SteFly Canopy Flasher

Installation Manual and Operating Instructions

Version 2.0

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info@stefly.aero   www.stefly.aero

Table of Contents

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 https://www.stefly.aero/en/product/canopy_flasher/

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 signalizes 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.

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 or red LEDs and black aluminum / SLS-printed housing
- Control Box (not included in Canopy Flasher Essential!) for automatic flash activation in flight and increase of flash intensity according to FLARM® collision warning data; with Bluetooth® (can send FLARM® and position data to a mobile device) and WLAN (for the web app to change seetings / 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)
- 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 flashes of light with high luminous power. The light beam is formed by a reflector or separate lenses as well as the housing, which is coated by a mirror / reflective foil for maximum efficiency**.**

The system architecture of SteFly Canopy Flasher with Control Box is shown below.
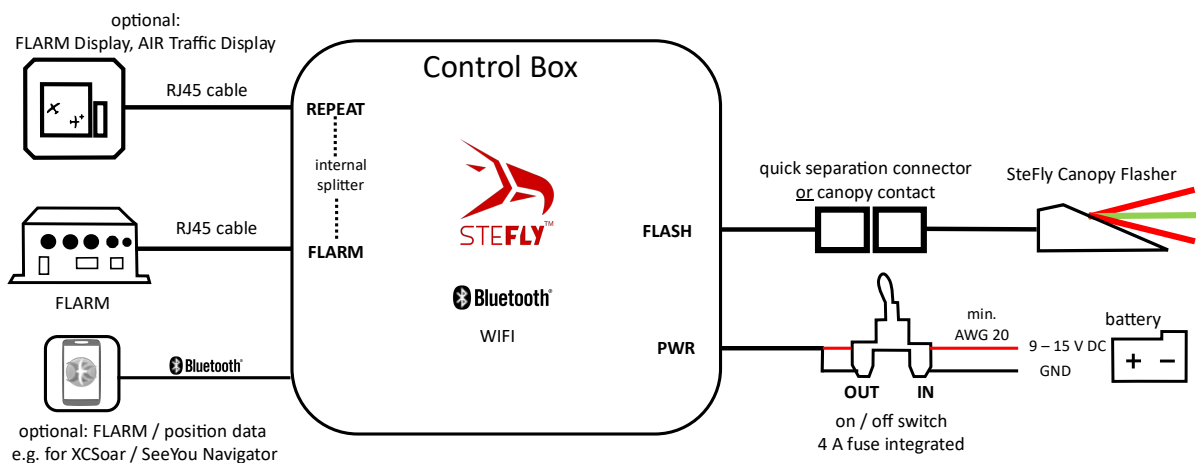
The canopy flasher is connected to the Control Box, which evaluates FLARM signals of aircrafts in the surrounding area. For safety reasons (dazzling) and energy saving, the canopy flasher only emits light flashes, when the aircraft is flying. Therefore, FLARM is connected to the Control Box via a RJ45 cable (standard 1:1 pin assignment).

An on/off switch (scope of delivery) must 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 12 V battery 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). For side opening canopies there are sets with special connectors available.

This system architecture has been simplified for SteFly Canopy Flasher Essential. A special cable connects the on / off switch and the quick separation connector / canopy contact:
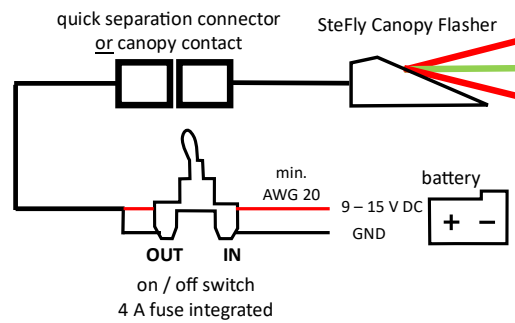

All SteFly canopy flashers delivered from February 2024 on have a small indicator light integrated into the heat sink, which lights up at the same time as the main LEDs. Therefore, the pilot can see live whether and at what rate the canopy flasher emits light. If necessary, the indicator light can be covered with tape.

3.3   Control Box

3.3.1   RJ45 Connectors

The Control Box has two 8-pin RJ45-sockets (8P8C) in accordance with IGC GNSS FR specification. The port labelled with "FLARM" receives data from the Flarm device by a standard 1:1 assigned RJ45 cable (included in scope of delivery). Purpose of the port labelled with "REPEAT" is to connect e.g. a Flarm display also by a standard 1:1 assigned RJ45 cable. Therefore the "FLARM" port and the "REPEAT" port are internally connected.
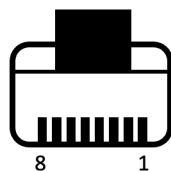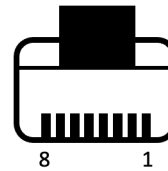
Pin Number RJ45	Required data input at the „FLARM" port	Data output at the „REPEAT" port
8	12 V	12 V
7	12 V	12 V
6	3 V	3 V
5	GND	GND
4	Flarm Data IN (RX)	Split OUT (TX)
3	Flarm Data OUT (TX)	Split IN (RX)
2	GND	GND
1	GND	GND

⚠️ 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.

3.3.2 Status LEDs of the Control Box

The Control Box has four status LEDs, positioned above the RJ45 connectors:
- LED "GPS" (left): Valid GPS data received (LED off = no fix / LED on = 3d fix and aircraft on ground / LED flash[1's] = 3d fix and aircraft airborne) <<< note actual flasher will only flash when airborne
- LED "BT": Bluetooth connection (turns on when Bluetooth connected)
- LED "DATA": FLARM activity (flashes when data present)
- LED "RS232" (right): Turns on when RS232 connection present

### 3.3.3 Connectors for Power and Canopy Flasher

The Control Box has a four-pin socket for connecting the canopy flasher and a two-pin socket for the power connection to the 12 V on-board electric system via the supplied on/off switch with integrated fuse. All connection cables are included in the scope of delivery.

3.3.4 DIP Switches

Please note: Control Boxes delivered 01/2025 and newer do not have DIP switches any more. All settings are made in the web application (see chapter 3.3.5). If Firmware 2.0.1 or newer is installed, the DIP switches have no function (except Rpt Tx). For all other settings please use the web app.

The DIP switches allow some individual settings, which are described in the following table.
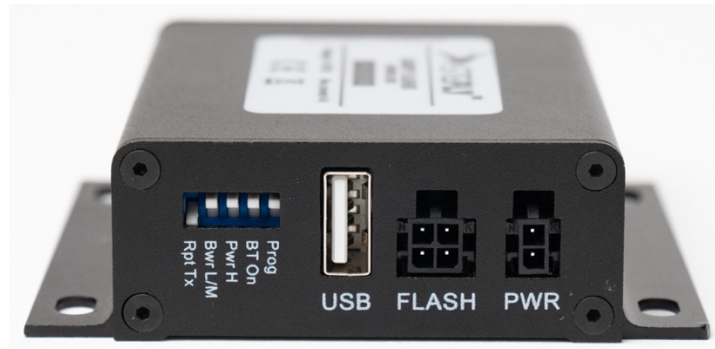
| DIP Switch Name	Switch up	Switch down
Rpt Tx	passing data (TX & RX) across from the FLARM to the REPEAT connection (repeater mode)	the transmit line to the FLARM is from the Control Box (e.g. XCSoar via Bluetooth) itself, not the REPEAT
Pwr L/M	low power	medium power
Pwr H	low or medium power (according 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); *Flasher is not operating*

3.3.5 Web App

The web application makes it possible to access the user interface of the Control Box using a smartphone / tablet / computer without installing a program. The browser window can then be used to make settings, call up status messages or start test mode.

To access the web app, proceed as follows:

Step 1: Connect the control box to 12 V DC (turn on the switch "ACL / FLASHER" on the instrument panel). Open WIFI settings on the smartphone / computer. Click on "SteFly-Flasher-..." or "Just Soaring".

Step 2: Enter the password 11221122 and click on "Connect".
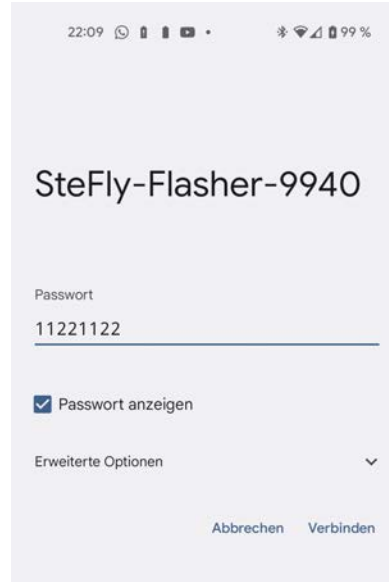
Step 3: The connection is established after a few seconds. The message "SteFly-Flasher-... has no internet access" may appear. Click on the message.

Step 4: Confirm that the connection should be maintained even though there is no online access (Yes).

Step 5: Type the address 192.168.0.1 into a browser window.
The user interface will then open.
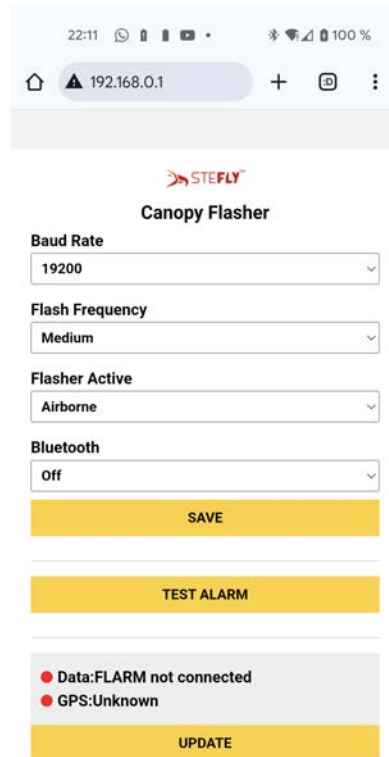
Step 6: If the control box is connected to Flarm via cable and the Flarm has satellite reception, the messages "Data: FLARM connected" and "GPS: 3D-fix on ground" appear.

The following settings are possible:
- "Baud Rate": Default setting 19200, as this is often the standard for Flarm. It is important that the same baud rate is set in the Control Box and Flarm to enable communication.
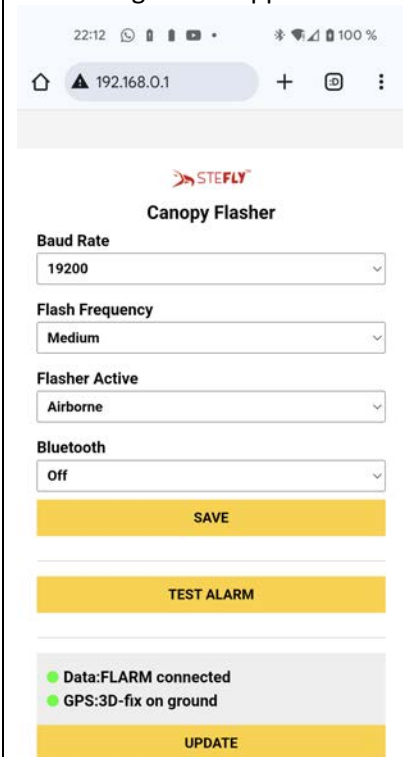- "Flash Frequency": Relative frequency of flashes when Flarm does not report another aircraft
- "Flasher Active": Setting e.g. that SteFly Canopy Flasher only flashes when Flarm reports another aircraft
- "Bluetooth": Off by default, but can be switched on to send location and Flarm targets to other apps

If a setting has been changed, then click on "SAVE".

To test whether the canopy flasher is working or whether communication between the canopy flasher and the Control Box has been established, click on "TEST ALARM" if the flasher is already installed. The LEDs then flash for 30 seconds.

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.

### 3.3.6 Notes on control boxes that were delivered before 01/2025

The latest firmware can be installed on all SteFly Control Boxes. The new firmware versions set WIFI automatically active for 3 minutes after the box is switched on. During this time the WebApp can be accessed. If no settings are made, the WIFI will switch automatically off again.

If your Control Box has DIP switches and a USB charging socket and no firmware update has been installed since the Control Box was delivered, it is possible that WIFI must be activated manually. To do this, supply the control box with 12 V DC (= switch on the "FLASHER" switch on the instrument panel) and press the PROG switch down during start-up (LED sequence 4-3-2-1). After a few seconds, all 4 LEDs flash in unison and the WLAN connection is activated for 3 minutes. If the latest firmware is then installed, WIFI is now automatically available every time the device is switched on within the first 3 minutes.

3.3.6 Firmware Update

The firmware update is also carried out via the web app. Either click on the "UPDATE" button in the web app (only available for firmware 2.0.1 or newer) or, after establishing the Wi-Fi connection (see chapter 3.3.5) type in the address **192.168.0.1/update** in the browser window.

Firmware 2.0.1 or newer: Select the new firmware file (available on the SteFly website) and click on "UPLOAD & UPDATE". After the confirmation message appears, check the settings ("CHANGE SETTINGS" button).
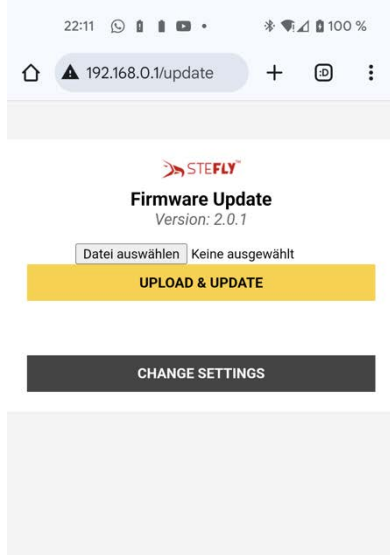
Older firmware: Choose "Firmware". Select the new firmware file (available on the SteFly website). Wait until the message "OTA Success" appears.

Older firmware: The WIFI connection has now to be re-established as the name of the Control Box has changed. To do this, follow the steps in chapter 3.3.5. Then open the new web app.
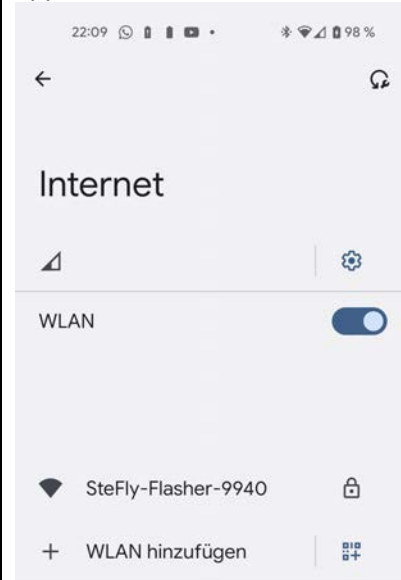
4 Installation

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 as 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 water with dishwashing detergent, isopropanol or benzene-free petroleum ether! 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
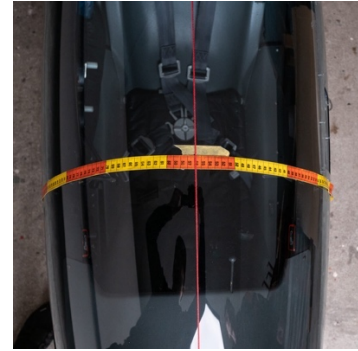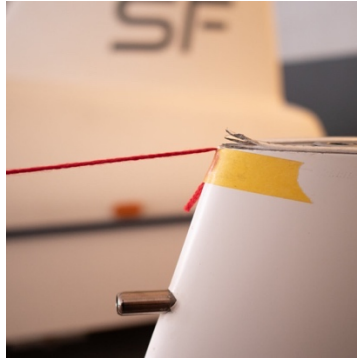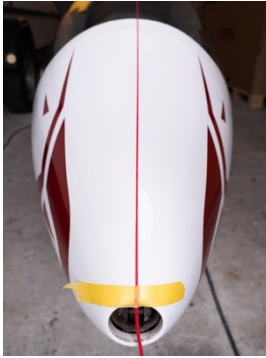
- Optional: attach the yaw string on the center line using the paper template
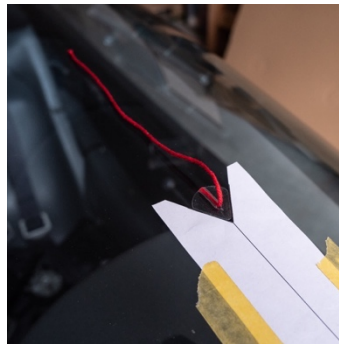
- Optional: stick the adhesive template with the outline of the canopy flasher on the outside of the canopy.

- Remove the protective film from the canopy flasher. Press the flasher housing very lightly against the canopy from the inside. Then check whether it is centered (in the case of the red flasher, aim through the line "front center mark" and "center of the 6 LED lenses"). Also make sure that the ventilation flap (if present) is not obstructed. 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 (install the switch in the way that the "in" screw terminal is on top).
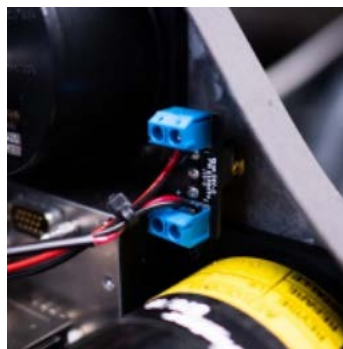
⚠	Please make sure to connect the right end of the cable with the corresponding device. Non-observance may result in damage of all corresponding devices.
⚠	Cables for power supply are typically red for +9 to 15 V DC and black (or blue) for the ground connection. Power supply cables for the control box should be minimum AWG 20 (included in scope of delivery). Non-observance resulting in reverse polarity may result in damage of the flasher.

- 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 Side Opening Canopy Contact

For many glider models with canopies opening to the side, we offer special canopy contacts tailored to the respective aircraft type. All canopy contacts have three gold-plated, robust spring contacts in a housing that, depending on the model, is attached to the inside of the canopy acrylic glass using 3M VHB adhesive tape or to the canopy frame using threaded sleeves. The counterpart, consisting of a PCB installed in a housing as the main element, is screwed onto the instrument panel cover. When the canopy is closed, electrical contact between the control box and the hood flasher is now established automatically.

Because of the large variety of solutions, we describe the installation of side opening connectors in individual manuals released on our website https://www.stefly.aero/en/product/canopy_flasher/

4.4 Function Test

Version Essential:

- o   Turn on the "Flasher" switch on the instrument panel
- o   Close the canopy: the flasher should flash twice with low intensity and then constantly with normal intensity

> ⚠️ 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.

Canopy Flasher with Control Box:

- o   Turn on the "Flasher" switch on the instrument panel
- o   Close the canopy. The flasher should flash twice with low intensity (light flashes with full brightness will be automatically emitted between takeoff and landing). This test shows that the flasher is connected to power.
- o   Open the web app (see chapter 3.3.5)
- o   Check that nobody is looking directly in the canopy flasher
- o   Click the "TEST" button; the LEDs will flash for a short period of time with high intensity
- o   To verify that the Control Box is set up correctly, please check left status LED "GPS" of the Control Box. Make sure that FLARM receives GPS signals (glider is located outside of the hangar). In this case left LED "GPS" should be on. If not make sure that the baud rate is set up correctly. Alternatively check the status for "DATA" and "GPS" in the web app.

In addition, if Power-FLARM® is installed, you can simulate an approximation in the FLARM® simulator app.

5 Operation

5.1 Before Switching the Canopy Flasher "On"

⚠️ 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

Version Essential: When the switch "Flasher" installed in the instrument panel is set "On" (and the canopy is closed, if canopy contact is installed), the flasher starts flashing.

Version with Control Box: When the switch "Flasher" installed in the instrument panel is set "On" (and the canopy is closed, if canopy contact is installed), the flasher will flash twice with low intensity and signalizes it is active. Due to the connection between Control Box and SteFly Canopy Flasher, the latter will start flashing with normal intensity when FLARM indicates that the aircraft is flying.

When your glider is in the air, the canopy flasher will flash constantly with a frequency according to the setting "low / medium / high" in the web app.

The frequency of the flashes 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.

All versions:

The light guide integrated into the heat sink enables the pilot to see at any time whether the canopy strobe is currently emitting flashes of light and at what frequency.

If SteFly Canopy Flasher measures a temperature of > 60°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 (especially green LEDs) as well as the large aluminium heat sink integrated in the housing, these temperatures do only occur in exceptional circumstances.

The following drawings illustrate the shape of the light cone.
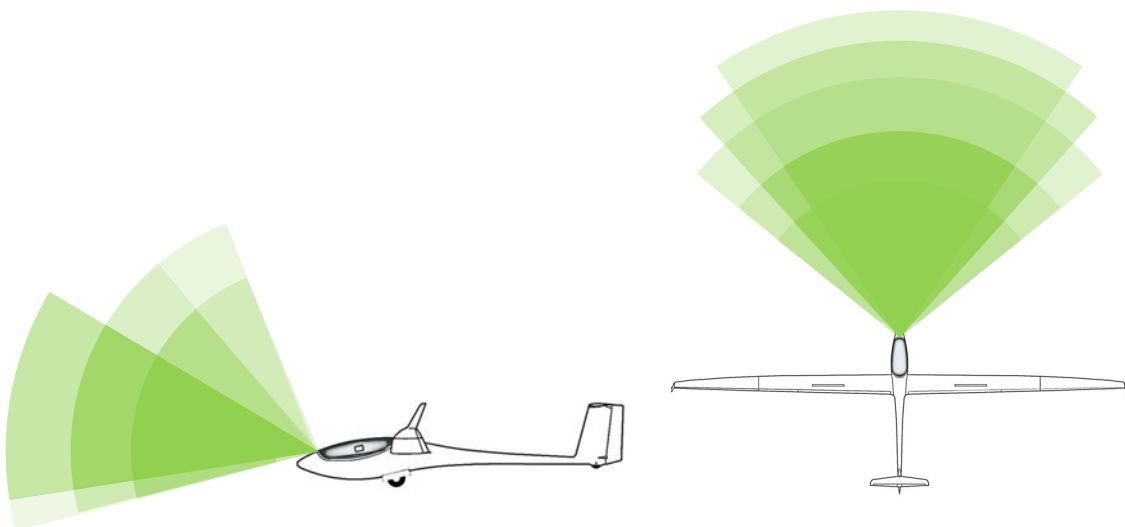
The brightest area of the flashes is in flight direction in extension of the longitudinal axis. The visible distance of the flasher is > 3,5 km in the center of the light cone and slowly decreasing to its edges.

Canopy protection from sunlight
Please always use a canopy cover whenever the glider is on the ground. This enhances the lifetime of all components due to less exposure to heat and UV light.

5.3 Switching the Canopy Flasher "Off"

Shortly after landing, FLARM recognizes that the flight has stopped. At the same time, the Control Box sends a signal to the canopy flasher with the effect that it will stop emitting light flashes. This avoids unintended dazzling, saves energy and prevents the LEDs from overheating in hot environments.

Canopy flashers without Control Box must be switched off manually on the ground.

If the canopy flasher does not stop flashing automatically shortly after landing, switch it off manually. The same applies if persons are approaching who are not aware of the danger of high-power LEDs to the human eye.

6 Maintenance

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

We recommend testing the canopy flasher on the ground several times a year to ensure that it is fully functional. Therefore, make sure that no one is looking directly into the canopy flasher, then set the "FLASHER" switch "On" (and close the canopy if a canopy contact is installed) and check whether the flasher is flashing at full brightness. If a control box is installed, the canopy flasher only flashes when the test mode is activated in the web app.

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

Opening the housing of the SteFly canopy flasher or the control box without prior consultation with us voids 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	Solution
Canopy flasher does not flash twice, when the on / off switch is turned "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 or not in the right position	Check that the spring loaded pins are in touch with the PCB of the opposite side of the instrument panel cover. For adjustment loosen the two hexagon socket screws of the connector on the canopy side, reposition, and fasten the screws again.
Canopy flasher does not flash in the air (according to the light guide on the heat sink)	FLARM baud rate not matching	Update the firmware. 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
Canopy flasher does not flash with high intensity during test mode or in flight	Side opening connector was not properly installed	Check if the PCB of the side opening canopy contact was installed like described in the manual of the canopy contact (pay especially attention to the direction of the printed arrow)

8 Technical Data

SteFly Canopy Flasher Green

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	53
Mass on-off switch	g	10
Mass connection cables included in the scope of delivery	g	57
Dimensions flasher (standard)	mm (length x width x height)	95 x 33 x 30
Dimensions control box (new generation without dip switch)	mm (length x width x height)	64 x 44 x 23
Dimensions on-off switch	mm (width x height)	15 x 31
Input Voltage	V DC	9 - 15
Amperage total for canopy flasher Essential	mA (@ 13,5 V)	80
Amperage total for canopy flasher and control box	mA (@ 13,5 V, flashing frequency "low")	110
Amperage total for canopy flasher and control box	mA (@ 13,5 V, flashing frequency "medium")	150
Amperage additional when transferring data via Bluetooth	mA	20
Internal fuse on-off switch	A	4
Operating temperature	°C	-30 to +60
Operating rel. humidity	%	0 - 95
Material control box housing	Black anodized aluminium	
Material canopy flasher housing	SLS printed polymer, painted matt black; heat sink black anodized aluminium; housing lined with mirror foil for maximum efficiency	
Interfaces Control Box	2 serial interfaces: 1x FLARM®-input and 1 x FLARM®-repeater (e.g. for AIR Traffic or FLARM®-Display), Bluetooth, WIFI	

SteFly Canopy Flasher Red

Size	Unit	Value
Number of LEDs		6
Wavelength of LED light	nm	Predominant around 630 (red)
Luminous flux	lm	2800
Mass canopy flasher	g	51
Mass control box	g	53
Mass on-off switch	g	10
Mass connection cables included in the scope of delivery	g	57
Dimensions flasher (standard)	mm (length x width x height)	51 x 66 x 18
Dimensions control box	mm (length x width x height)	64 x 44 x 23
Dimensions on-off switch	mm (width x height)	15 x 31
Input Voltage	V DC	9 - 17
Amperage total for canopy flasher Essential	mA (@ 13,5 V)	140
Amperage total for canopy flasher and control box	mA (@ 13,5 V, flashing frequency "low")	130
Amperage total for canopy flasher and control box	mA (@ 13,5 V, flashing frequency "medium")	200
Amperage additional when transferring data via Bluetooth	mA	20
Internal fuse on-off switch	A	4
Operating temperature	°C	-30 to +60
Operating rel. humidity	%	0 - 95
Material control box housing	Black anodized aluminium	
Material canopy flasher housing	SLS printed polymer, painted matt black; heat sink black anodized aluminium; housing lined with reflector foil for maximum efficiency	
Interfaces Control Box	2 serial interfaces: 1x FLARM®-input and 1 x FLARM®-repeater (e.g. for AIR Traffic or FLARM®-Display), Bluetooth, WIFI	