seeed studio

INDUSTRIAL PRODUCT DATASHEET

reCamera Gimbal 2002w & Optional Accessories

An open-source AI pan-tilt camera with modular design, built-in YOLO11 models, and low-code Node-RED workflow for target tracking and customizable applications.

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Overview



The reCamera Gimbal 2002w is a pan-tilt AI camera with dual-axis motorized mount (360° yaw, 180° pitch) for automatic target tracking, featuring built-in YOLO11 AI models and a 1TOPS NPU. Its modular design includes swappable sensor boards and core board options, complemented by fully open-source hardware/software and low-code Node-RED development for rapid deployment.

Key Features

Feature 1: A Pan-Tilt AI Camera

reCamera Gimbal has a dual-axis motorized mount which has 2 brushless motors support 360° yaw and 180° pitch motion. It allows reCamera automatically follow targets. For example:

- **Active Human Tracking and Counting**: reCamera Gimbal follows people in the scene while simultaneously counting the number of people.
- **Gesture Control**: reCamera Gimbal recognizes the gestures for “rock,” “paper,” and “scissors,” and rotates to a designated angle accordingly
- **Car Tracking**: reCamera Gimbal tracks a red car

reCamera Gimbal has many more possibilities. Feel free to share us your ideas:)

Feature 2: Built-in YOLO11 AI Models & 1TOPS NPU Computing Power

4 YOLO models pre-installed:

- **Object Classification**
- **Objection Detection**
- **Pose Detection**
- **Instance Segmentation**

reCamera includes an Ultralytics commercial license, you can directly use the **built-in YOLO models** for commercial or personal projects.

Feature 3: Modular Design

reCamera adopts a modular design. You can choose the components based on your needs.

Sensor Board features a swappable and interchangeable camera module design. The current version comes with the OV5647 sensor. If you need higher imaging performance, we also offer a version with an sensor board with GC2053 **reCamera 2002 Sensor Board GC2053** which has 1/2.9'' CMOS sensor and **supports changing lenses**. We also offer M12 lens options for different FOV requirements. More sensor boards are on the way - feel free to share your needs at **GitHub · Where software is built**

Core Board provides system control and computing power. It has a RISC-V SoC and a 1Tops@Int8 NPU. Also, the Core Board provides Wifi capability. We offer individual Core Boards, allowing users to purchase the core board separately and build their own custom reCamera:

reCamera 2002w Core Board 64GB with Aluminium Frame

reCamera 2002 Core Board 64GB with Aluminium Frame

reCamera 2002w Core Board 8GB with Aluminium Frame

reCamera 2002 Core Board 8GB with Aluminium Frame

Base Board provides connectivity. It offers interfaces including USB, Ethernet and debug serial ports enabling easy integration with external devices and systems.

Feature 4: Fast Development/Deployment with Node-RED

Node-RED enables low-code, visual workflow building. This allows users to build and manage application logic quickly with minimal coding.

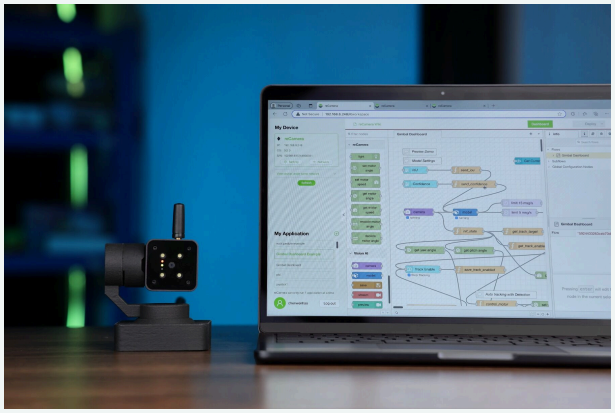
Based on Node-RED, we provide product-specific nodes that let you deploy a model and see results immediately For example, simply drag in a Camera, Model, and Preview node to complete the application flow.

Feature 5: Fully Open-sourced Hardware/Software

reCamera is fully open-sourced so user can modify software, and AI pipelines without limitation. **You can train own YOLO model and deploy it on reCamera.**

- **Hardware:** module board documentation is fully open, including 3D files, schematic, PCB files
- **AI Functions**: inference pipeline, NPU runtime integration, YOLO11n models, and Node-RED AI nodes are fully open.
- **Applications**: Node-RED flows, C++ SDK, RTSP examples, and Web UI resources are openly provided.
- **System**: Buildroot, U-Boot, Linux Kernel, device trees, drivers, and system services are open-sourced.

Product Gallery























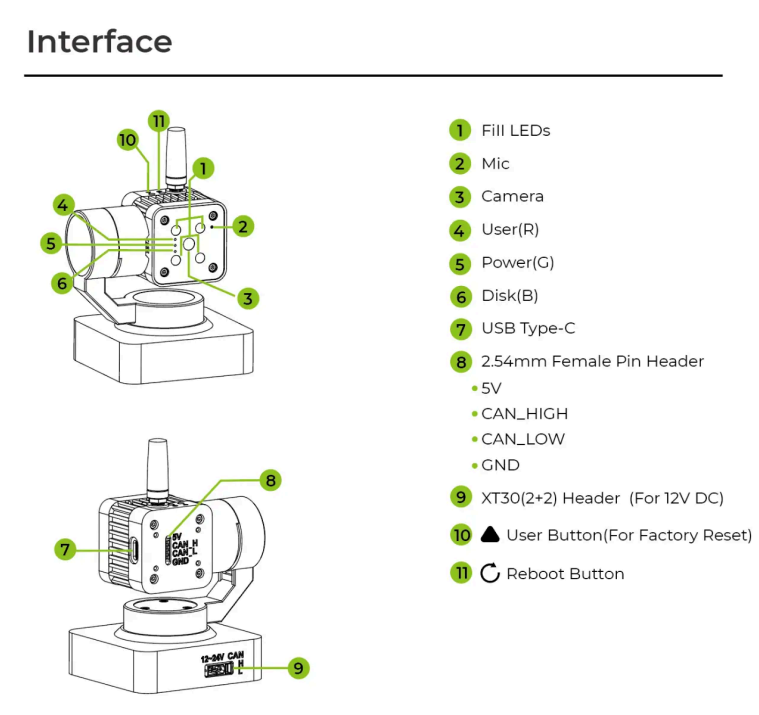
Specification

Processing System	
SOC	SG2002
CPU	C906@1GHz + C906@700MHz
AI Performance	1 Tops @ Int8
MCU	8051 @ 8KB SRAM
Operating System	Linux
Memory	256 MB

Video Encoder	5MP @ 30Fps	
Basic		
eMMC	8GB / 64GB	
Power Supply	12V DC Jack to XT30 connector	
Power Consumption(static)	12V, 185mA	
Power Consumption(peak)	12V, 1.5A	
Camera		
Camera Sensor	OV5647	
Resolution	5M(2592*1944) Pixels	
Chip	1/4" CMOS Sensor	
Pixel Size	1.4um	
Output Format	RAW 10	
Maximum Frame Rate	Full size: 15fps	
Aperture	F2.8	
Equivalent Focal Length	3.46mm	
Field of View	65°	
Distortion	<1%	
Lens structure	5P	
Interface		
USB	USB 2.0 Type-C	
Wireless	Wi-Fi 2.4G/5G Bluetooth 4.2/5.0	
Button	1 x Reboot Button, 1 x User Button	
Fill LEDs	4 x 0.3w White Light	
LED	1 x Power Indicator, □2 x IO programmable indicator	
Mic	On-Board Mic	
Speaker	External Speaker	
Motor Spec	MS3008	MS3506
Funtion	for Pitch Rotation	for Yaw Rotation
Turns	54	60
Rated Voltage(V)	12	12
Max Speed(rpm)	2000	2100
Rated Torque(N.m)	0.04	0.05
Rated Speed(rpm)	1160	1250
Rated Current(A)	0.64	0.79
Max Power(W)	4.6	6.4
Motor Poles	14	14
Motor Weight(g)	49	63
Drive Input Voltage (V)	6~16	6~16
Communication	CAN	CAN
Communication Frequency (Hz)	CAN@1Mbps:2KHz	CAN@1Mbps:2KHz
Encoder	15 bit Magnetic Encoder	15 bit Magnetic Encoder
CAN Baud Rate	100K、125K、250K、500K、1M	100K、125K、250K、500K、1M
Control Mode	Open Loop(24KHz) /Speed Loop(4KHz) /Position Loop(2KHz)	Open Loop(24KHz) /Speed Loop(4KHz) /Position Loop(2KHz)
Ambient Conditions		
Operating Temperature	-20~50 ℃	
Operating Humidity	0~90%	

Others	
Heat Dissipation	Fanless
Warranty	1 year
Mechanical	
Finished Product Dimension(W x H x D)	68x112x71mm
Enclosure	Polyamide(PA) Nylon
Weight(Net)	230g

Hardware Overview



Applications

- **Traget tracking**
- **Low-Code model customization:** Learn AI as you Play!
- **Open API:** connect to everywhere.
- **Home Assistant**

Resource Links

- https://www.seeedstudio.com/reCamera-gimbal-2002w-optional-accessories.html
- User Manual
- Motor CANBus Protocol in English
- Motor CANBus Protocol in Chinese

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