

Landing Height Announcement Controller

V2.0 HW:4.0+

User's & Installation guide

Note: This guide is for V2 of the controller pictured below. If you have the previous unit, please use the other guide found at the product page online.



INTRODUCTION

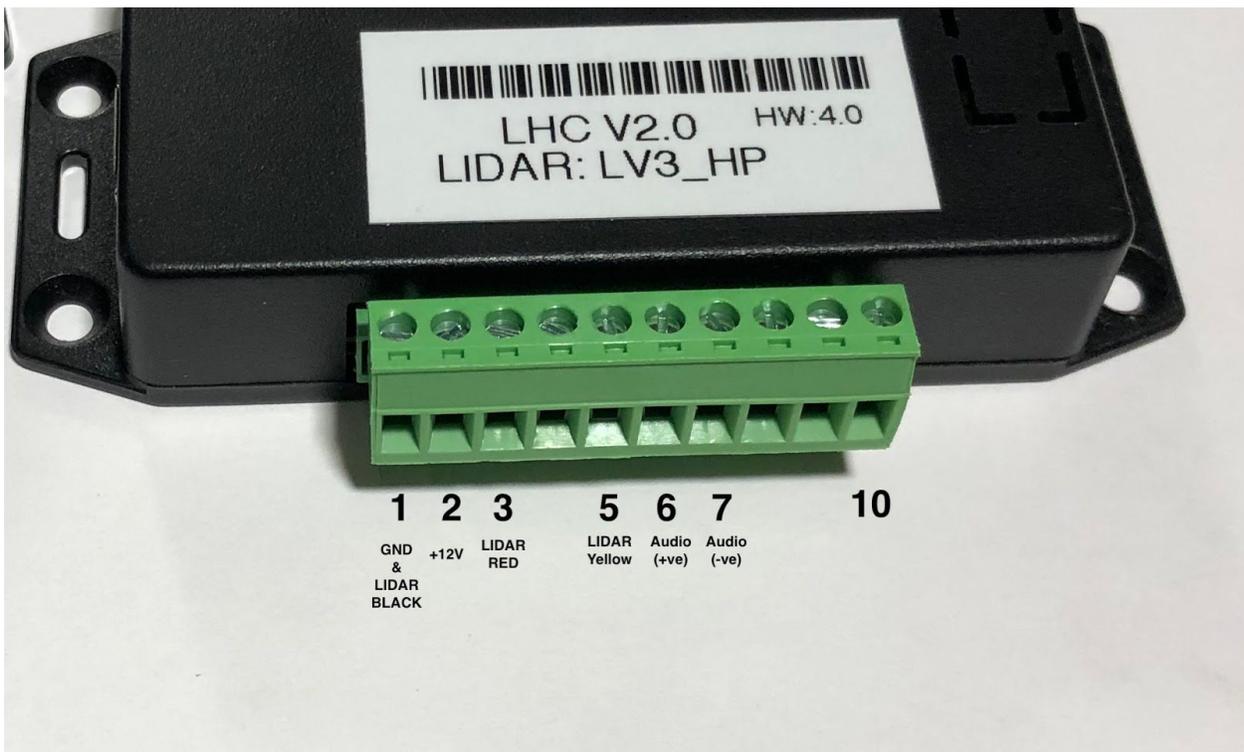
LHC uses Garmin LIDAR range finder module to detect actual height above runway starting from 100 feet down to touch down. It announces your height at certain fixed altitude all the way down.

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. This setup which is performed initially allows the controller to detect the “standing” height of the airplane in compared to the LIDAR so Zero is announced when reaching a similar attitude during touchdown.

The Zero point can be calibrated by shifting it +/- 1-4” inches to take into the account any flaring angle depending on the location of the LIDAR in compared to the main landing gear wheels.

CONNECTIONS

Refer to the following table for explanation of each PIN and connections.



10-PIN Connector

PIN	FUNCTION
1	(Input) GND. Connect this pin to airplane GND.
2	(Input) +12V. Maximum is 130mA. It can be shared with another non-inductive load circuit breaker. Or use a 1A circuit breaker or inline-fuse
3	(Output) +5V LIDAR Power. This is the RED colored wire for the LIDAR connection. WARNING: Don't mix LIDAR Power (Red) & Return (Black), it will DAMAGE the LIDAR power circuit.
4	No Connection. (Previously was LIDAR BLACK). See current recommendation at the end of this guide.
5	(Input) LIDAR Signal Output. LIDAR output (Yellow line).
6	(Output) Audio (+ve). Differential Audio output. (+ve line)
7	(Output) Audio (-ve). Differential Audio output. (-ve line)
8	No Connection. Leave empty.
9	No Connection. Leave empty.
10	No Connection. Leave empty.

Please see Notes & Recommendations at the end of this guide

INSTALLATION

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 ground surface 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 stereo 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.

In some installation with older type headsets or panels, a small amplifier module maybe needed to boost the audio to a proper level. Please contact us for suggestion if you experience weak audio signals from this controller.

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.

SOFTWARE

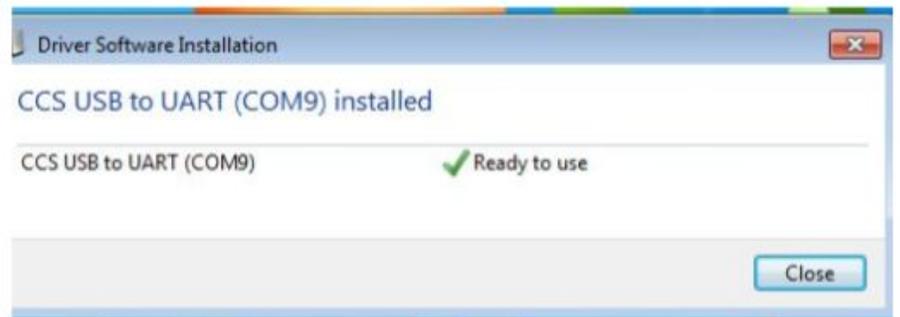
You can use MAC OS or Windows based laptop. Drivers are provided for Windows (if needed) but generally Windows OS should detect the COM port once USB is inserted. For MAC users, the standard Terminal program is used and drivers are not needed.

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 are 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.

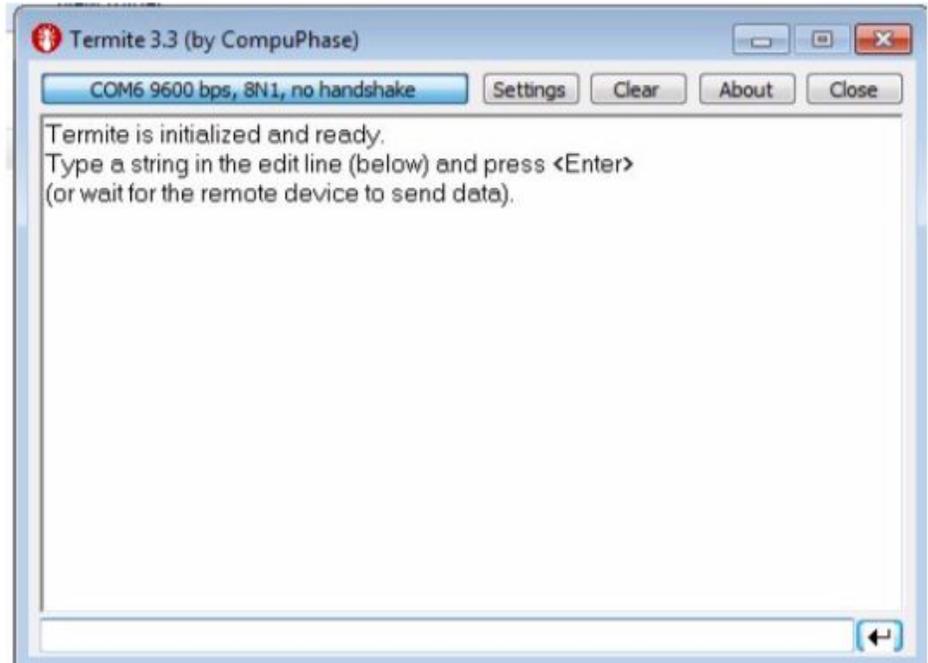
If you do need to install the driver, point it to the location you saved the driver folder.



For Windows, a Simple

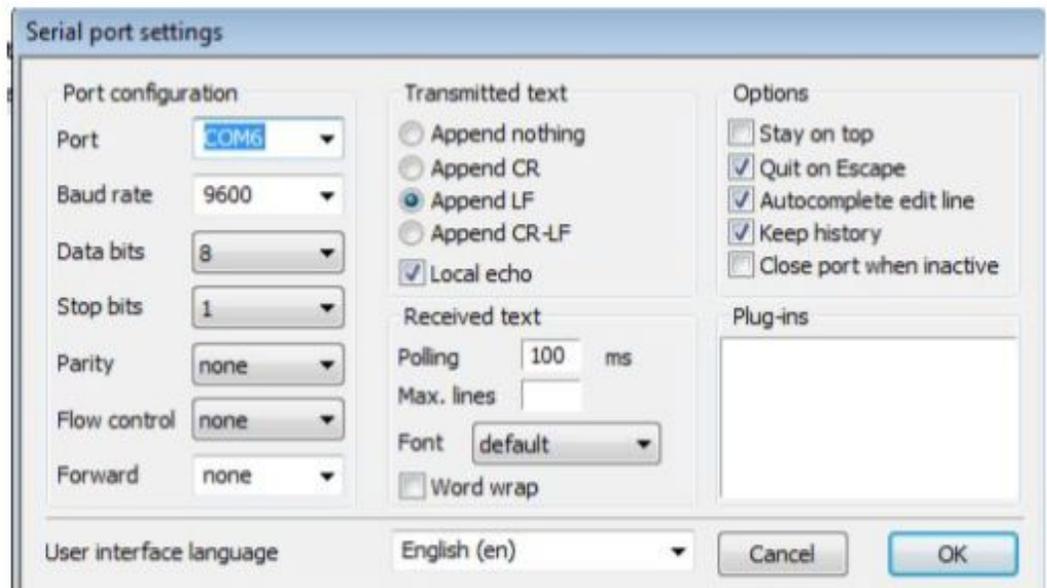
Terminal program EXE is provided.

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.



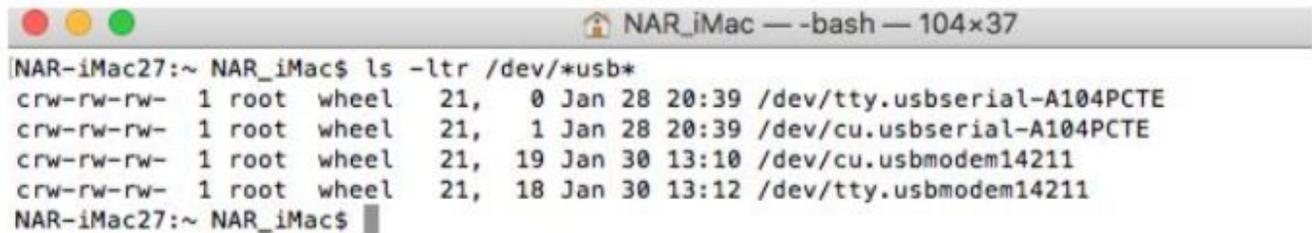
MAC OS

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.

USB COMMANDS

Press ENTER to get a reply from the controller asking to input the installation height.

Show Command: S To verify you are connected. Type S (or s) and enter. The shown results are returned from the controller. Initially no stored height is saved and this indicates the system is not setup yet. This command also 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.

Additional Notes & Recommendations

- 1) The LIDAR unit will be sent with a Capacitor. This Capacitor needs to be installed. If the LIDAR unit will be installed close to the controller without the need to extend the wires, place the Capacitor between PIN 1 (GND) & PIN 3 (LIDAR RED). Notice the polarity of the Capacitor. The Shorter lead (Marked -) on the Capacitor is the GND. The other Capacitor lead (longer lead) is the +Ve and goes to PIN 3 (LIDAR RED).

If you need to extend the LIDAR wires, solder the Capacitor right at where the LIDAR wires ends. So, the extension wires, and the original LIDAR wires along with the Capacitor are all soldered together and heat-shrink. Also notice the polarity of the Capacitor. The -ve Capacitor (shorter lead) goes to LIDAR BLACK wire. Other lead to LIDAR RED wire.

- 2) If you are attaching the LIDAR wires directly, it's recommend to actually solder a small extension (2" or so) or a thicker gauge wire before inserting into the 10-PIN Connector. The LIDAR wires are very small and can be actually cut when tightening the Connector screws. The Capacitor can go directly to the connector even with a 2" extension. It's also recommended soldering the Capacitor leads to the LIDAR wires rather than inserting both wires into the screw slot.
- 3) It's **now recommended** installing LIDAR BLACK wire directly to PIN 1 or soldered to the main GND coming in from your airplane GND to PIN 1.
- 4) The LIDAR & Controller takes less than 130mA current @ 9V-14.5V. So it does not need its own dedicated circuit breaker. Though it can't share power any inductive loads such as motors (ex flaps). Sharing with avionics is perfect, but not with any ADS-B OUT units or high-load units. Can be shared with Lights if they are low-powered. If it will have its own CB, then 1A is recommended or just an inline-fuse.
- 5) If the LIDAR does not have a full unobstructed view of the ground surface and some other parts of the plane (such as part of the landing gear) in its view, it maybe necessary to do some flight testing before making final holes or drills into the airframe for the final installation point. Its recommended the system is tested using a dummy access panel cover to attach the LIDAR before final location is selected and drilled.

- 6) To resolve any audio issues, it's recommended to use shielded 2-core wires for the two audio outputs. The shield itself can be used to connect the Audio GND to Controller GND. In fact, it's also recommended that the Controller GND to be taken directly from the same point as the Audio Panel GND (or Headset GND if the audio is going directly to headset). This procedure eliminates any ground loop that can affect the audio signal.
- 7) **IMPORTANT** not to mix the Black & Red wires of the LIDAR. Red is Positive and connects to PIN3. Black is -ve and connects to PIN 1. The LIDAR may not have a reverse-power protection internally and if these pins are swapped, the unit will be immediately damaged and may not be covered by the warranty if that was the case.
- 8) LIDAR Wires needed are the RED/BLACK/YELLOW. The other wires will be shortened if the LIDAR is shipped with the unit. The other wires are cut at different lengths and heat-shrink. Do the same if it's needed to shorten the original LIDAR wires.
- 9) The Audio outputs (PIN 6 & 7) are Differential Audio lines. It's not Audio & GND. If your Audio panel only accepts Single Line for Audio, then try to use the +ve Audio signal only. Though most if not all Panels will accept Audio (+ve) / Audio (-ve) Pair.
- 10) Almost all Audio panels/intercom will amplify the Audio signal, in certain situation or older equipments, it maybe necessary to add a small low-cost amplifier module to boost the audio. Contact us for some suggestions to resolve any audio issues.