MavLink support in Pitlab&Zbig FPV System

Functionality

OSD can work with other MavLink-enabled flight controller (FC), using MavLink1.0 protocol and presenting data from FC on OSD screen and sending data in telemetry stream (encoded in video signal). OSD can present data collected directly by OSD (e.g from GPS or current sensor) or received from flight controller. If both data exists, data from FC has higher priority and overrides data collected by OSD itself (e.g motor battery voltage information from FC send via MavLink message overrides voltage measurement made directly by OSD board).

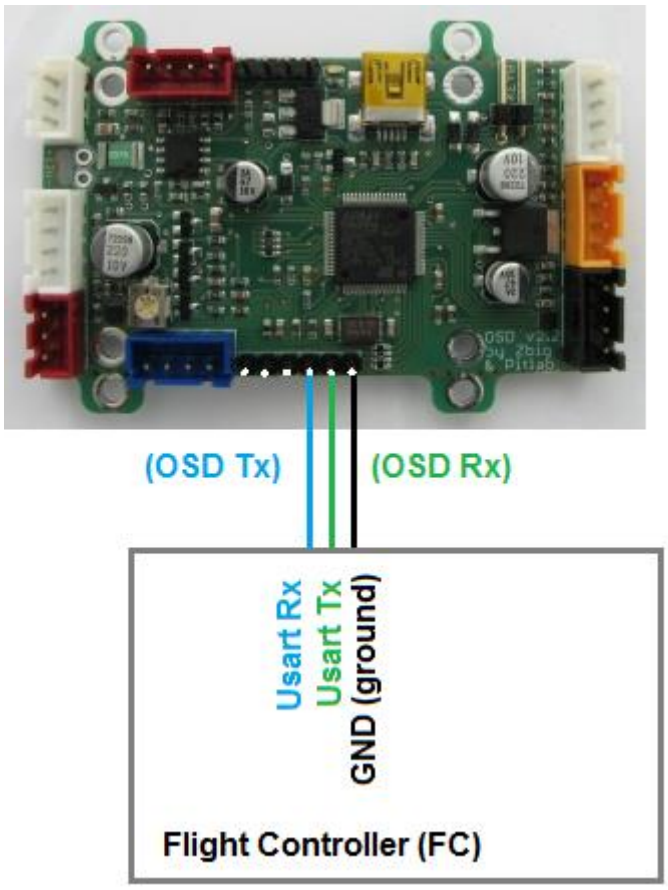
OSD presents waypoints from FC and allows to select waypoint and that way forces FC to start mission from this waypoint. OSD can show up to 30 waypoints from FC in OSD menu->waypoints.

Connections

OSD should be connected with flight controller using USART (RS232 TTL) connection.

NOTE: When connecting OSD with other FC please remove Pitlab Autopilot board first!

Connect FC and OSD with 3 wires (GND, Tx, Rx) as follows:



OSD works with fixed transmission parameters: 8 bit data, 1 bit stop, no parity, and default 57600 bps. Transmission speed can be set to 19200, 38400 or 57600 bps using FPV_manager application (page OSD->settings, in **MavLink USART** box).

For Ardupilot based flight controllers (e.g APM or Pixhawk) OSD should be connected to dedicated telemetry port.

Configuration

OSD do not need special configuration to work with other flight controller. OSD sends heartbeat message with System ID 90 and Component ID 8.

OSD sends request to FC and configures refresh rate of required messages: 10Hz for artificial horizon (pitch/roll), and 2Hz for other data (RC channels, GPS data, current/voltage etc). These rates are necessary for smooth display of information.

System ID of other system must be different than 90 (value 90 is reserved for Pitlab)

OSD menu operation

OSD menu can be operated with 3-position switch on RC transmitter using spare RC channel. User may connect RC signal directly to OSD board or select free channel from RC controller. Configuration will be made in FPV_manager.exe on page OSD->settings.

Supported messages

OSD requests and process only selected messages set described below. Other messages from FC will be ignored. It is recommended to disable any unnecessary messages from FC to reduce OSD processor load.

MAVLINK_MSG_ID_HEARTBEAT

Monitors status of flight controller and its connection

MAVLINK_MSG_ID_SYS_STATUS

OSD monitors and displays error status of all enabled sensors. In case any enabled sensor is not healthy OSD will show periodically E:xxxx message in autopilot mode field (where xxxx is the symbolic name of the sensor)

OSD displays voltage, current and discharge level from this message as motor (main power) battery parameters.

MAVLINK_MSG_ID_GPS_RAW_INT

When this message is present, OSD will ignore GPS connected to OSD board and will take all positioning data from this message.

MAVLINK_MSG_ID_VFR_HUD

This message provides following information:

- Altitude,
- Vertical speed (variometer)

- Airspeed
- Throttle position (for RC input channel monitor)

MAVLINK_MSG_ID_ATTITUDE

This message provides data for artificial horizon (pitch and roll) and heading (may replace course from GPS as external course source).
For fast horizon response this message may be send with up to 25Hz update rate.

MAVLINK_MSG_ID_RC_CHANNELS

This message provides information about up to 12 RC channels and RSSI signal level. This information can be used in RC monitor fields.

MAVLINK_MSG_ID_RC_CHANNELS_RAW

This message provides information about up to 8 RC channels and RSSI signal level.

This message may be used as alternative to MAVLINK_MSG_ID_RC_CHANNELS message.

MAVLINK_MSG_ID_WIND

This message provides information about wind speed and direction. This information overrides internal Wind Assistant data.

MAVLINK_MSG_ID_SCALED_PRESSURE

This message provides internal FC sensor (board) temperature (for OSD temperature field).

OTHER MESSAGES

In addition to above message set OSD may send to FC requests for other messages and then receive other messages (response) from FC.

Firmware and compatibility

Firmware supporting MavLink is a separate branch from official system firmware and should be considered as “For testing purpose only”. Pitlab do not takes any responsibility of this firmware and any possible damage caused by airplane using system with this firmware. There is no official support for this version nor any kind of warranty.

Firmware version which supports MavLink will be identified by “mav” suffix, e.g. “2.52**mav**”

MavLink-enabled firmware is fully compatible with latest OSD board version 2.3. If firmware is flashed to previous boards OSD will inform about incompatibility during startup.