

# Wiseome Product Datasheet

## *Mini Lidar* **Mini Lidar**

### **Laser Range Finder module**

Model No.: **iPin-DRB221**

※ The information in this document is subject to change without prior notice.

# Contents

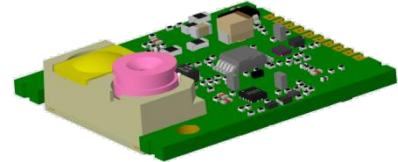
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## • Introductions

Range sensing is an essential affair in our life. There are lots of range sensing tools but most of them are too big that we won't carry it anywhere, anytime. This product, **iPin Mini Laser Range Finder**, is an extraordinarily small module which is capable to be embedded in smartphones and other mobile devices. Fundamental version provides a visible single-point distance measurement ability up to 20m. By combining with camera and IMU, we offer powerful photogrammetry measurement solution on multiple applications in advanced version.

### Features

- Ultra small LRF module
- Point to point distance measurement up to 20m
- Visible red light, comply with safety regulation



## • Hardwares

### 1. Electrical and Optical Characteristics (Tc = 25°C)

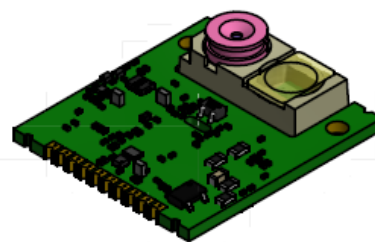
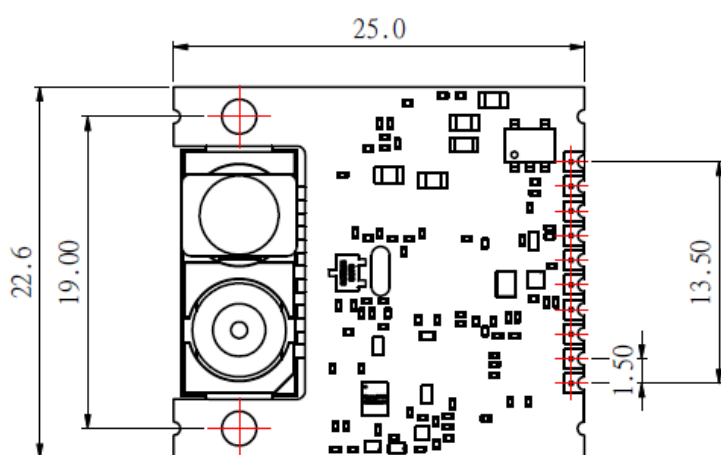
| Characteristics                         | Values               | Condition |
|---|----------------------|-----------|
| Operating Voltage                       | 3.6 ~5 V             |           |
| Supply Current                          | 300 mA               |           |
| Measuring Range and Tolerance (typical) | 0.1 ~ 20 m / ±3 mm   | *1, *2    |
| Laser Wavelength                        | 650 ~ 660 nm *3      | 25°C      |
| Laser Class                             | Class 3R             | < 5mW     |
| Interface                               | UART                 |           |
| Size (L X W X H)                        | 25.0 x 22.6 x 7.3 mm |           |

\*1 The measuring range and tolerance are depending on how much laser light reflect from target back to module and the brightness of the laser spot to the ambient light intensity (interior spaces, twilight). In unfavorable situation (ex.: outdoor measuring under intense sunlight), using an assistant target plate would be necessary.

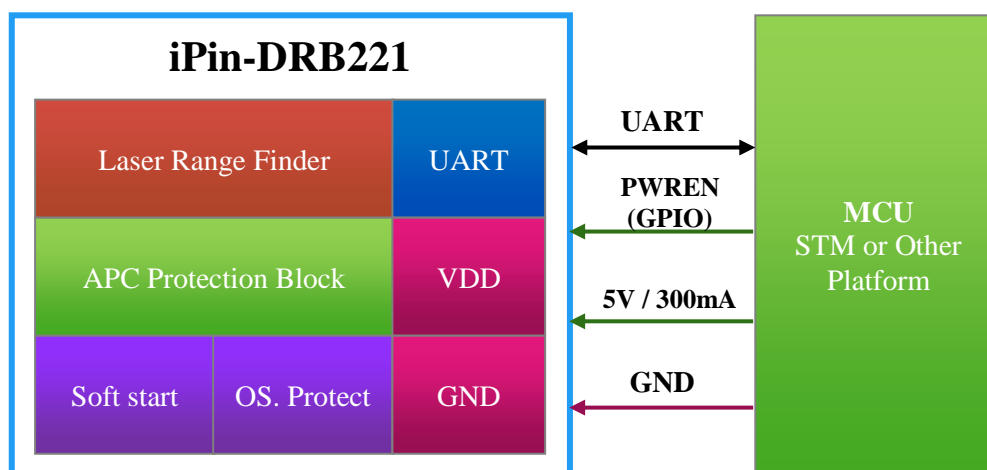
\*2 In favorable condition (ex.: target on white paper and 300~500 lx background illumination at 25 degree C), measuring range is up to 20m and 0.25mm/m tolerance deterioration must be taken into account. In unfavorable condition (ex.: target an insufficiently reflecting surface or measuring at high or low temperature environment), measuring range is reduced to 10m or less and 0.5mm/m tolerance deterioration must be taken into account.

\*3 It can be changed to other red or near-IR wavelength depending on requirement.

## 2. Outline Dimensions

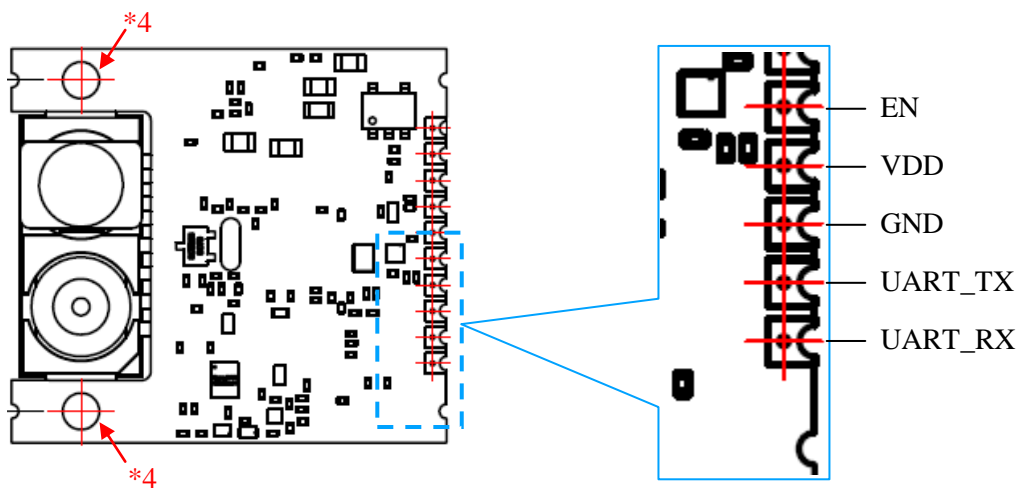


## 3. Function Block Diagram



## 4. Pinout Definition

| Pin #            | Signal Name | Pin Function   |
|------------------|-------------|--|
| 1                | UART_RX     | UART Input   |
| 2                | UART_TX     | UART Output  |
| 3                | GND         | Ground   |
| 4                | VDD         | Supply Voltage   |
| 5                | EN          | Enable Input :<br>V <sub>en</sub> : High to turn on the device |
| ※ Connector: TBD |             |  |



\*4 Please note that using electric insulation materials when contact both apertures for mechanical holding or other purpose.

## 5. Serial port Communication Protocol

### ◆ Data Communication Protocol

|                         |        |
|-------------------------|--------|
| Communication interface | UART   |
| Default baud rate       | 115200 |
| Data bit                | 8      |
| Stop bit                | 1      |
| Parity check            | None   |

## ◆ Standard data output format (Default)

| Byte 0                | Byte 1                                   | Byte 2  | Byte 3  | Byte 4 |
|-----------------------|--|---------|---------|--------|
| Header(0xCD)          | Addr                                     | Cmd MSB | Cmd LSB | CRC    |
| Data Code Explanation |  |         |         |        |
| Byte 0                | 0xCD, Frame header (8 bits)              |         |         |        |
| Byte 1                | 0x01, Address bytes (8 bits)             |         |         |        |
| Byte 2                | Command most significant byte            |         |         |        |
| Byte 3                | Command least significant byte           |         |         |        |
| Byte 4                | Checksum (Addr byte + Cmd MSB + Cmd LSB) |         |         |        |

## ◆ Command

| Command Code | Definition              |
|--------------|-------------------------|
| 0x0003       | Turn On Laser           |
| 0x0004       | Turn Off Laser          |
| 0x0005       | Single-shot measurement |
| 0x0006       | Continuous measurement  |

## ◆ Turn On Laser

UART Send:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x03   | 0x04   |

UART Receive:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x03   | 0x04   |

## ◆ Turn Off Laser

UART Send:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x04   | 0x05   |

UART Receive:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x04   | 0x05   |

## ◆ Single-shot measurement

UART Send:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x05   | 0x06   |

UART Receive:

Normally, reply measure result to master, measure result = 0xAABBCCDD millimeters.

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x05   | 0xAA   | 0xBB   | 0xCC   | 0xDD   | CRC    |

Receive Error reply from slave

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4     | Byte 5 |
|--------|--------|--------|--------|------------|--------|
| 0x0E   | 0x01   | 0x00   | 0x05   | Error Code | CRC    |

## ◆ Continuous-shot measurement

UART Send:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x06   | 0x07   |

UART Receive:

Normally, reply measure result to master, measure result = 0xAABBCCDD millimeters.

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xCD   | 0x01   | 0x00   | 0x06   | 0xAA   | 0xBB   | 0xCC   | 0xDD   | CRC    |

Receive Error reply from slave

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4     | Byte 5 |
|--------|--------|--------|--------|------------|--------|
| 0x0E   | 0x01   | 0x00   | 0x05   | Error Code | CRC    |

## ◆ Error Code Condition

| Error Code | Definition                              |
|------------|---|
| 0x01       | Measurement out of range or unavailable |

## • Precaution

- ◆ Do not observe laser beam, include visible and invisible laser, directly or indirectly by human eye since it may cause permanent damage instantly.
- ◆ The transparent cover on laser measure is an optical element. Do not contaminate the optical cover by soiling, oil or chemical.
- ◆ Be care of handing the module. Although it was made as firm as possible, it might still be damaged or deviated the designed position by mechanical impact.



## • Revision History

| Version    | Modification Content  | Date       |
|------------|---|------------|
| <b>0</b>   | Original version  | 2020/11/12 |
| <b>1</b>   | 1. Laser wavelength can be customerized<br>2. Laser class: class 2 change to 3R | 2021/4/15  |
| <b>1.1</b> | Add Serial port Communication Protocol  | 2021/5/19  |
|            |   |            |