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# Dismantling Report: DJI Front View Binocular Camera and Innovusion LIDAR

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# DJI Automotive Front View Binocular Camera

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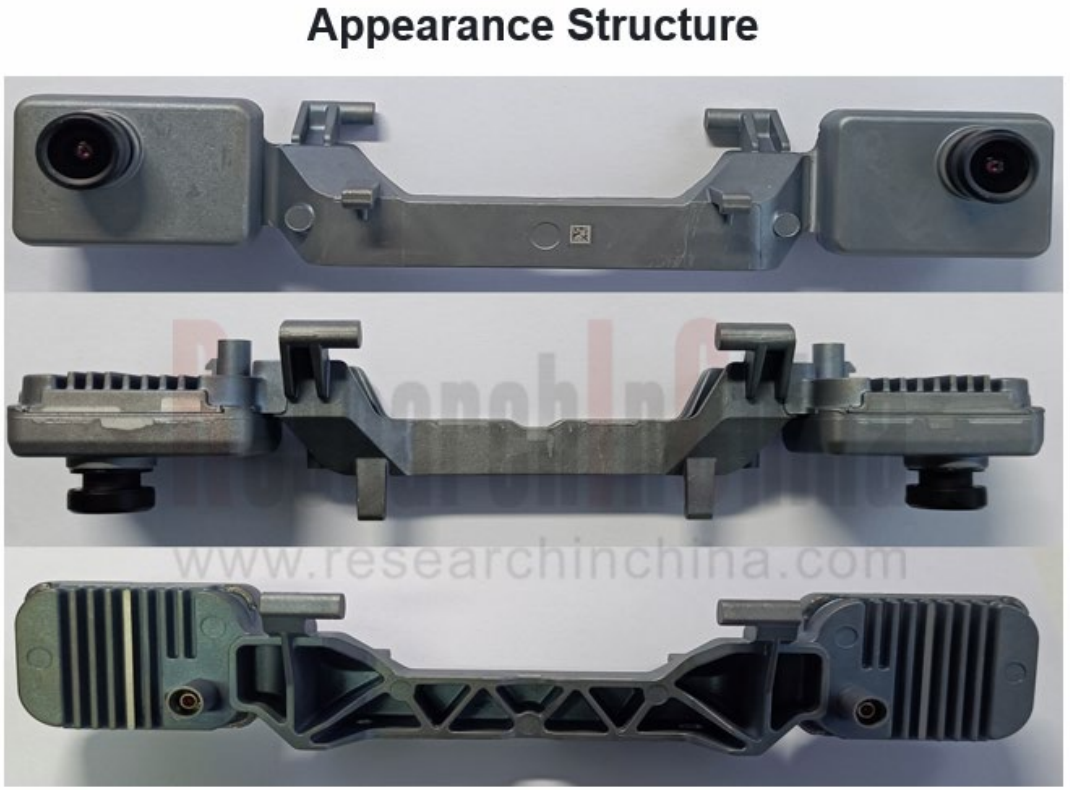
Recently, ResearchInChina selected two key components essential to current intelligent driving assistance systems - front view camera and LIDAR, conducted a complete dismantling, and formed "DJI Automotive Front View Binocular Camera and Innovusion LIDAR Dismantling Report, 2022".

**DJI Automotive Front View Binocular Camera**

DJI entered intelligent driving field in 2016 with its technological advantage in binocular vision for drones. 2023 Baojun KiWi EV DJI Edition was officially launched in September 2022, announcing that the first mass-produced intelligent driving assistance system project of DJI Automotive was officially landed and delivered to users. Baojun KiWi EV DJI Edition is equipped with "Lingxi Intelligent Driving System" jointly created by SAIC-GM-Wuling and DJI Automotive. The system integrates core hardware such as high stability processor, stereo vision binocular camera, high-definition surround view camera and high-precision radar. Intelligent parking can achieve 360 ° efficient intelligent parking, AI smart exiting and other functions. Intelligent driving can realize intelligent active recommendation, intelligent following, intelligent passing of curves, intelligent lane change, intelligent queue cutting response and other functions to achieve assisted driving in common urban congestion scenarios, urban expressway scenarios, diverse parking scenarios, etc. In many industry media reviews and user real use scenarios, Lingxi Intelligent Driving System has been highly praised.

The DJI front view binocular camera dismantled by ResearchInChina is exactly from Baojun KiWi EV DJI Edition.




DJI Automotive front view binocular camera module (from top to bottom: front view, top view, bottom view)

# DJI Automotive Front View Binocular Camera

DJI Automotive front view binocular camera, the overall length of the prototype module reaches 215mm, the distance between the center of the left and right two cameras (baseline length) is 180mm, the basic size of monocular module is 49×35×42mm. The appearance structure is symmetrical, and the overall module is made of ADC12 die-casting aluminum, and an integrated back cover is applied. The central bracket structure connects the left and right monocular module together, and the monocular module back cover is integrated with the bracket in a compact structure.

**Internal Structure**

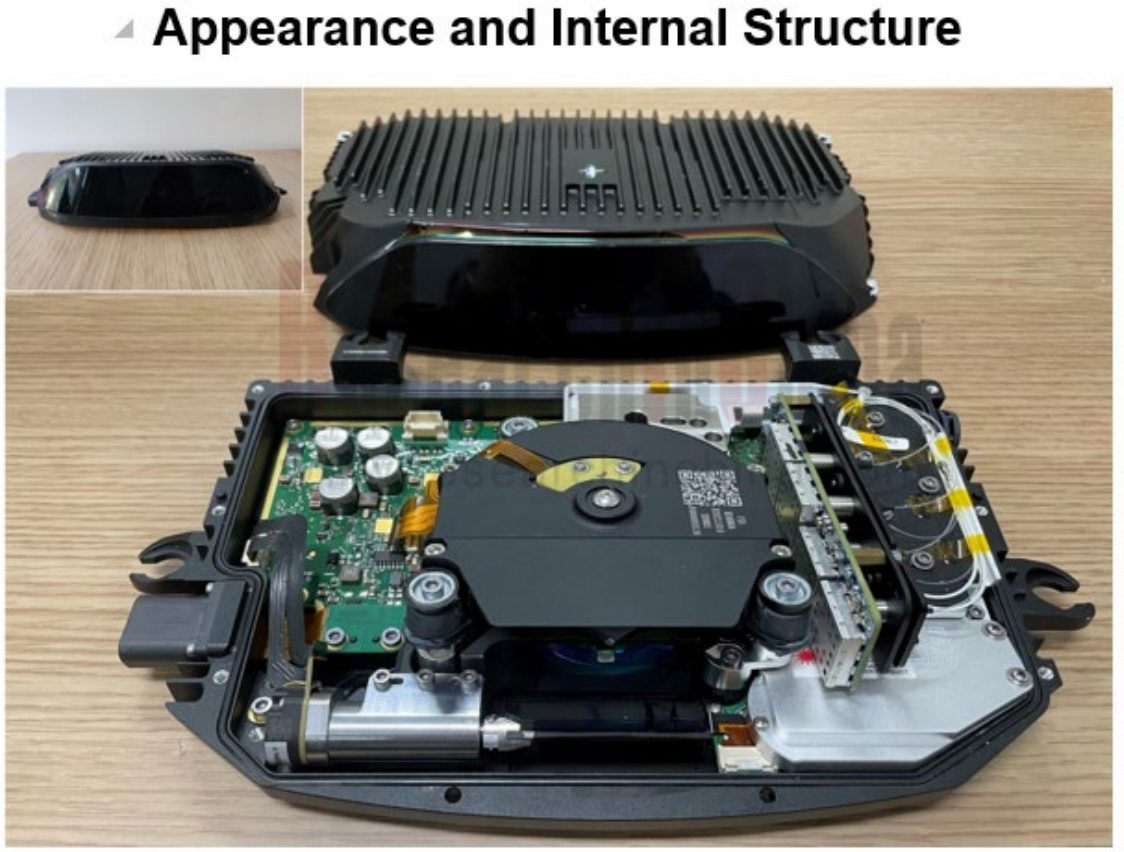
The single camera module hardware of DJI Automotive binocular camera is mainly concentrated in front shell, which is connected to the back cover by welding on all sides, and the lens is bonded to the front shell by AA glue, while the welding seam gap between the front shell and the back cover has no waterproof treatment. The sensor board of the monocular module is connected to the front shell by three 2.5mm tapping screws, and the sensor board is positioned with the front shell by pins with high positioning accuracy.

For key components, the automotive HDR image sensor adopts Sony IMX390, 2.45MP, CMOS size is 1/2.7-inch, maximum resolution is 1080P, can record 10bit 60fps video, and dynamic sensitivity is 120dB; The serializer uses Maxon MAX96717F GMSL serializer, receives video through MIPI CSI-2 interface, outputs it on GMSL2 serial link transceiver, simultaneously sends and receives bi-directional control channel data through the same GMSL2 link.

**Innovusion LIDAR**

Currently, domestic LIDAR manufacturers that have achieved OEM mass production include Innovusion, RoboSense, and HESAI, among which Innovusion has R&D layouts both at home and abroad, and its Falcon LIDAR has been pre-installed in NIO ET5/ET7/ES7 models. Innovusion has R&D centers in Silicon Valley, Suzhou and Shanghai, and vehicle-grade LIDAR manufacturing bases in Ningbo and Wuhan.

Innovusion Falcon LIDAR dismantled by ResearchInChina comes from NIO ET7 model.
Falcon LIDAR equipped by NIO ET7 uses 1550nm wavelength laser, with a maximum detection distance of 500 meters, and a detection distance of 250 meters under 10% reflectivity, with a horizontal angle of 120 ° and a resolution of 0.06 ° * 0.06 °. The principle of Innovusion Falcon and Luminar LIDAR is almost identical, and the transmitting part is also fiber laser.




Internal structure of the Innovusion Falcon LIDAR installed in the NIO ET7 model

The key component of the transmiting part of Falcon LIDAR is fiber laser pump source. The fiber laser pump source is from BWT Beijing, the model is K940EB2HN, and the price is estimated at 2500-3000 yuan. Docked with the pump source is a 1′4″ WDM wavelength division multiplexer, which is a technology that combines multiple modulated optical signals of different wavelengths (or frequencies) at the sending end through a multiplexer (also called a multiplexer, Mux) and sends them together into the same optical fiber of the optical line (optical fiber transmission link) for transmission. At the receiving end, the demultiplexer (also called a demultiplexer, demux) is used to receive the signals of different wavelengths separately, and then decode them.

The MCU that controls the laser transceiver is located near the pump source. This is Silabs' EFM8 series MCU, which is the most common optical module MCU.

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