

User Manual XC Tracer Maxx



Quick Start Guide

Attach the vario to your cockpit or onto your thigh. Press and hold the red button until you hear beep-beep, then release the button. The logo appears while the vario is searching for GPS satellites and as soon as the logo disappears the vario is ready and you can take off. You can switch screens with a short push on the button, and you can change the volume level by double pressing the button. After landing, switch the vario off by pressing the button until you hear beep-beep, then release the button.

If you want to change the settings: press the button twice in quick succession and hold it down for a second time. In the settings move the point with a short press of the button, with a long press select the entry. The Vario is preset to beep only when flying. But you can set this as you wish.

If you want to download the tracks or change the configuration file then connect XC Tracer Maxx to your computer with one of the included USB cables. Now switch on the vario and the SD card of XC Tracer Maxx will appear on the computer as a USB hard drive. Now you can download tracks, change settings in the config file, or copy new firmware updates to the SD card. The new firmware does get installed as soon as you switch off the vario. Please note that this can take a while when updating firmware for Flarm or uploading a Flarm obstacle database.

Introduction

XC Tracer Maxx is a high-precision GPS variometer with a perfectly readable LCD and integrated collision warning device FLARM. XC Tracer Maxx transmits twice per second the position and also the estimated flight path for the next 20 seconds. Other FLARM devices in the vicinity can then draw conclusions about a possible risk of collision risk. In case of a possible collision the corresponding FLARM device warns the pilot in the aircraft or helicopter. XC Tracer Maxx itself does not warn of possible collisions with other aircraft.

Many pilots use XC Tracer flight instruments for long XC flights and for competitions. But also for pilots with little flying experience an XC Tracer Variometer is the perfect choice. The lag-free indication of lift / sink rate makes it much easier to find and core thermals than when using a conventional variometer. All essential flight information is displayed on the LCD. In addition, data such as airspeed, altitude, climb, course etc. can be transmitted to a mobile phone, a tablet or an e-reader via Bluetooth Low Energy 4.2.

XC Tracer Maxx is also an IGC logger, the IGC files are approved by the FAI for paragliding competitions. XC Tracer Maxx has a built-in lithium-polymer battery, fully charged the battery is good for more than 60 hours of continuous operation. The battery is charged via the supplied Micro USB cable. The device also has a Bluetooth module. Via Bluetooth Low Energy 4.2 data such as airspeed, altitude, climb, course etc. can be transferred to a mobile phone, tablet or e-reader. Please check www.xctracer.com to see which apps need to be configured with which BLE strings.

Mounting

XC Tracer Maxx uses data from a 9-DOF IMU (9 Degrees Of Freedom Inertial Measurement Unit), and from a pressure sensor, to compute the real-time climb rate and altitude, avoiding the undesired time lag that conventional variometers suffer (due to data filtering). For this reason mount your XC Tracer Maxx in such a way that it moves as little as possible whilst you're flying.

It is important that the XC Tracer Maxx moves as little as possible in relation to the harness during flight. And leave some free space of 4-5cm all around your vario; otherwise the radio performance may be compromised.

It is therefore important that the XC Tracer Maxx is firmly attached to the cockpit or thigh with the velcro provided. Mounting on the riser is not ideal.

Switch On/Switch Off

Turn XC Tracer Maxx on by pressing and holding the red button until you hear beep-beep. Next the battery charge status is indicated by a series of beeps (this feature is described further below). Up to 2 minutes the system will search for a GPS fix, while only the XC Tracer logo is displayed on the screen. After a maximum of 2 minutes, the default screen is displayed, even if no GPS fix was found.



Switching off is done in exactly the same way. Press the red button until you hear a "beep-beep", then release the button and the XC Tracer Maxx switches off.

Battery Indicator

After switching the device on the battery charge status is indicated with a sequence of short beeps:

5x Beep means that the battery is charged 95% or more.

4x Beep means that the battery is charged 75% or more.

3x Beep means that the battery is charged 55% or more.

2x Beep means that the battery is charged 35% or more.

1x Beep means that the battery is charged 15% or more.

When the battery is less than 15% charged you will hear a constant beep for one second after switching the device on.

After indicating the battery charge the GPS now searches for a fix. A beep-beep-beeeeeep indicates that the device is now ready for flight.

The battery charge level is also displayed on the LCD.

Adjusting The Volume

XC Tracer Maxx has 4 volume settings: Mute, gentle, medium and loud. You can change the volume level by double pressing the red button (like a double click on the mouse of your computer), always from mute – gentle - medium – loud – mute – gentle etc.

Energy Management

A fully charged battery from the XC Tracer Maxx is sufficient to run the vario for 60 hours, including logging of IGC and KML files, sending and receiving of Flarm Beacons, data transfer over BLE etc. The battery can be charged via the USB port. To do this, use the USB-C charging cable provided and charge the XC Tracer Maxx overnight. Fully charging an empty battery takes about 5 hours.

Important: Please charge with your computer or use an original charger from a smartphone. Never use a cheap charger; this can damage XC Tracer Maxx!

Automatic Switch-Off

Automatic switch off is disabled during the first 60 minutes after switching on XC Tracer Max, however after that it will turn itself off if it hasn't detected lift or sink for 1 minute – ie. after you've landed. In addition, low-voltage detection will switch the device off if the battery voltage drops below 3.3V. The automatic shutdown works fine if the GPS reception is good. However, this is not always the case. Therefore it is advisable to switch off the variometer manually immediately after landing.

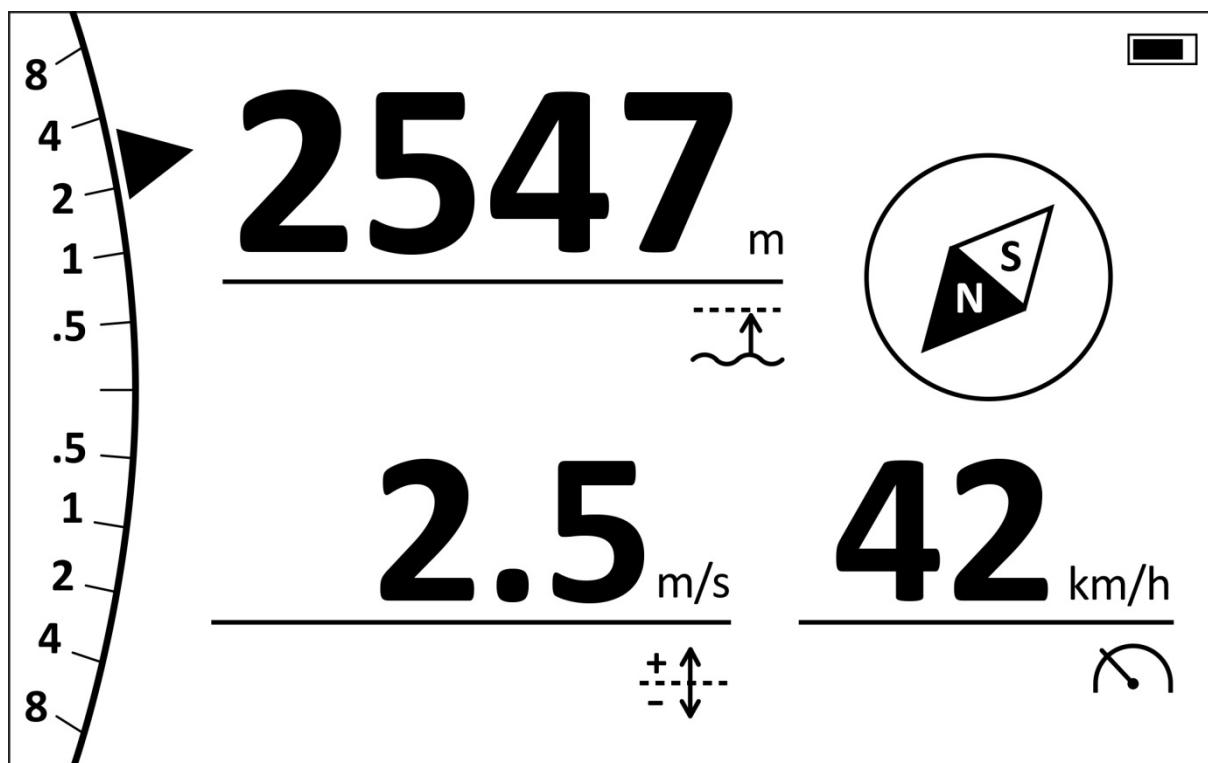
Screens

XC Tracer Maxx can display several predefined screens:

- Simple
- Standard
- Thermal
- Buddy
- Airspace (Not yet ready)

The LCD, which is perfectly readable in bright sunlight, has an update rate of 10Hz, so that a smooth display is guaranteed. The preconfigured screens cannot be changed; only which screens are to be displayed can be preset.

Simple Screen



This is the ideal screen if you don't want too much information displayed. The analogue vario indicator shows you the climb/sink rate in weak thermals with a high resolution, but you can also read the climb rate in strong thermals without any problems,

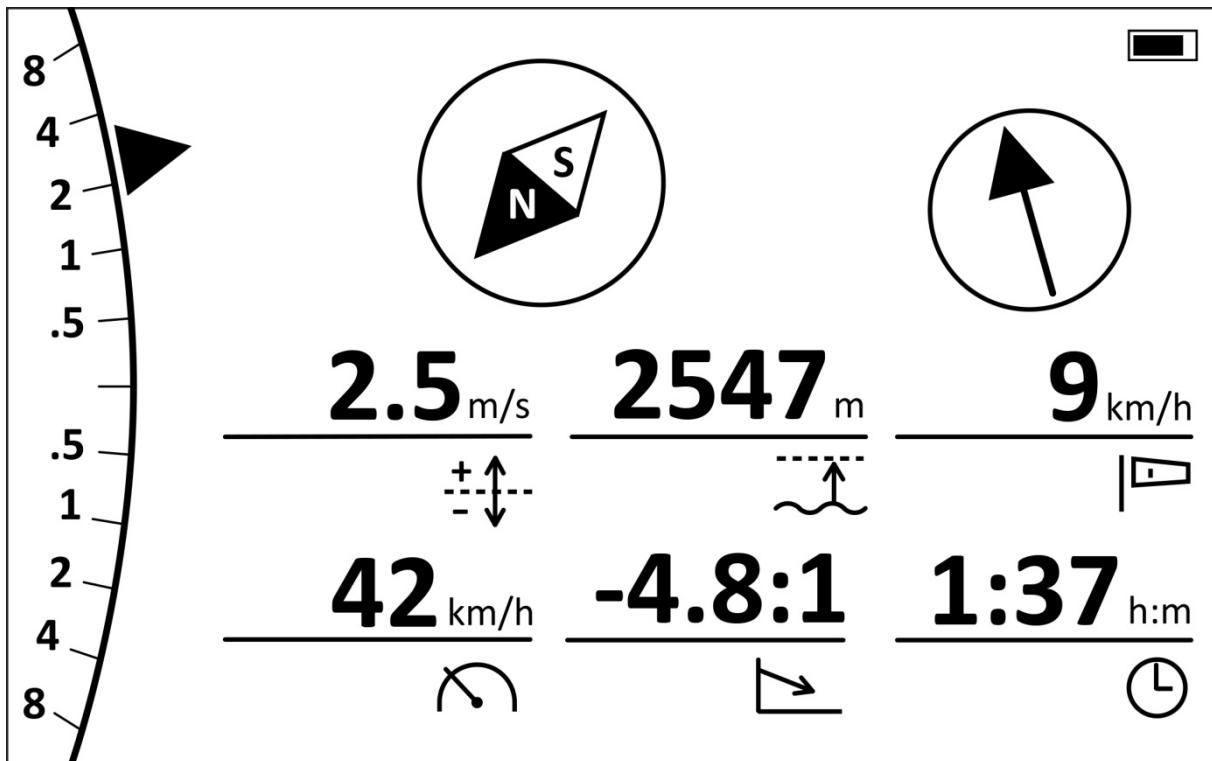
The digital vario display shows the current climb/sink rate.

Altitude is height above mean sea level.

Speed shows the speed over ground.

And the compass always shows you where north is. Please do not use this feature to fly in clouds or in foggy conditions.

Standard Screen



The standard screen will be the ideal screen for many pilots.

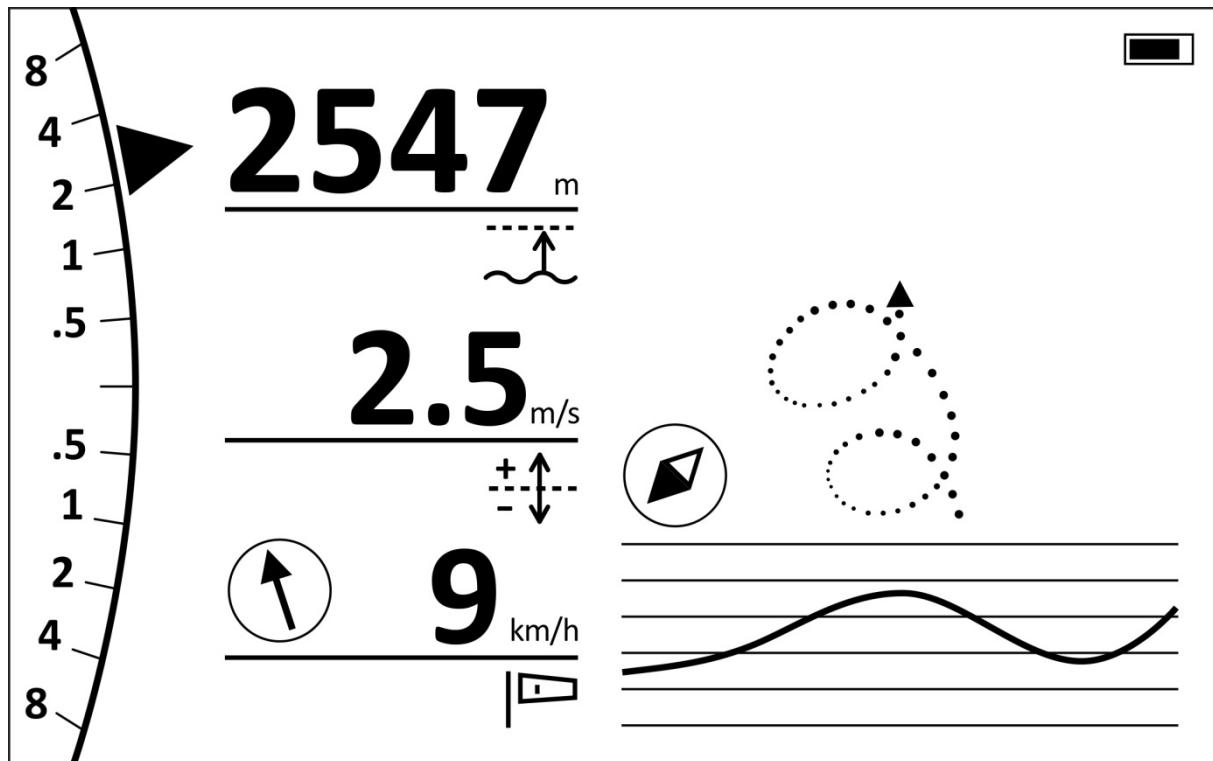
The displays are exactly the same as in the simple screen.

In addition to the simple screen, the standard screen also shows the glide ratio and the current flight duration.

The wind is also displayed. As long as the wind arrow is pointing upwards and the arrow head consists only of thin lines, the code cannot calculate the wind. As soon as the wind can be calculated, but the calculation is still uncertain, the wind is displayed, i.e. the arrow shows where the wind is blowing to, but the tip of the arrow still consists of thin lines.

As soon as the wind can be calculated reliably, the arrow head will be filled in black, as in the example above.

Thermal Screen



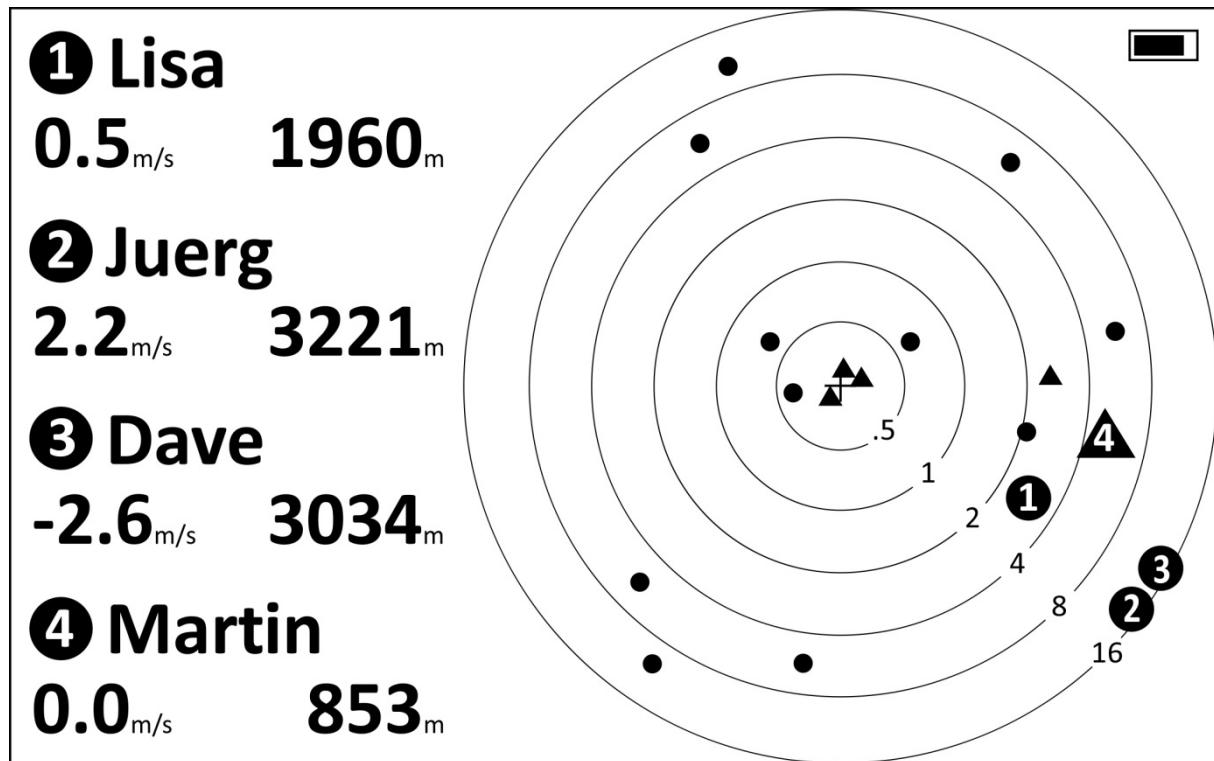
The analog vario display as well as altitude, digital vario and wind and compass show exactly the same as on the standard screen.

On the bottom right you can see the altitude curve of the last 30 seconds. This display can be very helpful to see at a glance whether you have gained or lost altitude. A short look at the screen is enough to know immediately what is going on without having to read numbers or remember numbers.

The thermal assistant displays the last 60 seconds of flight with dots. The dots show, depending on whether they are filled or not, or whether they are large or small, how the climb / sink rate was at that point. Large black dots indicate good climb, large circles indicate strong sinking.

This thermal assistant can be very helpful if you have fallen out of a thermal and want to find it again. But please keep always an eye on the airspace around you and don't keep looking at the screen, however helpful it may be. It is best to try the thermal assistant if you are flying alone in a thermal.

Buddy Screen



On the Buddy Screen you can see all paraglider and hang glider pilots who fly with a Flarm device and have been received by the XC Tracer Maxx in the last 5 minutes. Your position is in the middle of the circles, and from one circle to the next the distance doubles.

The dots show paragliders or hang gliders that are equipped with Flarm that are flying, and the triangles show pilots with Flarm that have not yet taken off or landed.

In the config file you can define the Radio ID and a name for up to 8 Buddies. These buddies are then displayed as large points or triangles. The height and climb of your buddies will be displayed. So you always know where your buddies are.

If you have defined more than 4 Buddies, the info of the first 4 Buddies will be displayed for 10 seconds, after that the info of Buddies 5-8 will be displayed for 10 seconds, after that info of Buddies 1-4 will be displayed again etc.

It is important to know that the position, altitude and status (flying or not) of your Buddies are continuously stored in the vario. This can be helpful to know where to start searching for a buddy in extreme cases. This info can be found in the settings under SAR (Search And Rescue) Buddy. More on how to change settings or view the settings without using a computer can be found below.

Airspace Screen

The airspace screen is not yet ready.

Change settings without a computer

If you want to change the settings: double click and hold the second click for one second. To go to the desired setting press the button once briefly; with a long press to select/change the setting.

It is very easy to add a buddy at takeoff who also uses a variometer with Flarm. Switch on the XC Tracer Maxx and the vario of your friend, and wait until both vario's have a GPS fix.

Now go to the settings of Maxx (double click and hold the second click for one second), then go to the menu "Add Buddy" with short clicks, then select this menu with a long click. Now you will see all the Flarm devices that are available within a radius of 50m around you. Navigate to the ID of the buddy with short clicks, and then select this ID with a long click. The ID of the buddy is now saved, and the radio ID will no longer get displayed.

Go back in selecting "Back", and then check under "Remove Buddy" whether the buddy has been saved. If you want to remove a buddy you can do this here, just select the buddy you want to remove and then delete the entry with a long click.

You can add up to 8 buddies in total. If you want to give a buddy a different name than for example Buddy3 you can do this on the computer by changing the name of the buddy in the config file.

Below "Remove Buddy" you will find the entry "SAR Buddy". Here you can check where your buddies have been when XC Tracer Maxx has received the last Flarm signal from them. This can be helpful in search and rescue operations to quickly find a missing paraglider or hang glider.

The remaining entries are self-explanatory.

XC Tracer Maxx Configuration File

Connect XC Tracer Maxx to a computer using a Micro USB Cable and once connected, switch the device on by briefly pressing the red button until you hear a beep-beep-beep. XC Tracer Maxx is now running in USB-MSD (Mass Storage Device) mode. XC Tracer Maxx's internal Micro SD Card will appear as an external drive in Windows Explorer or the Mac Finder. You will find a PDF copy of the user manual on the SD card, and also the XC_Tracer_Maxx.txt configuration file. Editing this file in Notepad (Windows) or Text Editor (Mac) allows you to adjust XC Tracer Maxx's settings. The various options are described below:

XC Tracer Maxx Configuration File

serialNumber=688D2E4C8100

Serial number of XC Tracer Maxx, is used for the IGC logger.

firmwareVersion=XC_Tracer_Maxx_R01

Indicates the device's firmware version.

reset=no

Setting *reset=yes* resets XC Tracer Maxx to the factory default settings. *Reset=no* is the default setting. After a reset *reset=no* will automatically be set in the config file.

supported protocols are None, XCTRACER, LK8EX1, LXWP0 or LXWPW.

Select the BLE protocol here. NB. Only one protocol can be selected at once. Please check at www.xctracer.com which protocol to choose for your app. LXWPW is like LXWPO, but with the information of the calculated wind.

stringToSend=LXWP0

In this case the LXWPO protocol will be used.

name of BLE service

bleName=XCT

A name for the BLE service can be assigned here, up to 14 numbers and letters are possible. Please do not use a hyphen, some Android Apps have problems with it.

logger configuration

The logger records IGC and KML files in parallel. IGC is recorded with 1Hz, KML is recorded with 5Hz. You can configure the logger as follows:

logOnlyWhenFlying=yes

When *logOnlyWhenFlying=yes* is set then a log file will be recorded once the GPS has recorded a speed greater than 4m/s. The logging will get stopped when you have landed. When you make a top landing the log file will be stopped, and a new log file will get created when you take off again. When *logOnlyWhenFlying=no* is set then a log file will be recorded

as soon as you switch on XC Tracer, and the logging will only be stopped when you switch off the device.

pilotName=Koni Schafroth

Enter your name here. Please don't use accidentally use any tabs as they will invalidate the IGC file. Spaces are fine.

passengerName=

You can enter the name of a tandem passenger here if you like.

gliderType=Gin Explorer

Enter your glider make and model here.

gliderId=14049

Enter the immatriculation number (if you have one) of your glider here.

screen version options

Simple

Standard

Standard & Buddy

Standard & Thermal

Standard & Thermal & Buddy

Standard & Thermal & Airspace

Standard & Thermal & Buddy & Airspace

screen version

screenVersion=Standard & Thermal & Buddy

Here you can choose which screen combination you want to have. The screens are explained below. Only the line *screenVersion=Standard & Thermal & Buddy* is interpreted by the microcontroller, this line is used to make the settings.

Automatic switching between standard & thermal screen

automaticSwitchScreen=yes

Here you can set whether or not you want to automatically switch from the standard screen to the thermal screen and back. This can be useful if you want to use the thermal assistant, but prefer not to release the brakes and press the red button to switch the screen.

create your own vario tone settings below

beepOnlyWhenFlying=yes

When this is set XC Tracer Mini III GPS will be silent before takeoff. This is very helpful when you have configured some kind of a thermal sniffer. With *beepOnlyWhenFlying=yes* the variometer will be silent until XC Tracer Mini III GPS detects a horizontal velocity of 4m/s or more during 1-2 seconds. With *beepOnlyWhenFlying=no* the variometer will beep not only in flight, but also when you walk or move.

setVolume=2

There are four volume settings, 0-3. With this option you set the volume that the vario will use for beeping. When *beepOnlyWhenFlying=yes* is set then the vario will be silent until you fly. Once you're flying the vario will beep with the volume that you have set. Remember though, that you can change the volume during flight with a short press of the red button.

dampingFactor=0.00

Here you can set a damping factor from 0 up to max 10. As soon as you set a damping factor then the vario will react slower to changes in altitude.

ClimbToneOnThreshold=0.2

With this setting the vario will begin to beep when the climb rate is higher than 0.2m/s. When you want to use a thermal sniffer then you can set *ClimbToneOnThreshold=-0.5* for example. In this case the vario will begin to beep when the sink rate is less than -0.5m/s. In this way you can adjust the beeping tone so that you know when you're flying in lifting air, despite the fact that you're actually sinking gently. This can be helpful to find and core thermals in weak conditions.

ClimbToneOffThreshold=0.1

With this setting the vario will stop beeping when the climb rate is below 0.1m/s. You can also use negative values here, for example -0.51m/s when you use a thermal sniffer.

SinkToneOnThreshold=-3.0

The sink tone will be activated when the sink rate is below -3m/s.

SinkToneOffThreshold=-3.0

The sink tone will be deactivated when the sink rate is less than -3m/s.

tone=-10.00,200,100,100

tone=-3.00,280,100,100

tone=-0.51,300,500,100

tone=-0.50,200,800,5

tone=0.09,400,600,10

tone=0.10,400,600,50

tone=1.16,550,552,52

tone=2.67,763,483,55

tone=4.24,985,412,58

tone=6.00,1234,332,62

tone=8.00,1517,241,66

tone=10.00,1800,150,70

You must define exactly 12 tones. Additional tones will be deleted from the configuration file, and missing tones will be complemented with values stored in the Eeprom. The tones must be defined ascending from tone 1 of -10m/s to tone 10m/s of tone 12.

Important: Please avoid using exactly the same climb rate on adjacent tones as it will create issues.

tone=1.16,579,527,50 means that with a climb rate of 1.16m/s the vario will beep with a frequency of 579Hz, that the complete tone interval will last 527ms, and that the tone will be audible for 50% of the tone interval. This is a typical tone that is used when indicating climbing.

tone=-3.00,280,100,100 means that with a sink rate of -3.0m/s a tone of 280Hz will be emitted. As soon as the sink rate changes the tone frequency also changes, depending on the configuration. This creates a nice sink tone (not that a sink tone is ever nice!)

You can create your own tone settings using the tone simulator on www.xctracer.com and then copy and paste them to the configuration file, or you can simply copy and paste other people's tone settings to the configuration file.

FLARM device information

FlarmRadioID=200006

The Radio ID is transmitted with the Flarm signal. Have a look at www.glidertracker.de, here it is possible to track your flight in real time. You can register your RadioID at ddb.glidernet.org and add additional information. The Radio ID will also be used by the apps when it comes to knowing where where your buddies are flying.

FlarmSerialNumber=FLATMXCTW-000006

This is the serial number of Flarm; this serial number is required when buying an obstacle database

firmwareVersion=6.67

Info über die installierte Flarm Firmware

firmwareExpirationDate=1.11.2020

Info until when the Flarm firmware is valid. After this date Flarm will not work anymore, a new Flarm firmware should be installed before!

obstacleDatabase=ALPS20190121

Indicates if and which obstacle database is installed.

obstacleDataBaseExpirationDate=2019-03-31

This info indicates whether the obstacle database is still valid. The obstacle database will no longer work after the expiration date.

FLARM glider type is HANGGLIDER or PARAGLIDER

type=PARAGLIDER

Here you can enter either HANGGLIDER or PARAGLIDER.

Add Radio ID and buddy name

Buddy1Name=

Buddy1RadioID=

Here you can add a name for your buddy and his or her radio ID. Or you can go to settings in the vario and add a buddy with a few clicks on the red button, and then later on you can change here in the config file the name of the buddy as you wish.

You can create your own tone settings using the tone simulator on www.xctracer.com and then copy and paste them to the configuration file, or you can simply copy and paste other people's tone settings to the configuration file.

XC Tracer Maxx doesn't actually save the new configuration into its internal memory until it starts up in normal flight mode. So, press the red button briefly to unmount / eject the device from your computer, disconnect it from the USB cable, then turn XC Tracer on as normal.

Important: Always close the configuration file before you unmount / eject XC Tracer Maxx!!!

Flarm Firmware / Update

The Flarm firmware must be updated once a year. In the config file you can see which firmware version is installed and until when this firmware is valid.

After this expiration date Flarm will not work anymore! An update must be done before this date!

Please check the homepage www.xctracer.com if a new Flarm firmware (*.fw file) is available. These firmware updates are free of charge, the installation is easy done with drag & drop. For instructions on how to do a firmware update see below.

Flarm Obstacle Database / Collision Warning

XC Tracer Maxx transmits your position twice per second and also your estimated trajectory for the next 20 seconds. Any other FLARM devices in the vicinity can use this information to assess any possible risk of collision. If another FLARM device determines that a collision is possible, it will warn the pilot of the other aircraft. XC Tracer Maxx itself does not warn of possible collisions with other aircraft.

XC Tracer Maxx itself does not warn of possible collisions with other aircraft!

XC Tracer Maxx can receive signals from FLARM devices on paragliders and hang-gliders and transmit the data to a mobile phone, tablet or e-reader. Depending on the app you use, you will know in real-time where your buddies are! During flight tests, signals were received from FLARM devices up to 29 km away.

The FLARM obstacle database can be installed optionally. Equipped with the obstacle database, XC Tracer Maxx reliably warns against collisions with fixed obstacles such as cables or antennas that are recorded in the database. The database and the collision algorithm enable the processing of complex obstacle types, comprehensively segmented and divided power lines and cable cars in 3 dimensions. The data is extensively checked and optimized using a digital elevation model in order to largely prevent false alarms.

Various obstacle databases are available, information which version is best for you can be found here <https://flarm.com/products/product-extensions/obstacle-databases/>.

A warning tone sounds approximately 10 seconds before a possible collision. The closer you fly to the obstacle and the more likely a collision is, the more intense the warning tone will be. As soon as you fly away from the obstacle, XC Tracer Maxx will suppress this warning tone.



The obstacle database is intended as additional safety feature, but you must never rely on it alone!!!

XC Tracer Maxx Firmware Update / How to read flight data

Connect XC Tracer Maxx to a computer using a Micro USB Cable and once connected, switch the device on by briefly pressing the red button until you hear a beep-beep-beep. XC Tracer Maxx is now running in USB-MSD (Mass Storage Device) mode. XC Tracer Maxx's internal Micro SD Card will appear as an external drive in Windows Explorer or the Mac Finder. Download the newest flight firmware for XC Tracer Maxx and the newest FLARM firmware from www.xctracer.com and copy the new firmware using drag and drop to the SD card. Now press the red button briefly and the new firmware will start to be installed.

When the XC Tracer Maxx firmware (*.iap file) is updated, the white LED lights up, after a short time a few ascending beeps sound, the firmware file is deleted from the SD card and the Vario switches off. The new firmware is now installed.

An update of the Flarm firmware takes much longer, after pressing the red button the white LED flashes for a longer time in short intervals. After 1-5 minutes a few ascending beeps will sound, the Flarm firmware file or obstacle database file will be deleted from the SD card and the Vario will turn off. The new firmware is now installed.

Important: The information about the firmware version will only be updated once the device has been started up in normal flight mode.

It's impossible to install incorrect firmware on the XC Tracer Maxx – all that happens is that the incompatible firmware will get deleted from the SD card.

Troubleshooting

In the rare event that XC Tracer Maxx doesn't respond when you push the red button, you can perform a hard-reset by pressing and holding the red button for approximately 1 minute. The battery will then get disconnected from the electronics. After that you can restart XC Tracer Maxx in flight mode, and the device will be functional again.

Handling

A variometer is a sensitive device, the sensors electronics and the LCD can be damaged by strong shocks / impacts. Handle your instrument with care!!!

Please only expose the vario to the sun while flying, otherwise the vario can become very hot. This can lead to an overheating of the battery and destroy the battery and the vario! The lcd can also get damaged by excessive heat. The vario is not waterproof; flying in rain is not a good idea anyway.

Warranty

XC Tracer grants a 24 month warranty for material and workmanship. Unsuitable or improper use (for example strong impact, water landing, opened enclosure, software modification, ripped off USB connector, broken lcd etc.) and normal wear and tear (scratches in the enclosure, degradation of the battery) are excluded from the guarantee.

Technical Specification

- High-resolution B&W LCD, 536x336 pixels, perfectly readable
- Hardened and glare-free glass for LCD protection
- Five different screens selectable, from simple screen to air spaces
- Simplest operation
- Legendary sensitive vario technology, with no time lag
- FLARM with transmission and reception of data
- FLARM obstacle database (optional)
- FLARM display of position and height of Buddies
- Internal broad band antenna, works worldwide
- Data transmission via BLE to mobile phone/tablet/E-reader
- IGC and KML Logger, approved by the FAI for competitions
- Many compatible apps for Android/iOS
- Freely configurable sound settings with our tone simulator
- Accelerometer/Compass/Gyro/Baro/GPS/BLE/FLARM
- Running time with full battery at least 60h
- Firmware update via drag & drop
- Size: 92x68x18 mm
- Weight 120g
- CE and FCC Certification
- Swiss Made

FCC Statement:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC ID: 2AVOQ01 / Contains FCC ID: XPYANNAB

