

# Model 309 Operating Instructions Manual



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**Please carefully read these instructions completely, especially Annex 1: SAFETY INSTRUCTIONS before using GliderKeeper**

## 1. Introduction.

**GliderKeeper** is a device that measures and records altitude of your model plane, controls a F5J FAI altimeter competition, and also is capable of measuring the total flight duration, making the timekeeper's task and dedication much simpler.

It has a built in OLED display and features a dual core 240MHz MCU with native Wi-Fi interface that eliminates the need of connection and disconnection from the airplane for data housekeeping and updates.

It is as well equipped with an Absolute Pressure sensor and an Accelerometer sensor.

To be able to measure the landing moment **GliderKeeper** accelerometer sensor must be tied, as stiff as possible, to your airplane body, nominally your plane's nose area skin.



Glued installation in a Supra and Double side tape installation in a PlusX

## 2. Installation.

The most suitable place to install your **GliderKeeper** is the canopy lid of your airplane. This location provides sufficient vibration transmission into the sensor while allow easy visualisation of the screen when desired.

However, it may be installed in either area in the nose compartment of your model.

Restrictions: the long dimension of the **GliderKeeper** must be aligned with the flight direction. And it desirable it lays flat or lateral with respect of the vertical line. In keeper menu you will be able to select that orientation.

Best way of installing **GliderKeeper** into your plane is to glue it either with silicone rubber or heat glue.

To allow for several installations we recommend as well padding both the canopy or fuselage and the sensor itself with American tape, so you can peel it off when necessary with no scores or damages.

For installations that do not allow time for curing the glue, a thin double side tape is acceptable.



Above pictures show installation using double sided tape in a Supra and an Ultima planes.

Hint: leave a tab when fixing the American tape for easy future removal.

***NOTE: At this time, a Velcro style joint is not accepted since it has been shown that it significantly dampens the vibration energy transmission into the sensor.***

Once the mechanical installation is done the male-female JR connectors of **GliderKeeper** have to be installed in series to the servo line that joins the receiver and your motor's ESC, like a normal FAI altimeter. From this line **GliderKeeper** will get its power and it will control the motor as per F5J FAI competition rules.

And now you are ready to fly!

### 3. Operation: Launching



Init Screen:

With RC transmitter already ON, power up your plane. **GliderKeeper** will perform a self-test during a few seconds while displaying Firmware version (Fw) and free memory percentage.

After initialisation it will show in the display:

Line 1: Last valid Flight Number.

Line 2: Firmware Version, where:

- **F** stands for FAI First class competition firmware.
- **S** Stands for FAI Second class competition firmware.
- " " A blank space means STD and training firmware.



Lines 3 and 4 will show last recorded flight data, before launching or actual flight results, after landing.

Line 3: Flight Duration in minutes and seconds, (or 'mm:ss' when not calculated yet).

Line 4: F5J Start Height in meters and tenths of meter (or '---.-' when not a valid F5J Start Height could be calculated. This means this flight will score 0 (zero) points due Emergency Motor was used (S) class competition.

Green LED will then steadily ON (depending on recording mode settings, see below).

Closed airplane canopy lid and enjoy your flight!

**GliderKeeper** will now follow receiver's throttle demand and pass this signal into ESC and you can launch your airplane.

Fast Green LED blinking (2 blinks per second) means a failure in GliderKeeper and the flight might be in risk, also an error message will be displayed in the screen and then fast blink. Like in picture, 'Err input' means no valid throttle input signal from receiver (useful when you want to enter Wi-Fi mode but not flying: Power the model while transmitter is OFF).



Safety first, if in doubt, please do not try to fly in this condition, the system is designed so safety latches of the system will not allow for motor on. Fix the problem, normally a wiring or connection issue or repair or replace defective unit. Always contact [GliderKeeper.com](http://GliderKeeper.com) for support, take note of error number for problem description.

Depending on recording mode, the system may, after initialisation, start recording. When it is recording, green LED will slowly blink (1 per second). This is the case, just after initialisation, when running an official FAI accepted Fw. You may not notice, in this case the, “steady Green LED”

Available recording triggers are: (See section 7 and following ones to configure your GliderKeeper)

- Always ON (as FAI)
- Throttle Slam (when throttle is advanced).
- Altitude Threshold (when a pre-set height is exceeded).

Available Competition settings:

- F5J FAI competition mode

During flight it will record F5J altitude as per FAI rules and it will shut throttle after 30 seconds or on pilot demand, whichever occurs first. Throttle will be automatically returned to its initial power up position and it cannot be changed until power is cycled in **GliderKeeper**. F5J Height will compute as the maximum of altitude since launch until 10 seconds after throttle shut.

- ALES (altitude shut) and Timer shut

Throttle will be shut when desired limit is reached (altitude or motor ON time). F5J start eight will also be calculated and shown in display. Note that this F5J start height will usually be higher than the altitude shut pre-selection.

- Training/ESC Setup

Throttle will always follow receiver’s demand: this is useful when calibrating your ESC input signals for shut and max. power. We always recommend performing this calibration with your altimeter installed in the receiver’s line.

## 4. Operation: Landing

During landing **GliderKeeper** will notice the landing condition. Wait 10 seconds with the airplane at rest before changing its attitude or opening canopy’s lid. This will allow **GliderKeeper** to accurately compute landing time.

Flight time is calculated from the moment throttle is advanced to the first moment the model hits the ground.

After you open the lid, Green LED should be OFF showing that landing time has been evaluated. It will as well display the new result in the OLED screen.



In this example flight #80, done with FAI\_S1.22 has been 0 minutes: 46 seconds long and F5J start height was 2,0m

Recording has not been stopped yet. You may choose to switch **GliderKeeper** off for preparing for

next flight and stop recording or stop recording and switch **GliderKeeper** into Wi-Fi mode by bringing the airplane into a “nosedown” position that is bring the fuselage (with **GliderKeeper** inside) into an almost vertical position or just bring the canopy into an almost vertical position after you opened the canopy. This command has to be 3 seconds long to tell **GliderKeeper** to stop recording and enter Wi-Fi mode.

If for whatever reason Green LED is still blinking, landing time is not yet calculated. Bringing the device immediately (in less than 5 seconds from opening) to “nosedown” will trigger as well landing time calculation (this may happen if the mounting of the unit is not sufficiently stiff to the airplane casing or the landing was extremely soft in high grass landing spot).

In summary “nosedown” means the long part of **GliderKeeper** stays almost vertical for longer than 3 seconds.

After “nosedown”

- a.- GliderKeeper will go into Wi-Fi mode.
- b.- Recording will be stopped.
- c.- Throttle control will be inhibited until next power cycle.
- d.- Flight Time will be checked and, if not calculated, it will be forced to perform this calculation.
- e.- Blue Led will activate.

“Nosedown” command also features a check of altitude window of 10 meters from power up altitude so by no means radio may get ON before a “normal” landing.

**WARNING:** Pilots flying step manoeuvres in slope flight, with their model “in front of” them or equivalent conditions are advised that GliderKeeper may detect this “nosedown” combination and it may enter in Wi-Fi mode (see note below).

## 5. Wi-Fi mode

Above paragraphs are like any normal Altimeter, but GliderKeeper brings a lot more of in field features thanks to the possibility of using built in Wi-Fi in GliderKeeper.

Annex 4 “Wi-Fi for dummies” may be of interest for those none familiarised in Wi-Fi terminology.

To eliminate any chance of interference into receiver during flight, Wi-Fi radio module of **GliderKeeper** will be OFF until a deliberate command from the pilot will request it. This command is the “nosedown” attitude after landing.

**NOTE:** *Wi-Fi connection uses some 2,4 GHz band channels, as used by common nowadays RC systems, but using much lower power and frequency spectrum. So, while it is very unlikely GliderKeeper Wi-Fi can interfere a good quality RC system, the opposite is not warranted and it is very much depending on brand and quantity of transmitters operating in the neighbourhood, the rate of GliderKeeper data transmission can be compromised or eventually become blind. It is the pilot responsibility to provide a suitable radio environment for operating GliderKeeper in Wi-Fi mode. See recommendations below.*

“Nosedown” command, and entering Wi-Fi mode, will only be acknowledged in these cases:

- a) If detected before initialisation at power up.
- b) If no valid receiver signal is found during initialisation (err Input) or (Error 6).
- c) After landing.

So, no fear to enter in Wi-Fi while waiting for launch signal, after a successful initialisation, no matter the attitude of the model, Wi-Fi will not enter until a flight cycle is completed.

Remember after entering Wi-Fi mode no throttle control will be available, and depending of your ESC brand you may hear some beeps from it indicating no throttle signal is present, a good reminder to disconnect the battery after Wi-Fi works. This is to avoid undesired throttle commands after the reset that may happen when updating firmware and other management actions that may result in a MCU reset.

Then, by cycling the power, you will initialise your ESC at the same time, as in normal model operations.

Just when entering Wi-Fi mode, blue LED will become steady on while looking for its stored Wi-Fi access point/s. If connection was successful it will begin to slowly blink (STA mode). If after 25 seconds (configurable in Wi-Fi setup menu) of search, the search is not successful, **GliderKeeper** will revert into a self-generated Wi-Fi access point (AP mode).

This will be the case of the first time you are using your brand new GliderKeeper.

Wi-Fi mode will let you access very new useful additional features as:

- Full field configuration of the device,
- Remote replication of OLED screen,
- Detail graphical visualisation of your flights, and in future,
- Wireless upload of flight results into contest organisation.

## 6. First Connection: AP mode.

First, we recommend before your first flight, at home, you take some time to configure your device up for the first time. You need to generate Wi-Fi AP mode. If the device is full installed you can perform just a short dummy flight by moving forward throttle and soon retract it, then after 10- 12 seconds move the device into “nosedown” and you will be in Wi-Fi mode. But it may be easier to generate a servo signal input error by just powering the aircraft while transmitter is off, most of the receivers will not generate any output, or as well just power the device thru the servo connector but do not give it any servo signal for instance with a 4,8V receiver’s battery pack. The screen would show “err input” or “error 6” and block the throttle and recording.

Then go to “nosedown” to enter Wi-Fi mode.

**GliderKeeper**, when entering Wi-Fi mode, it will always look for one of the Access Points configured in its memory (see para. 8). If not found, after these 25 seconds period it will fall back to Access Point mode, (AP mode). That is, **GliderKeeper** self generates a Wi-Fi for you to access in whatever setting condition.

This is the display when entered AP mode.

Line 1: Shows the ID. of the unit

Line 2: Shows the last 3 bytes of its IP address.

In AP mode it will be ALWAYS: 192.168.4.1  
(192. Is omitted for space reasons)



**In your terminal**, either mobile or PC computer look for a Wi-Fi called **GliderKeeper**ww:xx:yy:zz, being ww,xx,yy,zz the unique serial number of your device (useful when several **GliderKeeper** will be in the field). In this picture example look for a Wi-Fi called 'GliderKeeper1:65:98:48'.

Connect to this Wi-Fi with the password:

**123456789**

It will take a while and your terminal will warn you "internet not available".

In your terminal, open web browser and try to access to any URL like: "GliderKeeper.com" and you will be redirected to the landing page of the system.

If this attempt did not work, then in your browser and type in it the following IP address:

**192.168.4.1**



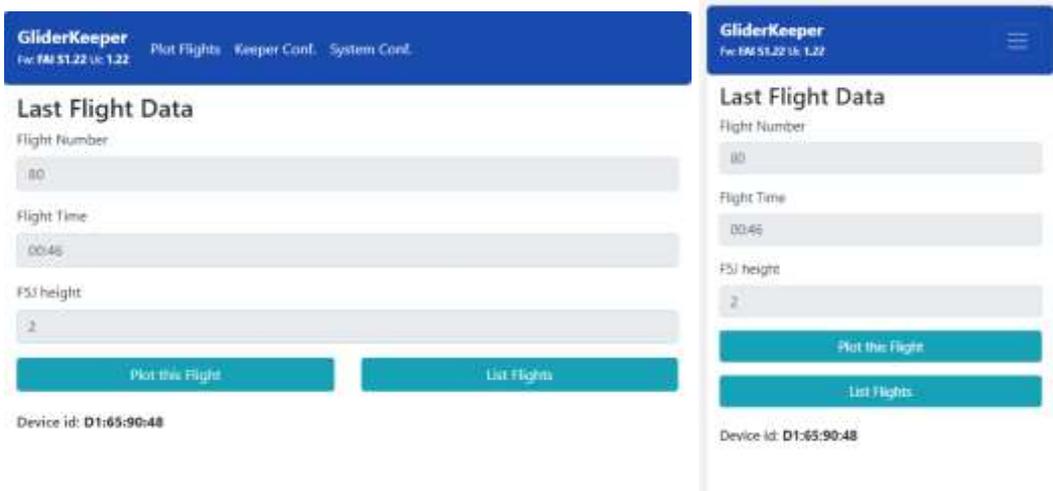
And press return or Go in your mobile.

NOTE: Sometimes when entering in AP the access fails and GliderKeeper is reset (Green led will indicate you are out of Wi-Fi mode). Please cycle power and go again to Wi-Fi since some non-volatile memory areas of GliderKeeper need to be read again. This usually happens first time a new terminal wants to access thru to this AP for the first time.

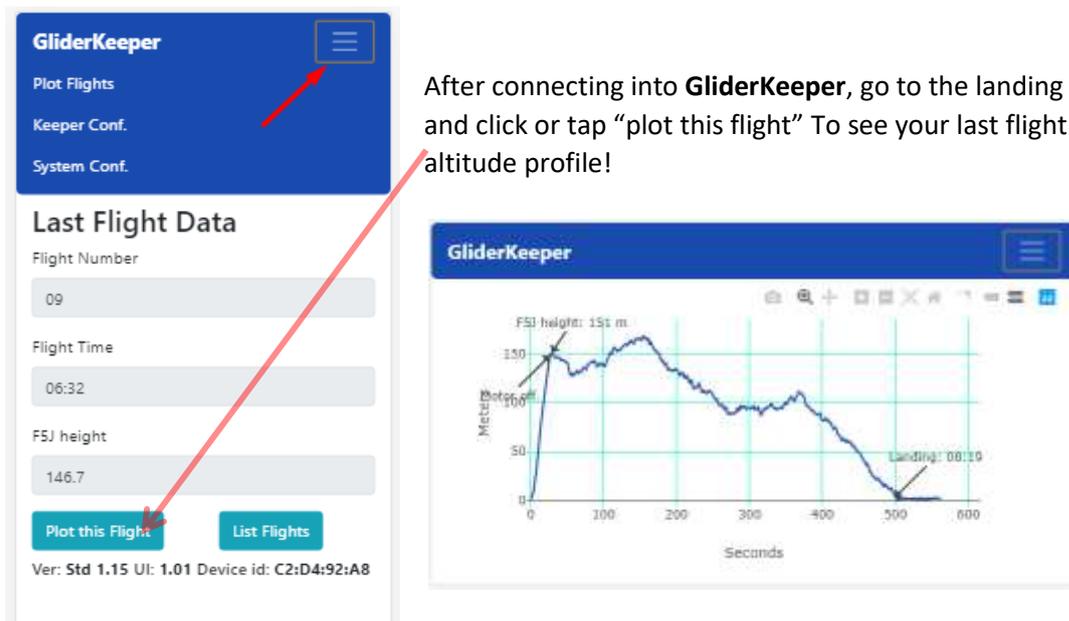
You will see this screen depending on your terminal.

Desktop view

Mobile Phone View



This landing page reproduces the OLED screen, gives the ID of the device and the firmware version but as well bring the main menu. (Main Menu is unfolded in Mobile phones clicking the menu icon)



## 7. Browsing GliderKeeper for first time and store preferred SSID's

Browsing thru GliderKeeper is simple and quite intuitive, just click the buttons and follow the instructions that will appear in the screen.

You need to do some investigations to recall your home's Wi-Fi password and maybe revisit your mobile manual of how to make it a “hot spot” or “shared connection” before entering this configuration page.

We want now you enter in blue top menu:



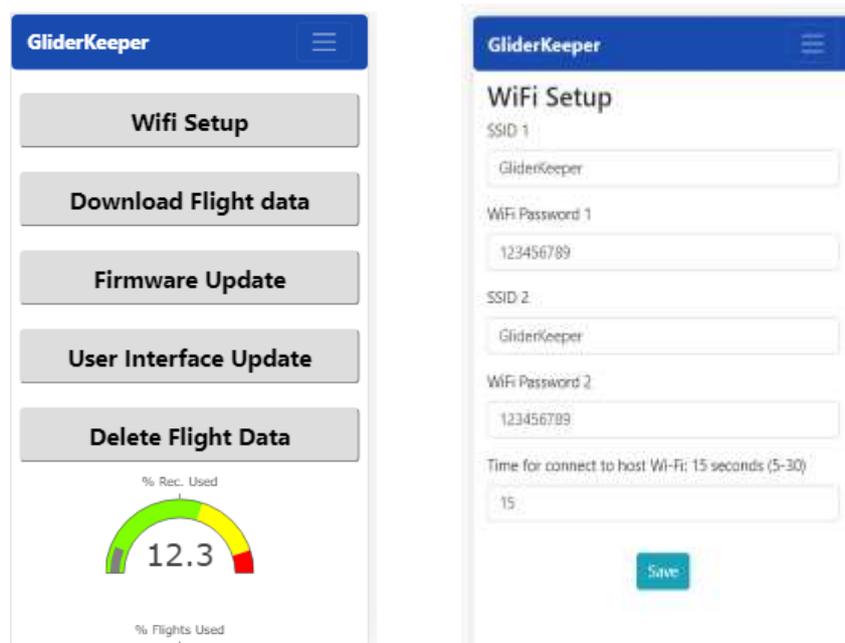
-**Plot Flights.** To select a flight number to be graphically plotted, last flight may be directly plotted in the main page.

-**Keeper menu** (to set competition and recording modes).

-**System Conf.**

Click in “**System Conf.**” And since you want now to give your Keeper the credentials of your own Wi-Fi, so click in “Wifi Set up”.

... and you will enter in this screen.



Type in the name (SSID) and the password of the Wi-Fi access point/s you want GliderKeeper to connect when entering Wi-Fi mode next time. There is space for two of them so you can comfortably store your home’s router credentials, to work with GliderKeeper in your PC and your mobile’s “hot spot” or “shared connection” details.

Android devices can freely change the name of its own “hot spot” so we would recommend you change those setting to something friendly specially those passwords with strange characters.

Note that iPhones cannot change the SSID (name) of its connection, but they will use the main name you have given to your iPhone, but still are able to change the password.

After those name/s are conveniently typed (make sure you do not have a typo...) press “save” to store them. You can change these settings by following this procedure as many times you need.

## 8. Connection in STA mode to the stored Wi-Fi details.

GliderKeeper can only connect to one of the two SSID’s stored and they have no priority, the strongest signal will be chosen with some preference to the last successful used. Once GliderKeeper is connected to one of the stored SSID it will try to reconnect to it until power is cycled, no matter if the other is stronger after some time or even the successful SSID is no longer present. Cycle power and enter Wi-Fi again if you want to change from SSID 1 to SSID 2 and vice versa.

Normally in field you will have your hot spot active, while at home your mobile will connect to your home router. Note in this last case GliderKeeper is in your home network and it will be available for any device in your Wi-Fi and it is possible to use your mobile as terminal as well.

Connecting in AP mode will always be possible after GliderKeeper has not found any of stored SSID’s during the period allowed (configurable in Wifi Setup menu).

NOTE: When entering Wi-Fi mode this first time, and until you successfully change this setting, the device will try to connect to a Wi-Fi access point called “**GliderKeeper**” with Password “**123456789**” (Default settings).

By now we are assuming you are in a desktop computer, in IOS the solution is straightforward, but if you are using Windows OS, we strongly recommend you install “Bonjour” from Apple.

[https://support.apple.com/downloads/bonjour\\_for\\_windows](https://support.apple.com/downloads/bonjour_for_windows)

(After installation you will be as well able to print wirelessly to a printer in your Wi-Fi as well!)

The procedure is very similar when using a mobile or a tablet as the terminal.

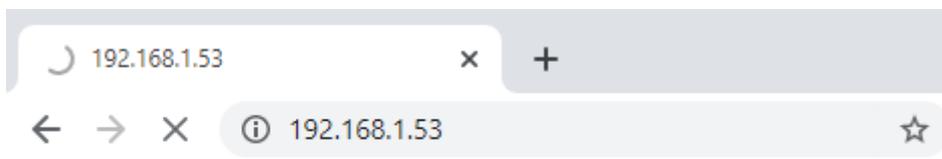
After saving the new credentials, cycle power and enter Wi-Fi mode, observe the Blue LED will begin to slowly blink very soon. This means GliderKeeper found and connected successfully to one on the stored networks. And Oled Screen will be much like this (Blue LED slowly blinking):



Now, to access **GliderKeeper**, type in your browser:

**Gliderkeeper.local**

Or in an Android Mobile Phone (or if Bonjour is not working to perfection, which is probable) you can always type in the IP direction of your **GliderKeeper** in your browser, in above example picture.

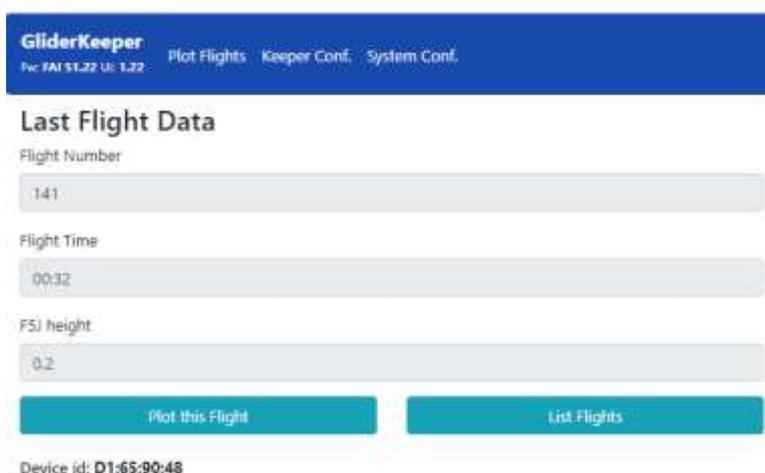


The IP number will be shown in the second row of the OLED display when in Wi-Fi mode, with the first "192." (omitted for space reasons).

In this example you should type in **192.168.1.53**

Note that normally mobile phone shared Wi-Fi's do give an IP number like 192.168.43.zzz.

And you will see in your browser screen the landing page of GliderKeeper!



**NOTE:** iPhone shared WiFi's do give an IP number which starts with **172** like 172.168.yyy.zzz. Take this in account if the Wi-Fi LAN is generated by an iPhone!

Needless to say, is that when you want to connect to **GliderKeeper** in STA mode with your mobile you have to enable your "shared data or hot spot" Wi-Fi beforehand.

STA mode is the recommended mode of connection of GliderKeeper; however, you may want to choose to stay in AP mode at your convenience.

One will know which Wi-Fi mode is by:

AP Mode:	STA Mode:
Long period of steady Blue LED ON	Very short period to blink.
Blue LED blink fast.	Blue LED blink slow.
IP (in OLED) will always be 192.168.4.1	IP (in OLED)in the format (*) 192.168.1.zzz (Home) 192.168.43.zzz (Android) 172.168.yy.zzz (iPhone)

See the table below for comparison.

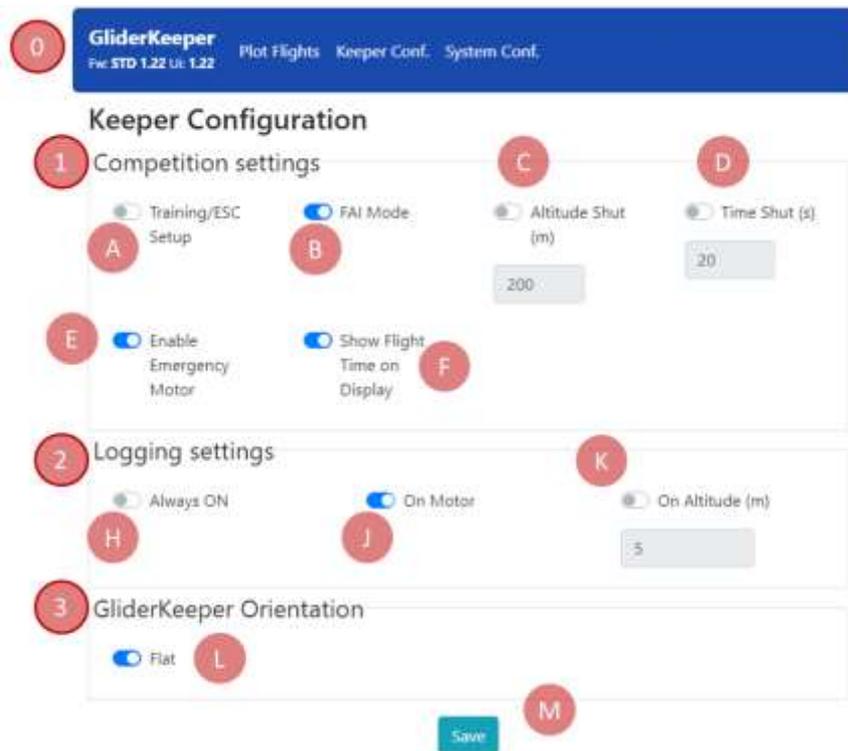
Hints to remember for how to use your GliderKeeper Wi-Fi mode:

AP Mode:	STA Mode:
It will always work.	Needs configuration as per paragraph 7.
It will take a little longer to connect every time.	Faster connection time.
More battery resources from the plane (200mA).	Lower power and heating. (60 mA).
It may overheat when powered with more than 5,5V and reset, especially when transferring big files	More reliable.
It will be slower than STA mode	Faster.
IP will always be 192.168.4.1	IP in the format (*) 192.168.1.zzz (Home) 192.168.43.zzz (Android) 172.168.yy.zzz (iPhone)
No internet available in your terminal, only access to GliderKeeper Webserver.	<b>Will allow future export to organisation</b>
	Memory level indicators in System conf. (**)

(\*) Any of above IP's will remain the same but will differ from unit to unit. You can save in your browser's Bookmarks, Shortcuts or Favourites these URL's for easier and faster future access.

(\*\*) On Mobile Shared Connection some charges may apply depending on your data contract. This would happen only on accessing "System Conf." menu page since some libraries are downloaded from the web for these level indicators.

## 9. Keeper Conf. Menu



The settings described below are available when STD (standard) Firmware is loaded, FAI versions will prevent selections of those setting that do not correspond to F5J competitions, see below table for comparison.

**0.- Main Menu.** Click or tap on each topic to open the respective menu. By clicking or tapping in “GliderKeeper” you will return to the landing page

**1.- Competition Settings.** -These settings allow you to configure how GliderKeeper will control your throttle.

**A.- Training/ESC Setup.** - You have the throttle control ALL THE TIME. Use this “competition setting” for calibrating your ESC. Or in the very first flights of you model.

**B.- FAI Mode.** – This behavior is according the rules of FAI “ F5J - RC ELECTRIC POWERED THERMAL DURATION GLIDERS”

Para **5.5.11.1.3.h)** “ii) To restrict the operation of the motor by the competitor to a single continuous run not exceeding 30 seconds. “

That is, you have control of your throttle during the first 30 seconds of flight, or until you retract the power setting below the threshold. After the first of these two events your throttle is controlled by GliderKeeper to the value stored when powered up.

**C.- Altitude Shut.** - GliderKeeper will shut the throttle upon reaching the Stored Altitude Level, 30 seconds or a lever retract below the threshold, whichever occurs first and will be maintained to the value stored when powered up. When this Competition is selected you can change the Altitude Level for this shutting operation this altitude target is set in meters.

**D.- Time Shut.** - GliderKeeper will shut the throttle upon reaching the number of Stored Seconds in or a lever retract below the threshold, whichever occurs first and will be maintained to the value stored when powered up. When this Competition is selected you can change the Motor Seconds for this shutting operation.

**NOTE: F5J Height Calculation.** -All above settings will allow for an F5J height calculation which is certainly meaningful when is FAI mode, but it can be very useful for training and other competitions.

**E.- Enable Emergency Motor.** - This Setting is applicable to FAI, Altitude and Time Modes. If enabled GliderKeeper will return throttle control to the pilot after motor shut (Note: Fw STD 1.22 will return the control after 30seconds, this time lag will be removed in future versions). The use of this emergency motor will delete the result of a previously calculated F5J height of this flight and will show “---.-“ meaning this flight is to receive a zero score.

**IMPORTANT NOTE:** In strict compliance of FAI rules this flight cancellation may happen despite the landing time and a Flight Duration has been calculated if throttle lever advanced. So, pilots in competition should take care of their throttle lever both for safety and for their score.

**F.- Show Flight Time on Display.** If muted, the flight time will not be displayed in OLED screen.

**2.- Logging settings.** Mainly to save storage memory, it shows when the data logging will start.

**H.- Always ON,** means it will be started on device initialization (important to track the “altimeter Zero”).

**J.- On Motor,** means that logging will start after motor is started.

**K.- On Altitude** Logging will start after the desired trigger altitude is exceeded, this trigger altitude can be changed if On Altitude is selected.

**L.- GliderKeeper Orientation.** Select **Flat** if GliderKeeper is installed in the canopy or the bottom of the fuselage. Deselect it if mounted lateral to the fuselage. Remember the long dimension of GliderKeeper must be parallel to flight direction either wire to the front or to the rear.

Always click or tap “save” for the changes take place next time GliderKeeper is powered up.

Some browsers may need a forced reload of this page see **\*NOTE:** in page 18 to confirm the changes have been successfully stored.

## 10. Fw Types.

**At the date of releasing this manual, 3 Firmware versions have been published**

1.- Fw **STD** is loaded in GliderKeeper. All above Options are available.

2.- Fw **FAI\_F** (First class competitions Fw), will only allow for **Show Flight Time on Display** and **GliderKeeper Orientation**. The rest of the setting will be ignored and assigned to: **FAI mode. Emergency Motor DISABLED. Logging Always.**

3.- Fw **FAI\_S** (Second class competitions Fw), will only allow for. **Emergency Motor, Show Flight Time on Display** and **GliderKeeper Orientation**. The rest of the setting will be ignored and assigned to: **FAI mode. Logging Always.**

**FAI\_S is the approved Fw for competitions where Emergency Motor is allowed (Second Class competitions).**

#### Summary table Fw types.

Feature\ Fw	STD (Standard)	FAI_S	FAI_F
<b>Competition</b>	Training/FAI/Altitude/Time	FAI	FAI
<b>Emergency Motor</b>	Enable/ Disable	Enable/ Disable(*)	Disabled
<b>Recording</b>	Always/ Motor / Altitude	Always	Always
<b>Orientation/Display</b>	ON/ OFF	ON/ OFF	ON/ OFF

(\*) Please check status of this flag after updating to FAI\_S since it may inherit last competition setting stored in the unit.

If rules would change or some other developments would recommend it, new firmware types may be published.

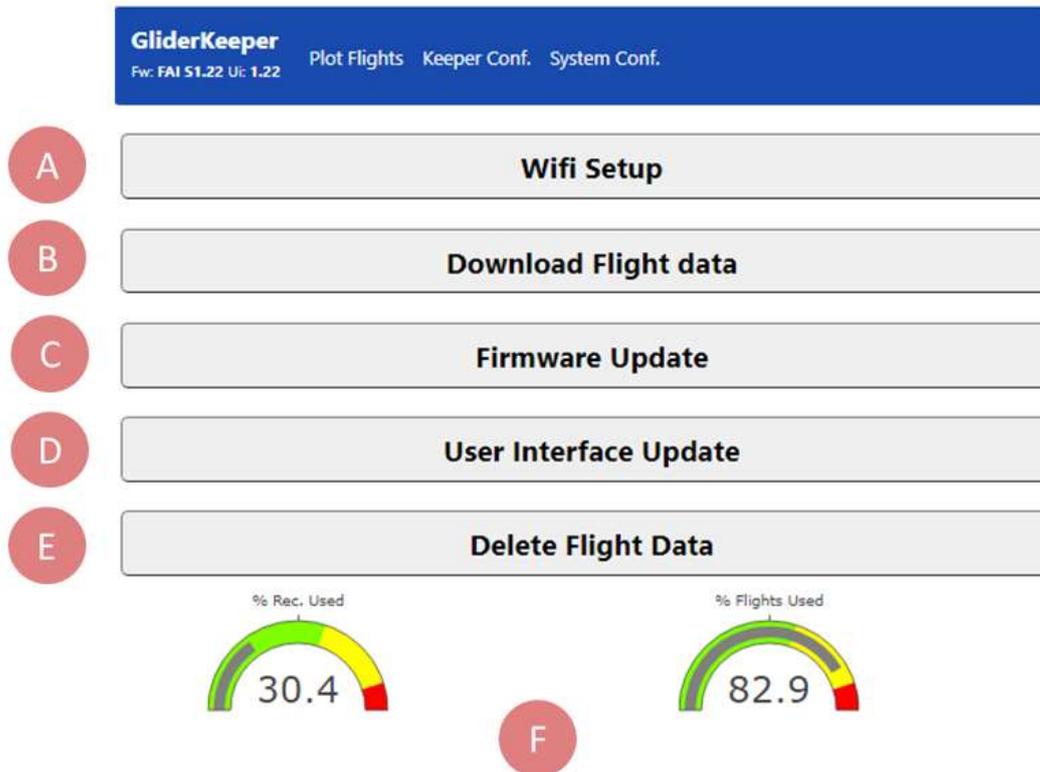
In **Plot flight** you will be able to browse in between all the flights which are recorded in the device and review their duration and F5J height values (available in all modes) to better choose the one to be plotted (Only STA mode).

In **System Menu** you will be able to see the used and available space for recording flights in your altimeter.

Be patient despite **GliderKeeper** MCU is very powerful, several Megabytes of data are moving around so let the unit some time to display last command results before the next command or you may overload and hang the system. New Firmware releases will improve performance and bring more features.

Do not forget to switch OFF your mobile's Wi-Fi shared connection after working with **GliderKeeper** to save battery of your mobile.

## 11. System Conf. Housekeeping and Software Updates



**A.- Wi-Fi Setup.** Click here to introduce your favourite Wi-Fi names (SSID) and passwords. At the bottom of Wi-Fi Setup menu you can change the time GliderKeeper will be searching for those stored SSID names and engage to them. Configurable between 5 and 30 seconds. Change it at your convenience if you are not using STA mode at all set it to 5 seconds and depending of your experience leave as short as possible for reliable STA mode connections, recommendation: not less than 10 seconds.

**B.- Download Flight Data.** Click here to download your flights for later analysis in a desktop.

**Hint:** Configure your mobile for downloading this file into your cloud repository, Google drive, One drive, etc. Then when finishing your flight session, download the data with your mobile at the field, before packing. And you will have the data for analysis ready! This will save a lot of wear in the JR connectors both in GliderKeeper and the model. Note mobile data charges may apply (9 MB of data is like 3 WhatsApp pictures or videos...). You can operate in the same manner but at home with your home's router Wi-Fi.

**C.-Firmware Update.** GliderKeeper software comes in two separate parts: a) the firmware which is the actual program running in the CPU and b) the User Interface (UI) files, which are the files that contain the screens and menus when in Wi-Fi mode, they both come packed in separated .bin files. Click here to update Firmware (Fw) and follow screen instructions.

You are likely to update the Firmware more often than the UI, specifically Firmware is the one that needs to be changed when in an official FAI competition.

You will be loading Firmware in one of the types as follows:

C.1) GK\_Fw\_FAI\_S\_1.22.bin or

C.2) GliderKeeperFw\_STD\_1.22.bin

This last format is deprecated in favour the first, more compact and readable. Where:

-GK stands for GliderKeeper

-Fw means it is the Fw part (versus UI).

-FAI means it is a FAI competition firmware (versus STD, standard or any future version).

-S (or F) Type of FAI competition. F is for First class competitions and S for Second class and 1.22 is the correlative version number.

We recommend you update to the latest available version, please check at [gliderkeeper.com/downloads](http://gliderkeeper.com/downloads) regularly.

**D.- User Interface Update.** To update the User Interface click the button for User Interface update and load:

GK\_UI\_1.22.bin or GliderKeeperUI\_1.22.bin with the same name convention as above.

We recommend updating UI when at home so connection will be more reliable as this is the longest size file.

**\*NOTE:** After loading a new UI you may experience or notice like it was not loaded. And the screen behave like it was the old one. There is a reason for that: your terminal has stored the old UI data and “caches” it that means it will not load these data from GliderKeeper but reuse the stored ones. In this case we recommend you clear the internet cache from your browser as:

Ctrl+F5 in Windows

Command+R in MacOS

Long press in reload in IOS

for Android the best is go to the tools or settings app: tools/applications/(your browser)/storage/delete cache (or internet data).

If you experience several unsuccessful trials to update UI and/or the system becomes nonresponsive maybe the file system inside GliderKeeper has been corrupted, refer to Annex 5 to perform a hard UI\_update directly thru the firmware.

**E.- Delete Flight Data.** Click here to erase all stored flight data information in GliderKeeper. GliderKeeper has got two memory areas to store flight information one area for the global flight results and other for the actual raw data. Overflowing any of those may yield to unavailability to recover stored data. We recommend not to start any competition with less than 40% of free memory, while the general recommendation should be to start a competition with a totally clean memory space.

**F.- Memory level meters.**

## 12. Desktop Application

A third part of GliderKeeper Software is the desktop Application, you want to use to review the stored flights in your computer.

Download from our web site <https://gliderkeeper.com/index.php/downloads/> in column of tools the desktop application that suits your operating system. Windows or MacOS.

With this application you can analyse downloaded data, and plot more variables than altitude like Throttle in and out and export to .csv format the raw data for further analysis in other platforms.

See Annex 3 for using the graphical interface of this application, both desktop or UI in terminal.

## 13. Support

If you need some help, have a suggestion, something to improve, you think you found a bug or just want to share your opinion or pictures, please send us an email to [support@gliderkeeper.com](mailto:support@gliderkeeper.com) with as much detail you have available. Please send us details like ID#, SW version, captured screens, FlightData.bin of your flight and, if available, picture of the model or the airfield... in those questions that having this info can help to diagnose.

We always welcome your contact and will come back to you as soon as possible. It is our understanding that listening Customer Voice is the best way for us to improve.

## 14. Specifications

**Dimensions:** 53 x 24,5 x 5,8 mm

**Weight (including cable):** 12,8 gr

**Power Supply:** (min.) 4,8 V / (Max.) 8,4 V / (Recomd. Wi-Fi AP) < 5,6V

**Current consumption:** Flight Mode <20 mA / Wi-Fi STA 60mA / Wi-Fi AP 200mA

**Barometric Pressure Sensor:** 300-1250 hPa, 8 Pa. Rel accuracy (0,6m)

**Accelerometer Sensor:** 12 bit/  $\pm$  8g range.

**Memory storage:** 148 flights or 5 Flight hours.

**Wi-Fi:** 802.11 b/g/n WPA/2

## Annex 1: SAFETY INSTRUCTIONS

Following the safety instructions below, and using common sense, will be the warranty of enjoying your GliderKeeper together with your model with no surprises. The following instructions are not essentially different that the ones a responsible hobbyist should follow:

1. Read instructions.

All the safety and operating instructions should be read before GliderKeeper is operated.

2. Retain instructions.

The safety and operating instructions should be retained for future reference (for inst.: file it in your mobile).

3. Follow instructions.

Operating manual should be followed.

4. Persons.

GliderKeeper can generate Radio Electric signals and is not a wearable. Use at more than 20 cm from human body. Special care should be taken for those that use an implanted medical device like a pacemaker.

5. Children

GliderKeeper is not a toy and should be used by adults or with a direct supervision on younger pilots.

6. Commercial Aviation.

As Wi-Fi equipment, always follow instructions from the crew when using inside a commercial airplane cabin.

7. Water and Moisture.

GliderKeeper is not water resistant. It should not be used in condensing environments.

8. Power Supply.

GliderKeeper works better in a battery power source:  $V_{min}$  3.5vdc  $V_{max}$  8.4vdc. Recommended less than 5.5V when in Wi-Fi AP mode.

9. Ventilation and cooling.

GliderKeeper uses an analogue power supply, which means it will dissipate excess voltage in heat. Care should be taken for dissipation and ventilation means when operating for long periods of time, especially in Wi-Fi AP mode, in case of powering above 5vdc.

10. Installation.

GliderKeeper will not need routinely disconnection from its model for maintenance or configuration. However before connecting it, make sure both connectors for each side are not worn or damaged such as they could impair the proper operation of the model.

#### 11. Damage Requiring Service.

Disconnect GliderKeeper from your model and take to qualified service personnel under the following conditions:

- a) When signal and power cable is damaged
- b) If liquid has been spilled inside the device.
- c) If the product has been exposed to rain or water.
- d) When an error message “error x” appears in the screen.  
Note: “Error 6” or “Err input” means no receiver signal present and may be caused by not having your RC transmitter ON or a faulty connection, sometimes this is useful for easy access to Wi-Fi mode. See the manual.
- e) If the product has been dropped or damaged in any manner.
- f) When GliderKeeper does not work as expected.

#### 12. Servicing.

The user should not attempt to service this product beyond that described in the operating instruction. There are no user serviceable parts inside GliderKeeper.

#### 13. SW Updates.

Always update GliderKeeper firmware and User Interface with firmware coming from GliderKeeper.com.

#### 14. Disposal.

When your GliderKeeper has reached the end of its useful life do not dispose in regular waste. Contact your local authorities for disposing in an approved electronic equipment recycling container.

## Annex 2: How to improve Wi-Fi link in some noisy environments.

If Wi-Fi connection is slow or it is lost, this is sometimes some other 2.4 GHz signals are present. Recommendations are given for a mobile Phone trying to connect in an airfield

- 1.- Carbon fibre fuselages can work as a shield for RF signals, install your **GliderKeeper** in a position where can have direct sight view of your terminal, the canopy lid is a easily steering part.
- 2.- Avoid nearby transmitters. Have you switched off your radio?
- 3.- Get closer both units together. Many times communications are best if both devices are close each other in the range of 0,5 to 1 m. Bear in mind that signal strength decay with the second power of distance so to get a better signal to noise ratio than a transmitter that emits 10 times more power than your mobile you have to be approx. 3,5 times closer
- 4.- Shield the interferences. Many times your own body can work as an effective shield from a nearby noise source. A nice carbon wing is also a shield to try.
- 5.- Procure a better environment. Sometimes by moving just a couple of meters changes stationary waves that might be causing trouble. Something that always works is going far enough from noise sources

## Annex 3: How to use plotly.js graphs.

The graphs generated by **GliderKeeper** are using an open source graph application called plotly.js the main tools are shown in the top right corner of the graph area:



From left to right



Download a picture of the graph ( Maybe to instantly share with your colleagues...)



Zoom an area, drag the area with the mouse or finger



Pan: you can move inside the zoomed graph towards any direction click and drag in the appropriate direction



+ Zoom



-Zoom



Autoscale to fit your graph in the screen



Reset Axes



Spike lines are useful to compare different parts of the graph



Show the closest value in hover gives you coordinates of nearest data point



Compare data will give you all the different values in a multiplot (desktop version)

## Annex 4: Wi-Fi for dummies.

We are just recalling here some details and terminology of the operation with Wi-Fi networks if you are familiar with these topics or you are already happy working with GliderKeeper just jump to the next section.

Wi-Fi stands for “Wireless Fidelity” and it is the most used radio frequency based physical support for an Ethernet local area network.

**GliderKeeper** uses 2.4 GHz band as Wi-Fi standard, IEEE 802.11.

Let’s explain some basic concepts:

### Wi-Fi Name or SSID

This name identifies a given Wi-Fi network, this is usually given by our network provider or we can set one ourselves. GliderKeeper can build his own network in AP mode (SEE BELOW) and with a name with the format **GliderKeeper**ww:xx:yy:zz. For safety reasons, the networks usually set a password to protect the access (**GliderKeeper** uses WPA2 encryption when in AP mode).

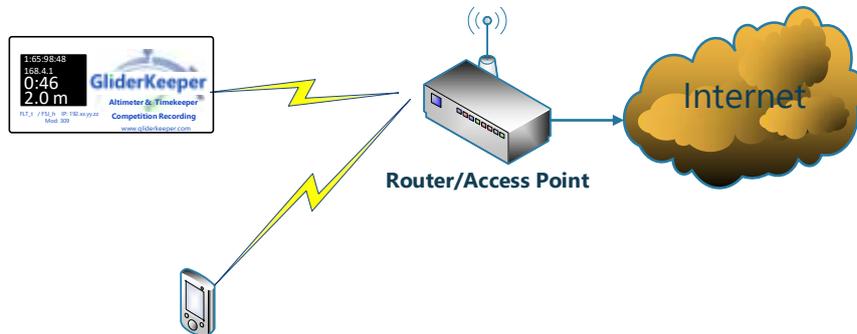
### GliderKeeper WiFi modes

There are two operational modes for Wi-Fi, Station mode (STA) and Access Point (AP) Mode.

**STA Mode:** GK Always tries to connect first to a nearby Wi-Fi network, if already configured on the Wi-Fi Menu. In this mode GliderKeeper behaves like any other device connected to a network.

**AP Mode:** If, for whatever reason, GliderKeeper cannot connect to a surrounding Wi-Fi, itself builds its own, the one with the aforementioned name (**GliderKeeper**ww:xx:yy:zz, with ww, xx, yy, zz sets to the device ID). In this mode the device waits for other devices, to log in.

At home, the AP is sometimes called “Router “and is normally is in charge of giving access to Internet.



The above illustration shows a GK device connected to a Home WiFi network.

If you shared your phone WiFi connection, then you can, at the field, connect GK to the phone WiFi. This is shows at the next figure:



This feature is usually called “HotSpot” or “Shared Connection” and it provides internet access to other surrounding devices, like GliderKeeper or a colleague mobile.

In the figure below you can see a GliderKeeper in AP mode where the mobile connects to the AP in this case the GliderKeeper. Internet is not available (both for GliderKeeper and the mobile).



**GliderKeeper** always tries to switch to STA mode and tries to connect to any of the two the already configured Wi-Fi networks. To configure these networks, you need to know the SSID Name and the Password of them.

### IP Address

Any device connected to an Ethernet will have an IP Number or IP Address. This number identifies uniquely it, This number has, four numbers separated by a dot, like 192.168.1.65, if any two devices wants to talk each other the need to know each other IP number.

Each device in STA mode gets a unique IP numbers from the Access Point, using a protocol called DHCP.

In order to made things a little bit easier, each IP address can have a name, for instance [www.google.com](http://www.google.com) may have the IP 172.217.168.174<sup>(\*)</sup>. This is achieved using a name to IP translation protocol called DNS. This is what you normally experience when browsing internet.

(\*) These numbers may change from time to time and geographical zones. To truly perform the experiment, in windows open a CMD screen and type: "ping google.com" and copy the resulting IP in the browser.

### Summary

Let's make a stop here to recap, we have been talking of wireless interconnection, but these interconnections are very much like wired connections or old telephone lines. There is a switchboard (the **AP**) that gives the telephone numbers (IP addresses) to the other telephones (the **STAtions**). So, when we want to have these wireless talks, first of all, what we need is to be into this switchboard and get a telephone number (an IP address) (connect to the wifi).

We have also seen that the AP (switchboard) for us may be your home's router, your mobile or at last GliderKeeper itself.

Once we have made a successful Wi-Fi connection (we have out telephone switch board working) ... our blue led is blinking, let's talk each other. And now the question is, to for example, ask to the weather specialist in an airbase for the ambient temperature.

We will "call" or **access** each other using the **web browser**. This is the case of your terminal when you are told to type the IP address of your GliderKeeper. Let's continue...

Your **GliderKeeper** is a web server but it will not be in that global list of the Internet. This is why we ask you to install "Bonjour".

If you have this possibility (or in an Apple environment) then you can call GliderKeeper.local and fine!

Otherwise and always in Android you must dial the IP Address of GliderKeeper to access to the GliderKeeper webservice (you make a phone call to the specialist). A webservice is like a weather specialist: it will answer to a question. A weather specialist will answer you the temperature we have, a webservice can answer to different questions and this is what GliderKeeper does when you click to the different menus.

It is important to note that in our example the weather specialist may have a different telephone number than the switchboard operator or in special cases maybe are the same person. This circumstance is the case of AP mode of GliderKeeper.

But no matter who is the switchboard (the Access Point), we want to talk to the GliderKeeper webservice and that is why we have to look the IP address in the Oled screen, to know it's telephone number (its IP)!

### More radio frequencies

GliderKeeper uses in this case 2,4 GHz frequency band. 2,4 GHz band has 14 channels (like the old 35MHz channels). Usually, our RC transmitter and receivers use all 14 channels in a more or less sophisticated way so there is no interference between RC sets.

When in AP mode, **GliderKeeper** will be using channels 1, 2 and 3 of the 2,4GHz band. In STA mode it will be using the channels that its AP is emitting. In AP mode **GliderKeeper** is using more battery power from your airplane so it is as well recommendable to limit the time **GliderKeeper** is in this mode to save battery for your next flight ( and, like in our previous example, the weather specialist is busier working as switch board operator as well).

(\*) Bonjour is a software that runs in your Windows computer to find out which servers are in the local network and have a server name ending in .local this is called a multicast domain server. This feature is native in Apple computers and in most Linux ones.

## Annex 5: How to recover from a failed User Interface upload.

If for whatever reason UI software fails to load. GliderKeeper would lose functionality since it cannot read configuration nor perform any display this can happen if power is lost during updating.

1. Place the unit vertical in “nosedown” attitude.
2. With no transmitter signal in receiver or GliderKeeper power it up. Wait some 30 seconds until Blue LED blinks. It would mean GliderKeeper is in AP mode.
3. Preferably from a PC connect to GliderKeeperxx:yy:zz:w (where xyz and w are the unique Id number of your unit)
4. In the browser type “192.168.4.1/UI\_erase” (without quotes) and press intro. Wait until “erase successful” message or GliderKeeper resets.
5. Cycle power and reconnect as 4.
6. In the browser type “192.168.4.1/UI\_update” (again, without quotes) and press intro
7. In the browser screen click in “Select File” and select the desired GliderKeeperUI\_x.yy.bin file and click Update UI.
8. Wait until “update successful: Rebooting” message, wait until GliderKeeper restarts.
9. Cycle power and GliderKeeper should work normally.

## Declaration of Conformity:



Konformitätserklärung  
Declaration of Conformity  
Déclaration de conformité  
Dichiarazione di conformità  
Declaración de conformidad

Hersteller / Verantwortliche Person  
Manufacturer / responsible person  
Fabricant / Personne responsable  
Fabbricante / Persona responsabile  
Fabricante / Persona responsable

Marta Lopez Lopez/ GliderKeeper.com

erklärt, dass das Produkt  
declares that the product  
déclare que le produit  
dichiara, che il prodotto  
declara que el product

GliderKeeper Model 309

folgenden Normen entspricht:  
complies following standards:  
correspond aux suivantes norms:  
corrisponde alle seguenti norme:  
cumple las siguientes normas:

<b>2014/53/UE</b>	
<b>2014/30/UE</b>	
<b>2011/65/UE</b>	
<b>2001/95/CE</b>	
Draft EN 301 489-1	Mar, 2017
Draft EN 301 489-17	Mar, 2017
EN 300 328	Nov, 2016
EN 55024	Nov, 2010
EN 55032	Aug, 2015
EN 60950-1	2006
EN 60950-1/A1	Mar, 2010
EN 60950-1/A11	Mar, 2009
EN 60950-1/A12	Feb, 2011
EN 60950-1/A2	Aug, 2013
EN 62311	Jan, 2008



Anschrift / Address / Adresse / Indirizzo / Dirección  
Marta Lopez Lopez, C/ Tahona5, 28224 Pozuelo de Alarcón, Madrid, Spain  
Email: GliderKeeper@Gliderkeeper.com  
Ort, Datum / Place and date of issue / Lieu et Date / Data e luogo /Fecha y lugar  
Madrid, 20 , Feb 2020