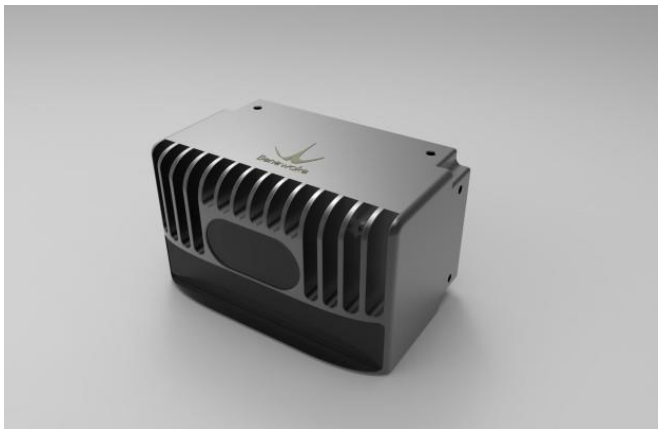
CE30-C Solid State Array LiDAR
Commands Description



Benewake (Beijing) Co., Ltd

Table of Contents

1. Introduction

The commands described in this documentation are used to control Benewake CE30-C LiDAR's work status, output data types and some data processing within embedded program. To make CE30-C work stably and output reliable data, we recommend that let CE30-C work with default sets.

2. Command Format

Benewake CE30-C LiDAR communicates with another device through TCP socket. The LiDAR is set as the server. Its default IP address is 192.168.1.80 and port is 50660. The IP address can be changed by command and users should carefully remember the IP address that they changed to, because there is no other way to connect LiDAR or reset LiDAR's IP address.

The length of every command is fixed to 50 bytes. If the actual length of the command is shorter than 50 bytes, the last should be filled with SPACE or 0x00 after the end of the command to reach the length of 50 bytes. Below uses the Start command as an example:

$$"getDistanceAndAmplitudeSorted\underbrace{\quad\quad\quad\quad\quad\quad\quad}_{21\ bytes\ spaces}"$$

Figure 1 The Start command that should be send to CE30-C

3. Notices

- Any setting command should be sent before using Start command. Because CE30-C will not apply any set change when it is measuring.
- Any set change through command is not permanently saved. All sets will be reset to default after CE30-C reboots.
- For any return value that longer than 1 byte, the format is **little endian**.
- This documentation only presents some general-purpose commands. Others, which need internal permissions or may cause not working properly, are not included.

4. Commands

4.1. Start Measurement

Command: getDistanceAndAmplitudeSorted

Return: the output data, see description

Description:

This command makes CE30-C start measurement. The output frequency is 20 frames per second

and one frame data could include:

No.	Output	Length	Enable	Description
1	Distance	24*320*2 bytes	Mandatory	Every 2 bytes stand for the distance value of a pixel in centimeter. The output sequence is from right to left and then from top to bottom.
2	Amp	24*320*2 bytes	Mandatory	Every 2 bytes stand for the received light intension of a pixel. The output sequence is from right to left and then from top to bottom.
3	Gray Data	24*320*2 bytes	Optional	Every 2 bytes stand for the gray value (from 2048 to 4096) of a pixel. The output sequence is from right to left and then from top to bottom.
4	Nearest Point	3 bytes	Optional	First 2 bytes stand for the distance value (in centimeter) of the Nearest point within the field of view. The last one byte stands for the horizontal position of the point within the field of view, and is in degree while the center of the field of view is at 0 degree.

4.2. Stop Measurement

Command: join

Return: none

Description:

This command makes CE30-C stop measurement.

4.3. Disconnect

Command: disconnect

Return: none

Description:

This command should be send when LiDAR is not measuring. This command makes CE30-C stop TCP socket communication.

4.4. Get Firmware Version

Command: version

Return: 6 bytes version information

Description:

This command should be send when LiDAR is not measuring. The return is string type data like "c4.9.8".

4.5. Region of Interest

Command: roi *width distance rows*

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failed

Description:

This command should be send when LiDAR is not measuring. This command set CE30-C's region of interest. Data within the *width* and *distance* (all in centimeter) will be outputted and others will be set to 0. The value can be set from to 0 to 65535, and 0 is equivalent to 65535. *Rows* define how many rows of pixel should be outputted (maximum to 24), and its value can be set to:

0 - 8 rows

1 - 2 rows

2 - 16 rows

3 - 24 rows

Default set is "roi 0 0 3".

4.6. Gray Data Output

Command: enableFeatures 131072 / disableFeatures 131072

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failure

Description:

This command enables or disables the output of gray data. More information about the gray data is described in Start Command's description.

Gray data output is disabled by default.

4.7. Nearest Point Output

Command: enableFeatures 1 / disableFeatures 1

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failure

Description:

This command enables or disables the output of nearest point data. More information about the nearest point data is described in Start Command's description.

Nearest point data output is enabled by default.

4.8. Ambient Light Compensation

Command: enableFeatures 8388608 / disableFeatures 8388608

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failure

Description:

This command enables or disables the ambient light compensation. This compensation will reduce the influence of ambient light to the output data, especially when CE30-C is used outdoor.

Ambient light compensation is enabled by default.

Notice: Ambient light compensation is not dynamic. That means CE30-C will not adjust the compensation with each measurement. CE30-C uses first several frames of data to estimate ambient light level when it starts measurement.

4.9. Change IP Address

Command: ipconfig *field1 field2 field3 field4*

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failure

Description:

This command is used to set CE30-C LiDAR's IP address to a new one, so that make it possible to connect several LiDAR to the same device. For example, we want to change LiDAR's IP address to 192.168.2.1, then we should send command: "ipconfig 192 168 2 1[30 bytes 0x00]", and we should change the IP address of the device, that connected to LiDAR, to192.168.2.xxx.

Notice: When the command is executed, CE30-C LiDAR will reboot immediately and apply the change. After the indicator turn on and became blue again, users can connect device to the LiDAR with the new IP address.

4.10. Set FPS

Command: setFps *fps*

Return: 4 bytes, 0x00000000 for success and 0xffffffff for failure

Description:

This command should be send when LiDAR is not measuring. *Fps* should be decimal. The value should be larger than 0 and should NOT larger than 20, otherwise the LiDAR's FPS will be set to 20.

4.11. Start Several Times Measurement

Command: getDistanceAndAmplitudeSortedTimes *times*

Return: *times* frames of data

Description:

This command starts several times measurement and should NOT be used when LiDAR already start measurement. The output form is the same as Start Measurement command, but the output will automatically stop when the measurements are finished. It can be used as a triggering mode.