FIRMWARE RELEASE NOTES

Versions V3.0.17 to v3.0.37.0

Model VLP-16

LiDAR Sensor

Velodyne

For all new features and changes, refer to the documentation that accompanies the new firmware release for details on usage. To downgrade sensor firmware, please contact Velodyne for service.

V3.0.37.0 (12-December-2017)

- Field upgrade from 3.0.29.
  Changed: To upgrade to 3.0.37 from 3.0.29 requires an additional step to complete the upgrade. To update the firmware :
    1. Go to the web UI page and select the firmware image
    2. Press the Update button.
    3. The update process will run and return with a status message indicating the update has completed.
    4. Reset the sensor by pushing the Reset button or cycle power.
    5. On the firmware update page and press "Update", without specifying a new firmware image
    6. On the next screen push the "Process Firmware Update" button.
    7. Firmware update will complete.
    8. Reset the sensor.
    9. Verify that the top board has new firmware installed by going to the Info page.

- IMPROVED: Low signal cross-talk filtering performance that was made more sensitive with the introduction of the Sun Noise Filter.
- FIXED: Distance error when upgraded

V3.0.34.0 (8-May-2017)

- ADDED: MAC address is now configurable.
- FIXED: Intermittent Ghost returns at 40, 80 and greater than 124 meters.
- FIXED: Web Interface Phase units changed from hundredths degree to degrees.
- REMOVED: Web interface Upload Calibration data from user interface.
- IMPROVED: Firmware Update messages during update.
- IMPROVED: Sun Noise Filter
- IMPROVED: Phase Lock rotations error < +/-5 degrees
- ADDED: Reverse rotation capability. Specify negative RPM values to use this capability.
- ADD: JSON and Snapshot File Changes
    - Snapshot file and JSON command "/cgi/info.json" in section "info" subsection "image" add section "top" for top board image info from last firmware update.
    - Snapshot file and JSON command "/cgi/info.json" in section "info" add "factory_mac_addr" field.
    - Snapshot file and JSON command "/cgi/info.json" in section "info" add "build" field.
    - Snapshot file and JSON command "/cgi/diag.json" in section "diag" changed format for adc_nf with array "[]" brackets around value.
    - Snapshot file "diag" field and JSON "cgi/diag.json" add field "adc_stats".
    - Snapshot file and JSON command "/cgi/settings.json" in section "net" add "mac_addr" field.
    - Snapshot file and JSON command "/cgi/settings.json" add section "active_net", "show_advanced" and "detthr".
    - Snapshot file and JSON command "/cgi/settings.json" fixed format for field "gpsctl", "ppsctl", "phaselock", "host" format by adding ',' between sub fields.
    - Snapshot file "factory" add "show_advanced" and "vhv" field.
    - Snapshot file "factory" changed adcofs with array "[]" brackets around value.
    - Snapshot file "factory" remove "vhvset" info now captured in "vhv" field.
    - Snapshot file "factory" add "xfmrpol" field

V3.0.32.0 (25-May-2015)

- ADDED: Non-graphical characters were stripped from the model number, serial number, UUID, and device name for consistency.

VLP-16 Firmware Release Notes

- FIXED: The Top-of-Hour (TOH) counter in the firing data and telemetry packets previously exceeded 3,599,999,999 usecs, the number of usecs in an hour. This fix ensures that the TOH counter rolls over to 0 usec.
- FIXED: The Top-of-Hour (TOH) counter in the firing data and telemetry packets was randomly incrementing and decrementing due to spurious PPS signals. This fix ignores any changes to the PPS line for 0.95 seconds following the initial rising edge.
- ADDED: A web interface input option has been added to allow PPS signal usage independent of a GPS receiver lock.
- ADDED: A web interface input field has been added for user specified wait time, in seconds, to qualify the PPS signal.
- ADDED: A web interface input option has been added to the allow the sensor to follow the time per the NMEA sentence independent of a GPS receiver lock.
- IMPROVED: Additional filtering has been included to enhance sun noise rejection.
- IMPROVED: Distance measurement errors exceeded specifications while imaging corners resulting in an apparent bulge in the point cloud. This fix ensures that the distance measurements while imaging corners remain within specifications.
- Snapshot file add "gps" field.

V3.0.29.3 (8-December-2016)

- FIXED: Some sensors have Motor rotation issue that was introduced in V3.0.29.2 release. This corrects Motors that might not be able to spin or spin at reduce rate then programmed.

V3.0.29.2 (23-November-2016)

- IMPROVED: Phase Lock feature has been improved to less than 5-degree error.
- ADDED: Motor Reverse Spin

V3.0.29.0 (18-December-2015)

- Resolves an internal communication error that resulted in missing laser data on 2368 data port. This fix results in slightly greater jitter in time stamps between packets relative to earlier firmware versions.

V3.0.28.0 (30-November-2015)

- The wait time it required, at startup, to generate Data Packets (Port 2368 Default) was reduced from above 50 seconds to less than 30 seconds. This behavior matches the HDL32.
- Improved Image at -10 degrees Celsius at startup.
- The Sensor's IP address can no longer to set to invalid value (example 255.255.255.255) using the Web Interface.
- Improved Firmware Update compatibility with Linux computers.
- At some angles and atmospheric conditions sun-light can affect the Sensor's Encoder Index. The Encoder Index is used to indicate zero position in the rotation of the spindle. The Sunlight shining into the sensor via a small opening can cause the encoder to detect a false Index. This is observed by jump to 24,xxx position. In extreme cases it can prevent the motor from spinning correctly and resulting in zero RPM and loss of laser UDP data (sensor stops sending data). This version guards against false Index occurrence.
- The sensor will no longer send malformed UDP Data Packets (Port 2368 Default) resulting from an internal error.
- V3.0.28.0 can only be upgraded in the field on sensors that operate on 3.0.24.x or higher. VLP-16 with firmware versions < 3.0.24.x need to be returned to the factory for upgrade to 3.0.28.x or higher

V3.0.27.0 (10-August-2015)

VLP-16 Firmware Release Notes

- FIXED: Cold Temp boot-up sequence. A few VLP16 were failing to boot-up after being exposed to cold temperatures for an extended time. This problem was traced to a low level boot-up routine that can only be corrected at the factory. V3.0.24.1 can be updated in the field but cold temperature fix will not be included.
- FIXED: Encoder values between 0 – 5 and 35995 – 35999 have been corrected. In previous versions the encoder value were being affectedly rounded to values inside that range and value 0 would not occur.
- FIXED: WebServer GUI Firmware Update has been ruggedized to avoid corrupt firmware in cases the power to the sensor was removed during firmware upgrade.
- IMPROVED: Improved short distance measurements to ensure minimal noise on short distance flat walls, removing previously visible "wave pattern"
- FIXED: When DHCP is enabled and no Server is present to assign the sensor IP address the default IP address was not being used for Data UDP Packet (default port 8308). The Sensor uses a "link local address" per RFC-3927 to determine the default IP address.
- FIXED: Object that exceeded the max distance were appearing as phantom returns closer than they were.
- CHANGED: Couple web interface field names have been changed to help clear up any misunderstanding which field is the IP address of the Sensor.
    - Configuration Page "Host IP:" changed to "Host (Destination) IP:"
    - Configuration Page "Network IP:" changed to "Network (Sensor) IP:"
    - Browser Tab icon and name changed to reflect VLP-16.
- V3.0.27.0 can only be upgraded in the field on sensors that operate on 3.0.24.x or higher. VLP-16 with firmware versions < 3.0.24.x need to be returned to the factory for upgrade to 3.0.27.x or higher.

V3.0.24.1 (11-May-2015)

- FIXED: Temperature induced distance shift
    - Previous versions of VLP-16 firmware were susceptible to large drifts in reported range due to temperature changes. This update significantly reduces the amount of drift.
- FIXED: Reduced noise on affected sensors
    - A small population of sensors experienced noise in the form of a 'ring' of false returns. This update significantly reduces the amount of noise.

VLP-16 Firmware Release Notes
V3.0.23 (30-Mar-2015)

- ADDED: Data packet tagging
  - Every data packet now identifies the type of sensor and return type the packet is formatted for. Future version of HDL-32E firmware will support this as well.
  - The following chart explains what the bytes mean:

Return Type	Field (37h) Address: 4DEh	Field (21h) address: 4DFh
HDL32 Strongest	37h	21h
HDL32 Last	38h	21h
HDL32 Dual	39h	21h
VLP16 Strongest	37h	22h
VLP16 Last	38h	22h
VLP16 Dual	39h	22h

- ADDED: Added additional factory functions to detect encoder errors.
- CHANGED: Updated field of view setting to use whole degree increments
  - FOV configuration was made to match HDL-32E by incrementing in whole degree increments. Range is now 0-359 instead of 0-35999.
  - NOTE: Any previous setting will be reset to default after firmware update. Downgrading to an older version will not update the setting to the old range.
- CHANGED: Updated web interface graphics
- FIXED: Issue with zero crossing
  - Sensor would occasionally drop a small amount of data when crossing the point of zero degrees rotation.
- FIXED: Snapshot filename
  - By default, the snapshot filename would be saved as all zeros, this has been corrected.
- FIXED: Error in NMEA sentence processing
  - Fixes incompatibility with certain GPS units that support non-zero fractional second fields in the NMEA $GPRMC sentence. This could cause the Top of Hour Counter to be off as much as 1 second.
- FIXED: Bug in encoder logic
  - This bug prevented phase lock from operating correctly.

V3.0.17

- Initial commercial release. Please see documentation for included features.

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