



## SparkFun Advanced Autonomous Kit for Sphero RVR

KIT-15303

The SparkFun Advanced Autonomous Kit for Sphero RVR (pronounced "Rover") provides all the functionality of the basic kit with the addition of time-of-flight distance sensing in the front and rear. Based around Raspberry Pi's small yet powerful Zero W model, the kit provides distance sensing, global positioning, and vision to the Sphero RVR.

A pan-tilt device allows a camera to not only provide video from the viewpoint of the RVR, but provide the ability to look around it as well. In addition, the Raspberry Pi Zero W and the Camera provide enough power to run most of the machine vision programs that will run on the Raspberry Pi platform.

The Qwiic distance sensing boards use time-of-flight technology to provide highly accurate distance sensing for things like collision and obstacle detection. The GPS board provides global position capabilities to the RVR. Whether you're setting up a geofence which the RVR must stay inside or mapping where the RVR has been, the board has the accuracy and capability to work for a small object such as the RVR. Pair these items with the already stellar sensor set of the RVR and the device has an advanced set of sensing abilities for autonomous mobility.

The kit itself comes with all the cables and mounting hardware including a separate mounting plate that provides extra space for mounting additional sensors or devices such as SparkFun's Qwiic line, which pairs with the rest of the devices with ease.

**Note:** A [Sphero RVR](#) is *not* included with this kit and will need to be purchased separately.

## INCLUDES

- Raspberry Pi Zero WH (Male Headers Pre-Soldered)
- SparkFun Servo HAT
- Raspberry Pi Camera V2
- GPS Breakout UBlox SAM-M8Q (Qwiic)
- 2 x Distance Sensor Breakout - 4 Meter, VL53L1X (Qwiic)
- Pi Zero Camera Interface Cable
- 16GB MicroSD card with custom firmware pre-loaded
- Pan-Tilt Servo and Hardware Kit
- Mounting Plate
- All the mounting hardware and cables required for working with the Sphero RVR

## FEATURES

- Raspberry Pi Zero WH
  - 802.11 b/g/n wireless LAN
  - Bluetooth(R) 4.1
  - Bluetooth Low Energy (BLE)
  - 1GHz, single-core CPU
  - 512MB RAM
  - Mini HDMI and USB On-The-Go ports
  - Micro USB power
  - HAT-compatible 40-pin header pins
  - Composite video and reset headers
  - CSI camera connector
- Servo HAT
  - 16 Servo motor Pin Headers
  - Qwiic Header for Qwiic Interface
  - 4 Pin UART interface
  - MicroUSB B Connector
- Raspberry Pi Camera Module V2
  - Image Sensor: Sony IMX219
  - Maximum Photo Resolution: 3280 x 2464 pixel
  - Supported Video Resolution: 1080p30, 720p60 and 640x480p90
  - Interface: CSI connector (15cm ribbon cable included)
  - Supported OS: Raspbian (latest version recommended)
- GPS Breakout Ublox SAM-M8Q
  - 72-Channel GNSS Receiver
  - 2.5m Horizontal Accuracy
  - 18Hz Max Update Rate
  - Time-To-First-Fix:
    - Cold: 26s
    - Hot: 1s
  - Max Altitude: 50,000m

- Max G:  $\leq 4$
- Max Velocity: 500m/s
- Velocity Accuracy: 0.05m/s
- Heading Accuracy: 0.3 degrees
- Time Pulse Accuracy: 30ns
- 3.3V VCC and I/O
- Current Consumption:  $\sim 29\text{mA}$  Tracking GPS+GLONASS
- Software Configurable
  - Geofencing
  - Odometer
  - Spoofing Detection
  - External Interrupt
  - Pin Control
  - Low Power Mode
  - Many others!
- Supports NMEA, UBX, and RTCM protocols over UART or I2C interfaces
- Distance Sensor Breakout - 4 Meter, VL53L1X
  - Operating Voltage: 2.6V-3.5V
  - Power Consumption: 20 mW @10Hz
  - Measurement Range:  $\sim 40\text{mm}$  to 4,000mm
  - Resolution:  $\pm 1\text{mm}$
  - Light Source: Class 1 940nm VCSEL
  - I2C Address: 0x52
  - Field of View:  $15^\circ - 27^\circ$
  - Max Read Rate: 50Hz
- Mounting Plate
  - Dedicated positions for the boards included (minus GPS board which mounts to the cover plate on the RVR)
  - Additional mounting points for I/O via 4-40 hardware.



