BEASTX Wiki:Books/MBPlus 52 ENG

March 22, 2021

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1 Introduction

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Intro[2] and the translation is 100% complete.

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1   `https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%`
     `3AMBPlusFblV52%3AIntro&action=page&filter=&language=en`
2   `https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Intro`

2 MICROBEAST PLUS - What's that?
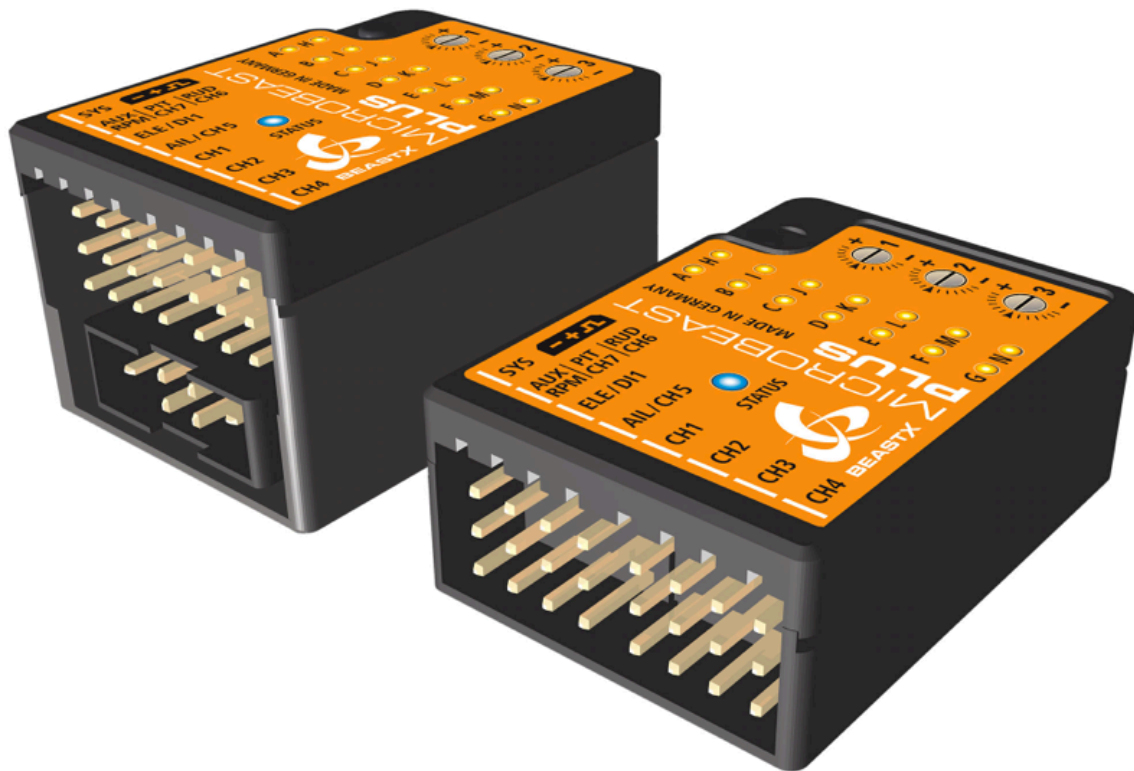
Figure 1

MICROBEAST PLUS is a gyro system which is used to stabilize and control your flybarless RC Helikopter on all three flight axis. It can be used with many different types of helicopters like 3D aerobatic helis, F3C competition helicopters as well as scale helicopters with 2 or more rotorblades. The system comes with basic flybarless stabilization functionality and can be upgraded by paid update to the "ProEdition". This enables additional features like AttitudeControl for recue bailout or constant leveling and a feature called Bank Switching which allows to change between different parameter presets in flight to serve different flight conditions or flying styles.

- wide input voltage range from 4 to 9 Volts
- supports nearly all types of radio systems with conventional receiver wiring as well as lots of different serial signal receivers like SBUS, XBUS, EXBUS, iBus, UDI, SRXL, SRXL2, SPPM, SUMD, Spektrum/JR/ALIGN remote satelite
- preset swash plate mixing for mCCPM and 90, 120, 140 eCCPM + fully customizable swash mixing with up to 4 swash plate servos and virtual phasing for scale helicopters

- swash plate servo update rate with up to 333Hz
- integrated tail gyro with torque precompensation ("RevoMix") supports all types of rudder servos with 760, 960 and 1500(1520)µs pulse width and up to 560Hz update rate
- integrated head speed governor for electric and nitro/gas driven helicopters (requires rpm sensor pickup or esc with rpm signal output)
- optional upgrade to "ProEdition" with bank switch feature for full customization and AttitudeControl for rescue bailout and selfleveling
- MICROBEAST PLUS HD comes with a switchable high power input for large helicopters with power hungry standard servos and additonal vibration resistance due to aluminum housing

To setup MICROBEAST PLUS there is no need for any additional devices. All you need is your radio system and your helicopter. Thanks to the well proven EasySetup system you can do all the necessary adjustment directly at the device and in very short time. If you like to get more insight into the system and like to have a more visualized type of setup you can also use the StudioX App for PC/Mac or StudioXm for your smartphone/tablet in combination with the USB2SYS interface (PC/Mac) or BLE2SYS interface (smartphone/tablet) (optional available). These apps are the source to get even more out of your device like saving/restoring paramaters, firmware updates, loading preset heli configurations and making advanced adjustment to fully customize your MICROBEAST PLUS to your needs.

3 Additional guides

This online manual is very extensive and covers all topics in detail, i.e. radio setup, mechanical helicopter setup, power distribution, description of additional features and of course all the menu adjustments and what these do and what they are necessary for. So reading this manual can give you a detailed knowledge about the system and should help to give answers to almost all questions you may have. Anyhow, for a first start you may just go with the quick start guide[1] and only refer to the online manual if you have some specific question. Also the quick reference card[2] can give you a good overview for the different menu structures and adjustment procedures that can be performed directly at the device.

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1   http://www.beastx.com/download/manual/microbeast/MBPlus_QuickStart_V52_EN.pdf
2   http://www.beastx.com/download/manual/microbeast/MBPlus_QuickReferenceCard_V52_EN.pdf

4 Firmware version 5.2.x

Please note that these instructions are only valid for the MICROBEAST PLUS firmware version 5.2.x!

The firmware version can be detected by connecting the device to a computer using the USB2SYS interface (optional) or tablet/smartphone using the BLE2SYS interface (optional) together with the StudioX App. During initialization also you can directly read from the display of the device what firmware version it is running: After power up when the Status-LED lights red, for a few seconds the Menu-LEDs A to G display the first digit of the firmware version and the LEDs H to N the second digit.
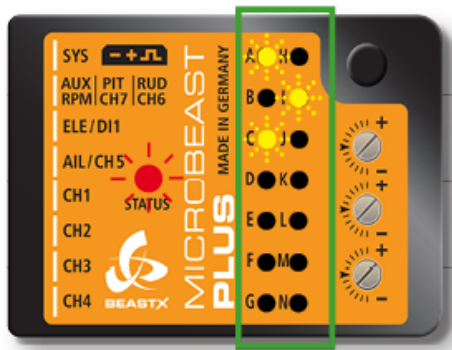
Firmware version 5.2.x
In the left row menu LEDs A and C indicate major version "5".
In the right row LED I lights up which stands for minor version "2".

Figure 2

(Click here[1] to see what's new with MICROBEAST Version 5.2.x compared to older firmware versions.)

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[1] https://wiki.beastx.com/./index.php/Help:FAQ:General/en#Differences_between_firmware_versions_.28changelog.29

5 Hardware options

	MICROBEAST PLUS	MICROBEAST PLUS HD
Power supply connection	Standard servo ports	High power input
On/Off Switch	❌	✅
Casing	Plastic	Aluminum composite
Recommended heli size	250 - 700	550 - 800

6 Software options

	Basic firmware	ProEdition firmware
AttitudeControl	❌	✔
Bank switching	❌	✔
Upgrade Price	-	99,- €

7 Safety Notes

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Safety[2] and the translation is 100% complete.

⚠️ Radio controlled (R/C) helicopters are no toys! The rotor blades rotate at high speed and pose potential risk. They may cause severe injury due to improper usage. It is necessary to observe common safety rules for R/C models and the local law. You can gather information from your local R/C model club or from your national modelers association.

⚠️ Pay attention to your own safety and the safety of other people and property in your vicinity when using our product. Always fly in areas away from other people. Never use R/C models in close proximity to housing areas or crowds of people.
R/C models may malfunction or crash due to several reasons like piloting mistakes or radio interference, and cause severe accidents. Pilots are fully responsible for their actions, and for damage or injuries caused by the usage of their models.

⚠️ Please read the instruction manual thoroughly before the first use of your MICROBEAST PLUS and setup the system carefully according to this manual. Allow sufficient time for the setup procedure and check each step carefully. Watch for a mechanically clean and proper build of your helicopter. A wrong system setup can lead to a serious accident and damage to the model.

⚠️ Radio controlled (R/C) models consist of several electrical components. It is therefore necessary to protect the model from moisture and other foreign subtances. If the model is exposed to moisture this may lead to a malfunction which may cause damage to the model or a crash. Never fly in the rain or extremely high humidity.

⚠️ When operating the helicopter with a MICROBEAST PLUS ensure there is a sufficiently large and stable receiver power supply. Because of the direct coupling of the rotor blades to the servos, without the use of a flybar mixer, the servos are exposed

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1   `https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%`
    `3AMBPlusFblV52%3ASafety&action=page&filter=&language=en`
2   `https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Safety`

to increased actuating forces. In addition, because of the intermediary electronic gyro system, the servos are driven more often than with traditional use. These factors can make the power consumption increase a lot compared to a flybar helicopter. When the supply voltage falls below 3,5 volts for a short amount a of time, the system will power off and reboot. In this case a crash of the helicopter is unavoidable.

⚠ Do not expose the MICROBEAST PLUS system to extreme variations in temperature. Before powering up the system, wait some time so that the electronics can acclimatize and any accumulated condensation is able to evaporate.

⚠ The sensors of MICROBEAST PLUS consist of highly sensitive electromechanical components. These can be damaged due to moisture or mechanical or electrical impact. Do not continue using this product if it has been exposed to such influences, e.g. due to a crash of the model or due to overvoltage caused by a defective receiver power supply. Otherwise a failure may happen any time.

⚠ When operating electric helicopters make sure that the electric motor cannot start inadvertently during the setup procedure. Particularly pay attention if using a single-line receiver and if the ESC is connected directly to the MICROBEAST PLUS. We recommend disconnecting the electric motor from the ESC during the setup procedure. Prior the first usage please slide the motor/pinion away from the main gear, then check that the motor does not to start inadvertently when the receiver is switched on.

⚠ When operating the RPM Governor feature of MICROBEAST PLUS it is essential to ensure that the motor cannot start by accident when making adjustment or performing preparations to start the engine. Carefully read this manual and make sure you fully understand how the RPM Governor feature is operated before making any adjustments. Also make sure the motor does not start when the radio link is interrupted or when you switch on the transmitter initially. With electric driven models do not dock the motor to the main gear unless all necessary adjustment procedures have been finished. Always maintain sufficient safety distance to the motor and other rapidly rotating components of the helicopter.

⚠ MICROBEAST PLUS with AttitudeControl can be used as a flying aid for beginners by limiting the reaction of the helicopter to stick inputs and by stabilizing the helicopter with a electronic control loop. However, this does not provide that the helicopter can always be flown safely! By incorrect control inputs the helicopter still may crash or be placed in a position in which the pilot becomes disoriented even when using AttitudeControl. In addition, the helicopter can drift due to external influences and it is not guaranteed that the artificial horizon of the device can stabilize the helicopter at any time and recover from any orientation. Influences such as temperature fluctuations or vibrations may cause incorrect results and distort the position calculation

of the system in consequence. There is no guarantee that the system will always work correctly. Only the pilot is responsible for the control of the helicopter and thus also for the use of the system. Note that the system for technical reasons will not hold the helicopter absolutely to the point. The unstable tendency of a helicopter will cause the model to fly in a certain direction even when using AttitudeControl. External influences such as wind can further strengthen this effect. In addition measurement inaccuracies of the sensors can distort the position determination slightly. You must always be able to turn off the system immediately and be able to take over full control of the helicopter.

⚠ We suggest you to seek the support of an experienced helicopter pilot before you undertake the first flight of your model. Additionally, flight training with a R/C simulator can help make flying easier and more enjoyable. Ask your local dealer if you need technical support or if you observe problems during the usage of our system.

⚠ AttitudeControl can help to facilitate flying of model helicopters by briefly passing over control to the system if the pilot becomes disoriented. By using the built-in artificial horizon the helicopter can be brought to a nearly horizontal position so that the pilot gains time to reorient. Thus, there can be no assurance that the model is saved from a crash in general. Depending on the current attitude and the speed of the model and depending on how fast the AttitudeControl is activated, the model may crash before or while the system tries to recover. In addition, the helicopter can drift due to external influences and it is not guaranteed that the artificial horizon of the device can stabilize the helicopter at any time and recover from any orientation. Influences such as temperature fluctuations or vibrations may cause incorrect results and distort the position calculation of the system in consequence. Strictly observe the general safety rules for dealing with RC models and do not totally rely on the system. The pilot is responsible for the control of the helicopter and thus also for the use of the system. You must always be able to turn off the system immediately and be able to take over full control of the helicopter.

8 Box content and accessories

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Box Content[2] and the translation is 100% complete.

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1   `https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%`
      `3AMBPlusFblV52%3ABox+Content&action=page&filter=&language=en`
2   `https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Box_Content`

9 This is what you get when buying the MICROBEAST PLUS

- the MICROBEAST PLUS flybarless unit
- printed Quickstart manual, Quick reference card and BEASTX sticker set
- all the wires to connect your receiver to the system (wire length 150mm)
- 3M gyro pads
- plastic tool for adjusting the gain dials

Figure 21

Please note: MICROBEAST PLUS is usually sold with BASIC firmware. If you like, you can upgrade to PROEDITION firmware later using the StudioX PC software or StudioXm app. Ask your dealer if you need the PROEDITION firmware upgrade installed already.

10 This is what you get when buying the MICROBEAST PLUS HD

Figure 22

- the MICROBEAST PLUS HD flybarless unit
- printed Quickstart manual, Quick reference card and BEASTX sticker set
- all the wires to connect your receiver to the system (wire length 150mm)
- 3M gyro pads
- plastic tool for adjusting the gain dials
- high power connector and on/off switch

Please note: MICROBEAST PLUS HD is usually sold with BASIC firmware. If you like, you can upgrade to PROEDITION firmware later using the StudioX PC software or StudioXm app. Ask your dealer if you need the PROEDITION firmware upgrade installed already.

11 Optional accessory

USB2SYS

Figure 23

USB2SYS connects your MICROBEAST PLUS / MICROBEAST PLUS HD with your computers USB port. With the StudioX Software (available for Windows and macOS) you can easily configure the system, create backups of your settings, load heli presets, upload firmware update file to your unit and much more.

For more information please see the StudioX manual[1].

BLE2SYS

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1   https://wiki.beastx.com/./index.php/StudioXm/en

Figure 24

BLE2SYS is a Bluetooth Smart Interface that allows to connect your MICROBEAST PLUS / MICROBEAST PLUS HD to your smartphone or tablet. With the StudioXm app (available for Android and iOS) you can easily configure the system, create backups of your settings, load heli presets, upload firmware update file to your unit and much more. Please note that your mobile device must be Bluetooth Smart/Bluetooth LE compatible.

For more information please see the StudioXm manual[2].

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2   https://wiki.beastx.com/./index.php/StudioXm/en

12 Hardware installation

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Hardware Installation[2] and the translation is 100% complete.

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%3AMBPlusFblV52%3AHardware+Installation&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Hardware_Installation

13 Attaching your Microbeast PLUS to the helicopter

Attach the Microbeast PLUS unit by using one of the provided 3M® gyropads at a preferably low vibrating position on your helicopter such as the gyro platform or receiver platform. You may need to choose another type of mounting pad depending on the vibration pattern of your helicopter.

There are eight possible mounting orientations: The MICROBEAST PLUS unit either can be attached **flat or upright** on the helicopter and the **servo connector pins must always point towards the front or rear** of the helicopter. The small white sensor pinboard on the side must always be inline with flight direction:
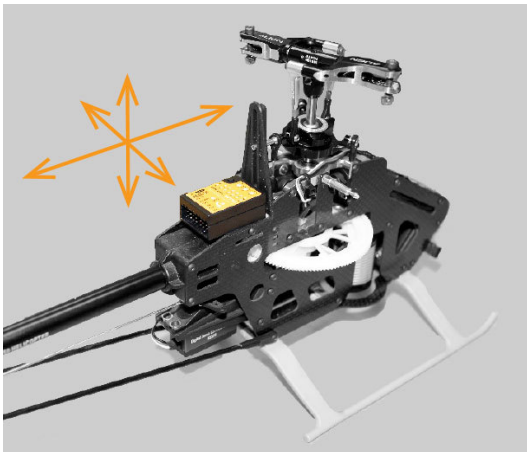
Figure 25
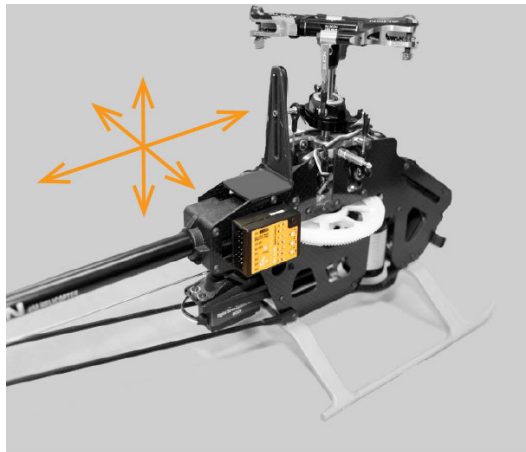
Figure 26

Figure 27
flat, cover on top, servo connectors showing to front

Figure 28
flat, cover showing to bottom, servo connectors showing to front

Figure 29
upright, button on top, servo connectors showing to front

Figure 30
upright, button on bottom, servo connectors showing to front
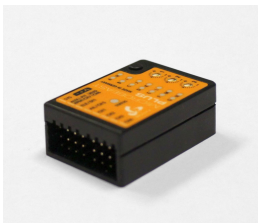
Figure 31
flat, cover on top, servo connectors showing to rear

Figure 32
flat, cover showing to bottom, servo connectors showing to rear

Figure 33
upright, button on bottom, servo connectors showing to rear

Figure 34
upright, button on top, servo connectors showing to rear

Figure 36

⚠️ **Pay attention that the edges of the Microbeast PLUS unit are all parallel with the corresponding rotational axes of the helicopter!** Especially make sure that the mounting platform is perpendicular to the main shaft! On the other hand it is not important that the unit is directly placed on the rotation axis (which is nearly impossible) and also it is not important whether the system is placed in parallel to the ground or not.

14 Introduction to MICROBEAST PLUS HD

MICROBEAST PLUS HD is the most powerful flybarless system from the MICROBEAST series. While function and operation are identical to MICROBEAST PLUS, the HD version is characterized by the possibility of a high power supply. This meets the requirements of speed flyers and extreme 3D pilots and is primarily used in helicopters larger than 500 size that have very power consuming servos installed. By using a low-resistance high-current connector system MICROBEAST PLUS HD makes it possible to use thick power cables for connecting receiver battery or BEC which preserves a virtually loss-free transfer of electric current. In addition the power connection is switchable using a particularly fail-safe switch system, so there is no need for a separate and costly power switch. **Apart from the high power supply and the switch system the operation of MICROBEAST PLUS HD is identical to MICROBEAST PLUS.** So it is not explicitly dealt with the HD version later on in this manual. All subsequent executions are also based on MICROBEAST PLUS HD!
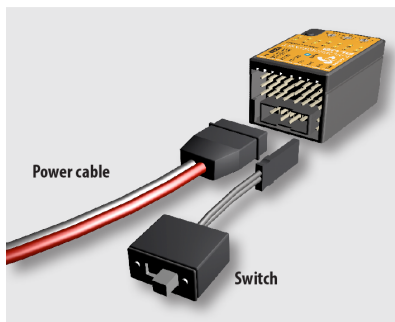
Figure 39

Figure 40

Figure 41

The input voltage range is 4.0 to 8.4 volts!
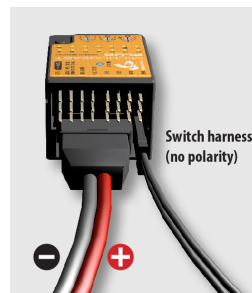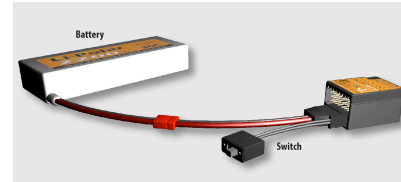
Solder to the supplied power cable a matching counterpart for the supply battery used or connect it with the BEC power wires (of your speed controller). When using a battery it is not recommended to directly connect the battery to the MICROBEAST PLUS HD without using the supplied power cable as an adapter. Continuous plugging and unplugging can cause the overlying servo plugs getting unplugged accidentally or cause the adhesive gyro pad to get loose! Receiver and servo plugs are connected to the ports on top of the unit. There is no difference between HD and non HD version in this respect.

The use of the electronic switching system is optional. The switch is designed in a way so that it interrupts the power circuit by shorting the switch circuit in OFF position. If

the switch is not connected MICROBEAST PLUS HD is switched on permanently as soon as the power is connected.

Please note:

- Using the high power connection port is not a must. You can also use MICROBEAST PLUS HD in a conventional manner by powering the unit from the receiver ports in the top row, as shown in the chapter on receiver installation[1]. However, using the electronic power switch system is not possible then!
- The electrical connections of the high power connection port and the upper terminal row form a parallel power circuit during operation. So it is possible to connect an additional power source at the upper terminal row. For example this can be a buffering battery or a backup system that shall protect against failure of the primary power source. In this case note the manufacturer's instructions, if this is possible and permissible for the supply systems used. Also note that using the electronic power switch system of MICROBEAST PLUS HD is not possible in this combination!
- Note that the system can only be as powerful as the power source allows. Use power cables with sufficient diameter, avoid long cable length and only use a plug system for connection of battery and power cable that is capable of transferring high currents.
- MICROBEAST PLUS HD does not supply an internal voltage regulation! The voltage that is applied to the high power connection port will directly be passed to the servo and receiver connections. Only use electronic components (servos and receiver) that are designed for your power source.

MICROBEAST PLUS HD will draw a very low amount of current even when the system is switched off! Therefore **always completely disconnect the battery from the system if you do not use the model for a extended period of time** to prevent the supply battery from getting discharged and damaged in consequence.

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1   https://wiki.beastx.com/./index.php/Manuals:MB_Plus:Receiver_Installation

15 Receiver connection

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Radio System[2] and the translation is 100% complete.

MICROBEAST PLUS can work with a lot of different receiver types and radio brands, especially with different types of radio signal protocols. Depending on which signal protocol and receiver you intend to use, the wiring layout may vary. In the following you can see all supported protocols and specific wiring schemes for each receiver type. **Ensure a tight fit of the connectors.** The pin board of MICROBEAST PLUS is designed so that the plugs firmly clamp each other when they are fully inserted. Anyhow, especially when using a receiver with single wire output it is possible that connectors are plugged in with no adjacent neighbors. Such plugs should additionally be secured against loosening.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3ARadio+System&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Radio_System

16 Standard receiver

A conventional receiver with multiple servo output connectors is what we consider a "Standard receiver". Here you connect each output to one control function of MICROBEAST PLUS by using one connection wire for each function. The 5 control functions (wires) are: Aileron, Elevator, Rudder, Collective pitch and Gyro gain. Connect each wire to the corresponding servo output at the receiver which you like to use for the specific function. If you don't know which stick controls which channel have a look at your radio's servo monitor, refer to your radios instruction manual or simply connect a servo to each channel testwise!
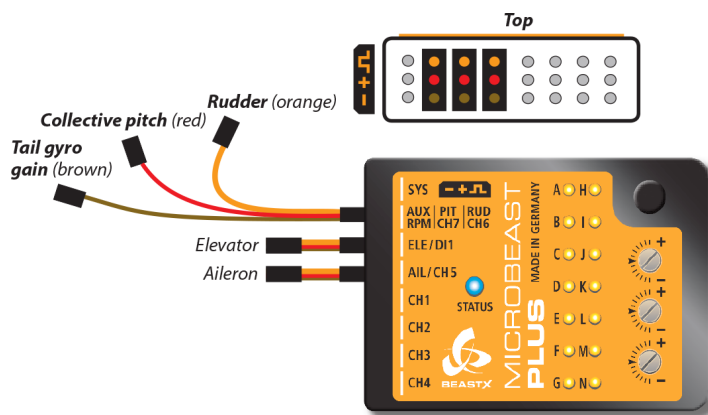
Figure 43

Here we show connection layouts for two common radio brands. Note that this is only exemplary, the channel output of your transmitter can by different even when using a radio of this brand. And you can use any radio system on the market, not only these two brands!
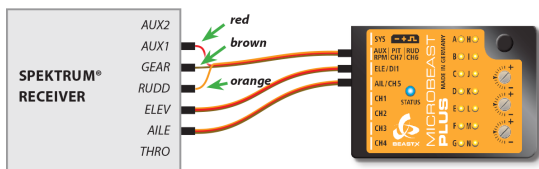
Figure 44
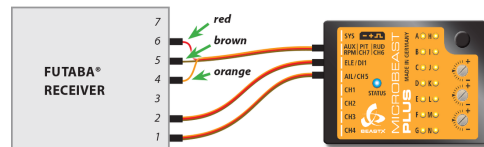
Figure 45

- The wires for rudder, pitch and gyro are signal wires. They must be placed on the same receiver side as the the both orange wires from aileron and elevator!
- You must connect all 5 functions/wires to the receiver. When you don't connect all wires, the system will not finish initialization sequence!
- The throttle servo/speed controller is connected to the receiver's throttle output. Using the headspeed governor function of MICROBEAST PLUS is not possible in combination with a Standard receiver!

17 Receivers with single wire output (single-line receivers)

A single-line receiver transmits all channels (control functions) by one single connection wire to MICROBEAST PLUS. This is done by packing all channel output data to a digital data paket or by chaining the servo signals. At the moment MICROBEAST PLUS supports the following systems: Multiplex® SRLX, Spektrum® SRXL, Futaba® SBus, JR® X-Bus(B), Jeti® UDI, Jeti® EXBus, ALIGN® iBus, FlySky® iBus, Graupner HOTT® SUMD, SPPM

> There are single-line receivers available that supply additional servo outputs. In combination with MICROBEAST PLUS you only have to treat such receivers as single-line receivers if you really use the single-line function. If you connect the receiver by using the standard 5-wire layout as shown above, such receiver has to be considered as "Standard receiver".

- The single-line connection wire is plugged into the [DI1] input of MICROBEAST PLUS
- The throttle servo or ESC is connected to the [CH5] output. When using a speed controller with BEC, from here the power will be distributed to receiver and servos.
- Alternatively or additionally you can connect a power supply/second BEC wire/buffering battery to the [SYS] port and/or to the receiver (in case this has additional servo or battery ports). All servo ports will form a parallel power circuit.
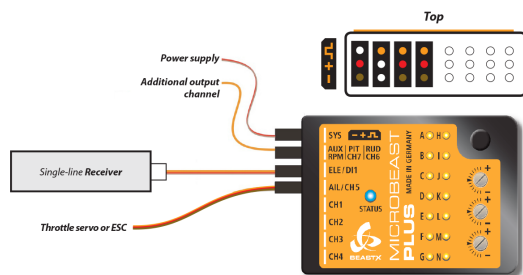
Figure 46
Wiring layout for single-line receivers
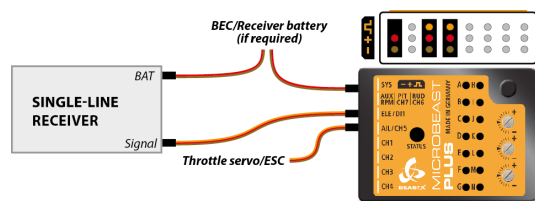
Figure 47
Alternative wiring layout for single-line receiver with additional servo output channels

When using a big heli with standard size servos it may be insufficient to only provide power at the [SYS] port or receiver. Adding additional power wires is highly recommended! If there are no other ports left to additionally feed in power, we recommend using the MICROBEAST PLUS HD which comes witch an additional high power input. This reduces wiring resistance and serves todays demands for a robust servo power supply.

18 Remote satellite (Spektrum® DSM/JR® DMSS/ALIGN® iBus)

A special type of single-line receiver is the remote satellite. These receivers usually serve as additional receiving unit in combination with a (bigger) main receiver to provide a more robust and fail safe radio system. With MICROBEAST PLUS you can use such receivers as stand alone receiving unit to achieve a small and light weight radio system for small sized rc models. MICROBEAST PLUS supports the following systems: Spektrum® DSM2, Spektrum® DSMX, JR® DMSS and ALIGN® iBus. The remote receiver can be directly connected to the white pin board at the side of MICROBEAST PLUS. Here the receiver will be powered with a stabilized voltage of 3.3 Volts. Alternatively if you own the optional available Spektrum® satellite adapter (Order Nr. BXA76009) you can connect the receiver at the front pin board to the [DI1] digital input, just like most other single-wire receivers. This allows to keep the white pin board free for connecting a sensor.

Please note: MICROBEAST PLUS does not support connecting more than one remote satellite at a time!
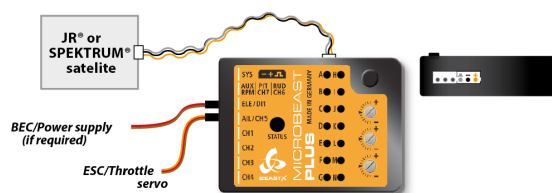
Figure 48

JR®/Spektrum® remote satellite connected at side pin board
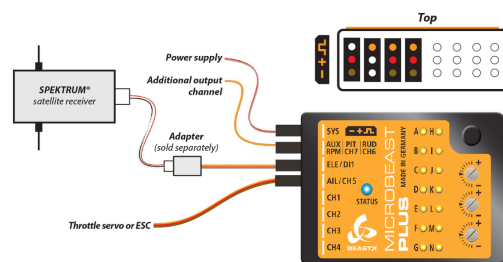
Figure 49

JR®/Spektrum® remote satellite connection with power adapter

When using a speed controller with BEC, the power will be distributed from [CH5] input to receiver and servos. Alternatively or additionally you can connect a power supply/second BEC wire/buffering battery to the [SYS] port.

⚠️ **Using a remote satellite is only recommended for small rc modells like helicopters of 450 size or smaller.** Due to the design, one single receiving unit is more prone to radio interference and can result in reduced transmission range.

39

19 Spektrum® SRXL2 receiver

Spektrum SRXL2 receivers are available in different forms. There exist receivers with standard servo connectors as well as remote satellites with a special 4-wire connector. The output signal of any of those receiver must be connected to the pin board at the side of MICROBEAST PLUS.

Please note: MICROBEAST PLUS does not support connecting more than one SRXL2 receiver at a time!

When using a speed controller with BEC, the power will be distributed from [CH5] input of MICROBEAST PLUS to the receiver. Alternatively or additionally you can connect a power supply/second BEC wire/buffering battery to the [SYS] port. It is not recommended to connect power to the receiver directly!

In order to connect a receiver with standard servo connectors, i.e. the AR6610T, you need the SRXL2 receiver adapter. Also you may use the governor sensor adapter BXA76401 but this requires to modify the wiring layout as shown below!
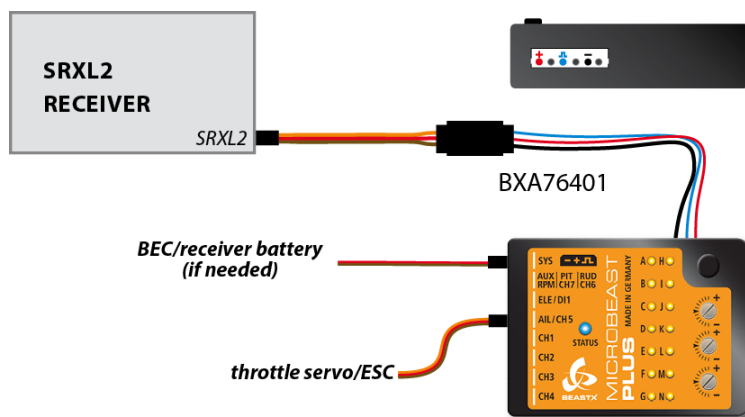
Figure 51
 SRXL2 receiver with standard servo connector and adapter

In order to connect a SRXL2 remote satellite like **SPM4650 it is necessary to interchange the plus and minus wires (usually black&orange) of the 4-wire receiver connector**. In this configuration you can directly plug in the receiver without the need

for an extra adapter.
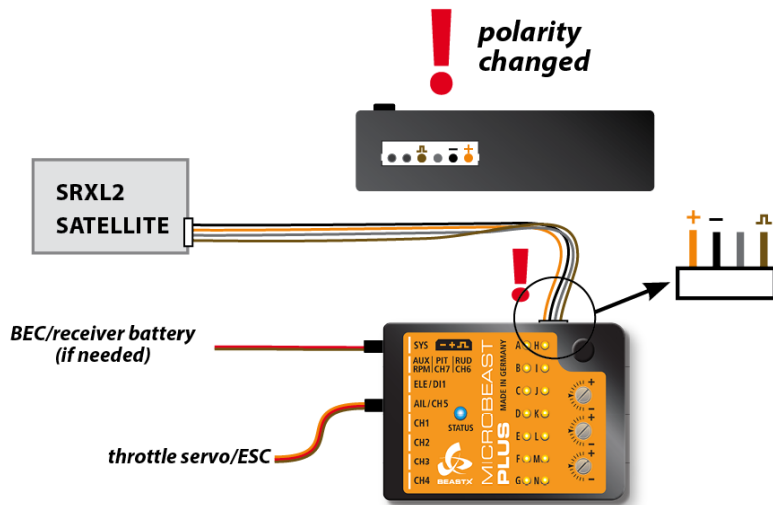
Figure 52
 SRXL2 satellite receiver with modified satellite connector
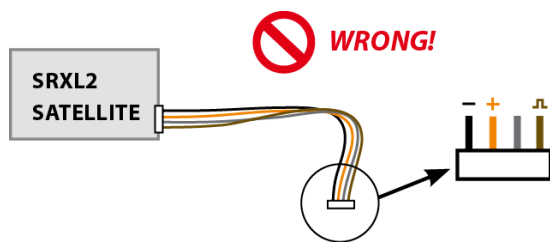
Figure 53
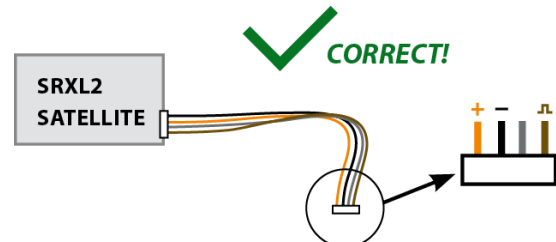
Figure 54

⚠️ **Never connect the 4-wire receiver connector to MICROBEAST PLUS in wrong polarity! This will damage your receiver immediately!** Check polarity at least twice before connecting the receiver to MICROBEAST PLUS. It is up to you to make sure polarity is correct. We do not assume any liability in case you do it wrong.

20 Radio system

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Radio Setup[2] and the translation is 100% complete.

1 https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
   3AMBPlusFblV52%3ARadio+Setup&action=page&filter=&language=en
2 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Radio_Setup

21 Preparing the radio system

You can use nearly any transmitter that provides at least 6 channels. By default 5 channels are used for controlling MICROBEAST PLUS and one channel controls the motor. If using additional features like AttitudeControl or RPM Governor a receiver with single wire output and more channels may be useful to have, but this is not a must.

- Create a new model in your radio's model memory.
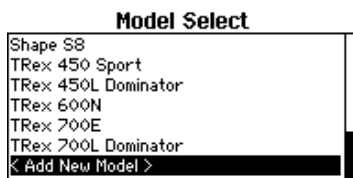
Figure 57

Figure 58
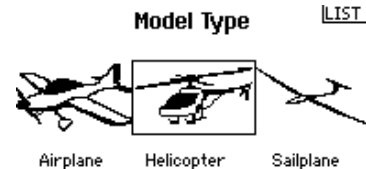
Figure 59

- Never enable your radio's eCCPM mixing function! Disable any mixing functions for the swashplate or rudder. Each function should be assigned to just one receiver channel. All the swashplate mixing will be done by MICROBEAST PLUS. Set your radio's swash mixer to mCCPM (mechanical mixing) which is often called "H1", "1 servo" or "normal" mixing or disable "swash mixing" if applicable.
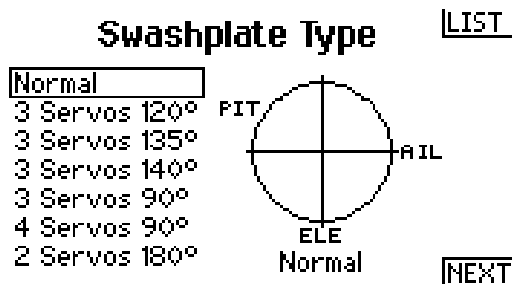
Figure 60

- Be sure that all trims and sub trims are disabled and that all servo travels are set to 100% in any flight mode. There mustn't be any active mixing functions (for example rudder revo-mixing). Have a look at the radio's servo monitor: each stick has to control one

channel/servo output (except for thrust stick which typically controls collective pitch and motor). Note when using MICROBEAST PLUS you do not directly control the servos of the helicopter. By moving a stick you give a control command to the system which then performs the necessary servo movements to move the helictoper in the commanded direction. Each control command is bound to one servo output channel of the transmitter.
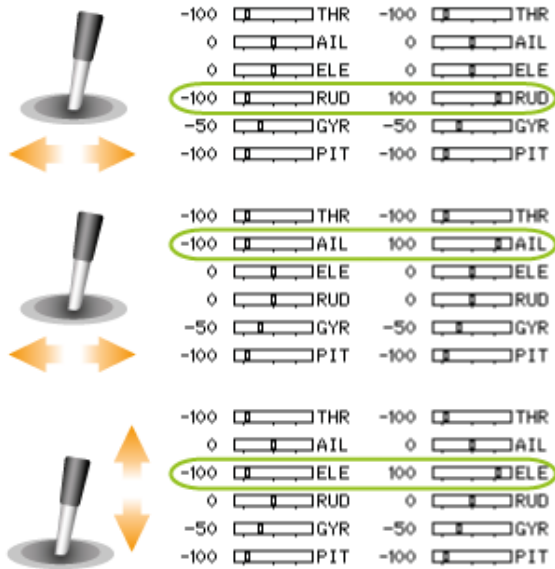
Figure 61

- Also do not adjust the collective pitch curve at the moment. For the setup procedures it has to be set as a straight line reaching from -100% to +100% (or 0 to 100% depending on radio brand).
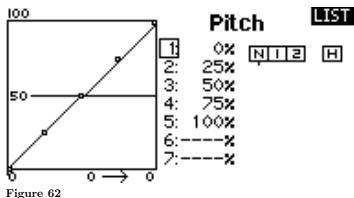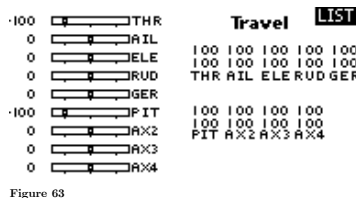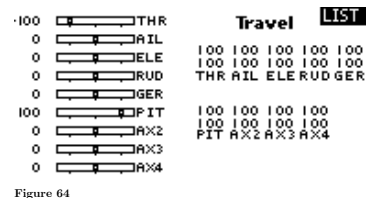
Figure 62   Figure 63   Figure 64

- Other functions such as throttle curves, ESC switches or auxiliary functions can be adjusted as usual. But especially for the throttle make sure you can disable the throttle channel and separate it from the collective stick movement for performing the setup. You can do this by using the HOLD switch on the radio or by setting the throttle curve to a flat 0% line. Also it is advisable to create different flight modes for different flight states/rotor headspeeds.

Flight Mode Setup `LIST`

Switch 1: Switch G
Switch 2: Inhibit
Hold Switch: Switch A

Mode: NORMAL

Figure 65

⚠️ **Make sure that the motor in electric models can not start when doing the adjustment work!** If the drive battery is used as power supply for receiver, servos and MICROBEAST PLUS disconnect the motor from the ESC.

22 Spektrum® DSM2/DSMX receiver binding

Before using your receiver with MICROBEAST PLUS make sure that the receiver is bound to the transmitter and that it is sending output data on the servo outputs and/or single-line port. Please refer to the manual of your radio system to find out how binding procedure is performed with your specific system. Also check if there is the need to perform special settings to enable the single-line data output of the receiver in case you intend to use this output port in combination with MICROBEAST PLUS.

Only in the case of using a single Spektrum® remote DSM2/DSMX satellite receiver directly connected to MICROBEAST PLUS you must bind the receiver by the aid of MICROBEAST PLUS as there is no other option to enable binding procedure at the receiver. **Please note that it is very important to bind the receiver first before programming MICROBEAST PLUS and this step must be performed, even if the satellite was already in use and already bound to the transmitter earlier** (e. g. in connection with a Spektrum® main receiver unit).

⚠️ **Watch out that the motor can not start accidentally when using the BEC of your speed controller to power the unit!**

When initiating bind sequence you have to set whether you're using a DSMX or DSM2 satellite (the actual selected signal protocol in the transmitter is not relevant!). **It is very important to choose the correct type of satellite receiver here, since an improper setting may seem to work but can lead to radio interference or total loss of radio linkage in the subsequent operation!**

Insert a Spektrum® "Bind Plug" at the [SYS] port of MICROBEAST PLUS. In case the power is supplied exclusively at the [SYS] connection, to bind a Spektrum® satellite receiver the power supply must be provided temporarily through any of the other ports [CH1] - [CH5]. To bind a **DSMX** satellite simply switch on the power supply now. The LED on the receiver and LED **H** on MICROBEAST PLUS will start to flash. You can bind the transmitter as usual (for more information refer to the instructions of your radio control system). To select and bind a **DSM2** satellite, hold down the button on MICROBEAST PLUS while switching on the power supply. Now the receiver's LED and LED **N** (!) on the MICROBEAST PLUS will flash. Release the button and bind the receiver with your transmitter. After successful binding procedure the receiver's LED will stay solid. LED **H** respectively **N** flash alternately to all other LEDs for 2 seconds, then MICROBEAST PLUS will enter receiver setup menu automatically as further setup steps may be required

to use this type of receiver. Remove the bind plug and proceed with the setup as described in the following of this manual.
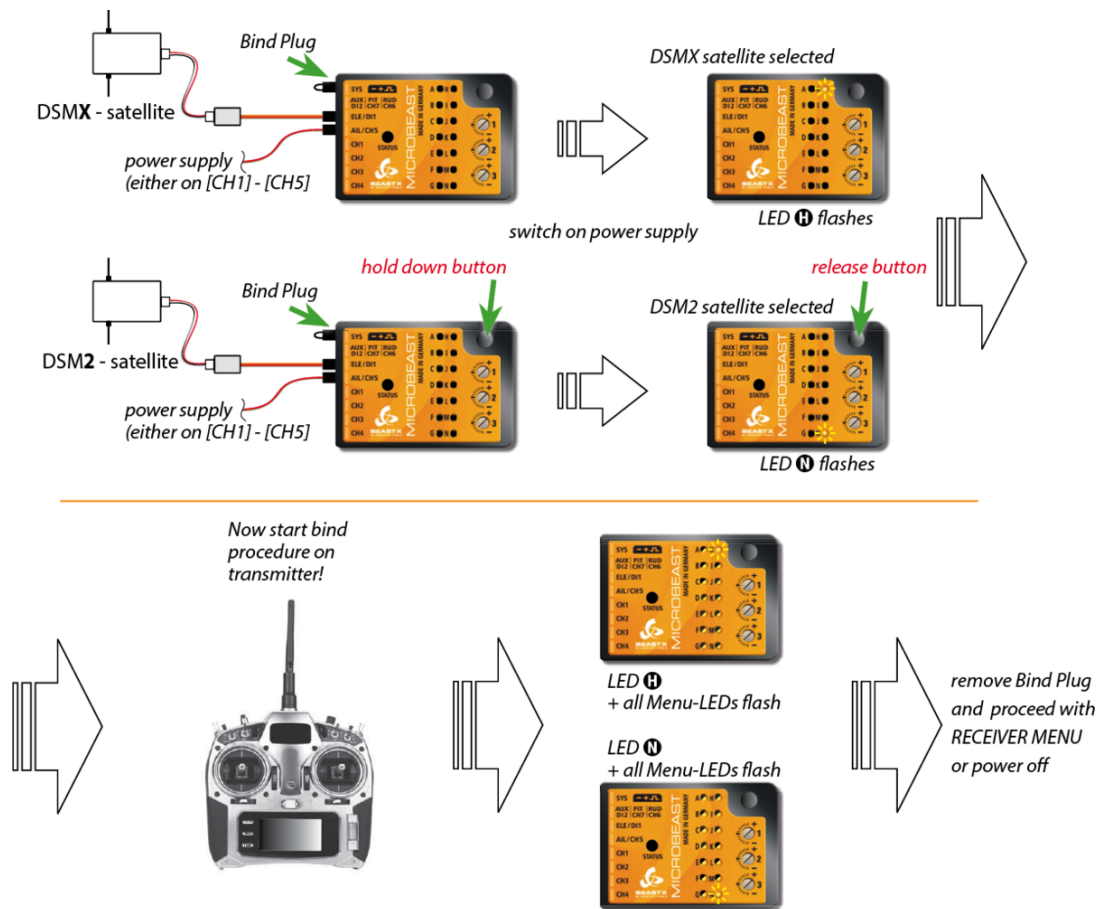
Figure 68

Note:

- Decisive for the selection alone is, which type of satellite receiver is plugged in! It is irrelevant which transmission method between the receiver and transmitter is actually used. Check carefully what type of receiver you have and what type you setup. An incorrect setting is not obvious but will lead to malfunction or failure of the radio link later in use.
- It makes no difference if you pull off the "Bind Plug" during the binding process or leave it connected as you would expect from some "standard" Spektrum® receivers!

23 Receiver Menu

This page is a translated version[1] of the page Manuals:MBPlusFblV52:ReceiverType[2] and the translation is 100% complete.

Due to the possibility of connecting very different types of receivers with different types of signal output, you must setup the receiver type in the RECEIVER MENU. Additionally when using a single-line receiver it is mandatory to define the function assignment for the receiver output channels. A single-line receiver bundles the control information to data packages or serialized electical signals. So by default it is not clear, which channel controls which (stick) function. Finally when using a single-line receiver you have to set a failsafe position for the throttle channel. This defines at which position the motor is disabled and where to move the throttle in case the receiver is not sending any throttle signal, i.e. during power up or in case of loss of radio link.

> By default the "Standard Receiver" is selected as receiver type. So if you're using this type of receiver and your MICROBEAST PLUS is brand new, you can skip this section as it is already setup correctly!

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1 https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
  3AMBPlusFblV52%3AReceiverType&action=page&filter=&language=en
2 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:ReceiverType

24 Preset function assignments for Single-line receivers

Spektrum® remote satelite or SRXL/SRXL2 receiver

THR	AIL	ELE	RUD	GER	PIT	AX2	AX3
Throttle [CH5]	Aileron	Elevator	Rudder	Gyro gain	Pitch	Aux [CH6]*	Governor (nitro)

JR® RJ01 DMSS remote satellite

THR	AIL	ELE	RUD	GER	PIT	AX2	AX3
Throttle [CH5]	Aileron	Elevator	Rudder	Gyro gain	Pitch	Aux [CH6]*	Governor (nitro)

PPM serial signal (SPPM)

1	2	3	4	5	6	7	8
Pitch	Aileron	Elevator	Rudder	Aux [CH6]*	Throttle [CH5]	Gyro gain	Governor (nitro)

Futaba® SBus/Sbus2 or BEASTX® FASST compatible receiver

1	2	3	4	5	6	7	8
Aileron	Elevator	Throttle [CH5]	Rudder	Gyro gain	Pitch	Aux [CH6]*	Governor (nitro)

Multiplex® SRXL, JR® XBUS Mode B, JETI® UDI

1	2	3	4	5	6	7	8
Aileron	Elevator	Rudder	Pitch	Throttle [CH5]	Gyro gain	Aux [CH6]*	Governor (nitro)

Graupner® HOTT SUMD

1	2	3	4	5	6	7	8
Pitch	Aileron	Elevator	Rudder	Aux [CH6]*	Throttle [CH5]	Gyro gain	Governor (nitro)

Jeti® ExBus

1	2	3	4	5	6	7	8
Throttle [CH5]	Aileron	Elevator	Pitch	Rudder	Gyro gain	Aux [CH6]*	Governor (nitro)

ALIGN®/FlySky® iBus

1	2	3	4	5	6	7	8
Aileron	Elevator	Throttle [CH5]	Rudder	Gyro gain	Pitch	Aux [CH6]*	Governor (nitro)

Modified assignment with PROEDITION firmware (*)

When using the PROEDITION Firmware upgrade by default the channel for function Aux [CH6] will be used to control the AttidudeControl gain. The control for Aux [CH6] will be moved to channel 9 (or AX4 for Spektrum® radios).

Please note: When you don't want to use a separate channel to control the AttitudeGain or when your radio doesn't have a sufficient amount of output channels, you have to skip the assignment for the AttitudeControl function manually!

25 Adjustment on the device

To get into the Receiver menu press the button on MICROBEAST PLUS and hold it down before(!) and while turning on the receiver power supply. The yellow Menu-LEDs start to cycle immediately. When you release the button, Menu LED A will be flashing and the color of the Status LED will indicate the receiver type that is selected at the moment.

Figure 70

⚠️ Note that in the first menu points of Receiver setup menu no control signal is emitted on [CH5] Output of MICROBEAST PLUS (in case you are using a single-line receiver). At Menu Point **N** (Throttle failsafe setting) the output is activated though to check throttle position! **If you use a speed controller with BEC, disconnect the motor to avoid unintentional starting of the motor!** For a heli with combustion engine you should remove the servo horn from the throttle servo to avoid linkage binding or breaking the servo horn.

25.1 Point A - Receiver type

In order to detect the connected receiver type make sure the receiver is bound to the transmitter and sending out signals. Also make sure the transmitter is setup correctly as shown in the chapter Radio System[1]. Then briefly press the button to start automatic

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Radio_System/en

receiver detection routine. The Status-LED will indicate which type the system is scanning for at the moment. When a valid input signal was detected the receiver type will be set automatically and the system will skip to Menu Point B in case a single-line receiver is used or it will exit and restart when a Standard receiver is used. When detection failed, the system will stay at menu point a and the Status LED will flash in red color. In this case once again make sure your receiver is connected properly to MICROBEAST PLUS, bound to the transmitter and sending out control signals and try again.

Status-LED	Receiver type/Transmission protocol
off	Standard receiver
purple	Remote satellite/receiver connected at remote port
red	No receiver detected
blue	Serial signal at port DI1

25.2 Function assignment

25.2.1 Default function assignment

Refer to the tables above and identify the column that represents your receiver type. Check whether your radio transmits the channels in the given order, respectively each stick function on the radio is using the specified channel number on the left. To know the channel assignment of your transmitter you can check the user manual of the transmitter or look at the servo monitor of the transmitter. In order to load the preset channel assignment hold down the button for at least 2 seconds and release. The yellow Menu-LED will immediately jump to Menu Point **N**.
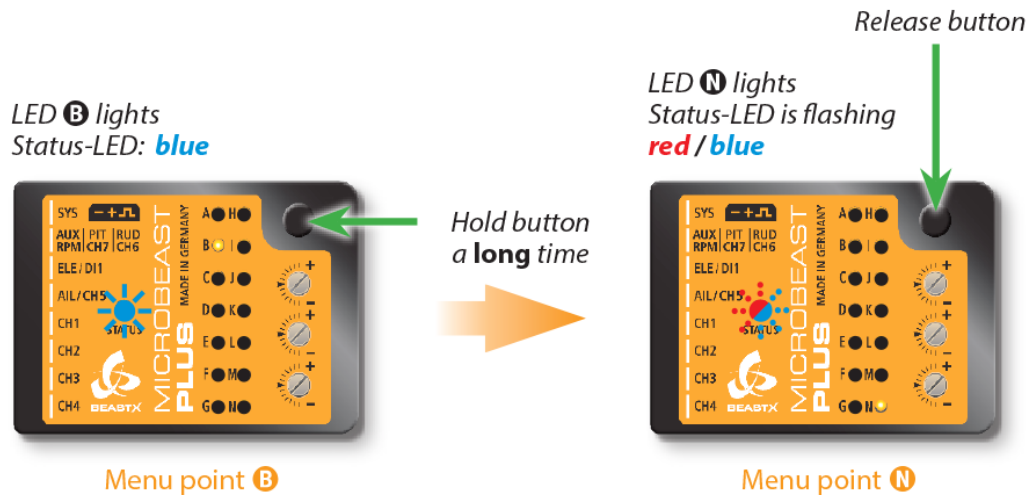
Figure 73

25.2.2 Manual function assignment

In case the channel to function ordering differs from the given tables above on your radio system, you have to manually assign the channel order step by step. This is done by simply actuating the appropriate channel function on your transmitter at each of the menu points B to I (PROEDITION: J). Each menu point represents one control function to assign. When you move the control stick/adjust the channel with the transmitter, a blue flash of the Status-LED indicates that a channel has been detected. It does not matter how far or in what direction you move the stick or in what position the stick/switch was. The channels value itself is not important, but the change of this value is. It is therefore important that only the requested function is activated and not by accident several simultaneously. Otherwise MICROBEAST PLUS may not recognize the allocated channel correctly. If you have moved the wrong stick/switch, just move the correct one afterwards. MICROBEAST PLUS remembers only the last function that was operated and confirms it with blue flashing of the Status-LED.

Press the button after learning each function to save the assignment and to go to the next function. Once a channel was assigned, it is no longer available and is ignored by MICROBEAST PLUS for the remaining process. Thus, after learning of the collective pitch function (at Menu Point B) you can enable the throttle function (remove throttle hold or switch to a linear or V shape curve) and teach the throttle channel by re-operating the thrust stick at Menu Point G. Now the collective pitch channel is no longer considered as this channel has already been assigned previously and MICROBEAST PLUS will detect and use the throttle channel as actuator for throttle function!</p>

The first 6 functions must be assigned as they are necessary for the basic flight control and the button remains locked until you operate a new control function. The other functions are

optional to assign and can be skipped. If special features like AttitudeControl or Headspeed Governor are not installed on your device, the specific menu points for assignment will not be accessible at all.

- The assignment for Aux [CH6] Output at Menu Point H can be skipped by pressing the button without teaching a channel for this function in case it is not used.
- Likewise, the assignment of the channel for internal (nitro) governor can be skipped in case it is not needed or if you don't want to control the governor with a separate channel, e. g. if your transmitter does not provide enough free channels. By skipping the assignment the internal governor function will use a different operating mode that allows to control it via the throttle channel (set at Menu Point G) if you like. When used in an electric model the internal governor is controlled by the throttle channel (set at Menu Point G) in general. In this case the assignment at Menu Point I can be skipped anyway, as an assignment will have no effect.
- Finally at Menu Point J you have to assign the channel that is used to engage the AttitudeControl/rescue stabilization (only when you've installed the PROEDITION Upgrade on your device). Again, this can be skipped if not needed or if you don't want to use a separate channel (or in case you haven't enough free channels left). AttitudeControl can still be used then. In this case the channel for the tail gyro gain(set at Menu Point F) is used to engage AttitudeControl or you can enable it separately using the Bank Switch feature. Please see the section about using AttitudeControl for further details.

-

Menu point	Function
B	Collective
C	Aileron
D	Elevator
E	Rudder
F	Tail gyro/Bank switch
G	Throttle [CH5]
H	Aux Output [CH6]
I	Governor control (nitro only)
J	AttitudeControl gain

If the Status-LED lights in **red color** this means either there is no valid remote control signal available or that you did try to assign two or more channels to a function. So check if the receiver is connected and powered properly and that you're only moving one channel at a time when trying to do the manual function assignment.

25.3 Point N - Throttle failsafe

At Menu Point N you program the failsafe position for the throttle channel. In case the single-line signal is interrupted during operation the throttle servo/speed controller connected to the [CH5] Output is automatically moved to this position. This particularly is the case:

- if using a single-line receiver that turns of the single-line signal in case of signal loss between receiver and transmitter (e.g. Spektrum® satellite receiver or Graupner® receiver in „SUMDOF" mode)
- if the connection between MICROBEAST PLUS and receiver gets disconnected
- during initialization when the transmitter was not switched on before or was switched on too late and the radio link between transmitter and receiver is not established yet

Additionally the failsafe position is used by the internal Governor function in case you're using a helicopter with electric drive system. Here the throttle is moved to the stored failsafe position when you set the Governor to Autorotation bailout mode!

Note:

- The fail-safe function is not effective if the receiver continues sending data even if the radio link is interrupted. In this case the failsafe setting of the remote control system may take precedence.
- To avoid accidents, you should program electric motors to "off" and reduce throttle on nitro helicopters to idle. The other control functions will be set to „position hold" in case of signal interruption. For these setting a failsafe position is not provided.

To teach the failsafe position simply set the throttle channel on your remote control to the desired position and press the button briefly. **If you did not connect a function to CH5 Output and don't need throttle failsafe, press the button to complete setup anyway!**
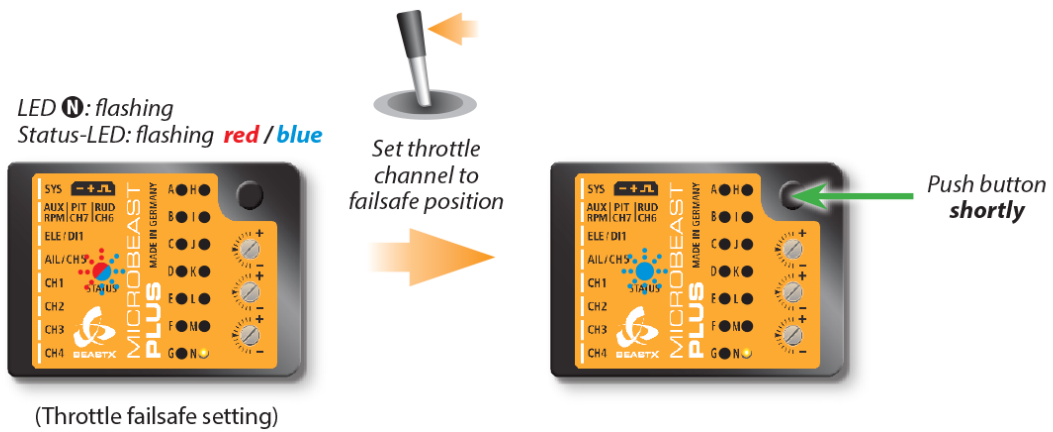
Figure 75   noframe

During failsafe setting the CH5 Output is enabled and can be controlled by the transmitter channel that is assigned to throttle function. This allows to check your throttle position in reality. When using electric models make sure the motor is disconnected from the ESC or the pinion is removed from the motor, so that it will not drive the model by accident.

26 Setup with StudioX

When StudioX is started and your MICROBEAST PLUS was detected by StudioX, click the Control Setup tab to show the adjustment options of RECEIVER MENU. The options you see here are basically similar to the Menu Points you can change directly at the device. At the top of the screen you can see which type of input signal is selected at the moment. The rows below show what channels are assigned to which control functions. Finally, in the last row you can see the internal value for throttle failsafe position that is set at the moment.

Choose **Control setup**

Here you can see current receiver system, function assignment and failsafe setting

26.1 Receiver type

In order to detect the connected receiver type make sure the receiver is bound to the transmitter and sending out signals. Also make sure the transmitter is setup correctly as shown in the chapter Radio System[1]. Press the "Scan" button to start automatic receiver detection routine. The Status-LED on the device and the display will indicate which type the system is scanning for at the moment. When a valid input signal was detected the receiver type will be set automatically and a dialog will appear in case a single-line receiver is used. This asks how to proceed with function assignments. When a Standard receiver is used the system will restart directly and you can leave the setup screen as there . When detection fails once again make sure your receiver is connected properly to MICROBEAST PLUS, bound to the transmitter and sending out control signals and try again.

Click scan button...

...and wait until scan is finished

If scan was successful the dialog will show up

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Radio_System/en

26.2 Function assignment

26.2.1 Default function assignment

Refer to the tables above and identify the column that represents your receiver type. Check whether your radio transmits the channels in the given order, respectively each stick function on the radio is using the specified channel number on the left. To know the channel assignment of your transmitter you can check the user manual of the transmitter or look at the servo monitor of the transmitter. In order to load the preset assignment choose **Load defaults** from the "New receiver detected!" dialog. Immediately after that the "Failsafe" dailog will show up.

26.2.2 Manual function assignment

In case the channel to function ordering differs from the given tables above on your radio system, you have to manually assign the channel order step by step. This is done by simply actuating the appropriate channel function on your transmitter at each of the menu points B to I (PROEDITION: J). Each menu point represents one control function to assign. When you're ready click **Teach** in the "New receiver detected!" dialog and start with function allocation at Menu Point B. When you move the control stick/change the channel output on the transmitter, a blue flash of the Status-LED indicates that the channel has been detected. The setup will jump to the next menu point automatically. It does not matter how far or in what direction you move the stick or in what position the stick/switch was. The channel's value itself is not important, but the change of this value is. **It is therefore important that only the requested function is activated and not by accident several simultaneously!** Otherwise MICROBEAST PLUS may not recognize the allocated channel correctly. Once a channel was assigned, it is no longer available and is ignored by MICROBEAST PLUS for the remaining process. Thus, after learning of the collective pitch function (at Menu Point B) you can enable the throttle function (remove throttle hold or switch to a linear or V shape curve) and teach the throttle channel by re-operating the thrust stick at Menu Point G. Now the collective pitch channel is no longer considered as this channel has already been assigned previously and MICROBEAST PLUS will detect and use the throttle channel as actuator for throttle function!

Choose **Teach**

At first move the stick for collective. Make sure only one channel is moved on the radio otherwise MICROBEAST PLUS is not able to detect the movement!

Proceed with the other function in similar manner

The optional functions can be skipped if not needed. See text below!

When skipping the channel number will be shown as -

The first 6 functions must be assigned as they are necessary for the basic flight control. The other functions are optional to assign and can be skipped. If special features like AttitudeControl or Headspeed Governor are not installed on your device, the specific menu points for assignment will not be shown at all.

- The assignment for Aux [CH6] Output can be skipped by pressing the "Skip" button without teaching a channel for this function in case it is not used.
- Likewise, the assignment of the channel for internal governor can be skipped in case it is not needed or if you don't want to control the governor with a separate channel, e. g. if your transmitter does not provide enough free channels. By skipping the assignment the internal governor function will use a different operating mode that allows to control it by the throttle channel if you like. When used in an electric model the internal governor is controlled by the throttle channel in general. In this case the assignment can be skipped anyway, as it will have no effect.
- Finally, you can assign the channel that is used to engage the AttitudeControl/rescue stabilization (only available you've installed the PROEDITION Upgrade on your device). Again this can be skipped if not needed or if you don't want to use a separate channel or in case you have no more free channels left). AttitudeControl can still be used then. In this case the channel for the tail gyro gain is used to engage AttitudeControl or can be enabled separately using the Bank Switch feature. Please see the section about using AttitudeControl for further details.

-

    If the Status-LED lights in **red color** this means either there is no valid remote control signal available or that you did try to assign two or more channels to a function. So check if the receiver is connected and powered properly and that you're only moving one channel at a time when trying to do the manual function assignment.

26.3 Throttle failsafe

After you've set the control functions you will be asked to program the failsafe position for the throttle channel. In case the single-line signal is interrupted during operation, the throttle servo/speed controller connected to the [CH5] Output is automatically moved to this position. This particularly is the case:

- if using a single-line receiver that turns of the single-line signal in case of signal loss between receiver and transmitter (e.g. Spektrum® satellite receiver or Graupner® receiver in „SUMDOF" mode)
- if the connection between MICROBEAST PLUS and receiver gets disconnected

- during initialization when the transmitter was not switched on before or was switched on too late and the radio link between transmitter and receiver is not established yet

Additionally the failsafe position is used by the internal Governor function in case you're using a helicopter with electric drive system. Here the throttle is moved to the stored failsafe position when you set the Governor to Autorotation bailout mode!

Note:

- The fail-safe function is not effective if the receiver continues sending data even if the radio link is interrupted. In this case the failsafe setting of the remote control system may take precedence.
- To avoid accidents, you should program electric motors to "off" and reduce throttle on nitro helicopters to idle. The other control functions will be set to „position hold" in case of signal interruption. For these setting a failsafe position is not provided.

To teach the failsafe position choose "Proceed" when asked to teach the failsafe position and set the throttle channel on your remote control to the desired position. Then press **Set** to save the position. If you did not connect a function to CH5 Output and don't need throttle failsafe, press **Cancel** to complete setup!

After function assignment click **Proceed** to start teaching the throttle failsafe position

Move throttle to lowest position at which the motor is turned off

Click **Set** to store the setting

⚠️ **During failsafe setting the CH5 Output is enabled and can be controlled by the transmitter channel that is assigned to throttle function.** This allows to check your throttle position in reality. When using electric models make sure the motor is disconnected from the ESC or the pinion is removed from the motor, so that it will not drive the model by accident.

27 SETUP MENU (Basic heli setup)

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu intro[2] and the translation is 100% complete.

MICROBEAST PLUS offers different type of menu structures for different needs of adjustment. Before the first flight MICROBEAST PLUS has to be adjusted to your helicopter mechanics and its components. This basic setup is done in the SETUP MENU.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+intro&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_intro

28 Adjustment on the device

If not already done power up your radio and MICROBEAST PLUS and wait until initialization sequence is finished. At first the system will calibrate to the radio system, Menu LEDs H to N will cycle up and down. **During this time do not move the sticks on your radio as the system is learning the stick mid positions.** In the second step MICROBEAST PLUS checks if the sensors are working correctly and learns the sensor rest positions. Here Menu LEDs A to G will cycle up and down. **During this time do not move the helicopter.** When initialization is completed the Status LED will change to blue or purple color indicating the current gyro mode. If you can't get through the initialization sequence either because LEDs A-G or LEDs H-N don't stop cycling please read the FAQ[1]. Note that during initialization pressing the button has no significant effect and you will not be able to enter any menu.

Now when the system is ready to operate press the button and hold it for at least 3 seconds. First the Menu-LED next to Menu Point A will begin to flash and then after a while will be solid. Now and only now you can release the button.

Figure 78

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1   https://wiki.beastx.com/./index.php/Help:FAQ:Powerup/en
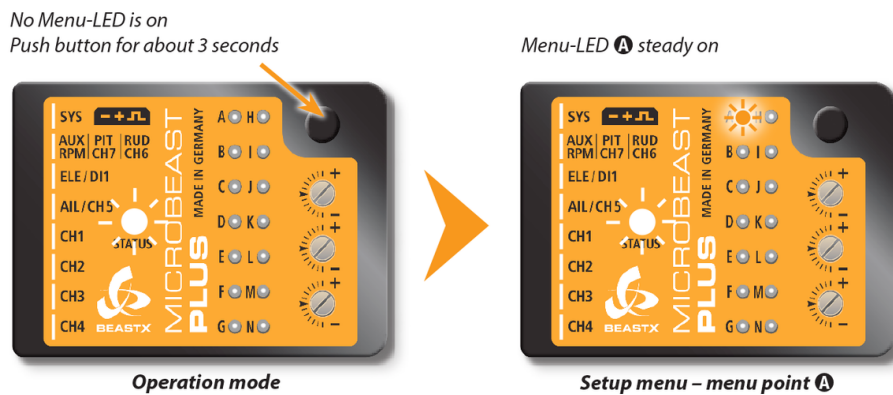
28.1 Button control

Proceed step by step through the different menu points reaching from A to N and perform the basic adjustment as described in the following. By briefly pushing the button at each step you will save the current setting and proceed to the next step. To leave the SETUP MENU you have to go through all menu points. After pushing the button at the last menu point (depending on installed firmware features and receiver type this either can be SETUP MENU point M[2] or N[3] or GOVERNOR MENU point F[4] or H[5]) you will exit the SETUP MENU and the system is ready for operation again.

Figure 79

If you need to change some specific setting later onwards you can enter the SETUP MENU again as described above and skip menu points by only pressing the button without changing anything at these points. So you can navigate to the desired menu point by simply pressing the button several times until you reach this point. Then after you have finished the adjustment, again press the button repeatedly to proceed to the end of the menu and to get back into operation mode.

- In operation mode no MENU LED is glowing!
- Just for your info at this step: There is another menu called PARAMETER MENU. This is entered by just briefly pressing the button from operation mode. Here the Menu LEDs are flashing quickly. If you see this condition you've entered the wrong menu. Skip through the menu by repeatedly pressing the button until back in operation mode and then retry to enter SETUP MENU, this time holding the button longer so that Menu LED A lights solid!

When in SETUP MENU you can reset all settings of the device to their factory default value. To do so hold down the button at any menu point of SETUP MENU for at least 10 seconds, then release. After doing so you will not be able to fly anymore! You have to do all the basic heli setup again and also all the other settings from PARAMETER MENU will be reset!! There are 2 exceptions:

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2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_M
3   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_N
4   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_F
5   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_F

- When you press down and hold the button at Menu Point H (Servo trims) only the servo trims will be reset to 0. Holding the button will not cause a full factory reset here.
- For the settings of RECEIVER MENU there is no such factory reset intended. The reset in SETUP MENU will only reset settings that are not receiver related. To change receiver related things like receiver type, function assignment or throttle failsafe simply perform the setup of RECEIVER MENU again.

⚠ **Never fly while MICROBEAST PLUS is in SETUP MENU or any other menu!** In this condition the gyro control and the stick controls are disabled.

28.2 Stick control

In SETUP MENU we use the sticks of your transmitter to change settings and interact with the menu. Most often the rudder stick is used to change or adjust a value, i. e. choose the mounting direction of the device or trim a servo center position. And on the other hand the aileron stick (roll) is used to switch between menu items, i.e. cycle through the servos when doing the trimming. There can be exceptions, so sometimes the sticks simply do what they are supposed to do (i.e. pitch moves the pitch when doing the pitch adjustment), but notice that in general the menu control with rudder plus aileron is always the same. If not it will be mentioned in the instructions.

29 Basic setup with StudioXm

When StudioXm is started and your MICROBEAST PLUS is connected to StudioXm choose **Basic heli setup** from the device overview page to enter the setup wizard, which will lead through the basic setup procedure of the SETUP MENU (note that the menu is only accessible after all settings have been loaded from the device and when the device is in operation mode! See general informations about StudioXm[1] if you need further instructions). The options you see here are basically similar to the SETUP MENU points A to M you can change directly at the device, but there might be little differences because of the different nature of the interactive setup. The adjustment is basically done using the buttons or dials in the app, sometimes interaction with your transmitter is necessary. Click **Next** at the bottom of each setup step to skip to the following Menu Point. From the dropdown list at the top also you can directly access specific setup items if necessary, but for the first time setup it is recommended to proceed step-by-step beginning at *Device Orientation* and ending with *Cyclic directions*. Adjustment procedure in short words is described at each step. If necessary refer to this manual if you need further assistance. When the setup is finished click the **Home button** in the top left corner to get back to the overview screen or disconnect the device and deactivate the BLE2SYS module by clicking the **Disconnect button** in the top right corner when adjustment is finished completely.

Note: When you cannot access the menu options because the system does not finish initialization sequence, make sure the radio system is powered up and bound correctly and proceed with RECEIVER MENU adjustment[2] first, if necessary!

⚠ **Always disconnect your BLE2SYS from the app when you attempt to fly in order to deactivate the module or disconnect it physically from your MICROBEAST PLUS.** When the module is active this can cause interference with your radio system as the BLE2SYS is also sending on the 2.4GHz band!

Also make sure MICROBEAST PLUS is in operation mode! When it is still in one of the adjustment menus the gyro control and the stick controls may be disabled and you will not be able to fully control your helicopter!

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1   https://wiki.beastx.com/./index.php/StudioXm/en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:ReceiverType/en

30 SETUP MENU A - Device orientation

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu A[2] and the translation is 100% complete.

MICROBEAST PLUS can be mounted in nearly all possible orientations. The only restriction is that the main connection terminal has to point in or against flying direction and the egdes of the unit must be parallel to the rotation axis.

Figure 82
Status LED **off**

Figure 83
Status LED **purple flashing**

Figure 84
Status LED **purple**

Figure 85
Status LED **red flashing**

Figure 86
Status LED **red**

Figure 87
Status LED **blue flashing**

Figure 88
Status LED **blue**

Figure 89
Status LED **red/blue**

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1 https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%3AMBPlusFblV52%3ASetupmenu+A&action=page&filter=&language=en

2 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_A

31 Adjustment at the device

Select the orientation that the device is actually mounted on your heli by choosing the suitable Status LED color. You can switch between the options by briefly moving the rudder stick to one or the other direction. The Status-LED will change the color accordingly.

Status-LED	Device orientation
off	flat, sticker on top side, socket points in flight direction
purple flashing	vertical, button is on the top, socket points in flight direction
purple	flat inverted, sticker on bottom side, socket points in flight direction
red flashing	vertical inverted, button is on the bottom, socket points in flight direction
red	flat, sticker on top side, socket points to the tail boom
blue flashing	vertical, button is on the top, socket points to the tail boom
blue	flat inverted, sticker on bottom side, socket points to the tail boom
red/blue	vertical inverted, button is on the bottom, socket points to the tail boom

32 Setup with StudioXm

Choose the orientation that the device is actually mounted on your heli by choosing the matching type in the app.

33 SETUP MENU B - Swashplate frequency

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu B[2] and the translation is 100% complete.

Setup menu point **B** is for selecting the servo update frequency (pulse rate) for the swashplate servos. To optimize the performance of MICROBEAST PLUS the rule is: the higher the better! With high update frequency the system will recalculate correctional movements more often and in consequence will send new commands to the servos with a higher frequency. Nevertheless, this will cause the servos to make more position changes at a given timeframe. In case your servo is not built for this kind of application this can cause an unusual high power consumption of the receiver power supply and cause the servos getting very hot. When this happens, reduce frequency immediately to prevent your servos from getting damaged. Only go as high as recommended by the servo manufacturer, or even lower when the servo is not capable of handling such high frequency in field use.

When using a servo that allows a higher frequency as MICROBEAST PLUS offers or that allows a maximum frequency which is not choosable, please select the next lower frequency that is closest to the given frequency or set the frequency with StudioXm PC Software or mobile App. **Note:** Using a lower frequency is always possible. Only too high frequencies can damage the servo and/or will cause the servo to not work properly. Here[3] you can find a list of parameters for the most common servos. Please understand that we can not list all servo types. We also can not guarantee the accuracy of this data. Ask the manufacturer of the servos or your servo dealer for detailed information.

⚠ **If you do not know the maximum pulse rate tolerated by your servos do not select more than 50Hz driving frequency.** A higher driving frequency can lead to failure of the servos!

With high frequencies, some servos run in a jerky manner, especially the fast ones with coreless or brushless servos. This is due to the high update rate that the servo receives. This is not critical and will not impact flight performance.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+B&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_B
3   https://wiki.beastx.com/./index.php/The_BEASTX_servo_list/en

34 Adjustment on the device

To select the desired servo frequency move the rudder stick repeatedly in one direction until the Status-LED lights in the correct color at SETUP MENU point B:

Status-LED	Swashplate servo frequency
purple	50 Hz
red flashing	65 Hz
red	120 Hz
blue flashing	165 Hz
blue	200 Hz

Note: When you set a different frequency using the StudioX or StudioXm App the Status LED will be **off**. You can change back to a preset setting by tapping the rudder stick as described, but this will remove your custom setting!

35 Setup with StudioXm

Choose a preset frequency by clicking one of the provided buttons for Menu Point B (Swashplate frequency) or set a custom frequency by directly changing the value with the dial or buttons.

36 Servo connection

After setting the correct update frequency plug in the swashplate servos, but do not install the servo horns yet as the servos could bind and get damaged on first power up!
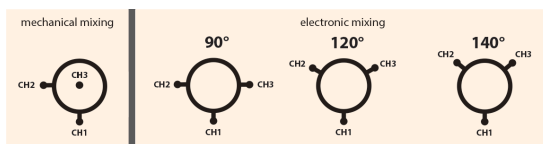
Figure 91
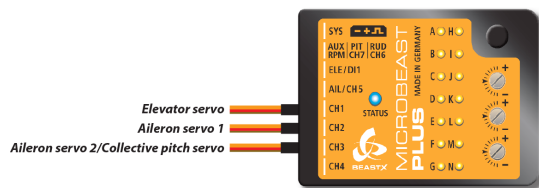
Figure 92

With electronic swashplate mixing the two aileron servos have to be connected to CH2 (=left) and CH3 (=right). With a mechanical mixed head (H1) the aileron servo connects to CH2 and collective pitch servo to CH3. Plug the the elevator servo into CH1 port. When using a scale helicopter with 90 degrees eCCPM you can connect a second elevator servo to CH7 output on the MICROBEAST PLUS. Note that CH7 only is a signal output, so you must power the servo from elsewhere, i.e. by getting power from the SYS-port or CH5 using a Y-adapter (for + and - only!). Anyhow, with large scale helicopters we recommend to use a separate power distribution unit to which you connect the servos. This will be the better option in regards to robust and fail safe power distribution.

When you route the wire leads in your model make sure that there is no tension passed to the MICROBEAST PLUS. Make sure that MICROBEAST PLUS is able to move freely, so no vibrations get passed onto the unit by the wire leads. It is not recommended to bundle or tie down the leads close to the MICROBEAST PLUS. On the other hand the wires must be attached so that they are unable to move the MICROBEAST PLUS during the flight caused by g-force. In particular, do not use any shrink tubing or fabric hose to bundle or encase the wiring in close proximity to the point at which the cables are plugged into the MICROBEAST PLUS. This makes the cables stiff and inflexible and can cause vibrations being transmitted to MICROBEAST PLUS.

37 SETUP MENU C - Rudder pulse width

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu C[2] and the translation is 100% complete.

With Setup menu point **C** you define the (center) pulse width for the rudder servo. Almost all available rc servos work with 1500 - 1520 μs. But there are a few special rudder servos on the market which use a different center position pulse length.

Figure 93

Here[3] you can find a list of parameters for the most common servos. Please understand that we can not list all servo types. If a servo needs a special pulse length this usually is mentioned in the data sheet of the servo, mentioned on the packaging or directly printed on the servo. Ask the manufacturer of the servos or your local dealer for detailed information. If in doubt about the center pulse for your servo use the setting 1520 μs. It is very likely that the servo will work with this pulse length. Also when the servo is rated with 1500 μs center pulse use this setting. There is barely any difference between 1500 and 1520

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+C&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_C
3   https://wiki.beastx.com/./index.php/The_BEASTX_servo_list/en

µs and the operating pulse range is nearly the same, so these servos are all of the same type.

There is a relationship between the setting of the rudder servo center pulse length and the (rudder frequency[4]). For technical reason only special gyro servos with 760µs pulse width can be used with frequencies higher than 333Hz, as standard pulse width would be too long and would not fit into the pulse!

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4   `https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Setupmenu_D`

38 Adjustment on the device

To select the desired rudder servo pulse width (servo type) move the rudder stick repeatedly in one direction until the Status-LED lights in the correct color at SETUP MENU point C:

Status-LED	Rudder servo center pulse length
purple	760
red	960
blue	1520

Note: When you've set a different pulse width using the StudioXm App the Status LED will be **off**. You can change back to a preset setting by tapping the rudder stick as described, but this will remove your custom setting!

39 Setup with StudioXm

Choose a preset rudder pulse width by clicking one of the provided buttons for Menu Point C (Rudder pulse width) or set a custom pulse width by directly changing the value with the dial or buttons.
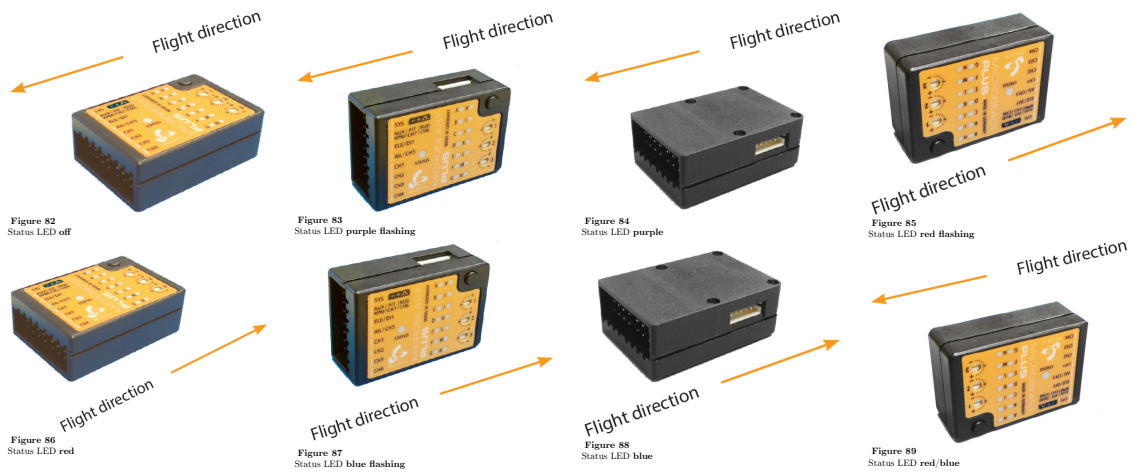
40 SETUP MENU D - Rudder servo frequency

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu D[2] and the translation is 100% complete.

As with the swashplate servos at Menu Point B you can select the update frequency for the rudder servo here. For best tail gyro performance the rule is: the higher the better! A good rudder servo should be capable of running with at least 270Hz. With high update frequency the system will recalculate correctional movements more often and in consequence will send new commands to the servo with a higher frequency and allow for better positioning and more locked in feeling. Nevertheless, this will cause the rudder servo to make more position changes at a given timeframe. In case the servo is not built for this kind of application this can cause an unusual high power consumption of the receiver power supply and cause the servo getting very hot. When this happens, reduce frequency immediately to prevent your servo from getting damaged. Only go as high as recommended by the servo manufacturer, or even lower when the servo is not capable of handling such high frequency in field use.

When using a servo that allows a higher frequency as MICROBEAST PLUS offers or that allows a maximum frequency which is not choosable, please select the next lower frequency that is closest to the given frequency or set the frequency with StudioXm PC Software or mobile App. **Note:** Using a lower frequency is always possible. Only too high frequencies can damage the servo and/or will cause the servo to not work properly. Here[3] you can find a list of parameters for the most common servos. Please understand that we can not list all servo types. We also can not guarantee the accuracy of this data. Ask the manufacturer of the servos or your servo dealer for detailed information.

⚠️ **If you do not know the maximum pulse rate tolerated by your servos do not select more than 50Hz driving frequency.** A higher driving frequency can lead to failure of the servo!

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+D&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_D
3   https://wiki.beastx.com/./index.php/The_BEASTX_servo_list/en

With high frequencies, some servos run in a jerky manner, especially the fast ones with coreless or brushless servos. This is due to the high update rate that the servo receives. This is not critical and will not impact flight performance.

41 Adjustment on the device

To select the desired servo frequency, move the rudder stick repeatedly in one direction until the Status-LED lights in the correct color. Please note that depending on the rudder servo center pulse width chosen at Menu Point C, you may not be able to select a frequency higher than 333Hz!

Status-LED	Rudder servo frequency
purple	50 Hz
red flashing	165 Hz
red	270 Hz
blue flashing	333 Hz
blue	560 Hz

Note: When you set a different pulse width with StudioXm the Status LED will be **off**. You can change back to a preset setting by tapping the rudder stick as described, but this will remove your custom setting!

42 Setup with StudioXm

Choose a preset frequency by clicking one of the provided buttons for Menu Point D (Rudder frequency) or set a custom frequency by directly changing the value with the dial or buttons.

43 Manuals:MBPlusFblV52:Setupmenu E

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu E[2] and the translation is 100% complete.

Next we have to setup the rudder gyro. For this we set the limits of the tail pitch control and the control directions, so the gyro will not move the servo further than allowed and in correct direction. In first line the rudder limits are necessary to prevent the gyro from moving the servo over the mechanical limits and damaging the servo. But when adjusting the limits please note that the optimum throw is not necessarily determined by the maximum possible control travel of the tail pitch slider. When the tail mechanics allow a very high range of pitch it may be advisable to adjust the limits based on the maximum allowed angle of attack of the tail rotor blades that will not lead to an aerodynamic stall of the blades. Such stalls can cause very bad stopping behavior like overshooting of the tail when stopping from rotation and can also cause bad tail response to rudder stick input when performing directional changes. Keep this in mind when adjusting the tail rotor endpoints. Check the helicopter's manual to find out how much tail pitch is useful and where to set end points.

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+E&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_E

44 Mechanical setup of the rudder servo

In the following of this setup step you will be asked to connect the rudder servo to MICROBEAST PLUS. When doing so plug the servo connector into CH4 output at the device. Watch out for correct polarity, the black or brown minus wire must be the clostest to the bottom of the device.
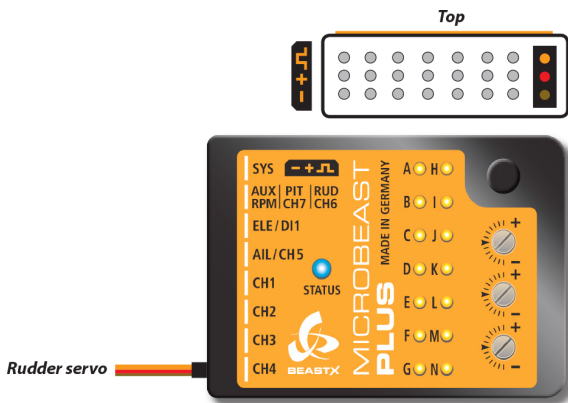
Figure 95

Then attach a servo horn to the rudder servo in such a way that the tail linkage rod forms a 90 degree angle to the servo horn (or as close as possible) and adjust the linkage rod as described in the manual for your helicopter. For most helicopters the tail pitch slider should be centred and the tail rotor blades will then have some positive pitch to compensate for the torque of the main rotor.
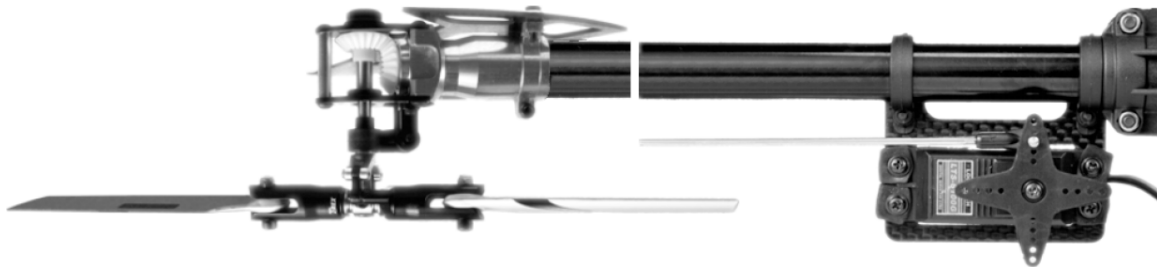
Figure 96

This mechanical adjustment especially is important when using the tail gyro in Normal-Rate mode. If the adjustment was not done properly the helicopter will constantly drift to one side or the other on the rudder axis. When using the tail gyro only in HeadingLock mode this adjustment is not so critical. Here the gyro will actively control the rudder so the helicopter does exactly follow the commands of the rudder stick. Anyhow, for optimum performance of the gyro a good mechanical adjustment is essentially!

45 Adjustment on the device

Using the EasySetup adjustment on the device this setup is separated in two Menu Points. At Menu Point E we set the rudder limits, at Menu Point F we teach the control direction. At first connect the rudder servo to [CH4] port of MICROBEAST PLUS as described above now.

45.1 SETUP MENU E - Rudder limits

To adjust the servo limits move the rudder stick in one direction until the servo reaches the maximum endpoint without any binding or stall. Release the rudder stick when correct position is reached. If you moved the servo too far you can steer the stick to the opposite direction and move the pitch slider a short way back. Also you can tap the stick briefly to only make minor adjustments. Once the correct endpoint has been found, don't move the rudder stick anymore and wait a second for the Status-LED to flash. This will indicate that the new position was stored. (If necessary you can change position as often as you want, but always wait until the Status-LED flashes when finished and proceeding to the next step!)

Now adjust the opposite direction. For this again use the rudder stick and hold it to move the servo/tail pitch slider into the other direction. Proceed as described to set the maximum endpoint and again wait until the position has been indicated with the flashing Status LED.

When both positions have been set skip to the next Menu Point F by pushing the button on the device briefly.

45.2 SETUP MENU F - Rudder control direction

1. Move the rudder stick and check the rudder direction on the helicopter. **If the stick is moving the servo into the wrong direction use the servo reverse function of your transmitter** and reverse the rudder channel to set stick control direction correctly.

2. Now set the rudder direction of the MICROBEAST PLUS gyro: When you move the rudder stick to the **right**, the Status LED must light up or flash in **blue** color. When you move the rudder stick to the **left**, the Status LED must light up or flash in **red** color. **When the display is inverted (red = right and blue = left) reverse the display (internal control direction) by tapping the aileron(!) stick once.**

3. Optional: When you move the rudder stick to full deflection, the Status LED should light solid, not just flash. If this is not the case, **increase the servo throw/endpoint of the rudder channel in the transmitter just as far so that the Status LED changes from flashing to solid when the rudder stick reaches the end position**. (Note: Do not increase the endpoint too much in the transmitter. We need an exact match of full stick position and stick end position. So the Status LED should just change from flashing to solid when raching the end position.)

Always set servo direction in the transmitter first, then check the display on the MICROBEAST PLUS or in the software and change the internal control direction if it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the gyro in which direction it must move the servo.** Be very conscientious when doing this setup step, as wrong gyro direction will cause loss of control during takeoff and you probably crash the helicopter!

In addition you can check the gyro direction by turning the helicopter by hand around its vertical axis. When turning the heli the gyro must move the servo so that the rotor will produce a counter action agains the turn direction. So later in flight the gyro will stop the helicopter from unwanted movement. Here the LED will light up in **blue** color when you turn the helicopter to the **right** and light up in **red** when you turn it to the **left**. So you can get a little reminder when you do not know which is the correct stick direction to setup, when you need to do the setup later on the field!

46 Setup with StudioXm

1. When you move the rudder stick to full deflection, the Status LED on the MI-CROBEAST PLUS should light solid and the label *right* or *left* should change the color accordingly. If the stick is not moving far enough, you will see the message "Increase!" In this case **increase the servo throw/endpoint of the rudder channel in the transmitter just as far so that the Status LED changes from flashing to solid when the rudder stick reaches the end position** and the label will disappear in the software. Repeat this for the other direction. Note: Do not increase the endpoint too much in the transmitter. We need an exact match of full stick position and stick end position. So the Status LED should just change from flashing to solid when raching the end position.

Stick moved into one direction, deflection not enough

Stick moved into one direction, maximum position reached

2. Now connect the rudder servo to [CH4] port of MICROBEAST PLUS as described above and check the rudder direction on the helicopter. **If the stick is moving the servo into the wrong direction use the servo reverse function of your transmitter** and reverse the rudder channel to set stick control direction correctly. Now when the servo is moving correctly set the rudder direction of the MICROBEAST PLUS gyro: When you move the rudder stick/servo to the **right**, the Status LED must light up or flash in **blue** color. When you move the rudder stick to the **left**, the Status LED must light up or flash in **red** color. **When the display is inverted (red = right and blue = left), reverse the display (internal control direction) by choosing either *normal* or *inverted* in the software.**

Stick moved left, but label shows right

Stick moved left, label shows left

3. Finally adjust the servo limit by changing the values in the two adjustment boxes for each direction. To do so, carefully use the rudder stick to move the servo to the endpoint (watch out to not jam the servo) and increase/decrease the endpoint as necessary.

Always set servo direction in the transmitter first, then check the display on the MICROBEAST PLUS or in the app and change the internal control direction if it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the gyro in which direction it must move the servo.** Be very conscientious when doing this setup step, as wrong gyro direction will cause loss of control during takeoff and you probably crash the helicopter!

In addition you can check the gyro direction by turning the helicopter by hand around its vertical axis. When turning the heli the gyro must move the servo so that the rotor will produce a counter action agains the turn direction. So later in flight the gyro will stop the helicopter from unwanted movement.

47 Extra info: Why setting stick endpoints?

This ensures that control range of the radio system matches the internal range of MI-CROBEAST PLUS. Later when setting the control style you can adjust how fast your helicopter should turn around the vertical axis. To get reproducable results you have to match your radio to the system!

48 Extra info: How the gyro works!

The gyro always tries to steer in the opposite direction of the rotation that is applied to the helicopter. If you move the helicopter by hand around its vertical axis, the gyro must actuate a rudder servo movement to compensate this rotation. If for example you move the nose of the helicopter to the left (tail moving to the right), the gyro has to steer right the same way as you would steer right with the rudder stick, so that the tail is pushed back to the left.}}
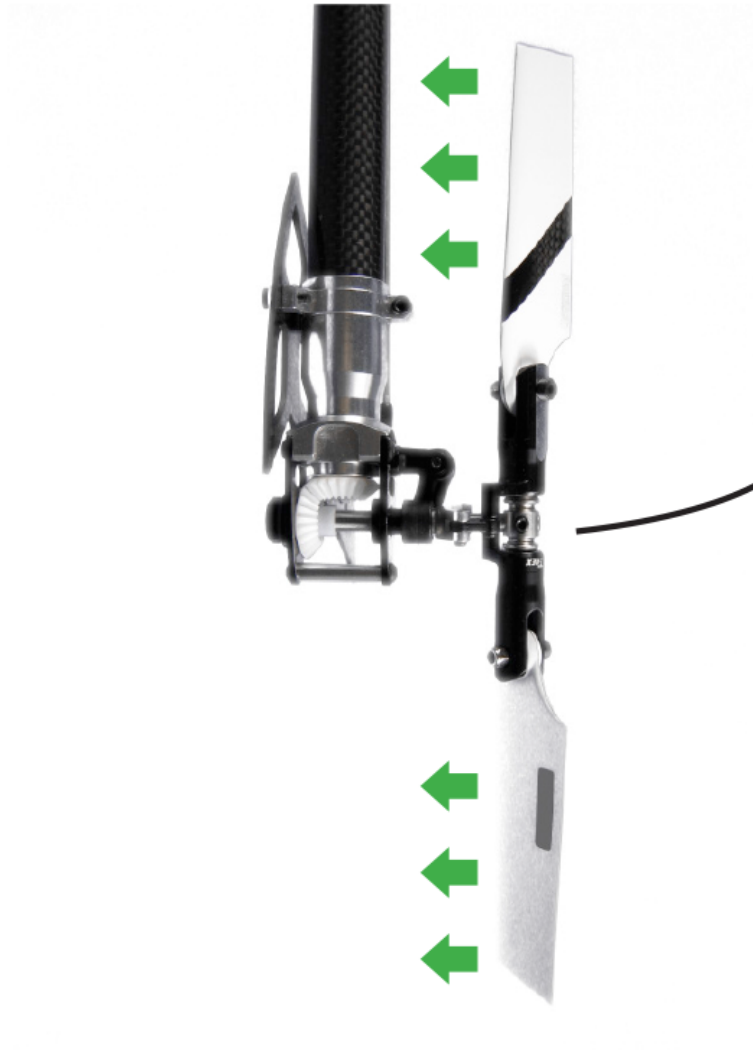
Figure 97   When moving the tail to the right by hand (nose of the heli to the left), the gyro will steer to the right, so the tail is pushed back to the left.
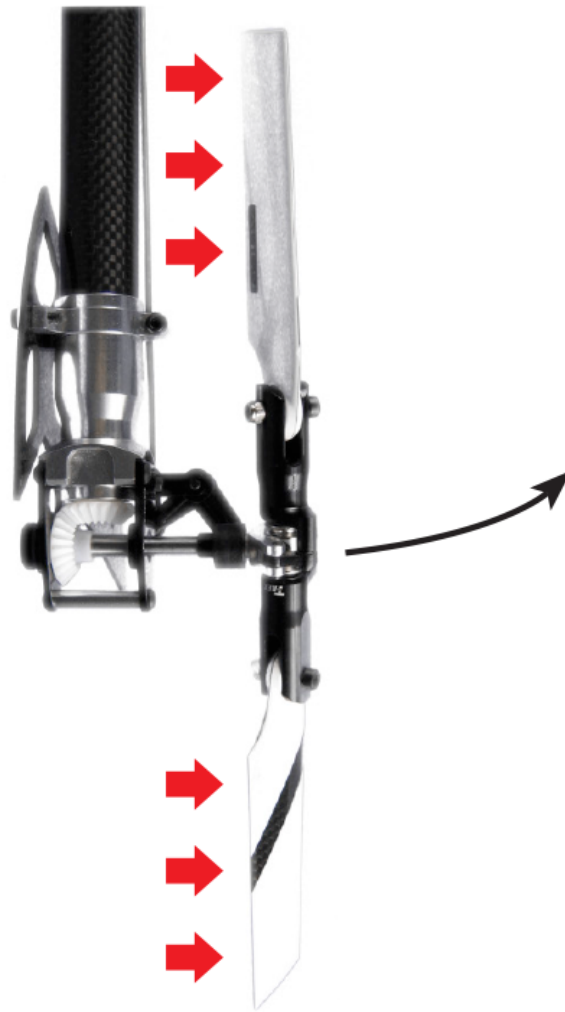
Figure 98   When moving the tail to the right by hand (nose of the heli to the left), the gyro steers to the left and so the tail will move even further!

Please note: This only shows an example for the ALIGN T-Rex 500 helicopter. Actually the tail pitch slider may move to a different position on your helicopter. This mainly depends on how the tail blade grips are controlled and how the tail mechanics is constructed in general. Check the manual of your helicopter to find out which directions the rudder must move on your helicopter.

49 SETUP MENU G - Collective and cyclic pitch mixing (CCPM)

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu G[2] and the translation is 100% complete.

At SETUP MENU point G you have to choose the electronic mixing type for the swashplate servos or select "no mixing" for switching off the mixing in case your helicopter has a mechanical swashplate mixer. For the electronic mixer you can choose one of the presets for 90°, 120° and 135°/140° swashplates that are suitable for most helicopters on the market. Also you can set nearly any other kind of swash mixing and swash geometry with the StudioX app if required. When you're using a multiblade rotorhead that requires to adjust the swash phasing electronically this can be done with the StudioX app as well.Which kind of CCPM your helicopter uses can be read in the manual for your helicopter.
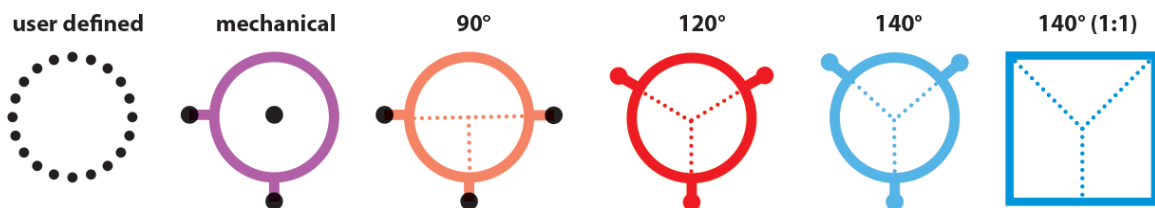
Figure 99

⚠ Never set any kind of swash mixing in your transmitter even when electronic mixing is required! Deactivate the swashplate mixing in your transmitter or set it to mechanical mixing (which is often called "normal", "H1" or "1 servo" mixing), so that each stick function only moves one receiver output channel. The swashplate mixing is all done by MICROBEAST PLUS!

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3ASetupmenu+G&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_G

50 Adjustment on the device

The color and state of the Status-LED shows the currently selected mixing type. To select the desired type tap the rudder stick repeatedly in one direction until the Status-LED lights in the correct color:

Status-LED	Swashplate mixer
purple	mechanical
red flashing	90° (3 or 4 servos)
red	120°
blue flashing	140°
blue	135°/140°(1:1)

The Status LED is off in case one of the mixer parameters has been changed manually from the StudioX app. You can switch back to one of the presets anyway by moving the rudder stick but note that this will delete your custom setting!

51 Setup with StudioXm

Choose the swashplate mixing/swash type of your helicopter by clicking the corresponding button in the app. With the buttons + and - you can adjust the Virtual swash rotation/swashplate phasing if necessary (i.e. when using a scale helicopter with multiblade rotorhead). To set a different type of swash mixing click **Advanced view**. Then a screen with advanced setup options will open.

x250px[1]

51.1 Virtual swash rotation

To change swash phasing for multiblade helicopters adjust the *Virtual swash rotation* (the phasing is set independent from the actual swash mixing type, so make sure the correct swash type was chosen before!). You can turn the swashplate internally by +- 179 degrees. To find out the exact value that is necessary for your helicopter align one rotorblade in parallel to the tail boom/longitudinal axis of the helicopter. Now when you move the elevator the rotorblade mustn't move at all. If it does, increase/decrease the phasing just until the blade is standing still. It must only react to roll or collective inputs similar as this would be the case with a two bladed rotorhead! The direction (sign) of phasing determines the control direction. If you have tuned the phasing into the wrong direction your control will be inverted, i.e. elevator will move the blades into the wrong direction when aligned 90 degrees to the boom.

51.2 Custom swash mixing

To create an individual swash geometry in case the given presets do not fit to your helicopter's swash type choose Customize. In example what you may do here is, when having a mechanical mixed helicopter, you can change the servo throw ratio of the aileron and elevator servo (outputs CH1 and CH2) in case these are not making similar cyclic pitch deflection (Note: You mustn't change the servo throw in the transmitter as with the transmitter you do not directly control the servos!)

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1 https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupGm.png

By default the values you see here are preset by the type you've chosen in the overview before. Change them as necessary.

52 Additional info: What swash mixing is required for my helicopter?

Today most helicopters use a 120° swashplate, i.e. all ALIGN T-Rex helicopters as well as SAB Goblin, Mikado Logo, MSH Protos and many more.

Mechanical mixing was very common on Thunder Tiger Raptor helicopters and Vario scale or trainer machines but is getting rare today.

The type 135°/140° (1:1) is the most common type of "140° degrees" swashplates. Often it is also considered as 135° swashplate! There is no uniform designation for this type of swash mixing. The main idea with this type of swashplate is to have an equal servo ratio on the elevator axis, which will remove the collective interaction due to unequal servo movement and in consequence will give a extremely precise control of the heli. If this is the case on your helicopter (elevator and aileron servos are moving the same distance when steering elevator) then choose this type, no matter whether it's called 135° or 140° swashplate. You can find this type of swashplate for example on Shape, JR and Hirobo helicopters.

53 SETUP MENU H - Servo directions

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu H[2] and the translation is 100% complete.

At SETUP MENU point H move the collective pitch on the transmitter and adjust the servo directions so that all servos are moving the swashplate up and down together (the other functions are disabled here, as they are not of interest at this setup step!). After adjusting servo directions make sure that the pitch direction is correct! You can either do this by setting the servo directions correctly right from the beginning or by changing the direction of the pitch channel in the transmitter later.

> **Please note:** Usually you can not reverse the servos with the servo reverse function of your transmitter! The transmitter only controls the functions of MICROBEAST PLUS, not the servos! Reversing a channel in the transmitter will only reverse the control function in total. There is one exception: with mechanical mixing (mCCPM) each servo is controling one function, so actually here you can reverse the servos be reversing the sticks/functions in the transmitter, too. Because of this, the servo reversing in MICROBEAST PLUS is not necessary and not provided when using the mCCPM swash type! SETUP MENU point H will be skipped in this case.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3ASetupmenu+H&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_H

54 Adjustment on the device

By tapping the **rudder** stick you can **select one servo after another**. Every color of the Status-LED is corresponding to a specific servo channel that is indicating its selection by a short up and down move. (You can switch back and forth between the servos as often as you need.) When you tap the **aileron** stick once, the selected servo will **reverse its direction**.

Status-LED	Servo reverse
purple	CH1 – elevator servo
red	CH2 – aileron(1) servo
blue	CH3 – aileron(2)
red/blue	CH7 – elevator servo(2) (90° eCCPM only)

55 Setup with StudioXm

When the adjustment screen appears, set servo direction for each servo as necessary and make sure the pitch is moving correctly as described above.

x250px[1]

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1   `https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupIm.png`

56 SETUP MENU I - Cyclic directions

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu I[2] and the translation is 100% complete.

At SETUP MENU point I we teach the the control directions to the system, so that it moves the swashplate in the correct direction when trying to control the helicopter.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+I&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_I

57 Adjustment on the device

1. Move the stick(s) for **aileron** and elevator **on the radio and check whether the swashplate is**moved correctly **on the helicopter.**
(Note for beginners: the swashplate must follow the stick movement, so pushing elevator forward will tilt the swashplate forwards, adding aileron to the right will move the swash to the right and so on.)

If the stick is moving the swashplate into the wrong direction use the reverse function of your transmitter and reverse the aileron and/or elevator channel in the transmitter to set stick control direction correctly.

2. Now set the internal control direction for the MICROBEAST PLUS gyro: When you push elevator **forwards**, the Status LED must light up or flash in **blue** color. When you pull elevator **backwards**, the Status LED must light up or flash in **red** color. When you move aileron to the **right**, the Status LED must light up or flash in **blue** color. When you move aileron to the **left**, the Status LED must light up or flash in **red** color. **When the display is inverted (red = right or forwards and blue = left or backwards) reverse the display (internal control direction) by tapping the rudder stick.** There are four possible options, only one is correct! In short: **aileron right + elevator forwards the Status LED must be blue**, **aileron left + elevator backwards the Status LED must be red.** When the LED is purple or shines in the contrary color, you've not set the correct option.

3. Optional: When you move stick(s) to **full deflection**, the Status LED should light **solid**, not just flash. If this is not the case, **increase the servo throw/endpoint of the aileron and elevator channel in the transmitter just as far so that the Status LED changes from flashing to solid when the stick(s) reach the end positions** . (Note: Do not increase the endpoints too much in the transmitter. We need an exact match of full stick position and stick end position. So the Status LED should just change from flashing to solid when reaching the end positions.)

> Always set servo direction in the transmitter first, then check the display on the MICROBEAST PLUS and change the internal control direction if it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the gyro in which direction it must move the swashplate.** Be very conscientious when doing this setup step, as wrong gyro direction will cause loss of control during takeoff and you probably crash the helicopter!

In addition you can check the gyro direction by turning the helicopter by hand around its horizontal and longitudinal axis. When turning the heli the gyro must move the swashplate so that the rotor will produce a counter action agains the turn direction. So later in flight the gyro will stop the helicopter from unwanted movement. Here the LED will always light up in **blue** color when you turn the helicopter to the **right** or **forwards** and light up in **red** when you turn it to the **left** or **backwards**. This is to give you a little reminder when you need to do the setup later on the field and you can't rememeber what color stands for what direction!

58 Setup with StudioXm

x250px[1]

1. When you see the adjustment screen for the cyclic directions move the stick(s) for **aileron and elevator** on the radio and check whether the swashplate is **moved correctly** on the helicopter.

(Note for beginners: the swashplate must follow the stick movement, so pushing elevator forward will tilt the swashplate forwards, adding aileron to the right will move the swash to the right and so on.)

If the stick is moving the swashplate into the wrong direction use the reverse function of your transmitter and reverse the aileron and/or elevator channel in the transmitter to set stick control direction correctly.

2. Now adjust the internal control direction of the MICROBEAST PLUS gyro: When you push elevator **forwards**, the Status LED must light up or flash in **blue** color and you should see the label **forwards** getting **blue** as well. When you pull elevator **backwards** , the Status LED must light up or flash in **red** color and you should see the label **backwards** getting **red** as well. When you move aileron to the **right**, the Status LED must light up or flash in **blue** color. When you move aileron to the **left**, the Status LED must light up or flash in **red** color. **When the display is inverted (red = right or forwards and blue = left or backwards) reverse the display (internal control direction) by choosing one of the four buttons below the direction label.**

3. When the stick is not moving far enough, you will see the message "Increase!" In this case **increase the servo throw/endpoint of the aileron or elevator channel in the transmitter just as far so that the Status LED changes from flashing to solid when the stick reaches the end position and the label in the software changes to "OK"**. (Note: Do not increase the endpoints too much in the transmitter. We need an exact match of full stick position and internal end position. So the Status LED should just change from flashing to solid when reaching the end position.)

Always set servo direction in the transmitter first, then check the display on the MICROBEAST PLUS or in the software and change the internal control direction if

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1   https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupMm.PNG

it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the gyro in which direction it must move the swashplate.** Be very conscientious when doing this setup step as wrong gyro direction will cause loss of control during takeoff and you probably crash the helicopter!

In addition you can check the gyro direction by turning the helicopter by hand around its horizontal and longitudinal axis. When turning the heli the gyro must move the swashplate so that the rotor will produce a counter action agains the turn direction. So later in flight the gyro will stop the helicopter from unwanted movement. Here the LED will always light up in **blue** color when you turn the helicopter to the **right** or **forwards** and light up in **red** when you turn it to the **left** or **backwards**. This is to give you a little reminder when you need to do the setup later on the field and you can't rememeber what color stands for what direction!

59 Extra info: Why setting stick endpoints?

This ensures that control range of the radio system matches the internal range of MICROBEAST PLUS. Later when setting the control style you can adjust how fast your helicopter will roll and tilt. To get reproducable results you have to match your radio to the system!

60 Extra info: How the gyro works!

The gyro always tries to steer in the opposite direction of the rotation that is applied to the helicopter.When tilting the helicopter forwards the swashplate has to move backwards, when tilting the helicopter to the rear, the swashplate has to compensate forward. Same thing applies to the roll axis: when you roll the helicopter to the left the swashplate has to steer right and vice versa. Basically the swashplate has to remain horizontal all the time while banking the helicopter.
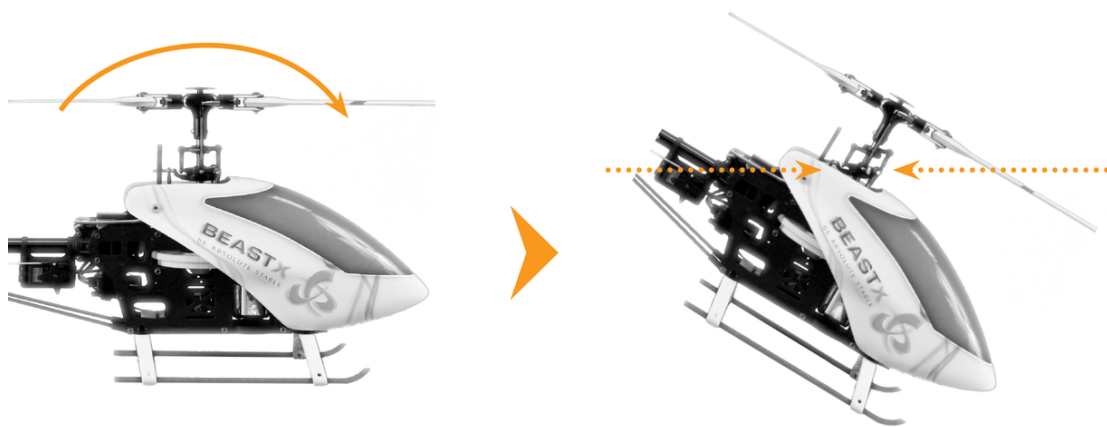
Figure 101

Figure 102

61 SETUP MENU J - Servo trim

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu J[2] and the translation is 100% complete.

At SETUP MENU point J we trim the servo center positions so that each servo horn forms an exact 90 degrees angle with the adjustment linkage. This is necessary as usually you will not be able to attach the servo horns in exact center position to the servo. **After all servos have been trimmed do not proceed to the next menu point yet.** After trimming adjust the linkage rods according to your helicopter's manual, so the rotorhead system is set up neutral and allows to have equal movements in all directions. For this the swashplate should be at the midpoint and perpendicular to the main shaft and the rotor blades should have 0 degrees of pitch. Always work this out from bottom (servos) to top (blade grips).

In case your helicopter has a non-DFC rotor head with adjustable swashplate driver also don't forget to level and phase the swashplate driver in the correct way. At 0 degrees of pitch the swash driver arms must be horizontal and the linkage balls of the blade grips must be perpendicular to the spindle shaft.

Figure 103

Figure 104

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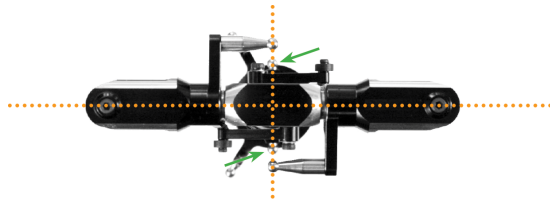
1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+J&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_J

62 Adjustment on the device

62.1 Separate servo trim

Initially the trimming is 0 for all servos. In this case the Status LED will be off when entering Setup Menu Point J. At first, attach the servo horns to the servos in this position. So you will make sure to get roughly equal throws to both directions. Mount the servo horns so that they form a 90 degrees angle to the linkage rod as close as possible. Then in the next step you can fine trim every single servo's center position, as usually mounting the servo horns at exact 90 degrees will not work out perfectly, depending on the servo gear trains and the servo horns.

By tapping the **rudder stick** you can **select one servo after another**. Every color of the Status-LED is corresponding to a specific servo channel that is indicating its selection by a short up and down move. Use the **aileron stick** to change the **servo trimming/adjust the center position**. You can switch back and forth between the servos with rudder as often as you need.

Status-LED	Servo trim
off	all zero
purple	CH1 – elevator servo
red	CH2 – aileron(1) servo
blue	CH3 – aileron(2) / pitch servo (mCCPM)
red/blue	CH7 – elevator servo(2) (90° eCCPM only)

62.2 Trimming the swashplate

If necessary, you can also trim the swashplate position at once. For this push and hold the button for at least 2 seconds when at Setup Menu Point H, then release. Now you can trim

the swashplate into each direction by tapping or holding aileron or elevator. The collective pitch can be trimmed up and down with the rudder stick.

62.3 Deleting the trimming

To reset the trimming and set all positions back to zero, push and hold the button for 10 seconds or more. When the yellow menu LEDs start to cycle in a loop, release the button.

63 Setup with StudioXm

When the servo trim screen appears, for your reference the servos will briefly move up and down once one after another in the given order CH1 to CH3 (CH7) so you can identify them easily. Trim each servo using the + and - buttons so that the servo horn forms an exact 90 degrees angle with the linkage rod. Then make the mechanical adjustment for the linkages as described above if necessary.

x250px[1]

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1   https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupHm.png

64 SETUP MENU K - Cyclic throw

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu K[2] and the translation is 100% complete.

At SETUP MENU point K we adjust the internal servo throw so that MICROBEAST Plus has a reference on how far it must move the servos when controlling the helicopter. To set the throw, you align one rotorblade on the longitudinal axis (in parallel to the tail boom) and measure the cyclic pitch with a digital pitch gauge on this rotorblade. (You can do this from the front or from the rear!)

Figure 105

Figure 106

Initially you should see 0 degrees of pitch now (in case you did the setup at SETUP MENU point J properly!). Then you switch to the adjustment position. The system will give some amount of pitch which you measure again. This time you should see 6.0 degrees (+ or - is not of importance). If not, increase or decrease the swash throw accordingly.

The color of the Status LED gives some indication whether you rotorhead geometry is well suited for flybarless usage or not. Ideally the Status LED on the device should be blue when in 6.0 degress position. If it isn't, this means your servo movements cause very much pitch deflection on the rotorhead. This can be bad for the performance as the system may tend to oversteer and overreact very easily. If you have problem with finding correct gain settings or overcompensation later in flight, the cause may be found here. To solve this you can change geometry by moving the linkage balls on the servo horns closer to the servo

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
      3AMBPlusFblV52%3ASetupmenu+K&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_K

center.

Status-LED	Cyclic throw
purple	not good
red	OK
blue	perfect!

65 Adjustment on the device

Initially the Status LED will be off, the swashplate will be leveled and rotorblades will have 0 degrees of pitch. Attach your pitch gauge to the rotorblade or blade grip, calibrate it to 0 degrees and then tap the **rudder stick** once. This will move the rotorblades into **measuring position**. Now check the pitch gauge. We want to see exactly +-6.0 degrees. By **aileron** input you can **increase/decrease the amount of pitch** (left = decrease, right = increase) until you have reached +-6.0 degrees (the sign/direction of pitch is not of importance). You can switch back and forth between measuring and zero position as often as you like. When done tap the button to proceed to the next menu point.

66 Setup with StudioXm

Initially the swashplate will be leveled and rotorblades will have 0 degrees of pitch when the cyclic throw adjustment screen opens. Attach your pitch gauge at the rotorblade or blade grip, calibrate it to 0.0 degrees and then click the **Measure button**. This will move the rotorblade into measuring position. Now check the pitch gauge, we want to see exactly +-6.0 degrees. Increase/decrease the throw value with the + and **- buttons** or the **dial** until the pitch is adjusted correctly. You can switch back and forth between measure and zero position as often as you like.

67 Measuring pitch without pitch gauge

If your helicopter is too small for attaching a digital pitch gauge or simply in case you haven't got one, you can use a little trick to measure the pitch anyway. You can calculate the angle from the distance the rotor blades move from zero position. Actually this is not as accurate as measuring the pitch with a digital pitch gauge but it's better than nothing. All you need for this is a ruler and and a good eye. First you need to know the length of the rotorblades from the bolt hole to the outer edge. Usually this matches the specified rotor blade length of the manufacturer. Then you align the rotorhead with the longitudinal axis of the helicopter and fold both rotorblades to one side (as this will put heavy load on the servos it is not recommended use this method on large helicopters with heavy blades!). Now hold your ruler to the blades and mark the zero position (or measure the distance from ground to the rotor blades). Then when you switch to adjustment position, the rotorblades will move up or down a few centimetres. The distance travelled can be transfered into degrees of blade pitch using the mathematical formula of sinus. Or the other way round you can calculate how far you rotorblades must move in order to get 6.0 degrees of blade pitch.

Enter blade length in millimeters

<input type="number" id="mw-bllength" value="0" min="0" max="1000"

68 SETUP MENU L - Collective pitch

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu L[2] and the translation is 100% complete.

At SETUP MENU point L you set the maximum negative and positive collective pitch for your helicopter. Additionaly you have to make sure that MICROBEAST PLUS is detecting the direction of movement correctly. This especially is important when using the rescue bailout function but has also effect on the normal flying!

Don't modify the pitch curves in your transmitter when doing the collective adjustments! Let everything at default (i.e. -100 0 +100), so the stick is moving the pitch channel over the full range.

When finished, adjust your pitch curves as you like and as you are used to. But for now, we need to set the working range which is necessary to gain optimum performance. Here it is important to define the mechanical possible range of your helicopter, not to define your flying style. For example when using a 3D trainer helicopter frame this usually will have a symmetric pitch range, i.e. reaching from +12 to -12 degrees. Now when you are a beginner or scale pilot you would not need that high amount of pitch (especially not in the negative section). Anyhow, it is not recommended to set the pitch range of MICROBEAST PLUS asymmetrical to -4 to +12 degrees for example, as this would not represent the helicopters capability. Better is to set the endpoints to -12 and +12 degrees and later use the pitch curves in your transmitter to adjust the lower end to your preferred flying style. Have a look in your helicopter's manual to find out what is the optimum pitch range.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ASetupmenu+L&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_L

69 Adjustment on the device

1. Move the **thrust** stick up and down and check whether the **pitch is changing direction correctly**. If not already done at SETUP MENU point H, **use the reverse function for the pitch channel in the transmitter to reverse direction of pitch movement in case it is wrong**.

2. Afterwards check the Status LED color: on **positive pitch** it must be **blue**, on **negative pitch** it must light in **red** color. **In case the display is inverted (red = positive and blue = negative), tap the**rudder stick **once to**reverse the internal pitch direction **of MICROBEAST PLUS.**
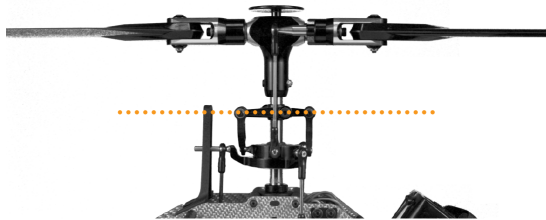
3. When you move **thrust stick to full deflection** the Status LED should light **solid**, not just flash. If this is not the case **increase the servo throw/endpoint of the thrust channel in the transmitter for each direction just as far so that the Status LED changes from flashing to solid when the stick reaches the end positions**. (Note: Do not increase the endpoints too much in the transmitter. We need an exact match of full stick position and stick end position. So the Status LED should just change from flashing to solid when reaching the end position.)

4. Finally adjust the maximum collective pitch when the thrust stick is at full deflection. **Increase or decrease the maximum amount of collective pitch** with **aileron** (left = decrease, right = increase). Then move the thrust to full negative and again adjust the pitch using the rudder.

> Always set the servo direction in the transmitter first, then check the display on the MICROBEAST PLUS and change the internal control direction if it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the system in which direction is up and down.** Be very conscientious when doing this setup step as wrong direction will cause loss of control during rescue bailout and poor performance in general!

70 Setup with StudioXm

x250px[1]

1. When you see the adjustment screen for the collective pitch move the **thrust** stick up and down and check whether the **pitch is changing direction correctly**. If not already done at SETUP MENU point I, **use the reverse function for the pitch channel in the transmitter to reverse direction of pitch movement in case it is wrong**.

2. Afterwards check the Status LED color and display in the app: on **positive pitch** the Status LED must be **blue**, on **negative pitch** it must light in **red** color. **In case the display is inverted (red = positive and blue = negative), reverse the internal pitch direction of MICROBEAST PLUS by changing the direction in the app.**

3. If the stick is not moving far enough, you will see the message "Increase!". In this case **increase the servo throw/endpoint of the thrust channel in the transmitter for each direction just as far so that the Status LED changes from flashing to solid and the label changes to "OK" in the software when the stick reaches the end positions**. (Note: Do not increase the endpoints too much in the transmitter. We need an exact match of full stick position and stick end position. So the Status LED should just change from flashing to solid when reaching the end position.)

4. Finally adjust the maximum collective pitch when the thrust stick is at full deflection for each direction using the + and **- buttons** in the app.

Always set the servo direction in the transmitter first, then check the display on the MICROBEAST PLUS and change the internal control direction if it does not match the real direction. **Do not change the internal direction in order to change the servo direction! This is only used for telling the system in which direction is up and down.** Be very conscientious when doing this setup step as wrong direction will cause loss of control during rescue bailout and poor performance in general!

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1 `https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupK.PNG`

71 What pitch is useful for my helicopter?

In general you can say "the smaller the helicopter, the more pitch you have to set". But it also depends on how much motor power you helicopter has, the type of rotorblades you use and finally in what you expect to do with the helicopter. So beginner or scale pilots will not need as much pitch as a 3D aerobatics pilot or high speed flyer. Anyhow, as already mentioned above set the pitch range in MICROBEAST PLUS so that it roughly fits to your helicopter mechanics and its capabilities.

Heli size (electric)	Maximum pitch
250	13.0 - 13.5 degrees
450	13.0 - 13.5 degrees
500	13.0 degrees
550	12.5 degrees
600	12.0 - 12.5 degrees
700	11.5 - 12.0 degrees
800	11.5 degrees

Heli size (nitro)	Maximum pitch
.37 - .40	12.0 degrees
.50 - .55	11.5 - 12.0 degrees
.90 - .105	11.5 - 12.0 degrees
Gasser	10.5 - 11.0 degrees

72 Measuring pitch without pitch gauge

If your helicopter is too small for attaching a digital pitch gauge or simply in case you haven't got one you can use a little trick to measure the pitch anyway. You can calculate the angle from the distance the rotor blades move from zero position. Actually this is not as accurate as measuring the pitch with a digital pitch gauge, but it's better than nothing. All you need for this is a ruler and and a good eye. First you need to know the length of the rotorblades from the bolt hole to the outer edge. Usually this matches the specified rotor blade length of the manufacturer. Then you align the rotorhead with the longitudinal axis of the helicopter and fold both rotorblades to one side (as this will put heavy load on the servos it is not recommended use this method on large helicopters with heavy blades!). Now hold your ruler to the blades and mark the zero position. Then when you add positive or negative pitch you can measure the distance between the outer edge of one blade to the other. This distance can be transfered into degrees of blade pitch using the mathematical formula of sinus. Or the other way round you can calculate how far you rotorblades must move away from each other in order to get a specific blade pitch.

Enter blade length in millimeters

<input type="number" id="mw-bllength-pitch" value="0" min="0" max="1000"

Enter blade pitch in degrees

<input type="number" id="mw-degrees-pitch" value="11" min="0" max="90"

73 SETUP MENU M - Servo limit

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu M[2] and the translation is 100% complete.

At SETUP MENU point M we can limit the servo movement so that the servos will not come out of the possible range of action and cause jamming of the linkages or swashplate. But ideally we want to limit as less as possible, so that the system can control the helicopter without any restrictions!

For the ease of use, the limiting is only one value to adjust but which will affect all servos and all possible positions at once, especially when steering into the corners. So when adjusting the limit, you move pitch, aileron and elevator all at once and into all possible positions and check if there is some point where the servos get jammed. Adjust the limit so that there is just no binding at any point.

The color of the Status LED gives some indication whether you rotorhead geometry is well suited for flybarless usage or not. Ideally the Status LED on the device should be blue after you've adjusted the limit properly. If it isn't, this means your servos do not make very large deflections and probably you do not have very much cyclic pitch left in the extreme positions. This can for example cause pitching up when flying with high speed and lots of collective input, inprecise flying in general or it can cause you heli not to have equal rotations rates, accelerate slowly or not being able to reach high rotation rates at all.

Status-LED	Servo limit
purple	not good
red	OK
blue	perfect!

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%3AMBPlusFblV52%3ASetupmenu+M&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_M

- Always try to give the system as much servo throw as possible and limit as less as possible. Do not use the limit to adjust the pitch or rates or similar, this is not what it is it used for!
- When changing the collective pitch later this may affect the cyclic limit, so don't forget to check and readjust the limit when you do any changes to the collective.

74 Adjustment on the device

At SETUP MENU point M carefully move pitch, aileron and elevator all at once and into all possible positions and check if there is some point where the servos get jammed. By **rudder** stick input you can **increase/decrease the amount of maximum servo throw/servo limit** (left = decrease throw, right = increase throw). Make sure the throw is as high as possible.

75 Setup with StudioXm

Carefully move pitch, aileron and elevator all at once and into all possible positions and check if there is some point where the servos get jammed. Increase/decrease the amount of maximum servo throw/servo limit by using the + and **- buttons** and the **dial**. Make sure the value is as high as possible.

x250px[1]

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1   https://wiki.beastx.com/./index.php?title=Special:Upload&wpDestFile=SetupLm.PNG

76 Headspeed Governor

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governor[2] and the translation is 100% complete.

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1 https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
   3AMBPlusFblV52%3AGovernor&action=page&filter=&language=en
2 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governor

77 What's a Headspeed Governor?

MICROBEAST PLUS comes with an internal headspeed governor function. What this does is controlling the throttle automatically, so that the rotor headspeed of the helicopter stays consistent in flight. I.e. when you add pitch and load the rotor disk, the system will add more throttle in order to prevent from sagging headspeed, when you descend quickly the system on the other hand will have to lower the throttle to prevent from overspeeding. Usually this is what you try to do when using the throttle curves of your transmitter, but this is very inprecise and will not give reproducible results. It's much more convenient to just tell the system what rotor headspeed you want and this will maintain the given head speed for the whole flight, even when batteries go empty or the motor starts to run lean. The governor function can be used with electric heli which doesn't have a governor or "heli mode" built in the speed controler or when the governor function of the speed controller doesn't maintain the headspeed very well. For helis with combustion engine you don't need to buy a separate governor device anymore, with MICROBEAST PLUS you already have it on your heli.

Please note that the Governor function is not applicable when a Standard receiver is used!

78 Hardware installation

Thus the RPM Governor of MICROBEAST PLUS can be used, the system must be able to detect the motor speed. This is done with the help of a rpm sensor that must be attached to the sensor input of MICROBEAST PLUS. For models with nitro/gas engines usually sensors are used that determine the speed signal magnetically or optically. These sensors are mounted next to the crankshaft or clutch bell and register the number of engine revolutions here. For electric motors the motor speed can be determined electronically. For this purpose a phase sensor (e.g. BXA76013) is connected to one or two of the motor phases. Some electric speed controllers also offer a direct signal output for the rpm signal, so that no additional sensor is required.

To see how the sensor is mounted in detail please refer to the instruction manual from the sensor or from the helicopter. The wire with the rpm signal is connected to sensor input pin at the sideport of MICROBEAST PLUS by using the optional adapter cable BXA76401. This sideboard also powers the sensor with the supply voltage, if necessary. Note that the height of the supply voltage corresponds to your receiver power supply voltage!

Here are some installation and connection examples. As described virtually all kinds of rpm sensors may be used. Unfortunately it is impossible to try and enumerate all types. If in doubt about whether a particular sensor can be used in conjunction with MICROBEAST PLUS ask your dealer to find out.

78.1 Electric drive system with external phase sensor

Connect the motor wires of the phase sensor with any two phases of the electric motor. It is recommended to solder those wires to the plugs of the speed controller. So for maintenance purposes it is easier to remove the motor from the model later. In some cases the use of only one phase wire is sufficient. Usually this is the case when the speed controller powers the system with a BEC thus there is no galvanic isolation between motor and receiver circuit. However, we recommend using both wires in any case! This ensures that the sensor provides an interference-free signal as possible.

The electronic speed controller is plugged into the [CH5] output.
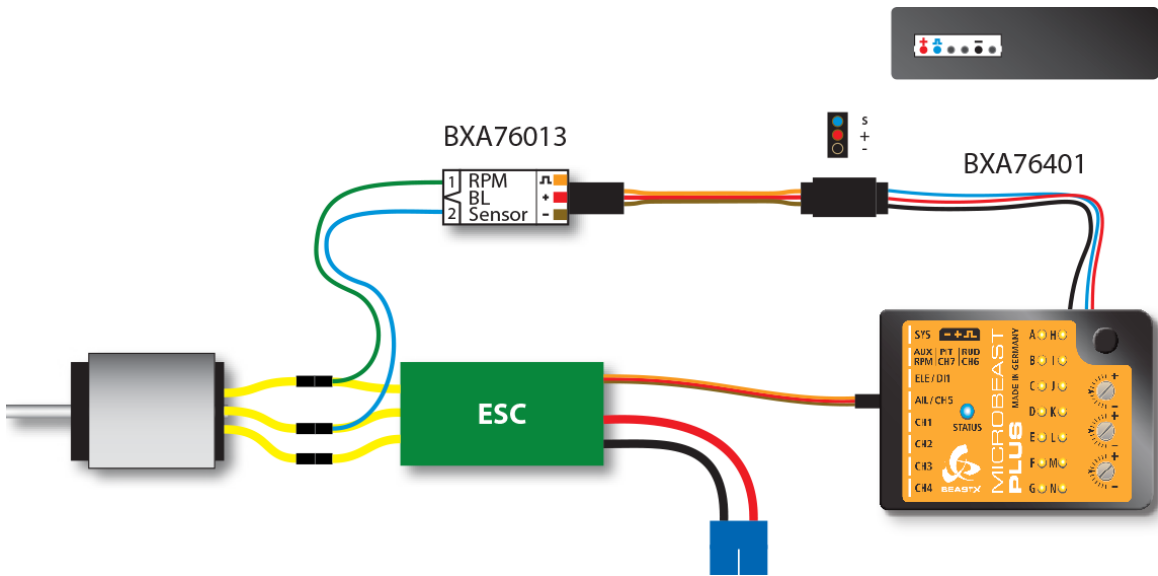
Figure 107

78.2 Electric drive system with rpm signal output from the speed controller

When a speed controller is used that provides a rpm signal output you can alternatively use the [RPM] sensor input on the front connection board of MICROBEAST PLUS (lowest pin of the tripple signal input). (RPM sensors can't be connected here as this pin header does not provide any power supply!) The speed controller's signal input wire is plugged into the output [CH5] as usual.
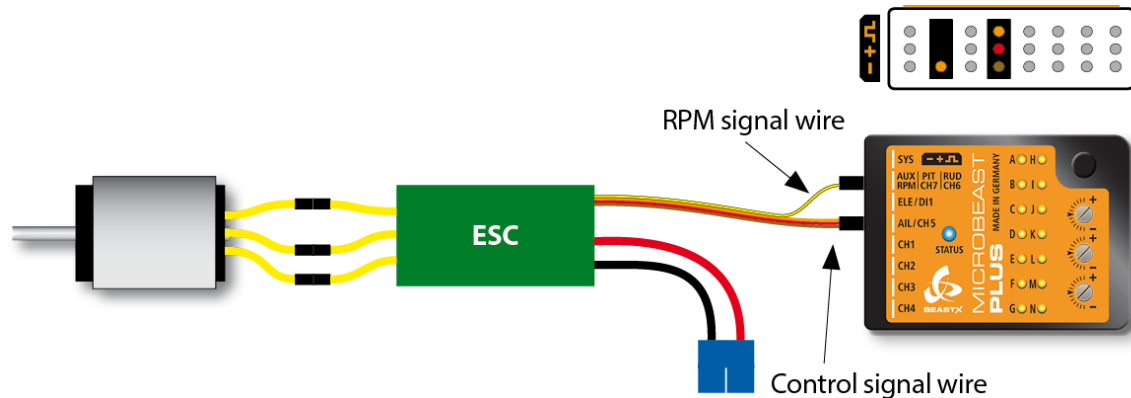
Figure 108

78.3 Combustion drive system (nitro/gas)

Particularly when using sensors for combustion engines check for correct polarity of the sensor power supply on the adapter cable BXA76401. Here commonly sensors are used that are designed for governor systems from other manufacturers and therefore have a special pin assignment. In this case the colors of the connecting cables may not follow the norm (The wire colors of the ALIGN governor sensor HE50H22 are swapped for example. Here red denotes the negative and black the positive pole!).
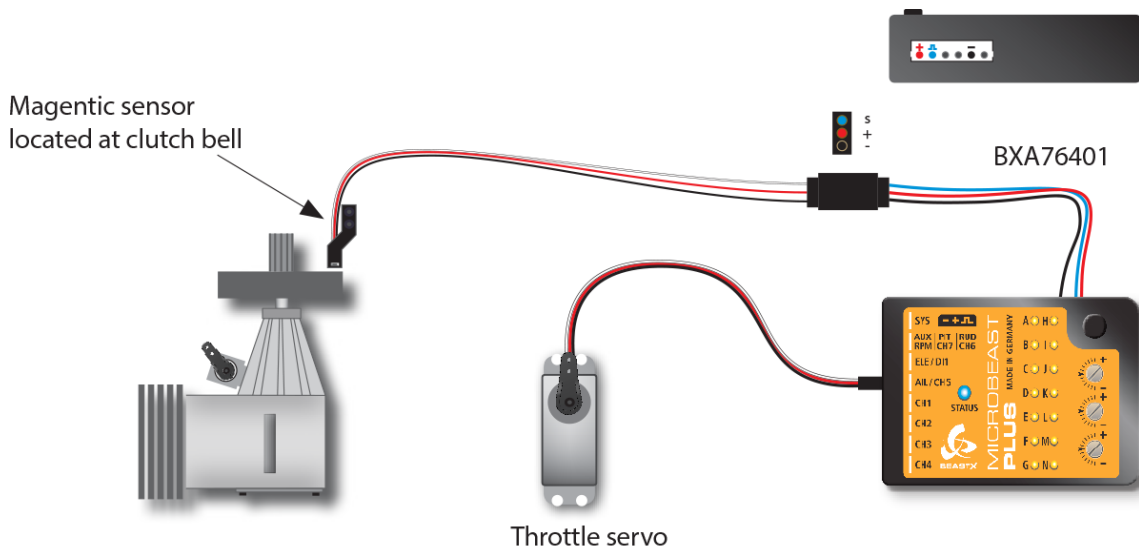
Figure 109

79 Activating the governor function

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Setupmenu N[2] and the translation is 100% complete.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3ASetupmenu+N&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Setupmenu_N

80 Adjustment on the device

At first you have to enable the governor function at SETUP MENU point N. If not already done enter SETUP MENU by pushing an holding the button from operation mode for at least 2 seconds, then release when the Menu LED A lights solid (!). Then repeatedly press the button until the Menu LED N lights up. Here at SETUP MENU point N you can toggle between three different options by tapping the rudder stick. The Status LED indicates which option is currently active:

Status-LED	Governor mode
off	**no governor** - the RPM Governor is not used. All control commands on the throttle channel will be passed to [THR] output directly.
red	**electric governor** - select this option if your helicopter is powered by an electric motor and an electric speed controller is plugged into output [CH5] of MICROBEAST PLUS. The device reads the speed signal from the speed controller or a phase sensor and controls the rotor speed accordingly. Note that the speed controller itself must not be operated in a (heli specific) governor mode! The speed controller must process the incomming throttle signals and control the motor as direct and unfiltered as possible.
blue	**nitro governor** - with this option the MICROBEAST PLUS can govern the rotor speed of a helicopter with nitro or gas engine. In this case the system controls the throttle servo which is connected to [THR] output and controls the carburetor of the engine. The motor speed will be read from a magnetic or optical sensor that captures the rotation of the crankshaft of the motor, the clutch bell or the main gear.

In order to enable the governor function choose **red** or **blue** depending on the type of helicopter/drive system you're using. Then briefly press the button to skip to the GOVERNOR MENU (this will only appear when the governor function is used, in case the governor is disabled = Status LED off, you will directly exit SETUP MENU!).

81 Setup with StudioX

When StudioX/StudioXm has connected to your MICROBEAST PLUS, in the device
overview main screen click the ”Governor setup” button. Under ”Governor Basic Setup” you
can enable the governor function by choosing either ”Electric” or ”Nitro/Gas Heli depending
on the type of helicopter/drive system you're using. When you choose ”Governor mode off”
on the other hand all control commands for the throttle channel will be passed to [CH5] out-
put directly. In this case all the other settings of ”Governor setup” menu will have no effect!

82 Sensor test routine

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu A[2] and the translation is 100% complete.

At GOVERNOR MENU point A there is nothing to adjust. Here you will only get some visual indication to see if the hardware is working so far and in general if there is a usable rpm signal.

⚠ Watch out! At this menu point the throttle channel is unlocked. This means you have full control over the throttle output [CH5] with your remote control to control the speed controller or throttle servo.

Be aware that electric motors rotate at high speeds! Keep a safe distance during the function test. We highly recommend to remove the motor from the main gear. However, please observe the manufacturer's specifications of the motor. Some motors may not be operated without load. In this case only let the motor run for a short time or let the motor stay attached to the main gear and only remove the main and tail rotor blades (Be careful, increased risk of injury!).

When using an electric model it is necessary to increase the throttle until the motor starts to rotate and the phase sensor or the speed controller outputs a rpm signal. Once the motor is running the Status-LED on the MICROBEAST PLUS should light up in **red** color. Please note that the control range of throttle is crucial! Usually the throttle endpoints of the transmitter are fixed by an initial programming of the speed controller. But also speed controller exist that require adjusting the servo throw of throttle channel in the transmitter, so that the throttle range is in accordance with the specification of the speed controller. Here is the possibility to check whether this setting has been performed correctly. Carefully add some throttle. **The motor should start to turn immediately if you move the stick just a little bit and full speed should be reached when the**

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AGovernormenu+A&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_A

stick just reaches full throttle position. If the motor turns at the maximum possible speed much earlier or only starts to turn at a very high stick deflection, decrease the travel of throttle channel in the transmitter or repeat the programming of the speed controller. Thus the Governor of MICROBEAST PLUS can operate correctly, the motor speed should increase as linear as possible when the stick is moved and there should be no ranges in that the motor speed does not change.

With a nitro/gas powered helicopter you can simply rotate the clutch or engine crankshaft by hand until the signal generator (magnet or similar) passes the sensor. Whenever the signal generator is within the detection range of the sensor the Status-LED should light up in **blue** color. In addition to the function control of the sensor, check the throw setting for the throttle servo in the remote control and adjust if necessary: Set the throttle to mid stick position and attach the servo horn, so that the throttle linkage is at a right angle to the servo horn. Then adjust the length of the linkage according to the instructions of the helicopter, so that it also is positioned perpendicular to the linkage lever at the carburetor. Adjust the lever at the carburetor so that it is opened halfways (note the markings on the carburetor!). Now move the throttle stick towards full throttle and adjust the servo travel in the transmitter accordingly, so that the full throttle position is reached without binding. Lastly move both throttle stick and throttle trim on the transmitter to the „motor off" position and also adjust the servo travel in that direction until the carburetor is fully closed. If the servo travel must be greatly reduced in both directions, it is recommended that the linkage ball on the servo arm is mounted further in so that the servo can be moved over a wider range. For more information refer to the instruction manual for your helicopter.
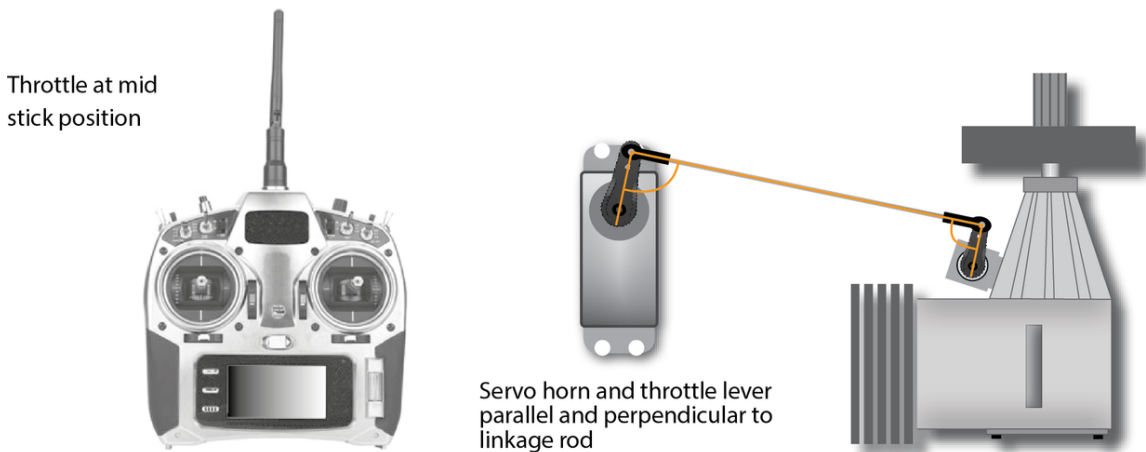
Figure 111

If the Status-LED on the MICROBEAST PLUS does not light up as described please double check the wiring. Particularly pay attention whether the power wires of the sensor are of correct polarity (on some sensors the wire colors do not match the usual standard!). If you have a magnetic sensor check if the magnets are installed with the correct polarity and if they are passing the front of the sensor close enough. Using a crankshaft sensor make sure that the sensor is mounted close enough to the frame accordingly.

83 Motor start position

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu B[2] and the translation is 100% complete.

GOVERNOR MENU point B is used to set the lowest throttle position. This is needed as the system must know the motor starting point for the automatic spool up of the rotor when enabling the governor from standing still.

Using an electric model bring the throttle stick to the position at which the motor is just about to start. If the stick throw has been adjusted as described at GOVERNOR MENU point A (or the speed controller has been programmed to the stick throws), the necessary throttle position should be achieved at the lowest position of the throttle stick. Some speed controllers provide a special mode that allows for a quick start-up in case of aborting an autorotation landing. Here you have a larger area between the actual „motor off" position of the speed controller and the point at which the motor starts. Also in this case move the throttle stick to the point at which the motor is just before to start, so that MICROBEAST PLUS can determine the effective throttle range correctly.

With a nitro/gasser model bring the throttle stick to idle position or a slightly increased idle position (not „motor off"!) so MICROBEAST PLUS can determine the effective throttle range in the next step. In case you've not assigned an auxiliary channel to control the Governor when doing the setup in RECEIVER MENU, this position additionaly will be used as idle position when performing autorotation maneuvers. So you should set the throttle as high as necessary here that the motor will maintain a stable run and doesn't quit in autorotation.

Watch Out! Output [CH5] can be directly controlled by the throttle stick.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AGovernormenu+B&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_B

84 Adjustment on the device

When setting the low throttle position make sure the Status-LED lights up in **blue** color (both electrical as well as nitro). This means that a new valid throttle position has been detected. If the Status-LED lights up in **red** then the throttle stick is too close to the throttle stick center position. This is not considered optimal and therefore can not be used as throttle position. In this case check the setting of the transmitter and the programming of the speed controller or readjust throttle servo, carburetor position and throttle linkage rod.

> When entering menu point **B** initially the Status-LED is off. As long as you do not move the throttle stick, the currently stored position will not be changed. So you can skip menu point **B** by a brief push of the button without changing the throttle position when performing subsequent adjustments in SETUP MENU or GOVERNOR MENU later. Conversely this means that you need to move the throttle stick at menu point **B** at least once to change the current throttle position!

85 Setup with StudioX

When performing the setup with StudioX, you will see the actual internal throttle value in the app. Usually this will be something around +-1000 when the throttle is at lowest position. Push the SET button in order to store this value as lowest throttle value for the headspeed governor.

86 Full throttle position

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu C[2] and the translation is 100% complete.

At menu point **C** you have to set full throttle position of your ESC or throttle servo. Here the output [CH5] can be only controlled by the throttle stick when the RPM Governor type is set to „nitro". In „electric" mode the throttle output will stay locked. So you can set the full throttle position quite comfortable without the motor running high (we expect that your maximum stick position actually indicates the maximum throttle position of your ESC in case your ESC is setup correctly!). Otherwise there are no differences between the modes „electric" and „nitro".

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AGovernormenu+C&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_C

87 Adjustment on the device

Move the throttle stick to full throttle position. The Status-LED must light up in **blue** color. This means that a new valid throttle position has been detected. If the Status-LED lights up in **red** the distance between the lowest throttle position and the full throttle position is too small. Since this will have a negative effect on the control behavior of the system, this throttle position can not be used. In this case check the setting of the transmitter and the programming of the speed controller or readjust throttle servo, carburetor position and throttle linkage rod. If necessary, set the lowest throttle position at menu point **B**[1] again.

Similar to menu point **B**[2] the Status-LED is off when entering menu point **C**. As long as you do not move the throttle stick, the currently stored position will not be changed. So you can skip menu point **C** by a brief push of the button without changing the throttle position when performing subsequent adjustments in Setup menu or Governor setup menu. Conversely this means that you need to move the throttle stick at menu point **C** at least once to change the current full throttle position!

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1   https://wiki.beastx.com/./index.php/Manuals:MB_Plus:Governormenu_B/en
2   https://wiki.beastx.com/./index.php/Manuals:MB_Plus:Governormenu_B/en

88 Setup with StudioX

When performing the setup with StudioX, you will see the actual internal throttle value in the app. Usually this will be something around +-1000 when the throttle is at maximum position. Push the SET button in order to store the value shown as maximum throttle value for the headspeed governor.

89 GOVERNOR MENU D - Setting up the transmitter

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu D[2] and the translation is 100% complete.

Similar to GOVERNOR MENU point A here we will only get some status information. At GOVERNOR MENU point D the different activation points of the Governor will be displayed based on color and state of the Status-LED. So you can prepare your transmitter for use with the Headspeed Governor function. The information conveyed by the Status-LED is basically the same in every Governor operation mode. However, the setup of the transmitter and the range of headspeed will be slightly different, depending on whether the mode **electric** or **nitro** is used.

Governor off = **off**, Autorotation = **purple**, Gov active = **red** or **blue** (= max. RPM)

When performing the setup with StudioX, you can directly read from the app in real-time what your activation points are and what your switch on the radio does!

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3AGovernormenu+D&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_D

90 How to control the Governor

90.1 Electric Governor

In **electric** governor mode the pilot does no longer control the speed controller with the transmitter. MICROBEAST PLUS completely takes over control of the ESC. With the transmitter you only specifiy the desired rotor speed you want the helicopter to maintain. When setting a speed higher than minimum, MICROBEAST PLUS will speed up the rotor smoothly and ensure that the demanded rotor speed is kept constant throughout the flight. To practice autorotation landings, additionaly you can keep MICROBEAST PLUS in a special mode that causes the speed controller to be switched off during the maneuver but speed up the rotor fast when aborting the autorotation (faster than with the initial soft start).

The rotor speed is set via the throttle channel of the transmitter. You may use the transmitter's throttle curves for instance, so you can switch the motor on and off and pretend different speeds using the flight mode system of the transmitter. Instead of curves you have to set horizontal lines so that the channel output value does not depend on the throttle stick position but is fixed in each flight mode. The flight mode switch then acts as a switch that switches between different speed settings. Alternatively, of course you may use a switch that is directly assigned to the throttle channel and adjust the switch position to preset different rotor speeds and to switch off the motor, but this may be much less convenient.
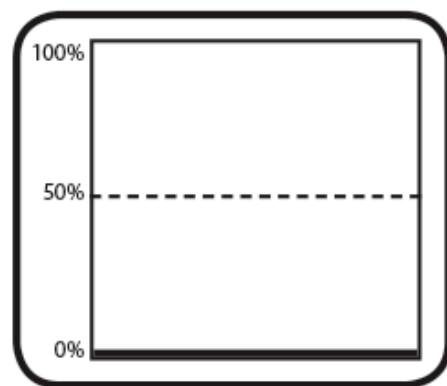
Figure 113

Idle up 1

- RPM Governor active
- 1680 rpm = 42% throttle
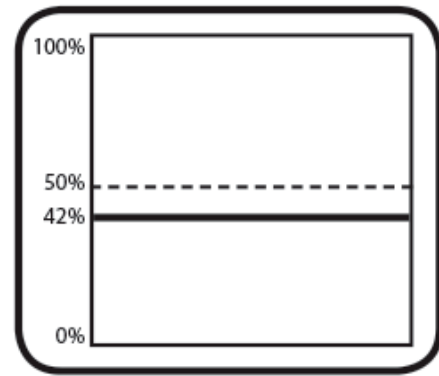
Status-LED **red**

Figure 114

Idle up 2

- RPM Governor active
- 2200 rpm = 55% throttle
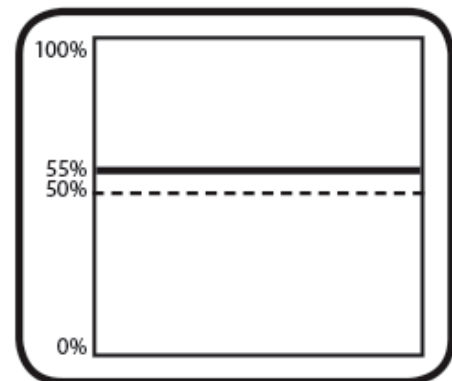
Status-LED **red**

Figure 115

Autorotation*

- RPM Governor on standby
- Motor off
- Throttle between 5% and 15%
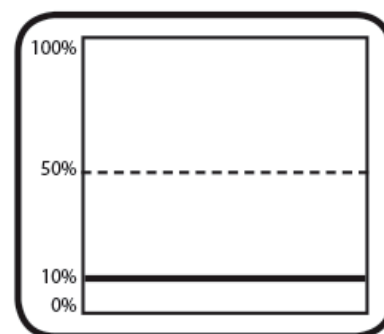
Status-LED **blue**

Only effective when RPM Governor was active before

Figure 116

In **electric** mode the adjustable throttle range is 4200rpm/min. The lowest rotor speed that can be set is 800rpm/min, the maximum speed is 5000rpm/min. To enable autorotation bail out mode the throttle must be set to a value between 5% and 15%.

Throttle position (scale depending on transmitter)		Rotor speed	Status-LED
100%	+100	5000	**blue**
95%	+90	4750	
90%	+80	4500	
85%	+70	4250	
80%	+60	4000	
75%	+50	3750	**red**
70%	+40	3500	
65%	+30	3250	
60%	+20	3000	
55%	+10	2750	
50%	0	2500	
45%	-10	2300	
40%	-20	2050	
35%	-30	1800	
30%	-40	1550	
25%	-50	1300	
20%	-60	1050	
15%	-70	800	
10%	-80	Motor off/ Autorotation	
5%	-90		**purple**
0%	-100	Motor off	**off**

90.2 Nitro Governor - with separate control channel

When the **nitro** Governor mode is used, the throttle servo can be controlled entirely via the throttle channel of the remote control as long as the Governor function is switched off. This is especially necessary to start and warm up the engine as well as to stop the engine after the flight. Only when the Governor is switched on, the system will take over control of the throttle servo to spool up the rotor to the desired speed (if this is not yet reached) and ensure that the rotor speed is maintained during the flight. As some model engines react very sensitive in the lower throttle sector and abrupt engagement can cause the engine to quit, i.e. when the clutch is not fully engaged and/or the rotor is not yet turning, also the manual throttle control can be of advantage. The pilot can run the engine to speed "by hand" before control is passed over to the Governor.

The adjustable rotorspeed range in "nitro" mode is 2500rpm/min. The lowest head speed to govern is 500rpm/min, the maximum head speed is 3000rpm/min.

When a separate control channel is used for the Governor function the throttle servo can be controlled as usual via throttle channel and throttle curves of the transmitter. By switching the separate control channel in different positions, the Governor can be activated and the desired rotor speed can be preset. Note that for safety reason the throttle channel has priority over the Governor control channel as long as the output is below 25%. So you can always control the lower throttle servo positions by hand, even if the Governor is already switched on by the separate control channel. Only when the throttle is raised above 25% the Governor intervenes and controls the throttle servo to spool up and maintain the rotor head speed. So when you want to bring the throttle servo to idle position for autorotation or to shut off the engine you can always do this, regardsless of how the Governor is set at the momement. In respect to this please note that MICROBEAST PLUS will be set to Autorotation bail out mode if the Governor was activated once and the throttle channel is brought back below 25%. Now when throttle is increased again, the Governor will speed up the rotor faster than on initial spool up! Therefore if you make a stopover and the rotor is completely stopped, you must completely disable the Governor once with the separate control channel. So the Governor is reset and will perform an initial startup again. Otherwise Autorotation mode would still be active and may cause the helicopter to tip over due to the abrupt speed up.

Normal flight mode
- Throttle curve controls throttle
- RPM Governor off (governor control channel below -90)

Throttle curve (throttle channel)

Governor channel

Status-LED **off**
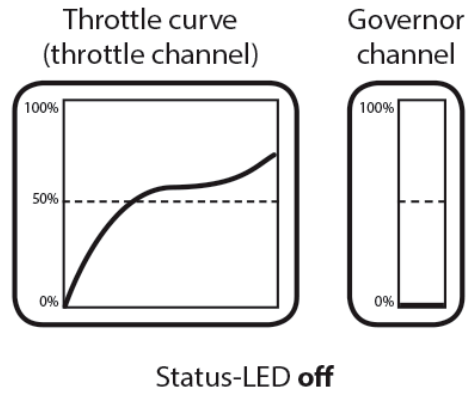
Figure 117

Idle up 1
- RPM Governor on
- 1800 rpm = +5 throw on governor control channel
- throttle must be above 20% throttle output

Throttle curve (throttle channel)

Governor channel

Status-LED **red**
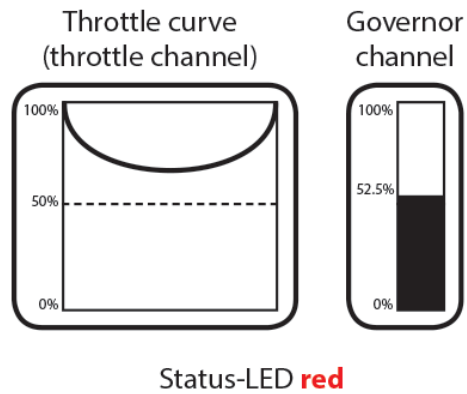
Figure 118

Autorotation*
- RPM Governor on standby (governor control channel stays above -90)
- Increased idle position (maximum 20% throttle output)

Throttle curve (throttle channel)

Governor channel
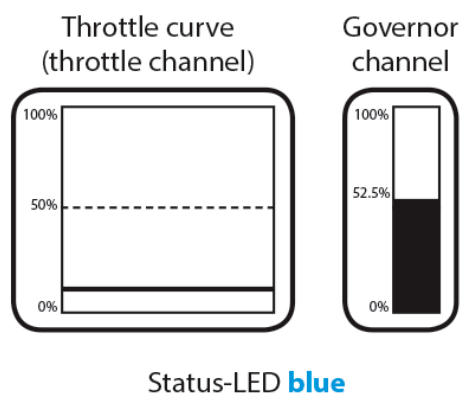
Status-LED **blue**

* Only effective when RPM Governor was active before

Figure 119

Throttle position (scale depending on transmitter)		Status-LED
100%	+100	
	95%	
+90		
	90%	
+80		
	85%	
+70		**off**
	80%	(= Manual control)
+60		**red** or **blue**
	75%	(= RPM control)
+50		
	70%	
+40		
	65%	
+30		
	60%	+20
55%	+10	
50%	0	
45%	-10	
40%	-20	
35%	-30	
30%	-40	
25%	-50	
20%	-60	
	15%	**Manual control/**
-70		**Autorotation**
	10%	
-80		
5%	-90	
0%	-100	

Rotor speed	Governor channel
3000	+100
2870	+90
2740	+80
2605	+70
2470	+60
2340	+50
2210	+40
2080	+30
1950	+20

Rotor speed	Governor channel
1820	+10
1680	0
1550	-10
1420	-20
1290	-30
1160	-40
1030	-50
895	-60
760	-70
630	-80
500	-90
off	-100

90.3 Nitro Governor - simple mode

If no separate control channel was assigned in RECEIVER MENU for the Governor, throttle servo and Governor function are solely controlled by the throttle channel. For this purpose the control range of the throttle channel is divided into two parts: Below the center position, the throttle servo is controlled manually by the throttle channel. The Governor is switched off and the servo output range is doubled, so that the throttle servo can be moved over the entire range. Once the throttle channel is switched to the upper area, the Governor will activate, spool up the rotor and try to hold the preset headspeed (the throttle position determines the headspeed here). Similar as it was described above for electric models you make the throttle curve a horizontal line, so that regardless of the position of the throttle stick, MICROBEAST PLUS will always see the same throttle value. So the preset headspeed will stays the same and does not change when moving throttle stick. At least two flight modes are necessary: One that the throttle curve goes only up to the middle position and in which the motor can be controlled by hand, i.e. for starting the motor, and one flight mode in which the throttle curve is a horizontal line used to preset the desired rotor head speed.

Normal flight mode
- RPM Governor off
- Throttle stick controls throttle servo
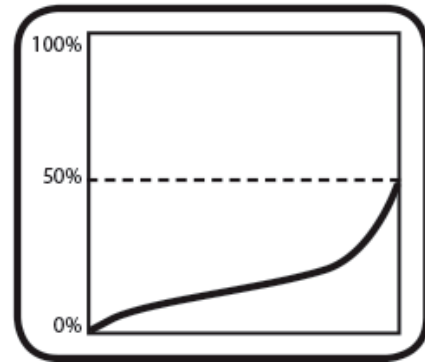
Figure 120

Idle up 1
- RPM Governor on
- 1800 rpm = 75%
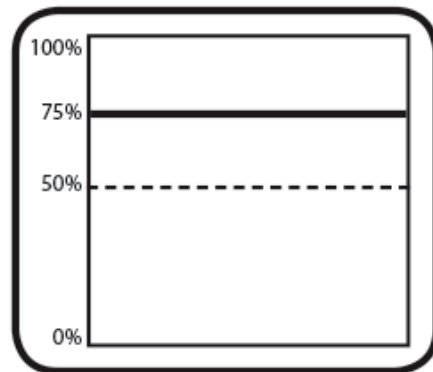
Figure 121

A third flight mode can be used for performing autorotation maneuvers: Here the throttle channel must be set to a constant value close below center position (between 40% and 50%). When you switch to this position once the governor was active, the throttle servo will be moved to the idle position set at menu point B. When switching back to governor mode, i.e. when you want to bail out from autorotation, the rotor will be spooled up at an increased rate. Alternatively if it is switch back to the flight phase with manual control, Autorotation mode is canceled and the next time you switch on the Governor, the rotor is spooled up slowly.

Autorotation*
- RPM Governor on standby
- Increased idle position
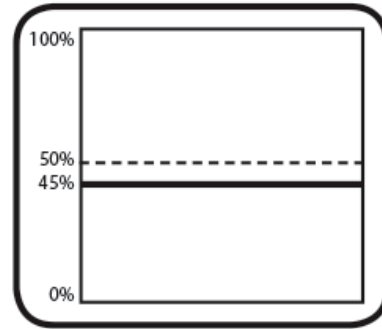
* Only effective when RPM Governor was active before

Figure 122   noframe

Throttle position (scale depending on transmitter)		Rotor speed	Status-LED
100%	+100	3000	**blue**
95%	+90	2750	
90%	+80	2500	
85%	+70	2250	
80%	+60	2000	**red**
75%	+50	1750	
70%	+40	1500	
65%	+30	1250	
60%	+20	1000	
55%	+10	750	
50%	0	500	
45%	-10		
40%	-20	Manual control or Autorotation	**purple**
35%	-30		
30%	-40		
25%	-50	Manual control	**off**
20%	-60		
15%	-70		
10%	-80		
5%	-90		
0%	-100		

91 GOVERNOR MENU E - Throttle signal divider

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu E[2] and the translation is 100% complete.

When using electric motors the rpm sensor signal usually consists of the (electric) field speed. In order to obtain the actual engine speed the field speed must be divided by half the number of motor poles. Using a 2-pole motor thus the measured speed corresponds to the motor speed. With a 10-pole motor on the other hand the field speed is five times higher than the actual speed. Also for nitro/gas engines the measured speed of the sensor may be higher than the actual speed. For example when a magnetic sensor is installed and more than one magnets are used for measuring the rotational speed, the rpm output will be multiplied by the number of magnets. So when two sensor magnets are used the rpm signal from the sensor will be twice the engine revolutions. So in order the rotor speed matches the rotor speed you set with the transmitter you must specifiy the factor by how much the incoming rpm signal must be divided to get the actual motor rpm.

The motor poles of an electric motor can be easily determined by counting the number of magnets built into the motor housing. Each magnet corresponds to one magnetic pole. Note that on some motors pairs of magnets are used rather than one single large magnet. These pairs together form just one magnetic pole! If in doubt refer to the datasheet of the motor or ask the manufacturer or your local dealer.

To determine the number of magnets that are used for a magnetic rpm sensor in a nitro helicopter, you can use the Sensor Test mode of GOVERNOR MENU (Menu point A). Each time a magnet passes the sensor the Status-LED will light up in blue color there, i.e. when you turn the clutch bell by hand. So you simply count how often the Status-LED lights up during one rotation. Then this is the divider you have to setup.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%3AMBPlusFblV52%3AGovernormenu+E&action=page&filter=&language=en

2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_E

92 Adjustment on the device

At GOVERNOR MENU point E the currently selected division factor is represented by the color of the Status-LED. Use the rudder stick to switch between options.

Status-LED	RPM Divider
off	**no division**
	2 motor poles (electric) or 1 magnet (nitro)
purple flashing	**2**
	4 motor poles (electric) or 2 magnets (nitro)
purple	**3**
	6 motor poles
red flashing	**4**
	8 motor poles
red	**5**
	10 motor poles
blue flashing	**6**
	12 motor poles
blue	**7**
	14 motor poles

93 Setup with StudioX

In StudioX simply enter the rpm divider using the push buttons.

94 GOVERNOR MENU F, G & H - Main gear ratio

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Governormenu F[2] and the translation is 100% complete.

The Governor of MICROBEAST PLUS in general calculates with the rotor head speed of the helicopter. So as shown at the transmitter setup step of GOVERNOR MENU you can preset the desired head speed very easily and MICROBEAST PLUS will try to maintain this headspeed as close as possible. Thus the detected rotation speed of the motor can be converted into rotor head speed, you must specify the main gear ratio of the helicopter.

The gear ratio should be specified in the instruction manual for your helicopter. Especially with electric models it will vary depending on the motor pinion used. For helicopters with a single-stage gear drive the reduction can be calculated by dividing the number of pinion teeth from the main gear tooth count.

Example: Shape S8 - Main gear tooth count 130 teeth / 15 tooth pinion. Gear ratio apprx. 8.65:1. **F** - Status-LED purple flashing, **G** - Status-LED red, **H** - Status-LED purple.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AGovernormenu+F&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Governormenu_F

95 Adjustment on the device

To set the gear ratio on the device you have to adjust three menu points in a row. Menu point **F** sets the number of gear ratio before the decimal point, menu points **G** and **H** specify the first two decimal places. Compare the following table and set the Status-LED using the rudder stick to the corresponding color and condition at each menu point so the desired gear ratio will result as a combination of all three menu points (**X.YZ:1**). The ratio can be adjusted in increments of 0.05. Choose the ratio that is the closest for your helicopter and set the menu points one after the other. To proceed to the each menu point briefly push the button. After menu point **H** the initial setup is finished and the button press will lead back to operation mode.

Menu point F Status-LED	**X.**
off	user defined
purple flashing	8
purple	9
red flashing	10
red	11
blue flashing	12
blue	13
red/blue	14

Menu point G Status-LED	**.YZ**	**Menu point H** Status-LED
purple flashing	.00	purple flashing
purple flashing	.05	purple
purple flashing	.10	red flashing
purple flashing	.15	red
purple	.20	purple flashing
purple	.25	purple
purple	.30	red flashing
purple	.35	red
red flashing	.40	purple flashing
red flashing	.45	purple
red flashing	.50	red flashing
red flashing	.55	red
red	.60	purple flashing
red	.65	purple
red	.70	red flashing
red	.75	red

Menu point G Status-LED	.YZ	Menu point H Status-LED
blue flashing	.80	purple flashing
blue flashing	.85	purple
blue flashing	.90	red flashing
blue flashing	.95	red

When a custom gear ratio was set using StudioX or StudioXm the Status LED will be **off** at menu point F. Pressing the button briefly in this combination the menu points **G** and **H** will be skipped and you will directly exit the menu. Other than that also here you can change the gear ratio with the rudder stick and use one of the preset ratios, but note that in this case the custom ratio will be erased!

96 Setup with StudioX

With StudioX simply enter your gear ratio in the app. Here we also added a calculator for single stage main drive systems. Enter your main gear tooth count and pinion size to easily calculate your main gear ratio. This can be directly stored then.

97 PARAMETER MENU A - Quick Trim

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Quicktrim[2] and the translation is 100% complete.

The first menu point of the PARAMETER MENU gives you the possibility to quickly adjust swashplate and rudder trim on the flying field. This may be neccessary when your helicopter slowly drifts in hovering flight or when it doesn't climb out straight on sudden collective pitch inputs. Additionaly when using the AttitudeControl feature (only included in PROEDITION firmware upgrade) you may trim the reference point of the artificial horizon in case the heli does not level perfectly when AttitudeControl stabilization is active.

Please note that the Quick Trim is a global parameter. When you use the Bank Switching feature the values you set here will be used in any flight mode. Separate trimming for each flight mode is not provided as we think it's not necessary.

⚠ **Never use the trim functions of your remote control!** MICROBEAST PLUS will see trim as a control command to turn the heli and not as servo trim. So using the trim on your transmitter will result in a constant rotational movement (if you feel you have such effect even when sticks are perfectly centered and all trims are zero, it may be necessary to increase the Stick Deadband at PARAMETER MENU point E!)

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AQuicktrim&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Quicktrim

98 Adjustment at the device

For the Quick Trim adjustment you have to enter PARAMETER MENU point A. To do so briefly push the button when in operation mode, so that the yellow Menu LED next to A will start flashing quickly (do not hold the button too long, as this will enter SETUP MENU point A which is shown by a solid lit up LED A).

98.1 Trimming the swashplate

To activate the swashplate trimming mode make sure your tail gyro is set to Heading Lock mode and that AttitudeControl is not active at the moment (if applicable)! Then you can to directly adjust aileron, elevator and collective here, without taking care about the single servos. Similar to the digital trim function of most transmitters here at PARAMETER MENU point A you can adjust the swashplate "one click" by tapping the aileron or elevator stick briefly in the desired direction. To trim the collective we use the rudder stick (left = minus, right = plus). If you want to trim the swashplate any further repeat tapping the stick several times or simply hold the control stick pushed for a longer time to automatically perform several trim steps. The color of the Status-LED gives you an approximate indication of how much you did trim and when the trim has changed the Status LED will flash for a moment.

98.2 Rudder servo

If the tail gyro is operated in Normal-Rate mode, the rudder servo must often be trimmed precisely so that the tail rotor produces just enough thrust to counteract the rotor torque in hovering flight. Otherwise the helicopter would constantly drift into one or another direction on its vertical axis as the gyro only dampens sudden movements but does not control the tail rotor's absolute position.

To trim the rudder servo proceed as follows: Make sure your tail gyro is set to Normal-rate mode! By tapping the rudder stick briefly in the desired direction, you can trim the rudder servo now. If you want to trim the rudder any further repeat tapping the stick several times or simply hold the control stick pushed for a longer time to automatically perform several trim steps. The color of the Status-LED gives you an approximate indication of how much you did trim and when the trim has changed the Status LED will flash for a moment.

98.3 Reset adjustment

You can delete all trimming by pushing and holding the button on the device for at least 10 seconds, then release. This will reset all trims back to factory state but will NOT affect the single servo trimmings of SETUP MENU! So you can change the trimming on the flying field if necessary and if it was wrong or too much, you can easily clear it out without affecting the other settings.

98.4 Trimming the artificial horizon (optional)

If the helicopter is not aligned horizontally as desired with active AttitudeControl, i.e drifts to one side in hovering, the artificial horizon can be readjusted. To do so activate AttitudeControl at PARAMETER MENU point **A** with the transmitter's AttitudeControl channel and make sure the tail gyro is in Heading Lock mode. By moving the aileron or elevator stick the roll and pitch tilt of the horizon can be increased/decreased. Briefly touching the appropriate stick will trim the horizon stepwise by 0.5 degrees to the specific direction. Touching the stick repeatedly or holding it for longer time will trim the horizon by several steps. The color of the Status-LED gives you an approximate indication of how much you did trim and when the trim has changed the Status LED will flash for a moment.

When you place the helicopter in horizontal position and you should be able to see the effect of trimming. When the swashplate is perpendicular to the main shaft this will by the approximate position of the helicopter in flight. Note that the helicopter usually is slightly tilted to the side in hovering flight due to the drag of the tail rotor. Therefore as a starting point by default the system has a trim of 4 degrees to the right to make the heli tilt against the rotor torque (using a helicopter with clockwise turning rotor). Also note that AttitudeControl can not recognize the absolute position of the helicopter. Depending on wind and environmental conditions it may happen that the helicopter stays level but drifts into a certain direction during hovering flight. You may use the trim to compensate this an hang the helicopter more into the wind, but when turning the heli by 180 degrees it will drift even more! So ideally you trim the horizon on a calm day when there is no wind.

As a last note please be aware that this is not a professional autopilot system. The system can be influenced badly by long-lasting vibrations or fluctuations in temperature. As a result it can't be guaranteed that the helicopter does always comply exactly the same attitude. The performance highly depends on many environmental conditions. So keep the system as far away as possible from rotating parts on the heli. Make sure the heli is running smooth and free of vibrations and make sure the MICROBEAST PLUS unit is perfectly aligned to the rotation axis of the helicopter (otherwise the axis will be cross connected together and the calculation of the artificial horizon will not match the real movement of the heli).

99 Adjustment with StudioX

When StudioX has connected to your MICROBEAST PLUS, in the device overview
main screen click the "Parameter" button. The topic "Quick Trim" provides adjustment
buttons to change the trim values for aileron, elevator, rudder and also collective.
Positive values indicate the directions right, forward or up. Negative values indicate
left, backwards or down. Please note that the first screen "Quick trim" has global
effect, meaning that the values set here are used in all of the Paramter Banks (in case
you're using the Bank Switching feature). Separate trimming for each bank is not provided.

On the bottom of the screen you can see the trimming for the Artificial Horizon. Here you
can trim the tilt on the roll and pitch axis in steps of 0.5 degrees. Please read the notes
above for more information about this feature.

100 PARAMETER MENU B - Control Style

This page is a translated version[1] of the page Manuals:MBPlusFblV52:ControlStyle[2] and the translation is 100% complete.

MICROBEAST PLUS transfers the stick inputs of roll, elevator and rudder as commands to rotate the heli with a given speed. When the sticks are in center position this means "do not rotate". On the other hand when you move the stick(s) to a specific amount of full deflection it is not settled how fast the helicopter will rotate. Here comes the control style setting into play which allows to choose between different control behaviors/control styles for your helicopter. This includes the maximum rotation rate of the helicopter as well as how sensitive MICROBEAST PLUS will react to stick inputs for aileron, elevator and rudder around the stick centre (Stick expo).

Factory setting for this option is "sport". This should be suitable for most pilots. If you are a rather inexperienced model pilot it is absolutely suggested to select the option "normal" for the first flights. Here the rotation rate on cyclic and rudder is highly decreased and the stick inputs around center are very gentle.

Additionally it is possible to freely adjust the control style with StudioX/StudioXm to your needs and even to store different control styles for the 3 flight modes when using the bank switch feature (PROEDITION firmware only). So you have the ability to switch between different styles in flight.

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1 https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
   3AMBPlusFblV52%3AControlStyle&action=page&filter=&language=en
2 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:ControlStyle

101 Adjustment at the device

The control style is set at PARAMETER MENU point B at the device (to enter this menu point briefly push and hold the button from operation mode, so Menu LED A flashes, then again brifly push the button so Menu LED B flashes). The choice is done by moving the rudder stick in one direction until the LED indicates the desired color and state. To find your individual preference increase the option step by step.

Status-LED	Control style
purple	normal
red flashing	sport
red	pro
blue flashing	extreme
blue	transmitter

If you are not satisfied with the presets, you may adjust the control behavior by using your remote control. To do so set the control behavior to "transmitter" (Status-LED "blue"). Then the maximum rotation rates for aileron, elevator and rudder can be adjusted by increasing or decreasing the servo travel for the corresponding function in your transmitter or by using the "Dual rate" function. 100% stick throw (servo throw) in the transmitter are equivalent to a rotation rate of apprx. 400deg/s on cyclics and 600deg/s on rudder in this mode. (So for example when you would set the rudder output to 50% in the transmitter, the heli rotates at 300deg/s with full rudder stick deflection.)

To adjust the sensitivity around mid stick position you can use the "Expo" function of your transmitter. Please refer to the manual of your transmitter.

Notes:

• When you've changed the preset control style using the StudioX or StudioXm App the Status LED will be **off**. You can change back to a preset by tapping the rudder stick as described, but this will remove your custom setting!

• When using the bank switch feature (PROEDITION firmware only) you can only adjust the settings for flight mode/bank 1 using the LED menu on the device. The settings for banks 2 and 3 must be changed in StudioX/StudioXm. When deactivating the bank switching, still you will see the settings of bank 1 here, as bank 1 is the default bank

that is used when bank switching is disabled!

⚠ When using predefined control behaviors other than "transmitter" we do not recommend to additionally adjust control curves (Expo/Dual rates) in your transmitter as this will indefinably mix the preset curves of MICROBEAST PLUS with the curves of the transmitter! Anyhow, if you only make small adjustments (e.g. slightly increasing the throw to increase rotation rate) this should be no problem.

⚠ If the tail gyro is operated in Normal-Rate mode the rudder stick directly controls the rudder servo instead of commanding a rotation rate to the gyro. In this mode the heli will turn as fast as it is determined by the rudder servo position and angle of attack of the rotor blades. The tail gyro does not monitor the rate of rotation. Therfore it is possible to get very high rotation rates and it is absolutely necessary to check how much pitch angle will be achieved at full rudder stick deflection at the tail rotor. Reduce the servo throw of the rudder servo by decreasing it on the remote control or limiting it on the MICROBEAST PLUS to a reasonable level.

102 Setup with StudioX

When StudioX has connected to your MICROBEAST PLUS, in the device overview main screen click the "Parameter" button. Click the "Next" button once in order to change to the topic "Bank 1 - Control style". Here you see the currently used maximum rotation rates and expo values for each control function aileron, elevator and rudder. The rate is measured in degrees per second, a value of 360 for example means your helicopter will make a full turn/rotation in one second, when you move the stick to full deflection. The expo value is specified in percent. 0% expo means that the stick input is influencing the output linearly. Usually this will make the control feel very sensitive and over reactive. By adding some expo you can soften the input around stick center position.

When using the Bank Switch feature you can set different control styles for each bank. Click "Next" until you will see "Bank 2 - Control style" or "Bank 3 - Control style" and adjust as necessary or set the values similar to Bank 1 in case you don't like to have different styles on each bank.

Please note that your custom values of Bank 1 will be changed/deleted when you select a preset control style in the PARAMETER MENU on the device (see above)!

103 PARAMETER MENU - Special parameters C to K

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Parametermenu[2] and the translation is 100% complete.

The points C to K of PARAMETER MENU offer a variety of settings which you may use to further improve the system performance and which allow you to adjust the flight characteristics of the helicopter to suit your personal preferences. Normally for the first flight you don't need to make any adjustments here.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AParametermenu&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Parametermenu

104 Adjustment at the device

When MICROBEAST PLUS is ready for operation, hold down the button until the Menu LED next to point A flashes quickly, then release the button immediately. The flashing menu LED A shows that you've entered menu point A of PARAMETER MENU. To skip to the setting you like to adjust, repeatedly press the button until the corresponding Menu LED flashes. The current setting of this menu point is shown by color and state of the Status LED. Tapping the rudder stick left/right you can decrease/increase the value. If you don't like to use one of the presets, you can edit each setting with the StudioX software/StudioXm app to your likings. In this case when your custom setting does not match the presets the Status LED will stay '*off*. You can still choose one of the presets by tapping the rudder stick, but this will erase your custom setting.

When using the bank switching feature (only with PROEDITION firmware) you can only change the settings for bank 1 using the LED menu of MICROBEAST PLUS. The parameters for banks 2 and 3 must be set in the StudioX software/StudioXm app. When disabling bank switching the settings will not change as bank 1 is used by default!

105 Setup with StudioX

Please note that editing parameters is only possible when the device has initialized completely. So as long as the system is not in operation mode the button to open the "Parameters" section is greyed out. If it does not pass initialization sequence check the device status shown in the middle of the screen. If the system does not finish "Receiver init" check the receiver settings and radio setup. If the system does not finish "Sensor init" make sure that it is perfectly standing still and that power supply is stable.

Click the "Parameters" button. You will find the special parameters mentioned above under "Bank 1 - Parameters". You can edit them using the given adjustment buttons. When using the bank switching feature (only with PROEDITION firmware) you can set parameters for banks 2 and 3 accordingly and switch between those different settings in flight. When bank switching is deactivated you can only set parameters for bank 1 as this is the default bank.

106 Parameter explanation

106.1 Speed flight stability (Point C)

When in fast forward flight apply jerky collective pitch inputs to test this parameter. The helicopter should mainly remain in its horizontal flight path during climbing and descending. If the nose of the helicopter is pitching up and down heavily like a swimming dolphin, increase the setting to compensate for this effect. But if the value is too high, the helicopter might feel sluggish and lazy. So it's best to try finding the lowest suitable setting. Note that the Cyclic Gain (usually set by Dial 1) must be set as high as possible as well. Otherwise the pitching up just may be the result of too low reaction of the gyro system in general.

If the helicopter is still pitching up at the highest value and maximum possible cyclic gain, check whether the swashplate has enough cyclic throw at high collective pitch values or use faster and stronger servos and rotor blades with very neutral phasing (for example blades specifically designed for flybarless helis).

Status-LED	Speed flight stability
purple	very low
red flashing	low
red	medium
blue flashing	high
blue	very high

106.2 Rudder rate consistency (Point D)

At PARAMETER MENU point D the rudder rate consistency can be adjusted. This parameter comes into play when the tail gyro is operated in HeadingLock mode. It determines how hard the tail gyro tries to maintain a given rotation rate from the

transmitter. If the value is set too low, pirouettes will be inconsistent during fast forward flight or in crosswind conditions and the helicopter will slowly drift on the vertical axis when in stationary hovering flight with crosswinds. If on the other hand the setting is too high, the tail gyro will respond delayed to fast directional changes and the rudder stick control feels very inprecise. Additionally the tail might make a slow bounce after stopping from a rotational movement and commute gently while hovering or flying around. So only adjust this parameter as high as necessary.

Parameter menu point **D** only adjusts some part of the tail gyro control loop. First of all, you must adjust the tail gyro gain in the transmitter and use it to switch the gyro to HeadingLock mode.

- Before adjusting the rudder rate consistency always try to find the maximum amount of tail gyro gain by flying around and using the tail gyro in HeadingLock mode.
- After adjusting the rudder rate consistency it might be necessary to readjust the tail gyro gain! Both parameters interact to each other.

Status-LED	Rudder rate consistency
purple	very low
red flashing	low
red	medium
blue flashing	high
blue	very high

Additional information

Please note that poor tail performance very often may be a sign of a stiff tail mechanics, slop in the tail linkage or an inadequate rudder servo! The tail rotor system in this case does not react as precise as necessary and hinders the tail gyro from working properly. If you cannot increase the rudder rate consistency further than "very low" or "low" without the tail rotor starting to slowly oscillate or bounce after doing a full stop, it is very likely that there is a mechanical issue. Also if on the other hand the tail does not turn constantly at high speeds or doesn't turn around at all, even with setting „very high", again this may be due to a mechanical cause.

Make sure that the maximum blade pitch at the tail rotor neither is too large nor too small. A large pitch angle can lead to a stall of the tail rotor blades. Then the tail rotor produces hardly any thrust, similar to a very small angle. Also check

the entire tail mechanics running smooth and without binding. Make sure that the rudder servo is strong enough and that it is supplied with sufficient power (long supply leads cause high voltage loss!). Check that the rudder servo does not get powerless at maximum servo deflection. This can happen if the pulse range of the servo is exceeded. The cause for lacking tail thrust also can be that the tail rotor blades are too small or too soft, or because the rotation speed of the tail rotor is too low!

To gain better tail gyro performance also check for correct servo horn length. If the tail gain in general is very low and the rudder tends to oscillate very easy move the linkage ball on the servo horn further inwards to the center. If on the other hand you have a very large amount of tail gain and the tail gyro still does not seem to be capable to hold the tail rotor in any flight condition, move the linkage ball on the servo horn further out from the center, to get faster response speed when the gyro needs to control the rudder.

Do not change the rudder rate consistency at menu point D in case the tail gyro does not hold well on abrupt directional changes. The rudder rate consistency doesn't compensate for sudden movements! In this case increase the gyro gain (if possible) or use the help of RevoMix feature (point F).

106.3 Stick deadzone (E)

The deadzone defines the range around the very center of the stick in which MICROBEAST PLUS will not react to stick inputs. Unfortunately, some on the market available transmitters have the problem that when the sticks are brought back to the center position after a stick input, they aren't exactly at the same center position as before. This generates a continuous deviation on the corresponding function, although the stick seems to be at mid position. This deviation is interpreted as a small input by MICROBEAST PLUS which leads to an unwanted drift on one or more axis. Especially you can see and feel this in hovering flight when the helicopter is turning slightly to one or another direction all the time. This makes it difficult to have precise hovering as it is hard to find a stick position at which no input is sent to MICROBEAST PLUS. This can be very dangerous as it may cause the helicopter to tip over when trying to take off or it can cause the pilot to loose control over the helicopter at all! So increase the stick deadband stepwise just until you don't see such effects. Note that as a result of large stick deadband there will be a wide range around mid stick position in that MICROBEAST PLUS will not react to stick inputs. This will make the control more inprecise. So if using "large" or "very large" deadband is necessary, we recommend to let your transmitter get checked by its manufacturer for damaged or worn out stick potentiometers.

Status-LED	Stick deadband
purple	very small
red flashing	small
red	medium
blue flashing	large
blue	very large

106.4 Torque precompensation/RevoMix (F)

The advantage of always knowing the collective and cyclic inputs allows MICROBEAST PLUS to help the tail gyro holding the tail in position. It can precompensate for the torque variations on the tail rotor, just before any noticeable deviation occurs. This method of torque precompensation (RevoMix) relieves the tail control loop and improves the tail performance, especially when using MICROBEAST PLUS on helicopters with insufficient tail authority and/or extreme motor torque (e.g. overpowered electric helicopters) where the tail does blow out for a short moment when applying a sudden collective or cyclic input.

In general you can see the compensation when you move the collective or cyclic control sticks. With precompensation activated the tail rotor has to produce a deflection which must counteract the rotor torque. Since at 0° pitch the least torque is applied by the main rotor, also the tail rotor makes the least deflection and the tail slider is in center position. If you pitch in positive or negative direction or move aileron or elevator control, a deflection will be added to the tail rotor which will act against the torque of the main rotor. For helicopters with clockwise rotating main rotor, the precompensation has to always push the tail to the left (nose of the heli to the right). For helicopters with the main rotor turning anti-clockwise, the precompensation has to push the tail to the right (nose of the heli to the left). The deflection will be to the same direction, whether positive or negative pitch, as the torque only increases. So when doing the adjustment first of all check which direction is needed for your helicopter. Then choose the amount of precompensation from the given preset or adjust freely using the StudioX Software/StudioXm App.

When doing the adjustment on the device the rudder servo will directly move into the direction of compensation. So you can easily see, where the tail will move when adding pitch. When precompensation is set to "high" the servo will move further than with "low", so you get an additional visual reference of what you're adjusting at the moment.

Status-LED	Torque precompensation/RevoMix
purple	off
red flashing	low - normal direction

Status-LED	Torque precompensation/RevoMix
red	high - normal direction
blue flashing	low - reverse direction
blue	high - reverse direction

Use torque precompensation when the tail does go away in torque direction when applying a sudden pitch input, even if the tail gyro gain is properly setup. Increase the amount of precompensation stepwise until the tail holds well. If the tail is moving against torque direction, the amount of precompensation is too high already. If the tail is blowing out even worse when torque precompensation is active, probably the direction of torque precompensation is wrong! If you can't find a good adjustment check the mechanical conditions. Use different (larger) tail rotor blades or higher tail rotor speed to gain better holding force. Also check your tail gyro gain. If the tail gyro gain is very low in general and the rudder tends to oscillate very easily move the linkage ball on the servo horn further inwards to the center. If on the other hand you have a very large amount of tail gain and the tail gyro still does not seem to be capable to hold the tail rotor in any flight condition, move the linkage ball on the servo horn further out from the center, to get faster response speed when the gyro needs to control the rudder.

Torque precompensation can only be used when you have 0° of pitch at SETUP MENU point H (servo trim)!

106.5 Cyclic response (G)

With point G can be set how aggressive the MICROBEAST PLUS responds to cyclic control commands (roll and pitch). This can reduce the usual uniform and linear control feeling of flybarless systems and approach it to the feeling of a flybared helicopter.

If you want to use this feature, start from the "slightly increased" setting, gradually increasing to the desired level, until you have found your ideal setting. A too high setting will result in uncontrollable, inaccurate rotation and deteriorating stopping behavior of each control function. How high this feature is adjustable without causing any adverse effects depends on many factors such as heli size, swashplate servos, main rotor blades, main rotor speed, servo power supply and depending on the particular heli setup.

Status-LED	Cyclic response
purple	normal

Status-LED	Cyclic response
red flashing	slightly increased
red	increased
blue flashing	high
blue	very high

106.6 Pitch boost (H)

PARAMETER MENU point H allows you to setup the collective pitch boost function. This function causes that the faster you move the thrust stick, the more additional collective pitch will be exposed. This can be especially useful in 3D aerobatics when very rapid collective pitch changes are necessary for certain flight maneuvers, as hereby dynamically the required control stick deflection will be reduced. However, the maximum pitch value will not be exceeded.

When the setting is too high, this can cause the rotor blades to stall when giving very fast collective pitch commands. The collective pitch will feel slow and spongy, precisely causing the opposite effect as desired. Also note that a high setting can make the pitch control inprecise and more sensitive, as when giving fast stick input, the pitch will overshoot.

Start from the "low" setting, gradually increasing to the desired level, until you have found your ideal setting. How high this feature is adjustable without causing any adverse effects depends on many factors, such as maximum pitch values, pitch curve, swashplate servos, main rotor blades, system headspeed, pilot skills, ...

Status-LED	Pitch boost
purple	off
red flashing	low
red	medium
blue flashing	high
blue	very high

106.7 Throttle response (I)

Use PARAMETER MENU point I to change the response of the internal Governor control. This determines how fast and how far the system will open the throttle when the rotor speed changes. Ideally the response is set as high as possible. If it is too low, the main rotor will speed up in unloaded conditions as the system reduces throttle not quick enough. Also the internal Governor will increase throttle very cautious when the rotor is loaded, so that the head speed will drop. If on the other hand the response is set too high, the throttle may stutter audible and the throttle will kick in very hard. So the motor speed will overshoot when the rotor head is loaded. This will make the headspeed even more inconsistent than with a lower setting. The height of throttle response highly depends on factors such as heli size (blade size), motor power and performance and/or the throttle reponse behavior of the speed controller (when flying an electric heli). If you need to adjust the throttle response, we recommend to start with the lowest value and increase stepwise just until you get the most consistent rotor head speed. Having a heli with good motor power and a fast responding speed controller (on electric helis) typically allows to have high throttle response values (up to "very aggressive" setting) which will give very consistent head speed. Helis with not so much power (small nitros, gasser, scale helis) prefer low throttle response settings for a softer throttle management.

Status-LED	Throttle response
off	soft
purple	normal
red flashing	slightly increased
red	increased
blue flashing	aggressive
blue	very aggressive

106.8 Slow rampup speed (J)

When using the internal Governor function this will not apply full throttle immediately when switching into idle up but will increase the motor speed slowly until the desired head speed is reached. At menu point J you can determine how fast this soft start occurs when the Governor is activated initially. The speed is given in number of revolutions by how much the rotor speed is increased per second. The higher the speed the faster your preset head speed will be reached. Please note that the given rates only are indicative. Depending on the response of the speed controller and the inertia of the rotor system it can actually take longer or shorter until the desired speed is reached.

Status-LED	Slow rampup speed
purple	50 rps
red flashing	100 rps
red	200 rps
blue flashing	300 rps
blue	400 rps

With the StudioX software/StudioXm App you have the option to disable the softstart feature, which will set the spool up rate to "0". This is necessary when using a speed controler with built-in soft start feature (but without headspeed governing!). In this case the system will add half throttle immediately and wait until the speed controler has finished the spool up. Then it will activate the governing.

⚠ Please note that you can't set a speed lower than 50 rps with StudioX because of the fact noted above. Setting the speed below 50 will be the same as setting it to 0, so it will disable the soft start!

106.9 Fast rampup speed (K)

When using the internal governor function and you change the head speed in the transmitter in flight (i.e. by switching to a different flight mode), there will not be an abrupt change but the system will increase the rotor rpm with a given rate that can be adjusted here. This rate also determines how fast the rotor head speed will increase when reactivating the Governor after an autorotation maneuver (Autorotation bailout). In this case, when the heli is still in the air, the normal soft start (which is set at point J) would take way too much time for the rotor to speed up again, so we use this faster spool up rate instead.

Status-LED	Fast rampup speed
purple	same as slow rampup speed (J)
red flashing	300 rps
red	500 rps
blue flashing	700 rps
blue	900 rps

⚠ When using a very fast rampup speed in consequence the throttle will be opened very quick. Especially when recovering from an autorotation maneuver this can cause the rotor blades to fold in or will damage the main gear. So only increase the value stepwise and with care. With nitro helicopters using quite low values is recommended (even the setting "same as slow rampup speed (J)" may be sufficient) as here an abrupt throttle change from idle position can cause the engine to quit! Also nitro motors react quite slow to throttle changes and it takes some time to speed up the rotor. When the change rate does not fit to the physical speed up, it can happen that the motor is driven to full throttle during spool up by accident as the motor does not come to speed. In this case for technical reason it may happen that the systems stays at full throttle then!

107 Gain settings

This page is a translated version[1] of the page Manuals:MBPlusFblV52:Gains[2] and the translation is 100% complete.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3AGains&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:Gains

108 Tail gyro

Gyro gain and operation mode
The tail gyro system of MICROBEAST PLUS helps to keep the helicopter's tail in position while flying around. It makes the rudder only react to stick inputs but not to external effects. Before the first flight, you have to set the correct amount of gyro gain in order to adapt the reaction of the gyro system to your specific helicopter model. Additionaly, you have to choose between two different operation modes:

- **Normal-Rate mode** - here the tail gyro of MICROBEAST PLUS only acts as dampening that decelerates sudden rotations caused by external influences. Slow, constant rotational movements will not be compensated. Thus the tail does not drift in hover due to the main rotor torque, a perfect mechanical adjustment of the tail rotor is essential (see the section to Setup menu point **E** & **F**[1]). But even with perfect mechanical adjustment you will always encounter some drift on the rudder axis due to crosswinds and the pilot has to constantly perform corrections when doing hovering flight. In high-speed flight on the other hand the tail will be aligned in flight direction by the wind, so curves can be flown very dynamically and the pilot doesn't have to constantly concentrate on controlling the rudder.

- **HeadingLock mode** - in this mode the tail is actively controlled by the gyro system. You will barely feel any external influences. By giving rudder stick input, the pilot only commands the gyro how fast it has to turn the tail. When the stick is in center position the tail gyro will ensure that the tail keeps locked into position by any means. This simplifies the control significantly. In hovering flight the beginner can fully concentrate on the control of cyclic and collective pitch and the advanced pilot can perform 3D - flight maneuvers such as backwards flying quite easily. The only disadvantage of HeadingLock-Mode is that the rudder must be steered by the pilot when flying curves. Otherwise the gyro will try to keep the tail aligned with the initial direction.

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Setupmenu_E/en

When setting up the system for the first time, start with medium gain in HeadingLock mode. Then readjust the gain as necessary:
Low gain will cause the rudder control feel weak, the tail will break out on collective pitch inputs and it will stop with overshoots. Increase the gain step by step. You will feel the tail having more and more precise stops and hold better and better on jerky pitch inputs. But watch out! If the gain gets too high, the stops will bounce back quickly and wagging will appear in fast forward or backward flight (or even on take-off). In this case land immediately and reduce the gain! For optimum performance set the gain as high as possible, just before the tail rotor starts to wag in fast forward flight.

Tail gyro response
In addition to the gyro gain adjustment there is a parameter called gyro response which helps to optimize the precision of the gyro. Increasing the gyro response will cause a harder stop and quicker response to rudder stick inputs. But if the response is too high, the tail will bounce back after a hard stop and feel spongy when making fast direction changes. If the response is set too low on the other hand, the rudder control feels dull and stopping might be too soft. Ideally the tail should stop perfectly to the point without making any flapping noises.

Before adjusting the gyro response make sure the maximum possible tail gyro gain has already been determined as described above! The gyro response can be considered as some sort of fine-tuning and adjusting this parameter will not have any significant effect if the gyro is not operating correctly in general. Also note that after adjusting the tail gyro response you may have to readjust the tail gyro gain once again, as these parameters interact to each other.

For better tail gyro performance also check for correct servo horn length. In case you can set the gyro gain only to a very low value and the rudder tends to oscillate very easily, move the linkage ball further inwards to the center of the servo horn. If on the other hand you have a very large amount of gain and the gyro still does not seem to be capable of holding the tail rotor in any flight condition, move the linkage ball on the servo horn further out from the center, to get faster response speed when the gyro controls the rudder servo. Also you may use different (larger) tail rotor blades or higher tail rotor speed to achieve better holding force.

109 Cyclic adjustment

The control loop for the cyclics depends on two major parameters: **Cyclic gain** and **Cyclic feed forward**.

Cyclic gain
In general the higher the gain, the harder the helicopter will stop after cyclic moves and the more stable and exact the helicopter will fly. But if the gain is too high, the helicopter will tend to oscillate at high frequency especially on the elevator axis. Due to their low mass, this behavior will occur sooner on small helicopters, so typically these do not need as much gain as large helicopters.

On the other hand, in case the gain is too low, the helicopter does not stop precisely and overshoots the more or less after a cyclic movement. Additionally, it feels unstable and sluggish in fast forward flight and when hovering. In general, low gain will allow the helicopter to have more life of its own and so it will not react to stick inputs as precise and immediate as the pilot expects it.

Ideally you set the gain to the sweet spot, at which the system reacts as precise and stable as possible without creating any negative effects.

Cyclic feed forward
This part mixes some amount of stick input directly to the servos, bypassing the control loop. If correctly adjusted, the feed forward relieves the control loop so it will work more efficiently by only having to make residual corrections. Factory setting of the dial is horizontal which provides a good setup in most cases. Turn dial 2 clockwise to increase the cyclic feed forward. This will cause more cyclic stick input going directly to aileron and elevator on the swashplate. Decreasing the direct stick feed forward will do the opposite.

In case the cyclic feed forward is set too high, the stick input will over control the cyclic input from the control loop. Eventually the control loop needs then to steer back and compensate the unwanted cyclic movement. Even though you get the impression to have a more direct and immediate control over the servos with high feed forward values, unwanted side effects may appear, like pitching back on cyclic stops and imprecise fast forward flight.

If the direct cyclic feed forward is too low, the helicopter will feel softer, slower and less "connected". The optimal point depends of many factors like blades, servos, head speed, size and mass of the helicopter. Ideally you can increase the feed forward just as high as possible without any negative effects happening. So you get a quite natural stick feeling

and the control loop is supported as good as possible. Before adjusting the cyclic feed forward you should try to find the optimal maximum cyclic gain first (see above). Then adjust the cyclic feed forward and after that, you may have to adjust the cyclic gain once again, as both parameters interact to each other.

The cyclic feed forward does not affect the maximum rate of rotation! If the helicopter turns too slow, you should check the settings of the swashplate limiter in Setup menu point $\mathbf{L}$[1], change the control behavior at Parameter menu point $\mathbf{B}$[2] or increase the servo travels or "Dual Rate" setup of your transmitter.

Also to get a quicker and more aggressive response, change the control style at Parameter menu point $\mathbf{B}$[3] (reducing expo and increasing the maximum rotation rate) and increase the cyclic response at Parameter menu point $\mathbf{G}$[4]. It is not recommended to increase the feed forward in this case! Although it may produce a quicker servo movement and more direct stick feel at first glance, you will get negative effects on overall performance as described above.

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Setupmenu_L/en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:ControlStyle/en
3   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:ControlStyle/en
4   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Parametermenu/en

110 Adjustment at the device

The gyro gain and gyro operation mode can be directly adjusted from the transmitter. The other parameters mentioned above can be set by turning the dials on the device into a specific position. **To adjust the dials please only use the supplied plastic BEASTX adjustment tool to prevent damage to the dials!**
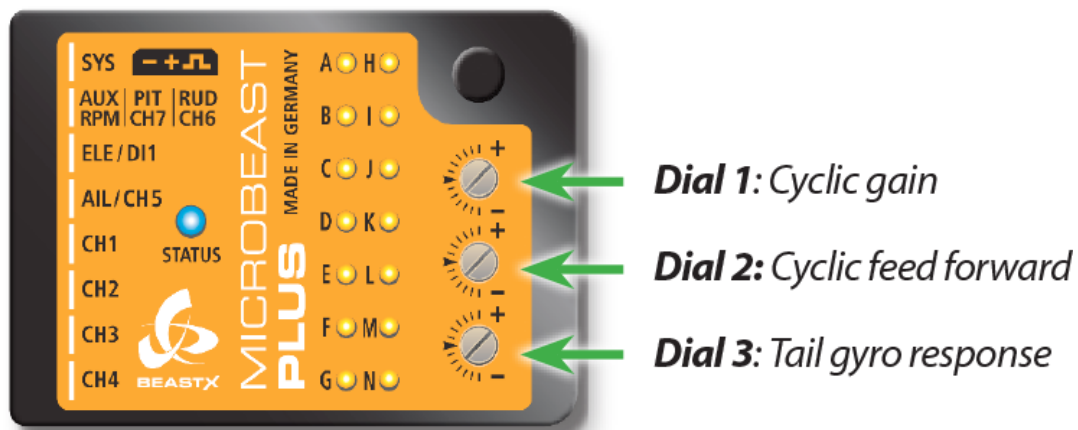
Figure 128   noframe

110.1 Tail gyro

Gyro gain and operation mode
The tail gyro gain is adjusted by one of the transmitter's auxiliary channels. The more servo throw this channel produces, the higher the tail gyro gain will be. Additionally, the direction of servo throw determines whether the gyro operates in Normal-Rate mode or in HeadingLock mode.

While adjusting the gain or after initialization sequence was finished, the current amount of gain is displayed by one of the menu LEDs for about 10 seconds: When the gain channel is centered, this will correspond to 0% gain indicated by LED **A**. The maximum adjustable tail gain is 100% and will correspond to LED **N**.

The color of the Status-LED indicates the selected mode: Purple indicates Normal-Rate mode and blue indicates HeadingLock mode.

Menu-LED	N	M	L	K	J	I	H	G	F	E	D	C	B	A	B	C	D	E	F	G	H	I
Gyro gain	100%	96%	88%	80%	72%	64%	56%	48%	40%	32%	24%	16%	8%	0%	8%	16%	24%	32%	40%	48%	56%	64%
Auxiliary channel	-100	-96	-88	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8	0	8	16	24	32	40	48	56	64
Gyro mode	Normal-Rate mode														HeadingLock mode							

Please note that the actual percentage and sign of servo throw in the transmitter will depend on its brand and/or type! For the first flight we suggest to start with medium gain not higher than LED **G** (LED **D** for 450 size helicopters and smaller) in HeadingLock mode (Status LED blue).

- Operation without using the auxiliary channel for tail gyro gain is not possible!
- When gain is close to point **A** (0% gain) the rudder servo will not perform full servo travel as the gyro is switched off. Do not attempt to fly in this condition!

Dial 3: Tail gyro response
Factory setting of the dial 3 is horizontal which provides a good setup in most cases. Turn dial 3 clockwise to increase the tail gyro response. Turning dial 3 counter clockwise will decrease it. Increasing the gyro response will cause a harder stop and quicker response to rudder stick inputs.

110.2 Cyclic adjustment

Dial 1: Cyclic gain
The swash gyro gain (cyclic gain) can be set by dial 1 from 50% up to 150%. The factory setting is horizontal which corresponds to 100% swashplate gain. Turn dial 1 clockwise to increase the gain and counter clockwise to decrease. For your first flights we suggest not changing this setting. However, when using very small helicopters (such as 250 or 450 size), reduce the cyclic gain by 3 marks (=75% gain) as with such small helicopters the control loop tends to overcompensate more easily.

Dial 2: Cyclic feed forward
Factory setting of dial 2 is horizontal which provides a good setup in most cases. Turn dial 2 clockwise to increase the cyclic feed forward. This will cause more cyclic stick input going directly to aileron and elevator on the swashplate. Decreasing the direct stick feed forward will do the opposite.

111 Setup with StudioX

When you're using the optional available PROEDITION firmware in combination with the Bank Switch feature you can set the parameters for the tail gyro and cyclic control loop in the StudioX app independant for all three flight modes. The dials on the device have no effect in this case. The auxiliary channel for adjusting the gyro gain is used to switch between banks (flight modes) instead of adjusting the gyro gain (see the page Bank Switching[1] for more detailed information).

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:BankSwitch/en

112 AttitudeControl

This page is a translated version[1] of the page Manuals:MBPlusFblV52:AttitudeControl[2] and the translation is 100% complete.

Please note that AttitudeControl is an optional feature. **It is only available on devices with MICROBEAST PLUS ProEdition firmware installed.** You can buy this optional update from the freakware Webshop[3] and flash the ProEdition firmware to your device using the StudioX Software/App.

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3AAttitudeControl&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:AttitudeControl
3   https://www.freakware.de/en/beastx/software-updates-w19629

113 What is AttitudeControl and how to use it

Basically what AttitudeControl does is leveling your helicopter by the flip of a switch or press of a button. There are different options on how the helicopter will be leveled which can be selected in PARAMETER MENU.

113.1 Leveling modes

- Angular Mode

  In this mode the helicopter flies like a quad copter. You have full control over pitch, but pushing aileron or elevator will only cause the helicopter to tilt by a given angle instead of rotating it around the roll or pitch axis. This makes flying much easier as you can't flip over the helicopter. Instead the maximum tilt is limited by your stick input. (Note: If you want to train inverted hovering using the angular mode, you will have to bring the helicopter into inverted position with AttitudeControl disabled first and then activate it).

- Bailout rescue

  The rescue mode can be used to bring the helicopter into a safe and well known position in case you loose orientation. No matter in which position the helicopter is at the moment, upright or inverted, once you activate the bailout rescue the system will bring your helicopter into an upright hovering position. In addition you set the Attitude Mode to "Bailout rescue with Pitch", here the system also will add some collective pitch input, so the helicopter hovers even when you have the thrust stick set at negative pitch position by accident. Or you could add even more pitch so the helicopter gains height quickly (for this pupose you can also use the "rescue boost" which can be set using the StudioXm App or StudioX Software).

- 3D - Mode

  This basically does the same as the rescue mode but difference is that it will also level the helicopter in inverted position. Here the system detects which position is closer to reach and directly levels the helicopter without making a turn around. This can be used when you want to train and learn aerobatic maneuvers, like inverted hovering, flips or

ticotcs. As you can override the AttitudeControl by adding some cyclic stick input even you could let AttitudeControl activated for a longer time, so the system guides you like a helping hand. I.e. when you make a front flip you only have to concentrate on giving correct collective pitch input. The elevator does not have to be as precise, as the exact leveling when reaching inverted hovering position is done by attitude control, even the system will pull the helicopter into level position, once it is tilted more than 90 degrees to the front. Please note the system will not level the heli into on or the other direction when it is in vertical position. This makes it more comfortable to fly around and perform loopings or knife edge flying while 3D Mode is active!

Besides the general choice from theses 5 Modes (Angular Mode, Bailout rescue, Bailout rescue with Pitch, 3D - Mode, 3D - Mode with Pitch) you can adjust more options with the StudioX Software or StudioXm App. For example you can add some boost pitch for a short amount of time so the helicopter gains height quickly, or you can lock the thrust stick input. These options are described later in detail. Also note that when using Bankswitching (Flight mode switching) you can set different Attitude modes and options for each flight mode and tweak the system to your likings even more.

113.2 Activating AttitudeControl in flight

Separate channel

Usually we use a separate free channel on the transmitter to activate/deactivate the AttitudeControl during operation. When this channel is moved into one direction, the AttitudeControl is off, when you switch it into the other direction the AttitudeControl will be activated and your helicopter will be leveled when you release the sticks for aileron and elevator. Here the amount of deflection determines how strong the system reacts and how hard it tries to keep the helicopter in level position (and in consequence how hard it is to control the heli against). So what you need on transmitter side as a switch that controls the AttitudeControl channel (which channel number this is you setup when doing the receiver and function assignments in RECEIVER MENU!). When the switch is in OFF Position the channel is moved into one direction, i.e. to -100% throw. Now when you flip the switch in order to activate the AttitudeControl, the channel is moved into the other direction, i.e. to +50%. In this case the AttitudeControl will activate with a gain of 50%. The amount of gain/channel deflection must be tuned to your liking later when flying, 50 is usually a good starting point. If you don't want so hard reaction of the system, i.e. when you want to fly while the 3D mode is active for a longer time, you will lower the gain to maybe 30. If you want very quick and instand turn around you may raise the value to

60. Just don't go too high from the beginning as this can cause a very hard and abrupt reaction of the system, maybe harder than your helicopter likes!

The LED display on the MICROBEAST PLUS shows whether AttitudeControl is active and how high the gain is. When the switch channel is moved into the OFF direction the Menu-LED A will light up and flash. In this case AttitudeControl is deactivated. Here it doesn't matter how big the deflection of the channel is as only the sign of the deflection determines whether AttitudeControl is on or off. When activating AttitudeControl and the throw of the channel is 100%, the LED N will light up. Adjust the deflection of this channel, i.e. by reducing the servo throw in the transmitter, so that the Menu-LEDs lights up next to point G lights up (usually at 50% as described above).

Menu-LED	A (flashing)														B	C	D	E	F	G	H	I
Attitude-Control gain	-														8%	16%	24%	32%	40%	48%	56%	64%
Auxiliary channel	-100	-96	-88	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8	0	8	16	24	32	40	48	56	64
Attitude-Control Status	off														on							

Programming example Spektrum radio

Figure 129
Assign a switch to the AttitudeControl channel...

Figure 130
... here we use switch H assigned to Aux2 (channel 7)

Figure 131
In the servo monitor you can see how the switch changes the output of gyro channel. +100% = AttitudeControl on

Figure 132
-100% = AttitudeControl off

Figure 133
If you like to inverse the switch direction just reverse the Attitude-Control channel in your transmitter

Figure 134
For the beginning reduce the output of the AttitudeControl channel to apprx. 50% in the direction where AttitudeControl is activated. This will set attitude gain to 50%.

Gyro channel (combined switch mode)

As an alternative to using a separate channel for activating the AttitudeControl you can also use the gyro gain channel, i.e. when you only have a 6-channel transmitter or when using a receiver with standard wiring (here we simply can't connect an additional channel physically). The activation of AttitudeControl will work quite similar as described above for the separate switch channel. Moving the channel into one direction will activate the AttitudeControl and the amount of deflection of the channel determines the stabilization gain, when moving the gyro channel into the other direction the leveling is disabled. But additionaly here the gyro gain channel also still adjusts the gyro gain. Precisely this happens when the channel is moved in the direction where the leveling is disabled. Here the amount of deflection adjusts the gyro gain and sets the gyro into heading lock mode. So for example you would assign a switch to the gyro gain channel and adjust the throw into one direction to let's say -50% and in the other direction to +60%, resulting in a gyro gain of 50% and a stabilization gain of 60%. By flipping the switch you can activate/deactivate the AttitudeControl instead of toggling the tail gyro between "Normal-Rate" and "HeadingLock" mode. The gyro gain value of -50% will be saved internally when switching into positive direction.

Menu-LED	N	M	L	K	J	I	H	G	F	E	D	C	B	A	B	C	D	E	F	G	H	I
Tail gyro gain	100%	96%	88%	80%	72%	64%	56%	48%	40%	32%	24%	16%	8%	0%	last value							
AttitudeControl gain	-														8%	16%	24%	32%	40%	48%	56%	64%
Auxiliary channel	-100	-96	-88	-80	-72	-64	-56	-48	-40	-32	-24	-16	-8	0	8	16	24	32	40	48	56	64
AttitudeControl Status	off														on							
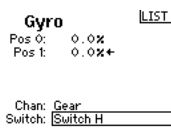
Figure 135

In the transmitter's gyro menu we assign a switch to control the gyro channel (channel 5).
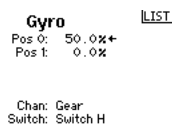
Figure 136

When the switch is released we can set the tail gyro gain. As starting point we use 50% gain (=50% deflection).
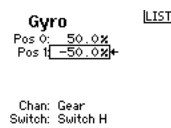
Figure 137

When we pull the switch for AttitudeControl the channel is moved to the opposite direction. Here we set -50% deflection which sets the AttitudeControl gain to 50% as well.
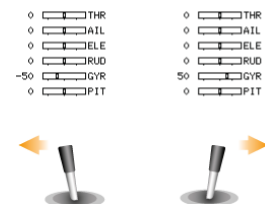
Figure 138

Use the servo monitor to check if the gain channel is changing direction when actuating the "rescue switch".

⚠️ When using AttitudeControl with combined switch channel make sure Attitude-Control is at least deactivated once before take off. Otherwise the tail gyro gain would be minimal as the system would not have been able to determine your tail gain adjustment after initialization.

⚠️ Also note that in this mode it is absolutely necessary to use a switch that changes the control directions directly and without intermediate steps. In particular, do not use a slider on the transmitter! Otherwise, when you activate AttitudeControl the tail gyro sensitivity would be decreased to 0% before the system turns on the AttitudeControl. So you would have 0% of tail gyro gain when AttitudeControl is active.

A third alternative is to use the bank switching feature and set the attitude gains fixed for each flight mode. In this case the AttitudeControl will be active as long as the flight mode is selected and the Attitude gain is greater than 0%. So you could use one bank/flight mode for hovering and sports flying, one flight mode for 3D aerobatics and a third one with angular mode and 50% gain for rescue bailout or hover training. You can switch between modes using a simple 3-position switch.

Please note that due to the complexity of this feature configuring and enabling bank switching is only possible with the StudioX software or StudioXm app!

113.3 Functional test of AttitudeControl

When activating AttitudeControl you should be able to see an immediate impact on the swashplate control: If the heli is tilted to one side, MICROBEAST PLUS permanently steers the swashplate opposed to the inclination. In the region around horizontal position the swashplate will always stay nearly horizontal to the ground (note: by default the the heli will be rolled by 4 degrees to the right, this is to compensate the tail rotor thrust when hovering!). The system constantly tries to bring the helicopter back to the horizontal position as long as the helicopter is oblique.

Tilt the heli forward

The swashplate is tilted backwards and stays in this position...

Figure 141

... until the heli is brought back to horizontal again.

Figure 142

When AttitudeControl is deactivated on the other hand, the swashplate will always be moved back to neutral position (perpendicular to main rotor shaft) as soon as the helicopter is standing still for a few seconds, independant of the current leveling. Here the system only corrects currently occurring rotational movements, but does not regulate the absolute deviation from horizontal position.
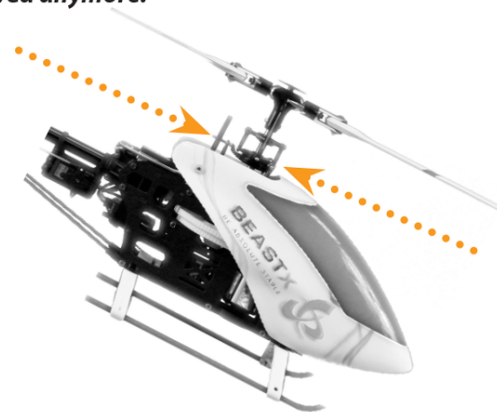
Figure 143

In the modes rescue bailout and 3D - Mode the system will also control the collective pitch when it tries to rotate the heli back into level position. Here the maximum amount of pitch is determined by the setting AttitudeControl Pitch in PARAMETER MENU (Point M). When using the mode "rescue bailout with pitch" or "3D - Mode with pitch", additionally it will keep this pitch angle when level position is reached. Then the pilot only can add collective pitch in the same direction, but not in the opposite direction. Check to see if this works correctly and whether the control directions are correct. If the helicopter is kept in hovering position, some positive collective pitch must be applied by AttitudeControl and you can use the thrust stick to add more positive pitch, but not less. Analogous this must work when the heli is in inverted hovering position if using the "3D - Mode with pitch". Here AttitudeControl will apply some negative collective pitch and you can only add more negative pitch, but not positive.

113.4 Flying with AttitudeControl

If not done already, for the first flight keep AttitudeControl deactivated and adjust all flight parameters like tail gyro gain, cyclic gain and so on as described in this manual.

If the heli is set up well you can familiarize yourself with the effect of AttitudeControl. For this we suggest to use the "Bail out rescue mode". Fly the helicopter in a sufficient amount of height in a stable hover and activate the AttitudeControl by using the appropriate

switch. The helicopter should continue to hover in approximately the same position. Now give some aileron or elevator stick input and release the stick when the helicopter reached some oblique position. AttitudeControl should bring the helicopter back to the horizontal position more or less rapidly.

Deactivate AttitudeControl and again tilt the helicopter by giving some stick input. Now the helicopter will stay tilted if you release the stick. Only when AttitudeControl is activated by flipping the switch again, the helicopter will be rotated back to horizontal position as before.

⚠ If using an AttitudeControl operation mode with collective pitch control, moving the thrust stick does not have any effect in some area as AttitudeControl takes over collective pitch control as long as the thrust stick is in this area and AttitudeControl is activated. Therefore make sure the thrust stick is in a position that will roughly produce the same amount of collective pitch, before and while deactivating AttitudeControl. Otherwise when deactivating AttitudeControl the helicopter would make a leap down, if the thrust stick controls a smaller pitch angle than AttitudeControl.

⚠ For safety reason you should never take off or land with activated AttitudeControl. As AttitudeControl actively gives control commands to the control loop of MICROBEAST PLUS, the swashplate may tilt to one side if the helicopter is not placed perfectly level on the ground. This may cause the helicopter to tilt and crash when trying to take off or when the motor is switched off and the main rotor is running out.

113.5 Fine tuning of AttitudeControl

- The amount of deflection of the AttitudeControl switch channel controls the AttitudeControl gain. This determines the speed and roughness of the control input from AttitudeControl. If the effect of AttitudeControl is too low resp. the heli rotates back to horizontal position too slowly, increase the AttitudeControl gain by increasing the deflection of the AttitudeControl channel (i.e. by using the servo throw adjustment for this channel in the transmitter). If on the other hand the heli overshoots after reaching neutral position and bobs briefly, maybe the AttitudeControl gain is set too high. Reduce the gain accordingly. In such case also make sure that cyclic gain and cyclic feed forward are well adjusted. It is recommended to adapt the AttitudeControl gain to the preferred application. If you would like to use AttitudeControl as emergency rescue then set the gain as high as possible. On the other hand when using AttitudeControl mainly as a training aid, for example in 3D - mode, then make the effect of AttitudeControl rather weak, so that the system does take over control gently.

- In case the helicopter is not aligned horizontally as desired with active AttitudeControl, i. e. drifts to one side in hovering, the artificial horizon can be readjusted. This is done in Quicktrim Menu at PARAMETER MENU point A or by changing the trim with the StudioX software or StudioXm app. When the positioning seems to vary randomly and the tilt gets a huge offset the longer you fly, this can be due to bad position measurement. The cause for this can be high frequent vibrations, fluctuations in temperature or misalignment of the device. On the other hand please note that minor deviations are inherent. When you feel the artifical horizon gets some little offset after some time let the heli stay in hover position for a few seconds without touching the sticks. Usually the horizon will recalibrate automatically then (as long as the vibration level is not too high).

114 Adjustment at the device

If not already done enter PARAMETER MENU by pushing the button briefly when the device is operational, so that the Menu LED next to point A starts to flash. Then repeatedly press the button to skip to Menu LED (menu point) L. At PARAMETER MENU point L you can choose between five different AttitudeControl operation modes. This is done by selection with the rudder stick. Tap the rudder stick repeatedly until the Status-LED lights in the desired color. If one of the AttitudeControl operation modes is selected, the AttitudeControl function is enabled and it can be activated/deactivated in operation by using the previously assigned transmitter channel for AttitudeControl. The "AttitudeControl disabled" option specifies the AttitudeControl is completely disabled and actuating the AttitudeControl channel has no effect (in terms of the AttitudeControl). The assignment to the colors of the Status-LED is as follows:

Status-LED	AttitudeControl operation mode
off	AttitudeControl disabled
purple	Angular Mode
red flashing	Bail out rescue mode
red	Bail out rescue mode with pitch
blue flashing	3D - Mode
blue	3D - Mode with pitch

⚠ Firstly enable AttitudeControl when all initial settings in SETUP MENU and RECEIVER MENU have been performed. Otherwise the servos may drive to the mechanical full stop, start binding and may get damaged, e.g. when AttitudeControl gets activated when leaving the menu and the system starts to try moving the heli.

Briefly press the button store the setting. In case you've chosen a mode with (collective) pitch control, briefly pressing the button at point L will lead to menu point M. Otherwise menu point M will be skipped und the system will exit PARAMETER MENU.

Hovering pitch

At PARAMETER MENU point M the collective pitch will move to the set hovering position. As described above this will be used to keep the heli in hovering position (when using an AttitudeControl mode with pitch). Ideally the pitch angle is exactly as large as it is necessary to maintain a stationary hovering flight without ascending or descending. Typically this is somewhere in the range between 5 and 6 degrees.

By moving the rudder stick left or right you can descrease or increase the hovering pitch. The color of the Status-LED indicates the range where the pitch is in between at the moment. This range is specified as percentage of maximum positive/negative pitch.

Status-LED	AttitudeControl collective pitch
off	> 20% of maximum collective pitch
purple	> 30% of maximum collective pitch
red	> 50% of maximum collective pitch
blue	> 70% of maximum collective pitch

- Please note that during operation you can always add more pitch by giving thrust stick input. The pitch you adjust here is only the minimum amount of pitch. So practically in case this is not enough pitch to keep the heli in the air you will always have the option to override the pitch input for safety reason.
- When using the "3D - Mode with pitch" make sure that the maximum pitch range is symmetrical, i.e. the maximum positive and negative pitch are of same size. Otherwise the hovering pitch will differ in normal and inverted flight as the AttitudeControl pitch is calculated from each maximum pitch setting! The setting affects both directions, separate adjustment of the hovering pitch angles is not provided.
- If the maximum positive/negative pitch is changed at SETUP MENU point K in consequence also the hovering pitch will change! So after adjusting the maximum pitch also check and readjust the hovering pitch here at menu point M.
- When tilting the helicopter the amount of pitch will change and you may not see the set amount of hovering pitch. This is because the system uses an internal algorithm that controls the pitch during rotation, trying to roll the helicopter with as less horizontal and vertical movement as possible. Anyhow, this algorithm bases on the assumption that you've set the hovering pitch as good as possible. But, for examply, when you've set more pitch in order to achieve the helicopter gaining height when AttitudeControl is active, this may not cause the helicopter to turn on spot properly.

115 Setup with StudioX

When StudioX/StudioXm has connected to your MICROBEAST PLUS, in the device overview main screen click the "Parameter setup" button. Then click the "Next" button repeatedly until you reach the screen "Bank 1 - AttitudeControl" or directly go to this options screen using the box on top. Here you can choose between five different AttitudeControl operation modes. If one of the AttitudeControl operation modes is selected, the AttitudeControl function is enabled and it can be activated/deactivated in operation by using the previously assigned transmitter channel for AttitudeControl. The "AttitudeControl disabled" option specifies the AttitudeControl is completely disabled and actuating the AttitudeControl channel has no effect (in terms of the AttitudeControl).

Hovering pitch

When an AttitudeControl mode *with pitch* is used, you can set the minimum amount of pitch deflection that is used to keep the heli in hovering position. Ideally the pitch angle is exactly as large as it is necessary to maintain a stationary hovering flight without ascending or descending. Typically this is somewhere in the range between 5 and 6 degrees. The value you see here is the percentage of the maximum amount of pitch. So if you've set up your helicopter with 12 degrees of pitch, you will roughly see 6 degrees of hovering pitch at a value of 50. If you like to measure the exact pitch click the "Measure" button. This will move the swashplate into hovering position temporarily.

- Please note that during operation you can always add more pitch by giving thrust stick input. The pitch you adjust here is only the minimum amount of pitch. So practically in case this is not enough pitch to keep the heli in the air you will always have the option to override the pitch input for safety reason.
- When using the "3D - Mode with pitch" make sure that the maximum pitch range is symmetrical, i.e. the maximum positive and negative pitch are of same size. Otherwise the hovering pitch will differ in normal and inverted flight as the AttitudeControl pitch is calculated from each maximum pitch setting! The setting affects both directions, separate adjustment of the hovering pitch angles is not provided.
- If the maximum positive/negative pitch is changed at SETUP MENU point K in consequence also the hovering pitch will change! So after adjusting the maximum pitch also check and readjust the hovering pitch here at menu point M.
- When tilting the helicopter the amount of pitch will change and you may not see the set amount of hovering pitch. This is because the system uses an internal algorithm that controls the pitch during rotation, trying to roll the helicopter with as less horizontal and vertical movement as possible. Anyhow, this algorithm bases on the assumption

that you've set the hovering pitch as good as possible. But, for examply, when you've set more pitch in order to achieve the helicopter gaining height when AttitudeControl is active, this may not cause the helicopter to turn on spot properly.

Pitch boost

The option "Pitch boost" allows to set an additional pitch input which can be added for a restricted amount of time. For example when you set the "Pitch boost" to 80 and the "Boost time" to 1000, the system will give 80% pitch input for 1 seconds (=1000 milliseconds) as soon as the helicopter reaches horizontal position when activating the AttitudeControl. So you can use this to gain height instantly and get away from the ground, i.e. when rescuing the helicopter.

- You can use the "Pitch boost" feature in any of the five AttitudeControl modes, not only in the modes *with pitch*! On the other hand, when using "Pitch boost" in combination with *Rescue with pitch* or *3D-Mode with Pitch*, first the system will use the "Pitch boost" for the given amount of time and then move the pitch to the given amount of hovering pitch.
- When the "Boost time" is set to 0 the "Pitch boost" is disabled resp. will not have any effect.

116 Bank Switching (optional)

This page is a translated version[1] of the page Manuals:MBPlusFblV52:BankSwitch[2] and the translation is 100% complete.

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3ABankSwitch&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:BankSwitch

117 Bank Switching - What's that?

With Bank Switching you can change between 3 different parameter sets in flight, instead of using only one fixed parameter set. This allows to adapt the system to different flight conditions or different rotorhead speeds, i.e. when hovering, cruising, speed flying, landing and so on. Or you can use the Bank Switching to selectively change specific parameters, i.e. switch between different rescue modes or test the effects of a parameter. Please note that due to the variety of setup options it is only possible to enable and setup the bank switching with the StudioX computer software or StudioXm App for mobile devices.

118 Usage instructions

When Bank Switch is activated all parameters have to be set in the software.
This also includes the gains that usually are set with the 3 dials on the device as well
as the tail gyro gain. **There is one exception:** the AttitudeControl gain can be
still controlled by a separate switch channel. Only when no additional channel was
assigned in RECEIVER MENU, you have to set the AttitudeGain for each Bank in the
software and the selected AttitudeMode will be activated depending on the amount of gain.

The dials do not have any functionality anymore, the gyro gain channel now is used to
switch between the banks. When the gyro channel is in center position Bank 2 is active,
when the gyro channel is moved to positive direction Bank 1 is active, and when its moved
to negative direction Bank 3 is active.

Menu-LED (Bank)	A H (Bank 1)	D K (Bank 2)	G N (Bank 3)
Rudder channel	> +35%	-35% to +35%	< -35%

Please note that the values may vary slightly, actually there is a little range around center
position so you do not have to set the gyro channel to exactly 0% to activate bank 2. Also
the signs may be interchanged depending on the type of radio system used. Anyhow, you
can see in the Software/App which Bank is active at the moment as well as you can read
the current bank from the display. Each time you change the Bank the Menu LEDs will
light up for 4 seconds and will indicate like a little bar which Bank is selected: bar on top
is Bank 1, bar in the middle is Bank 2, bar at the bottom is Bank 3.
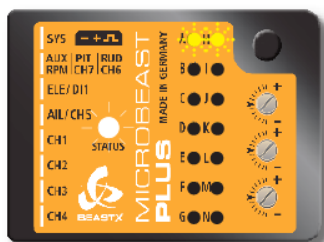
Figure 147
Bank 1 is indicated by LEDs AH
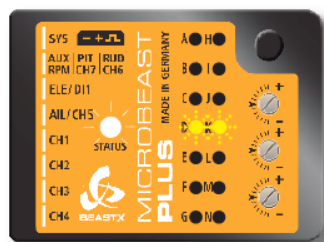
Figure 148
Bank 2 is indicated by LEDs DK
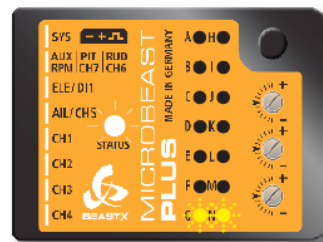
Figure 149
Bank 3 is indicated by LEDs GN

Following the Bank display you will see the AttitudeControl display for additional 4 seconds. When LED A flashes AttitudeControl is off, otherwise one of the Menu LEDs B - N shows the amount of AttitudeControl gain, see AttitudeControl instructions[1] for further informations.

In order to use bank switching in flight either you can assign a 3 - position switch on your transmitter to the gyro channel (which is used for bank switching now) and select banks randomly or you can link the gyro channel with you flight mode switch, so that the parameter banks are set automatically for each flight mode.

Using a 3-Position switch to toggle parameter banks

Figure 150
Assign a switch to the gyro channel...

Figure 151
... here we use switch G

Figure 152
In the servo monitor you can see how the switch changes the output of gyro channel

Figure 153
0% (=Bank 2)

Figure 154
-100% (=Bank 3)

Figure 155
If you like to inverse the switch direction just reverse the gyro channel in your transmitter
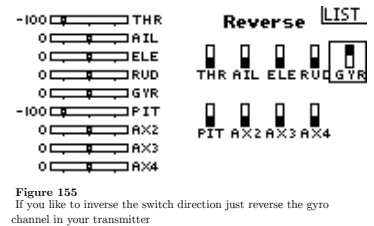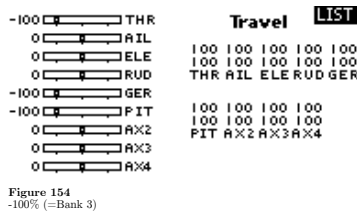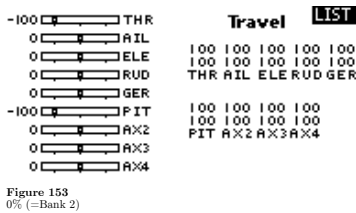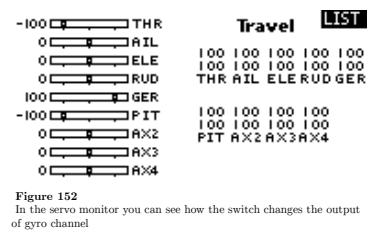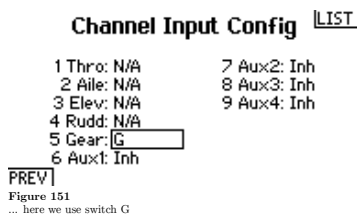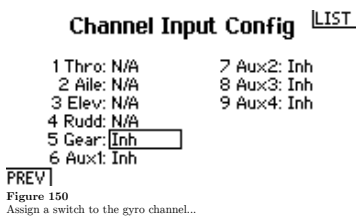
Using the flight mode system of your radio to automatically switch parameter banks

Figure 156
Activate the gyro function in your transmitter...

Figure 157
... and use the flightmodes to control the gyro channel. Set the values to select banks for each flight mode as necessary.

Figure 158
As already mentioned use the servo monitor and the display on the device to check whether everything is working as expected.

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1 https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:AttitudeControl/en

- When using bank switching please be absolutely sure which banks you're using in flight and which are the banks you can choose from. When you do not need a bank either make sure that you can't activate it on the transmitter or copy all parameter values from another bank to this bank, so you will not switch to an unwanted condition by accident.
- When Bank Switching is disabled always the parameters of Bank 1 will be used!
- The options you can change in the devices PARAMETER MENU are always related to Bank 1, no matter whether Bank Switching is used or not!

119 Setting Bank Switching with StudioX

When StudioXm has connected to your MICROBEAST PLUS in the device overview main screen click the "Parameter" button. Then click the "Next" button repeatedly until you reach the screen "Bank 1 - Gains" or directly go to this options screen using the box on top. Here you can aktivate Bank Switching clicking the specific button below the gain adjustments. When Bank switching is activated the following screens are accessible and can be used to change parameters of each of the Banks 2 & 3 besides the Paramters of Bank 1 in the beginning.

Please note that the first screen "Quick trim" has global effect, meaning that the values set here are used in all of the Banks. Separate trimming for each bank is not provided.

When you've set a separate control channel for the AttitudeControl function in "Control setup" the gain adjustment for AttitudeControl in the App will have no effect. Only you can use Bank Switching then to change between different rescue modes in flight. On the other hand when you did not assign a separate channel for the AttitudeControl, you can set the AttitudeControl gain for each bank/flight mode and use the Banks/flight modes to activate/deactivate the rescue in flight. Note that AttitudeControl will enable when the gain is higher than 12! Check the status display on the device overview main screen or the display on the device to see if AttitudeControl is active and what gain is set!

120 Reset to default settings

This page is a translated version[1] of the page Manuals:MBPlusFblV52:FactoryReset[2] and the translation is 100% complete.

In the following we will describe how to reset your device to factory settings. This brings all parameters and settings back to the default values as mentioned in the manual and shown on the MICROBEAST PLUS quick reference card[3] (marked with a * there).

Please note: The factory reset will not change your receiver settings (receiver type, function assignments, failsafe settings). This simply can be changed by doing the receiver setup procedure in Receiver Menu[4] again.

In case your system does not pass initialization sequence, you will not be able to perform factory reset on the device as you need to do this in Setup Menu (which is accessed from operation mode). But doing a reset will not solve this problem anyway! **When you can't pass radio system initialization sequence, make sure to perform Receiver Menu[5] setup completely!**

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
     3AMBPlusFblV52%3AFactoryReset&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:FactoryReset
3   http://www.beastx.com/download/manual/microbeast/MBPlus_QuickReferenceCard_V52_EN.pdf
4   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:ReceiverType/en
5   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:ReceiverType/en

121 Performing factory reset at the device

To perform the reset enter SETUP MENU. Release the button once and push and hold it again. Keep the button pressed for at least 15 seconds. You will see the Menu LEDs cycling down from A to N. This shows factory reset was performed. The system will exit SETUP MENU when you release the button. Now all settings are set to default and you have to perform the Basic Setup[1] again, in order to fly the helicopter.
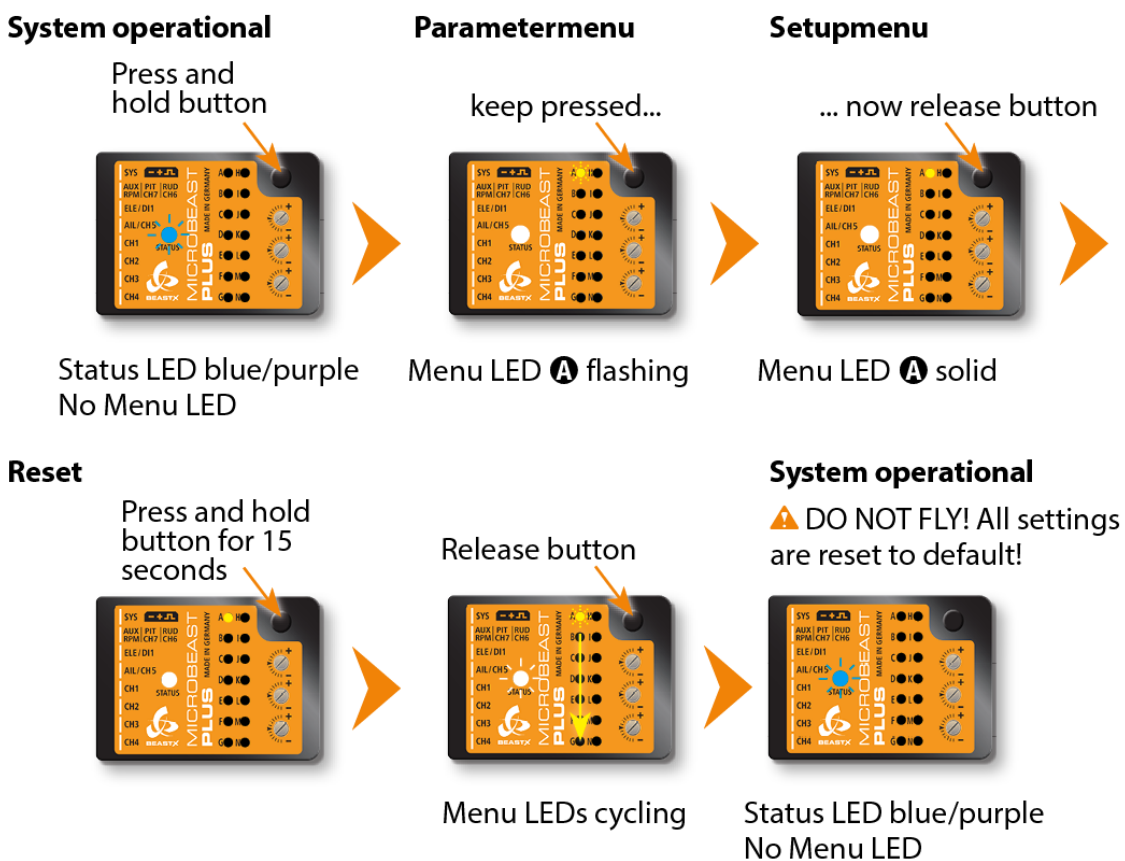
Figure 159

1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Setupmenu_intro/en

122 Factory reset with StudioX

When using the StudioX app/software you can perform the factory reset by computer (requires USB2SYS interface) or with your smartphone/tablet (requires BLE2SYS interface). You will find the reset option by choosing "Backup/Restore" from the overview screen in StudioX (which opens when connection is established to your MICROBEAST PLUS). From there click the "Next" button two times or directly choose "Factory reset" from the selection box above to open the reset screen.
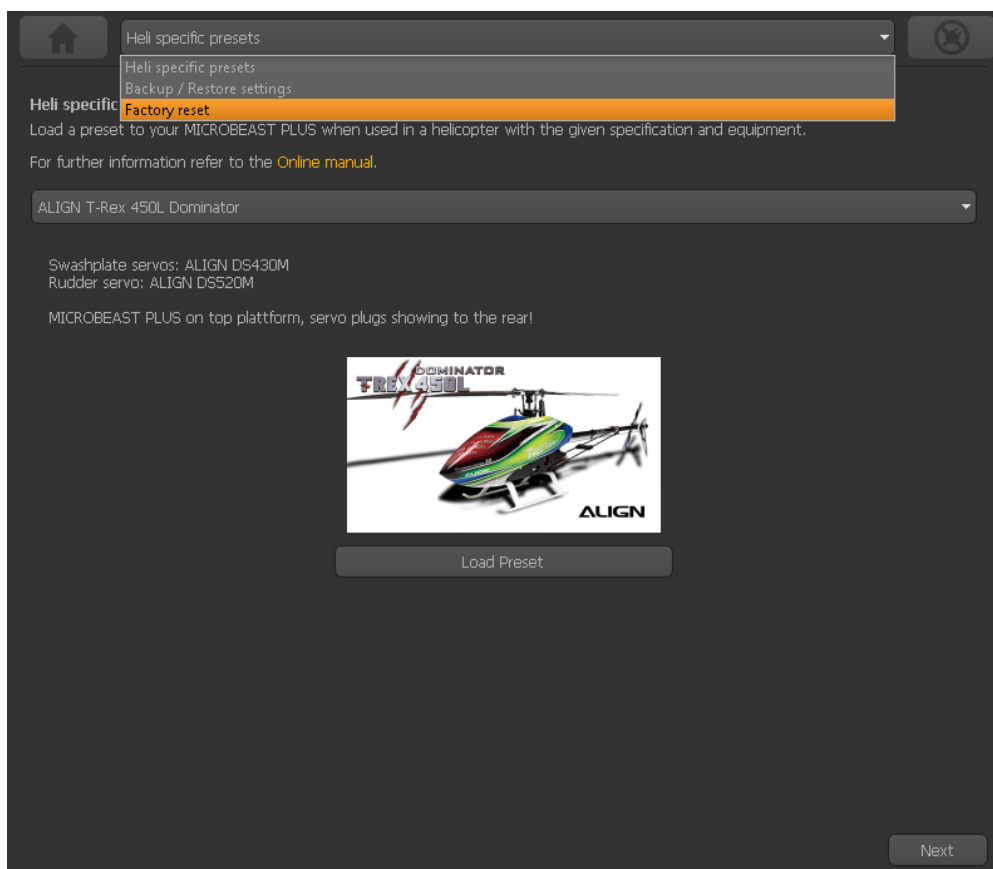
Figure 160
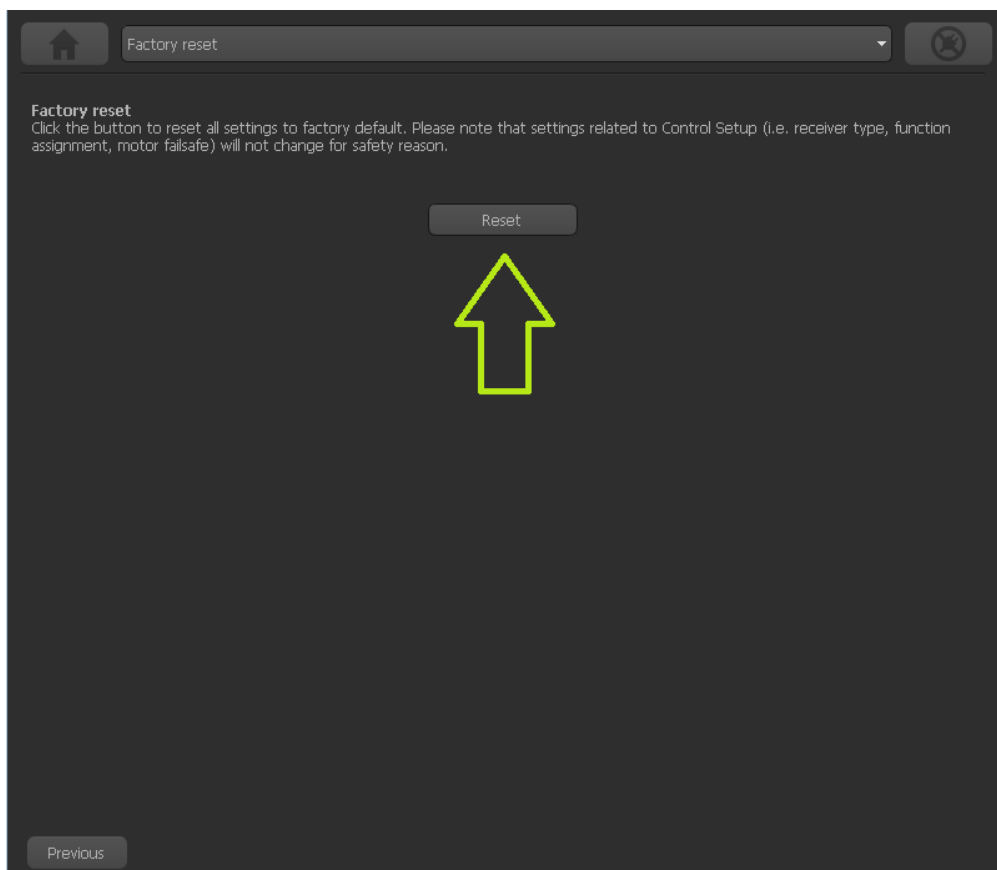
Figure 161

Click the "Reset" button and confirm the question "Are you really sure?". Now all settings are set to default and you have to perform the Basic Setup[1] again, in order to fly the helicopter.

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1   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV5:Setupmenu_intro/en

123 Information about firmware versions

This page is a translated version[1] of the page Manuals:MBPlusFblV52:VersionInfo[2] and the translation is 100% complete.

The software that is installed on your MICROBEAST PLUS controller is what we call a "firmware". This firmware can be updated (i.e. for improvements, fixes, new features, ...) by downloading a file from the internet and flashing this on the device. To distinguish between firmware files each firmware has a unique version number "X.Y.Z" where "X" is the major version, "Y" is the minor version and "Z" is the patch version. You can say that when the major version ("X") changes then a lot will be different between two versions. When minor version "Y" increases, there will be a few new features or parameters. A change in "Z" is only a patch or fix that shouldn't be greatly noticable expect for some very little improvements. From the changelog below you can find out differences between versions. In general it is always recommended to stay with the latest version as this should give you the most features and benefits.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-Manuals%
    3AMBPlusFblV52%3AVersionInfo&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/Manuals:MBPlusFblV52:VersionInfo

124 Reading the current firmware version

When connecting your MICROBEAST PLUS with the StudioX app or software the firmware version is the first thing you will see when the overview screen opens. In case there is a firmware update available usually there also should pop up some information message. Then you may update your device right away or read here what has changed in decide if it's useful for you to update.

124.1 LED display of the device

Reading the firmware version from StudioX is the most convenient way but it also to read the firmware without the help of an external device. After powering up MICROBEAST PLUS it performs a brief initialization phase. A quick self test turns all menu LEDs on simultaneously and the Status LED cycles through all colors. Then, for about 3 seconds, the Status LED turns red and the first two digits (X and Y) of the internal firmware version are shown. In the remaining time a running light of the LEDs A - G signals that the sensors are being calibrated and the LEDs H - N do indicate the initialization of the receiver signals. During the initialization phase (i.e. when viewing the firmware version or later) briefly push the button to display the third digit (Z) of the firmware version. Here the Status LED flashes purple. Again briefly press the button and the color of the Status LED changes to flashing blue. Now you can read the firmware's data version "X.Y" from the display. If you press the button for a third time, the Status LED goes off and the hardware version "X.Y" of this MICROBEAST PLUS device is displayed. Press the button for a last time to leave the version display and to view the running light for status information.

124.2 Representation of values

The representation of all values is in binary using the Menu LEDs. When a Menu LED is lit up this stands for "1", when the LED is off this means "0". The least significant bits are A and H. The type of value that is currently displayed is represented by the color of the Status LED as described above.

Firmware version
As mentioned above the firmware version consists of three values "X.Y.Z". "X" and "Y" are displayed automaticaly before the initialization sequence. "X" is represented by Menu LEDs A - G, "Y" is represented by letters H - N. The "Z" value is shown if the button is

pressed once while initialization takes place. To display "Z" all LEDs A - N are used.

Data version

The data version consists of two values "X.Y" which are displayed at the same time through menu LEDs A - G for "X" and H - N for "Y".

Hardware version

The hardware version consists of two values "X.Y" which are displayed at the same time through menu LEDs A - G for "X" and H - N for "Y".

125 StudioX software and mobile app

This page is a translated version[1] of the page StudioXm[2] and the translation is 100% complete.

StudioX / StudioXm is the app that allows to fully configure your MICROBEAST PLUS, Spektrum AR7210BX and NANOBEAST. You can use it to do all the configuration from the computer or smartphone, to backup settings, load preconfigured setups and do a lot more. The PC/mac software can also be used to update and configure your BLE2SYS bluetooth smart interface which is used to connect your BEASTX device with the smartphone. In addition you can perform some adjustments with older devices like MICROBEAST and Spektrum AR7200BX/AR7300BX.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-StudioXm&action=
     page&filter=&language=en
2   https://wiki.beastx.com/./index.php/StudioXm

126 Windows PC/mac and USB2SYS computer interface

The latest StudioX version is **3.5.2**!

126.1 Installation

If not already done you can get StudioX here:

StudioX 3.x for Windows[1]

StudioX 3.x for macOS[2]

The setup procedure is easy and works as usual. On (older) Windows systems you may get a note that vcredist_x86.exe is missing on your computer. In this case please install the **Microsoft Visual C++ 2019 Redistributable Package** (even if you have installed any Microsoft Visual C++ package on you computer you may need this specific version!). The file is included in the StudioX installation folder. Also you can get this from the Microsoft website or by using the Windows Update functionality.

To connect your BEASTX device to the computer you need one of the following USB interfaces:

Figure 162

Figure 163

Figure 164

---

1   `http://studiox.beastx.com/download/latest.php?os=win`
2   `http://studiox.beastx.com/download/latest.php?os=mac`

BEASTX	SPEKTRUM	RCWARE RX2SIM
USB2SYS interface	SPMA3030 interface	Wireless Multi-Sim Adapter
		with USB2SYS interface emulation

After installation of the StudioX software bundle, Windows should install the correct drivers when the USB2SYS / SPMA3030 interface is plugged in the PC for the first time. When using the RX2SIM Multi-Sim Adapter drivers should install as soon as it is switched to USB2SYS emulation mode (push button repeatedly until LED lights yellow, see RX2SIM manual). Check the notifications of your Windows system:
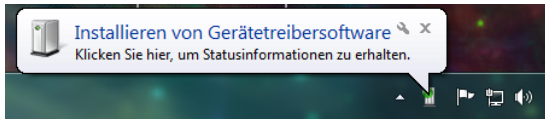
Figure 165 noframe
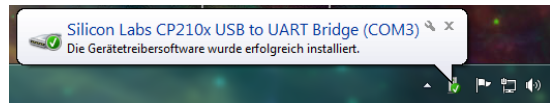
Figure 166 noframe

If you did not see any message popping up at all, check you Windows device manager if the interface driver has been installed correctly. To access the device manager under windows type devmgmt.msc in the Startmenu's search bar or simply enter **Device manager**. You must be able to find following entry:
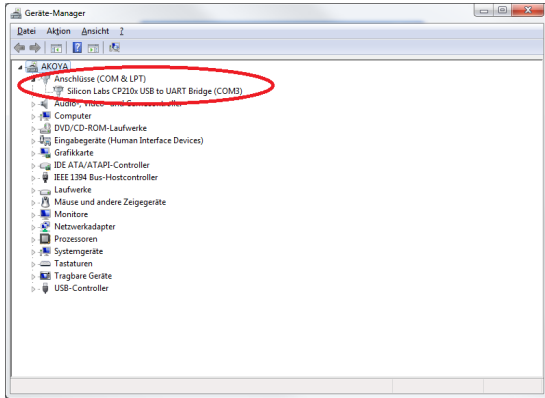
Figure 167 noframe
 The name COM3 may be different on your PC. This entry must disappear when you disconnect the Interface from the PC and re-appear when you connect it again.
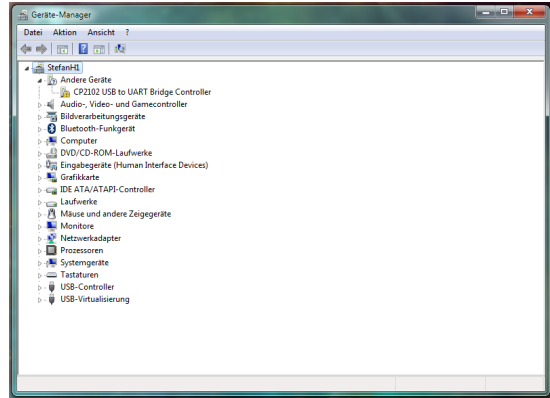
Figure 168 noframe
 If there is only an entry marked with an yellow "!" something went wrong and you have to install the driver files manually.

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In case the drivers did not install correctly please see the USB2SYS driver installation guide[3].

126.2 Connecting the USB2SYS with your BEASTX device

All BEASTX gyros come with a serial communication port which typically is marked with the letters *SYS*. Connect the servo wire coming from your USB interface to this port. Make sure to connect the wire in correct polarity on both sides!
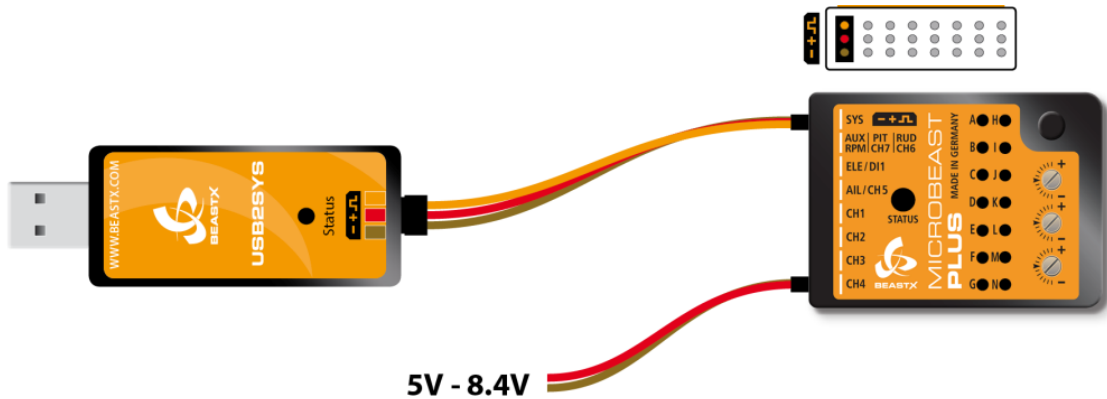
Figure 169
When using the USB2SYS interface you have to power the device with a separate power supply, i.e. receiver battery or BEC of the R/C model. It will not be powered from the USB port.

Also you can use a RX2SIM Wireless Multi-Sim Adapter instead of the USB2SYS interface. For this you can switch the RX2SIM into an USB2SYS emulation mode (push button on the RX2SIM several times until the LED lights up in orange color).

Figure 170
In this configuration the BEASTX gyro will be powered from the USB port. Anyhow, this only will work when receiver and servos are not connected to the gyro! Otherwise the power of the USB port will not be sufficient to supply all consumers. In this case you have to power the device from the receiver battery as well.
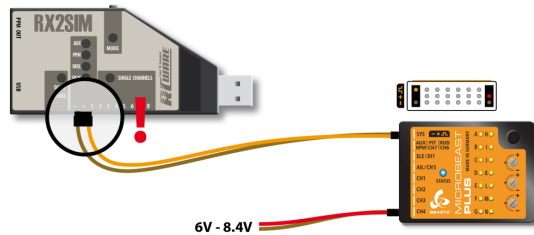
Figure 171
But here when using more than 6 Volts (i. e. using a 2s Lipo battery as receiver power supply) you must disconnect the red wire (plus pole) from the servo wire going to the interface. **Otherwise you will damage the RX2SIM and/or USB port of your computer!**

---

3   https://wiki.beastx.com/./index.php/USB2SYS/SPMA3030_driver_installation/en

To configure and update your BLE2SYS bluetooth LE adapter with StudioX connect it with the USB2SYS interface or RX2SIM wireless simulator interface to the computer. Using the USB2SYS you must power the device with an external power supply connected to a Y-harness. Watch out for correct polarity!
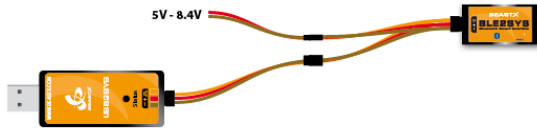
Figure 172

Figure 173

127 Smartphone/tablet and BLE2SYS bluetooth interface

If not already done download and install the latest version of StudioXm from the Apple iTunes Store or GooglePlay Store:

StudioXm for iOS[1]   StudioXm for Android[2]

Make sure to give the App privileges for using the bluetooth connection and to write data to the internal storage. With iOS you will be asked to grant privileges at first start up. On Android devices sometimes it may be necessary to do this manually in the Application settings! (When the StudioXm App is not allowed to write to the internal storage your user specific settings will not be saved, i.e. language and port settings, device names, storing RestorePoints, etc.) Also make sure to allow the App to access your internet connection in case you want to download firmware update files for your device. Note this may produce extra costs when using your mobile data connection!

To connect your BEASTX controller with your smartphone/tablet the BLE2SYS bluetooth smart interface is required. This is plugged into your device's SYS port and is used to establish a wireless communication to the phone.

Figure 174

---

1   https://itunes.apple.com/us/app/studioxm/id1145413743?ls=1&mt=8
2   https://play.google.com/store/apps/details?id=com.freakware.StudioXm

128 Basic functionality

This page is a translated version[1] of the page StudioXm:Overview[2] and the translation is 100% complete.

---

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-StudioXm%
     3AOverview&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/StudioXm:Overview

129 BEASTX flybarless system

129.1 Connecting to device

If not already done start StudioX now. When the **USB2SYS** is connected to the computer, make sure the corresponding port is selected in the selection box in the middle of the screen. If you have connected it after starting the software, click the RESCAN button above to refresh the port list, usually the correct port will be selected automatically then. If you don't know which port is the right one, also you can disconnect the USB2SYS once again, click RESCAN to clear the port list, connect the USB2SYS, wait a few seconds and click RESCAN once more. Now the port should be selected.

With the **BLE2SYS** in combination with a smartphone/tablet the BLE2SYS device should appear automatically when starting the app after powering up your flybarless device with BLE2SYS. If this is not the case, click the selection box and choose "BLE2SYS". If nothing's there, click the RESCAN button above to search for new devices. This can take from a few seconds up to a few minutes. If the scan process finishes immediately and the box stays empty it is very likely the bluetooth function is switched off on your phone or the app has no rights to access the bluetooth connection! So check your phone settings in this case.

Then connect the USB2SYS interface to the [SYS] port of your BEASTX device and power everything up. Click CONNECT to load the data from your device and to enter configuration menus. In case you are asked for the BLE2SYS pin code, this is 1111 by default.

When connection fails, **on the computer** once again check driver installation and port configuration as shown in the beginning[1]. When your BLE2SYS is not found by the **smartphone**/**tablet**, check if the BLE2SYS it is operating properly: The blue LED must flash in short intervals. Note that by default the interface will switch off automatically after 30 seconds. So if you need too long time to initiate connection it may have been disabled. Disconnect it or cylce power and try again. **Sometimes it**

---

1   `https://wiki.beastx.com/./index.php/StudioXm/en`

can be helpful to close the app completely, disconnect and reconnect the BLE2SYS and start over again!

Also note that the device name can be different! By default it's "BLE2SYS", but as it's possible to change the bluetooth id, it maybe different. (The automatic deactivation time as well as the bluetooth id can be changed in the configuration menu by clicking the BLE2SYS button above the device selection box.)

129.2 Overview screen

When connection to your BEASTX device is established, wait until the data is loaded from the device and initialization sequence is finished. At first the system will calibrate to the radio system, Menu LEDs H to N will cycle up and down at the device (MICROBEAST PLUS/AR7210BX) and you can read **Radio init** in the opening overview screen. During this time **do not move the sticks on your radio** as the system is learning the stick mid positions! In the second step the device checks if the sensors are working correctly and learns the sensor rest positions. Here Menu LEDs A to G will cycle up and down (MICROBEAST PLUS/AR7210BX) and you can read **Sensor init** in the opening overview screen. During this time **do not move the helicopter!** When initialization is completed, the Status LED will change to blue or purple color indicating the current gyro mode and you can read the gyro gain and mode in the app.

To be able to access all settings wait until your device has passed initialization sequence. If it doesn't, probably receiver setting is wrong. So start with the CONTROL SETUP.

If you can't get through the initialization sequence either because LEDs A-G or LEDs H-N don't stop cycling, please read the FAQ[2] and do the CONTROL SETUP first (see manual of your device for further instructions).

---

2   https://wiki.beastx.com/./index.php/Help:FAQ:Powerup/en

130 BLE2SYS Configuration

When using an iOS or Android smartphone/tablet you can configure the BLE2SYS device by tapping the BLE2SYS button on top of the main window. This will open a configuration screen (or you will be asked to enter the pin code for the bluetooth device first). Also you can configure your BLE2SYS by the help of a PC/mac. In this case you have to connect the BLE2SYS to a USB2SYS computer interface using a Y-harness and powering with a receiver battery over the second line (as shown earlier[1]). Then just click "Connect" and open the com port as you would connect to a BEASTX gyro.

130.1 Device Name

You can set a custom device name (maximum length 11 digits) by changing the name in the line on top of the screen, i. e. by entering the name of your helicopter. Then this name will be the bluetooth identifier. Please note when chaging the name you may have to restart the StudioX app as well as the BLE2SYS device in order to see the new name in the main window.

130.2 Automatic deactivation

Never ever fly your helicopter when the bluetooth device is active! The bluetooth signal is sent on the 2.4GHz band and may interfer with your radio signal. For your convenience you can set an automatic deactivation timeout here, so the device will power off automatically after the given amount of time when no connection is requested. So you can leave the module plugged into your BEASTX device when flying the helicopter and when not using the app. When you set the timeout to 0 the device will be active all time.

Warning: When you deactivate the timeout, never leave your BLE2SYS connected when flying your helicopter! This can lead to radio signal loss and cause severe injury or damage!

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1   https://wiki.beastx.com/./index.php/StudioXm/en

130.3 Change pin code

If necessary you can change the pin code for connecting to the BLE2SYS. We highly recommend to do this as the default pin "1111" is known to everyone, so it may be very likely that some moron tries to fool you and connects to your device when on the flying field or even when you intend to fly!

130.4 Firmware update

When you are using a computer (PC/mac) to configure your BLE2SYS, you will additionaly see a "Firmware Update" button. So obviously when you click that button you will be able to upload latest firmware updates to your BLE2YS interface (if necessary). The update procedure is not different to any other BEASTX device and is described in the section Firmware Update[2].

---

2   https://wiki.beastx.com/./index.php/StudioXm:FirmwareUpdate/en

131 Presets/Backup/Restore/Reset

This page is a translated version[1] of the page StudioXm:BackupRestore[2] and the translation is 100% complete.

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1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-StudioXm%
     3ABackupRestore&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/StudioXm:BackupRestore

132 Preset helicopter settings

For a given set of helicopters StudioX offers preset setups. In case you have the exact same helicopter with similar electronic setup (i. e. servos, ESC, ...) you can load the preset for your helicopter to your BEASTX flybarless device. So it is not necessary to go through the basic setup routine as your device will be readily setup by loading the preset. Anyhow, you must make sure your radio setup is done properly and that all control commands on the radio are working as expected. Also it may be nessary to readjust the servo center positions, either using the quick adjust option in PARAMETER MENU or the single trimm option of SETUP MENU. Last but not least it is absolutely mandatory that your BEASTX device is mounted in the exact same position is defined by the given preset. Otherwise the correction of the system will go into the wrong direction. In case your device is mounted differently, you must check and readjust device orientation in SETUPMENU!
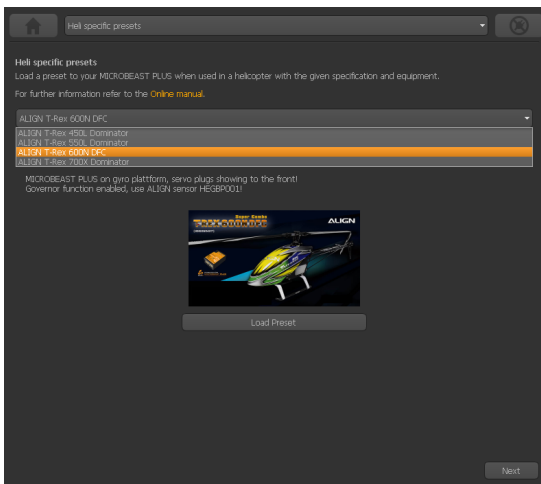
Figure 176
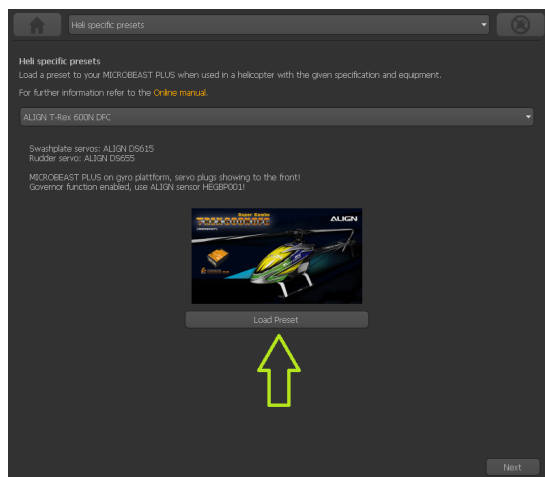
Figure 177

133 Backup/Restore

With StudioX you can save your current device settings and load them to your device again, i. e. when you like to test the effect of some parameters and you want switch back to the former setup. With the StudioX software for PC and macOS it is also possible to export those backups to the computer's file system. So you can share your settings with other pilots.

Creating a restore point

You will find the option for saving your setup on the next screen behind the heli presets. Please click "Next" in the lower right corner on the screen where you see the Align helis, or choose backup/restore from the selection box above in the middle.
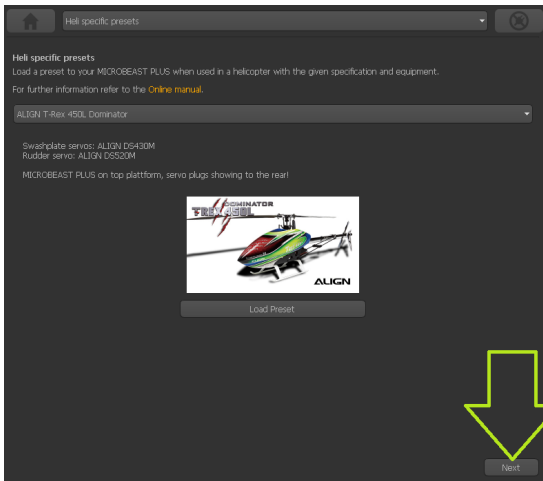
Figure 178
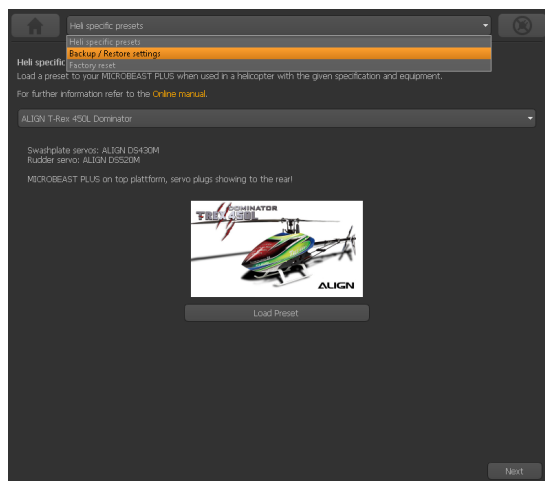
Figure 179
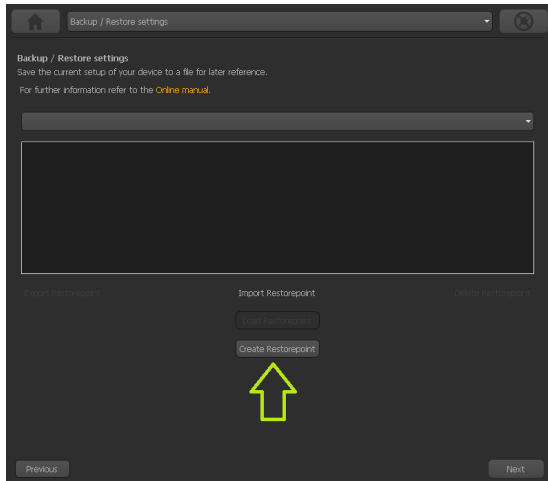
Figure 180
"Create" to create a new restore point which saves your settings.
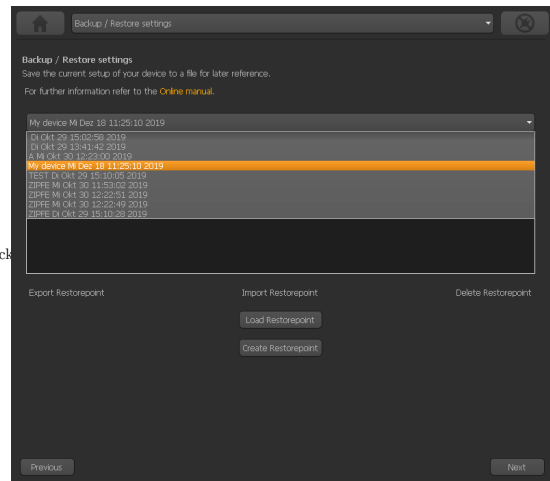
Figure 181
will find the new restore point in the selection box in the middle of the screen. Choose it to see all the details and in order to reload or export it.

Click   You
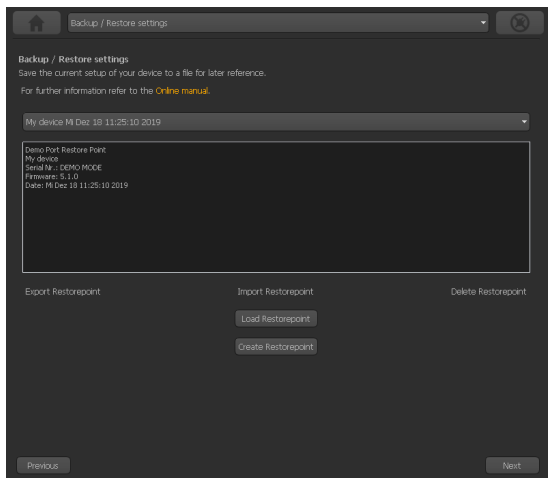
Figure 182
The informations about the restore point will be filled out automatically with date, serial number, helicopter name and other informations. You can edit these if necessary. The modification will be stored automatically!

Exporting a restore point to the file system
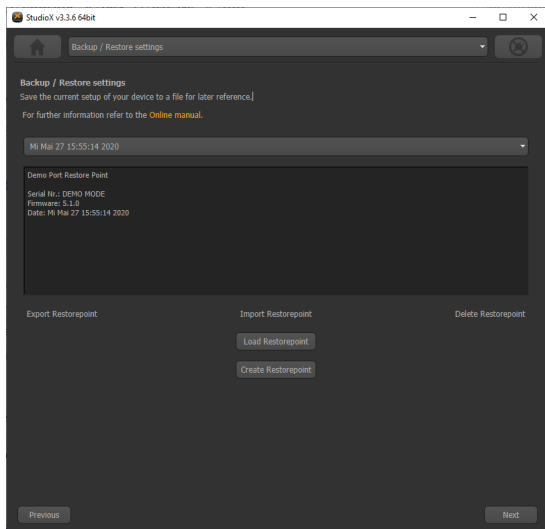
Figure 183
the restore point you like to save to the file system and click "Export Restorepoint".

Select
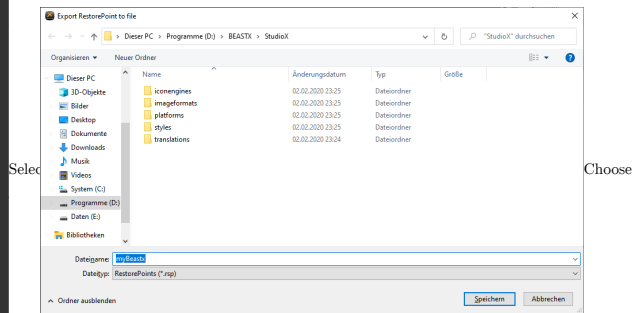
Figure 184
the destination folder and enter a filename. The data will be saved with ending ".rsp".

Choose

Import a restore point from the file system
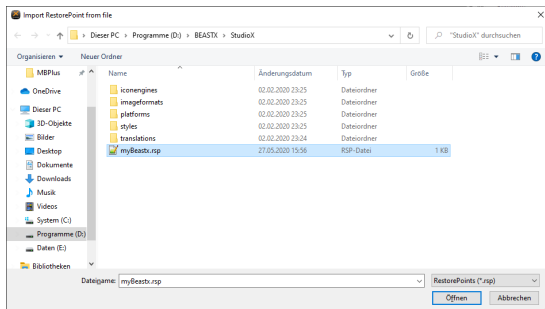
Figure 185
"Import Restorepoint" and choose the restorepoint file with ending ".rsp" from the location it is stored on your computer.
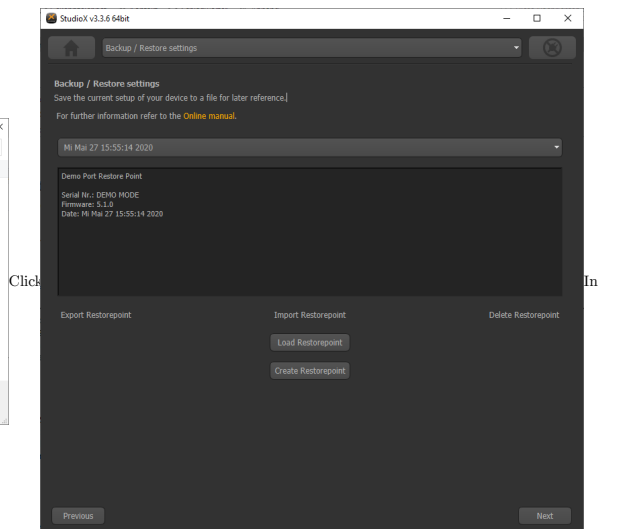
Click

Figure 186
case the file was valid and can be used for your device, there should be a new entry in the list now. Select this new entry and flash it to your device by clicking "Load Restorepoint".

In

134 Reset all settings

You will find the reset option by choosing "Backup/Restore" from the overview screen in StudioX (which opens when connection is established to your BEASTX device). From there click the "Next" button two times or directly choose "Factory reset" from the selection box above to open the reset screen.
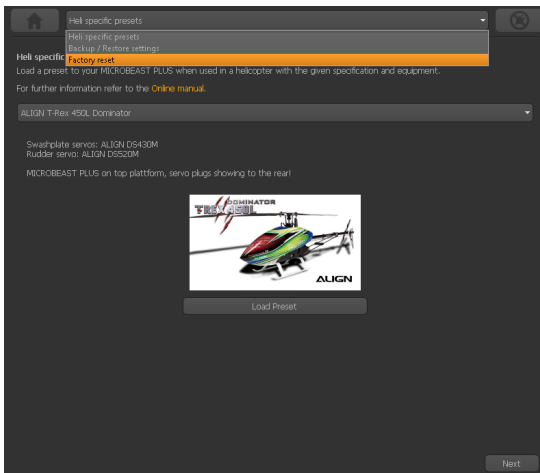
Figure 187
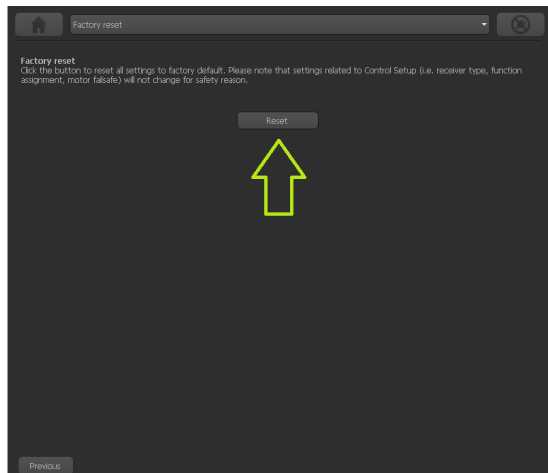
Click

Figure 188
the "Reset" button and confirm the question "Are you really sure?". Now all settings are set to default and you have to perform the basic setup again, in order to fly the helicopter.

Please note: The factory reset will not change your receiver settings (receiver type, function assignments, failsafe settings). This simply can be changed by doing the receiver setup procedure in RECEIVER MENU.

135 Firmware update

This page is a translated version[1] of the page StudioXm:FirmwareUpdate[2] and the translation is 100% complete.

1   https://wiki.beastx.com/index.php?title=Special:Translate&group=page-StudioXm%
     3AFirmwareUpdate&action=page&filter=&language=en
2   https://wiki.beastx.com/./index.php/StudioXm:FirmwareUpdate

136 Introduction

StudioX/StudioXm allows to directly flash firmware files to your BEASTX device using the USB (StudioX for PC/Mac) or bluetooth (StudioXm for smartphones) connection. The update process is similar to all our devices so it will be shown here for MICROBEAST PLUS exemplarily. Using a computer in combination with the USB2SYS interface also allows to update the firmware of your BLE2SYS bluetooth interface. Updating the BLE2SYS from a smartphone and via bluetooth is not provided.

137 freakware Network

The firmware files must be downloaded from the freakware network webserver. So for the update process it is necessary that your computer or mobile device serves an internet connection. Please note that especially when using mobile data this may produce costs! We recommend to not use the mobile network and just do the update process at home where you have (free) wifi. Especially when using a mobile device check that your network settings and privileges for using the internet are set correctly for the StudioXm app in you Android or iOS settings. Typically, when your internet is not configured correctly you will not be able to login to the freakware network and will see an error message when clicking the "Firmware Update" button in the app.

Now to get the firmware files, at first you will be prompted to log in to the freakware network with your login (=email address) and password. If not already done create an account now. If you have forgotten your password click the corresponding button to request a new password. The login credentials will be stored, so next time when doing a firmware update you can skip this step quickly. If you don't like that your password is saved you can disable the corresponding option.

Choose Firmware Update from the overview

Log in to the freakware network with your credentials or create a new account.

138 Update procedure

For the update procedure it is highly recommended to unplug all servos as the servo can go to full deflection during the setup. This is because the outputs of your device will not send out any signals during the update process. In such situation some servos can behave very strange or unforeseen, especially cheap servos with bad servo software. Using an electric heli it is also recommended to unplug the motor from the ESC or unplug the ESC or main battery in case this is not used for powering the radio system (no BEC), so the motor will not start by accident during or after the firmware update.

You can only download firmware updates when the device is registered/linked to your user account. When the device belongs to anyone else, a message will tell you. In this case please contact the BEASTX customer service providing your user account (email address) and the devices serial number. To make this procedure more convenient you can click the email link in the StudioX/StudioXm app, so an email with the requesting serial number will be opened automatically.

If the device is not registered to anyone, click the Register Device button once to link it to your account.

In the combo box in the middle of the screen you can choose between all available firmware files for your device. It is recommended to always use the latest/highest firmware version. Firmware files marked as BASIC will provide the standard firmware that usually comes with your MICROBEAST PLUS / AR7210BX / NANOBEAST which means the device will have the flybarless functionality and some little gimmicks like headspeed governor (usually everything that is necessary to fly a helicopter).

Firmware files marked as PRO or PROEDITION include the basic functionality plus enhanced features like rescue bailout, automatic stabilization, bank switching or other features the give you more options and features that may help you flying or that allow to tweak the system to all your needs. Please note: This firmware is not free of charge as it gives some additional functions not all people need and not all people want to pay for! So only if you like to have those features you can upgrade your device to be able to also request these firmware files. In case your device is not eligible to download the firmware, you can get to the freakware Webshop by clicking the button below where you can directly buy the upgrade option for your device.

Once you have chosen the firmware you want to flash to your device and in case the firmware is unlocked for your device you can click the request button. Now please wait a

few seconds until the firmware file was generated individually for your device. Once this is done, again click the button to Download and Flash the firmware. Before this happens you will be asked one last time, if you are really sure you want to flash a new firmware to your device. Please note: Flashing from a different major version (i.e. updating from V4.x.x to V5.x.x) will erase all settings of your device and you will have to do all the setup again. This is because typically a new major version will be created when the whole setup procedure has changed are a bunch of new settings and parameters will be added to the firmware, so the old setup is not applicable to the new firmware anymore. So also make sure you've read and understood the manual for the new firmware as well!

The firmware procedure should start immediately after pressing the OK button. During the update please do not do anything! Just wait until the progress has gone up to 100%, which will take a few seconds when using a computer with USB2SYS and may take 1 or 2 minutes when using a smartphone with BLE2SYS bluetooth connection. When using the bluetooth keep your smartphone/tablet in very close distance to the BLE2SYS module (just a few inches) as the bluetooth connection can be interrupted easily. Also it is advisable to keep the radio system switched off when performing the update and stay aways from other radio devices like wifi routers or similar. When the procedure has finished your device will reboot and StudioX/StudioXm will close the connection. Now you can connect again and start over with the setup.

139 When the update fails

When the update does finish completely usually the device will be stuck in recovery mode as the main application is erased now. This is no problem at all! Just try again. If the update fails again and again at some point, completely close the app and power off your device. Power on again, start the app and try again. If that all does not work you please try another computer or smartphone.

Especially when using the bluetooth connection do as mentioned above: stay away from radio devices that may interfere with the bluetooth connection and try to stay as close to the BLE2SYS as possible. When using a computer in combination with USB2SYS make sure there are no processes running in background that may interrupt USB communication. Especially when using a virtual machine for running the StudioX app it may happen that the USB connection is slow and not performing properly. So do not use a virtual machine for running the app. Also make sure drivers are installed and configured properly. In very rare cases it can be that the wire or plugs from USB2SYS to your device may be damaged or have a loose connection, so try a different connection cable. Finally make sure your power supply/battery is fully charged and holding voltage and disconnect all servos for the update procedure as mentioned above.

140 Contributors

Edits   **User**

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1   Chapter 141 on page 343

1	Shornstein	
2	Shornstein	
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5	Shornstein	
6	SgtLarkin[3], Shornstein	
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12	Potebnia[8], Shornstein	
13	Potebnia[9], Shornstein	
14	Potebnia[10], Shornstein	
15	Potebnia[11], Shornstein	
16	Potebnia[12], Shornstein	
17	Potebnia[13], Shornstein	
18	Potebnia[14], Shornstein	
19	Potebnia[15], Shornstein	
20	Potebnia[16], Shornstein	
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36	Shornstein	
37	Potebnia[17], Shornstein	
38	Bastique, BrandonXLF, Chlewey, ChrisDHDR, Ghouston, Guanaco, It Is Me Here, JarektBot, Jdx, Jed, Paradoctor, Patrick, Penubag, Perhelion, Rocket000, Ronhjones, Roomba, Shornstein, Timeroot, Tintazul	
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55	Potebnia[20], Shornstein	
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67	Potebnia[22], Shornstein	
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188	Shornstein	

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Version 3, 29 June 2007

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