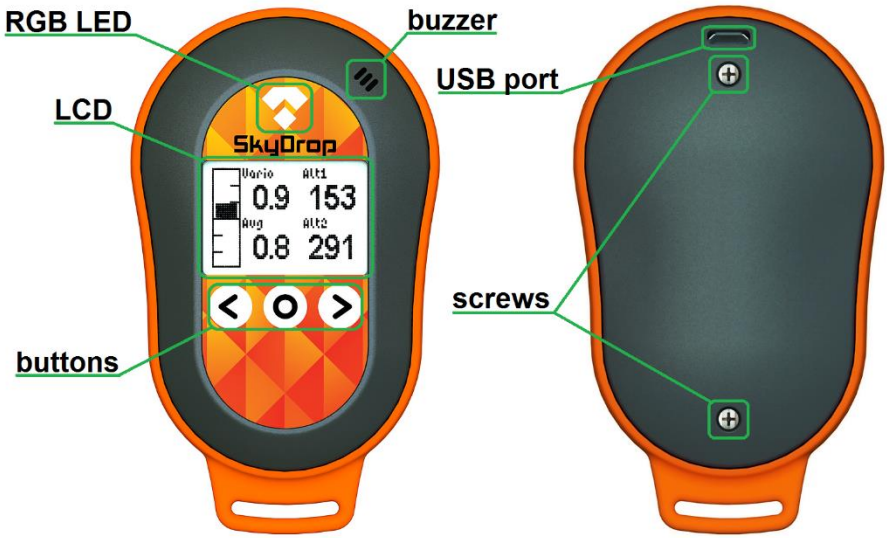
SkyDrop user guide

SkyDrop - combined variometer

main features

- **analog/digital variometer** – 0.1m/s accuracy
- **5 altimeters** – 1m accuracy, real time refresh rate
- **GPS recording** – 1Hz sampling
- **bluetooth & USB connectivity**
- **motion & environment sensors**
- **light weight & compact size** – 68g, 98 x 58 x 20 mm



RGB LED – multicolor signal light

LCD – main interface display

buttons – user controls

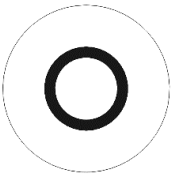
buzzer – audio transducer

USB port – communication & charge interface

screws – used for assembly/disassembly

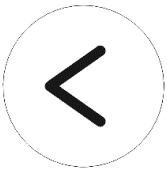
buttons

the middle button is used to confirm selection



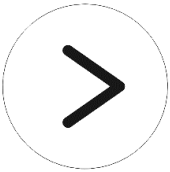
- turn on – press & hold for 1s
- show menu bar – press & hold for 1s (after select menu by arrow)
- turn off – press and hold for 5s or show menu bar and after short press
- list adjustable widgets – short press on home screen
- toggle widget value, start/stop flight stopwatch – long press
- confirm selection – short press in menu
- move to upper level in menu – press & hold

the left arrow button is used for left move



- scroll between screens to the left – short press
- select widget menu – short press when menu bar is on screen
- scroll up in menu – short press
- lower value during setting parameter – short press if setting value

the right button is used for right move



- scroll between screens to the right – short press
- select settings menu – short press when menu bar is on screen
- scroll down in menu – short press
- upper value during setting parameter – short press if setting value

important note – please read

SkyDrop is in silent mode after start-up, so if you want to hear acoustic feedback, please blow/suck shortly to/from buzzer grid. This feature will help you to be polite to others before take-off. Of course, sound is enabled automatically just after take-off. To disable this function, please uncheck **Logger suppress audio** checkbox.

operation of the SkyDrop variometer

During startup animation, firmware version in bottom left corner and hardware revision in bottom right corner are shown. The device will start on the last used home screen. You can scroll between home screens by pressing the left or the right button arrows. If adjustable or switchable widgets are on current home screen, you can shortly press middle button to scroll between them. If adjustable widget is highlighted, you can change its value by arrow buttons. If switchable widget is highlighted, you can toggle its state by long press of the middle button. To enter widget or settings menu, you need to bring up the menu bar from the bottom of any home screen by long press of the middle button, until menu bar appears. After that, you can enter into widget menu by pressing the left arrow button, or enter into settings menu pressing the right arrow button, or you can turn off the device by short press of the middle button again.

multi-color light signalization

yellow light – during device is flashed with new firmware
red light – when connected to PC/charger and battery is charging
green light – when connected to PC/charger and battery is full
red flash – when battery is less than 20%
yellow flash – when no GPS fix
green flash – when GPS 3D fix is reached
cyan flash – when bluetooth is enabled, but not connected
blue flash – when bluetooth is enabled & connected

widget menu

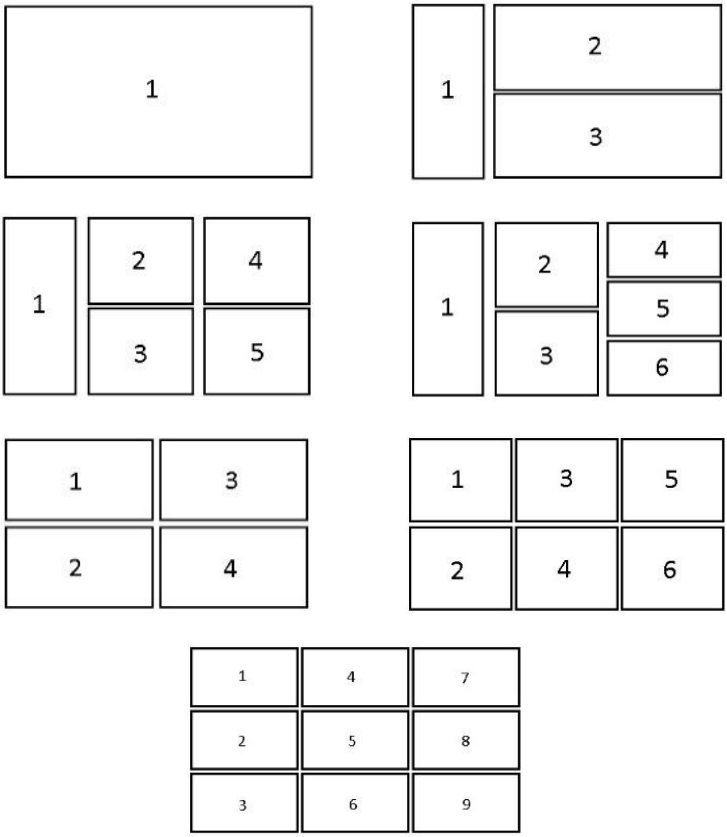
Change widgets selection allow to assign different widget options on current home screen. Use arrow buttons to scroll between fields on the screen, use middle button to select field for widget change, which will be chosen from widget list in next step. Several widgets are adjustable (e.g. altimeter widgets **Alt**) or another once can enable/disable specific function (e.g. **beep** or **weak**) can be toggled.

You can chose from following widgets:

Vario bar shown graphically value of analog vario, each step represents 1m/s. The vario bar increases from middle to top when vario shows 0 to 3 m/s, then decreases from middle to top when vario shows 3 to 6 m/s. The bar shows sinking the same way, so the total range of vario bar is -6 to 6 m/s.
Vario shows value of digital variometer.
AVG vario (**Avg** on LCD) shows value of averaged digital variometer during time period set in **Average vario integration int.**
Weeklift ON/OFF (**weak** on LCD) can be toggled by long press to switch on/off weak lift sound.
Audio ON/OFF (**beep** on LCD) can be toggled by long press to mute/unmute vario sound.
Altitude (**Alt** on LCD) shows altimeter (1 - 5) value. This widget can be adjusted.
Ground Speed (**GSpd** on LCD) shows ground speed obtained from GPS receiver.
GPS Heading (**GHdg** on LCD) shows heading obtained from GPS receiver.
GPS Heading Arrow shows graphically heading obtained from GPS receiver.
GPS position (**GPos** on LCD) shows GPS coordinates obtained from GPS receiver.
Glide ratio (**Glide** on LCD) shows ratio between actual ground speed and sinking rate.

Flight time (**FTime** on LCD) shows stopwatch of current flight. You can manually start/stop this stopwatch by long pressing the middle button when highlighted.
Time shows actual clock.
Battery shows remaining battery power in %.
Temperature (**Temp** on LCD) shows temperature and humidity.
Empty leaves current field empty.

Change layout entry in widget menu allows to change widget layout on current home screen. You can chose from following options.



Pages count entry defines number of home screens (1 to 5).

description of functions

Vario lift / sink threshold defines the vertical speed value when sound is activated (in 0.1m/s steps).
Vario fluid audio allows sound tone change during actual beep.
Vario weak lift setting enables continuous sound before lift threshold is reached to let pilot know “something is in the air” (in 0.1m/s steps).
Digital vario integration int. suppress very fast vario changes and makes displayed digital vario value more stable (in 0.1s steps; this is not affecting vario bar graph of sound output).
Average vario integration int. defines time used to compute average vario value, used for overall thermal power overview (in 0.1s steps).
Vario units setting allows metric or imperial format modes.
Vario demo can simulate device behavior to achieve desired settings (in 0.1m/s steps).
Altimeter mode can by absolute related to QNH1 or QNH2, relative to other altimeter (with offset adjustable though home screen widget), or following GPS altitude.
Altimeter zero at takeoff checkbox in altimeter relative mode set altimeter value to zero when takeoff condition occurs (automatic or manual).
Altimeter units setting allows metric or imperial format modes.
Altimeter get from GPS sets altimeter value equal to GPS altitude. If in QNH dependent mode, this choice will change also QNH value. In relative mode QNH value stays, just offset is changed. **Note**: Altimeter value is based on atmospheric pressure, which varies during weather changes, therefore altimeter should be calibrated prior to takeoff. Altimeter calibrating can be done by entering the known altitude of location or setting the known QNH value valid for current area or get from stabilized GPS value (GPS altitude is changing slower within fast altitude changes, so it can take some time for stabilization, usually several minutes).
Logger enabled checkbox enables or disables GPS tracking of device movement.

Logger format of output file can be chosen IGC or KML.
Logger state can be waiting for takeoff, flying or landed.
Logger start / land threshold defines altitude change needed for takeoff / landing detection (in ±1m steps). Long press flight time stopwatch **FTime** widget when highlighted for manual start / stop.
Logger timeout is count down time used for landing detection if altitude stays within defined interval (in seconds).
Logger suppress audio checkbox mutes the device when waiting for takeoff, so launch area is not saturated by random mix of annoying sounds generated by many waiting varios.
GPS enable checkbox enables/disables onboard GPS receiver (significant for battery power).
GPS status shows ratio of fixed/available satellites.
GPS time shows actual GMT time obtained from GPS receiver.
GPS date shows actual date obtained from GPS receiver.
GPS speed units, used for ground speed widget **GSpd,** can be chosen from – m/s, km/h, mph and knots.
GPS format of coordinates can be chosen from – DD.dddddd, DDº MM.mmm' or DDº MM' SS".
Bluetooth module shows used type onboard.
Bluetooth enabled checkbox enables/disables bluetooth function (using this function significant for battery power).
Bluetooth protocol selection changes devices communication between DigiFly (XCSoar), LK8EX1 (XCtrack) and BlueFly protocols.
Bluetooth forward GPS checkbox will enable forwarding GPS coordinates to connected device, so there is possibility to turn off its internal GPS receiver to save power.
Time item in settings menu allow adjust on-board clock.
Date item in settings menu allow adjust on-board date.
Time zone entry is useful with GMT time obtained from GPS receiver to set correct local time.
DST checkbox means daylight saving time option if applicable.
Sync with GPS checkbox allows to get accurate time setting from GPS receiver.
Display contrast adjustment tunes LCD screen contrast.

Display backlight adjustment controls backlight level (in 20% steps).
Display backlight timeout defines time interval after last button press when backlight remains turned on.
Invert display checkbox switch dark and empty pixels on LCD.
Flip orientation checkbox turn over LCD screen, so SkyDrop can be operated in upside-down position.
Animation checkbox enables smooth switching between home screens.
Vario volume adjust vario sound level (in 10% steps).
Vario mute checkbox switch off beeping of vario. This can be also done by **beep** widget.
Alert volume adjustment set sound level of pop-up info messages.
Menu volume adjustment set sound levels.
On/Off sound checkbox play sound at startup or switching off.
Page sound checkbox informs which home screen is currently selected by 1 to 5 fast beeps.
Button sound checkbox enables beep when any buttons is pressed.
GPS ready checkbox play sound when GPS 3D fix is achieved.
Mass storage checkbox enables access to onboard flash memory (micro SD card) when connected to computer.
Auto power-off entry can define time interval after which device will automatically turn off, if no operation occurred. Please note: auto power-off cannot occur during flight.
Uart function can be used for data streaming by UART interface. User can choose from several baud rates – 9600, 19200, 38400, 57600 or 115200. UART is using same protocol as bluetooth. Debug msg. option runs at baud rate 921600 and is used for development.
Format SD function will erase and format inserted micro SD card – recommended if any mass storage connection problem occurs.
Debug log checkbox activates log records used for debugging and can be checked if technical support ask for it. There are some other service information in debug menu.

power management

Since SkyDrop is portable device with rechargeable Li-Poly battery onboard, it needs time to time recharge its battery. You can use any micro USB wall charger or another USB host device, even another portable device with active OTG function.

technical specification

weight & dimensions – 68g, 98 x 58 x 20 mm (3.8″ x 2.3″ x 0.8″)

pressure sensor – MS5611-01BA03, 10cm resolution, -1400 to 25000 m altitude (-4600 to 82000 feets)

GPS receiver – L80 22/68 channel, position <2.5m CEP, velocity accuracy <0.1m/s, sensitivity -165dBm

IMU sensor unit – LSM9DS0

Humidity & temperature sensor – SHT21

Bluetooth transceiver – PAN1026, 2.1 SPP, BLE 4.0

USB interface – micro USB 2.0, device only

battery – 900 mAh, charging current max. 500 mA

buzzer – magnetic transducer 95 dB @ 10cm

operation temperature range – device -40 to 85 ºC (-40 to 185 ºF), battery -40 to 45 ºC (-40 to 113 ºF), LCD -20 to 45 (-4 to 158 ºF)

power consumption – depends on activated functions. Several operation modes are listed:

audio mode only	13h
audio + altitude logger, without GPS	12h
audio + bluetooth	10h
audio + GPS logger	9h
audio + GPS logger + bluetooth	7.5h

package includes

SkyDrop variometer with strap, raiser mount, USB cable, stickers, user guide

device update instructions

Watch video tutorial on SkyBean YouTube channel or follow these instructions:

1. Download update file/s from our repository skybean.eu:8080/repo/updates

   The last folder contains the newest firmware version.

2. Please read carefully additional instructions before update when they are included in build directory (e.g. Warning.txt, Readme.txt)

3. Connect SkyDrop to the computer via micro USB cable.

4. Wait until USB mode is enabled and device folder will pop up.

5. Copy files **UPDATE.FW** and **UPDATE.EE** (from 0010 to 1278 folder) or **SKYDROP.FW** (from 1449beta) to the device. File name must stay exactly the same, so be careful if you download the file multiple times.

6. Eject the device from system toolbar and then long press the right button to reset in case two files were copied (UPDATE.FW and UPDATE.EE) or just power on with the middle button in case just single update file was copied (SKYDROP.FW)

7. SkyDrop led will lid yellow during the update.

8. Disconnect USB cable and you are done.

Alternatively you can find updates or recently solved software issues on our GitHub account github.com/fhorinek/SkyDrop

important information

By purchasing this device user agrees with terms and conditions of device operation. SkyDrop variometer is not designed for flying under instrument flight rules (IFR) in any case. Manufacturer is not responsible for any accidents or injuries caused by reliance on information provided by SkyDrop variometer. We highly recommend to use both velcro and safety strap when flying with SkyDrop. Security strap is not a regular mount. However we did our best to protect device against destruction during water landing, it is not guaranteed and warranty will void. If device is broken of any reason, do not hesitate and contact us to solve it.

FAQ / Troubleshooting

If there is something wrong with the device or if you need more detailed explanation of any function, please visit our FAQ section at: skybean.eu/page/skydrop-frequently-asked-questions
If you cannot find the answer, do not hesitate to contact us via email or Facebook.

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