Landing Height Announcement Controller

User's & Installation guide

LHC uses Garmin LIDAR range finder module to detect actual height above runway starting from 100 feet down to touch down. It announces your height at certain fixed altitude all the way down.

The Garmin Laser module needs to be installed pointing to ground. Installing the module at an angle is also possible. The actual installation height is entered into the controller and with its current reading and provided installation height, any angles are calculated and stored.

The announced height is the height of the bottom of the landing wheel to the ground (in feet). For example, if the controller is announcing "Ten", this means the landing gear is 10 feet away.

A switch input option is provided and can be used to disable audio announcement so this feature can be used on-demand.
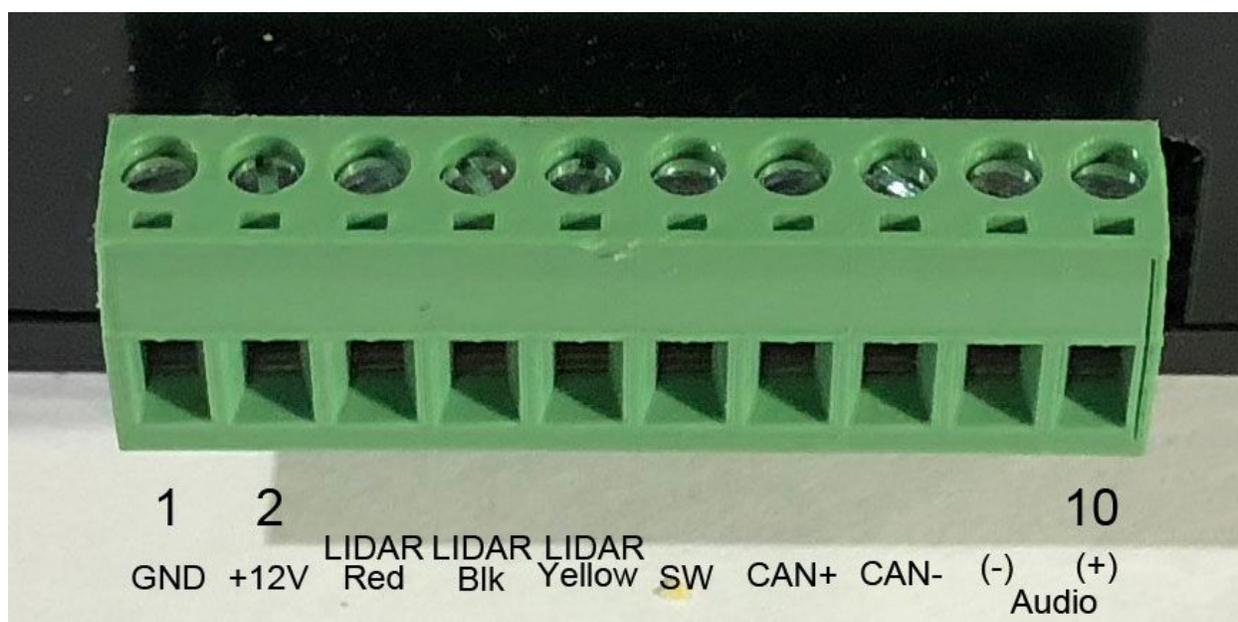

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If you received the LHC as a set; it includes Garmin LIDAR-Lite module as well, otherwise the components are:

- Controller Box
- USB Cable
- 680uF Capacitor

LHC uses a 10-pin Terminal Block. Refer to the image below and pin assignments.


Looking at the Terminal Block inserted into the controller. Left most pin is PIN-1. Right most pin is PIN-10.

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10-PIN CONNECTOR

PIN #	FUNCTION
1	**(Input) Ground (GND)** Connect this pin to your airplane ground.
2	**(Input) +12V** This controller uses 100mA of power. It can share another non-inductive load circuit breaker. Or use a 1A circuit breaker/inline-fuse.
3	**(Output) LIDAR Power.** This is +5V connection to the Laser module. This is the RED colored wire for the LIDAR connection.
4	**(Input) LIDAR Return.** Return line for LIDAR. This is the Black wire. **WARNING**: Don't mix LIDAR Power (Red) & Return (Black), it will DAMAGE the LIDAR power circuit. **These two pins also need a capacitor installed, see notes.**
5	**(Input) LIDAR Signal Output** This is LIDAR output to the Control box. Yellow line.
6	**(Input) Optional Switch.** Connect one end of a standard switch to +12V, the other end to this input pin. When the switch is opened (or no switch installed), Audio is played normally. If the switch is closed (+12V present on this input pin) then audio is muted.
7	**(Input) CAN High Pin.** Connection to EngineBridge CANBus network.
8	**(Input) CAN Low Pin.** Connection to EngineBridge CANBus network.
9	**(Output) Audio (-).** Differential Audio output. (-ve line)
10	**(Output) Audio (+)** Differential Audio output. (+ve line)

Optional Switch

Use a switch if you prefer to use the LHC at certain times. You can also use the circuit-breaker (if dedicated) to switch off/on the controller on-demand.

To Controller PIN 6   +12V
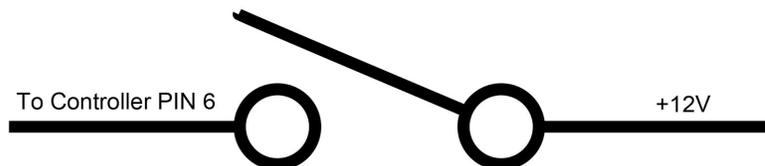
Lidar-Lite V3 Connections

The Garmin Lidar-Lite V3 comes with its special cable/connector. Only three wires are used (Red, Black & Yellow).

You can connect the wires directly to the controller if you are installing the control box right next to LIDAR unit. If you need to extend the Garmin provided Wires, then use the Capacitor (included) and solder/heat shrink right at the end of the Garmin cable.

Use a suitable three conductor wires depending on your installation location, path and environment. As seen in photo, this installation used a CAT5e cable. Power requirements is 100mA.

Attach the capacitor while noting the polarity. The side with (-) is also the shorter lead goes to the black wire. The other side (longer lead) goes to Red wire. **DO NOT MIX POWER/GND for LIDAR unit.**

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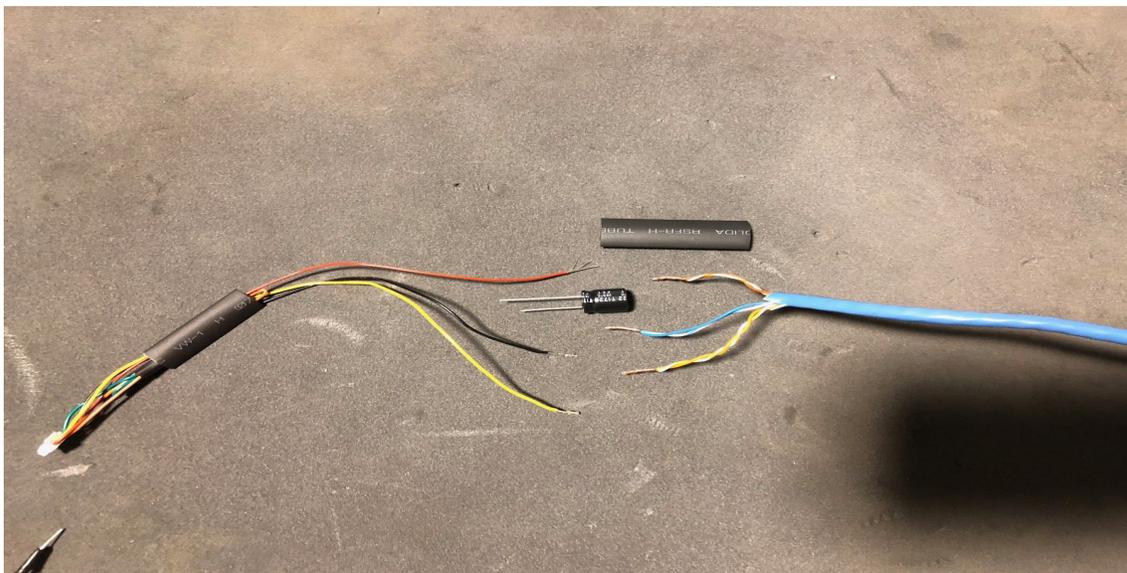
Installation Procedures

There are different options/procedures to successfully install and test this controller.

You need a laptop or a PC with a USB port to input the installation height, and this also needs to be used when the LIDAR unit is fitted and secured at its intended position.

The value being read from the LIDAR unit is stored and used for subsequent operations so its necessary for the LIDAR unit to be properly secured and fully installed on your airplane before starting the USB setup process.

The first procedure is to find a suitable location for the LIDAR; it needs a clear, unobstructed view of the grounds below. It can be installed at an angle, make sure no objects including landing gear doors can move, flap in the winds or obstruct the view during landing.   These doors can move in front of the LIDAR during take off similar to our demo installation (see photos/video on our website), that LIDAR is installed in the gear well, the door closes on the LIDAR after takeoff, and opens before landing. Once the landing gear is fully down, the doors are out of the way and LIDAR sees the grounds unobstructed.

An alternative first procedure is to test Audio output to your audio panel to make sure you can hear audio.   The Audio output is Mono differential audio signals. You can use it on Stereo input to your Audio panel by joining both channels to the Audio (+) output of the controller. Or directly to a mono Audio input. The controller is capable of sending audio directly to the headset if equipped with a mono RCA jack input. For this case, connect both Audio wires to an RCA male then insert into your Panel input or headset.

Supply +12v/Gnd connection to the controller and choose a suitable location for the box.   This controller can connect to EngineBridge CANBus network for extra functionality as new products are released.

If desired, Audio can be tested before installing or connecting the LIDAR unit. Just by applying power (even from a +9V small battery) and connecting the Audio cables. The software section explains how to test the Audio using USB.

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SOFTWARE

You can use MAC OS or Windows based laptop.
Drivers are provided for Windows (if needed) but generally Windows OS should detect the COM port once USB is inserted. For MAC users, the standard Terminal program is used and drivers are not needed.

The same COMMANDS apply for both MAC or Windows OS.

Controller is in USB SETUP MODE only if its powered with USB cable inserted into a PC. If you power the controller first then insert the USB, you need to restart the controller so it can enter Setup mode.

Windows OS

Windows 7,8,10 were tested and no drivers needed most of the time. Windows XP,2000 require the driver to be installed.   The Hardware name is EBridge_LHC.
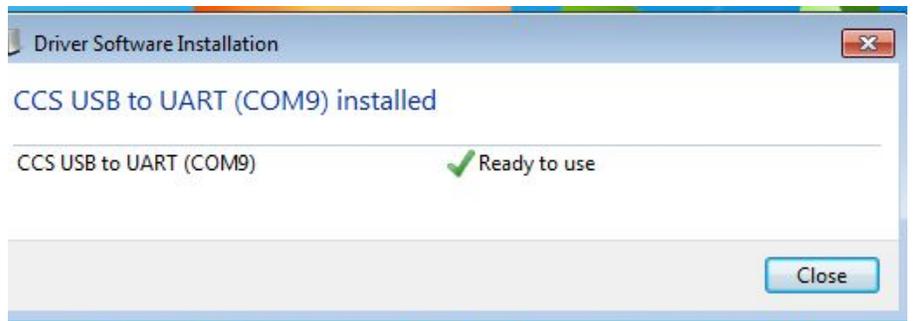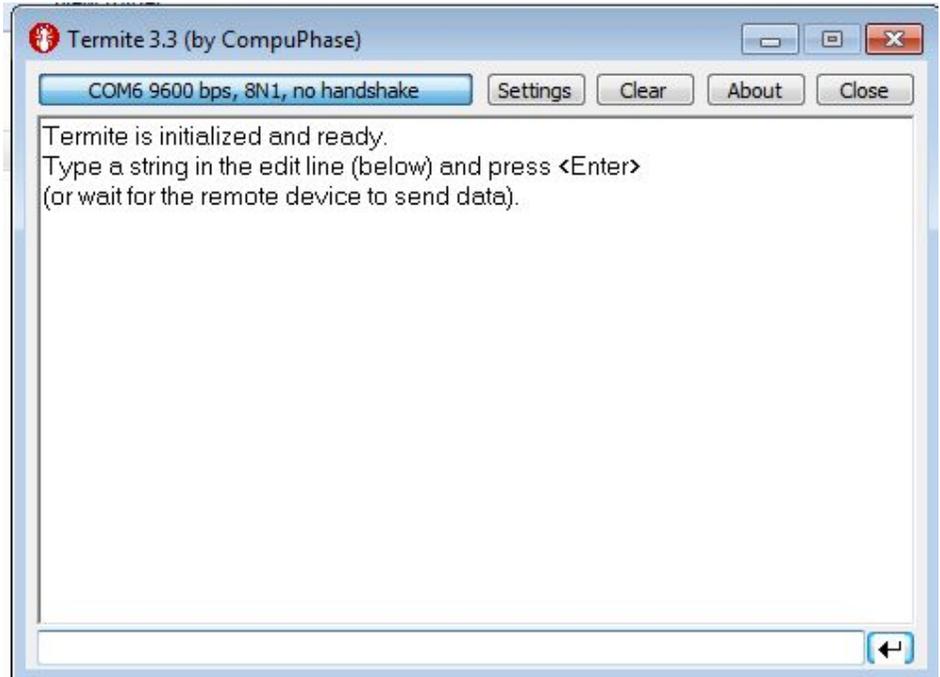

Use the driver if Windows did not auto-detect the USB COM Port.

If you do need to install the driver, point it to the location you saved the driver folder.

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For Windows, a Simple Terminal program EXE is provided.

You can use any COM Terminal application for windows if you prefer. Otherwise, the provided EXE can be used for a direct setup.

Once you load the program, Click on Settings, and change Baud to 9600 if it was not selected.

COM port could be different from shown here. The rest of the options are correct as default.

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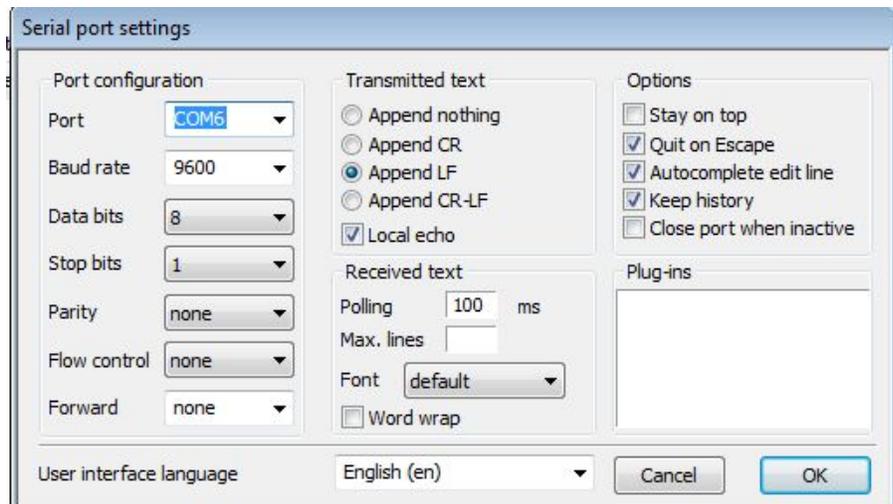
Show Command: S

To verify you are connected. Type S (or s) and enter. The shown results are returned from the controller. This indicates the system is not setup yet. And it shows the reading (in Inches) from the LIDAR.

If LIDAR is not installed, 0.00 will be displayed.

This command can be used anytime, even after setup to verify the range and confirm setup is complete.

Test Command: T

If you type T (or t) and audio is connected, Zero will be announced.

Play Command: P

To hear ALL messages stored within the controller, press P (or p), all messages are announced in sequence.

Input Height

Measure the actual height above ground for the sensor. Measure to the BACK (base) of the unit, not to the glass. For example, if you installed the LIDAR at an angle, while its actual height measured with a tape measure is 30.44", but the reading its reported is 52.3", you need to enter 30.44

You can enter the height at anytime, height format is xx.xx in INCHES. For the above example, type 30.44. System automatically takes the value once it detects correct sequence of number entered. Any mistake, just press enter and do it again. You can't damage the controller by making mistakes here. Use Show command to confirm.

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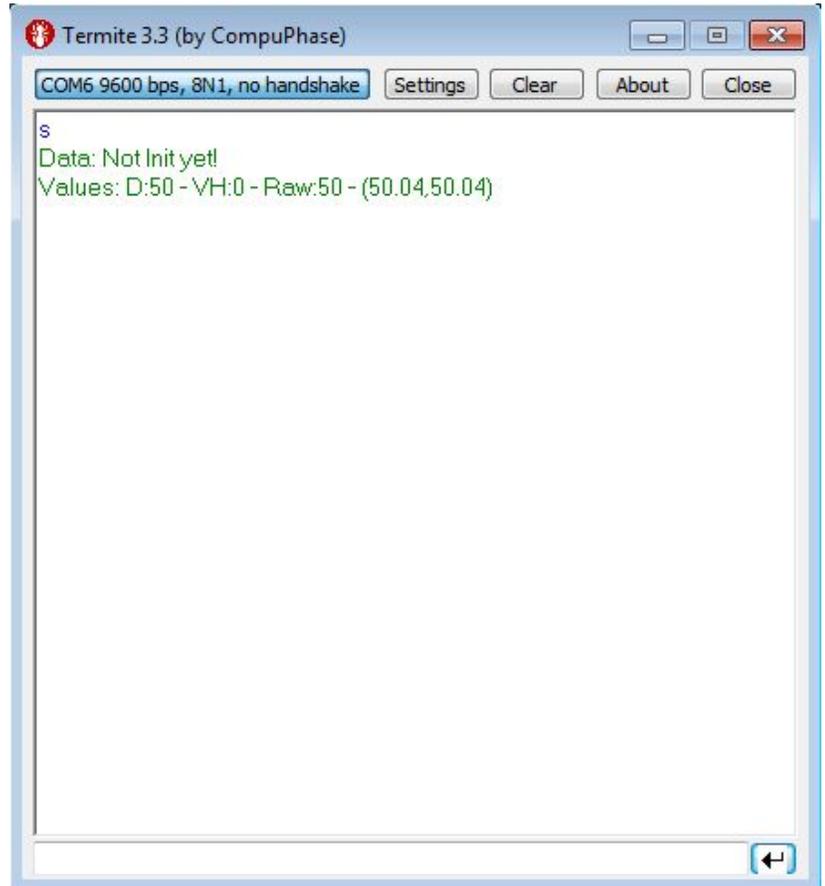
MAC OS

The same commands and procedure apply above.

On MAC, drives are not needed and the built-in Terminal program can be used as follows:

Connect the OS X USB port to the Controller and start or restart the controller if it was already powered.

Use the Finder to go to Applications > Utilities > Terminal. And run Terminal.

To find the COM port, enter the following commands: **ls -ltr /dev/*usb***
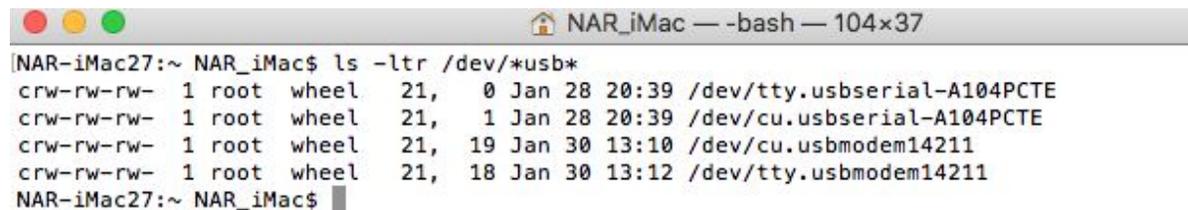

```
NAR-iMac27:~ NAR_iMac$ ls -ltr /dev/*usb*
crw-rw-rw-  1 root  wheel   21,   0 Jan 28 20:39 /dev/tty.usbserial-A104PCTE
crw-rw-rw-  1 root  wheel   21,   1 Jan 28 20:39 /dev/cu.usbserial-A104PCTE
crw-rw-rw-  1 root  wheel   21,  19 Jan 30 13:10 /dev/cu.usbmodem14211
crw-rw-rw-  1 root  wheel   21,  18 Jan 30 13:12 /dev/tty.usbmodem14211
NAR-iMac27:~ NAR_iMac$
```

This displays all your Terminal ports. USB port would be tty.usbmodemxxxxx or similar.

Connect to the controller by typing: **screen /dev/tty.usbmodem14221 9600 Note 14221 can be different in your laptop.**

Use the same commands to test/verify/show and setup. Unpower the device and remove USB to complete the setup.

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