Supplemental LHS Wiring Notes

Landing Height System

(NORSEE Certified Edition)

200-B & 200-C

This guide offers various scenarios to assist in wiring the Landing Height System (LHS) to Aircraft power. Audio Panels, GPS, and Retractable Landing Gear.

LHS Power Wiring

It is recommended that the LHS Audio be wired to **a "Switched" audio input;** this means there is a button that the pilot can use to mix or disable that particular audio channel. Similar to an ADF switch or NAV2 (if unused) and so on. If a Switched audio input is used; the LHS power can be shared with a non-essential equipment power, **otherwise either a dedicated 1A circuit breaker of the Pull/Push type OR a panel mounted dedicated toggle switch** powered from a non-essential equipment can be used to power the LHS.

- Pull a 2-core Shielded Aircraft approved cable (24 AWG) from your power source to the location of the LHS.
- Use one wire for +12V/24V power and the other wire for Aircraft GND (Ground) point from a ground bus or terminal behind the panel. Airframe ground point next to the LHS can also be used if it offers a good ground connection.

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- Connect Aircraft Power wire to the LHS Power wire at the provided Quick-Disconnect cable. Crimp or heat shrink immediately before connecting any other wires.
- Connect Aircraft GND to LHS Ground wire. Keep this un-crimped or exposed until Audio Test is completed, as you may add one more wire to this connection.
- One side of the wire shield needs to be connected to the Airplane Ground

LHS Audio Wiring

LHS-200-X Series use a Single-Ended Audio output (Audio HI). This audio signal is referenced to Aircraft Ground. In almost all cases, a single wire (LHS Audio HI) to (Audio Panel Audio HI Channel input) is sufficient. In this case, the installer can use a 1-core shielded wire with one side of the wire shield connected to aircraft ground.

In rare cases, the Audio panel may use an isolated Audio LO, meaning the Audio Panel itself does not reference their Audio LO to their Ground reference, in such cases, use a 2-core shielded wire with the Audio Panel Audio LO connected to the LHS Ground wire.

The LHS unit offers an Audio Test button using the WiFi interface. Installers must test Audio to make sure it's working correctly before finalizing the installation to verify the Audio panel does not require a dedicated Audio LO to be connected to LHS Ground wire as an audio reference.

For installation that requires dedicated Audio LO and only a 1-core shielded wire was used; the shield of the wire can be connected from one side to the Audio LO of the Audio panel and on the other side to the LHS ground wire.

LHS Gear Detection Wiring (200-C only)

The LHS 200-C unit is able to detect the configuration or status of the landing gear using three different methods. A single wire is used for all these methods.

LHS 200-C Gear Detection feature is disabled by default and can be enabled using WiFi setup. The method of detection is also selected when enabling this feature.

When the LHS is within the ground surface detection zone (starting 230 ft) while the airplane is descending and the gear detection is unsafe; the LHS announces "Check Landing Gear" message every 5 seconds.

Method 1: Detect Gear Switch Up wire

Connect the LHS Gear detection to the UP side of the gear lever switch. When the gear lever is set to the UP position, a voltage is present on this wire. The LHS gear detection routines consider the gear unsafe as long as there is a voltage present on the wire.

Method 2: Detect Gear Switch Down wire

Connect the LHS Gear detection to the DOWN side of the gear lever switch. When the gear lever is set to the Down position, a voltage is present on this wire, and the LHS gear detection routines consider the gear safe as long as there is a voltage present on the wire.

Method 3: Detect Ground Reference Activation

The LHS gear detection can also detect a ground activation reference. This method can be used with airplanes that have a single green light to indicate that gear is down and locked. In most cases, the green light gear down and locked uses a limit switch (or more than one limit switch wired in series) that presents a

ground reference to one side of the Green light, which allows it to complete its circuit and illuminates.

The LHS gear detection wire can also be connected to this side of the light to detect when a ground reference was activated once the gear is down and locked.

Note that this method works on indicator lights that are **switched to ground,** meaning power is always present on one side of the indicator lights, and ground is presented to the light to complete the circuit. If the indicator light is wired the other way around, where a ground is always present on one side and +ve power is switched to the indicator light to complete the circuit, then Method 2 above can be used with this setup as well, so the LHS can detect a voltage present on the indicator light when the gear is down and locked.

Note that this method of detection may not be suitable on airplanes that have 3-separate indicator light for each gear (Nose, Left and Right), as this method can detect a single ground activation. Use Method 2 for Gear Down Switch voltage detection directly on the gear lever to detect the gear lever is set to down position.

LHS GPS Input Wiring (200- B & 200-C models)

The LHS 200-X series can be connected to RS232 output from a non-primary GPS source.   Even though our RS232 input is fully protected and is safe not to damage or feedback errors back to GPS source; NORSEE policy does not allow connecting NORSEE articles to primary aircraft systems. Basically, installers just need to make sure that in the unforeseen event the RS232 output of the GPS source is causing issues to the GPS, the flight can still continue safely regardless of the condition of that GPS source.

The LHS unit detects NMEA 0183 GPS output sentences, both standard NMEA sentences that begin with $G and Garmin proprietary NMEA 0183 sentences that

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begin with the characters, "$PGRM". The LHS also detects Aviation output format that uses Type 1 sentences which begin with STX and ends with ETX ASCII Aviation out format.

LHS GPS input is a single wire RS232 input which needs to be connected to GPS RS232 TX output wire, This can be shared with several other equipment that also expect RS232 using the same format and baud rate. Baud rate can be configured using WiFi setup.

The LHS uses GPS data for GPS ground speed & GPS reported altitude, and the LHS GPS firmware when it becomes available can offer higher GPS reported altitude along with Speed setup to configure the unit.

Extra Notes:

1 - Audio test must be performed before closing up the panel; audio test can be done by accessing the Wi-Fi page of the LHS once powered

2- Wrong wiring such as connecting +Voltage source to the Audio HI of the LHS **WILL** damage the internal Audio chip; the unit must be returned to replace the internal audio chip, this is not recoverable in the field. Any voltage source touching the Audio wires will damage the internal LHS audio system.

3- Above guide is for any Audio Channel; "Switched" or "Unswitched". Some Channels may be "Auto Muted" if COM activities are present while the announcements are active. Installers can verify any limitation of the audio channel selected by either checking with the Audio Panel guide, contacting the Audio Panel manufacturers or testing audio while an ATIS is active to make sure the channel selected is being "Mixed" with the main COM audio and not "auto muted".

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4- Do not run the audio and GPS wire along a bundle of wires that can carry high current such as Battery cables, Strobe cables, Radio Transmitter cables Antenna, ADS-B out/Transponder Out wiring

5- The LHS Audio output is "very" high impedance when it's not announcing; meaning the audio wire is fully released. If any noise is present while the unit is not announcing, the noise is external. Check location and/or run path.

6- Do not leave any long unconnected wires, as these act as an antenna. If using a multicore cable that may include an unused wire, connect that wire to ground from one end.

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