



## **en/Firmware-0.86**

45

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MikroKopter.de

# Firmware 0.86

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**Date of release: 15.09.2011**

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## Forum-Link:


<http://forum.mikrokopter.de/topic-28183.html>

## Download:

- [FlightControl V0.86d \(FC1.0 - FC2.0\) \(MEGA644\)](#)
- [FlightControl V0.86d \(FC2.1\) \(MEGA1284\)](#)
- [Navi-Ctrl V0.26g](#)
- [MikroKopter-Tool V1.76b](#)

## Specialversion for ACT-2,4GHz S3D-receiver

- [FlightControl bis FC2.0 V0.86d - nur für ACT-S3D 2.4GHz Empfänger](#)
- [FlightControl ab FC2.1 V0.86d - nur für ACT-S3D 2.4GHz Empfänger](#)


 Only works with this 2,4GHz-s3d-version!

## How do I update?

Never made an update before? Read this: [Software Update](#)

## Compatibility

- Compared to version 0.84 the FC settings **not remained compatible** and will be re-initialized!
- The MK3Mag remains on the old version. Please do not update!
- The compass must be re-calibrated. Attention: The [new version](#) of the calibration is nessecary!

 You should never import settings of previous versions via the [KopterTool](#). The settings should be done manually!

## Videos

## EasySetup in the KopterTool

All important settings are summarized here. This makes it easier for beginners to find their way.

More information: [Easy Setup](#)


## Expert-Settings

If you need access to all settings you can make them visible by clicking on "expert view".

## Adjustable altitude for ComingHome

In the settings you can set a fixed height for coming home ([EasySetup](#) or [NaviControl2](#)).

With this function the Mikrokopter not only comes back... it also stays im a height of 25 meters for example. The climbing / descending speed is 3.0 meters per seconds - you can't change this value

 Notice: The altitude will be used only in Vario-altitude-control. And only if the throttle-stick is in neutral-position.

## Dynamic PositionHold

- In PH-mode the GPS-target position will be changed by the stickmovement.
- So the MK will not log-off in PH-mode
- That makes it much easier to fly during windy conditions because the MK can be moved more precisely
- The direct stick-influence to the MK will be damped simultaneously.

 Note: Default is ON. It can be disabled under "[EasySetup](#)" or "[NaviControl2](#)".

## No Receiver Beep

In "MISC" you can activate "no beep without active sender". Then you can switch on the Kopter without turning the transmitter on. If the Kopter gets connection once it is beeping constantly again.

## GPS-Characters in the Jeti/HoTT-Display

Character behind the distance:

- - : no GPS possible
- / : Free
- W : Waypoint flight
- H : Coming Home
- D : Dynamic Position Hold
- P : Position Hold

## Teachable CareFree (CareFree 2.0)

**Include: Textmarkierung "##include\_teach\_begin" nicht gefunden!**

**Include: Textmarkierung "##include\_teach\_end" nicht gefunden!**

CareFree
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# The function

The movements of your MikroKopter are controlled by remote control via the sticks *nick* (forward/backward) and roll (left/right).

If you move the nick-stick away from you => "nick - forward" then the copter flies forward over the front (red rigger).

As long as the copter is facing away from the pilot, it is like sitting in the copter yourself.  
Bewegt man den Steuerknüppel nach links, fliegt der Kopter nach links. Steuert man nach rechts, fliegt der Kopter nach rechts.

If you now fly e.g. a 180 ° turn and the front (red rigger) looks to the pilot, confusion can occur. From the point of view of the MikroKopter is still everything right. Front is still in front, left is left, right is right. But for the pilot on the ground everything is now upside down. If he controls e.g. to the left, the model flies to the right.

This "nose flying" requires a little practice.

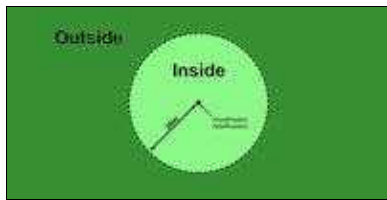
With the Function **CareFree** (or Headless Mode) there is no front on your copter. If the function is "on" the MikroKopter will fly in the direction you move with the transmitter - So you have a "fixed flight direction" no matter where the front of the copter is in flight then points.

It is only important to know that the direction forward/back/left/right is fixed in your copter. In order to avoid confusion in the control, the pilot should then turn with the remote control in the new orientation and remain so.

How to use the function CareFree as help or as a emergency function you can see here.

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# Radius



The **CareFree** function can be used differently depending on the distance to the starting point.

The distances are:

- Distance Kopter <-> starting point => 0-20m = Inside
  - ◆ Here, the "fixed flight direction" can be determined by the orientation via your copter itself
- Distance Kopter <-> starting point => mehr als 20m = Outside
  - ◆ Here, the "fixed flight direction" will be determined by the position of your copter and the starting point

23.8V	Alt: 50m
10:00	Dir: 270°
20mAh	I: 10A
10	16m
25km/h	90°
MikroKopter	

Via the **MK-Telemetrie** (next to the house icon) the distance from the copter to the starting point can be viewed =>

---

## CareFree "Inside"

the MikroKopter is within a 20m radius around the starting point around, it is easy to see the front (red rigger) of the copter.

Within this radius, the "fixed flight direction" can be determined by the orientation of the copter itself.



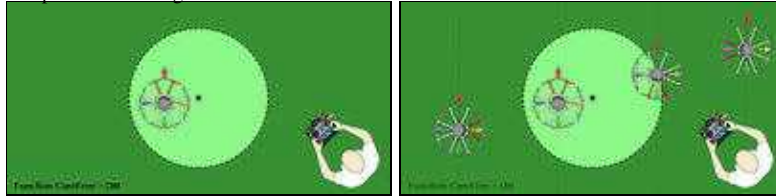
**The function:**

By default, the **CareFree** function is disabled.

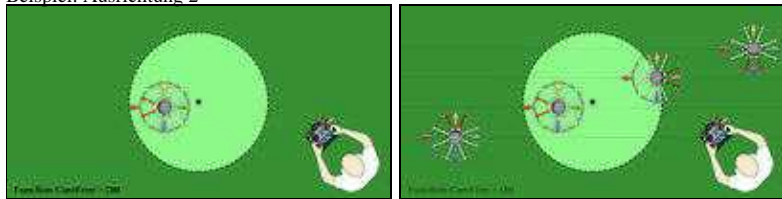
The front of the copter (red rigger) is therefore the flight direction forward.

To determine the "fixed flight direction" yourself, fly the copter inside the 20m range around the starting point.

Beispiel: Ausrichtung 1



Beispiel: Ausrichtung 2



If the copter is within the 20m radius around the starting point, the "fixed flight direction" is determined as follows =>

1. Turn the copter with the front (red rigger) in the desired direction.
2. Activate the **CareFree** function
3. The direction in which the front (red rigger) now shows, is now automatically set as the direction of flight "forward"

As long as the **CareFree** function is active, the copter retains this "fixed flight direction" for forward/back/left/right - no matter how you turn the copter during the flight and how far away the copter is.

**IMPORTANT**

The pilot should turn now in the now set forward / backward direction and stay in this position!!!

If the pilot turns with the remote control, it can lead to confusion in the control !

The (flight)directions are fixed to the copter, not to the remote control !

## CareFree "Outside"

Befindet sich der MikroKopter außerhalb des 20m Radius um den Startpunkt herum, kann es schwierig sein die Ausrichtung des Kopter zu bestimmen.

Hier kann die Funktion **CareFree** auch als Notfunktion genutzt werden.

Aktiviert man nun die Funktion **CareFree**, wird die aktuelle Position des Kopters und die Position des Startpunktes genutzt.

Die Richtung zwischen diesen beiden Positionen wird automatisch als vor/zurück Flugrichtung festgelegt.



### The function:

By default, the **CareFree** function is disabled.

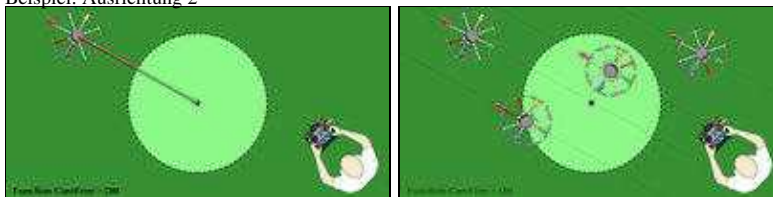
The front of the copter (red rigger) is therefore the flight direction forward.

The Kopter is located outside of the 20m radius around the starting point..

Beispiel: Ausrichtung 1



Beispiel: Ausrichtung 2



If the copter is outside the 20m radius around the starting point, the "fixed flight direction" is automatically set as follows =>

1. The front of the copter (red rigger) points in any direction (usually not visible)
2. Activate the **CareFree** function
3. On the line between copter position and start position, the alignment is now automatically set backwards / forwards



As long as the **CareFree** function is active, the copter retains this "fixed flight direction" for forward/back/left/right - no matter how you turn the copter during the flight and how far away the copter is.

### IMPORTANT

The pilot should turn now in the now set forward / backward direction and stay in this position!!!

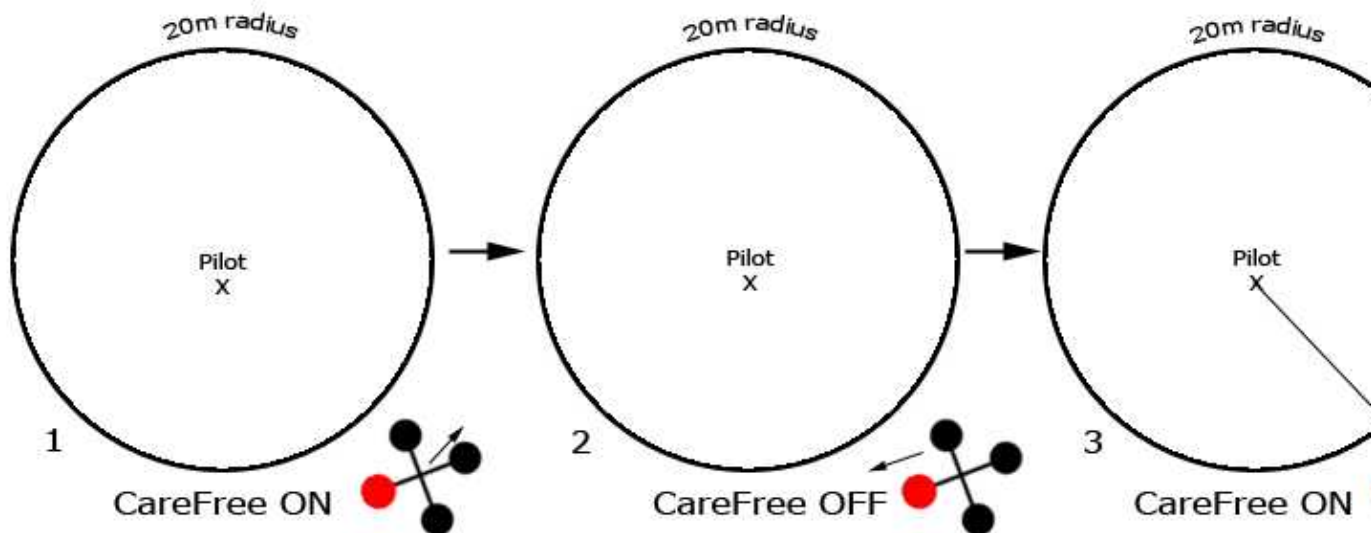
If the pilot turns with the remote control, it can lead to confusion in the control !

The (flight)directions are fixed to the copter, not to the remote control !

### Example

The pilot wants to teach-in a new [CareFree](#) direction, even if he doesn't know the actual direction of the MK

case IV = CareFree re-activated outside the 20m radius



1. [CareFree](#) was already on, but the control direction is inconvenient
2. If the pilot switches [CareFree](#) off, the actual direction will become the control direction
3. [CareFree](#) is switched on -> the actual bearing between MK and pilot will become the control-direction  
- no matter of the actual MK-Direction
4. Pulling the stick then means "back"

More examples here: [CareFree](#)

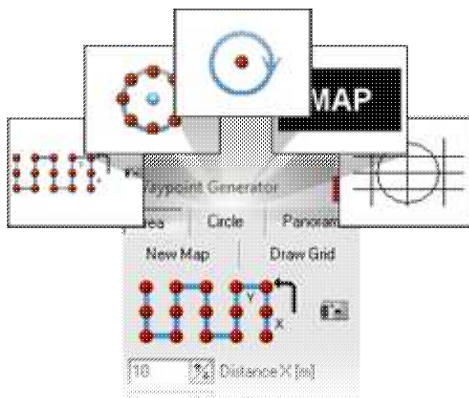
## Waypoint-Generator

**Include: Textmarkierung "##include\_begin" nicht gefunden!**

**Include: Textmarkierung "##include\_end" nicht gefunden!**

WaypointGenerator

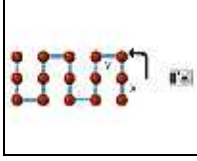
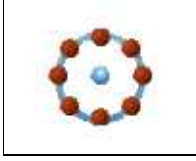


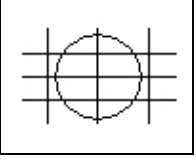
-  [deutsch](#)



## The WayPoint-Generator

With the waypoint generator you can create quick and easy waypoints and POI. And you can also place a grid for dimension determination or generate blank cards for testings.

How the WayPoints, POI, maps or grids can be set and been used you can read here for the individual functions.

To open the individual explanations please "click" on the images below::				
Gebiet	Kreis	Panorama	Neue Karte	Raster
				

## Error-messages in the Jeti-Box

When using the Jeti-display error messages will be issued as morse "O" (3\* beep) and displayed as text

Note: This text is only available at version FC 2.1 or higher, because of the space in the processor

Also look at: [ErrorCodes](#)

## Implementation for HoTT-transmitter (FC 2.1 only)

There is a new transmitter-generation from Graupner: "HoTT"



Together with the developers of Graupner we have created an interface for the [MikroKopter](#), to display the telemetry of the [MikroKopter](#).

**Include: Textmarkierung "##include\_hott\_menu\_begin" nicht gefunden!**

**Include: Textmarkierung "##include\_hott\_menu\_end" nicht gefunden!**


This page as an **PDF-Document**? Click on that Symbol and wait a little moment... --->

Graupner HoTT Transmitter

To open -> Click image or text



**MX-20/MC-20/MC-32  
Update**

 If you select HoTT as receiver the zero-position of the sticks will be moved by 5 positions. Otherwise you have to trim all stick positions manually.


More information here: [HoTT](#)

## ComingHome as FailSafe

In case of RC transmission-lost, the MK can now automatically fly to the Home-Position (and altitude)

Basically the idea is, to bring the [MikroKopter](#) back into the reception range.

- In this case GPS, compass and altitude control will be automatically enabled. When the signal is back, it goes back to 'Manual Control'
- After the set time, the MK uses "Emergency Gas" and the "Emergency Time" to perform a descending
- The time is limited to 30 seconds, this is enough to go through short rc signal lost times and put the [MikroKopter](#) nearer to the starting point
- The MK will do this for the preset time (no matter if it reached home or not).
- Waypoints are cancelled until the reception is back
- The MK is flying a direct route towards the home position
- If a "Coming Home Altitude" is set, this will be used immediately with a sink/rise-speed of 3.0m/sek
- When signal is back, the MK will **not** go back to the old Position or altitude automatically


 Note: By default, the CH-Time is 0sec, that means it is disabled by default. It can be set under "MISC" (expert setting).

### Example:


- MK is in 120 distance and 50m altitude.
- [FailSafe](#)-Time is 30sek and Emergency-gas-time is 15sek.
- CH-Altitude would be 20m

So in the example the MK would:

- fly back and descend simultaneously
- altitude would be reached in second 10 after Transmitter fails
- position would be reached in second 20
- there it would wait for a while, because the FS-Time is 30 seconds
- Emergency gas would be used in second 30 and the MK comes down
- the motors would be stopped in second 45


 **ATTENTION:** Before using this function the user have to clarify whether such a mode acceptable to the particular place or not of a legal, actuarial or other provisions is permitted.

## FailSafe Video

 Attention: Please do not imitate! If you turn off the transmitter, the MK is not necessarily under control. Turning on the transmitter may take a few seconds.

## Maximum Altitude


In the settings you can set a maximum height. If you set these to 0, it is disabled.

 only if Vario-altitude-control is enabled and the gas-stick in neutral position

## Check of the magnet-vector

In GPS-flight the exact compass angle is very important. By interferences (electricity oder magnets) there can quite a difference of 30°

Now the [NaviCtrl](#) is checking the magnet-vector in flight - It only may have a difference of 20% from the vector at the calibration (which corresponds to a measurement error of about 30° , depending on location)


 In this firmware the compass has to be calibrated according to the [neuen Methode](#) !

 in case the calibration fails: [read](#)

## Inclination

The [NaviCtrl](#) now measures the magnetic inclination. It's the angle in which the magnetic fieldlines go into the ground. In Germany it is about 62-69°.

Here you can compare the values: <http://www.magnetic-declination.com>

 The value may differ to start no more than 10° from the theoretical. Otherwise you can start the engines, but do not takeoff.


## New Error-messages


### Error-message 21: "GPS Fix lost"

Message, that during the flight the GPS signal got interrupted or the amount of satellites dropped under 4

### Error-message 22: "Magnet error"

- the difference of the value of the magnetic field is more than 20% from that of the calibration.
- or the measured inclination differed more than 10° from the theoretical value.
- This error-message prevent the Kopter from starting. The engines begin to start but you can't give throttle.
- If that bothers you, you can disable it in the "misc" settings.

 If you get these error-messages but no interferences (wires or iron nearby), then you have to re-calibrate the compass. [new methode](#)

 Read more: [MagnetError](#)

## Error-message 23: "Motor restart"

- a BL-Ctrl tries to restart the engine
- maybe an engine is blocked or a cable is broken during flight

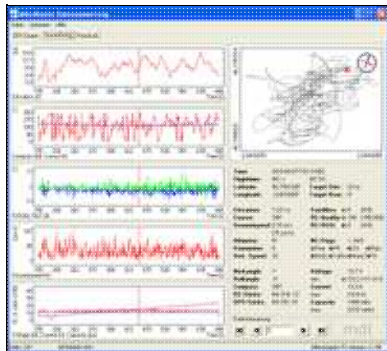
## Error-message 24: "BL Limitation"

- a BL-Ctrl goes into the power limitation
- either overcurrent or too high temperature

## GPS-Logging

The information in the GPS logging were extended by:

- all the individual streams of the BL controller
- all temperatures of each BL-controller (only BL-Ctrl2.0)
- Performance of brushless controllers (e.g. if the temperature goes over the limitation)
- FC I2C error count
- the current strength of the magnetic field and the current measured inclination -> If a source of interference are available
- free analog inputs Ch4-7 -> if someone wants to connect external sensors there



Tool for loading the Files: [MK\\_GPX](#)

## The new names of the settings

- Setting 1: "Fast"
- Setting 2: "Normal"
- Setting 3: "Easy"

The "sport"-setting was removed

## Other changes

- LED-switch-threshold reduced from 10 to 5
- If the GPS is deactivated - display no failure. If GPS is not plugged - display no failure as well
- The display of the nose-direction in the [KopterTool](#) was faulty, when you have changed the "front"-alignment of the MK (X-formation)
- Mixer-settings won't be deleted, if the parameter-revision is changing



- GPS-Angle limit from 100 to 140 + GPS-I-Limit from 75 to 85 -> With this the MK can hold the GPS-Position at a wind speed of about 50km/h. Previously it was about 40km/h
- Throttle had a ground-position of 120 instead of 127 just as the other channels. Now it was unified because it was confusing.
- Pressure-sensor Vario-Mode: Soft takeover of the height-target-value
- Motor smooth adjustable (Settings -> Gyro) - default is **OFF**

◆ there is a [thread](#) in our board about it.

## Bugfixes

- Version NC 0.26g creates KML-Files that are compatible with the latest Version on Google Earth
  - Version NC 0.26g supports the MK-GPS with the new LEA-6S-0-001 chipset
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- KategorieFirmware/FC