How to start the EX1 rover up

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# Learning Resources

Secure Shell

<https://hostpresto.com/community/tutorials/how-to-connect-to-a-linux-server-using-secure-shell-ssh/>

<https://www.codeproject.com/Articles/497728/HowplustoplusUseplusSSHplustoplusAccessplusaplusLi>

Screen Terminal-multiplexer.

<https://linuxize.com/post/how-to-use-linux-screen/>

# Procedure

The following procedure describes how to start and operate the EX1 rover from the Ground Control Station (GCS) Main Computer.

## SSH connection to EX1 P-OBC.

First step will be to connect the GCS to the Primary-Onboard Computer (P-OBC) via Secure Shell (SSH). Make sure both the GCS Main Computer and the P-OBC share the same network.

### Important Information

The current SSH configuration has been defined using a key-based authorization instead of a username-password based authorization method. The public key can be found under *authorized\_keys* in the *~/.ssh* directory of the P-OBC.

The following information should be noted and kept private:

P-OBC Private IP Address: 10.240.20.170 (*RANDOMWALK3\_2.4GHz* WLAN Network)

P-OBC Username: roverTX2

P-OBC Password: rovertx2

SSH Port: 2020

Public/private SSH Key Pair:

Key Comment: [davidrm@dc.tohoku.ac.jp](mailto:davidrm@dc.tohoku.ac.jp)

**Key Passphrase**: her0\_EX1\_r0ver

*Note: The private IP address of the P-OBC may change based on the network used. If the same network is to be used often, it is highly recommended to set up a static IP address for the P-OBC.*

To connect to the P-OBC, open the SSH client application called **PuTTY**. The necessary configuration has been already saved. Under *Load, save or delete a stored session,* load the following sesion: *EX1 Rover P-OBC SSH Auth 10.240.20.170.*

Make sure to change the IP address under *Host Name* if a new network is used. It is highly recommended to change and save the new session settings so as to avoid having to make changes every time a new connection is established.

*Note: The session called EX1 Rover P-OBC 10.240.20.170 is a backup of the initial SSH configuration under a username-password-based authorization. In the event that the Key Pair fails, load this configuration instead and proceed to connect with username and password.*

Once the proper configuration has been defined, click Open and a new SSH connection will automatically start.

Input the **Key Passphrase** as previously defined and you will be finally connected to EX1 P-OBC.

## Rover startup.

Since multiple virtual terminals are necessary to start up EX1, we need to use the **Screen** package functionality (see *Learning Resources* for more information).

Start a new screen session:

$ screen

Open a new virtual terminal by clicking Ctrl+a c.

*Note: Check all the Screen commands with* Ctrl+a ?.

In the new virtual terminal run the following set of command to access supersued (root) mode:

$ sudo su

(input P-OBC user password if required)

We need to source the setup.bash file in the root environment by:

$ source HERO\_EX1/devel/setup.bash

And finally start the rover up with:

$ roslaunch ex1\_startup wake\_up.launch

*Note: If we would like to record telemetry data, the command should be instead:*

$ roslaunch ex1\_startup wake\_up.launch telemetry:=1

Next, we need to switch to the initial virtual terminal with Ctrl+a backspace and run the following command in order to connect the PS4 Dualshock joystick.

$ sudo ds4drv

(input P-OBC user password if required)

Connect the joystick following the instructions in *Connecting a PS4 Dualshock controller to Jetson TX2* file.

Switch to the terminal where ROS is running with Ctrl+a space.