Matek Optical Flow Module



Overview

(EOL) Optical Flow 3901-L0X – MATEKSYSCommunication between 3901-L0X module and Flight controller via UART MSP V2 protocol supported by INAV and ArduPilot.

Key Takeaways

The Matek 3901-L0X is an optical flow sensor with integrated short-range lidar, designed to improve drone position control, especially in GPS-denied environments.

Overview

The Matek 3901-L0X combines an optical flow camera with a VL53L0X laser time-of-flight lidar. It communicates with flight controllers via UART using the MSP V2 protocol, supported by both INAV and ArduPilot. The module is lightweight and intended for mounting on the underside of multirotor drones, with the camera lens pointing downward and the small arrow on the sensor pointing forward for correct orientation.

Key Features

Optical Flow Sensor: Functions like an optical mouse to detect motion relative to the ground, enabling precise horizontal position hold without GPS. Integrated Lidar: Short-range lidar with a maximum range of 2 meters, primarily for altitude hold between 0–2 meters when enabled.

MC

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U Update: Uses STM32L051 instead of STM32F051 due to MCU shortages. Communication: UART MSP V2 protocol; ensure correct serial port mapping according to your flight controller manual. Mounting Requirements: Lens must be at least 2 cm above the ground during initialization for proper optical flow operation.

Installation and Setup

Mount the sensor under the drone, aligned with the forward direction. Adjust FLOW_POS_X and FLOW_POS_Z parameters to match the sensor's offset from the drone's center of rotation (e.g., 2 cm forward, 5 cm below) for optimal performance. While the onboard lidar can be used, it is not recommended for outdoor use due to its short range; a longer-range lidar is suggested for better altitude control.

Practical ApplicationsGPS-denied flight: Maintains stable horizontal positioning indoors or in areas with poor GPS signal. Altitude hold: Works in combination with the lidar for low-altitude hovering.

FP

V and racing drones: Lightweight design and compatibility with INAV make it suitable for high-speed multirotor applications.

Accessories and Mounting

Custom housings are available to protect the sensor and ensure proper alignment. Materials like PETG-CF or TPU provide rigidity, vibration damping, and crash resistance for drone applications. The Matek 3901-L0X is widely available through Matek resellers and online marketplaces, and it is compatible with standard multirotor builds running INAV, Betaflight, or ArduPilot with optical flow support.

Article Content

(EOL) Optical Flow 3901-L0X – MATEKSYS

Communication between 3901-L0X module and Flight controller via UART MSP V2 protocol supported by INAV and ArduPilot. There is no detailed datasheet of

MatekSys Optical Flow 3901-L0X — Copter

MatekSys Optical Flow 3901-L0X The MatekSys optical flow 3901-L0X sensor is a lightweight optical flow sensor including a short range lidar which uses the MSP

Matek Optical Flow & Lidar Sensor 3901-L0X 3901 PMW3901

This is a custom housing designed for the Matek Optical Flow & Lidar Sensor 3901-L0X / PMW3901 module, created to mount securely under The Scout FPV drone (or any similar multirotor build

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Matek Optical Flow & Lidar Sensor

Matek Optical Flow & Lidar Sensor - 3901-L0X This sensor works the same way as an optical mouse, helping your iNAV quad maintain position without GPS! This module also integrates a laser time-of

MATEK OPTICAL FLOW & LIDAR SENSOR 3901-L0X

Make sure Optical Flow lens to ground >2cm for opflow initialization while FC starting up. Maximum range of VL53L0X is 2m, Altitude hold 0~2m @ throttle

Optical Flow & Lidar Sensor 3901-L0X – Precision

The Matek 3901-L0X Optical Flow Lidar Sensor is a compact, lightweight dual-sensor module designed for drones, UAVs, and robotics applications requiring

Products – MATEKSYS

Ultra-Precise I2C Power Monitor, I2C-INA-BM Servo PDB, w/ 12A BEC 9-55V to 5/6/8V AP_Periph CAN Digital Power Monitor, CAN-L4-BM Power Module

Matek Systems

Make sure Optical Flow lens to ground >2cm for opflow initialization while FC starting up. Maximum range of VL53L0X is 2m, Altitude hold 0~2m @ throttle 0~100% if VL53L0X is enabled.

Matek Optical Flow & Lidar Sensor

Matek Optical Flow & Lidar Sensor - 3901-L0X This sensor works the same way as an optical mouse, helping your iNAV quad maintain position without GPS! This

MATEK OPTICAL FLOW & LIDAR SENSOR 3901-L0X

Specifications Optical Flow: PMW3901 Lidar: VL53L0X Interface UART Protocol: INAV MSP Working Range: 8cm~200cm Field of view: 42 degree (PMW3901), 27 degree (VL53L0X) Minimum

Matek Optical Flow & Lidar Sensor

Matek Optical Flow & Lidar Sensor Unlock stable, GPS-free position hold for your FPV drone with the Matek Optical Flow & Lidar Sensor. This advanced module

How to Install Optical Flow Sensor on Drone

The Matek Systems 3901-L0X Optical Airflow Sensor for FPV Racing Drone 210mm 220mm 240mm 250mm Carbon Fiber is used for Position hold and altitude hold on the drone.

Setting up Optic Flow in INAV 2.2.x

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Connecting and configuring the hardware The easiest to connect board in MATEK Optic Flow / Lidar - you need one Serial port to get all of the data from the board (optic flow and rangefinder). The next

Matek Optical Flow & Lidar Sensor 3901-L0X 3901 PMW3901 Module

Matek Optical Flow & Lidar Sensor 3901-L0X 3901 PMW3901 Module Support INAV for RC FPV Racing Drone Quadcopter Multirotor

Matek Optical Flow & Lidar Sensor 3901-L0X | Matek

Matek Optical Flow & Lidar Sensor 3901-L0X from manufacturer Matek, in category Flight Controller (FC).

Matek Optical Flow & Lidar Sensor 3901-L0X INAV

Enter the Matek Optical Flow & Lidar Sensor 3901-L0X, a compact powerhouse designed to solve this exact problem. This module ingeniously fuses two distinct

Matek Systems

Buy Matek Systems- Optical Flow & LiDAR Sensor 3901-L0X by Matek Systems from our Sensors range - Large Letter - @ 3DXR- Unmanned Aircraft Systems & The Cube Autopilot - The Cube

Matek 3901-L0X Optical Flow a Lidar (2m)

Matek Optical Flow and Lidar 3901-L0X is an additional sensor for measuring height and movement. In combination with iNav or Ardupilot firmware, it will help to hold the position and height of the copter

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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