Model 309 & 311 Operating Instructions Manual

GliderKeeper
Altimeter & TimeKeeper Competition Recording
www.gliderkeeper.com

Table of Contents

<div style="border: 2px solid red;">

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

</div>

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 Microcontroller with a 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 and Accelerometer sensors.

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.

After Fw version 1.24 **GliderKeeper** is compatible with the automated competition management system **GliderTimer (mini)** and the synchronisation module for **GliderKeeper**, **GKSync** See here.
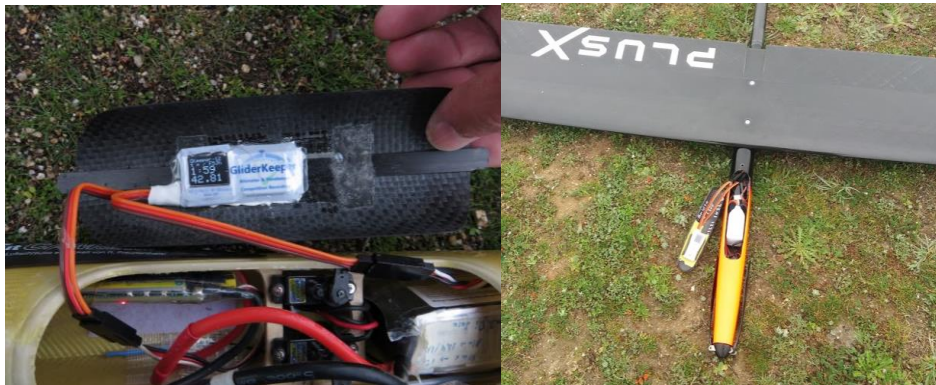
Glued installation in a Supra and Double side tape installation in a PlusX

2. Installation.

We recommend you make sure to understand sections 6 to 11 and that your device configuration is the one you desire before going to the airfield. Your device comes with some example flights for you to familiarise.

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, masking 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: Pay special attention in avoid damages to the Oled display screen, do not bend the unit and do not press into the screen. Display mishandling may not be covered by the warranty.

NOTE: At this time, a Velcro style joint is not advised 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 <u>RC transmitter already ON</u>, 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 **F**irst class competition firmware.
- **S** Stands for FAI **S**econd 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.

<u>Green LED will then steadily ON</u> (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: To enter easily in Wi-Fi mode, 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 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 (power OFF and then ON) 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.

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.

NOTE: "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 **GliderKeepe**r may detect this "nosedown" combination and it may enter in Wi-Fi mode (see note below).

(*)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).

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 in Annex 2.

"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 **GliderKeepe**r.

Wi-Fi mode will let you access very new useful additional features as:
- Full field configuration of the device,
- Remote replication of OLED screen, in your mobile
- Detail graphical visualisation of your flights, and in future,
- Wireless upload of flight results into contest organisation.
- Automatic uploading Flight Data to **GliderTimer**.

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. It is advisable you make your first contact with GliderKeeper from a PC, we found mobiles are a bit confusing sometimes.

If you are not familiar with Wi-Fi connections and terminology it may be advisable you review Annex 4 "Wi-Fi for dummies" to get easy with the ideas used here.

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 15 seconds period it will fall back to Access Point mode, (AP mode). That is, **GliderKeeper** self generates a Wi-Fi, if it cannot log in their stored ones.

Then you can access in whatever setting condition.

This is the display when entered Wi-Fi.

Line 1: Shows the ID. of the unit

Line 2: IP number in this sequence "IP=*byte1*."
        Alternating with "*byte2.byte3.byte4*",
        introduce in your browser:

 "*byte1.byte2.byte3.byte4*"

If you are using an Android terminal or an iPhone:

 Turn your mobile data OFF (see your model´s manual).

In your terminal, either mobile or PC computer look for a Wi-Fi called
GliderKeeperww: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 'GliderKeeperD1: 65: 82: C8'.

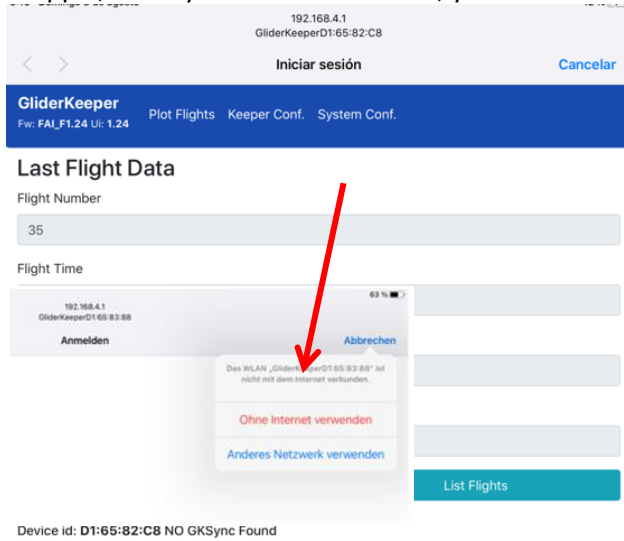Connect to this Wi-Fi with the password:

123456789

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

Normally the landing page will directly appear in your screen.

Apple view:

In Apple, while you are in this screen, you will not be fully in the browser, but most functions will be available.

To enter the browser inclusive of the downloading of flight files, Pulse "cancel" and then "use without internet".

(*)If it does not appear, In your terminal, open web browser and try to access to any URL like: "GliderKeeper.es" (or any never used address in your browser) or "gliderkeeper.local" 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 (as GK in in AP mode), this way will always work:

192.168.4.1

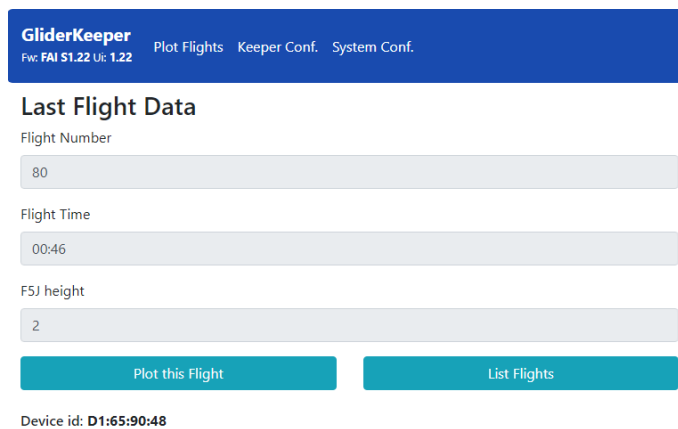**(Always type the IP address showed in the Oled display)**

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 OFF and then ON) 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.

(*)NOTE: On Win10 terminals with a wired network and a Wi-Fi connecting to GliderKeeper in AP mode, you may experience a pop out browser tab with some Microsoft content, this is due the captive portal has been redirected by the system to somewhere to check there is internet available, which in your case it is thru the cable. Close this tab an open a new one.

You will see this screen depending on your terminal.

Desktop view   Mobile Phone View
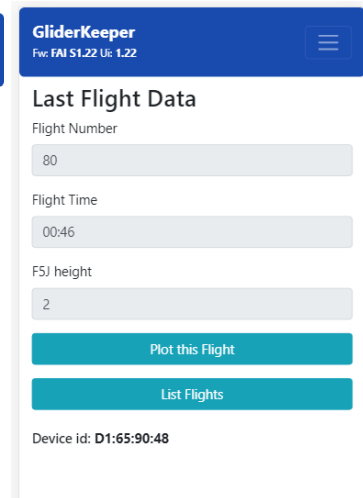
This landing page reproduces the OLED screen, gives the ID of the device and the firmware version but as well bring the main menu. (Main Menu is unfolded in Mobile phones clicking the menu icon)
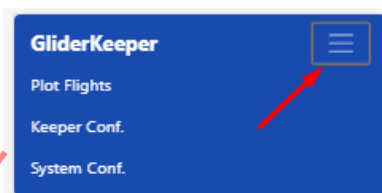
After connecting into **GliderKeeper**, go to the landing page and click or tap "plot this flight" To see your last flight altitude profile!
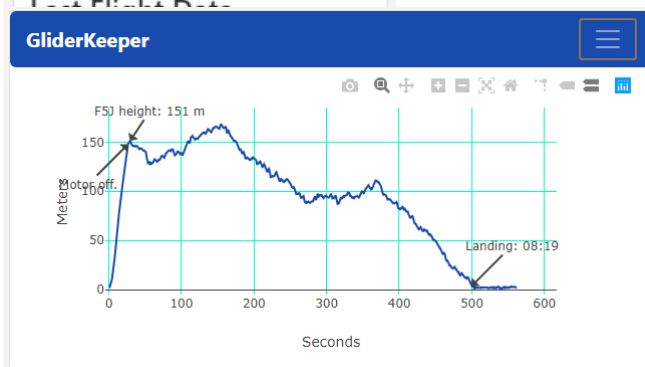
7.   Browsing GliderKeeper for first time and storing preferred SSID´s

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

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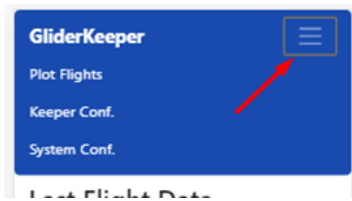
-**Plot Flights**. To select a flight number to be graphically plotted, last flight may be directly plotted in the main page.

-**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.

In the top of the menu you can introduce your Name and initials to be reproduced in the Oled display and reported to **GliderTimer.**

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 Hotspot name, but they will use the main name you have given to your iPhone, but still are able to change the password.

In this moment you can also introduce your name or initial to be replicated in Oled display and passed to **GliderTimer**.

After those names 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 (OFF and then ON) 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

(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 OFF and then ON) 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 Sceen will be much like this (Blue LED slowly blinking):

ID of the unit
IP Indication
Last Flight´s Duration
Last Flight´s F5J Height
(In the label) Reminder to form IP number

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.
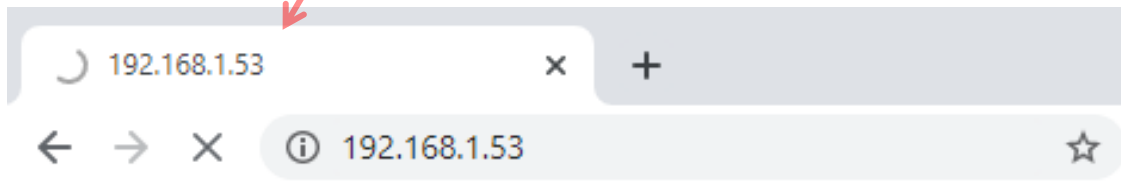
IP number will be shown in the second row of OLED display when in Wi-Fi modei, alternating "IP= byte1." or "byte2.byte3.byte4"
In this example you should type in **192.168.1.53**
(Note that normally mobile phone shared Wi-Fi's do give an IP number like 192.168.43.byte4)
And you will see in your browser screen the landing page of GliderKeeper!
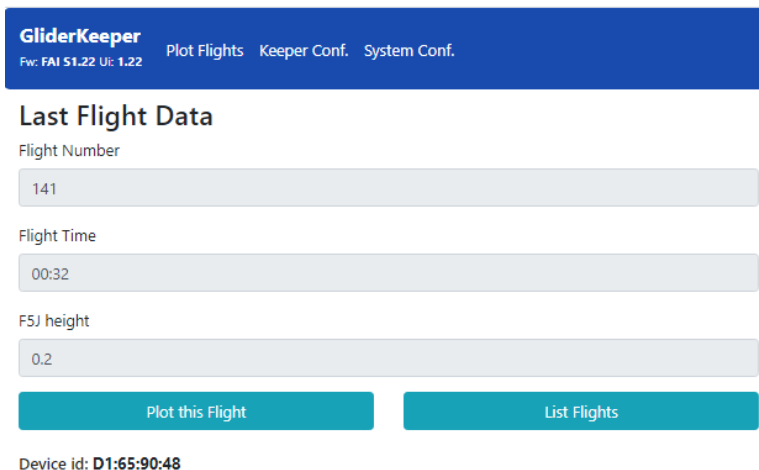
NOTE: iPhone shared WiFi's do give an IP number which starts with **172** like 172.168.byte3.byte4 Take this in account if the Wi-Fi LAN is generated by an iPhone!

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.(Scan time+ Wi-Fi connection aprox 50s)	Faster connection time. Aprox. 10 secs.
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.	**Will allow future export to organisation**
	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
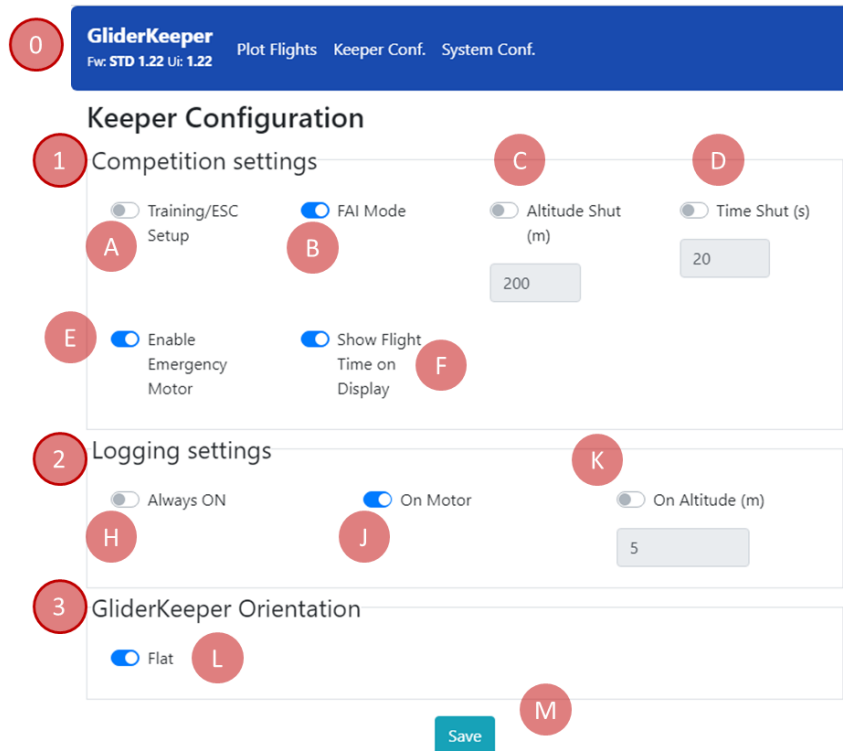
The settings described below are available when STD (standard) Firmware is loaded, FAI versions will prevent selections of those setting that do not correspond to F5J competitions, see below table for comparison.

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 minimum value stored when powered up.

C.- Altitude Shut. - **GliderKeeper** will shut the throttle upon reaching the selected Altitude Level, the seconds selected in Time Shut or lever retracts below the threshold for motor OFF, whichever occurs first and throttle will be maintained to the minumum 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 selected seconds, or the altitude selected in Altitude Shut or lever retract below the threshold for motor OFF, whichever occurs first, and throttle 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.

C and D perform the same function, select C or D to change the desired setting

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.

<u>**IMPORTANT NOTE:**</u> 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 before power OFF. So, pilots in competition should take care or 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 20 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): It 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): It 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).

FAI_S in the firmware to use in competition where Emergency Motor is accepted (Second Class Competitions)

Summary table Fw types.

Feature\ Fw	STD (Standard)	FAI_S	FAI_F
Competition	Training/FAI/Altitude/Time	FAI	FAI
Emergency Motor	Enable/ Disable	Enable/ Disable(*)	Disabled
Recording	Always/ Motor / Altitude	Always	Always
Orientation/Display	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** your 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
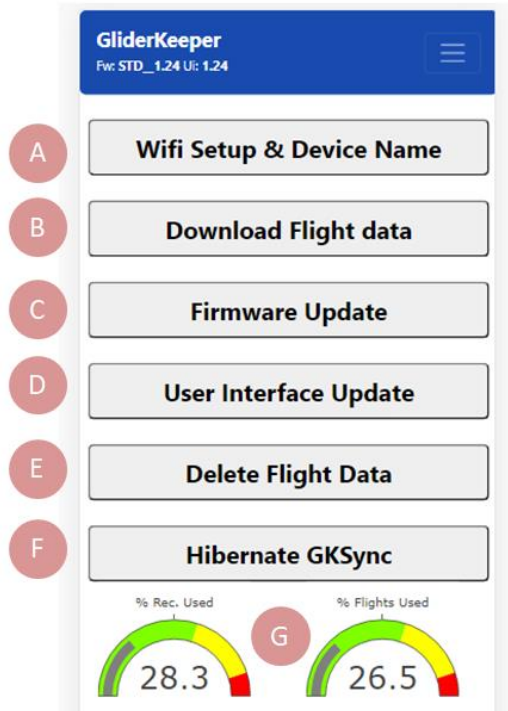
A.- Wi-Fi Setup. Click here to introduce your own Wi-Fi names (SSID) and passwords. At the bottom of Wi-Fi Setup menu you can change the time **GliderKeeper** will be searching for those stored SSID names and engage to them. Configurable between 5 and 30 seconds. Change it at your convenience if you 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 (Firmware Update) 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 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.

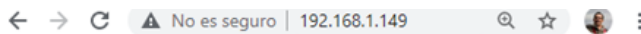We recommend updating UI when at home so connection will be more reliable as this is the longest size file.

*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/aplications/(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, a page like this will appear instead any web page, follow the simple instructions in the page to start again UI updating.

 If still sytem is not responsive 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 50% of free memory, while the general recommendation should be to start a competition with a totally clean memory space.

F.- Hibernate GKSync. Tap or click here to make **GKSync** clock to stop, saving its minimal battery charge. The synchronisation of **GKSync** is only valid for six hours, so if you are not flying in the following days we recommend hibernating **GKSync**. With this you will be able to use your **GKSync** for a few years. You will need to Synchronise GKSyng next time you use it, same as for a competition. The time showed by **GKSync** in the next power up after hibernation corresponds to the hour it was hibernated.

G.- Memory Gauge meters. In grey you can see the actual level of usage both in number of flights or total memory. We recommend you do not start a competition with less than 50% memory free.

12. Usando GKSync y GliderTimer(mini).

With the introduction of Fw 1.24, stability and connectivity aspects have been improved, but the most important aspect of this update is that it provides support for the GliderTimer (mini) contest management system.

The first difference is the appearance of the "launch time" field.

This box makes sense if you have used a **GKSync**, which is what sets GliderKeeper's time, otherwise you will see a launch time sometime in 1970 or 2031.
GKSync and **GliderKeeper** store their time in UTC (Universal Time Coordinated) and it is your terminal that will apply the local time corrections.
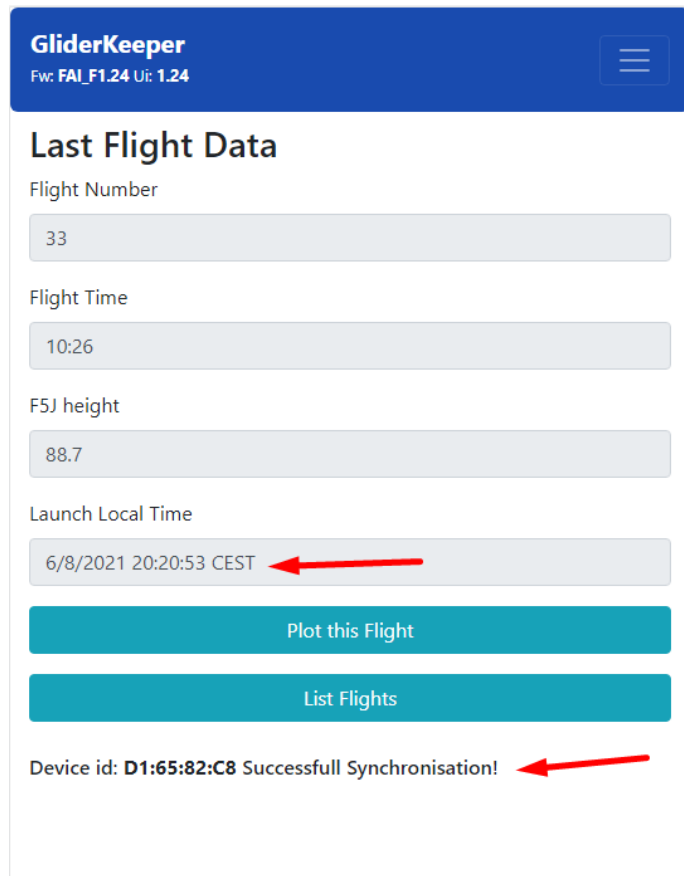For a successful completion of the automatic competition recording, the **GKSync** and GliderTimer must be synchronized within 6 hours of the end of the competition to ensure correct application of the working time windows; the permissible cumulative error is about 0.150 seconds.
To synchronize **GKSync**, your **GliderKeeper** must be connected in STA mode to an Internet access point.
Synchronization starts automatically as soon as the connection is established. Mobile data consumption is negligible. The synchronization status can be checked on the landing screen next to the unit ID by the bottom of page.
GKSync must be synchronized before a competition with GliderTimer.

The messages that will be displayed are:

"NO GKSync Found"; No GKSync detected. If one is not installed this is not an error message.

"GKSync Operating"; There is a GKSync but synchronization is not possible. This happens if GK is in AP mode or no internet is available. You are ready for competition if you were synced less than 6 hours ago.

"I-net sync on going..."; Sync in progress, wait up to 2 minutes. If it goes longer than 2 minutes, reconnect.

"Only Keeper is in Sync"; Synchronization is in progress, wait a few more seconds.

"GKSync not working"; GKSync error.

"Successful Synchronization"; Once this message appears, you are ready for competition.

Instalation of GKSync

Connect to **GliderKeeper** espansion port as in the picture:

Using with GliderTimer.

It is not recommended to have your shared Wi-Fi on. Enter Wi-Fi mode in the presence of an active GliderTimer. When GliderTimer is detected, **GliderKeeper** will send the data of your last flight to be evaluated in the ranking of the competition managed by GliderTimer.

The sequence of events should be:

-GliderTimer notifies of the start of the working time.
-The model is launched and performs the flight.
-On landing, measure the distance to the landing spot.
-Approach the model with the GliderTimer ON and enter GK in Wi.Fi mode, e.g. by holding the fuselage of the aircraft vertically.
-GliderTimer will make an acoustic indication and play back the flight data.
-Enter the landing distance (1m in the photo) in
-Store the flight.
-Continue to the next pilot.

The data transfer can be repeated as many times as necessary, improving the transmission conditions, if there has been a failure. To do this, cycle (OFF and then ON) the **GliderKeeper** power supply (keeping it vertical so that it does not lock in the sequence of the next flight, if by mistake **GliderKeeper** enters flight mode, switch it off without having used throttle up, and the last flight made will be transmitted).

It is possible to participate without **GKSync** in a **GliderTimer** competition, with the disadvantage that it will be necessary to give the flight is within the working time manually. After landing and while connecting GliderTimer will try to guess the landing time during some 20 seconds. If you want to go directly to manual input, Power GliderKeeper OFF and then ON before entering Wi-Fi mode.

Reset GliderTimer after each round.

13. 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.

14. 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 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.

15.Specifications

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

Weight (including cable): 11,8 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? Specially in the case of Futaba radios, if connectivity problems are found, we recommend either switch transmitter OFF or place it in the ground more than 4 meters away **GliderTimer**

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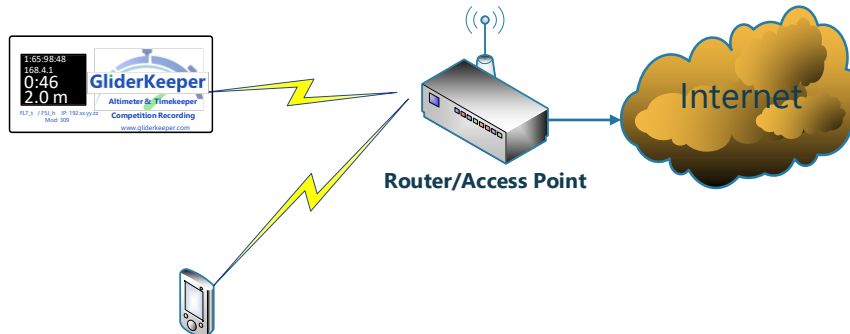
The above illustration shows a GK device connected to a Home WiFi network.

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 may have the IP 172.217.168.174[(*)]. 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 **STA**tions). 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** webserver (you make a phone call to the specialist). A webserver is like a weather specialist: it will answer to a question. A weather specialist will answer you the temperature we have, a webserver 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** webserver 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 **GliderKeepe**r 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.

Fw 1.24 implements a recovery system that will cover most of the problems

If the problem persists or you cannot even reach Wi-Fi mode, folloe these instructions:

1. Important: Place the unit vertical in "nosedown" attitude BEFORE powering **GliderKeeper**.

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 (OFF and then ON) 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 powe (OFF and then ON) and **GliderKeeper** should work normally.

Annex 6: Summary Differences from Fw x.26 (Jul23) and x.27(Nov23).

For those already familiar with GliderKeeper we brief here the differences you will find into your devices behaviour after updating to the x.27 Fw.

1.- Fw 1.27 and UI 1.27 will work In GliderKeeper while Fw 3.27 and UI 3.27, or later ones, will work on the new HW GliderKeeper Pico. Do not try to update with a wrong FW to the platform, since results may become unpredictable. There is a protection layer to avoid mistakes but we kindly request you do not try to beat it.

2.- Time of Flight Measurement in line with the Specifications proposal "AMRT Time of flight determination v01", the actual value computed as Time of Flight is the time elapsed from Throttle movement until Ground contact subtracted by 600 milliseconds as a bias correction for time from throttle movement to model release by the hand.

3.- Memory management. Now after you fill up your memory (some 5 hours) GliderKeeper will still be recording useful info, at the cost of erasing older flight info. This will cause some slow response of the system, please erase as soon as possible, we recommend to have your unit erased before each competition. A maximum of 255 flight can be traced after these 255 flights no more writes are allowed until erasing. Memory level advised on power up display and Blue led warnings.

4.- Blinking Strategy: As GliderKeeper Pico can now run with no display we have increased the information you can get from the on-board LEDs.

Green Led, now shows the progress of the flight.

a) Fast Green LED Blinking (2 per sec): An error has occurred (normally the motor signal not present, many times not present for doing maintenance work). The unit won´t give you Throttle at all. Fix the condition or repair unit.
b) Solid Green LED: STD Fw, Throttle armed, no recording.
c) Slow Green LED blink (one per sec): Throttle armed, recording.
d) Double Green LED blink (new): F5J height calculation on going (motor ON or just shut, 10 secs), recording
e) Triple Green Blink (new): Flight mode, searching for landing event, recording.
f) Green LED OFF: Landing has been detected. Flight time calculated, recording.

Blue LED, Wi-Fi and memory status
a) Solid Blue LED: Looking for Stored Wifi´s
b) Slow Blue LED blink (one per sec): Emiting AP mode´s Wifi signal, you have to connect to GliderKeeperww:xx:yy:zz wifi.
c) Double Blue LED blink (new): GliderKeeper is connected to your Home´s or Mobile HotSpot wifi.
d) Triple Blue LED blink (new, on Power on): Less than 25% recording memory. Please download data and erase, this afternoon.
e) Quintuple Blue LED blink (new, on Power on): Wild Blue blink, you ran out of memory, GliderKeeper will be overwriting older flights. Working under degraded conditions may fail detecting landing (0,5% of times). Download and erase ASAP.

f) Quintuple Blue LED blink (new, on Landing): Wild Blue blink, you have used Emergency Motor. Flight scores cero.

5.- Pico Display. This is a detachable small display for weight and space saving. You do not need to used it as you can access to GliderKeeper via a wireless connection. You can connect it any time. Display will be detected on power ON, after f5Jheight calculation, after landing and every 1,5 seconds in Wi-Fi Mode.

If you were flying with no display. You may want to connect the display after landing. Connect the Pico Display unit and enter Wi-Fi mode, by placing the GLIDEKEEPER unit vertical for 3 seconds, or cycle power.

Pico Display may work with a GliderKeeper with a damaged built-in display. You have now an option to activate it in UI 1.27 (or later), go to Keeper Conf. Menu (from the web browser or the App) and select the external display.

Declaration of Conformity:

$C\,E$

Konformitätserklärung
Declaration of Conformity
Déclaration de conformitè
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:

2014/53/UE	
2014/30/UE	
2011/65/UE	
2001/95/CE	
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