# v2.1.x Changelog

*Firmware v2.1.x for all Ouster sensors*

**Ouster**

**Jun 24, 2021**

# Contents

# 1 Firmware Release Notes

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**Version** v2.1.1
**Date** 2021-06-21

This firmware release introduces these new features

1. Calibrated Reflectivity - We introduce an 8-bit calibrated reflecivity output. Please reference the Calibrated Reflectivity subsection of the Key Feature section of the Software User Manual for more information, including information on the hardware requirement for this feature.
2. Signal Multiplier - We introduce a feature that multiplies the sensor signal output in exchange for disabling the lasers through a select portion of the horizontal FOV. Please reference the Signal Multiplier subsection of the Key Feature section of the Software User Manual for more information, including the commands for setting and changing the Signal Multiplier value.
3. Configuration UI - We introduce a beta configuration tab on the sensor web page. The tab can be used to configure most of the TCP API parameters of the sensor. Confirguration can be made active using the `Apply Config (reinit)` button. Configuration can be made to persist through power cycles using the `Save Active Config` button.

# 2 Supported Products

The current firmware is supported on the following Ouster products:

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OS0 , OS1, OS2:

- GEN1: P/N 840-101-XXX-XX
- Rev C: P/n 840-102-XXX-C
- Rev D: P/n 840-102-XXX-D

# 3 Firmware Changelog

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**Version** v2.1.1

**Date** 2021-06-21

### Added

- Add support for Calibrated Reflectivity
- Add Config UI to sensor web page (Beta)
- Add signal multiplier modes to increase signal strength in the enabled azimuth window for gen2 sensors only
- Add alerts for motor speed
- Add alerts for unexpected sensor state transition
- Improve OS2 cold start to -20˚C
- Improve OS2 signal strength by 16%

### Removed

- Delete TCP command set_data_dst_ip.
- Delete TCP command get_data_dst_ip.
- Delete TCP command set_udp_port_lidar.
- Delete TCP command set_udp_port_imu.
- Delete TCP command get_lidar_mode.
- Delete TCP command set_lidar_mode.
- Delete TCP command get_config_file_path.
- Delete TCP command set_auto_start_flag.
- Delete TCP command get_auto_start_flag.
- Delete TCP command get_watchdog_status.

### Changed

- Change the Reflectivity values in the packets from 16-bit to 8-bit

### Fixed

- Fixed phase locked motor control to handle out-of-bounds motor velocity.
- Slow time sync on initial boot with PTP
- Fixed aximuth_window parameter logic behavior.

# 4 API Changelog

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**Version** v1.6.0

**Date** 2018-08-16

**Description**

- Add `get_sensor_info` command gives `prod_line` info.

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**Version** v1.7.0

**Date** 2018-09-05

**Description**

- No TCP command change.

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**Version** v1.8.0

**Date** 2018-10-11

**Description**

- `get_sensor_info` command gives `INITIALIZING`, `UPDATING`, `RUNNING`, `ERROR` and `UNCONFIGURED` status.

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**Version** v1.9.0

**Date** 2018-10-24

**Description**

- No TCP command change.

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**Version** v1.10.0

**Date** 2018-12-11

**Description**

- Remove all references of `pulse_mode`.
- Add `get_alerts`, `pps_rate` and `pps_angle` usage commands and expected output.

- Remove TCP commands prior to v1.5.1.

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**Version** v1.11.0

**Date** 2019-03-25

**Description**

- Add section on HTTP API commands.
- TCP Port now hard-coded to 7501; port is no longer configurable.
- Update to SYNC_PULSE_IN and MULTIPURPOSE_IO interface and configuration parameters (see details below).

**Configuration parameters name changes:**

- `pps_in_polarity` changed to `sync_pulse_in_polarity`
- `pps_out_mode` changed to `multipurpose_io_mode`
- `pps_out_polarity` changed to `sync_pulse_out_polarity`
- `pps_rate` changed to `sync_pulse_out_frequency`
- `pps_angle` changed to `sync_pulse_out_angle`
- `pps_pulse_width` changed to `sync_pulse_out_pulse_width`

**New configuration parameters:**

- `nmea_in_polarity`
- `nmea_ignore_valid_char`
- `nmea_baud_rate`
- `nmea_leap_seconds`

**Configuration parameters option changes:**

- **timestamp_mode**
  - `TIME_FROM_PPS` changed to `TIME_FROM_SYNC_PULSE_IN`
- **multipurpose_io_mode (formerly pps_out_mode)**
  - `OUTPUT_PPS_OFF` changed to `OFF`
  - `OUTPUT_FROM_PPS_IN_SYNCED` changed to `OUTPUT_FROM_SYNC_PULSE_IN`
  - Removed `OUTPUT_FROM_PPS_DEFINED_RATE`
  - Added `INPUT_NMEA_UART`

**TCP command changes:**

- **Added commands:**
  - `get_time_info`
- **Changed commands:**

- `get_config_txt` (returned dictionary keys match parameter changes)

- **Removed commands:**
  - `set_pps_in_polarity`
  - `get_pps_out_mode`
  - `set_pps_out_mode`
  - `get_timestamp_mode`
  - `set_timestamp_mode`

**Polarity changes:**

- `sync_pulse_in_polarity` was corrected to match parameter naming.
- `sync_pulse_out_polarity` was corrected to match parameter naming.

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**Version** v1.12.0

**Date**

**Description**

- Corrected IMU axis directions to match Sensor Coordinate Frame.
- Sensor Coordinate Frame section of sensor user manual for details on sensor coordinate frame. This change inverts IMU X, Y, and Z axis relative to v1.11.0.

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**Version** v1.13.0

**Date**

**Description**

- Add TCP command `set_udp_dest_auto`
- TCP command `get_alerts`, includes more descriptive errors for troubleshooting
- Packet Status now called Azimuth Data Block Status and is calculated differently
- Packets with bad CRC are now dropped upstream and replaced with `0` padded packets to ensure all packets are sent for each frame.
- Return format of TCP command `get_time_info` updated
- Removed reference to window_rejection_enable

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**Version** v2.0.0

**Date** 2020-11-20

**Added**

- Add TCP command `get_lidar_data_format`.
- Add in `azimuth_window` documentation.
- Add in commands `phase_lock_enable` and `phase_lock_offset` and their documentation.
- Add in verbose responses to parameter validation for TCP commands.
- Add in command `save_config_params` which supersedes the deprecated command `write_config_txt`, which will be deleted in future firmware.
- Add in command `get_config_param active` in favor of the deprecated command `get_config_txt`, which will be deleted in future firmware.
- Add in new STANDBY and WARMUP statuses.
- Add in parameter `operating_mode` in favor of the deprecated parameter `auto_start_flag`, which will be deleted in future firmware.
- Add in parameter `udp_dest` in favor of the deprecated parameter `udp_ip`, which will be deleted in future firmware. This is to be consistent with the `set_udp_dest_auto` parameter and to reflect that valid values can be hostnames in addition to ip addresses.
- Add in HTTP GET `api/v1/diagnostic/dump` endpoint.

**Removed**

- Remove deprecated TCP command `set_udp_ip`.

**Changed**

- TCP command `get_beam_intrinsics` now returns: 1) `lidar_origin_to_beam_origin_mm`, distance between the lidar origin and the beam origin in millimeters; and 2) beam altitude and azimuth angle arrays with padded zeros removed.
- `azimuth_window` parameter now in terms of millidegrees and implemented CCW.
- Deprecate `api/v1/system/time/` HTTP API and its sub-APIs and replace with `api/v1/time/`

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**Version** v2.1.1

**Date** 2021-06-21

**Added**

- Add configuration parameter `signal_multiplier` and its documentation

**Removed**

- Remove deprecated TCP command `set_data_dst_ip`
- Remove deprecated TCP command `get_data_dst_ip`
- Remove deprecated TCP command `set_udp_port_lidar`
- Remove deprecated TCP command `set_udp_port_imu`
- Remove deprecated TCP command `get_lidar_mode`

- Remove deprecated TCP command `set_lidar_mode`
- Remove deprecated TCP command `get_config_file_path`
- Remove deprecated TCP command `set_auto_start_flag`
- Remove deprecated TCP command `get_auto_start_flag`
- Remove deprecated TCP command `get_watchdog_status`

**Changed**

- Fixed azimuth_window parameter logic behavior. Notable changes:
  - [0,0] now outputs only a single column instead of all columns.
  - [1,2] results in sensor startup failure and an alert because there are no valid output columns.