SkyTraX

By Caelum Systems

User Guide

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Overview

SkyTraX is a GPS and barometric data logger for skydiving. It operates on the principle of “set and forget” - turn it on at the start of each day, and it will automatically detect the start and end of each jump and log only the duration of the jump to memory. Like an AAD, it will automatically turn itself off at the end of the day.

SkyTraX prioritises logging GPS data - if the GPS fix quality is sufficiently high, GPS data will be stored in memory. However, if the GPS fix is lost or degrades during a jump, SkyTraX will automatically switch to logging barometric data for altitude and vertical speed. If the GPS fix is later recovered, logging will seamlessly switch back to GPS data.

Logged data is presented in a standardised format supported by most existing software tools for viewing skydive logs. (For example: Flysight Viewer, gSwoop, etc.)

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Specifications

GPS	Update rate	5 Hz
	Accuracy	Position: 2.5 m Velocity: 0.05 m/s
	Time to fix	Cold start: 26 s Hot start: 1 s
Barometer	Update rate	5 Hz
	Accuracy	1 m
Memory	SD card size	2 GB included (>10,000 jumps)
	Interface	USB mass storage device class
Battery	Chemistry	Lithium-Polymer (LiPo)
	Lifetime	Min. 2 days of frequent use
	Charge time	120 minutes
Dimensions	Length	57 mm
	Width	43 mm
	Height	13 mm
	Weight	33 g

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User Interface

Power

Power On: To power SkyTraX on, press and hold the button until the purple indicator LED turns off.

Auto Power Off: Like an AAD, SkyTraX will automatically turn itself off, 14 hours after power on.

Manual Power Off: To power SkyTraX off manually, while in Standby state:

- Press and release the button.
- Wait a second for the red indicator LED to appear.
- Press and release the button.
- Wait again for the red indicator LED to appear.
- Press and release the button.
- Wait again for the red indicator LED to appear.
- Press and release the button; the device will now turn off.

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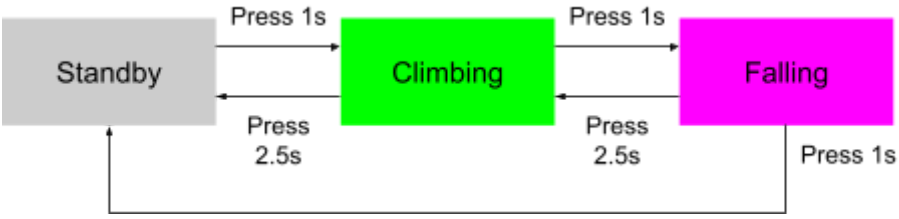
Manual Mode Change

While powered on, the button can be used to manually force the device forwards and backwards in state. Press and hold the button for 1 second to advance one state, and press and hold the button for 2.5 seconds to return one state.



Note: If you manually enter the Falling state by pressing the button, SkyTraX will not automatically return to Standby state as usual. It will continue logging until it is manually advanced to Standby, or once 20 minutes has elapsed. This allows you to manually log a track without exiting an aircraft.

Indicator LED

The indicator LED cycles through several colours in sequence every 3 seconds, where each colour has a specific meaning. See the table below for the meaning of all possible LED colours.

LED Colour	Function	Meaning
White ○	GPS =	No fix
Blue ●		Fix
Green ●	State =	Climbing
Purple ●		Falling
Red ●	Battery =	Low
Orange ●	Memory =	Close to full

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Jump Tracks

Downloading Jumps

Option 1: The easiest way to retrieve jumps stored on SkyTraX is by connecting to a PC using a USB C cable. SkyTraX will appear as a USB mass storage device, with a folder structure that can be opened and navigated in the same way as a USB drive. Jumps are presented by date and time, and can be copied across to the PC for long-term storage and viewing. Please note that this interface is only available when the micro SD card is fitted.

Option 2: SkyTraX features a removable micro SD card, which functions independently of the internal memory storage. This allows users to jump without an SD card fitted. When the SD card is plugged back in, on the next power cycle SkyTraX will copy the data from the internal storage onto the SD card. The SD card can then be removed and plugged into a PC for reviewing the transferred jumps while SkyTraX can continue to be jumped in parallel.

Viewing Jumps

Logged data is presented in a standardised .csv format that is supported by most existing software tools for viewing skydive logs. Supported software includes Flysight Viewer, gSwoop, etc.

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Charging the Battery

⚠ Read and follow all instructions and warnings relating to the LiPo battery. Failure to do so may lead to fire, personal injury, and/or damage to property.

SkyTraX uses a Lithium-Polymer (LiPo) battery, which is designed to last for at least 2 full days of frequent jumping. To recharge the battery, simply connect to any 5V USB charging brick or to a PC using a USB C cable. While charging, the red charging LED remains lit. When this LED goes out, the device is fully charged. Recharging a dead battery to full capacity takes approximately 120 minutes.

⚠ Do not leave the device charging unattended.

⚠ If you notice the device start to swell, smoke, or heat up, immediately disconnect it from the charging cable and move it to a safe location, away from combustible materials.

⚠ Do not leave the device in direct sunlight or in an environment where the temperature may exceed 60℃. This may cause the battery to overheat, resulting in the possibility of fires or damage to the device.

⚠ Do not attempt to charge the device when it is below 0℃ or above 45℃. Charging outside this temperature range may damage the battery and could result in fires.

⚠ Do not attempt to use or charge a device that is visibly damaged.

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Recommended Mounting

1. **Pocket -** SkyTraX is small enough and sensitive enough that for many applications it can just be left in a secure pocket when jumping. The SkyTraX logo must be facing away from your body in the pocket.

To ensure a good GPS fix throughout the jump, one of the following mounting options is recommended:

2. **Audible Slot -** SkyTraX is small enough to fit in the audible slot of most skydiving helmets. Simply fit the device into the helmet as you would any audible altimeter, ensuring that the side with the SkyTraX logo is facing outwards (away from your head).

3. **Helmet Mount -** Mounting SkyTraX to the top or back of your helmet is the most reliable way of ensuring a good GPS fix throughout a jump. This mounting option is strongly recommended for any jump where GPS reliability is crucial, for example competitions. To attach a mount to your helmet:
    1. Choose the appropriate mount that matches your helmet. This is important to ensure the curvature fits closely.

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2. Decide where on the top/back of your helmet you want to apply the mount, taking into account the curvature of the helmet and mount.
3. Remove the backing from the VHB adhesive tape on the mount.
4. Stick the mount to your helmet in the chosen location, and press down hard.
5. Wait for at least 72 hours, to allow the VHB adhesive tape to reach full bond strength. Avoid using the helmet or mount during this time.
6. Slide SkyTraX into the mount. The snap feature ensures that the device stays secure, while allowing simple removal with one hand.

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Troubleshooting

Warnings and Errors

Warnings and errors are shown by the indicator LED on the front of the device.

Possible warnings include:

Red	Battery is low	Plug the device into power using a USB C cable.
Orange	Internal memory is nearly full	Insert an SD card with sufficient free space to allow the internal memory to be transferred over.
Flashing White	Memory transfer is in progress	Wait for the transfer to complete before using the device or removing the SD card.

Possible errors include:

Static White	Device is busy	Wait for the current action to complete before using the device. If this error persists, try holding the button for at least 2 seconds to cancel the action. If this has no effect, please contact the manufacturer.
No colour	Battery is dead	Plug the device into power using a USB C cable.

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Resetting the Memory

Auto Reset: When the internal memory is nearly full, SkyTraX will automatically copy any new jumps to the SD card and then reset the internal memory. While this is happening, the indicator LED will continuously flash white. Press and hold the button to cancel this process.

Manual Reset: If you want to manually clear the internal memory, while the device is connected to a PC using a USB C cable, create a folder in the SkyTraX USB memory named “reset”. (Note that this is case sensitive.) Unplug the device from the PC, and manually turn it off and back on again. The device will immediately copy any new jumps to the SD card and then reset the internal memory. While this is happening, the indicator LED will continuously flash white. Press and hold the button to cancel this process.

Software Update

To enter the “Software Update” mode, first ensure SkyTraX is plugged into a PC using a USB C cable. While in Standby state:

- Press and hold the button until the indicator LED lights turquoise. Continue holding the button until the LED turns off (~ 12 seconds).
- Release the button.
- Wait for the turquoise indicator LED to reappear.
- Press and release the button.
- Wait again for the turquoise indicator LED to reappear.
- Press and release the button.
- The LED will light green to indicate that the bootloader has connected to the PC over USB. SkyTraX will appear on the PC as a USB drive with the name “CAELUMBOOT”.

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Disclaimer

Caelum Systems Ltd makes no guarantee or express or implied warranties of any kind in association with the SkyTraX device or its components, including but not limited to warranties of safety, function, performance, or merchantability. Use of the product is at the user's own risk.

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