Welcome to FBL Gyro Configuration software

If you have gone flybarless and are using the ALZRC 3GYS, CopterX 3X1000, Helicox TG-1, Hobby King ZYX or Tarot ZYX then this software may be useful to you. Based on the Tarot ZYX programming software, this program will allow you to use the same software functionality even if you are not using the Tarot ZYX gyro.

This software is provided on an all care no responsibility basis. The software is still Beta software and it may pay to double check your configuration using a programming box.

To view actual screen shots of the FBL software you can see them at:

http://fbl.net.nz/screenshots

Getting started:

Besides the software and gyro you will need a Tarot XYZ USB or compatible cable. This will allow you to connect the gyro to the software. You can search the web for "Tarot USB adapter cable". There are several places to purchase this cable on-line. Completely reading and understanding your gyro manual will make setting up your gyro less time consuming.

File Menu

Open Config File - This will open a previously saved file.

Save Config File - This will save the current file on screen.

Transmit Config File - This will send the current on screen setting to the gyro. The FORCE UPDATE will do the same function.

Properties - This is where you can change the color scheme of the software.

Exit - This will close the FBL software. Make sure you have saved your settings either to the gyro or to a file or they will be lost.

CONNECTING

Connect the gyro to the receiver per the gyro instruction manual.

***** DO NOT CONNECT THE SERVOS TO THE GYRO JUST YET! *****

Start the FBL software

Power ON Radio (TX)

Power ON Receiver with Gyro attached (RX)

Wait till Gyro initializes (Constant Red for HH mode or constant Blue for Norm mode)

Plug USB cable into PC

Plug cable into Gyro

Click on CONNECT and select COM port from drop down box

USB will slowly blink a blue light until connected

The three red circles in the upper right corner will change to green.

For programmable radios systems:

Connect the gyro to the receiver per the gyro instruction manual. Start the FBL software. Turn on your transmitter and create a new model, set the trims and sub -trims of all the channels to be zero. Set the swashplate mode to non-mixing mode (Model Type Heli 90). Make sure all the mixing functions related to swashplate and tail are turned off. Do not adjust the collective pitch curve now, leave it as a straight line. Connect a battery to the ESC/BEC. This will supply power to the receiver and gyro. Wait for the gyro to initialize. Plug the USB cable into the PC and into the gyro. Then click on the CONNECT button and select the com port from the drop down box. Once the gyro is connected the three red circles in the upper right corner will change to green. You're now ready to start programming the gyro.

Setting up the gyro:

Select your preferred style of flying, once selected the icon will turn RED. You'll notice that preset parameters are loaded for the style selected. You might want to start out at a lower level until you have everything setup and are comfortable with the FBL setup and then advance your style selection. We all want to get to that EXTREME button.

BEGINNER - FC3 - 3D SOFT - HARD CORE - EXTREME

Main Rotor

Roll agility

> It is equivalent to the maximum roll rate.
> Bigger the value faster the helicopter makes rolls.
> Default settings values are from beginner "30" to extreme "60".

Roll gain

Increasing the gain will increase the sensitivity and response speed of the roll axis and decreasing the gain will decrease the sensitivity and response speed of the roll axis.

Pitch agility

It is equivalent to the maximum pitch rate
Bigger the value faster the helicopter makes loops.
Default settings values are from beginner "30" to extreme "60".

Pitch gain

Increasing the gain will increase the sensitivity and response speed of the pitch axis and decreasing the gain will decrease the sensitivity and response speed of the pitch axis.

Tail Rotor

Yaw Rate L

The maximum left pirouette speed. Turning speed when rudder is to the left.
Default settings values are from beginner "30" to extreme "45".

Yaw Rate R

The maximum right pirouette speed. Turning speed when rudder is to the right.
Default settings values are from beginner "30" to extreme "45".

Yaw gain

Increasing the gain will increase the sensitivity and response speed of the yaw axis and decreasing the gain will decrease the sensitivity and response speed of the yaw axis.

ALL DATA RESET: Click on the ALL DATA RESET button to clear all the values and return to the default parameters (default.ini).

Model Name: This is where you will enter the name of the model. It might be a good idea to save the file using the model name to better keep track of your settings.

FORCE UPDATE: Clicking on the FORCE UPDATE button will send the current setting to the gyro.

SETUP

Click on the **SETUP** button. This will bring up the **SETUP** screen.

Monitor: This is where you will set your transmitter controls. Follow the on screen steps. When complete, click on the Next button at the bottom of the screen or the Installation tab at the top of the screen.

Installation: Select the style of your installation. When complete, click on the Next button at the bottom of the screen or the Servo Type tab at the top of the screen.

Servo Type: This is where you will select the type of servos installed. If you have some

doubts as to what type of servos you have, go to http://www.servodatabase.com and look up your servo brand and model. In the Modulation info you will find either Analog or Digital. Under the Additional Specifications you'll find the Pulse Width. This is the number you need to match as close as you can to the Servo Type listed.

If you don't know if your servos are analog or digital select the **All the tail and swash plate servos are 1520us analog**.

Example of Servo Database entry.

Hitec HS-55 - Standard Feather Servo

Basic Information

Modulation:	**Analog**
Motor Type:	Coreless
Gear Type:	Plastic
Rotation/Support:	Bushing

Additional Specifications

Rotational Range:	? (add)
Pulse Cycle:	20 ms
Pulse Width:	**900-2100 µs**

When complete, click on the Next button at the bottom of the screen or the Swashplate Type tab at the top of the screen.

This next step is where you will connect the servos to the gyro.

Now's your chance to try the Save Config File option. Click the Finish button in the lower right corner, this will close the Setup Screen. Go to File - Save Config File and enter a file name when prompted and Save. Unplug the battery and then connect the servos to the gyro per installation manual. Reconnect the battery and wait for the gyro to initialize. Click on the CONNECT button again to reconnect. Go to File - Open Config File and enter the name you entered when saved or pick it from the list. Click on SETUP to continue the setup process. Moving on to Swashplate Type. You can click on the Swashplate Type tab at the top of the screen or click Next until the Swashplate Type tab is high-lighted.

Swash Type: Select the type of swashplate you are using. When complete, click on the Next button at the bottom of the screen or the Servo Reverse tab at the top of the screen.

Servo Rev: This is where you will reverse the servo(s) if necessary. If your servo(s) are moving in the wrong direction click on the tab next to the channel you wish to Reverse. When complete, click on the Next button at the bottom of the screen or the Servo Trim tab at the top of the screen.

Servo Trim: This is where you will set the servo arms at 90 degrees (this will give you

symmetrical movement up and down), you then adjust the lengths of the Servo arm to swash links to get the swash level.

Swash Travel: This is where you will set the travel on the swash plate to ensure there is no binding. Follow the on screen steps. When complete, click on the Next button at the bottom of the screen or the Collective Pitch tab at the top of the screen.

Collective Pitch: This is where you will set the direction and overall movement for the collective. If the direction of the collective is reversed, use a negative number as opposed to a positive number. You can also increase or decrease the overall travel of the collective here. When complete, click on the Next button at the bottom of the screen or the Tail Setup tab at the top of the screen.

Tail Setup: This is where you will set the direction, trim and limits of the tail servo. Verify the rudder servo moves in the correct direction, if not click on the Normal button to reverse the tail servo. You can also set the HH (Tail Limit A) and Normal (Tail Limit B) tail mode travel limits. Follow the on screen steps. When complete, click on the Next button at the bottom of the screen or the Gyro Dir tab at the top of the screen.

Gyro Dir: This is where you will set the direction of the roll, pitch and yaw in the gyro. Tilt the heli in the direction of a roll and the swash plate should correct for the roll (the swash plate will try to stay level as pictured). If it move in the wrong direction click on the Normal button to reverse the direction and repeat to verify it moves in the correct direction. Repeat this for the Pitch and Yaw axis. When complete, click on the Next button at the bottom of the screen or the Piro Opt tab at the top of the screen.

Piro Opt: This is where you will check the piro direction optimization. Follow the on screen steps. When complete, click on the Finish button in the lower right corner. The Advanced Configuration Screen will close and you will be at the Main Screen. This is a good time to save your work. Go to File - Save Config File and select the file you used earlier or give it a new name if you choose and click on the Save button.

ADVANCED

This advanced information was provided by **Jaakko Haavisto**.

 Click on the **Advanced** button. This will bring up the **Advanced** screen.

Main Rotor:

Roll P gain

> Proportional Gain produces a regulative action on the swash plate which is proportional to the measured rate error on the swash plate and thus proportional gain makes the aileron rate follow the rate commanded on the swash sticks.

Abrupt stops of flips should be free of high frequency shaking. If this is not the case the proportional gain is too high. Also if this is too high, instability and hunting will tend to occur.
Default "80" in all configurations.
With fast cyclic servos this can be increased.
(In all five default profiles "Roll P gain" value is identical to "Pitch P gain" value.)

Roll I gain

Integral gain is responsible that the helicopter keeps the direction under all circumstances. When wind forces the helicopter out of its direction, the integral gain is correcting this. Fast forward flight is also stabilized by the integral gain. Integral gain must be setup so that the helicopter remains stable during load changes on swash plate. When integral gain is set to high, the stopping behavior on swash plate is influenced negatively: the helicopter has a tendency to slowly drift back after a hard stop. A to high integral gain has also bad influence on fast forward flight: The elevator control feeling becomes doughy and in extreme situations even slow oscillations (approx. 1 Hz) can appear.
With fast cyclic servos integral gain can be increased after the first flights in order to get more flight stability.
Default settings values are from beginner "120" to extreme "60".
(In all five default profiles "Roll I gain" value is identical to "Pitch I gain" value.)

Roll D gain

The Derivative (D) Gain affects the helicopters behavior after a control input is suddenly released. This Gain allows attenuation of the helicopter body tremor which is generated when the helicopter has been stopped by a sudden movement of the control stick. In the situation where the P Gain and I Gain have been made too large, the helicopter body may oscillate if the sticks are operated by flicking them with your fingers. By increasing the D Gain, the oscillation in the above situation will be reduced, and it will be possible to further increase the I Gain. Care will be required, because if the D Gain is too large, small oscillations may continue, or the vibration of the helicopter may cause sudden and severe hunting to occur.
Default settings values are from beginner to hardcore "0" and in extreme "30".
(In all five default profiles "Roll D gain" value is identical to "Pitch D gain" value.)

Pitch P gain

Proportional Gain produces a regulative action on the swash plate which is proportional to the measured rate error on the swash plate and thus proportional gain makes the elevator rate follow the rate commanded on the swash sticks. Too high proportional gain can cause an oscillating tendency on elevator in fast forward flight and also a bad stopping behavior on elevator rate changes. Also if this is too high, instability and hunting will tend to occur.

Default "80" in all configurations.
With fast cyclic servos this can be increased.
(In all five default profiles "Roll P gain" value is identical to "Pitch P gain" value.)

Pitch I gain

Integral gain is responsible that the helicopter keeps the direction under all circumstances. When wind forces the helicopter out of its direction, the integral gain is correcting this. Fast forward flight is also stabilized by the integral gain. Integral gain must be setup so that the helicopter stable during load changes on swash plate. When integral gain is set to high, the stopping behavior on swash plate is influenced negatively: the helicopter gets a tendency to slowly drift back after a hard stop. A to high integral gain has also bad influence on fast forward flight: The elevator control feeling becomes doughy and in extreme situations even slow oscillations (approx. 1 Hz) can appear.
With fast cyclic servos integral gain can be increased after the first flights in order to get more flight stability.
Default settings values are from beginner "120" to extreme "60".
(In all five default profiles "Roll I gain" value is identical to "Pitch I gain" value.)

Pitch D gain

The Derivative (D) Gain affects the helicopters behavior after a control input is suddenly released. This Gain allows attenuation of the helicopter body tremor which is generated when the helicopter has been stopped by a sudden movement of the control stick. In the situation where the P Gain and I Gain have been made too large, the helicopter body may oscillate if the sticks are operated by flicking them with your fingers. By increasing the D Gain, the oscillation in the above situation will be reduced, and it will be possible to further increase the I Gain. Care will be required, because if the D Gain is too large, small oscillations may continue, or the vibration of the helicopter may cause sudden and severe hunting to occur.
Default settings values are from beginner to hardcore "0" and in extreme "30".
(In all five default profiles "Roll D gain" value is identical to "Pitch D gain" value.)

Acceleration

Acceleration of the roll and pitch motion.
Roll and pitch acceleration to the desired speed. When this value is high swashplate will tilt fast when stick is moved.
Default "125" in all configurations.

Deceleration

Deceleration of the roll and pitch motion.
Roll and pitch deceleration to the desired speed or stop. When stick is returned to center it will take some time (delay) for swash to return. It's normal on FBL

helicopters and that returning speed can be controlled with these settings. Lower the value means easier to fly, but it loses some "edge" from the controls. Default settings values are from beginner "40" to extreme "55".

RC Dead Band

The deadband of the aileron and elevator sticks
The RC deadband is to ignore input from sticks that don't return to zero and to remove cross channel stick changes when the sticks are moved to the limit on the two axis. Too small a value will make it hard to do single axis maneuvers without a change in the other axis (i.e. a flip ends up rolling left or right during the flip...). Bigger value means that you have to move more rudder stick before anything happens.
This avoids drifting from stick pots and servo noise.
Default "40" in all configurations.

Gyro Dead Band

The deadband of the roll and pitch sensors.
The Gyro deadband is the value used to ignore small changes coming from the gyro MEMS sensors.
This avoids drifting from gyro and servo noise. Big number results in poor stability and drift. Too small a number can overwork your servos.
Default "4" in all configurations.

Tail Rotor:

Yaw P gain

Proportional Gain generates a steering signal on the tail servo which is proportional to the rate error. The higher the proportional gain is the more direct the tail follows the stick. To setup proportional gain one should increase it until the tail has a high frequency shaking tendency and then decrease it. The default value is "80". The proportional gain depends strongly on the individual tail setup. Especially at larger helicopters with low tail power it can be increased by a factor of two.

Yaw I gain

The Integral Gain corresponds to the heading hold gain of a normal gyro. It is used to produce an angular control of the tail. Too high a value will result in a bad stopping behavior with a back bouncing tendency. When integral gain is to low, the tail is unstable on heavy pitch inputs and cannot hold the position. The integral factor is almost independent on the tail setup of the helicopter. In default settings values are from beginner "25" to extreme "50".

Yaw D gain

Stop gain. During a tail stop (from piros) it will be helpful to use a bit more tail

gain to get a crispy stop.
Default settings values are from beginner to hardcore "0" and in extreme "30".

Acceleration L

Acceleration of the left pirouette
This limits the servo throw change per calculation frame on tail servo. For example having 3D helis with super tail rotors you will be able to get high accelerations without stall effects or bouncing on a stop. With a scaler and a weak tail it will have stall and overshoot with too much throw change each calculation cycle. So it should be lowered until we get a stop without bouncing. It will stop more smooth but without overloading the tail.
Also if this value is too high it might cause stripping of tail TorgueTube gears.

Acceleration R

Acceleration of the right pirouette
This limits the servo throw change per calculation frame on tail servo. For example having 3D helis with super tail rotors you will be able to get high accelerations without stall effects or bouncing on a stop. With a scaler and a weak tail it will have stall and overshoot with too much throw change each calculation cycle. So it should be lowered until we get a stop without bouncing. It will stop more smooth but without overloading the tail.
Also if this value is too high it might cause stripping of tail TorqueTube gears.

Deceleration L

Deceleration of the left pirouette.
If the helicopter tail does not decelerate as fast as the gyro anticipates it overshoots the intended stop position, then the gyro brings the tail back. The end result is bouncy stop. Since the main rotor torque assist the stops in one direction, bounce is often observed in the other direction only. To eliminate bounce you can either improve the mechanical setup to keep the gyro happy in line with default gyro configuration tailored for high performance 3D helis. Or, lower the gyro's deceleration rate to match the particular heli.
However note that stops may start to feel very soft if the deceleration is dropped too far.
Also if this value is too high it might cause stripping of tail TorgueTube gears.
Default settings values are from beginner "20" to extreme "35".

Deceleration R

Deceleration of the right pirouette
If the helicopter tail does not decelerate as fast as the gyro anticipates it overshoots the intended stop position, then the gyro brings the tail back. The end result is bouncy stop. Since the main rotor torque assist the stops in one direction, bounce is often observed in the other direction only. To eliminate bounce you can either improve the mechanical setup to keep the gyro happy in line with default gyro configuration tailored for high performance 3D helis. Or, lower the gyro's

deceleration rate to match the particular heli.
However note that stops may start to feel very soft if the deceleration is dropped too far.
Also if this value is too high it might cause stripping of tail TorgueTube gears.
Default settings values are from beginner "20" to extreme "35".

RC Dead Band

The deadband of the tail (Rudder) stick.
The RC deadband is to ignore input from sticks that don't return to zero and to remove cross channel stick changes when the sticks are moved to the limit on the two axis. Too small a value will make it hard to do single axis maneuvers without a change in the other axis (i.e. a flip ends up rolling left or right during the flip...). Bigger value means that you have to move more rudder stick before anything happens.
This avoids drifting from stick pots and servo noise.
Default settings values are from beginner "80" to extreme "40".

Gyro Dead Band

The deadband of the yaw gyro
The Gyro deadband is the value used to ignore small changes coming from the gyro MEMS sensors.
This avoids drifting from gyro and servo noise. Big number results in poor stability and drift. Too small a number can overwork your tail servo.
Default "4" in all configurations.

"Tail compensate Cyclic to tail" and "Tail compensate Collective to tail" settings are used to fine tune the helicopter tail so that the tail will be perfectly steady when doing for example tic-tocs. If these aren't used tail still holds but it will wiggle a bit when gyro is making corrections. With these settings it's possible to give some advance to tail so that gyro doesn't need to do corrections for the tail.

Tail compensate Cyclic to tail

The ratio of cyclic pitch mixing to tail pitch.
Compensation factor for tail when using cyclic (doing tight rolls and loops).
Default "0" in all configurations.

Tail compensate Collective to tail

The ratio of collective pitch mixing to tail pitch.
Compensation factor for tail pitch when using high positive and negative collective pitch.
Default "0" in all configurations.

Zero Pitch

The amount of tail pitch to compensate for the main rotor torque.

When you are finished with the settings in the Advanced Configuration, click on the OK button. The Advanced Configuration screen will close. This would be a good time to save your work (File - Save Config File - enter file name - Save). You may want to FORCE UPDATE to ensure your settings are transmitted to the gyro.

When you are satisfied with your gyro set up and data has been sent to the gyro, disconnect the cable from the gyro and you are ready to fly.

The proper sequence for sending a file to the gyro:

a) Start the software
b) Press connect and wait for the gyro to connect
c) Load the config file you want to put into the gyro (File - Open Config File)
d) Transmit the file (Force Update or File - Transmit Config File)
Done. But make sure you do it in the order listed above.

Much thanks to all the people that post on the FBL thread, if you see something familiar in this doc, it's because I've used a lot of good info from that thread here.