PIXHAWK TOOL KIT

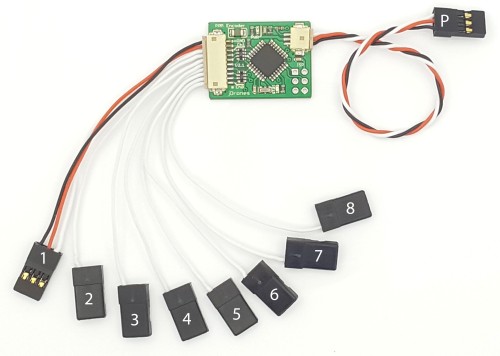
# 1 Radio Telemetry Kit 915 MHZ

**Features:**  
• Very small size  
• Light weight (under 4 grams without antenna)  
• 915Mhz frequency band  
• Receiver sensitivity to -117 dBm  
• Transmit power up to 20dBm (100mW)  
• Transparent serial link  
• Air data rates up to 250kbps  
• Range of approx 1 mile with supplied antennas  
• Demonstrated range of several kilometers with a small omni antenna  
• Can be used with a bi-directional amplifier for even more range  
• MAVLink protocol framing and status reporting  
• Frequency hopping spread spectrum (FHSS)  
• Adaptive time division multiplexing (TDM)  
• Support for LBT and AFA  
• Configurable duty cycle  
• Built in error correcting code (can correct up to 25% data bit errors)  
• Open source firmware  
• AT commands for radio configuration  
• RT commands for remote radio configuration  
• Adaptive flow control when used with APM  
• Based on the HopeRF HM-TRP radio module, featuring an SiLabs Si1000 RF microcontroller.  
• Upgraded to more convince Molex 1.25mm  
  
  
**Specs:**  
Band: **915MHz**  
Antenna connectors: **RP-SMA connector**  
Output power: **100mW (20dBm), adjustable between 1-20dBm**  
Sensitivity: **-117dBm sensitivity**  
Interface: **Standard TTL UART**  
Connection status: **LED indicators**  
  
  
**Configuring Telemetry Radio using Mission Planner:** <http://ardupilot.org/copter/docs/common-configuring-a-telemetry-radio-using-mission-planner.html>

<https://hobbyking.com/en_us/fpv-radio-telemetry-kit-915mhz-1.html?___store=en_us>

# 2 PPM Encoder

The PPM encoder allows to encode up to 8 PWM (pulse width modulated) signals into one PPM (pulse position modulation) signal.

[](http://ardupilot.org/copter/_images/jDrones_PPM_Encoder_V21_Above_with_numbers_500px.jpg)

The jD-PPM Encoder (v2.1) uses the ArduPPM firmware, replacing the previously used Paparazzi PPM Encoder firmware. The new ArduPPM firmware has been designed from scratch to enhance performance and robustness, and to better accommodate our product needs now and in the future.

## Failsafe output values:

* New interrupt system that handles certain Futaba receivers better (simultaneous changes on groups of R/C channels in fast intervals) (this was already present in v2.3.13)
* Adapted behaviour in case of channel loss: If one channel is lost, it will be set according to the following table. The other channels will continue working.

|  |  |  |
| --- | --- | --- |
| Channel 1 | Roll | Set to center (1500 μs) |
| Channel 2 | Pitch | Set to center (1500 μs) |
| Channel 3 | Throttle | Set to low (900 μs) |
| Channel 4 | Yaw | Set to center (1500 μs) |
| Channel 5 | ... | Remain at last value |
| Channel 6 | ... | Remain at last value |
| Channel 7 | ... | Remain at last value |
| Channel 8 | ... | Remain at last value |

* In Copter and Plane a fail-safe action can be triggered by the throttle low signal.

# 3 Mini OSD

This is a Mini OSD System specially designed for use with small electric powered models. Its light weight and compact design makes it ideal for use on micro planes or any other model where saving weight is crucial.  
  
This GPS OSD system enables you to view vital data real-time while flying your FPV model. Things such as battery voltage, flight time, ground speed and GPS coordinates are all within view while using this system. This is a must have for you FPV model!

**Features:**  
- GPS Coordinate Display  
- Time Display   
- Ground Speed Display  
- Voltmeter  
- Stopwatch  
- RSSI Receiver Signal Strength Detection  
- Programmable Display Content  
- Supports NTSC and PAL TV Signal  
- Supports Anti-Glare Shade Control Signal  
- Supports Manual Calibration

**Specs.**  
Weight: **Main Board - 4.6g / GPS Module - 25g**  
Dimensions: **Main Board - 34x4x20mm / GPS Module - 45x10x42mm**  
Working Voltage: **Main Board - 7.4~12V / GPS Module - 5V**  
Voltage #1: **2-6S 22.2V**  
Voltage #Aux: **7-28V**

<http://ardupilot.org/copter/docs/common-minim-osd-quick-installation-guide.html>

# 4 I2C

I2C splitter used to connect upto 4 peripherals to I2C port in pixhawk

# Bar02- Sensor R1

The **BlueRobotics Bar02 High-Resolution 10m Depth/Pressure Sensor** is a low-pressure, high resolution, high accuracy version of the Bar30 sensor. Using the MS5837-02BA sensor from Measurement Specialties, this device can measure up to 10-meter depth (2-bar absolute pressure) with a water depth resolution of just 0.16mm! It can also measure altitude in air using air pressure with a resolution of 13cm. It’s housed in the same penetrator form factor as the Bar30 and can handle up to 10-bar absolute pressure (90-meter water depth).

## Specifications

|  |  |  |
| --- | --- | --- |
| **Electrical** |  |  |
| **Item** | **Condition** | **Value** |
| Supply Voltage | – | 2.5-5.5 volts |
| I 2 C Logic Voltage (SDA and SCL) | – | 2.5 - 3.6 volts |
| Peak Current | – | 1.25 mA |
| **Pressure** |  |  |
| **Item** | **Condition** | **Value** |
| Maximum Mechanical Pressure | – | 10 bar |
| Standard Operating Pressure | – | 0.3-1.2 bar |
| Extended Operating Pressure | – | 0-2 bar [up to 33 ft (10 m) in water] |
| Absolute Accuracy | From 600-1000 mbar (20°C) | +/- 0.5 mbar |
|  | From 300-1100 mbar (0-60°C) | +/- 2 mbar (2 cm in freshwater) |
|  | From 300-1000 mbar (-20-85°C | +/- 4 mbar (4 cm in freshwater) |
| **Temperature** |  |  |
| **Item** | **Condition** | **Value** |
| Operating Temperature | – | -20 to +85°C |
| Storage Temperature | – | -40 to +85°C |
| Absolute Accuracy | From 300-1100 mbar at -20-85°C | +/- 2°C |
| **Physical** |  |  |
| Wire Colors | Green - I 2 C Clock (SCL, 3.3V) |  |
|  | White - I 2 C Data (SDA, 3.3V) |  |
|  | Red - Positive (2.5-5.5V) |  |
|  | Black - Ground |  |
| Overall Length | 37 mm |  |
| Thread Size | M10x1.5 20 mm threaded |  |
| Recommended Through Hole Size | 10-11 mm |  |
| Wrench Flats | 16 mm |  |

**Data Sheet(MS5837 02BA):** <http://www.te.com/commerce/DocumentDelivery/DDEController?Action=srchrtrv&DocNm=MS5837-02BA01&DocType=Data+Sheet&DocLang=English&DocFormat=pdf&PartCntxt=CAT-BLPS0059>

**Example code is available for Arduino and Raspberry Pi(Python)**

<https://github.com/bluerobotics/BlueRobotics_MS5837_Library>

<http://docs.bluerobotics.com/bar02/#arduino>

<https://github.com/bluerobotics/ms5837-python>

<http://docs.bluerobotics.com/bar02/#python>

# 6 Power Module with XT60 connectors

The APM Power Module is a simple way of providing your APM with clean power from a LiPo battery as well as current consumption and battery voltage measurements, all through a 6-pos cable. The on-board switching regulator outputs 5.3V and a maximum of 2.25A from up to a 4S LiPo battery. The Power Module comes completely assembled with XT60 connectors, and wrapped in shrink tubing for protection.

Specifications:

Max input voltage: 18V

Max current sensing: 90A

Voltage and current measurement configured for 5V ADC

Switching regulator outputs 5.3V and 2.25A max

6-pos DF13 cable plugs directly to APM 2.5's 'PM' connector

# 7 USB RGB

**Product Description**

USB extension with RGB LED for Pixhawk flight controllers.

This unit provides easily access to a USB when your Pixhawk is less accessible, the LED gives the same status updates as shown on the Pixhawk unit.

Cable included, for the LED the 4p DF13 conects to the I2C port, for the USB the 4p DF13 connect to USB port.