

LK8000-Recipes for Glider Pilots

Preface

Some years ago, I (and Paolo) wrote the handbook for version 3 of the LK8000 flight computer software. The book was comprehensive as I thought I would have to satisfy the reader by explaining all the bells and whistles the program provides.

But I was wrong, the text was far too long!

In practise users **only** wanted to know how to solve their current or most urgent problem with the program. The questions arising during use of the program are often very similar. And, because of that, I take a different approach in this document. I have collected the typical questions I faced, grouped them, and will give the best answer using the LK8000 program.

Some questions are easily answered. Others require a more elaborated answer. I hope you are pleased with the answers I provide.

Some knowledge of gliding and computer terminology is required.

Corrections, comments, and suggestions (best with text) are welcome!

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Common Things

What is LK8000?

LK8000 is a high quality free open source flight computer software application that deals with all in flight needs for the sports of gliding and paragliding. LK8000 can also be used by general aviation (GA) pilots by ignoring the gliding related information.

Who uses LK8000?

According to a user survey at www.lk8000.org, LK8000 is used equally by glider pilots, paraglider pilots and GA pilots. Despite the application being developed to meet the needs of glider pilots, over time, many features were also enjoyed by paraglider pilots. However, LK8000 seems to be a bit of an overkill for GA pilots. ☺

Where/How can I get information about LK8000?

Most information can be obtained from the project homepage www.lk8000.org. It is there that you can download the program and documentation for offline reading. Also, at www.youtube.com there are many videos to help you get an idea of the program's capabilities.

Which devices are suitable for running LK8000?

The LK8000 application runs on many devices with different operation systems. Popular devices include Android (e.g. smartphones), Linux and Windows (Windows PC, Windows CE PNA) based devices. There is an experimental Apple port but I no knowledge out of the Apple version.

Which devices are the best today for LK8000?

It is difficult to decide which is the best device because there is a wide variety of hardware that will run LK8000. Many pilots prefer using LK8000 on devices with large sunlight readable displays, including Linux based ebook-readers (e.g., KOBO etc.). Others choose smartphones with high nits displays. Another use of LK8000 is with "Openvario", a project using self-assembled hardware (see www.openvario.org for details).

How do I try LK8000 myself?

It's very easy!

(1) If you have a reasonably current Android smartphone, install the app from the Google Play and you are ready for testing.

(2) The PC version of LK8000 can be downloaded from the homepage www.lk8000.org as a zip file. Unzip the file and you are ready for testing by starting the LK8000 executable (.exe) file.

The other platforms require a bit more knowledge of the installation process.

Where can I get/download LK8000?

Depending on which platform you would like to run LK8000, use the following list:

Android - Google Play

Windows - LK8000 homepage www.lk8000.org

Windows CE -LK8000 homepage

Linux - LK8000 homepage

Apple (beta port) - The LK8000 forum, accessed by clicking on the “Forum” link on the LK8000 homepage

Which data files are needed to run LK8000?

You'll need:

- (1) Maps, mostly provided at the LK8000 homepage (or via LKMAPS app/program); namely paired *.LKM and *.DEM-files
- (2) Airspace data, usually provided by your national aero club or by www.openaip.net
- (3) Waypoint data, from www.soaringweb.org or www.openaip.net (easiest: .cup format)

Which devices can be connected to LK8000?

The most popular devices that can be connected to LK8000 are FLARM, e-varios and radios. Via these connections LK8000 can help you deal with a lot of additional and valuable information, as well as getting a very convenient way of controlling your radio. Other specialised devices are named in the device driver list of LK8000.

What information can I gain from LK8000?

The much better question is, “What flight information can I not get from LK8000?” There is not much left out. Have a try and be surprised!

How can I learn LK8000 effectively?

Install and play with it (PC, cell phone, PNA, ebook-reader). LK8000 has a simulation mode so you can learn nearly all aspects of the program very conveniently. Let your glider fly and watch the program's response. Create a task and try it in simulation.

NEVER TRY TO LEARN LK8000 IN FLIGHT!!!

Are there any educational videos?

You can find a lot of educational videos for LK8000 on YouTube, just search for them. LK8000 developers (e.g. by Alpha Lima, LK8000team) have provided videos so are first-hand sources for LK8000 information.

How do I use the simulation mode in LK8000?

At program start up, there is a menu button [SIMULATION]. By pressing it you activate the simulation mode. Simulation mode gives you access to all program features except logging (you do not need a GNSS receiver to try the program on a PC). If you activate the menu (press “M” bottom right) you get a “simulation” choice. Within the simulation sub-menu you “fly” your glider by setting speed, track and also providing “lift” by increasing

height. You do this by pressing the [choice] and [+] and [-] buttons. The PC version has assigned keys. The arrow keys are used for adjusting speed up and down and for turning right and left. The PgUp and PgDn keys assigned to increases and decreasing height. All program calculations are done just as they would be done in flight mode. All configuration options are valid; which means you can configure the program according to your needs in simulation mode and the program's behaviour in flight mode is the same. You can also replay log files in simulation mode.

Which LK8000 version is really installed on my device?

(M)enu > [Info] > [Status] > Status: System

Where I can get further information?

First and the most comprehensive source of information are the LK8000 homepage and forum. For development items, you can also look at github (there are links to github on the homepage). There are also some educational (and entertaining) videos at YouTube.

Installation

How do I install LK8000 on a Windows PC?

Grab the current zip-file for a PC installation from the LK8000 homepage and unzip it anywhere on your storage device. You'll see an "LK8000" folder with all necessary files in it. That's all, start the executable and choose "simulation" mode. The program starts with default parameters and uses provided demo data. For further exploration you need to get and place your map, airspace, and waypoint files within the respective _Maps, _Airspaces and _Waypoints sub folders.

How do I install LK8000 on an Android device

Using Google Play, you'll need to install the LK8000 app with permission to use GPS and baro sensor. You get a fully usable program with a set of demo data. To install your own data (map, airspace and waypoints files), you'll need to copy your files into the LK8000 sub folders _Maps, _Airspaces and _Waypoints respectively; a utility like "total commander" which can be also installed from Google Play is very helpful for that. Map files can also be installed using the LKMAPS app (also available from Google Play). In LKMAPS you choose your region by coordinates and get the map installed in the correct LK8000 sub folder.

How do I install LK8000 on a PNA?

It depends. If your PNA is an Android device, see above. If your device runs Windows CE, you can install the program to the main memory or to an SD-card. I prefer to install it to an SD card because you can handle it with a PC. And, when you are ready with your configuration, you put it back into the PNA and use it. Some PNAs have a nice UI where the link to the actual program is somewhat hidden. If that is the case for you, you'll need to make sure that the link points to LK8000.exe. Check the internet for your special device; you should be able to find how to edit the link accordingly.

How do I install LK8000 on a KOBO book-reader?

The best way isto do the same as a comprehensive PC-installation. Which means, all needed data files are available on your PC in the needed folders. Then take your KOBO and boot it into Nickel. If you connect the KOBO via USB-cable to your PC you will get a message on the KOBO to accept a USB storage media connection. Confirm it and your KOBO acts like an external storage device for your PC.

And now the tricky part:

- (1) Copy your PC-prepared LK8000-folder from the PC to the KOBO.
- (2) Copy the file "KoboRoot.tgz" to the **hidden folder** ".kobo" on the KOBO.

If you download the "kobo_install.zip" you will find the KoboRoot.tgz-file in the hidden folder ".kobo".

You can use an appropriate file manager tool for this (e.g., the "total commander" with a view option for hidden files/folders turned on. Windows file explorer does the same thing ... I am on Linux :-).

Reboot your KOBO and magically LK8000 appears on start-up (with a switch to Nickel option [KOBO]. Pressing the [KOBO] button means you will leave LK8000 and return to your e-reader). Because you already copied the LK8000 folder and all necessary data, you can configure LK8000 as usual.

Updating LK8000 on KOBO works this same way.

How do I install LK8000 on a Linux-PC?

Make sure that you have the needed software environment. Using Debian it means:

```
sudo apt-get install pkg-config libSDL2 libzip libboost libfreetype6 libpng libgeographic  
xsltproc imagemagick ttf-dejavu zip libgl1-mesa libegl1-mesa libx11 libasound2 libsndfile1.
```

Then unzip the LK8000 folder and start the program.

For other Linux distributions, install the packages indicated as above for Debian.

How do I install LK8000 on an Apple device?

Here someone else can contribute please. I do not own an Apple device. I've heard from the LK8000 forum that there is a port to Apple in good.

Handling

What about the program handling?

The program handling has been designed for “big” fingers clicking/tapping on a touch screen. This means you can use the program with gloves on! You have sufficiently large areas to click/tap on for program operation. Sometimes, “long” clicks are needed. Usually, the program reacts to clicks/taps with a characteristic tone/sound so you can determine acoustically what has happened.

Within the program, there are several rotating information stacks viewed by repeated clicking on a functional area of the screen. For example, if you click on the centre of the bottom line repeatedly, you go through the several available information tables and maps.

How are screens switched?

The screens are switched “vertically” and “horizontally”. What does this mean? For example, if you are in the main map and click on the centre of the bottom-line, you get the first main information table; this is vertical rotation

You click again in the centre of the bottom line and you get the second main information table, and so on, until you are back to the main map. An example of this follows.

Map M (click bottom line centre) → 1.1 Info table Cruise (click centre bottom line) → 2.1 APTS := airports (click centre bottom line) → 3.1 COMN :=common targets (click centre bottom line) → 4.1 TRF := traffic, needs FLARM (click centre bottom line) → Map M

Viewing sub-pages/multi-maps is done by horizontal rotation, which means clicking right or left in the middle of the screen. If you are at a table 1.1, and click right or left, you will get tables 1.1, 1.2, and etc.

How do I use the menu?

The menu is self-explanatory. You display it by clicking in the lower right corner of the screen; the menu is a collection of soft buttons. Within the menu you can go back and forward by clicking the labelled buttons.

How do I handle the information tables?

The tables contain a lot of different information, some of which are read only, while others can be chosen for further detail. The main information tables can be reached and changed by clicking in the centre of the bottom line repeatedly (main tables and map). After the last table you go back to the last map screen. Sub-tables, e.g. 1.3, can be reached by clicking left or right of the middle of the screen until you find the one you need.

Sorting the tables information columns can be done by clicking on the appropriate column header you would like to use for the sort.

If you want to select a table item to view additional detail about the item, e.g. an airfield as a target, you can move the table cursor up or down by clicking into the upper or lower part of the screen respectively. Your selection will be confirmed by a longer click at the centre of the screen.

How do I move the map (PAN-mode)?

You reach the PAN mode via

(M)enu > [ScreenViews] > [PAN on]

In PAN mode you can move the map by clicking and NOT releasing, moving the map to the chosen point, then releasing your finger.

A crossbar is shown on the screen which can be used for waypoint definition. The defined waypoints using PAN mode can be used for navigation; they are found on the 3.1 COMN table.

Standard Settings

Pitfall!

You play with your freshly installed LK8K and change data and parameters, and in the end you are quite pleased with your settings then shut down the program. At next program start up there is a surprise, all settings are gone!

SO WHAT? The developers somehow decided to make this the standard behaviour until you explicitly demand to save the run time parameters!!!

This can be done by:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] >
[System Setup] >> ... >> System Setup Page 22 System: Save runtime: ON

How do I store my settings permanently?

As mentioned above, the easiest way is:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] >
[System Setup] >> ...>> System Setup Page 22 System: Save runtime: ON

You should also consider using profiles for yourself as pilot, your device and for the gliders you fly.

How do I change the screen orientation?

Config2/3->LK8000 Setup -> System Setup -> Page22 System -> Screen Orientation

Where can I get maps, airspaces and waypoints?

Maps : mostly provided at the LK8000 homepage (or via LKMAPS app/program)

Airspace data: usually provided by your national aero-club or see www.openaip.net

Waypoints : from www.soaringweb.org or www.openaip.net

Where can I set maps, airspaces and waypoints?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 1 Site

How do I set my personal data?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] >[Pilot Setup]

How do I set up my glider(s)?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] >[Aircraft Setup]

Using this method, you choose the appropriate polar file for your glider! A method you can repeat for each glider you fly.

How do I set my home airfield (take off airfield)?

(M)enu > [Nav] > [Waypoint Lookup] > Choose your airfield name from the list or by keyboard > Select your airfield > [Details] > [Next] > [Next] > Set as new Home

OR

you do a long tap on the moving map at the needed airfield location and select your airfield from the shown list. Then, follow the same path as described for [Waypoint Lookup] above.

How do I set the units for the used data?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 9 Units:set the several available units as desired.

How do I set a safety height for take-off/ landing?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 6 Safety factors: Safety Altitude: ...then set the desired height;
300m for example.

How do I set a safety height around terrain?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 6 Safety factors: Terrain height: ...then set the desired height;
50m for example.

How do I set a landing gear warning?

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] > System Setup Page 15 Alarms: Gear warning altitude: ...then set the desired height; 150m for example.

How do I create and use a personal checklist?

Within the _Configuration folder there is a text-file NOTEPAD.TXT you can edit this file to meet your needs. In this file you can write down your checklist and add some personal information like telephone numbers etc. You can easily define separate pages, refer to the example provided. BUT, you have to do this work in the hangar with a pure UTF8 editor. The NOTEPAD.TXT file is accessible in LK8000 by selecting:

(M)enu > [Info] > [Info 2/2] > [Notepad]

Personal Settings

How do I restrict the amount of provided flight information?

Within the system setup you can configure multi-maps, info-pages and bottom bars.

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 10 Interface

Here you can switch ON and OFF the maps, pages and bottom bars as you desire. The minimal setup would be multi-map1 and bottom bar Nav1 ONLY!

How do i connect my FLARM device? (recommended)

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Setup Device]

Select a free device channel – e.g. [A] (Upper knob line)
Select the FLARM as device type – Name Flarm
Set the Port – com4 (or devttyS0) ... name/number of the serial interface
Baudrate – 19200 (at least 19200 for traffic on map)

.... other parameters left as default (unless you know what you are doing!)

You have to leave the configuration menu to make your choice active. You can check if you have been successful by going again into the configuration of the FLARM device and watch the terminal output. If you see there something similar to NMEA strings being displayed, all is o.k. Keep in mind that the FLARM device needs a GPS-fix before sending something useful.

NOTE: If the FLARM device is your only GPS source set it as device [A]!

How do I get FLARM targets on the map? (FLARM serially connected and working!)

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 13 Map Overlays: Traffic on map: Enabled

How do I connect my e-vario? (recommended)

You must connect your e-vario physically to the LK8000 device via a serial interface (dedicated or multiplexed/ cable or Wi-Fi/Bluetooth). Within the program, the connection is made as follows:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Setup Device]

Select a free device channel; e.g. [B] (Upper knob line)
Select your e-vario as device type – Name, LXV7_EXP for example
Set the Port – com3 (or devttyS2) ...name/number of the serial interface
Baudrate – 57600 (as described in the e-vario manual)

You have to leave the configuration menu to make your choice active. You can check if you have been successful by going again into the configuration of the e-vario device and watch the terminal output. If you see there something similar to NMEA strings being displayed all could be o.k. Which information can be used by LK8000 depends on the device driver. For testing, choose a different and available device; e.g. for LX-devices.

How do I connect my radio with LK8000 (recommended)

You have to connect your radio physically to the LK8000-device via a serial interface (dedicated or multiplexed/ cable or Wi-Fi/Bluetooth). Within the program the connection is done as follows:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Setup Device]

Select a free device channel; e.g. [C] (Upper knob line)

Select your radio as device type – Name Dittel KRT2 for example

Set thePort – com4 (or devttyS3) ...name/number of the serial interface)

Baudrate – 9600 (according to the radio manual)

You have to leave the configuration menu to make your choice active. You can check if you have been successful by going again into the configuration of the radio device and watch the terminal output. If you were successful you can control your radio conveniently from within the program.

Currently supported radios: Dittel KRT2, Funke ATR833 and Becker Ar620x

How do I change the map content to my needs?

(1) (M)enu > [Display] > [Display 1/3] and [Display2/3] – Many variations possible

(2) (M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] > System Setup Page 3 Map Display –Many options

How do I change the map orientation?

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] > System Setup Page 3 Map Display: Orientation

How do I set bigger/smaller fonts?

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] > System Setup Page 12 Fonts... font size choices can be made for different

map/overlay features.

You can increase or decrease font size by choosing an appropriate number (e.g., -10, +10 respectively)

How do I set/change/hide the split maps?

The split maps can be switched on and off via the system configuration:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] > System Setup Page 10 Interface: Configure Multimaps

If you do not want to display them, you can switch them all off! But they can be useful!

You can vary the size of the split by doing a long click and hold on the horizontal border between the two views, then move the border up/down.

The shown maps (upper part of the split screen) can also be oriented to suit your needs.

How do I use the table pages?

In table pages you can select targets for navigation. A click in the upper table screen half moves the table cursor up and the lower half down. To select the chosen row do a long click in the centre of the table.

To switch table pages back/forward click in the left /right part of the screen. To go on to the next table (or after the last table to the map) click in the centre of the bottom line. This a rotating tables-map-stack by repeatedly clicking on the centre of the bottom line.

How do I re-sort table columns?

If you want to re-sort table columns, press on the column header you would like to use to sort. The data will then be shown according the newly selected sort criterion. You can change the direction of sort by pressing the column header again.

How do I show/hide an info page?

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 10 Interface: Configure Info Pages

Here you can switch Info-pages on and off

How do I set the bottom bars?

(1) You can switch the different bottom bars on and off via

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 10 Interface: Configure Bottom Bar

If you switch all off, NAV1 remains.

(2) You can change the content of the bottom bars THR0, CRU7, FIN8 and AUX9 using:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 16: InfoBox Cruise (=CRU7)
17: InfoBox Thermal (=THR0)
18: InfoBox Final Glide (=FIN8)
19: InfoBox Auxiliary (=AUX9)

Set content for each bottom bar to your needs. The number of values shown in the bottom bar depends on the screen size of your device and the chosen font size for the bottom bar (approx. 4 – 6).

How do I use the FLARM-RADAR?

The FLARM radar is available with a connected FLARM, connected with a baudrate of at least 19200 baud. Make sure that you have:

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 13 Map Overlays: Traffic on map: Enabled

You will get an additional FLARM-RADAR screen page which shows you a top and side view of FLARM-targets at the chosen magnification scale. Scale variation is done via click in the upper/lower part of the screen.

As usual you can hide the FLARM-RADAR screen via

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 10 Interface: Configure Multimaps

How do I use profiles?

You can create profiles for the device you are using, your glider and you as a pilot. This makes sense if you use a navigation device with different gliders or if you want to use your LK8000 customisation on other devices, or on club devices with changing pilots.

A profile is selected or saved for the chosen config data for device, pilot and aircraft By using: (M)enu > [Config] > [Config 2/3] >[LK8000 Setup]

You will have three possibilities to save profiles via [Device save],[Pilot save] and [Aircraft save]. At program start-up you can choose to load desired profile files.

How do I modify the custom menu?

(M)enu > [Config] > [Config 2/3] >[LK8000 Setup] > [System Setup] >
System Setup Page 10 Interface: Configure Custom Menu

Before Take Off

Which settings before take-off are essential?

Apart from maps, airspaces and waypoints, which are already chosen in the system configuration, you need to check the basic and wind parameters for ground level:

(M)enu > [Config] > [Setup Basic]

(M)enu > [Config] > [Setup Wind]

Can I follow a checklist?

In short YES! Within the _Configuration folder there is a text-file NOTEPAD.TXT. You can edit this file to meet your needs. In this file you can record your checklist(s) and add personal information like telephone numbers and etc. You can easily define separate pages; look at the example. BUT you have to do this work in the hangar work with a pure UTF8-editor (e.g. notepad++). NOTEPAD.TXT is readable in LK8000 by selecting:

(M)enu > [Info] > [Info 2/2] > [Notepad]

How do I set pilot and sailplane?

Pilot:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Pilot Setup]

Sailplane:

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Aircraft Setup]

or, you choose the appropriate profiles at program start up.

How do I set the airfield elevation?

This is done automatically, so no need to do it by hand. Within the airfield data, its elevation is provided and via GPS, LK8000 knows where you are. If you are in “nowhere” this will be an approximate value according to terrain data.

How do I set wind speed/direction at ground level?

(M)enu > [Config] > [Setup Wind]

How do I set wing loading?

(M)enu > [Config] > [Setup Basic]

Which airspaces are active?

Who knows? **If in doubt, assume they are all active!**

For further helpful information, call air traffic control by radio or better, before you fly, watch their web site for news.

If you know what you allowed to do, you can deactivate airspace(s) within the program by a (1) long press on the map at the airspace position. Then, (2) you get a list with all notable things nearby, which will include the desired airspace. (3) If you choose it then you get the option to interactively deactivate it for the current program run.

Which NOTAMs to take care off?

For further helpful information see your respective agency's website .

For Germany there is a DFS-web site:

https://secais.dfs.de/pilotservice/user/login/login_edit.jsp

Using these sites you can dig for the latest NOTAMs relevant to your flight area.

During Flight

How is the “safety altitude at take-off” communicated?

The take-off safety height is set via

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [System Setup] >
System Setup Page 15 Alarms: Take off safety: 300m (for example)

Setting a safety height causes a gentle acoustic hint “safety” when you have reached this altitude after take off.

What was my take off time?

(M)enu > [Info] > [Status] > Status:Times: Take off time

How long has my flight been already?

(M)enu > [Info] > [Status] > Status: Times: Flight time

What is my ground speed?

Bottom bar NAV1: VG

What is my current McCready value?

Bottom bar CRU 7: AutMC

How is the wind at my altitude?

See the numerical wind information bottom-left corner of the map and the wind arrow near the glider.

Am I thermalling my best?

Hopefully ...:-)

Available aids are:

(1) Thermalling display mode: Your flight path is drawn in more detail with colours corresponding to your climb rates

(2) Thermalling centre: Within your thermalling path a virtual thermalling centre is displayed graphically with a source sign

(3) Thermalling bottom bar TRM0: During thermalling the bottom bar TRM0 will be shown with the configurable values:

TC.Gain	height gain in current thermal
TC.30s	climbing speed in the last 30s
TC.Avg	average climbing speed within this thermal
TC.All	average climbing speed so far in the flight
%Climb	portion of climbing so far in the flight

(4) For better centering, a sound is played indicating that the glider has to level for a short time to move the circle.

How large is my height band?

(1) During thermalling, in the upper-left corner of the map, a height band diagram of the flight up to now is shown. On the diagram an arrow is shown indicating the current height. Using this feature, you can judge your height within the flight band

(2) (M)enu > [Info] > [Analysis] > Analysis: Barograph

Who is around me? (using FLARM indication)

(1) See glider arrows in the map

(2) See gliders on the FLARM-RADAR display

(3) See gliders on the traffic info page 4.1

How are the others are climbing?

(1) See glider arrows in the map, climbing speeds are displayed nearby

(2) See gliders on the FLARM-RADAR display

(3) See gliders on the traffic info page 4.1

May I follow another sailplane? (with FLARM installed)

Yes! On the traffic info page 4.1, mark the glider to follow and select it. On the detail page you can lock it for following (and unlock).

How do I take care of bugs on the wings?

Use

(M)enu > [Config] > [Setup Basic] > Efficiency. 95% (for example)

You set the "Efficiency" in %. An efficiency of 95% means you have lost 5% of your L/D pride by bugs.

How is "water dumping" handled?

You have to know how fast water is emptied out of your glider; this value, called "Ballast dump time", is set in the aircraft configuration.

(M)enu > [Config] > [Config 2/3] > [LK8000 Setup] > [Aircraft Setup]

LK8000 has in

(M)enu > [Config] > [Setup Basic] a switch [Dump Ballast]

which you should press when you open the valves. The label changes to [STOP DUMPING], which you should press again when closing the valves. This way LK8000 measures the water dumping time and calculates the dumped water amount.

Can I go for the next destination already without thermalling?

With screen overlay values, you can set the arrival height at the chosen target and therefore, the needed L/D. If you set up a safety height, it is also included with the on-

screen values. With these values you can judge your current situation for yourself ... play safe.

What are my current alternative landing possibilities?

“Right at the moment” generally means you are in trouble

The “Best alternative” is automagically calculated for you! You can access it by clicking the upper-left corner of your map until you get

“B> NAME”

as your new target. All calculations are switched to this target.

If you get out of trouble again, you can revive your old target by clicking the same screen area until the “T> <OLDTARGETNAME>” appears.

How do I control my radio from LK8000?

(M)enu > [Config] > [Setup Radio]

In some dialogues it is also possible to set the frequency directly. For example, when selecting an airport.

What is my current battery voltage?

(M)enu > [Info] > [Status] > Status: Ext.Device

When is sunset?

(M)enu > [Info] > [Status] > Status:Times : Sunset

Navigation

Where am I?

You can see your current position on the moving map. You can zoom in and out or pan the map.

For radio communication it is useful to get a verbal description of the position. A tap long on the moving map at the gliders position will get you a short description of your current position from the Oracle. If you select the Oracle, a more elaborate position description appears.

Which navigation aids do I have available?

A lot!

- maps with Pan and ZOOM
- target and target distance shown in upper-left part of the main map
- bottom line NAV1 with track
- bottom line CRU7 with track and target distance
- course deviation in the upper-centre of the main map
- split map, with airspace side view
- split map, with waypoints to reach
- Airspace ping warning
- target tables
- landables tables
- short selection of distinct targets in the upper-left part of the main map (T -task, B – best alternative, 1 – alternative 1 [selectable], 2- alternative 2 [selectable], H-home airfield, L – last thermal)
- selection of relevant targets after a long click in the map at the position of interest
- ...

How do I navigate the easy way?

Select a waypoint and go for it!

(M)enu > [Nav] > [Waypoint Lookup] > Choose waypoint: Select waypoint : [Goto]

Is my track correct?

- The course deviation is given in the top-centre of the moving map (default moving map mode)
- The current track and course deviation is given in bottom bar CRU7

How is airspace taken into account?

The airspace data are usually provided by your national flight safety authority or similar. Airspaces by default are seen as active. But you can disable/re-enable them as needed. Airspace can be shown the map in various ways to suit your taste. In the split maps pages you also get a side view of the relevant airspace. Approaching airspace, you will get a warning the you can ignore or confirm for a specific time interval. Additionally, you will be warned by the airspace sonar, which is a ping varying in frequency and tone depending on

your distance to the airspace border. You will get warnings whenever you approach any airspace; either from the side, below or above.

How far is my next goal?

Look at the top left, when in the default moving map mode!

How long will it take me to reach my next goal?

Switch the bottom bar to CRU7 and look at the NextETE value (in minutes)

How do I set an alternative goal?

An interesting thing to do is set an alternative goal and not lose the original one. In LK8000 you can actually define two alternative goals without losing the original one. This is very practical if you are low, and in an airfield hopping mode. If you select a waypoint by

(M)enu > [Nav] > [Waypoint LookUp] : Choose waypoint: [Select waypoint] :
[Set Alternative 1...2]

you can set them as alternative 1 or 2

By using a long click on the moving map display, you can also select a waypoint and set it as alternative 1 or 2. The short cut for choosing the alternatives is by clicking the top-left corner of the moving map repeatedly and shuffling the goal set.

How do I create a new waypoint?

The most effective method to create a new waypoint is from the PAN map mode. The PAN mode you reach via:

(M)enu > [ScreenViews] > [PAN on]

In PAN mode you can move the map by clicking and NOT releasing. Then, move the map to a chosen point and releasing your finger.

A crossbar is shown on the screen which can be used for marker/waypoint definition. Once declared, marker/waypoints can be used for navigation. They can be found on the 3.1 COMN data table.

How do I navigate to a newly created waypoint?

The newly created waypoint/marker can be found on the 3.1 COMN data table. You select the waypoint by moving the table cursor up or down with a click in the upper or lower table screen region respectively. Confirm the selection with a long click in the centre of the table screen; this will allow you the opportunity to choose the selected item as your new target.

Common Contest Things

How do I create a task?

Go to the task edit page:

[M]enu > [Nav] > [Nav 1/3] > [Task Edit]

There you can create, save, or load a task (-file).

First you can start with no task by pressing [Clear]. Then you add a waypoint by clicking on the “add waypoint” line. You will be asked about the start line rules which, once selected, you apply them. Next, you successively add waypoints until the finish point for the task, and the appropriate rules for each waypoint and finish point.

That is it!

If you like you can use the [Analysis] button on your task, [Reverse Task] or [Save] buttons. [Save] allows you to write the task to a file. You will also be able to [Declare] the task to a connected logger.

How do I create a task as a FAI triangle?

You can analyse a created task by using the [Analysis] button on the task edit page (see above) to get the possible FAI sectors graphically. It will not take long for you to realize if your chosen task is within the FAI triangle borders.

A “best practice” is to prepare a task graphically using www.prosoar.de; check it out, it is self-explanatory and you can save the chosen task as a cup formatted file which can be loaded into LK8000 at the task edit page. The only difficulty is that you have to copy these cup task files into the _Tasks folder of your LK8000 installation.

How do I create a task as an FAI triangle with take-off on a leg?

If your task is created as a FAI-triangle with the start on a leg, LK8000 can handle this. Use [Analysis] to verify that it is correctly interpreted.

How do I save/load a task?

Easy...on the task edit page use:

[M]enu > [Nav] > [Nav 1/3] > [Task Edit]

and the [Load] and [Save] buttons. Externally declared task files must be placed within the _Tasks folder of your LK8000 installation to be loadable.

How do I visualize the entire task on the map?

Use the PAN view mode and zoom out as needed to see the whole task which is shown graphically.

How do I modify a task?

On the task edit page

[M]enu > [Nav] > [Nav 1/3] > [Task Edit]

you can click on waypoint lines to get all the editing possibilities (change, move up/down, delete) for a selected waypoint.

How do I analyse a task?

On the task editing page, with a given task created or loaded, you can start to analyse you task be clicking the [Analysis] button.

How do I declare a task to an IGC-logger (e.g. FLARM)?

On the task editing page with a given task crated or loaded, you can declare it to a connected logger by clicking the {Declare] button.

How do I create a task-file for LK8000 at www.prosoar.de?

On www.prosoar.de you usually start with a clean racing task. With your mouse you select your start point with a click. Each successive turnpoint is created with a click as well. The last click is the finish point. While you are moving the mouse, the FAI sectors are shown dynamically and so the choice of task is very convenient. To edit the task, use the menu on the upper-right of the screen. The [/°\+] soft button gives you immediately editing possibilities, like adding further turn-points and moving a turnpoint in a rubber band manner. On the screen's left-hand side you see the start point turnpoints, and the finish point...and the resulting task distance. If you are satisfied, you can export your created task as a cup formatted file, which can be read by LK8000 from within the _Tasks folder.

(BTW. There is also xcplanner.appspot.com as online task-planer)

How do I utilize my own waypoints at www.prosoar.de?

At www.prosoar.de you can use your own waypoint files. To do so, click the [Waypoints] button on the left-hand side of the screen. The rest is self-explanatory.

How is my flight logged?

LK8000 is capable of logging your flight. You can find the resulting LK8000 data logger file, properly named, in the _Logger folder of your LK8000 installation. Default is a one second log interval. *Keep in mind that the LK8000 log file is not IGC certified ...* but sufficient for OLC and better than nothing.

Attention:

LK8000 needs to detect your landing and close the log file. So, wait some seconds before you shut down LK8000 after landing. It is best wait for the acoustic landing signal (and message on screen "landing").

Did I circle the turning point?

Ohit helps to zoom into the map as much as needed to do it safely.

There is the auto-advance turnpoint feature within LK8000 but I would not rely on it to detect the turnpoint. Check it out but play it safe.

Which gliding zone is still available after passing the turnpoint?

LK8000 can show a gliding zone on the map not only from the current height, but also in projection after a calculated waypoint arrival height. This way you can judge your chances of reaching a location after reaching your turnpoint.

How long is my flight path up to now?

You can get this information from an info table. You get all relevant OLC data of your current flight with a projection of a successful task completion; this comes from info table 1.5 OLC.

What is my current OLC speed?

Consult info table 1.5 OLC.

What distance remains to my goal/destination?

This value is given on the main map beneath the task point in the upper-left corner of the map.

How fast can I go to my goal/destination?

Multi-map 2 is useful for this. In the lower part of the split screen you see the safety height, the MC value for the safety height, the calculated actual arrival height and the possible MC value.

How long is my current OLC path? And, how many OLC points have I already collected?

Consult info table 1.5 OLC. Click the middle of the bottom line until the 1.x tables appear. Then click the middle of the screen, left or right until you reach table 1.5.

Centralized Contest

How do I create an AAT?

Go to the task edit page:

[M]enu > [Nav] > [Nav 1/3] > [Task Edit]

There you can create, save, or load a task (-file).

First you can start with no task by pressing [Clear]. Then you add a waypoint by clicking on the “add waypoint” line. You will be asked about the start line rules which, once selected, you apply them. Next, you successively add waypoints until the finish point for the task, and the appropriate rules for each waypoint and finish point.

Hint: Use www.prosoar.de for task creation, export the task as a cup file, then copy it into the _Tasks folder then load it.

How to modify an AAT graphically?

On the main map you click near the point to change. Then, you can choose the relevant turnpoint. You get the possibility to move it within the cylinder and then save it at the new position.

How do I analyse an AAT?

Within the task editor

[M]enu > [Nav] > [Nav 1/3] > [Task Edit]

you press the buttons [Analysis] > [Task Calc] > [Optimize] and get optimized AA-task lines on the map

How do I create an AAT with a distant starting point?

You create it same way as a usual AAT but for the start point you can choose [Alternate start points] “On”. Then you can add alternative start points.

With

[M]enu > [Nav] > [StartPnt Cycle]

you can switch between the added starting points.

How do I talk to my teammates?

As usual, via the microphone ☺

Team flying in competition is supported by LK8000 through simple coding/de-coding of the positions. One exchanges via radio a three to four-digit alphanumerical code, sample shown below

G4A3

This code, when set displays your own position. And, when received, indicates the position of the team partner. The coding of your own position is done by calling up the team code window with

Menu ► Nav ► Nav 2/3 ► Team Code

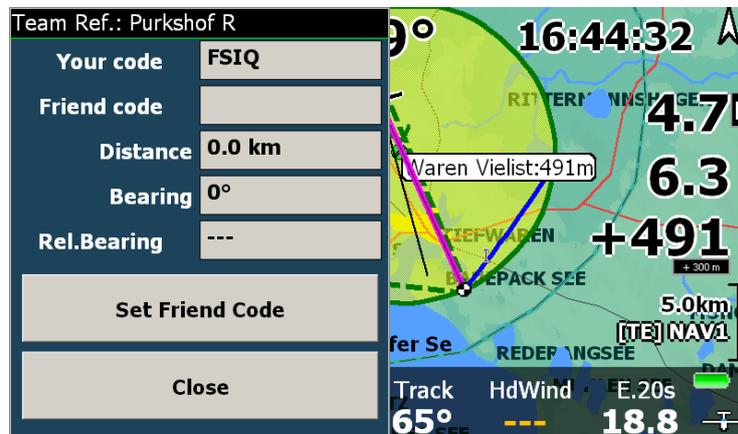


Figure 1: Team code window

Your own position, as shown in fig. , is coded with “FSIQ”. In the box “Friend Code”, you can enter the position code of your partner. Once entered, you will receive the distance and bearing (relative bearing) to fly to the partner, if so desired.

For this procedure to work it is a requirement that a previously agreed waypoint as reference point has been set!

May I follow another glider?

This can be done conveniently by FLARM tracking.

Go to the traffic table 4.1 and choose a FLARM target. With [Target] you can lock it and get a crosshair for following 4.3.

To release the target, go again to table 4.1 and choose the same target now you can release your current target with the [Unlock] button.

After Landing

Where do I find my take-off and landing times?

(M)enu > [Info] > [Info 1/2] > [LogBook] > [LogBook List]

Hint: The last fight you get with a click on [< Prev].

Where do I find my LK8000 logger file?

Look in the _Logger folder of the program.

How do I read the FLARM logger file with LK8000?

If a FLARM device is connected, it is now possible to read the IGC files out of the device and store it in the _Logger directory. A new FLARM device was added as device driver to the device configuration menu. If a FLARM device is connected and detected, a new [Conf] button in the device configuration appears. Pressing this button leads to an Alarm Configuration page with the IGC file download possibility via the [IGC Download] button.

When can LK8000 be switched off?

Wait until an acoustic signal occurs (ding dong) and the screen message "Landing" occurs and (safe way) wait an additional ten seconds before shutting down the program.

How should LK8000 be switched off?

Please do not shut down the program by switching off your nav device. Instead, always use the software shutdown

(M)enu > [Exit]

This way all open files will be closed and a clean program exit is guaranteed.

Further Things

Can I replay my flight on LK8000?

YES, by clicking:

(M)enu > [Config] > [Config 1/3] > [Logger Replay]

and choosing the logger file of interest.

How can I use marked waypoints permanently?

The marked waypoints are stored in the file LKJJJJMMTT.cup in the LK8000/_Waypoints folder. With a text editor you can rework this text file for appropriate names and etc. You can also append it to your current .cup waypoint file. On the next program boot you can use your marked/renamed waypoints as usual waypoints.

How can I climb in simulation mode?

(1) You can increase the value of "NetVario" and fly forever.

(2) Increase the height value by:

(M)enu > SIM MENU > [ALT], [+]

Relevant internet addresses with free content

www.lk8000.org

homepage

program download

maps repository

<https://play.google.com>

LK8000 android app

LKMAPS android app

www.prosoar.de

task planing

www.daec.de

German airspace data (provided by DFS)

www.openaip.net

waypoints

hotspots

airspace data

www.soaringweb.org

waypoints

airspace