Manual µRONDO

µRondo by

PRO RC - fine in RC

Preface

Congratulations to your new µRONDO Flybarless System and thank you for choosing µRONDO.

µRONDO is a Flybarless System that is equally suited for beginners and advanced pilots due to its simple handling and high performance.

No matter what level of prior knowledge you have or for which model helicopter you would like to use µRONDO, this manual will guide you through a quick and easy assembly and set-up.

In order to enjoy this kind of flying experience in its full quality it is essential that you are very careful and accurate with the assembly and set-up of your system. We therefore recommend you study this manual minutely even if you already have some experience with flybarless systems.

System components / extend of delivery

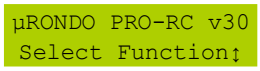
The µRONDO system consists of the µRONDO central unit and a terminal unit. The central unit contains the controlling electronic with the three gyroscopes. In order to optimally fit the controlling unit to a helicopter system several values need to be adjustable. This is where the terminal comes into action. With the terminal you can display, adjust and save all of these adjustable values. Included in the delivery is the central unit, a sticker pad, the terminal unit, a standard receiver adaptor, a patch cable and a Y adaptor cable.

List of abbreviations

µRONDO = PRO-RC µRONDO central unit
Terminal = PRO-RC terminal with four buttons and 2*16 characters LCD (display)
Gyro = gyroscope
➔, ➔, ➔, ➔-button = button right, left, up, down
Rigid-head = rotor head without flybar or flybar stabilisation
SP = swash plate

Operation

Once the terminal is connected to µRONDO you can use the four buttons to navigate the menu and adjust the values. After connecting and switching it on you will be in the welcome menu.

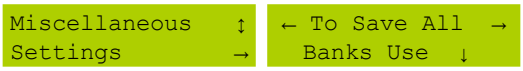


Press the ↑↓-buttons to scroll through menu items. To select the current menu item press the →-button. You can find an overview of the menu structure in the appendix.

Many of the main menu items have more than one parameter that can be adjusted. If there is more than one parameter to adjust, press the →-button repeatedly to select the one you would like to adjust. Press the ←-button once or the →-button repeatedly to navigate back to the main menu. As soon as the value you selected is displayed it's value can be changed using the ↑ ↓-buttons.

Changed values will immediately become valid, however they are not saved permanently and will reset to their previous values when the supply voltage is disconnected. Without any hassle it is therefore possible to try different values or even determine them during a flight and discard them afterwards by disconnecting the supply voltage or save them using the terminal.

If you want to save your adjusted values there are two possibilities to do so:
1. Select the main menu item “Miscellaneous Settings”. Then, in the adequate sub menu, save all values in the usual practise by pressing the ↓-button.



2. The more convenient way however is to press and hold the ←-button then press the →-button, too in the main menu. This is called „Quick safe“ and is confirmed with „ALL PARAMETERS SAVED“ on the display. It can be used in any main menu except for the “Channel Monitoring” menu.

For flight operation the terminal must always be disconnected as the communication between µRONDO and the terminal can cause reaction delays!

TIP: if your µRONDO system is mounted inaccessibly use a servo extension cord to connect the terminal.

New in Version 3.2

- **Tail Gyro Mode**: In the menu „Miscellaneous Settings“ there is a submenu „Tail Gyro Mode“. If this option is set to “On”, et µRondo operates as a pur Tailgyro. Some parameters are preset for this mode an unused menu items are not shown. The standard setup „Swashplate Configuration“ - „Mechanic“ allows CCPM mixing by the transmitter. Any other setting like 120° enables CCPM mixing in µRondo and hence µRondo is expecting unmixed signals from the transmitter.
- **Improvements in control**: The stopping in elevation direction and the uniformity of the tail rotation have been improved.
- **Menu area**: French is now selectable as menu langauage.

Mechanical preparation of your helicopter and requirements

In order to use µRONDO you need to remove your helicopter's fly bar and make some adjustments if required. In case there is a rigid-head conversion kit offered by the manufacturer of your helicopter we recommend you use it as often times the servo ranges are already adjusted in these.

Note that for a rigid-head considerably higher forces act upon the servos. It is therefore generally advisable to use good and if applicable bigger or stronger servos as well as a stable and strong power supply. **Please note: µRONDO needs digital servos for tail and swash plate!**

Power supply
The power supply for µRONDO and the receiver can be implemented as follows:

Power source **Receiver type**	Electronic flight controller with BEC	Electronic flight controller without BEC	Power servo with receiver battery
Sum signal receiver	Power supply via BEC	Y-cable at any servo outlet or the motor outlet of µRONDO	Y-cable at any servo outlet or the motor outlet of µRONDO
Spektrum satellites	Power supply via BEC	Power source at µRONDO „Input“	Power source at µRONDO „Input“
Futaba S-Bus	Power supply via BEC	Y-cable at any servo outlet or the motor outlet of µRONDO	Y-cable at any servo outlet or the motor outlet of µRONDO
Standard receiver	Power supply via BEC	Power source at receiver or Y-cable at any servo outlet	Power source at receiver or Y-cable at any servo outlet

µRONDO assembly and connection

For mounting the central unit choose a position that is easy to reach and low on vibrations. It should also not be placed next to any pieces that might be electro statically chargeable such as for example a tail drive belt and µRONDO should not be exposed to any exhaust fumes.

Use the enclosed double sided foam sticky tape for mounting µRONDO. Only use the enclosed tape and not just any other tape as it is adjusted to µRONDO in its thickness and stability. There is no need for mounting an additional steel plate for µRONDO as it already has the steel plate integrated in its base. Make sure that all adherence surfaces are oil free and dust free!

You can mount µRONDO to a standing or hanging position. Usually the plug connector is transverse to the flight direction. In case mounting is only possible with the plug connectors pointing in flight direction due to mechanical circumstances you can set this 90° rotation in the µRONDO menu system („Turn Rondo 90°“)

When positioning µRONDO it is essential that you are extremely careful and patient as the three integrated sensors will later only measure the difference in the very movement they are supposed to. Askew or rotated mounting will lead to clearly worsened flying and controlling characteristics. Therefore please take your time here! Later on if the helicopter drifts away heavily when doing pirouettes the reason is mostly askew positioning of the central unit.

If you use a receiver with the optional adaptor cable the channel assignment at µRONDO can be preformed as described in menu item „Receiver Assignments“**.**

The tail rotor servo always has to be connected to the µRONDO „Tail“ jack.

Connecting the receiver

µRONDO supports all kinds of receivers directly: So called single line receivers, receivers that provide all signals through one port (Futaba, Jeti,..) and Futaba S-Bus receivers. This kind of receiver is connected to the „Input“ jack via patch cable.
You can chose to connect one or two Spektrum satellite receivers to the 9-pin plug connector at the front side of µRONDO. Make sure that these plugs are connected at the far right or far left side! Some pins in the middle will remain empty. If you only use one satellite you can chose freely between the far right or far left pin.

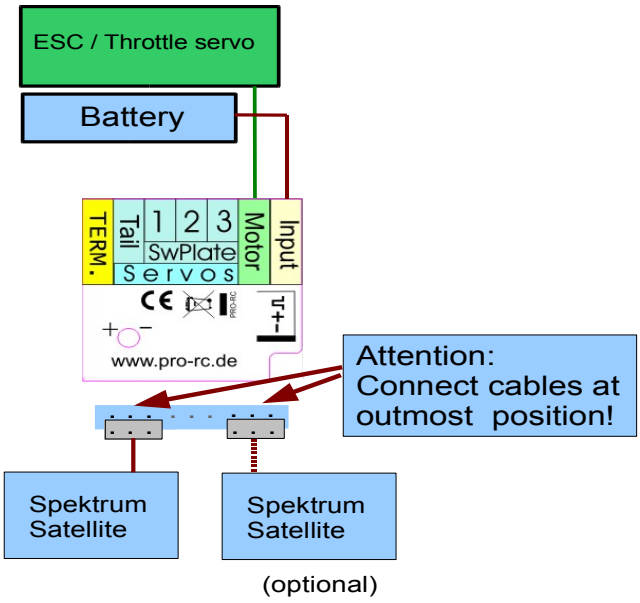
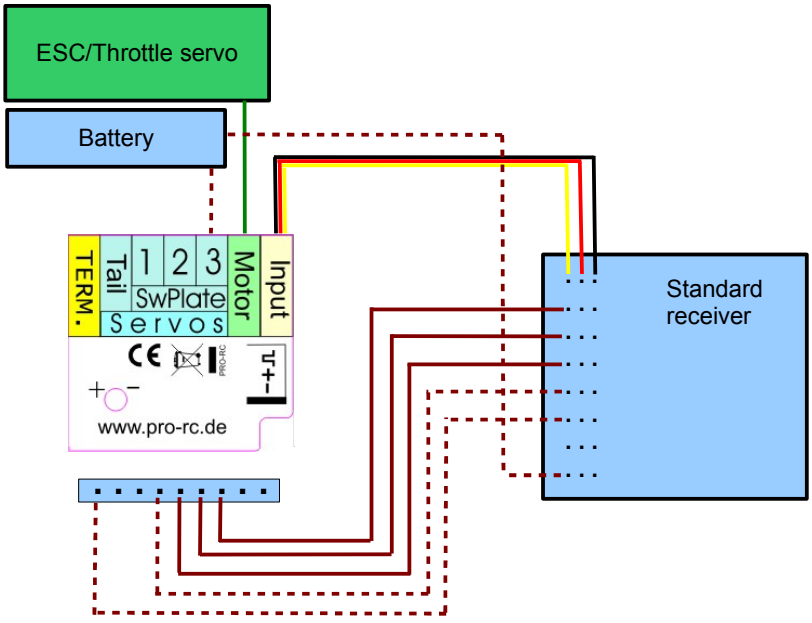


Diagram for Spektrum satellite receiver connection

Connection of the Spektrum satellite receivers

A third possibility is to connect a standard receiver through its servo outlets via the included adaptor cable. The sequence in which the adapter jacks are connected to the receiver channels is unimportant. The channel assignment is allways done in the µRONDO menu. Connecting the battery through a free channel at the receiver is only advisable for small models as the current for all servos then flows through the 3-core cable to µRONDO.

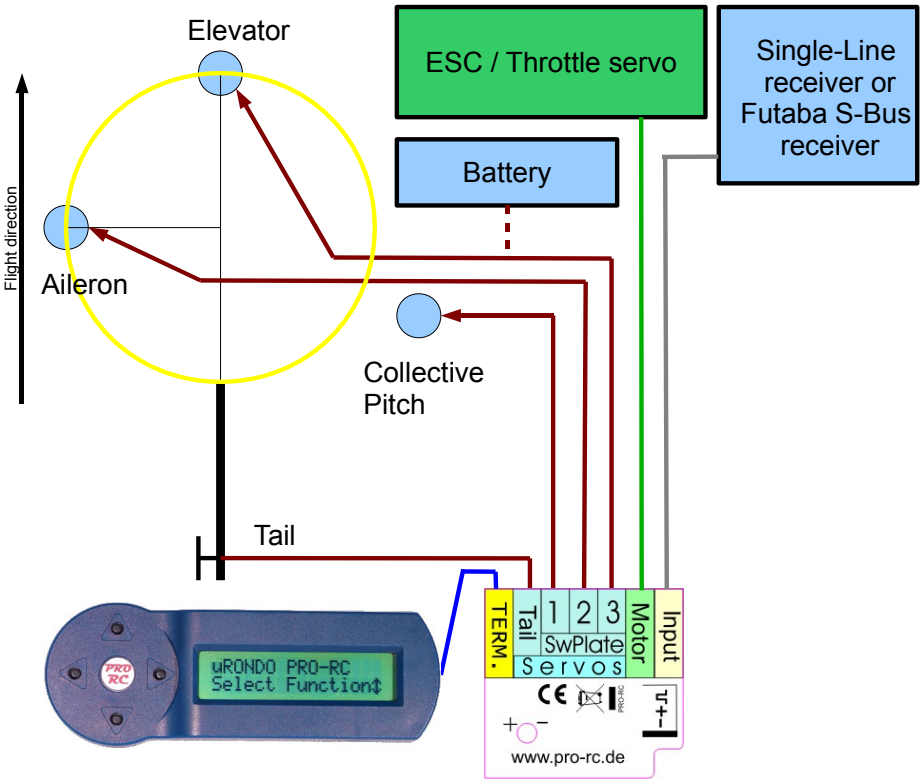


Connection diagram standard receiver

Connection of a standard receiver

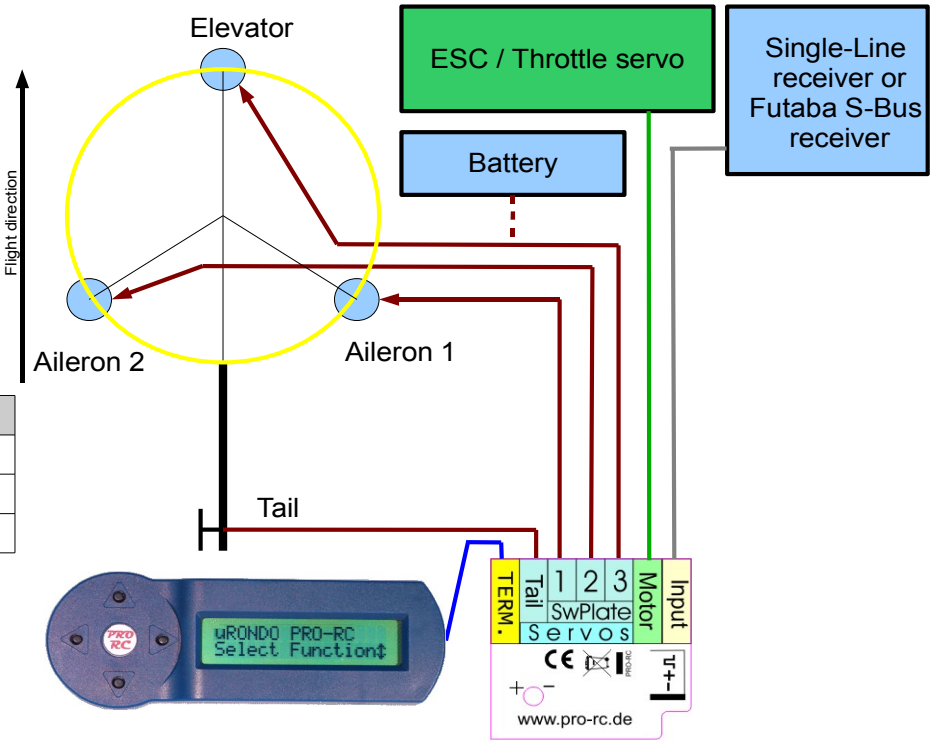
Connecting the servos

Connection diagram for mechanical swash plate mixing:



µRONDO	Servo
SWASHPL. 1	Pitch
SWASHPL. 2	Aileron
SWASHPL. 3	Elevator

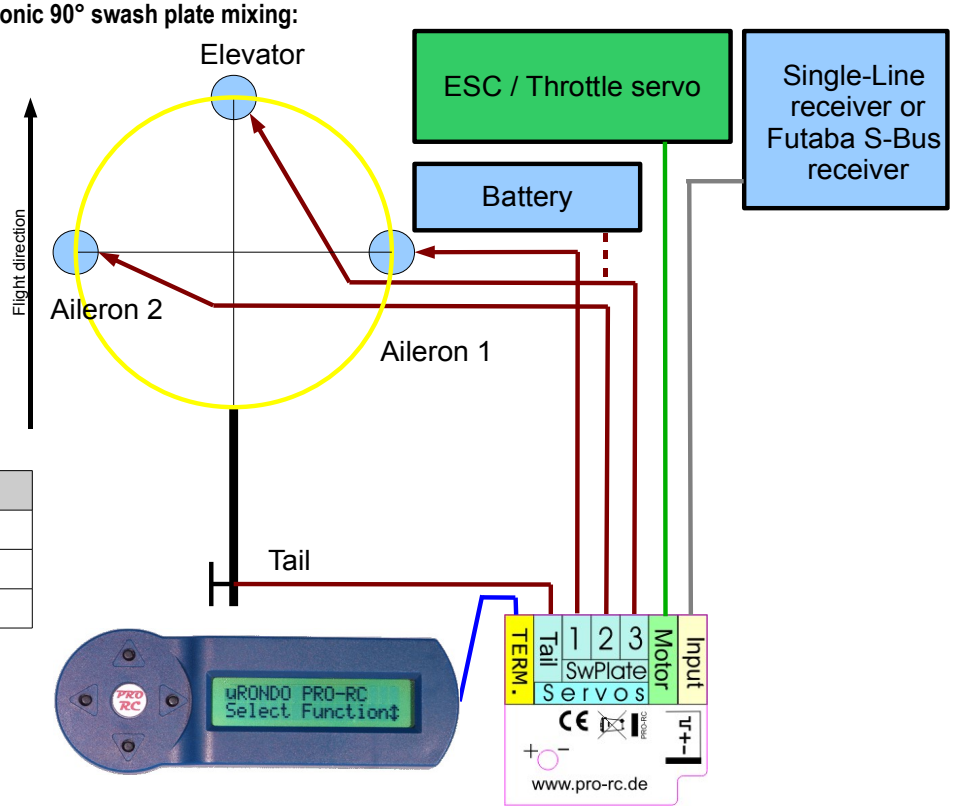
Connection diagram for electronic 120°/135°/ 140° swash plate mixing:



µRONDO	Servo
SWASHPL. 1	Aileron servo 1
SWASHPL. 2	Aileron servo 2
SWASHPL. 3	Elevator servo

There is no problem if your swash plate has both aileron servos in front and the elevator servo at the back. It is however important that the elevator servo is connected properly. In case the two aileron servos are swapped it is possible to compensate that with „Servo Reverse“ later on.

Connection diagram for electronic 90° swash plate mixing:



µRONDO	Servo
SWASHPL. 1	Aileron servo 1
SWASHPL. 2	Aileron servo 2
SWASHPL. 3	Elevator servo

Part 2 Set-up

µRONDO is distinguished by the fact that apart from the mechanical settings such as servo positions and ranges or the servos' and gyroscopes' movement directions only the the tail and swash plate servo sensitivity (gain channels) have to be set.
Therefore and even without the knowledge of control engineering specialities of a flybarless system a new model can be set up in only a few minutes. The following chapters will guide you through the set-up and optimisation of your system step by step.

Use of the gain channels
Just as in a tail gyro the sensitivity of the swash plate control system has to be adjusted to the model for swash plate stabilisation. In most tail gyro systems the sensitivity can be set through the value of the transmitter signal and the operation mode through its algebraic sign. Thus for example with values between 0 and +100% you can set the sensitivity for the operation mode „Heading Lock“ and with values between 0 and -100% the sensitivity for the operation mode „Gyro Mode“. This is equally true for µRONDO namely for the tail and swash plate. There are different options in the µRONDO menu system for this. Thereby both sensitivities can be set together via one channel or separately via two channels by the transmitter. Pilots that want to only have the tail adjustable trough the transmitter as customary can set the swash plate sensitivity directly at µRONDO with the help of a potentiometer. This version is also the delivery condition. As through a potentiometer values are only adjustable in one direction the operation mode can be selected in the menu (Mode1 or Mode2).

Programming the transmitter

In your transmitter choose the model type “helicopter with mechanical swash plate control”. This is very important because µRONDO needs all functions on different channels and all mixing is done in µRONDO if needed. Deactivate **all** mixers that might be pre-set in your transmitter such as for example the static DMA mixer for the tail and check the result on the servo display of your transmitter. Depending on the transmitter's manufacturer the 100% display for the transmitter does not correlate to the same servo travel. It is therefore advisable that you set your values as µRONDO „sees“ them. In order to do so, connect the terminal to µRONDO and switch on the transmitter and the receiver. It is not necessary to connect the servos yet. Use the 🡻-button to switch to “Channel Monitoring” and press the ➔-button to display all channels.

In this menu you can see what µRONDO determined the values to be. This way you can easily adjust the previously mentioned channels. The abbreviations used in the menu are: T = tail, I = gain channel 1, II = gain channel 2, CP = collective pitch, E = elevation, A = aileron.

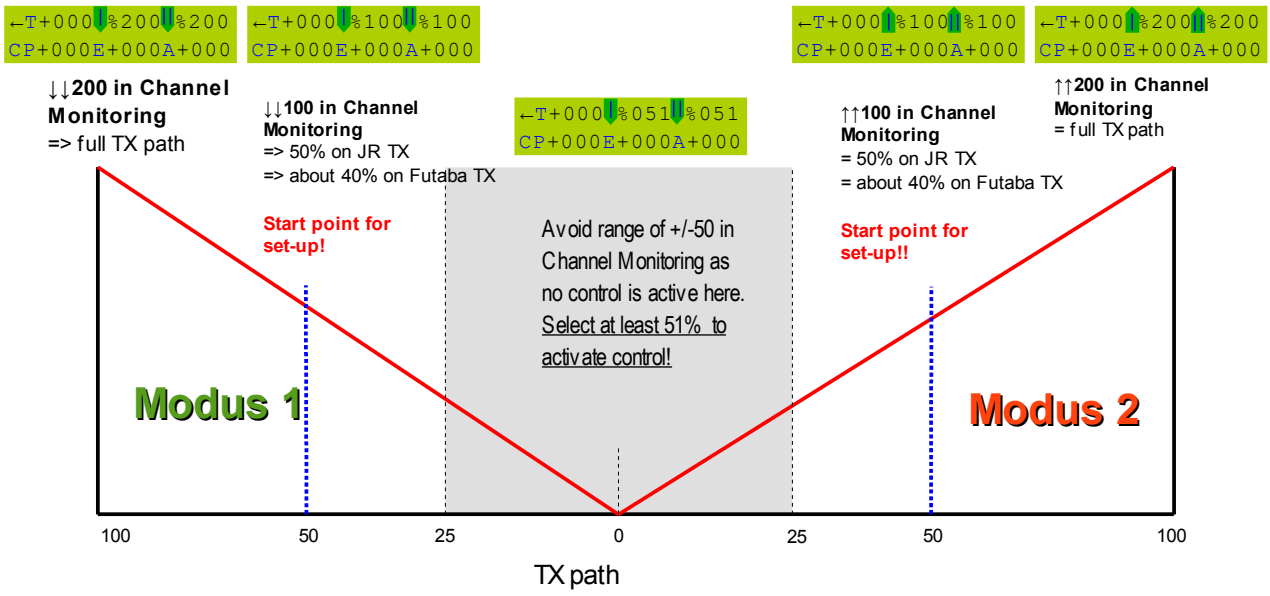
Initially limit the travel for your transmitter as follows:
Elevation and aileron: `E+/-100 A+/-100` Tail servo: `T+/-100` Collective pitch: `CP+/-100`

A µRONDO stabilised helicopter can reach enormous turn rates depending on its set-up. To make sure the first flight does not end in nasty surprises and with too high yaw rates, we strongly recommend to start of with the reduced servo travels. Later on it is easy to increase them via the transmitter.

Sensitivity set-up:
For the sensitivity control of µRONDO via the transmitter as well as for the choice of the control mode one or two further channels can be used, preferably controlled by simple 2-pin switches. Sliders would basically work too, but they are not recommended as their positions are hard to reproduce. The 2 positions of these switches or sliders will later determine the controller sensitivity. Once all values are set, they will only change very rarely. For now it is sufficient to allocate one or two switches/sliders to each channel depending on the number of free channels. In delivery condition Gain1 is used for the tail sensitivity and operation mode, the swash plate sensitivity setting is done via the potentiometer. The swash plate operation mode is pre-set to Mode1. The 100% displayed mean that the factory settings are 100% applied. Higher values therefore mean a higher sensitivity, lower values a lower sensitivity. Now set both sides to 100% - check in the "Channel Monitoring menu". Here "both sides" means both switch end positions. The arrows ⇓ in the Channel Monitoring menu show the switching.

Arrow down correlates to the operation mode „Mode1", arrow up id for the operation mode „Mode2". Set the value on the right side, the swash plate sensitivity, through the potentiometer. As soon as you get close to 100% this is also displayed in a short flicker of the LED. This way you can quickly set the 100% even without connecting the terminal.

The following diagram shows the ratio between transmitter travel and µRONDO display



These are the factory settings for the operation modes:

Mode 1	= factory setting for nearly all flight styles such as scale, scenic flight, acrobatic flight
Mode 2	More stable than Mode 1 for extreme acrobatic flight, speed flight and 3D

Adjusting µRONDO

After you have mounted µRONDO and programmed your transmitter accordingly, all that is left to do is to set up the Gyro reverses as well as servo reverses and travels before you can start off to your first flight.

µRONDO's main menu is set up in a way that you can follow it step by step for the first set-up. Therefore we will follow this same principle here and explain each step one after the other.

When you first switch on your transmitter make sure that all trimmings/ channels are in the centre in order for µRONDO to initialise. As soon as channels are correctly assigned to functions through the menu „Function Assignment" this is only true for elevator, aileron and tail.

Before you switch on your helicopter, we recommend you detach all linkages from the servos so that they cannot block in case for example when servo travels are far too big.

Now switch on your helicopter. The LED in µRONDO will start flashing red for a few seconds then it will start to light up continuously. Directly after the switch on, µRONDO will try to calibrate the sensors and initialise the system. During this time do not move your helicopter or the control sticks. If the helicopter or the sticks are moved anyway calibration of the sensors is not possible and the LED will not change to light up continuously which means the system will not be ready for use. In this case the change will only take place if the helicopter was not moved for at least a few seconds.

If you have not yet connected the terminal go ahead and do so now.
The terminal display will show the following message:

```
µRONDO PRO-RCv30
Select Function↕
```

As soon as the µRONDO menu is visible press the 🡻-button in order to navigate to the first menu item.

Receiver Assignments
Press the 🡻-button to navigate to the sub menu „RX Type".

RX Type choose the receiver you use.

Spektrum Receiver Satellites:

```
←    RX Type    →
↑   Spektrum    ↓
```

Start Binding with
For Binding use the 🡺-button to navigate to the menu item "Start Binding" and start the process by pressing the 🡻-button

```
← Start Binding →
     with ↓
```

```
    Connect
   Receiver
```

and then "Connect Receiver". If the last menu is shown, you can connect one or two Spektrum satellites as often as you like and each time you plug a satellite in, it is initialised for binding (fast blinking of the receiver LED). So, you can connect receiver 1 (starts blinking fast) and then receiver 2 (also blinks fast) and then turn on the TX in binding mode and bind both receivers at the same time. Should a receiver not show the fast blinking LED, just unplug it and plug it in again. Once all receivers are bound, restart the whole system (turn all off and on again). The Satellite LED's will remain solid as will the µRONDO LED.

```
← Coll. Pitch →
↑       1     ↓
```

```
←    Tail     →
↑      4      ↓
```

```
←   Elevator   →
↑      3       ↓
```

```
←   Aileron    →
↑      2       ↓
```

Sum Signal Receiver
Connect the receiver to the „Input" jack and choose the value „SingleLine".

```
←    RX Type    →
↑  SingleLine   ↓
```

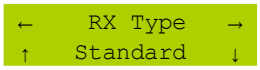
For sum signal receivers, too functions have to be assigned to the channels as described for Spektrum satellites.

Futaba S-Bus Receiver
Receivers with the Futaba S-Bus are equally connected to the „Input" jack.

```
←    RX Type    →
↑ Futaba S-Bus  ↓
```

Check if all channels are assigned to the correct functions and adjust them if needed.

Standard Receiver
Through the included adaptor cable and the patch cable a standard receiver can be connected, too. Please choose the value „Standard“ in this case.



The assignment of channels to functions also works as described above.

Channel Monitoring
The Channel Monitoring is used to check the function assignment and the travel settings of your transmitter.

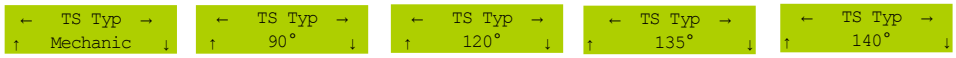
Tail Settings
Tail Servo
Here you choose the control frequency of your tail servo.

1520us	Digital servos
760us	S9251, S9256, BLS251

An incorrect setting of the control frequency can destroy the tail servo and does not lead to an improvement in the tail performance!

CPitch→Tail
There is the option to set a mixer for the function Pitch to Tail in µRONDO. This is needed when the tail gyro is not able to hold the tail by itself for fast pitch changes.

Swash plate Configuration
SwPl Config.
Here you can choose your swash plate type. The following options are available:



Servo Reverse
Tail Servo, SwPl Servo 1-3
With the help of the control sticks check if the swash plate and the tail rotor are controlled in the correct direction. If only one function is inverted invert this function at the transmitter. Otherwise use this menu to invert each servo's direction.

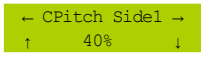
For the following settings the maximum servo ranges are always set automatically. The servos are set to the appropriate positions by µRONDO whilst you do not have to hold on to the transmitter sticks.

Servo Center Check + Adjust
Tail Side 1-2, SwPl 1-3
After choosing the function „Servo Center Check“ all servos are set to their center position. Now mechanically adjust the swash plate linkages or the servo levers in a way that the swash plate is perpendicular to the rotor shaft and that **Pitch is set to 0 degrees**.
For the fine tuning you can now use the sub menus to adjust each servo's center position.

This basic setting is important for a balanced flight behaviour.

Tail / SwPl Ranges
Tail Side 1-2
This menu is used for adjusting the mechanical servo travels. As soon as you switch from the main menu to the first sub menu using the ➔-button the tail servo will move to its end position 1. Adjust the end position by using the ↑ ↓-buttons so that the servo does not reach its mechanical limit. The ➔-button takes you to the menu for the tail rotor's end position 2.

CPitch Side 1-2
In the sub menu "CPitch Side 1" the swash plate automatically moves to its end position 1. With a pitch gauge check if the pitch angle complies with your requirements.



In the sub menu "CPitch Side 2" the swash plate automatically moves to its end position 2.
Proceed here as described above.

```
← CPitch Side2 →
↑      40%      ↓
```

Please set symmetrical pitch values for both end positions (e.g. +/- 10 degrees).

Max. Cyclic
In the sub menu "Max. Cyclic" you can set the maximum cyclic amplitudes for the swash plate. After choosing the function the swash plate automatically moves to the center position. As soon as the elevator or aileron stick is moved the swash plate automatically slowly moves to the appropriate end position. Here, too make sure that none of the servos reaches its mechanical limit.

We recommend you set about 8 degrees for the elevator and aileron function. Please measure under all circumstances!

Gyro Reverse
This gives you the possibility to adjust the gyro reverse of each gyro axis.

```
← Tail Gyro    →
↑   Normal     ↓
```

```
←Elevator Gyro →
↑   Normal     ↓
```

```
← Aileron Gyro →
↑   Reverse    ↓
```

In this menu the tail and swash plate control has an increased sensitivity so that the impact is easy to see.
Please check for the gyro reverse as follows:
Hold your helicopter horizontally. Now tip it about 45 degrees forward. The swash plate should tilt backwards. This means that µRONDO performs the exact steering movement that the pilot would use to stabilize the model. Please check all axes in this way and please be very precise when doing so. **An incorrect gyro reverse makes the model uncontrollable and will certainly lead to a crash.** At this point also check the reverses of your control sticks. Please note that the rigid-head alteration can invert the pitch. Increasing collective pitch must show a higher pitch at the rotor blades. The swash plate can indeed move downwards in the process!

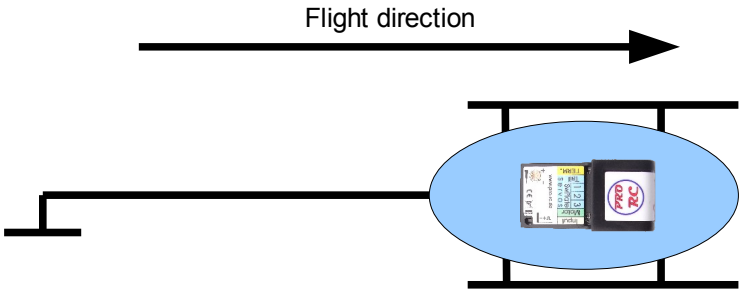
Dynamic SwPl Settings
Dyn. SwPl
This function compensates exterior influences for pirouettes. It should therefore be switches on in any case!

Dyn. SwPl Dir.
Use this menu item to set the compensation direction. In order to make these settings the swash plate moves to an elevation end position. Look at the swash plate from the side and turn your helicopter's nose left and right repeatedly. Thereby observe the swash plate movement. The direction is set correctly when for example the swash plate is tilted forward and while you turn the helicopter's nose away from you the swash plates side that faces you moves downwards for a moment. In the same manner it should move upwards when the swash plate is tilted backwards while you perform the same movement. Later while the helicopter is flying this compensation will be much smaller. The big amplitude during programming is only used in order to make the check easier.
If this approach seems too complex just switch on the dynamic swash plate rotation and perform a pirouette later on. If the helicopter is thereby quiet (without swash plate control input!) the direction is correct. If the helicopter wobbles invert the direction. If the compensation direction is set incorrectly the result will simply be unclean pirouettes there is no danger.

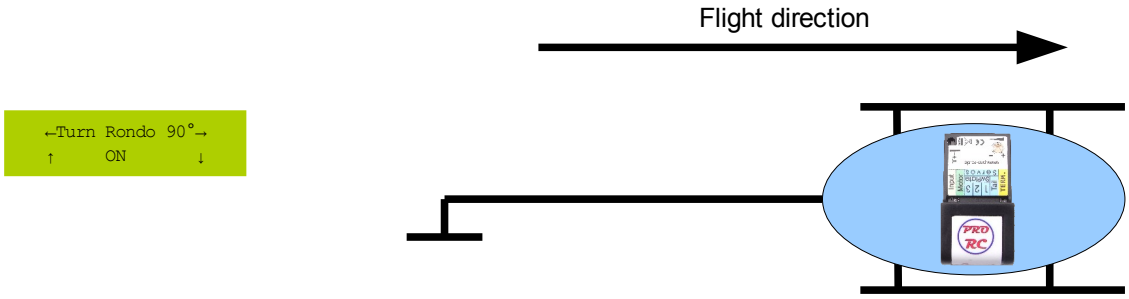
Miscellaneous Settings
These are optional settings that are not compulsively needed for the basic set-up.

Turn µRONDO 90°
Ex factory µRONDO is programmed in a way that the plug connector has to be mounted crossways to the flight direction.

```
←Turn Rondo 90°→
↑      OFF       ↓
```



If it is necessary for mechanical reasons µRONDO can also be rotated by 90 degrees.
This can be activated in the turn µRONDO 90° menu.



Thereby it does not matter if µRONDO is rotated left or right.

In every case it is necessary that you check the gyro reverses after the rotation and correct them if needed.

V-SwPl Twist
This is a static virtual swash plate twist as it is known from various transmitters. If for example your model reacts with a slight tilt to the right when you give elevation down, you can correct that behaviour with a virtual rotation by a few degrees to the left.

Language
Here you can choose the display language for the terminal. All settings and configuration values are obtained when the language is changed.

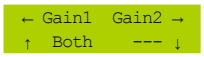
Bank
There are 4 banks (locations to store µRONDO set-up data). It is for example possible to use one bank for a functioning set-up and another one for testing purposes. When µRONDO is switched on it automatically loads the bank that was last saved.

To Save all Banks Use ↓
After you press the ↓-button all current settings are saved to the currently active bank.

Reset Selected Banks With ↓
Here all settings for the current bank set in µRONDO can be reset to the factory settings.

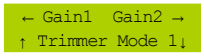
Gain Channel Settings

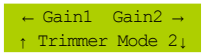
This menu item is used for setting the transmitter sided sensitivity channels for the tail and main rotor plane as well as the optional potentiometer to µRONDO. We recommend you use only one common switch for both planes if you want to control both sensitivities from the transmitter.



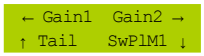
This is done in the setting „Both“. On the other side you have the option to use different channels for Gain1 (tail rotor plane) and Gain2 (swash plate plane) in order to set both values independent of each other.

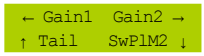
Please note that the sensitivity setting via potentiometer can only be done for one flight mode at a time in order to achieve a sensitive adjustment. In case you use „Trimmer Mode1“ and „Trimmer Mode2“ the potentiometer changes the sensitivity for both the tail rotor and the swash plate at the same time.





Furthermore it is also possible to set the tail sensitivity through a gain channel and the swash plate through the potentiometer. To do so choose one of the following options.





„Tail SwPlM1“ means that the tail sensitivity is controlled by the transmitter and the swash plate by the potentiometer, the operation mode of the swash plate is Mode1. Accordingly „Tail SwPlM2“ is the operation mode Mode2.

TIP: Usually a flybarless system can not be trimmed by the transmitter. Every change of the transmitter signal, even a trim change is interpreted as a turn signal by the flybarless system. Mode1 is an exception as in this mode it is possible to trim via the transmitter. This makes things especially easy for pilots that are changing from a flybar to a flybarless system. It has to be said though that trimming from the transmitter always hints to an inaccurate mechanical setting. If you have to trim in Mode1 in order for your helicopter to fly stable in a position we recommend you make the appropriate changes in the mechanics first and only trim in exceptional cases.

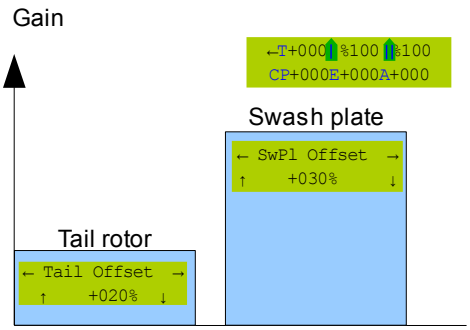
Tail Offset
SwPl Offset

In order to set both planes (sensitivity for swash plate and tail) differently with a single switch or potentiometer use the functions „Tail Offset“ and „SwPl Offset“. With the help of those two values you can set the appropriate sensitivity to a higher or lower value and so you can adjust them to the requirements of your helicopter. If the transmitter sensitivity is 100% on the Channel Monitor display the values for the swash plate and the tail are deployed 100% or unmodified. The offset values change this percentage value accordingly.

In the diagram the transmitter sensitivity is 100%, the tail offset is +20%, the swash plate offset is +30%. This means the tail sensitivity is elevated by 20%, the swash plate sensitivity by 30%.
Computationally this presents as follows:

sensitivity tail gyro = sensitivity transmitter ± Tail offset
sensitivity swash plate = sensitivity transmitter ± SwPl Offset

The transmitter value therefore changes both sensitivity values parallel.
Leave the offset values at 0% before the first flight.



Congratulations, at this point all basic settings are completed!
Remember to save your set-up.

The first flights

Before the first take off we strongly recommend you closely check the following points:

- Are all control function directions set correctly?
- Are the gyro reverses (tail, elevator, aileron) correct?
- Is the Gain channel set to 100%?
- Are the offset values set to 0%?
- Is the center of gravity centered on the rotor axis?

With the basic setting the helicopter will hover stable and safe. In order to further increase the flight behaviour please follow the matrix below:

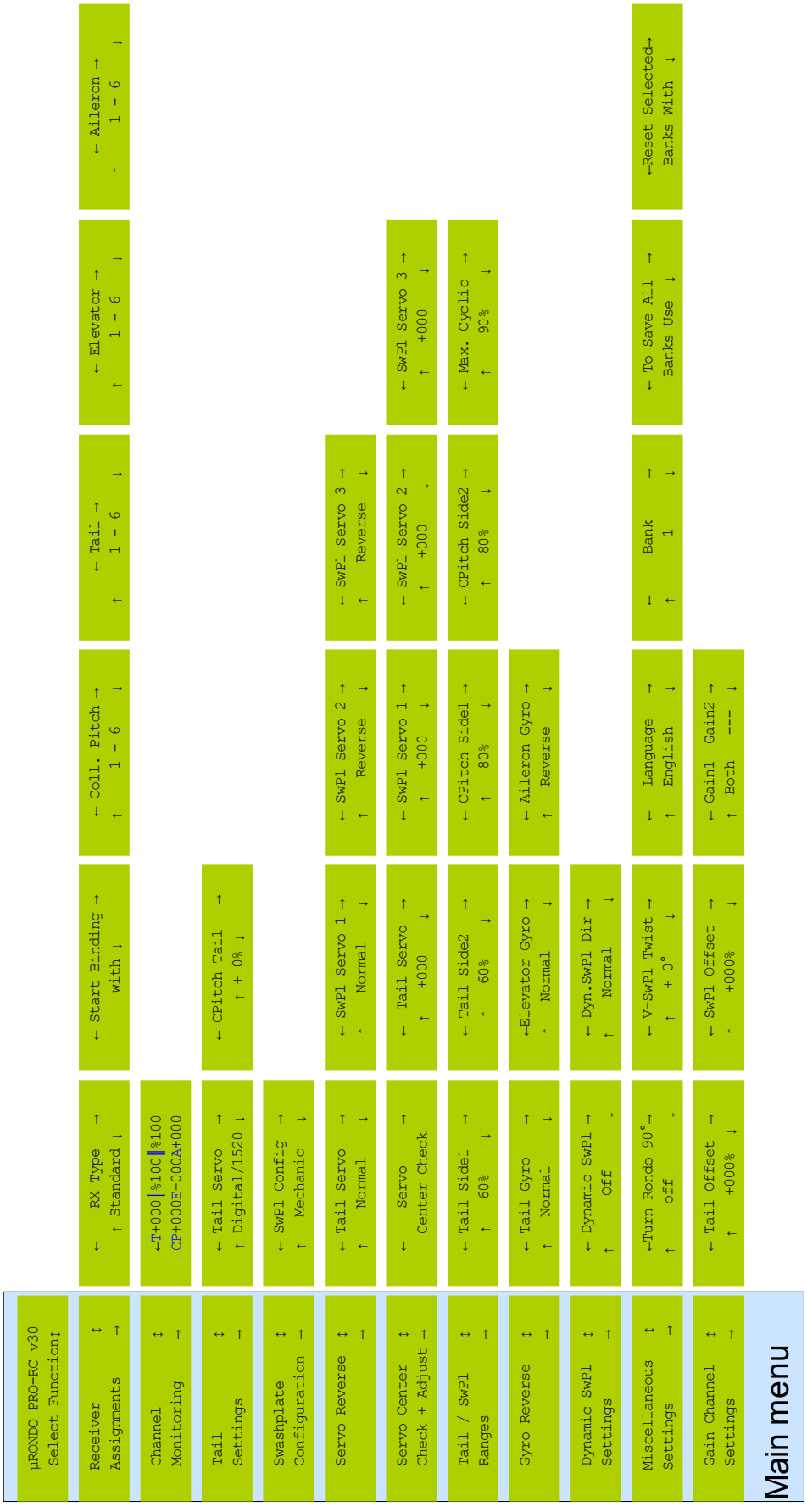
Flight behaviour	**Optimisation µRONDO**	**Optimisation transmitter**
Helicopter has indirect behaviour to cyclic inputs		Increase the function's servo ranges / dual rate
Helicopter too versatile		Reduce servo ranges / dual rate use the transmitter EXPO
Helicopter feels too soft	Increase SwPl Offset	
Tail oscillates	Reduce Tail Gain Offset	Reduce the transmitter gain (CAUTION: If only one sensitivity channel is used both tail and swash plate are changed!)
Tail not inherently stable	Increase Tail Gain Offset	Increase the transmitter or potentiometer gain
Tail rotation rate too low		Increase the servo range / dual rate
Pirouettes wobble	Invert Dynamic Swash plate	
Helicopter shakes on swash plate	Reduce SwPl Gain Offset	Reduce transmitter or potentiometer gain
LED flashes constantly		Set the trimming to the center position or do not move helicopter after switching it on

If your tail rotor does not stop evenly on both sides, µRONDO has the possibility to learn a hovering offset. Thereby the tail rotor control is learned and stopping will be considerably smoother on both sides.

In order to learn this offset value bring your helicopter to a quiet hovering flight and switch the sensitivity channel Gain1 quickly four times in a row. Whilst doing that and even about five seconds afterwards you should not move the tail control at all if possible and the helicopter's nose should, if it is not completely calm, turn towards the wind. If the learning was successful µRONDO will confirm with a slight tail twitch.

The stopping should now be the same on both sides. In order to save the learned value you must connect the display to µRONDO after landing. Instead of the usual welcome menu a special menu will appear where you can save the learned value by pressing the ←-button. Every other button discards the learned value. The range in which this offset can be set by µRONDO is limited. If, after connecting the terminal, you see the message „Out of Range“, the value is off limits and µRONDO could not set the offset value. In this case it is often sufficient to give the tail rotor a slight positive pitch. You can reach this by changing the leverage length between the tail servo and the tail linkage. After that repeat the learning process for the hovering offset. You can delete the hovering offset by switching Gain1 quickly four times in a row while the terminal is connected. A menu will then offer you to delete the value.
In order to check if the swash plate is set mechanically correct switch to Mode 1. If the model drifts to one side there can be two main reasons. Either the swash plate is not aligned correctly or the center of gravity for the model is not correct. Check and correct the center of gravity first. If it is okay change the linkage of the swash plate accordingly until the model is nearly position stable in Mode 1.

Attachment
µRONDO
Menu structure



Specifications

Area of application:	Model helicopters that are not subject to authorisation
Supply voltage range:	VCC = 4 – 9 Volts, ~50 mA
Temperature range:	0 - 70°C

Relative air humidity over 90% or contact to humidity or water is not acceptable.

Measurements	
µRONDO:	39 * 18,5 * 20 mm
Terminal:	132 * 50 * 19mm
Weight µRONDO:	14g (including steel plate for vibration attenuation)

Input signals receiver:	(VCC = 5-9 Volts)
Pulse range:	1,520 ms +- 400µs
Repetition rate:	~ 20 ms
Logic High:	> 3V
Logic Low:	< 1V
Charging:	> 10k

Servo output:	(VCC = 5-9 Volts)
Pulse range swash plate:	1,520 ms +- 400µs, repetition rate 3,6 ms
Pulse range tail:	1,520 ms +- 400µs, 3,6 ms
	760µs +- 400µs, 3,6 ms
Logic High:	> 4V
Logic Low:	< 1V
Inner resistance:	220 Ohm

The outlet „Terminal“ may only be exclusively used for the terminal.

Technology:
Three precision sensors in Silicon Micro Machine (SMM) technology.
Controlled yaw rate up to 500°/s, 12 bit resolution.
C-MOS micro processor 56 MHz.
LCD-Display for optimal readability even in bright daylight.

Content of delivery:
µRONDO, terminal, patch cable, standard receiver adaptor cable, Y-cable.

µRONDO and PRO-RC Terminal are conform to RoHS after EG-Richtlinie 2002/95/EG

Disclaimer of liability

A model helicopter that is equipped with µRONDO always has to be used in a way that neither people nor objects can be endangered or damaged.

µRONDO is solely designed for the use in model helicopters and it may not be mounted to any aircraft that carries humans.

Vibrations, static discharge, dirt, petrol residuals and humidity can cause fault in µRONDO's functions and should therefore be kept away.

As PRO-RC has no control whatsoever over the appropriate handling of µRONDO, PRO-RC can not take any liability for the use of µRONDO unless the cause can be established to be of reckless action on the part of PRO-RC.