

Seagull #GPK

User Manual



Product: Seagull #GPK
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GENERAL INFORMATION

***** Please read this manual thoroughly before connecting and configuring Seagull #GPK *****

Seagull #GPK is an RTK/PPK/MB GNSS receiver which can be used as navigation device for your UAV platform and integrated into #MAP-X2 for ultimate camera trigger and logging precision.

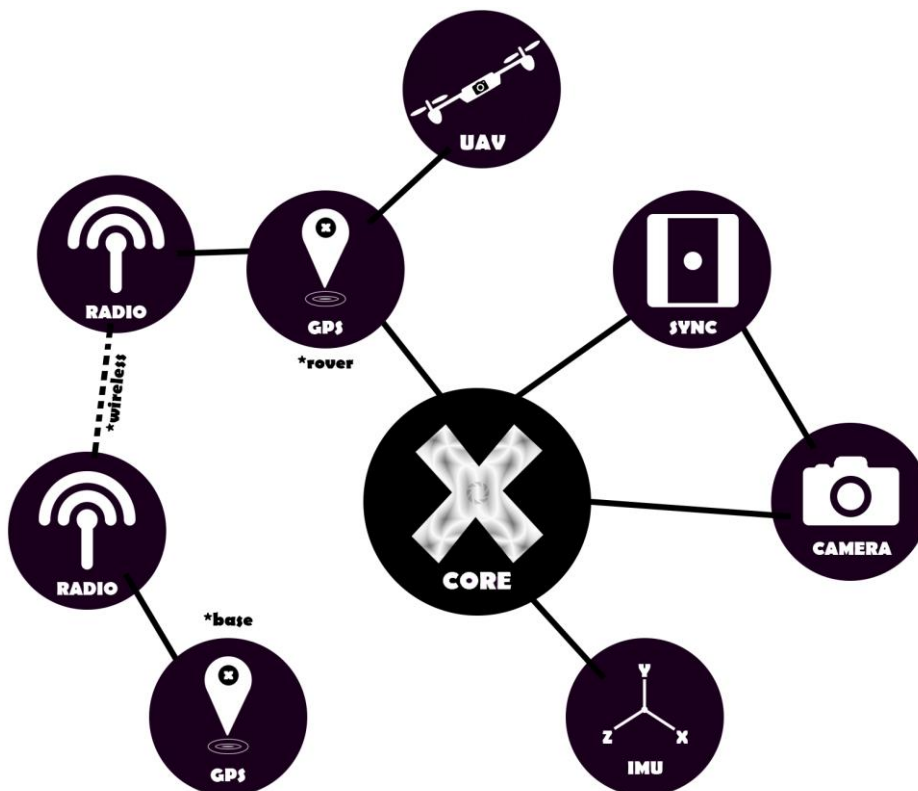
#GPK can operate as both BASE and ROVER, depending on the user selection.

When operating in BASE mode, #GPK can LOG RAW messages for use with PPK processing.

Typical precision that can be achieved with #GPK via RTK is 1-2cm!

#GPK features:

- High refresh rate – 4Hz MB, 5Hz RTK, 10Hz RAW, 10Hz GNSS
- High precision navigation – 1-2cm!
- Easy configuration - via internal microSD card
- Base role - PPK BASE Logging
- Dual configurable capabilities - BASE and ROVER
- #MAP-X2 Compatibility - for precision triggering and navigation
- Multiple modes: Real Time Kinematic, Post Processed Kinematic, Moving Baseline



CONFIG FILE

GENERAL

The CONFIG.txt is located on the SD card within the #GPK. This file is used to configure the modes, settings and parameters for the specific needs with its application or use case.

To edit the CONFIG.txt file, simply insert it to a PC/Mac and edit the values after the ":" (comma) in the file.

EDITING

Please note that when saving the changes, please keep the text format in "ANSI" – other formats might lead to corruption of the CONFIG.txt file.

Also, don't insert any spaces or other characters than listed within the brackets – doing so will corrupt the file, so it can't be read by #GPK.

NOTE: In a case that the CONFIG.txt file becomes corrupt or deleted, it will be re-created if an empty card is inserted, during the powerup of #GPK and will be initiated with DEFAULT values.

Example of default #GPK - CONFIG.txt file:

```
##### GPS GENERAL SETTINGS #####
GPS type (MANUAL/BASE/ROVER) :BASE
Navigation type (RTK/PPK/MB) :RTK
GNSS configuration (G&R/G&B) :G&R
Baudrate :115200
Navigation rate (1-10/AUTO) :AUTO

##### BASE AUTO SURVEY #####
Survey time (seconds) :300
Accuracy (meters) :3

##### BASE FIXED POSITION #####
Latitude (degrees) :0
Longitude (degrees) :0
Altitude (meters) :0
Accuracy (meters) :0
#####
```

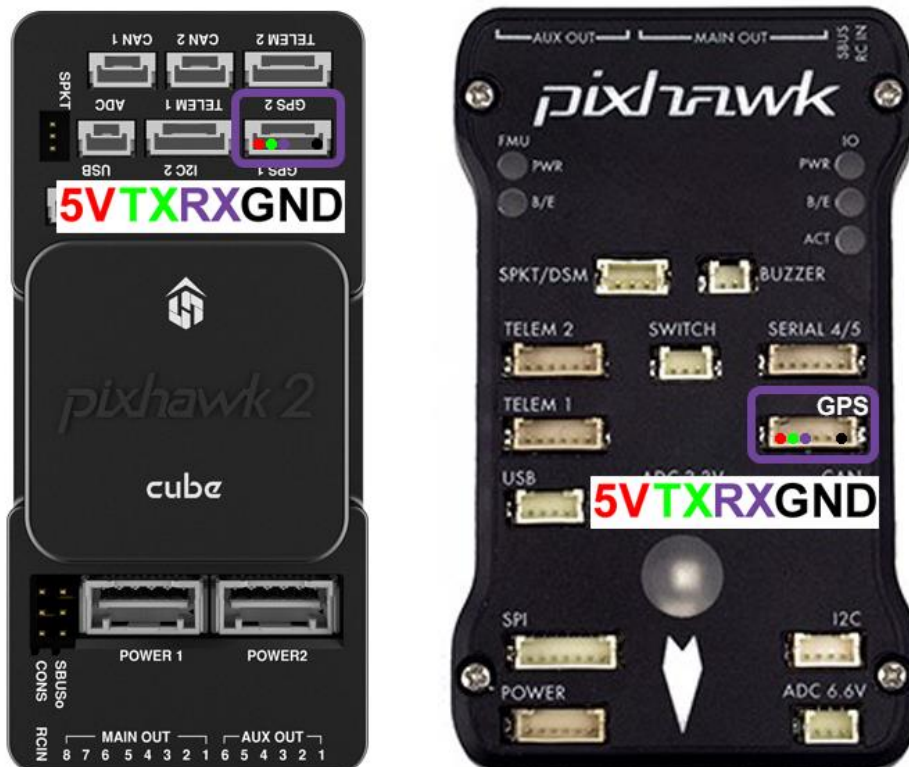
SETTINGS AND VALUES TABLE

SETTING NAME	SETTINGS	RANGE	DEFAULT	DESCRIPTION
GPS GENERAL SETTINGS				
GPS type	MANUAL / BASE / ROVER	n/a	BASE	This setting defines the #GPK functionality whether it should be established as base, rover or manually configured by the user.
Navigation type	RTK / PPK / MB	n/a	RTK	GPS module navigation type whether its Real Time Kinematic, Post Processed Kinematic or Moving baseline.
GNSS configuration	G&R / G&B	n/a	G&R	Satellite system to use: G&R – GPS and GLONASS G&B – GPS and BEIDOU
Baud rate	Value	1200 - 960000	115200	Baud rate used for communicating with #MAP-X2 or other devices that #GPK is connected to. The baud rate must match the device that #GPK relates to.
Navigation rate	1 – 10Hz / AUTO	n/a	AUTO	Navigation rate set for the GNSS receiver. Typically, it is set to AUTO so #GPK will set the navigation rate to the maximum possible rate depending on the navigation type set out.
BASE AUTO SURVEY				
Survey time	Value in seconds	0 <> *a lot (9e+15)	300	Auto survey for base lock time frame – will wait and try to lock precise coordinate for the timeframe set out to survey for.
Accuracy	Value in meters	0 <> *a lot (9e+15)	3	Desired auto survey accuracy for the base. Will keep surveying until the precision is achieved.
BASE FIXED POSITION				
Latitude	Value in degrees	0 <> *a lot (9e+15)	0 (disabled)	Known fixed position needs to be entered for ultimate precision.
Longitude	Value in degrees	0 <> *a lot (9e+15)	0 (disabled)	Known fixed position needs to be entered for ultimate precision.
Altitude	Value in meters	0 <> *a lot (9e+15)	0 (disabled)	Known fixed altitude needs to be entered for ultimate precision.
Accuracy	Value in meters	0 <> *a lot (9e+15)	0 (disabled)	Enter how accurate the coordinates provided are Latitude + Longitude


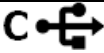
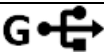
FLIGHT CONTROLLER INTEGRATION

PIXHAWK / PIXRACER / ARDUPILOT BASED FC

Connect the #GPK module that is operating in ROVER mode to Pixhawk1, Pixhawk2, Pixracer or other ArduPilot based flight controllers directly into the GPS marked ports. There is no need to setup any extra configuration, because all the necessary modes are set by #GPK.







PORT / PIN DEFINITIONS

PORT	DEFINITION	PINS			
COM	Communication port PURPLE FOR BASE GREEN FOR ROVER	1: VIN (3.9 -12V)	2: TX (3.3V)	3: RX (3.3V)	4: GND
LOG	Port for connecting to #X2 or other loggers	1: VIN (3.9 -12V)	2: TX (3.3V)	3: RX (3.3V)	4: GND
FC	Port for connecting to Flight Controllers	1: VIN FC (typically 5V do not exceed 3.9 – 12V limits)	2: RX (3.3V)	3: TX (3.3V)	4: GND
	PPK BASE logging button				
	Controller USB and firmware update port	The unit can be powered via USB 4.4 – 12V useful when operating as a BASE			
	GNSS USB for updating firmware and manual setting setup				



TROUBLESHOOTING

To determine the current state of Seagull #GPK - simply read the output of the LEDs' and reference it to the table below:

 POWER	ACTION
Solid on	The unit is powered on
Off	The unit is powered off
 SD CARD	ACTION
Blinking	Micro SD card - is not present
Flashing rapidly	Micro SD card initialization error – please check format!
Fading	Micro SD card has been initialized and waiting for log to start
Solid on	Micro SD card – logging has been activated
 GNSS LOCK	ACTION
Solid on	GNSS lock has been established
Off	No GNSS lock
 RTK LOCK	ACTION
Blinking	RTK FLOAT
Solid on	RTK FIXED
Off	No RTK lock

TECHNICAL SPECIFICATIONS

- u-blox NEO-M8P-2, L1/B1, GPS/GLONASS/BEIDOU GNSS receiver – update rate up to 10Hz
- Supply voltage: 3.9 – 12v (5v recommended – do **NOT** exceed 12v!)
- Current draw: 80mA MIN, 100mA AVERAGE, 120mA MAX
- Dimensions: 45mm x 41mm x 11mm
- Weight: 16g (without misc. cables, antenna etc.)

PPK LOGGING

#GPK is capable of PPK logging when settings are configured in the CONFIG.txt file on the #GPK internal microSD card.

If the #GPK unit is set to operate as a BASE, then PPK logging can be initiated via press of the LOGGING button that is present on the #GPK module.

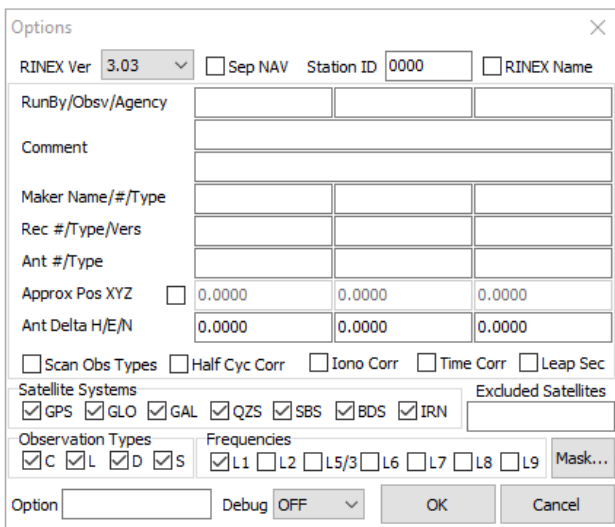
If the #GPK unit is set to operate as a ROVER PPK, then button push logging is disabled and messages are only to be logged with #MAP-X2.

PPK PROCESSING

Generated LOG is in u-blox UBX format, in order to do the post processing please use RTKLIB conv to convert the PPK UBX file to RINEX 3.03.

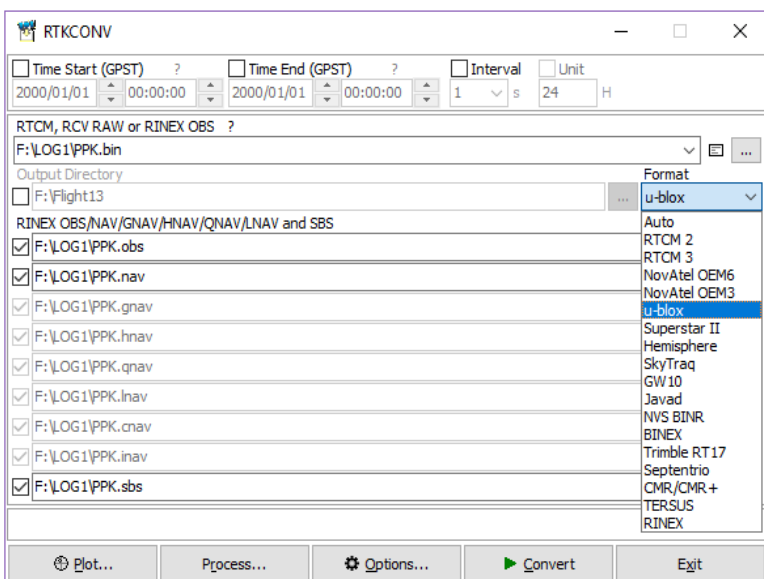
*** Download RTKLIBv2.4.3.zip from [HERE](#) ***

STEP 1: Open "RTKLIB CONV" and select the following options.

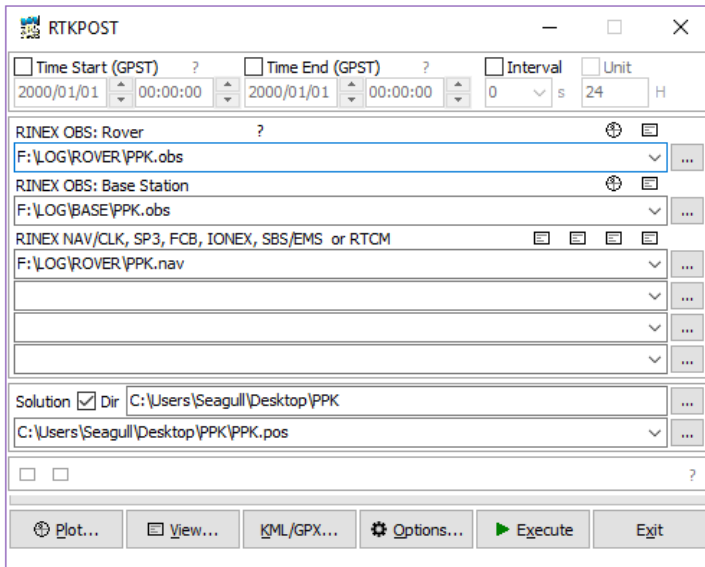


STEP 2: Add "PPK.bin" file and choose format "u-blox".

STEP 3: Click "Convert" for the LOGS generated from #MAP-X2 and the #GPK units.



STEP 4: Open "RTKPOST" and input "BASE.obs" file, "ROVER.obs" and "ROVER.nav" files.



STEP 5: Click "Options" and set the following settings:

"SETTINGS 1" tab

Positioning mode: **Kinematic/Static**

Elevation Mask / SNR Mask: **20**

REC Dynamics: **ON**

"SETTINGS 2" tab

Integer Ambiguity Res: **Fix and Hold**

Max Pos Var for AR / AR Filter: **ON**

"POSITIONS" tab

Base Station: **RINEX Header Position**

STEP 6: Click "EXECUTE" and wait until process is complete.