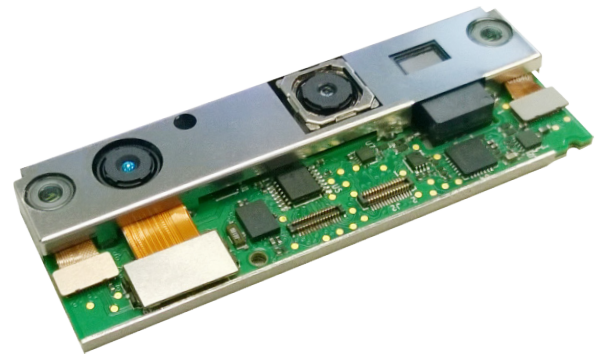


The Jabil Carbon module is an advanced 3D sensing module that is capable of high resolution 3D imaging at ranges from 0.3m to 5m. The modular design allows for multiple configurations and customization. It was designed with mobile platforms in mind. It is slim, compact, and low power.

The current iteration and specifications are based on a DOE and algorithm designed by Qualcomm and is compatible with the chip sets listed in this document.

AVAILABLE QUALCOMM API INCLUDES

- | | |
|------------------|----------------------------------|
| Bokeh Effect | Room Scanning |
| Surface Scanning | Facial Recognition (Face Unlock) |



LASER PROJECTION MODULE

- Height: 4.8mm
- Foot Print: 9mm X 14mm
- Flex Cable Connection – ZIF or B to B
- Laser Wavelength: = 825nm
- Optical Output Power: 220 mW CW
- Dot Pattern Resolution (Standard): 464 X 348 (with 4:3 sensor)

NIR CAMERA

- Z height: 4.9 mm
- Foot Print: 9mm X 9mm
- Monochrome 4MP sensor
- MIPI interface
- F2.2 fixed focus lens
- Up to 20 fps
- Power at max frame rate 280 mW

IMPLEMENTATIONS

- Long Range
 - Depth: 0.3m to 5M
 - Baseline: 43mm
- Short Range
 - Depth: 30cm to 100cm
 - Baseline: 30mm

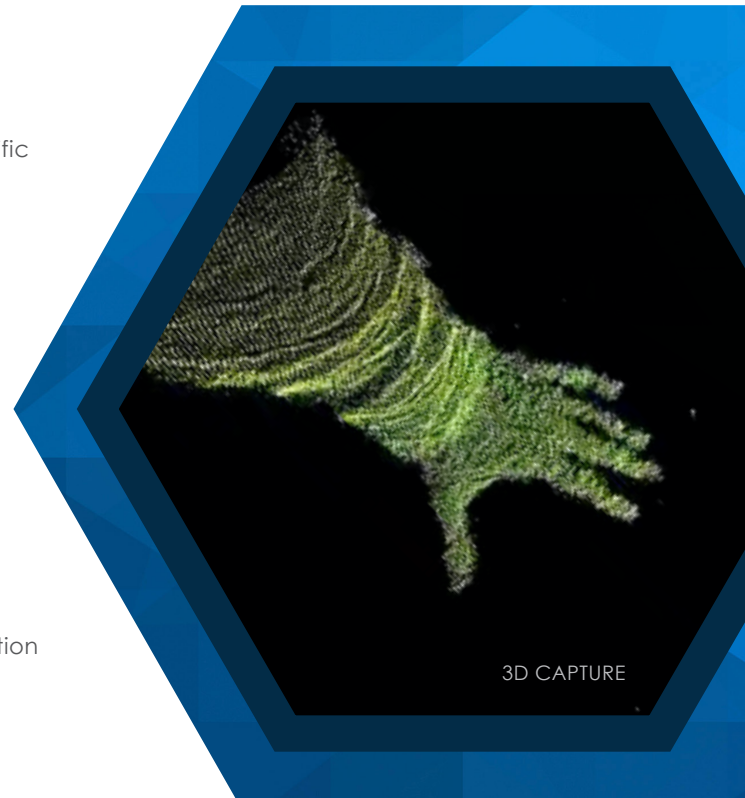
(Baseline: Distance from center of LPM to center of NIR camera)

QUALCOMM CHIP TIERS SUPPORTED

- SDM 660, mid-tier
- SDM 835
- SDM 845
- QVR 835, VR Specific
- QVR 845

HOW IT WORKS

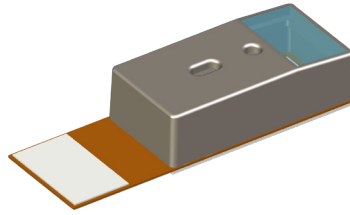
- Module generates a dot pattern NIR spectrum and projects into the scene
- Dot pattern is optimized for the Qualcomm chipset & algorithm
- Designed for easy integration into mobile devices
- Design ready for high volume manufacturing
- Enables high precision 3D mapping for ultra-high resolution images
- The modular design allows for custom layout and footprint optimization based on use case and application specific constraints



LASER PROJECTION MODULE

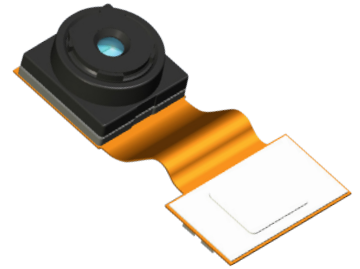
Design is configurable to user application:

- Custom pin-out
- Custom connector
- Custom DOE
- Custom laser diode (wavelength, power)



NIR CAMERA

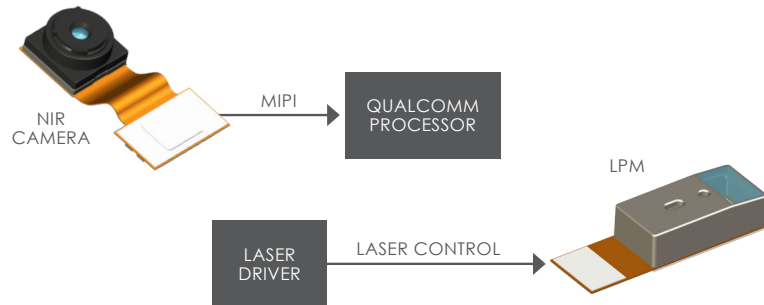
- High Sensitivity 2 μm Pixel
- MIPI interface
- F/2.2 Lens
- 280mW max power consumption
- Standard FOV:
 - Horizontal: 60°
 - Vertical: 45°
- Standard Fixed Focus supports 0.5m to 5m depth measurement
- Configurable options:
 - Fixed focus adjusted for short range applications
 - Custom Notch and Bandpass light filters
 - Custom sensor



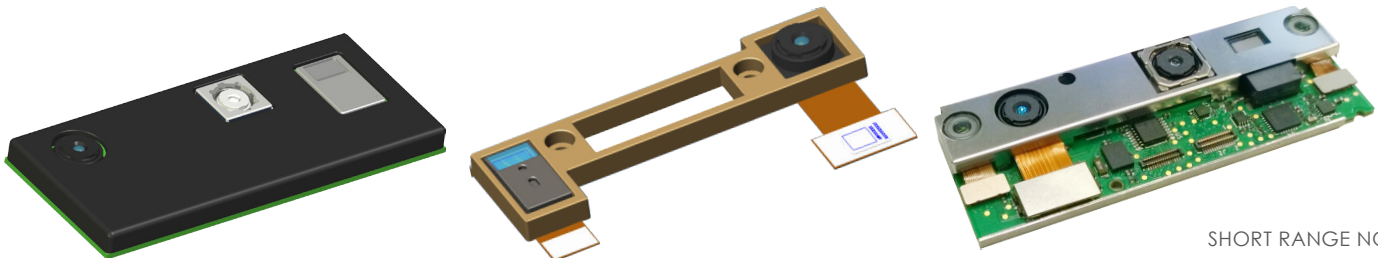
IMAGING CONFIGURATIONS

- Ability to integrate off-the-shelf RGB sensor of customer's choice
- Dual fish-eye camera support for stereoscopic sensing applications
- Customized imaging configurations based on application
 - LPM + NIR
 - LPM + NIR + RGB
 - LPM + NIR + RGB + 2 Fish Eye
 - LPM + NIR + 2 Fish Eye
- Hardware synchronization for all imaging modes and configurations

BLOCK DIAGRAM



EXAMPLE SYSTEM IMPLEMENTATIONS



SHORT RANGE NOT SHOWN