

From The Desk of The Robotsmiths

Thank you for your Heron M300 order! As part of the integration, we have prepared this quick reference sheet for you and your team detailing your specific package.

Network Information

These Herons should be connected to a wireless network to begin operation. Follow the steps in Section 5.2 of the Heron user manual to wire into the vehicles and setup a connection to your wireless network. Once logged into the Heron's computer with SSH, use the wicd-curses network utility per the instructions to connect the vehicles to your wireless access point.

It is possible to directly connect to the Heron core computer via Ethernet. Remove the sealing cap from the Ethernet panel connector and plug a cable between your PC and the Heron. The Heron can then be accessed by ssh, by its internal IP address:

```
ssh administrator@192.168.1.11
password : clearpath
```

Parameter	Heron 1
Core computer internal IP	192.168.1.11
Core computer wifi IP	DHCP
Core computer hostname	CPR-H300-0137
Core computer login	administrator/clearpath

Parameter	Heron 2
Core computer internal IP	192.168.1.11
Core computer wifi IP	DHCP
Core computer hostname	CPR-H300-0138
Core computer login	administrator/clearpath

Parameter	Heron 3
Core computer internal IP	192.168.1.11
Core computer wifi IP	DHCP
Core computer hostname	CPR-H300-0139
Core computer login	administrator/clearpath

Software Information

- The hardware launch script will run on startup. It can be started in the background with **sudo service ros start** and stopped with **sudo service ros stop**. Your team should never need to start or stop the service—just use `roslaunch` to launch additional nodes which interface with the persistent ones.

Remote Connection to Heron

Your robot is set up with Ubuntu 14 and ROS Indigo. For maximum compatibility, we recommend your ROS workstation be configured the same way.

After installing Ubuntu 14 and ROS indigo on your workstation, the Heron and Heron Desktop packages can be found at

<https://github.com/heron/heron>

https://github.com/heron/heron_desktop

Rostopics may be viewed remotely by configuring the local `ROS_MASTER_URI` environment variable on your workstation to point at the hostname or IP address of the remote machine. The local `ROS_IP` variable must often be set to that of the local machine.

Please see the following tutorial: <http://wiki.ros.org/ROS/Tutorials/MultipleMachines>

SSH may also be used to remotely log into the vehicle's computer either over a wireless network or a direct Ethernet connection

Example Usage

When using SSH to remotely log in, or with the `ROS_MASTER_URI` environment variables configured on your workstation, list the available rostopics with:

```
rostopic list
```

Verify that the GPS has a fix by checking the `navsat` topic. Note that the “fix” topic will only publish when a valid fix is achieved. A regular fix is available when the Status field shows “1.” In the command prompt, type:

```
rostopic echo /navsat/fix
```

To view the raw data from the GPS receiver, use the “`nmea_sentence`” topic instead:

```
rostopic echo /navsat/nmea_sentence
```

MIT Configuration Notes

Vehicle Power and E-Stop Button

These vehicles have been integrated with an emergency stop button which acts as the power switch for the vehicle. Depressing the large red mushroom button mounted on the user bay will cut power to the electronics and turn the vehicle off. Twisting the button in the clockwise direction will restore power to the vehicle. It will take time for the computer to restart and connect to the network.

The USB port on the Port (left) side of the vehicle has been modified to connect to the Estop / Power button. It will not function as a USB port. Please see the diagram below for connectivity.

<CRITICAL>

The ESTOP power button must only be connected to the USB connector on the Port side of the vehicle! Do not connect it elsewhere or connect other USB devices to the port side USB connector. It is the responsibility of the user to train all operators of the vehicle and mark proper connectivity as required!

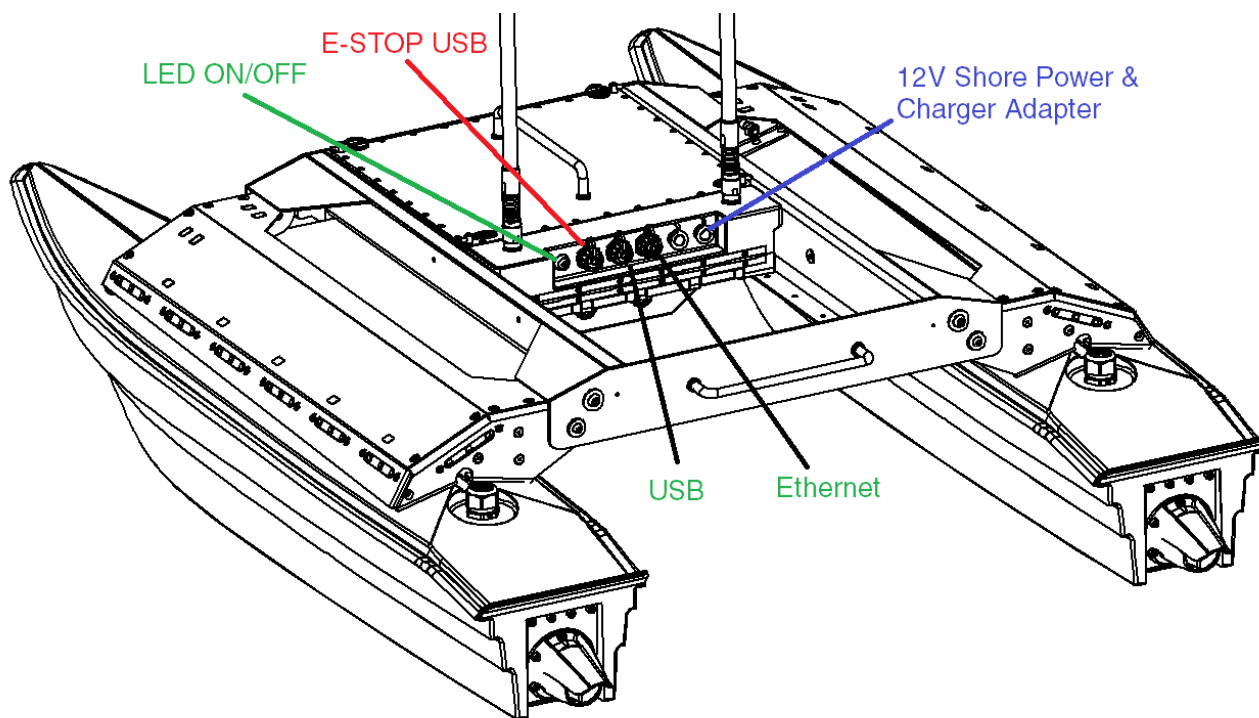


Figure 1 MIT Heron Connectivity Diagram

LED ON/OFF switch

The pushbutton switch on the user bay has been configured to turn the LEDs ON and OFF while working with the Heron USV. When LED integrated into the button is lit, power is enable. Do not leave LED lit when boat is not in use.

< CRITICAL >

There will be no indication of the vehicle's power state if the LEDs are turned off. Take care not to leave the vehicle powered on when finished.

Shore Power and Charging Adapter

The 6 Position Switchcraft EN3 Connector on the Starboard (right) side of the USV has been configured to accept 12V shore power and 2X charger input. See the diagram below for connectivity. An adapter cable has been supplied to connect the chargers and 12V power supply to the vehicle. Plugging in the shore power will switch the vehicle to the 12V supply. The LEDs will blink to indicate low voltage is detected, this is OK. The motors cannot be used while running on shore power, they will brown out the power supply and reset the computer.

< CRITICAL #1 >

Do not use the motors while running on shore power

< CRITICAL #2 >

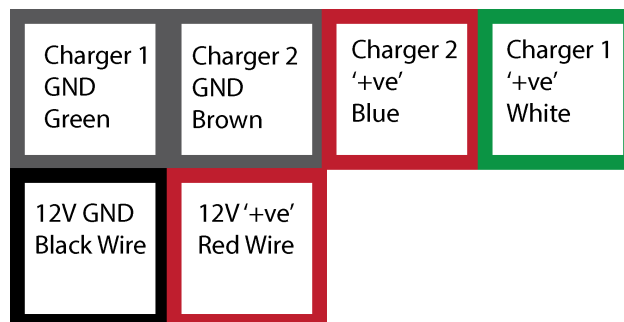
The chargers must only be plugged into the adapter cable and boat while the 12V supply is connected. The battery will not charge properly without the 12V supply present.

< CRITICAL #3 >

The EN3 charger and power adapter cable must only be plugged into the Starboard side EN3 Panel connector. Plugging them into the other EN3 Connector may damage the USV electronics

It is the user's responsibility to train operators and provide proper markings for connectivity.

A diagram of the Anderson connection pinout is provided below, should the Anderson Power Pole connectors become disconnected. This diagram is shown from the adapter cable connection side.



Viewed from Connection Side of connector assembly
(not cable side)

High Speed Motors

The MIT34, MIT35 and MIT36 project Heron units are the first customer vehicles to be configured with higher Kv motors. These motors will run at approximately 18amps each where the old motors would run at 10amps each. The Heron MCU board has been supplied with thicker copper traces to handle the excess current. It is recommended that the user monitor the enclosure temperature while operating the boat at high speed. It may not be possible to operate continuously at high speed on high temperature days. Running the vehicle at full speed continuously will decrease run time below the standard Heron USV rating.

At this time, Clearpath does not provide an enclosure temperature limit for vehicle operation. Temperature is measured on the MCU, close to the current sense traces where it may be hotter than other areas of the PCB and enclosure. We recommend trying to keep the temperature reading below 75 degrees C as measured by the /status topic.

Monitoring the temperature of the boat may be done by logging into the boat and observing the /status topic.

```
rostopic echo /status
```

Note the vehicle external operating temperature limit of 30 deg C.

< CRITICAL >

Running the USV at full speed, continuously, in high temperature conditions may overheat the user-bay and affect the operational lifetime of the electronic components.

Learning

If you are new to using ROS, please visit our support page for information on how to get started using your new Husky:

support.clearpathrobotics.com

Please contact our support team directly at support@clearpathrobotics.com if you have any questions that aren't answered on our support page. For ROS-specific questions, we recommend visiting answers.ros.org, which we also keep an eye on.

Sincerely,

The Robotsmiths