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# **v2.2.x Changelog**

*Firmware v2.2.x for all Ouster sensors*

**Ouster**

**Dec 22, 2021**

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# 1 Firmware Release Notes

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**Version** v2.2.x

**Date** 2021-12-18

## **Highlighted changes**

1. Added configurable UDP packet format.
2. Introducing Dual Return Mode (Strongest and Second Strongest).
3. Updated sensor web UI.
4. Updated cold temp startup behaviors for improved reliability but longer startup time.

## **Bug fixes**

1. Fixed GPIO input pin polarity flip on newer hardware revisions

## 2 Supported Products

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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
- Rev 05: P/N 840-102xxx-05
- Rev 06: P/N 840-102xxx-06

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**Note:** Dual Return mode is only supported with Rev 06 and above sensors.

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# 3 Firmware Changelog

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**Version** v2.2.0

**Date** 2021-12-18

**Description**

**"Added"**

- Add support for Configurable Data Packet Format
- Add support for Dual Returns mode

**"Changed"**

- Update Sensor Web UI
- Update TCP command get\_lidar\_data\_format
- Update TCP command get\_sensor\_info



**Version** v2.1.3

**Date** 2021-10-22

**Description**

**"Added"**

- Added PN support



**Version** v2.1.2

**Date** 2021-07-16

**Description**

**"Added"**

- Add support for minor hardware revisions



**Version** v2.1.1

**Date** 2021-06-21

**Description**

**"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\_lidarAdded PN support for new turntable boards
- 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 azimuth\_window parameter logic behavior

# 4 API Changelog

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**Version v2.2.0**

**Date** 2021-12-18

**Description**

**"Added"**

- Add config parameter `udp_profile_lidar`, `udp_profile_imu` and their documentation
- Add `initialization_id` to `get_sensor_info` TCP command
- Add `columns_per_packet` to `get_config_param` TCP command

**"Changed"**

- The fields `base_pn`, `base_sn`, and `proto_rev` in `get_sensor_info` TCP command have been cleared

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**Version v2.1.3**

**Date** 2021-10-22

**Description**

**"Added"**

- Added PN support

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**Version v2.1.2**

**Date** 2021-07-16

**Description**

**"Added"**

- Add support for minor hardware revisions

→

**Version v2.1.1**

**Date** 2021-06-21

**Description**

**"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.

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### Version v2.0.0

Date 2020-11-20

### Description

#### "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 v1.13.0

##### Date

##### Description

### "Added"

- Add TCP command `set_udp_dest_auto`
- TCP command `get_alerts`, includes more descriptive errors for troubleshooting

### "Changes"

- 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"

- Removed reference to `window_rejection_enable`

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#### Version v1.12.0

##### Date

##### Description

### "Changes"

- 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 v1.11.0

##### 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.

#### Version v1.10.0

**Date** 2018-12-11

#### Description

#### "Added"

- Add `get_alerts`, `pps_rate` and `pps_angle` usage commands and expected output.

### **"Removed"**

- Remove all references of `pulse_mode`.
- Remove TCP commands prior to v1.5.1.

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### **Version v1.9.0**

**Date** 2018-10-24

### **Description**

### **"Changes"**

- 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.

### **Version v1.7.0**

**Date** 2018-09-05

### **Description**

### **"Changes"**

- No TCP command change.

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### **Version v1.6.0**

**Date** 2018-08-16

### **Description**

### **"Added"**

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