Colibri II

Flight recorder and navigation instrument
Preliminary

1   General description

The unit's main function is flight data recording and generating of files which meets IGC regulations. Due to excellent HW configuration, which most important feature is a sunshine readable colour display, many supplemental navigation functions are offered to the pilot. Unique is for sure vario meter function which offers audio and also needle presentation.

1.1 GPS receiver

A high sensitive GPS receiver is as an integral part of the unit, also GPS antenna is a part of GPS receiver, so external antenna connection isn't any more necessary. Due to integral antenna solution **vertical** and also horizontal installations are possible. By horizontal installation solution keep display up.

1.2 Power supply

The unit contains a battrey (accumulator) which is capable to run the unit for approximately 8 flying hours, external power supply is also foreseen via a converter which converts board power to 5V. External power supply module can be ordered as an option.

1.2.1 Accumulator recharging

The accumulator is regularly charged via USB port of a PC, so no special charges are provided; a suitable cable is part of delivery. Charging time is typically 3 hours. The accumulator is also recharged during external power presence. Presence of external power is designated by a "**plug**" symbol.
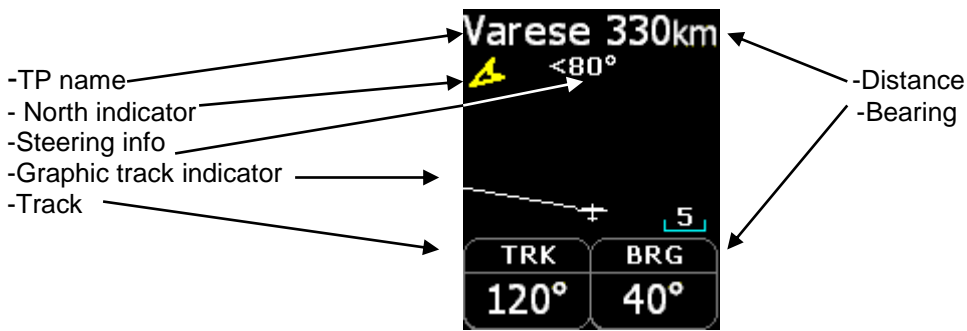
1.2.2 Navigation and vario meter function

1.2.2.1 Navigation

The unit is capable to store 500 turn points in following formats:
-SeeYou .CUP format

The unit offers following navigation data:

-TP name
- North indicator
-Steering info
-Graphic track indicator
-Track

-Distance
-Bearing

1.2.2.2 Vario meter

The vario meter consists of a **needle,** arc with **scale** and audio. Audio signal **volume** can be easily adjusted by using of navigation switch (up/down). Having no pressure inlet means also no TE compensation.

1.3 Controls

There is only one device which makes possible to control the unit. A so called **navigation switch** which includes five independent switches and those switches realizes following functions:

- Up and down command (after sideway press)
- Left and right command (after sideway press)
- Push button after vertical press

1.4 Connectors

An USB Mini B Type plug is situated on the right bottom side of the unit and is used for external power supply of the unit and for PC communication via RS 232 port of PC.
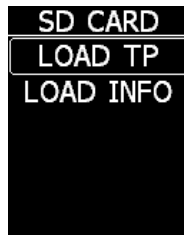
Note!
There is no USB port carried out, that means no direct communication Colibri II – PC via USB. Via USB connector only power can be supplied (5V max) and NMEA data to external units is sent.

1.5 SD card reader

The unit has an integral SD card reader which is capable to receive SD micro size SD cards. The device is foreseen to manage following:

-Memory media for flights
-Input of data (declaration, TP data)

The card reader is positioned on the left side of the unit.

Note!
The card reader presence during flight is **not obligatory**, even by no card inserted the flights will be stored in the internal memory of Colibri II and a subsequent download will be possible.

1.6 Highlights

-Extremely small outline: 40 x 62 x 22 mm
-Completely new design approach
-Sunshine readable colour display as a central part of the system
-Simple manipulation via one multifunctional switch
-Built in GPS receiver and GPS antenna
-NMEA output
-Internal battery ensures up to 8 hours of autonomy
-Built in battery charger (5V via USB cable)
-External power input
-SD card as a data transfer medium (micro version)
-Vario meter with audio as a standard solution
-Basic navigation
-Flight recorder

2 Colibri II Menu organization

Colibri II has five menus (modes) and selection of individual menus is possible exclusively after using of left and right buttons of **navigation** switch.


See also further captures.

2.1 Setup Menu

All settings which are necessary for operation of the unit can be preset in this menu. Executive devices are **up/down**, **left/right** and the **push button** of the navigation switch. After press on the button a yellow frame will show ready for **edit status**.

2.1.1 QNH / ALT

This menu makes possible to adjust altitude reading to match actual barometric pressure situation. After input of actual QNH the altitude reading of Colibri II will become an altimeter, showing NN altitude (above sea level).
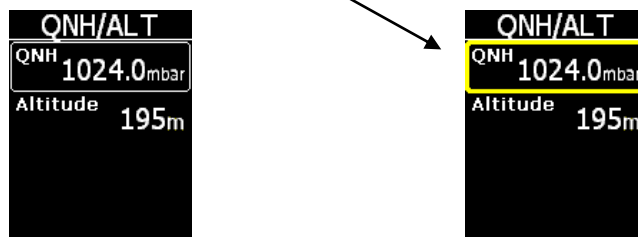
Input of new QNH value is possible after using of push button and up/down switch.

Important!
Adjusting of QNH or input of field elevation will not affect flight recorder altitude reading, the altitude stored in flight will remain based on QNH 1013.

To **leave menu** use left or right arrow, this philosophy is valid for complete setup.

2.1.2 VARIO

After push on VARIO vario meter setup will open.

Vario filter, means adjustment of vario needle response, lower numbers will make reactions faster and vice versa.
Auto Thermal will enable or disable Thermal assistant automatism. **X** means disable.
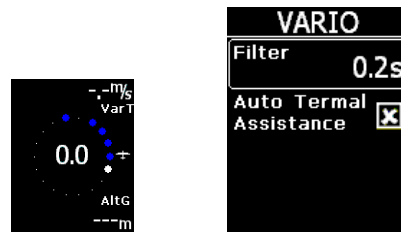
2.1.3 UNITS

Inputs of units corresponding to pilot personal requirements are possible.

2.1.4 SD CARD

Makes possible to input turn point data and flight declaration data (Info).
The declaration data transfer will consequently write header into IGC
file with pilot and glider data and also task data.
Load of new turn point data base will ensure navigation aid and manual
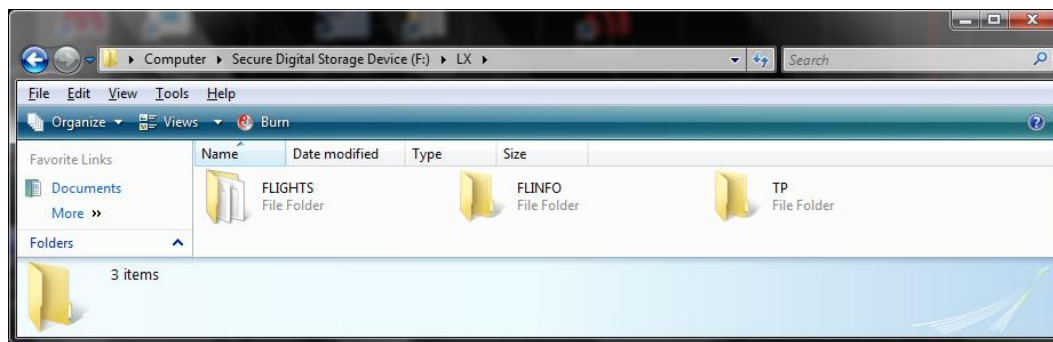flight declaration.

2.1.4.1 SD Card file structure

The unit comes with one SD card which is already initialized and ready for operation. Into LX folder three subfolders are prepared.

FLIGHTS: flights will be stored after download
FLINFO : .HDR (pilot, glider… and declared task) files store, creation possible with LXe
TP   : store for turn point files in .cup format

2.1.5 LOGGER

This Menu helps to enter all flight recorder relevant parameters by hand
as follows:

-Rec.Interval: defines time between two fixes
-Name and Surname: pilot personal data
-Reg.Number: glider identification
-Comp.ID: competition number of the glider
-Glider: glider type
-Class: glider class input (scroll to select)

| Note! |
| --- |
| All above mentioned inputs can be also entered after LOAD INFO by SD card, except Rec. interval |

2.1.6 WARNINGS

The unit is able to warn the pilot that he is approaching
towards altitude limit. Loudness of the warning can be
adjusted by altering Volume and the altitude at which
warning will be activated is set in Altitude.

2.1.7 ENL

Every unit has a built in **E**ngine **N**oise level **S**ensor which detects engine noise after engine is running. The value vary from 0 until 100%, and typical values by running engine is around 90%. This page doesn't make possible of any input, but serves as an ENL indicator. ENL is also stored in IGC file.
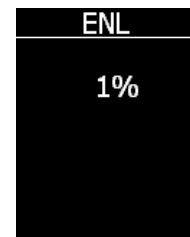
2.1.8 DISPLAY

To save power and to extend endurance of battrey a screen saver option can be enabled. After screen saver is enabled the display will **go off** after time limit will be exceeded.
A press on any key will reactivate the display and time out count down will be reset.
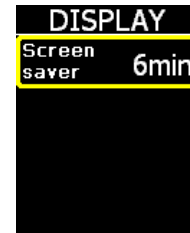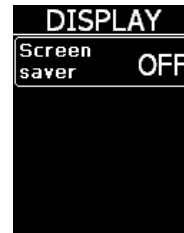
2.1.9 PASSWORD

99999 delete all stored flights.

2.1.10   INFO

INFO menu informs about serial number in numeric and also in IGC three letter code.
The last row shows Firmware version.

3　Navigation

3.1　Navigation towards turn point

The unit is capable to store turn point data in **.cup** format
The data input is exclusively
possible by SD card in menu SD CARD.
Selection of a turn point is possible after using of **up/down**
selector. A short press will select near positioned (under alphabet)
turn point. After the key is pressed continuously a **fast selection** of
a far positioned turn point is possible. Basic navigation data as;
Name, the **distance**, **steering** information, **track** and **ground speed**
are present on the display. There are no sub pages.

3.2　Navigation in Task

Not ready at the moment.

3.3　Wind Calculation

The unit is able to calculate wind vector during climbing period.
The wind vector is visualized in the main navigation page and
no pilot inputs are foreseen. The first result will appear after
2 full turns.

4 Flight Recorder Management

The flight recorder doesn't need any special care as all works nearly automatic way, without pilot assistance. All what the pilot should do is to adapt settings, see capture LOGGER (2.1.4).

4.1 Start and Stop of flight recording

The unit will start recording immediately after start conditions will be fulfilled. Start conditions are connected with ground speed and altitude change, so even after GPS BAD during take off, the unit will start recording. It is recommended to switch the unit on a **few minutes** before take of. This will ensure a straight base line of baro trace (IGC regulation). Longer time switched on before take off will not reduce memory space of the flight recorder, due to circular recording before take off.

After landing the unit will close the flight after **approximately 3 minutes**, so it is recommended to keep the unit under power until very typical information **Calculating Security** will appear on the display. A very significant signal that the flight recorder has closed the flight is presence of **Logg book**. During run time there is a statistic page.

Note!
If the flight recorder was switched off before the flight was regularly finished, the Calculating Security procedure will start immediately after next power on.

4.2 Downloading of Flights

Downloading of flights is possible **exclusively** after using of SD card. Select **flight of interest** in LOGGBOOK menu and run COPY to SD (press button) and the flight will be copied to SD card. The process is accompanied with a typical message **Busy Copying**.
The flight will be copied in .IGC format and mentioned format is acceptable by any scoring office or OLC.
VIEW INFO will show header data (pilot, glider…), this page is only display.
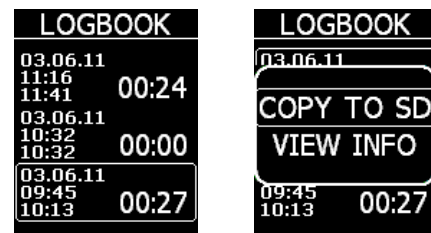
4.2.1 Flight evaluation

To check the flight data integrity use LXe or IGC shell programs. IGC shell is an IGC free ware program specially designed for flight integrity check. Not ready at the moment.

4.3 IGC file structure

IGC flight recorder file is text file, that means the data are simple readable by any text editor. At of an IGC flight is printed below:

```
ALXNG88FLIGHT:1
HFDTE110509
HFFXA015
HFPLTPILOT:CRT.ROJNIK
HFGTYGLIDERTYPE:LAK19-15
HFDTM100GPSDATUM:WGS-1984
HFRFWFIRMWAREVERSION:1.0
HFRHWHARDWAREVERSION:1.0
HFFTYFRTYPE:LXNAVIGATION,COLIBRI II
HFGPS:uBLOXf_TIM-LP,16,max9000m
HFPRSPRESSALTSENSOR:INTERSEMA,MS5534A,max8000m
I023638FXA3941ENL
C110509143109110509000100
C4619767N02003217ESZATYMAZ
C4622930N02015629ETSKSTART
C4619767N02003217ESZATYMAZ
C4619767N02003217ESZATYMAZ
F093156023111041307173232025
LLXNORIGIN0926594619153N02003303E
B09265946191532N02003303EA000000001007000
B09270546191532N02003303EA0006800091007000
```
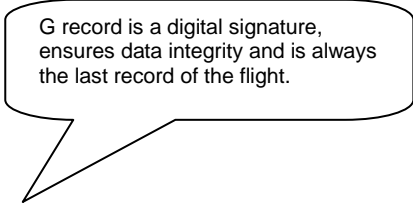
- Recorder Sn. and flight number
- Date ofvthe
- ENL enabled
- Flight declaration data as C record
- B records as position records

B0927114619153N02003303EA0006800091007000
B0927174619153N02003303EA0006900093007000
B0927234619153N02003303EA0006800093007000
B0927294619153N02003304EA0006900093007000
B0927354619153N02003304EA0007000093007000
B0927414619153N02003304EA0007000093007000
B0927474619152N02003304EA0007000091007000
B0927534619153N02003304EA0006900091007000
B0927594619152N02003304EA0006800091007000
B0928054619152N02003304EA0006800091007000
B0928114619152N02003304EA0006800093007000
B0928174619153N02003304EA0006800091007000
G33069178E3C800E8CE815DD7F0D6968983E2BC0F44C3DC20645F06CC9F78E84
GAF5B28F33E76C8DC5C105CB2B168472106BA50860B3DC93F72D9439C9B371975
G43221B

> G record is a digital signature, ensures data integrity and is always the last record of the flight.

4.4 Baro trace check (calibration)

Each flight recorder should be periodically checked to show that buit in pressure sensor is still in limits. The procedure is extremely simple and needs some minutes. The most important action is setting of Rec. Intreval in Looger Setup to 1 second; otherwise the trace will not be uniform. The procedure should go on as follows.
-Put the unit into the pressure chamber
-Set QNH 1013 conditions
-Apply a pressure jump to start recording
-Climb apr. 4m/s and make a stop for apr. 30 seconds every 1000 m
-After reaching 8000m sink apr 4 m/s and make stops after every 1000m
-After reaching zero open the chamber and switch off the unit
-Switch on the unit after 4 minutes and download the "flight"
-Return Rec. Interval setting to default value
-Print baro trace after using of convenient PC program, for instance LXe

5 Cooperation with other units

5.1 Sending of NMEA data

The unit can be used as a GPS and pressure/altitude source for many navigation systems. The NMEA data is sent at 19200 bps. The same is valid for additionally data in so called LXWp format.

5.2 Data exchange with other units

Colibri II is capable to communicate with units (programs) which are listed below. It is necessary to arrange suitable cable connections.

Unit	Declaration	TP data	Flight download	Remarks
LX 7007	✓	✓		
SeeYou Mob.	✓	✓	✓	
Oudie	✓	✓	✓	
ConnectMe	✓	✓	✓	
LX 166*	✓	✓	✓	
LX 1606*	✓	✓	✓	
LX Mini Map*	✓	✓	✓	

*depends on program which is running on PDA

6   Installation

The installation works are extensive due to Colibri II HW configuration. If the unit will be used as a stand alone flight recorder (using of internal battrey) no installation works will be necessary. In fact the unit may be kept in the pocket or put anywhere in the cockpit. Due to low weight some provisionally installation methods can be used as for instance adhesive types.

6.1   How to power on and off

A longer press (**approximately 1 second**) on push button of navigation switch will power on the unit, the first signal that the power has been applied is presence of LX Navigation logo. To long press will switch back off and this is some kind of safety procedure, to filter out undesired turns on.
To switch off simple apply a longer press on the push button until the unit will go off.

6.2   External power supply

After need of an external power supply a special LX **power interface** should be used.

Important!
Never apply 12 V to the unit; the unit will be **seriously damaged** after 12V will be applied.

6.3   Pin out of USB mini B connector

6.4   Optional mounting frame

A suitable mounting frame with snap in effect can be delivered as an option, using of this option makes installation of Colibri II easy and processional.

6.5   Battery pack replacement

Due to safety reason it is recommended to use only original accumulators delivered through LX Navigation or LX Navigation distributors.
To replace the battrey simple remove the bottom plate of Colibri II, mentioned is possible after removal of 4 M2 screws.
Replace the battrey and reinstall the bottom plate.
Replacement of the battrey will not cause any data loosing or electronic seal damage.

6.6   List of standard parts and options

-Colibri II unit with built in battery
-USB Mini B to USB cable (for charging purpose)

6.6.1 Options

-DC/DC converter for external power from glider power network