HobbyKing KK2.0 Multi-Rotor Control Board

Layout:

USER MANUAL:

Initial Setup:

-Mount the FC on the frame with the LCD facing front and the buttons facing back.

-Connect the receiver to the pins on the left side. The negative (black or brown) lead towards the edge of the FC. The order is, from front to back: Aileron, Elevator, Throttle, Rudder and AUX. Connect AUX to a switched channel on your transmitter.

-Connect the motors and servos to the pins on the right side. M1 is the front one and M8 is the back one. The negative (black or brown) lead towards the edge of the FC.

See below for how to find out which motor goes where.

DO NOT MOUNT THE PROPELLERS YET!

The M1 connector must always have a ESC connected, because this ESC will be the only one that supplies the FC with 5V power. This ensures stable power to the FC.

The M2 to M8's 5V power pin is connected together, and any servos here will be supplied by any ESC's connected here. There is not necessary to cut the 5V (red) lead on any ESC unless it has a Switching BEC.

With many servos, for example airplane stabilization, there may be necessary with an extra BEC. Do not use multiple switched BEC's

-Set up a new model on your transmitter, Use a normal airplane profile.

-Turn on the power and press the menu button and enter the "Receiver Test" sub-menu.

Move each channel on your transmitter and check that the displayed direction corespondents with the stick movements. If they disagree, reverse the channel on your transmitter.

Check that the AUX channel show "ON" when the switch on your transmitter is in your preferred on position. If not, reverse the AUX channel on your transmitter.

-Use the trims or sub-trims and adjust the channel values shown on the LCD to zero.

-Enter the **"Load Motor Layout"** sub-menu and choose the configuration you want. If the configuration you want is not listed, use the "Mixer Editor" sub-menu to make one, more on that later.

-Enter the **"Show Motor Layout**" sub-menu and confirm the following. Is the configuration correct? Is the motors and servos connected to the correct output? Correct rotation direction? Does the motor speed up when dropping the arm it is mounted on?

-Enter the "PI Editor " sub-menu and check for correct PI gain values. Use known good values or the default ones.

-Now you can mount the propellers and test it. Arm it by give right rudder and zero throttle for a few seconds. It will beep and the LED will turn on. Do not arm it until you have put the multicopter on the ground and stepped away 5 meters.

Safe it after landing by holding the rudder to left with zero throttle. It will beep and the LED will turn off. Do it before you approach the multicopter.

If it wants to tip over right away, check your connections and your custom made mixer table if you have one.

If it shakes and maybe climbs after its airborne, adjust the Roll and Pitch Pgain down.

if it easily tips over after its airborne, adjust up.

If it drifts away, use the trims to keep the drift down. It will normally drift away with the wind. If you need excessive trim, check if the arms and motors have the correct angles and that the motors are good.

Increase the Roll and Pitch I gain (note the difference from P gain) until it flies straight forward without pitching up or down.

Turn on the Self-leveling by holding right aileron while arming or disarming it. Turn it off by holding left aileron. Alternatively you can assign this to the AUX channel. See below.

Sub-menu descriptions.

"PI Editor": Adjust the PI gain settings here. Use the PREV and NEXT buttons to highlight the parameter you want to change, then press the **CHANGE** button. To adjust both Roll and Pitch at the same time, see the

"Mode Settings "sub-menu.

"Receiver test":

To check output from the receiver.

"Mode Settings":

-**"Self Level"** item: How the self-leveling function will be controlled:

--**"Stick":** Turn on Self-leveling by holding the aileron to the right when arming or disarming. Turn it off with left aileron.

--**"AUX":** AUX switch channel controls the self-leveling function.

-**"I part of PI**" item: How the heading-hold function will be controlled:

--**"On":** Always on.

--**"AUX":** AUX switch channel controls the heading-hold function.

-**"Arming"** item: How the heading-hold function will be controlled:

--**"Stick":** Arm with right rudder and zero throttle. Disarm with left rudder and zero throttle.

--**"On":** Always on. Careful with this one. Use it only when the FC does not control any motors, e.g. when using it for airplane stabilization.

-**"Link Roll Pitch" item:**

--**"On":** Edit the Roll and Pitch gain parameters together.

--**"Off":** Edit the Roll and Pitch gain parameters separately. Use it when the multicopter has different inertial mass on the different axis.

"Stick Scaling": Here you can adjust the response from the stick to your liking. Higher number gives higher response.

Similar to the endpoint or volume adjustment on your transmitter. You can also adjust your transmitter to adjust the stick response and use the stick scaling if you want even more response**.**

"Misc. Settings":
-**"Minimum Throttle"** item: Adjust just high enough to keep all the motors running when the throttle is above zero.
-**"LCD Contrast"** item: Adjust the LCD contrast.
"Self-level Settings":
-**"Self-level Gain"** item: The power of the self-leveling. Higher number is stronger.
-**"Self-level Limit**" item: Limits the max power of self leveling. Higher number is higher limit.
"Sensor Test":
Displays the output from the sensors. See if all shows "OK". Move the FC around and see that the numbers change.
"Sensor Calibration":
Follow the instructions on the LCD. The calibration is only necessary to do once per initial setup.
"Esc Calibration":
Instructions:
1: Important: **TAKE OFF THE PROPELLERS OR DISCONNECT ONE WIRE FROM THE MOTOR!!**
2: Turn off the FC power.
3: Turn on the transmitter and set the throttle to max.
4: Press down button 1 and 4, keep pressing until last step. Releasing the buttons aborts the calibration.
5: Turn on power to the FC
6: Wait for the ESC to beep its full throttle calibrated signal. Takes a few seconds, depends on the ESC.
7: Lower the throttle to idle.
8: Wait for the idle throttle calibrated signal.
9: Release the buttons.
"Mixer Editor": This menu lets you adjust where and how much signal the motors gets from the sticks and sensors.
This makes you able to make any configuration possible, with up to 8 motors or servos.
To change between the output channels 1-8, press CHANGE when the upper right number is highlighted.
-**"Throttle"** item: Amount of throttle command. Usually 100% if the output channel is connected to a ESC.
-**"Aileron"** item: Amount of aileron/roll command. Use positive value for motors on the right side of the roll axis and negative for the left side of the roll axis. The value is given by the motor's distance from the roll axis. More is further away
-**"Elevator"** item: Amount of elevator/pitch command. Use positive value for motors on the front side of the pitch axis, and negative for the back side of the pitch axis. The value is given by the motor's distance from the pitch axis. More is further away.
-**"Rudder"** item: Amount of rudder/yaw command. Usually 100%. Use a positive value for a CW spinning propeller, and negative for a CCW spinning propeller.
-**"Offset"** Item: Applies a constant offset to the channel. Keep this zero when it is a ESC channel, and around 50% when connected to a servo. Fine tune servo position by adjusting this value.
-**"Type:"** Item: Set it to the type (servo or ESC) connected to the channel.
--For ESC: Output PWM rate is always high. Outputs zero when disarmed or throttle is at idle. Applies
the **"Minimum Throttle"** item from the **"Misc. Settings"** sub-menu when armed and throttle is above zero.
--for Servo: Output PWM rate can be high or low. Outputs the offset value when disarmed or throttle is at idle.
-**"Rate":** High rate (400Hz) for ESC or digital servos, or low rate (80Hz) for analog servos.

"Show Motor Layout":
Shows the configuration graphically. Use to check your build and/or your custom mixer table.
"Load Motor Layout":
Loads one of many fixed configurations. The loaded configuration can be modified afterwards.
TUNING GUIDE:
1: Make sure the KK2 reads the transmitter stick neutrals. Go to the "Receiver Test" menu and use the trims to get the values to zero.
2: Go to the **"PI Editor"** menu and set P to 150 and I to zero for both the Roll and Pitch Axis. It is only necessary to edit the roll axis, pitch axis will be automatically changed to the same values as the roll axis.
Leave the P-limit and I-limit alone, it is seldom necessary to change them.
3: Hover the aircraft and compare the response to the multicopter in this video:
http://www.youtube.com/watch?v=YNzqTGEl2xQ (beware of the chicken!)4: adjust accordingly to the response.
If you are newbie and does not fly around yet, just leave the I-gain at zero or the default value.
Also the Yaw PI-gains can be left at default, but remember to zero them if you use the string tuning method.
Default PI editor settings
Roll/Pitch Axis:
Pgain = 150
Plimit = 100
Igain = 50
Ilimit = 20
Yaw Axis:
Pgain = 150
Plimit = 20
Igain = 50
Ilimit = 10