# M10P

## Communication Protocol

**V2.0.1 2024.07**

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# Table of Contents

# 1 Overview

The M10P's point cloud data output and the writing and querying of calibration parameters as well as the configuration of various states are performed via the serial/network port. The point cloud output protocol is 160 bytes long, including angle, speed, distance and GPS time information (hardware support required); the calibration protocol contains pulse width calibration parameters, distance calibration parameters and some function parameters; the parameters written to the lidar contain instructions such as lidar stop and start.

# 2 Communication Protocol

## 2.1 Serial Port Configuration

Baud rate: 512000 bps

Check bits: NONE

Data bits: 8

Stop bit: 1

Data format: HEX format, H for high byte

## 2.2 Network Port Configuration

Unicast Mode:

| MAC | Varies | Fixed |
|---|---|---|
| Local IP | 192.168.1.200 (Default) | Modifiable |
| Local Data Package Port Number | 2369 (Default) | Modifiable |
| Destination IP | 192.168.1.102 (Default) | Modifiable |
| Destination Data Package Port Number | 2368 (Default) | Modifiable |

Broadcast Mode:

| MAC | Varies | Fixed |
|---|---|---|
| Local IP | 192.168.1.200 (Default) | Modifiable |
| Local Data Package Port Number | 2369 (Default) | Modifiable |
| Destination IP | 192.168.1.255 (Default) | Modifiable |
| Destination Data Package Port Number | 2368 (Default) | Modifiable |

## 2.3 Point Cloud Output Protocol

| Byte_0 | Byte_1 | Byte_2 | Byte_3 | Byte_4 |
|---|---|---|---|---|
| **A5** | **5A** | **Len_H** | **Len_L** | **Angle_H** |
| Byte_5 | Byte_6 | Byte_7 | Byte_8 | Byte_9 |
| **Angle_L** | **Speed_H** | **Speed_L** | **Distance_1_H** | **Distance_1_L** |
| Byte_10 | Byte_11 | **.....** | Byte_146 | Byte_147 |
| **Distance_2_H** | **Distance_2_L** | **.....** | **Distance_70_H** | **Distance_70_L** |
| Byte_148 | **.....** | Byte_157 | Byte_158 | Byte_159 |
| TIME | TIME | TIME | **0xFA** | **0xFB** |

1) Byte_0- Byte_1: frame header, fixed as A5 5A.

2) Byte_2- Byte_3: Len_H/ Len_L are the length of data frame, from the first byte to the last byte.

3) Byte_4- Byte_5: Angle _H/ Angle _L are the starting angle of the current data segment, for example: 0x8C 0xA0 equals the decimal number 36,000, which represents the angle of 360°, i.e. 0°.

4) Byte_6- Byte_7: Speed _H/ Speed _L are the current rotate speed, representing the counted time it takes for the lidar to move from one tooth to the next. The calculating formula is: rotate speed = 2,500,000/speed. For example: 0xD 0x90 equals the decimal number 3472, which means the speed is 720 rpm/minute, i.e. 12 Hz.

5) Byte_8- Byte_147: Distance_x _H/ Distance_x_L are the distance value, in mm.

   For example: Distance_x _H =0x13, Distance_x_L =0x88, the distance value equals the decimal number 5000, which is 5 meters.

   If the distance parameter is 0XFFFF, then this data point is invalid and the point cloud number in the data frame should subtract 1. Therefore, the actual point cloud number turns to 69 (normally 70). Similarly, if there are two 0xFFFF, the actual point cloud is 68.

   The angle difference between every two-point cloud is: 15 divide the actual

point cloud number (m). So, the angle of every point cloud in the data frame is:

The horizontal angle of the $N^{th}$ point = angle_CodedDisc + 15 / m * N (N = 0,1 ... m-1)

6) Byte_148- Byte_157: GPS time information (GPS module connection is needed for time information output), in order: year-month-day-hour-minute-second-high 8 bytes of millisecond- low 8 bytes of millisecond- high 8 bytes of microsecond- low 8 bytes of microsecond.

7) Byte_158- Byte_159: frame tail, fixed as 0XFA 0XFB.

# 3 Control Lidar on PC

You can control the lidar to stop or start scanning on the PC, instructions are as follows:

Through ROS driver:

rostopic pub -1 /lslidar_difop_switch std_msgs/Int8 "data: 1"  (start lidar)

rostopic pub -1 /lslidar_difop_switch std_msgs/Int8 "data: 0"  (stop lidar)

# Revision History

| Rev. | Release Date | Revised Content | Issued/Revised By |
|---|---|---|---|
| V2.0.0 | 2022-07-18 | Initial version | LS1286 |
| V2.0.1 | 2024-04-07 | Point cloud output protocol modified | LS1499 |
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*This product information is subject to change without notice.

LSLIDAR

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