



SteFly Canopy Flasher

Installation Manual and Operating Instructions

Version 1.4

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1 Preliminary Remarks

1.1 Important Notices

SteFly Canopy Flasher was designed to improve the visual awareness of your glider by sending out light flashes from high-intensity LEDs.

Make sure that the device can be legally installed and operated with the laws in your country. Aircraft registered in EASA member states have to comply with EASA **Standard Change CS-SC036b (INSTALLATION OF VISUAL AWARENESS LIGHTS)**. [Link](#)

Before using any part of the system, please read and understand this manual. All information in this document is subject to change without notice. The latest version can be downloaded from www.stefly.aero.

CoTexx GmbH does not accept responsibility for damages which are the result of installation and operation of the device.

1.2 Limited Warranty

SteFly Canopy Flasher and Control Box as well as our accessories are warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, CoTexx will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorised alterations or repairs.

1.3 Conventions and Pictograph Definitions

The safety instructions in SteFly operating manuals are the result of risk evaluations and hazard analyses. In this document, the following hazard levels and information are considered:



Pay special attention to critical notes marked with a yellow caution symbol, because non-observance may result in damage or any other critical situation.



A red caution symbol signals that non-observance may result in injuries.



Command to perform an action or task associated with a source of danger, the disregarding of which may result in serious accidents.



A blue cloud indicates useful information or tips.

2 Safety

2.1 Safety Precautions



Duty to inform

Each person involved in the installation or operation of the canopy flasher system must read and observe the safety-related parts of these operating instructions.



Make absolutely sure that **nobody is looking directly into the canopy flasher** or into the reflected beam in nearer vicinity, **when the LEDs of the canopy flasher are emitting light!** This could possibly **damage the retina** temporarily or even permanently. The Control Box has the function to start the flash mode shortly after take off and stop it after landing, when the on / off- switch in the instrument panel is in the “on” position. But always be aware of malfunctions, e.g. misleading FLARM signals. Especially take care, when the ACL switch in the instrument panel is flipped “on”, because SteFly Canopy Flasher signals that it is working properly by two short, reduced-brightness flashes.

2.2 Proper Use

SteFly Canopy Flasher was designed to improve the visual awareness of your glider by sending out light flashes from high-intensity LEDs.

The LED flasher shall be installed in the inside of the forward part of the canopy and therefore has a limited field of coverage in the forward sector of the aircraft.

SteFly Canopy Flasher is an additional feature of helping pilots to avoid mid-air collisions in day VFR conditions. Security decisions and airspace observation must be made regardless of having installed a visual awareness light system.

The Control Box features a USB-A charging port, which can supply mobile devices with power during flight.

2.3 Improper Use

Improper use will cause all claims for liability and guarantees to be forfeited. Improper use is deemed to be all use for purposes deviating from those mentioned above, especially:

- This product is not certified as anti-collision light and therefore must not be installed if an anti-collision light is required due to operational regulations.
- Operating it outside the operation conditions defined in technical data section, e.g. input voltage, temperature and humidity.

3 Product Description

3.1 Scope of Delivery

Everything you need for a standard installation is included in the scope of delivery:

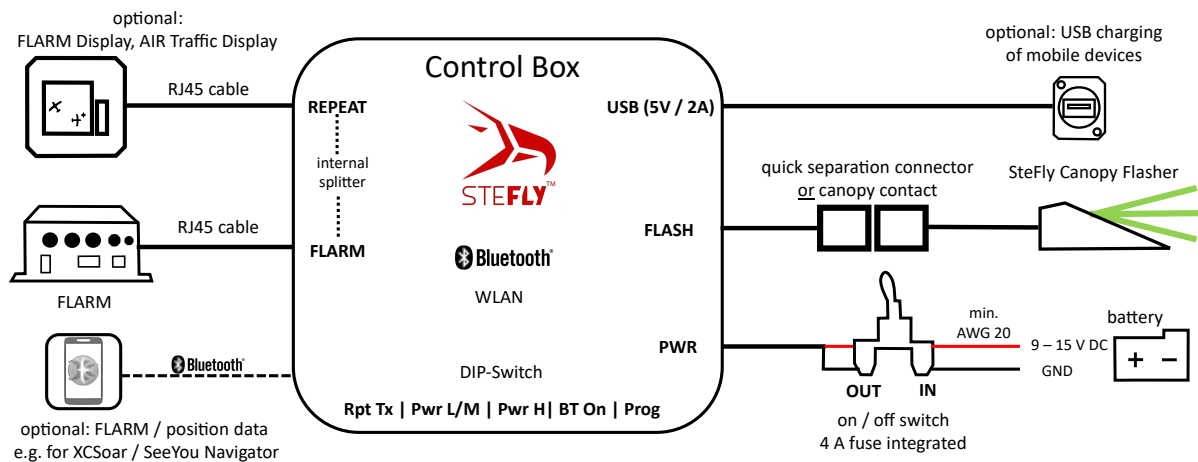
- SteFly Canopy Flasher with green LEDs and black aluminum / SLS-printed housing
- Control Box for automatic flash activation in flight and increase of flash intensity according to FLARM® collision warning data; with integrated USB charger 5 V / 2 A for mobile devices, Bluetooth® (can send FLARM® and position data to a mobile device) and WLAN (for baud rate / updates)
- On/off switch with integrated 4 A fuse and labeling panel

- All required cables (12 VDC power supply to on-off switch / on-off switch to control box / control box to canopy flasher)
- Masking foil template for precise alignment of the canopy flasher in the direction of flight
- Yaw string with clear adhesive pad and alignment template

3.2 Design and Function

SteFly canopy flasher was specially designed as visual awareness light for gliders and sailplanes. LEDs are emitting green flashes with high luminous power. The light beam is formed by a reflector and the housing, which is coated by a mirror foil.

The system architecture is shown below.



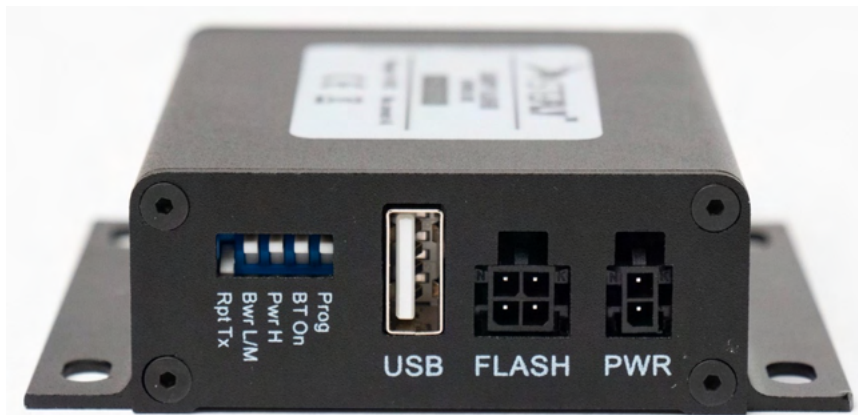
The canopy flasher is connected to the Control Box, which evaluates FLARM signals of aircraft in the surrounding area. For safety reasons (dazzling) and energy saving, the canopy flasher only emits light flashes, when the aircraft is flying. Therefore, FLARM is connected to the Control Box via a RJ45 cable.

An on/off switch has to be installed, to activate and deactivate the visual awareness light. It has an integrated fuse against system overloads and system shorts. This switch is electrically positioned between the storage battery(ies) and the Control Box. The switch must be accessible during the operation of the aircraft and should therefore be installed in the instrument panel.

In case of jettison of the canopy for emergency exit, the design provides a quick separation connector (standard) or a canopy contact (useful for side opening canopies, available as accessory).

3.3 DIP Switches

The DIP switches allow some individual settings. In default status all DIP switches are up.

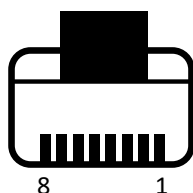


DIP Switch Name	Switch up	Switch down
Rpt Tx	passing data (TX & RX) across from the FLARM to the REPEAT connection (repeater mode)	the transmit line to the FLARM is from the Control Box (e.g. XCSoar via Bluetooth) itself, not the REPEAT
Pwr L/M	low power	medium power
Pwr H	low or medium power (according to setting of "Pwr L/M" DIP switch)	high power mode, regardless of "Pwr L/M" setting
BT On	Bluetooth off	Bluetooth on, connect to send position / FLARM data to mobile devices with XCSoar / SeeYou Navigator
Prog	normal use	only for updates (see chapter Change of Baud Rate / Update the Control Box); <i>Flasher is not operating</i>

3.4 RJ45 Connectors

The Control Box has two 8-pin RJ45-sockets (8P8C) in accordance with IGC GNSS FR specifications and is therefore connected e.g. to a device from FLARM Technology by a 1:1 assigned RJ45 cable (included in scope of delivery).

RJ45 IGC-Layout (view into female connector)



Pin Number RJ45	Function / Signal
1	GND
2	GND
3	RX (receives data)
4	TX (sends data)
5	not connected
6	not connected
7	+12 to +18 V DC power supply
8	+12 to +18 V DC power supply



Connecting power to an incorrect pin when using an improper type of cable may harm the Control Box or FLARM device and void any warranty.

3.5 Status LEDs of the Control Box



The Control Box has four status LEDs, positioned above the RJ45 connectors:

- LED1 (left): Valid GPS data received (off = no fix / on = 3d fix, on ground / flash[1's] = 3d fix, airborne) <<< note actual flasher will only flash when airborne
- LED2: BT connected (turns on when BT connected)
- LED3: Activity (flashes when data present)
- LED4 (right): Connected (turns on when RS232 connection present)

3.6 Change of Baud Rate / Update the Control Box

To establish communication with FLARM it is mandatory that the baud rate of FLARM and Control Box are the same. By default, the serial connection of the Control Box is 19200 baud.

If you want to change to autobaud or select a different baud rate, please follow the steps below:

1. turn power on
2. while booting (LEDs go 4-3-2-1) switch PROG switch down
3. after a few seconds you should see all LEDs constantly flash.
4. find WiFi ssid: "JustSoaring" pw: "11221122", connect and go to <http://192.168.0.1>
5. you can select any baud rate or autobaud and save

[Home](#) / [OTA Update](#)

Settings

In addition to DIP switches on the control box some settings can be changed from the web interface.

Baud Rate:

6. you can also do a WiFi update from this place using <http://192.168.0.1/update>
 - a. choose "Firmware" and select the corresponding update file

Firmware Filesystem

Keine Datei ausgewählt

9A7EDC0C - **ESP32**

- b. click "Start"
- c. wait until "OTA Success" is shown
- d. search again for WiFi ssid: "JustSoaring", pw: "11221122", connect, go to <http://192.168.0.1/update> and repeat the update process with the filesystem
- e. restart the Control Box and follow steps 1 – 4. You will now see more configuration possibilities and a button to test the flasher

Settings

In addition to DIP switches on the control box some settings can be changed from the web interface.

Baud Rate:	<input type="text" value="19200 bps"/>
Active when no GPS status:	<input type="text" value="YES"/>
When no FLARM data stream:	<input type="text" value="Last flash"/>
iOS/BLE support:	<input type="text" value="N"/>
Power saving:	<input type="text" value="N"/>

Flash the flasher



If autobaud is activated, the system will check the baud rate when turning on. Once the baud rate is detected, the status LEDs of the Control Box will show a one-time LED sequence (4-3-2-1).

If there is no baud rate detected automatically, the baud rate will be set to 19200 baud after 30seconds.

FLARM should be present from power on.

4 Installation

4.1 Installation Location

SteFly Canopy Flasher is installed on the inside of the canopy facing forward. The best position for SteFly Canopy Flasher is the far forward as possible for minimal obstruction of the pilot's field of view. Most gliders have installed a flap controlling the cockpit ventilation at the front of the canopy. Ensure that this flap has enough clearance and is not blocked by the canopy flasher.

4.2 Installation Process

A video showing the installation process is available on YouTube: [Link](#)

Overview of the installation process:

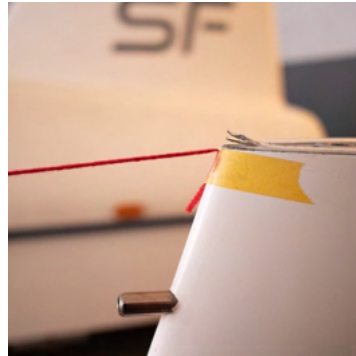
- Determine the approximate position of the canopy flasher (ensure that the flap controlling the ventilation has enough clearance!)

- Degrease the canopy in the area of the adhesive surface (for the canopy flasher and the yaw string)

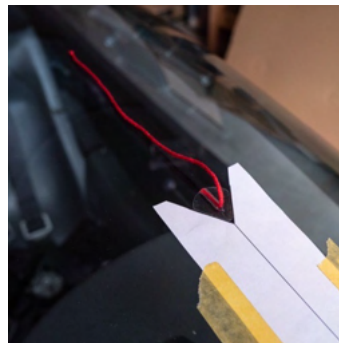


Degrease an aircraft canopy made of acrylic glass / PMMA / Plexiglas® only with isopropanol or benzene-free cleaning naphtha! Other solvents such as acetone or methanol / alcohol may cause cracks / permanent damage!

- Tension a thread from the nose of the fuselage to the top of the vertical stabilizer. Use a measuring tape to align the thread in the middle of the canopy



- Optional: attach the yaw string on the center line using the paper template



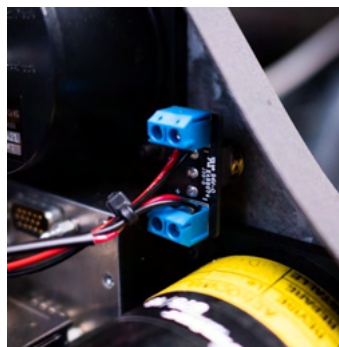
- Stick the adhesive template with the outline of the canopy flasher on the outside of the canopy. Remove the protective film from the canopy flasher and stick it to the canopy according to the template. Once the 3M VHB Tape is in contact with the canopy, do not try to reposition the canopy flasher. Apply moderate pressure for durable adhesion.



- Position the on/off switch in the instrument panel. The labeling board of the switch also serves as a drilling template (drilling diameter 6 mm).



- Fasten the control box in front of the instrument panel (screws and clamps / cable ties / Velcro)
- Connect the power supply cables to the screw terminals of the on/off switch,



Please make sure to connect the right end of the cable with the corresponding device. Non-observance may result in damage of all corresponding devices.



Cables for power supply are typically red for +9 to 15 V DC and black (or blue) for the ground connection. Power supply cables for the control box should be minimum AWG 20 (included in scope of delivery).

- Plug in the cables
- Use zip ties or other appropriate fasteners to place cables permanently and prevent from movement.



When selecting the connectors, we made sure that they separate automatically with little force in event of canopy jettison. Therefore, you must not use zip ties to secure the plugged-in connectors and bind them together! Secure only the connector that comes from the control box, as this will remain connected to the aircraft, even during canopy jettison.

4.3 Function Test

Test the correct function by switching on the canopy flasher after having completed the installation. When the switch is toggled on the ground, the canopy flasher will flash twice with less intensity.

To verify that the Control Box is set up correctly, please check status LED1. Make sure that FLARM receives GPS signals (glider is located outside of the hangar). In this case LED1 should be on. If not make sure that the baud rate is set up correctly. (see chapter [Change of Baud Rate / Update the Control Box](#))



Make absolutely sure that **nobody is looking directly into the canopy flasher** or into the reflected beam in nearer vicinity **when the LEDs of the canopy flasher are emitting light!** This could possibly **damage the retina** temporarily or even permanently.

With the newest updates (firmware and filesystem 06/23) it is possible to test the flasher by connecting the Control Box with a computer or smartphone via WiFi and start the flash mode by clicking the “Test” button. Follow the steps in chapter 3.6 [Change of Baud Rate / Update the Control Box](#).

Another possibility to force the canopy flasher flashing with strong intensity may be simulated and triggered by the FLARM® simulator App, if Power-FLARM® Fusion is installed.

5 Operation

5.1 Before Switching On the Canopy Flasher

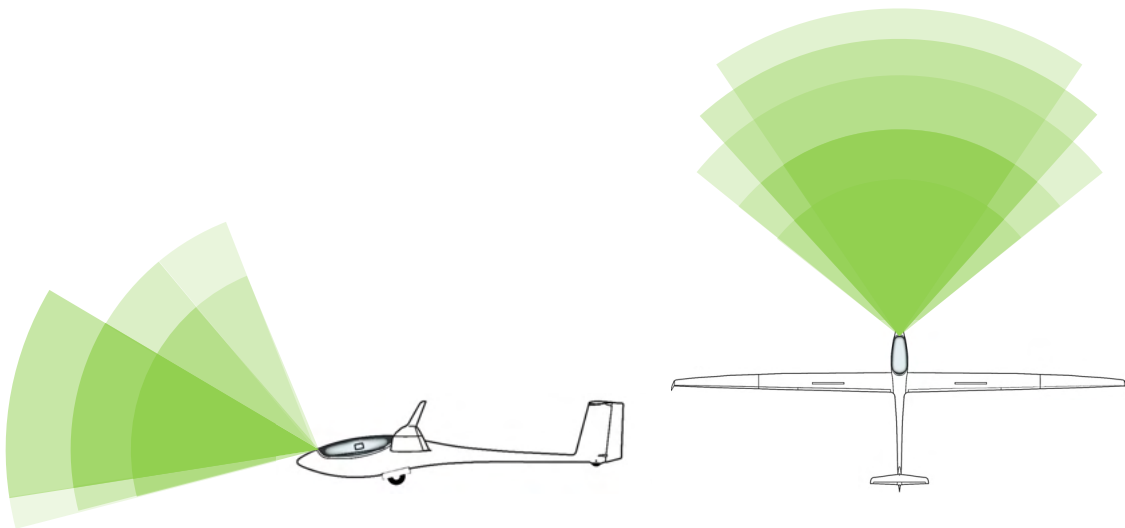


Make absolutely sure that **nobody is looking directly into the canopy flasher** or into the reflected beam in nearer vicinity, before toggling the on-off switch to “ACL”. The **powerful LEDs** of the canopy flasher could possibly **damage the retina** temporarily or even permanently.

5.2 Switching On the Canopy Flasher / Normal Operation

When the switch is toggled on the ground, it will flash twice with less intensity and signals that the flasher is active. Due to the connection between Control Box and SteFly Canopy Flasher, the latter will start flashing when FLARM indicates that the aircraft is flying.

The following drawings illustrate the shape of the light cone.



The brightest area of the flashes is in flight direction in extension of the longitudinal axis. Due to the green color of the light, which has the best perception of all colors for the human eye, the visible distance of the flasher is > 3,5 km in the center of the light cone and slowly decreasing to its edges. Even if the angle of approach of another aircraft moderately differs from your flight direction, your canopy flasher warns the other pilot. Indicative values for visible angles with reference to the z-axis of the LED plane are -30° below and $+60^\circ$ above, as well as up to $\pm 45^\circ$ right and left.

When your glider is in the air, the canopy flasher will flash constantly with a frequency according to the setting of the DIP-switches. The settings “low / medium / high” have impact on the flashing pattern (the time between individual flashes).

The intensity of flash frequency increases as soon as there is an aircraft in the vicinity on potential collision course. This happens in accordance with acoustic and visual FLARM warnings.

If SteFly Canopy Flasher measures a temperature of $> 60^{\circ}\text{C}$ in the flasher housing, the flash mode will slow down to prevent the components from overheating. Due to the high efficiency of the LEDs as well as the large aluminium heat sink integrated in the housing, these temperatures do only occur in exceptional circumstances.



Canopy protection from sunlight

Please always use a canopy cover whenever the glider is on the ground. This enhances the life-time of all components due to less exposure to heat and UV light.

5.3 Switching Off the Canopy Flasher

Shortly after landing FLARM usually recognizes that the flight has stopped. At the same time, the Control Box sends a signal to the Canopy Flasher and it will stop flashing. This avoids unintended dazzling, saves energy and prevents the LEDs from overheating in hot environments.



If the flasher does not stop flashing shortly after landing (approx. 30 seconds) turn off the switch manually. The same applies, if persons are arriving, who are not familiar with the risk for the human eye of high-power LEDs.

6 Maintenance

The whole system consisting of SteFly Canopy Flasher, Control Box, on-off switch and cables has no serviceable parts.

To obtain warranty service, please contact your local dealer or contact SteFly directly.



Opening the housing of SteFly Control Flasher or Control Box will void the warranty!

If it is needed to remove SteFly Canopy Flasher from the canopy, carefully begin pulling at the end of the flasher housing (where the LEDs are placed). Take your time and 3M VHB Tape will slowly tear bit by bit. Please contact us if you need new 3M VHB tape as spare part for reinstallation.

7 Troubleshooting

Problem	Possible Causes	Remedy
Canopy flasher does not flash twice, when the on / off switch is flipped to “on”	Battery is not connected to the electrical aircraft system	Connect batteries
	Battery voltage too low	Check battery voltage and recharge / exchange it
	Cables not properly plugged in	Reconnect the cables
	If installed: canopy contact loose	Check and adjust again that both sides of the canopy contact are in contact, if the canopy is closed
Canopy flasher does not flash in the air	FLARM baud rate not matching	Check if the baud rate of FLARM and Control Box is the same
	FLARM is not working	Check if FLARM is connected to the electrical systems
	FLARM cable is not properly plugged in	Reconnect the cable
	Thermal protection mechanism is activated	Let the flasher cool down

8 Technical Data

Size	Unit	Value
Number of LEDs		10
Wavelength of LED light	nm	predominant 490 – 570 (green)
Luminous flux	lm	3600
Mass canopy flasher	g	53
Mass control box	g	128
Mass on-off switch	g	10
Mass connection cables included in the scope of delivery	g	57
Dimensions canopy flasher	mm (length x width x height)	95 x 33 x 30
Dimensions control box	mm (length x width x height)	78 x 84 x 25
Dimensions on-off switch	mm (width x height)	15 x 31
Input Voltage	V DC	9 - 15
Amperage total for canopy flasher and control box (w/o charging mobile devices)	mA (@ 13,5 V, flashing frequency “low”)	110
Amperage total for canopy flasher and control box (w/o charging mobile devices)	mA (@ 13,5 V, flashing frequency “medium”)	150
Amperage additional when transferring data via Bluetooth	mA	20
Internal fuse on-off switch	A	4
USB-A charging port output	V / A	5 / 2
Operating temperature	°C	-30 to +60
Operating rel. humidity	%	0 - 95
Material control box housing		Black anodized aluminium
Material canopy flasher housing		SLS printed plastic, painted matt black; heat sink black anodized aluminium