, it is waiting for a command.

Debugging

We collected a couple of examples, when the user might find difficulties, and possible steps to find the problem.

Ethernet device BIND failure

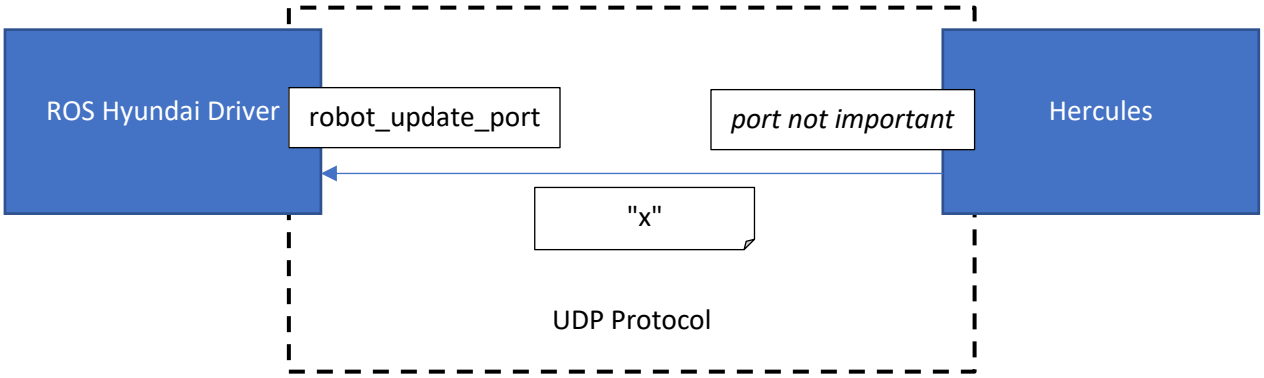
If the teach pendant shows the error message "Ethernet device BIND failure", that is printed by the update job, it means, that the simulator was unable to register the UDP port in the system. Please try to restart the simulator, then the system itself.

If this doesn't help, you can use the command:

```
netstat -a -p udp
```

To list all listening UDP ports, and find a possible collision.

Updates are not received by the ROS Hyundai Driver



You can start the ROS Hyundai Driver separately from the rest of the system, by navigating to the containing folder, then entering the command:

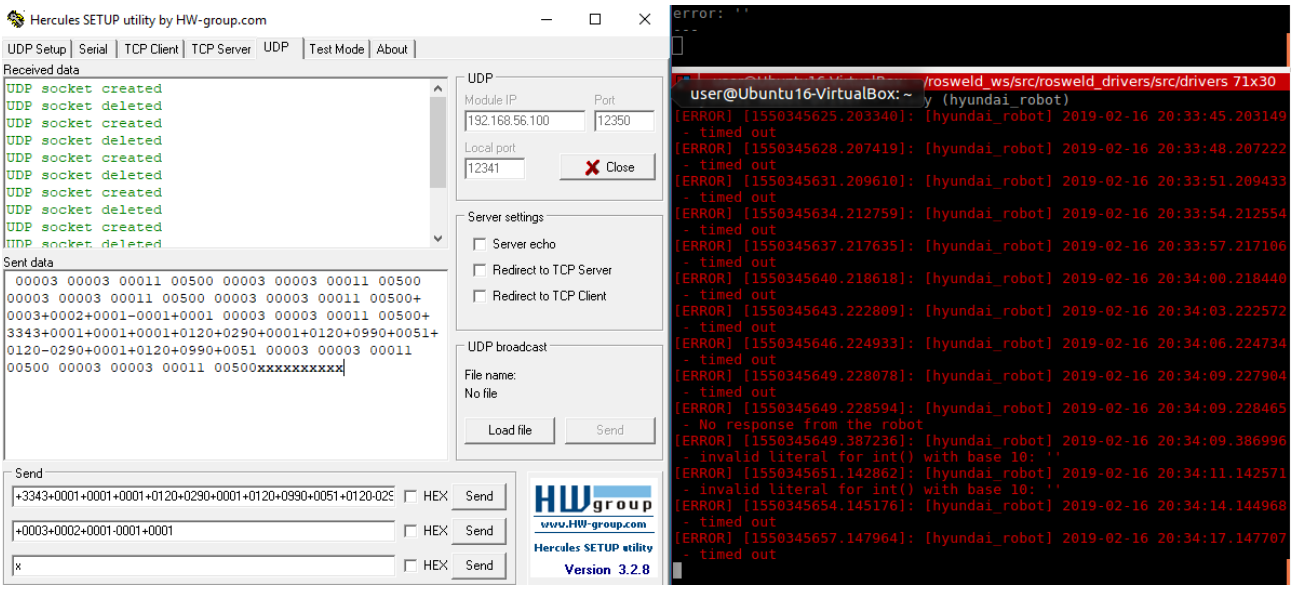
```
python hyundai_robot.py
```

This way, you will see all error messages. Now start the Hercules debugging utility, that you can download from the link below:

https://www.dropbox.com/s/wyztyxf50gu0j7l/hercules_3-2-8.exe?dl=1

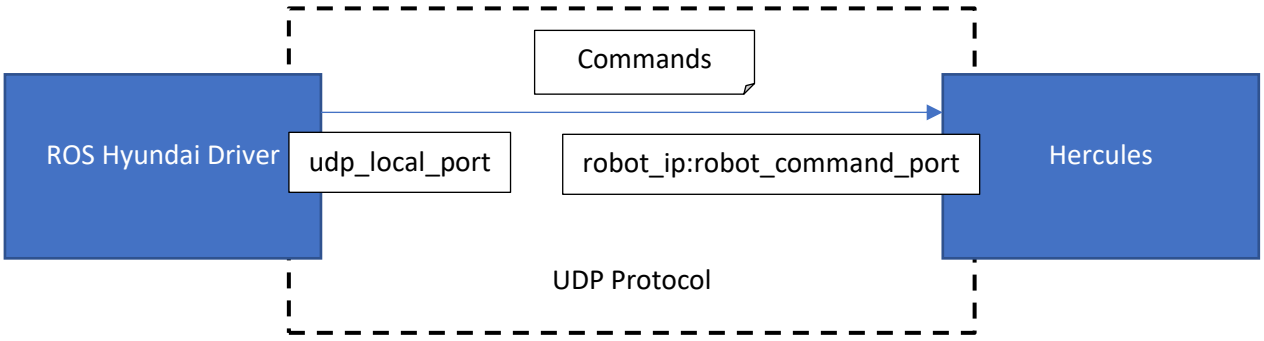
Now, select the UDP tab, enter the IP address of the ROS server into the Module IP field, the robot_update_port into the Port field. This is the target address. Also enter any port into the local port field.

Now use any of the Send buttons below, to send one character: "x". If the network is set up well, the ROS Hyundai Driver should output an error message: "Invalid literal…" on all presses.



If this happens, your Windows PC can reach the ROS PC. If not, please double check the state of your network: IPs, ports, firewalls.

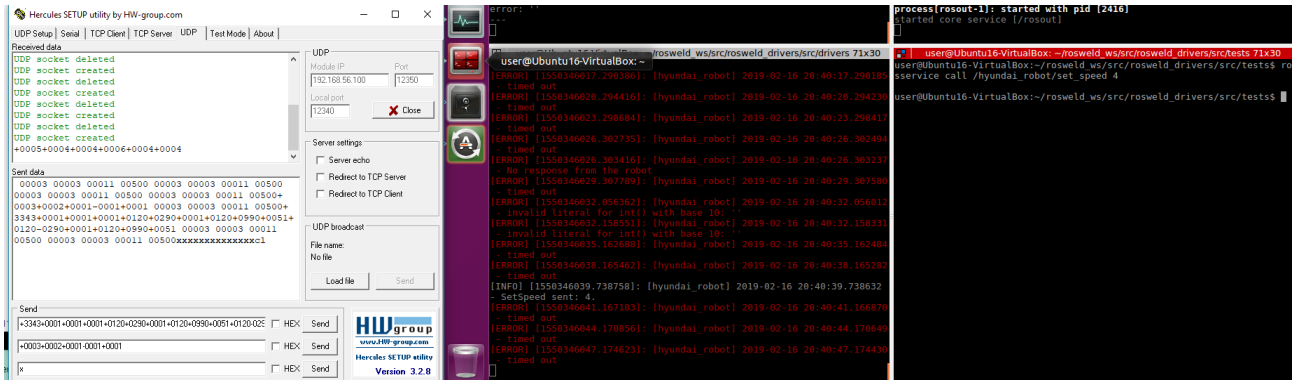
Commands are not received by the robot



Make sure, that the Hyundai simulator is not running, to avoid port binding collisions. Change the local port of Hercules to the robot_command_port, and press listen. Now, if you send a command from the ROS Hyundai Driver, using the following command:

rosservice call /hyundai_robot/set_speed 4

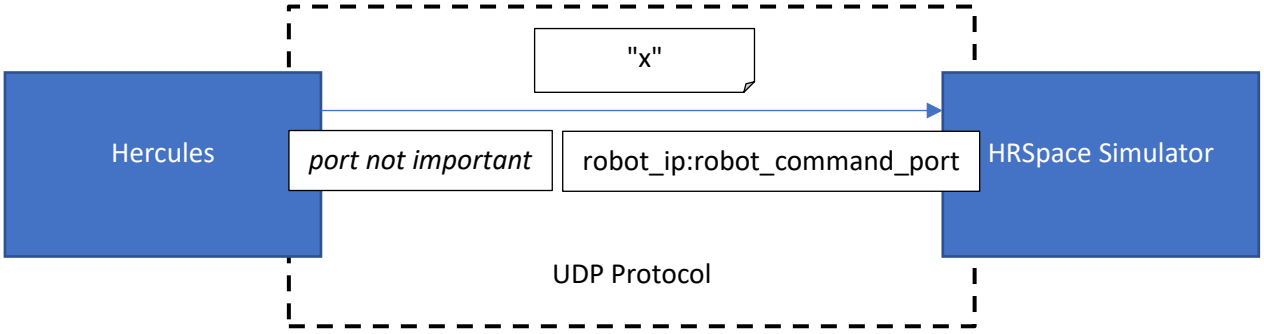
You should see the data being received in Hercules:



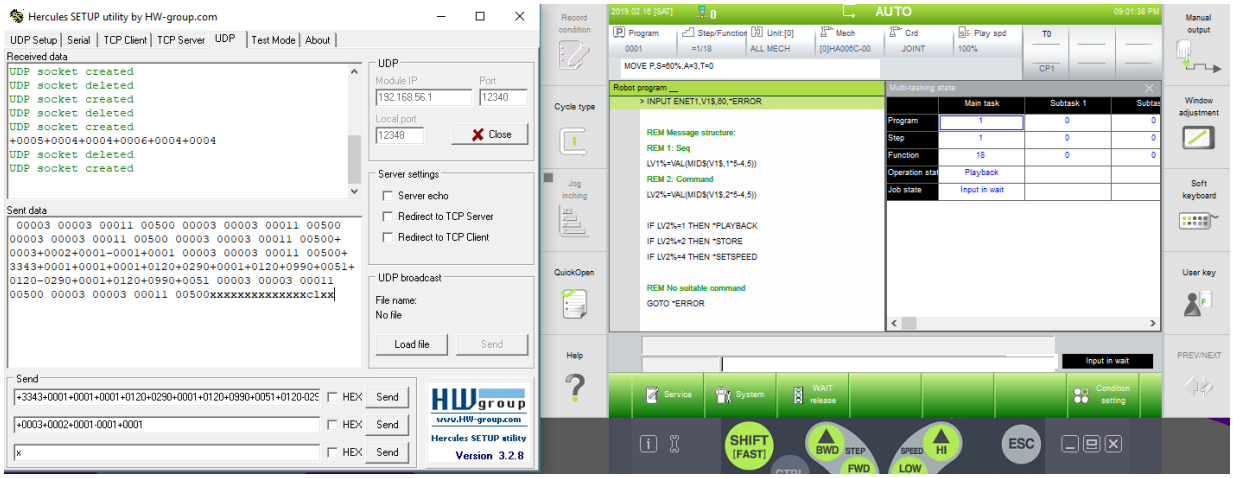
The data received means: [seq number = 5][command = 4 (setspeed)][speed = 4]

If you can get this far, the network connection from the ROS PC to the Windows PC works. If not, please double check the state of your network: IPs, ports, firewalls.

Hercules works with the ROS Hyundai Driver, but the robot doesn't



Now we can connect Hercules directly to the robot, to send commands.



Make sure, no Hercules is using the Local Port of the Robot Simulator. Start the simulator, and the virtual teach pendant. Start the execution of the Main JOB 0001. If the executed line in the simulator is the INPUT command, that means, that the robot is waiting for an incoming message.

In Hercules, set the Module IP to the address of the robot (in the simulator, the address of the PC), and the port to the robot_command_port. The local port doesn't matter, as long as it doesn't collide with anything else.

Now send an "x" character using one of the Send buttons in Hercules to the robot. If the execution moves from the INPUT command every time, you press the Send button, then the robot can receive the network messages.

If you get this far, it means, that the robot can receive local network messages. If not, please try to restart the simulator, check your firewall and network settings.