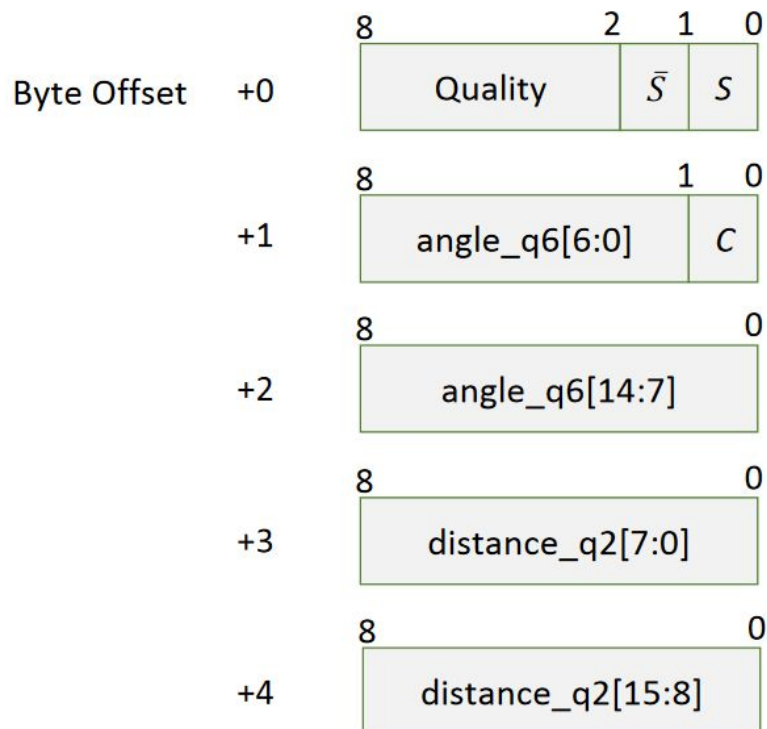


# Communication with RPLiDAR

- The RPLIDAR uses a non textual binary data packet based protocol to communicate with host systems
- The communication session is always initialised by host system
- startMotor() call will start the motor.
- startScan() call will start the scan.
- The data, which contains the angle and distance values will be sent in the following format:

## Format of the Data Response Packets :



- Details about the data :

Field Name	Description	Examples / Notes
S	Start flag bit of a new scan	When S is set to 1, the current and incoming packets belong to a new 360° scan.
$\bar{S}$	Inversed start flag bit, always has $\bar{S} = !S$	Can be used as a data check bit.
C	Check bit, constantly set to 1	Can be used as a data check bit.
quality	Quality of the current measurement sample	Related the reflected laser pulse strength.
angle_q6	The measurement heading angle related to RPLIDAR's heading. In degree unit, [0-360] Stored using fix point number.	Refer to the below figure for details. Actual heading = angle_q6/64.0 Degree
distance_q2	Measured object distance related to RPLIDAR's rotation center. In millimeter (mm) unit. Represents using fix point. Set to 0 when the measurement is invalid.	Refer to the below figure for details. Actual Distance = distance_q2/4.0 mm

*Figure 4-5 Field Definition of a RPLIDAR Measurement Result Data Response Packet*

- Some important functions:

Function Name	Brief Introduction
startMotor()	Request RPLIDAR to start the motor rotating. For RPLIDAR A1, this interface will enable DTR to set the motor start rotating by default. For RPLIDAR A2, this interface will start the motor by using the default duty cycle and configure the rotating speed.
stopMotor()	Request RPLIDAR to stop the motor rotating.

*Figure 3-1 RPLIDAR Functions Related to Motor Control*

Function Name	Brief description
startScan()	Request the RPLIDAR core to start measurement scan operation and send out result data continuously If the Express Scan mode is supported, and the program invokes the startScan() by using the default parameters
startScanNormal()	Force the RPLIDAR core to start measurement scan operation in Scan mode
startScanExpress()	Force the RPLIDAR core to start measurement scan operation in Express Scan mode. If the RPLIDAR firmware not supports Express Scan mode, the function will fail the execution.
stop()	Request the RPLIDAR core to stop the measurement scan operation.
grabScanData()	Grab a complete 360-degrees' scan data sequence.
ascendScanData()	Rank the scan data from grabScanData() as the angle increases.

*Figure 3-2 RPLIDAR Functions related to Measurement Scan Operation*

Function Name	Brief description
getHealth()	Get the healthy status of an RPLIDAR
getDeviceInfo()	Retrieve the device information, e.g. serial number, firmware version etc, from an RPLIDAR
getFrequency()	Calculate an RPLIDAR's scanning speed from a complete scan sequence.
checkExpressScanSupported()	Check whether the RPLIDAR supports Express Scan mode
getSampleDuration_uS()	Get the single measurement duration in standard scan mode and express scan mode respectively. The unit is micro second.

*Figure 3-3 RPLIDAR Functions related to Retrieving Other Information Operation*

Some important links:

1. [RPLiDAR communication protocol intro manual](#)
2. [RPLiDAR SDK intro manual](#)
3. List of all functions can be got from [rplidar\\_driver\\_impl.h](#)
4. A [sample code](#) to read data as given in the sdk.