





## **en/Firmware-0.84**

32

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MikroKopter.de

# Firmware 0.84

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**Release Date:** 30th march 2011

**License:** [LICENSE.TXT](#)

- **Forum-Link:** <http://forum.mikrokopter.de/topic-23631.html>


**Download:**

- [FlightControl V0.84a \(FC1.0 .. FC2.0\) \(MEGA644\)](#)

- [FlightControl V0.84a \(since FC2.1\) \(MEGA1284\)](#)
- [Navi-Ctrl V0.24f](#)
- [MikroKopter-Tool V1.74b](#) (26th april 2011)

## Version for ACT-2,4GHz S3D-Receivers

- [FlightControl until FC2.0 V0.84a - only for ACT-S3D 2.4GHz Receivers](#)
- [FlightControl since FC2.1 V0.84a - nur für ACT-S3D 2.4GHz Receivers](#)

 only for this receiver-version

## How do I update?

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

## Compatibility

- There is a change in the SPI protocol between NC and FC. The result is that the boards will report "communication error" instead of "incompatible" in case of incompatible firmware versions
- The FC-Settings of the FC-Version 0.82 are compatible and will not be overwritten
- As usual: do not install old settings (<0.82) saved via [MikroKopter](#)-Tool.
- MK3Mag remains on the old version. Do not update it!

## Point of Interest

The idea of "Point of interest (POI)" is to point the camera of the [MikroKopter](#) to a specific object or position.

The yaw-direction and the camera angle will point move in that case.

The [NaviControl](#) needs the following informations for this feature:

- GPS-Position of the POI
- altitude of the POI

Depending on the own position and altitude, the [MikroKopter](#) can calculate the angles.

## POI-Videos

### Video with explanation

(English)

### Video with Wakeboarder

We attached a [FollowMe](#)-Transmitter to a helmet an made an autonomous camera tracking shot

**The used helmet:**



There is in the front a waterproofed [GoPrp](#) camera. And in the back the [FollowMe](#)-Transmitter with 9V batterie supply and a WI232 transmitter.

LotharF started the [MikroKopter](#) and activates the POI ([PointOfInterest](#)) and the [CareFree](#) function.

#### **Further informations about that Video:**

- Camera on the [MikroKopter](#): Canon EOS 550D (also called Canon T2i) (Objektiv: 18-55IS set to 18mm; Stabilizer:Off) (Video settings: 1280\*720/50fps)
- 5,8GHz video transmitter sends the live-video to check the recorded picture. Monitor on the tripod
- Video editing: [VReveal](#) for Deshaking and changing the colors (making a warmer style)
- Video cut: [Magix](#) Video deluxe 17 premium HD;
- Music: found on [CCMixer.org](#)

## **GPS-Position of the POI**

In the following example, we want to take pictures of the Evenburg (Leer)

With the [KopterTool](#) (since V1.74) we can put the POI onto the building.

Now we define three waypoints for three different view angles. The [MikroKopter](#) shall automatically point into that direction.

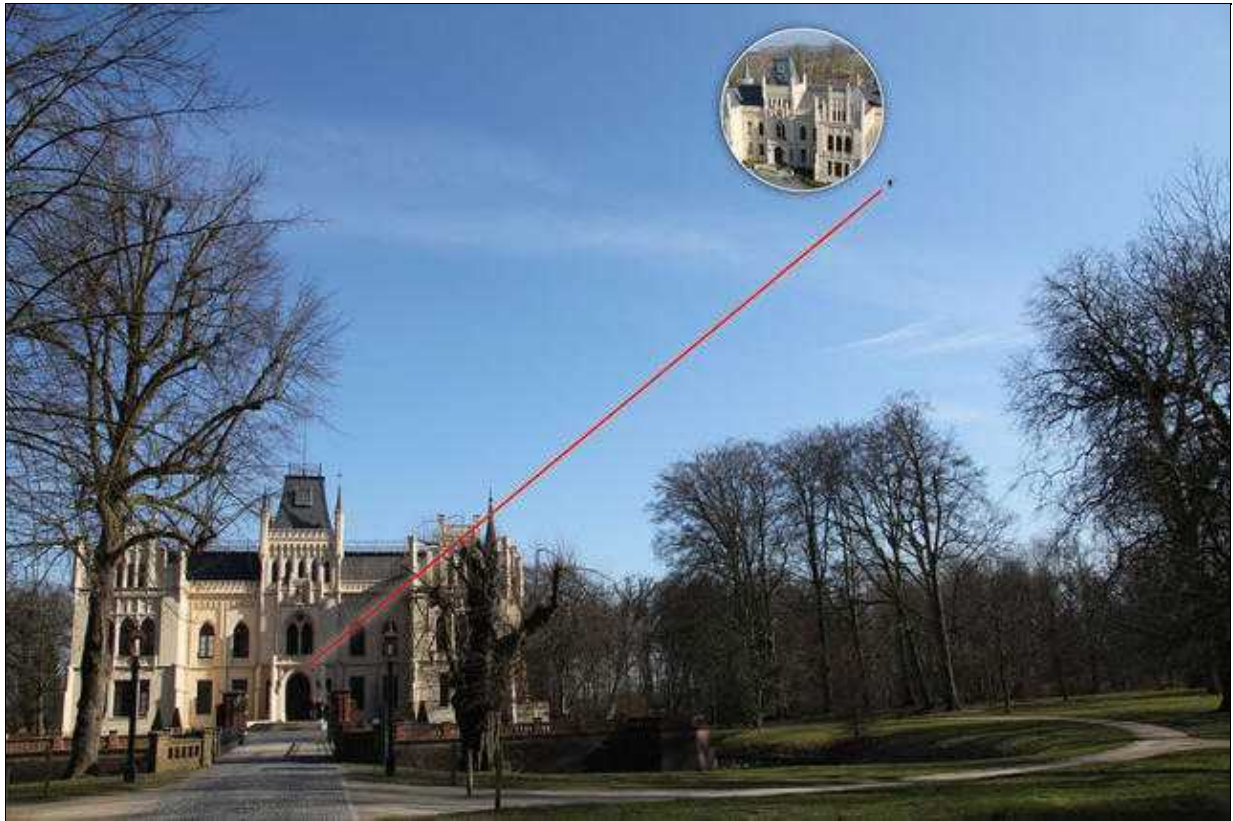
The screenshot displays the MikroKopter software interface. At the top, it shows the title bar 'MikroKopter - Tool V1.73f (c) www.mikrokopter.de' and a status bar with 'Imagesize (1004x600) Position 53.230018 : 7.494706'. Below this, there are several data panels: '#Sat 8', 'Altitude: 10m', 'Speed [m/s]: 0.0', 'Data Link: OK', 'Mode: FREE', and 'Time: 0:00'. There are also two circular gauges for heading and a battery status gauge showing '54mAh' and '15.3V 8W'. The main area is an aerial view of a mission plan with a drone icon and several waypoints connected by lines. A 'Simulation' window is open in the bottom right, showing a 3D model of the drone. At the bottom, a 'Waypoint-List' table is visible, with columns for 'Nr.', 'Latitude', 'Longitude', 'Time', 'Radius', 'WP-Event', 'Climb rate', 'Altitude', 'Heading', and 'DelayTime'. The 'Heading' column is circled in red. Below the table, there are checkboxes for 'Use POI' and 'Camera stick control', both of which are checked and circled in red.

Nr.	Latitude	Longitude	Time	Radius	WP-Event	Climb rate	Altitude	Heading	DelayTime [s]
POI	53.230745	7.4942443	--	--	--	--	5		
1	53.2319731	7.4954744	5	10	100	20	60	POI	
2	53.2323192	7.4942721	5	10	100	20	85	POI	
3	53.2319867	7.493079	5	10	100	20	75	POI	

## Result



## POI in Action



## Altitude of the POI

The [MikroKopter](#) can control the camera nick-angle if needed. It can be selected in the Koptertool "Use POI -> Camera Nick control"



- The camera can still be manually adjusted via the RC-Transmitter.
- The ration between camera angle (Servo angle) and angle to the POI is set by the Parameter "[Nick compensation](#)" in the Camera-Settins of the [FlightControl](#)

## activating via RC-Transmitter

The YAW-rotation for pointing to the POI is connected to the [CareFree](#) (CF) feature.

Means: the [MikroKopter](#) will only move yaw, if CF is enabled and activated. This is a safety feature. So the pilot still has control if he doesn't know the direction of the MK

Also the nick-angle is connected to CF. So if CF is deactivated, the angle is neutral (or Poti-setpoint)

## POI-setting via Follow-Me-Transmitter



If you don't want to use a Notebook on the field to use POI, a [FollowMe](#) transmitter can also be used easily. It transmits its own GPS-Position as POI and also as Waypoint.

That also works fine for moving POIs (see Video)

- If you use "Position Hold mode (PH)" via RC-transmitter, the MK remains on its position and locks into POI-direction (if CF is activated)
- If you use "Coming Home (CH)", the [MikroKopter](#) also follows.

see also: [FollowMe](#)

## New method to calibrate the compass

Thanks to a clicking sound, it is now much easier to calibrate the compass properly. This method has the advantage that when calibrating the MK does not have to be aligned exactly horizontal.

### Video for calibrating

1. Start as Compass Calibration usual - (like you would select setting 7)
2. Move the Nick stick to bottom to go into Step 2 of the calibration (the clicking sound starts)
3. Turn the [MikroKopter](#) a few times in direction of the nick axis (with axis orientation to North / South) until the Summer stops beeping
4. Turn the [MikroKopter](#) a few times in direction of the roll axis (with axis orientation to North / South) until the Summer stops beeping
5. (you could also mix step 3 and 4, so you could also start with the roll-axis)
6. Pull the Nick stick down to move from Step 2 to Step 3
7. Once again, pull the Nick-pull stick down to start the Z-axis calibration (go into Step 4)
8. Turn the [MikroKopter](#) a few times in direction of the roll or nick axis (with axis orientation to North / South) until the Summer stops beeping
9. Pull the Nick stick down -> end of the calibration and store the calibration data

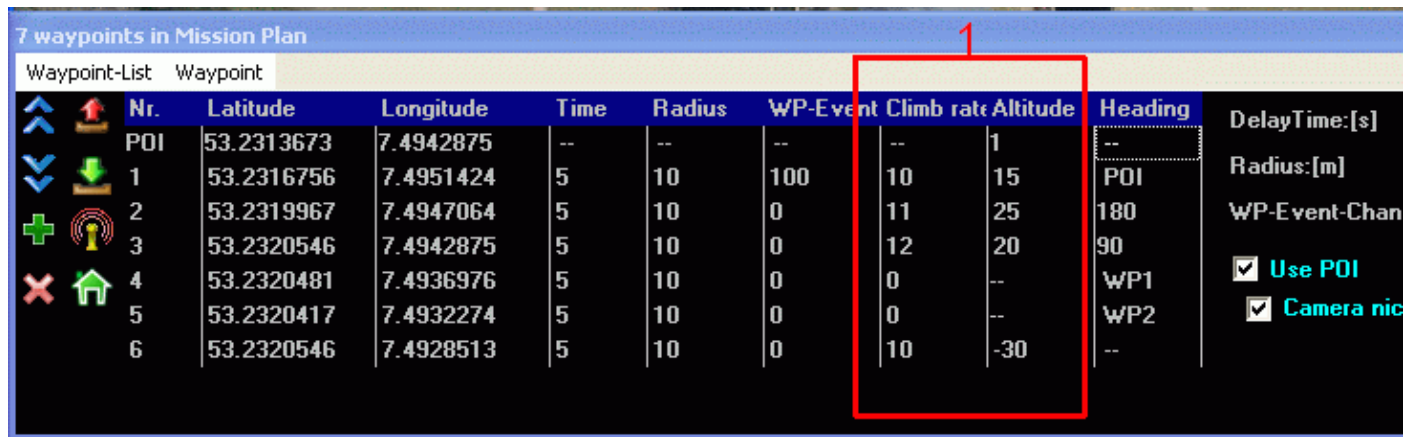
The process also works in older firmware versions, but then without the clicking sound.

## Yaw / Compass - Control

- Revision of the compass-routines in the FC and NC
- If the MK is rotated by external influences to the yaw axis, it now steers back more firmly.
- Yawing to a specific angle is now possible from the Navi-Ctrl via serial commands (only if [CareFree](#) is active)
- The threshold value for the yaw stick (logging out from the compass-mode) is now smaller. Now smaller stick movements are possible for yaw. Now more sensitive turning is possible.

## waypoints with altitude





- For each waypoint now an altitude (height) and a climb rate can be defined
- The altitude is in meters and the climb rate in 0.1m/sec (10 -> 1m/sec)
- The rising or sinking starts when switching to that waypoint
- If a climbing rate is defined, the target radius is a 3D sphere (ball) in the sky. So the coordinate AND the altitude must be inside the desired radius
- If the climb rate is zero, the altitude will be ignored for the target position. In that case the MK flies in the actual altitude
- In field 2 (see picture) you can set the default setting when you place the waypoint.
- You can first place all the waypoints on the map and then modify the clime rate of altitude
- Multiple waypoints with different altitudes can be placed onto the same spot. E.g. for a virtual "elivator"
- The altitude control works only in vario-mode of the hight control. The gas-stick must be in the hovering position in that case.

use for this function "Vario altitude control". You can change it in the [MikroKopter-Tool](#) -> Altitude.

## Display on the JetiBox

In the [JetiBox](#) there is a sign behind the altitude value.

### Characters:

Jeti display	meaning
=	Constant height
+	rising manually
-	sinking manually (descending)
^	Climbing by Waypoint
V	Sinking by Waypoint

## Autolanding

In the video (above) an autonomous landing is shown.

Therefore the following tips:

- Two waypoints are placed on the same position. The first e.g. at a height of 8m. This ensures that the MK is flying perpendicular to the last waypoint (sinking)
- The landing waypoint is set very low (below the earth's surface) as example -30m. This ensures that

- the MK will be stand safe in the end and will not lift off again in case of air-pressure fluctuation.
- The you probably have to try different rates of sinking. A value of 10 (1m/sec) works usually quite well.
- When touching the ground, the MK jumps usually something a bit. This is due to the dynamic pressure of the propeller that influences the pressure sensor. High landing legs help to reduce the effect.
- It is best to land on the grass and keep well clear of obstacles and people.

## viewing direction for waypoints

File Data Link WayPoints GPS coordinates

#Sat 8 Altitude: 5m Thrust

Data Link: OK Mode: CH CF Speed [m/s]: 0.0

Time: 00:00

0 / 0 00:00 5m 5m

7 waypoints in Mission Plan

Waypoint-List	Waypoint	Nr.	Latitude	Longitude	Time	Radius	WP-Event	Climb rate	Altitude	Heading	DelayTime:[s]	Radius:[m]	WP-Event-Chan
	POI		53.2313673	7.4942875	--	--	--	--	1	--			
	1		53.2316756	7.4951424	5	10	100	10	15	POI			
	2		53.2319967	7.4947064	5	10	0	11	25	180			
	3		53.2320546	7.4942875	5	10	0	12	20	90			
	4		53.2320481	7.4936976	5	10	0	0	--	WP1			<input checked="" type="checkbox"/> Use POI
	5		53.2320417	7.4932274	5	10	0	0	--	WP2			<input checked="" type="checkbox"/> Camera nick
	6		53.2320546	7.4928513	5	10	0	10	-30	--			

For each waypoint a viewing direction can be selected.

display	value	sight direction
"_"	0	free direction
1-360	1-360	fixed direction (360 = North) (180 = South)
"POI"	-1	points towards the POI
WP1 WP9 ..	-2 ...- x	points towards a Waypoint

## Notes regarding view direction (POI)

### What is the direction of view?

The camera direction is the view direction. When a camera is mounted in rotated direction (i.e. 45°) ([FlightControl](#)-settings: Camera-direction), this would be the sight direction

### How to enable or disable it?

- The NC has access to the compass direction only when [CareFree](#) is on.
- If a POI (or WP1 WP9 ..) is selected, then the MK constantly corrects the yaw direction regarding the GPS-positions.
- If controlled manually (using yaw stick), the MK goes back to automatic yaw-mode after 1 second (only when POI or WP1..WP9 is used)
- If a fixed view direction is set (numbers 1-360), then the MK uses this value only once when switching to this new waypoint. If the pilot manually rotates, the MK does **not** go back to the fixed direction

### When is the view direction active?


- The new direction of view is used when switching to that waypoint

### What happens if the MK is directly over the POI?

- Directly above the POI, it may happen that the MK turns always around. This happens every time it is >2 meters away from the POI. In the area of <2m to the POI, the POI yaw control is off.

### WP1...WP9

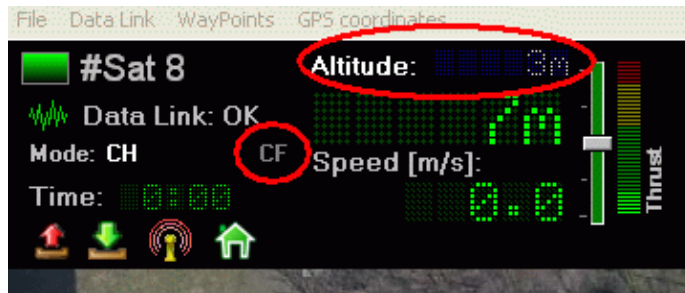
You can also use a waypoint as POI. I.e. MK can also look in the direction of any waypoint.

 If the MK is looking towards its own waypoint, then it would happen that it starts rotating around itself when reaching that point (see previous note)

### Height of the POI

- When using the POI, a altitude of the POI can also be selected (example: clock on a church tower)
- This feature is only possible for the POIs. For a fixed sight or WP1...WP9 you can not use the camera nick function.

## Indicator of active carefree and height control



- The character "CF" is now yellow when free care is active.
- The word "Altitude" is now lighted when active

= Right click on analog values =



- You can now click the right mouse button on the name of the analog data to use the value in the Scope display. The active values are also now highlighted in yellow.

## Offset in the Poti-channels

There was a difference in the display of Poti values in the virtual LCD and [MikroKopter](#)-Tool display. To correct this the poti-offset was increased from 110 to 127.

In practice this means that the same poti-position results in a different value compared to older firmwares. The difference in the value is 17 (the new value is smaller by 17).

In general, this should not really be noticed.

## Other changes

- No changes in the altitude-stabilisation or flight-feeling (beside the changes in yaw)
- Beeping when you switch the carefree switch -> long beep = on, short = off (also comes once after calibration)
- You can start the motors only if NC reports "No Error". If some error code is reported, it only Beeps. You probably have to wait a few seconds before you can start the motors after sensor calibration.

- Variable "[JetiBeep](#)" added for acces to the Jeti-buzzer in own changes to the FC-sources
- Default Values for Servo-Min/Max adjusted in the settings (for MKDS18-Servo)
- Default receiver is now Jeti or PPM after a setting reset
- When running motors, new settings (via [MikroKopter-Tool](#)) not accepted
- [MikroKopter-Tool](#): When you click in the waypoint-table onto a point, this flashes on the map and gets into the foreground (handy if several points are aligned on the same spot)
- If the MK shall fly to waypoints, the GPS-mode switch has to be moved once after starting. If the switch was already on CH, you must switch it to PH and back to CH to activate the waypoint list. This prevents the MK to fly towards a waypoint immediately after the take off and so prevents hitting obstacles in the way in low altitudes.

## Bugfix

### MikroKopter-Tool V1.74b

- waypoint reading from Mikrokofter fixed (Heading was wrong)

### Navi-Ctrl

- Blinking frequency for Waypoint event was wrong (fixed in 0.24c)
  - 0.24F Support for LSM303 magnet Sensor
-