README for Brain2/iKon2 FrSky INTEGRATION (version 1.1   21 June 2019):

You can use the Brain2/iKon2 integration, with FrSky Receiver that use Smart Port for telemetry (X series receivers). Compatible Transmitters are for now the three FrSky Horus (X12S / X10S / X10).

For telemetry, under "MANUALS" see the "Telemetry" pdf document that explain how connect and configure your ESC or a Temperature sensor to the Brain2/iKon2 and how to activate the reception of telemetry data on your transmitter.

1) Transmitters must use OpenTX (**at least the version 2.2.4**) firmware. This is not a guide for installing, update and use OpenTX on FrSky transmitters, for this purpose, instructions, software and drivers download and firmware update, refer to either the FrSky and OpenTX websites. Using the OpenTX program "Companion", after it updates itself (Help -> Check for Updates), verify that your transmitter is updated with the latest version of the OpenTX (**is needed at least 2.2.4** version with LUAC checkbox activated). Check also from FrSky website that your Receiver is updated with latest firmware;

2) Connect your Brain2/iKon2 unit via a USB cable to your PC, open the Windows application, and update the Brain2/iKon2 software and firmware to the latest version (leave the software open);

3) With the Windows application, on the panel 3 ("Receiver Selection") of the Wizard, select the "FrSky" receiver kind icon;


4) Under "Help" menu select "Download Latest FrSky Integration" or download from www.msh-electronics.com website the file "Brain2FrSky.zip" and save in a folder of your PC;

5) Unzip the Brain2FrSky.zip to create the folder "BRAIN2";

6) Copy in the root of the transmitter SD memory card the whole folder "BRAIN2";

7) With receivers that have standard 3 poles connectors like RX8R, X8R & X6R: Per the schematic in panel 4 ("Connections"), connect a standard 3-pole female/female cable like that supplied with the Brain2/iKon2 to the Smart Port "- + S" of your "X" receiver and the other end in the CH3/S-REC connector of the Brain2/iKon2 that work as TELEMETRIC IN/OUT port;

8) Using ONLY the adapter cable **MSH51645**, connect the standard connector of the adapter cable to the SBUS port of your FrSky "X" receiver and connect the small JST connect of the adapter cable to the lateral SAT1 connector of the Brain2/iKon2 that with this protocol active become the S.Bus signal input port. Note: Power to receiver come from S.Port; ***** DON'T USE OTHER CABLE, OTHERWISE, YOU MAY BURN YOUR Brain2/iKon2 UNIT AND/OR YOUR RECEIVER!!!! *****

9) Power your TX, go to MDL, MODEL SETUP, Internal RF, Mode=D16, Receiver No.=01, select Bind. Keeping pushed the "f/s" key, power your receiver to Bind it to the transmitter model that is active in the transmitter. Cycle power of RX;

10) Power your transmitter and your receiver. With the Brain2/iKon2 software, verify in panel 5 ("Transmitter setup") the correct direction of each channel as explained in the side bar instructions. If necessary, correct it in the transmitter, reversing the channel in the transmitter menu "MDL", "OUTPUTS", "Direction";

11) With the Brain2/iKon2 software, verify in panel 5 ("Transmitter setup") that you are able to obtain the full -100/+100 travel of all control channels. If necessary, correct them in the transmitter, raising or lowering in the menu "MDL" -> "OUTPUTS" the Min/Max values;

Now you are ready to use the Brain2/iKon2 Integration, going in to the "SYS" menu and with "PgDn" go in "SD-HC CARD", select "BRAIN2" folder and open, select brain2.luac file and "Execute" it, the first section menu "Brain2 Calibration Dial menu" page appears:
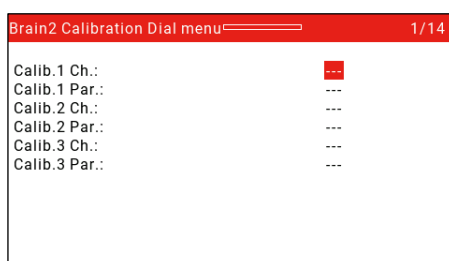
Integration info's:
- Once inside the Brain2/iKon2 integration, you can use: PgDn / PgUp, the Roller with his buttons and the three-position switch you have assigned to the Brain2/iKon2 for the selection of the active Setup1 or 2 or 3 (e.g. the SC switch).
- You can move between each of the 14 sections menus with PgUp and PgDn. The active section is indicated in the title of the screen. Each time you enter in a menu, before modifying any parameter, wait until the update bar on the top disappear.
- Inside each section menu, you can go to a specific parameter/row rotating the Roller. The value of the active parameter/row is highlighted. To enter into edit mode for change the value of the active parameter, push the Roller button (value start to blink), values are changed on the transmitter display rotating the Roller but are not sent and memorized in the Brain2/iKon2 unit until you push again the Roller button and from blinking the value returns to normal.
- To facilitate and speed up the navigation, when you arrive at the last row of the menu and rotating again clockwise the dial, you will return to the first row of that menu. If you rotate anticlockwise the dial from the first row of a menu, you will go to the last row of that menu.
- Also, during the edit of parameters represented by a list of names (the Loggable Parameters, the Timers Names, etc.), when you arrive at the end of the list and you again rotate clockwise the dial, you will return to the first value of that list. If you rotate anticlockwise the dial from the first value of a list, you will go to the last value of that list.
- Menu from 1 to 6 are related to "Common" values. Menu from 7 to 11 are related to the "Setup" actually active in your TX. You must set on the transmitter the switch of "Setup" selection to the Setup number (1 or 2 or 3) with the values you want see (and eventually change), before entering in one of these "Setup" menu (7 ⇔ 11).
To exit from the Integration menu, you can push in any moment, the "RTN" button.

Brain2 Servos menu	3/14
Refresh Frequencies:	
Cyclic Hz:	---
Tail Hz:	---
Check Mode:	---
SERVO1:	
Servo1 Type:	---
Servo1 Reverse:	---
Servo1 Center Pulse:	---
Servo1 Positive Throw:	---
Servo1 Negative Throw:	---
SERVO2:	

Brain2 CCPM menu	4/14
Mixers:	
Cyclic Ring:	---
Pitch Mixer:	---
Reversed Pitch:	---
Aileron Mixer:	---
Elevator Mixer:	---
Swashplate Type:	
Swashplate Type:	---
Servo Angles:	
Servo 1 Angle:	---
Servo 2 Angle:	---

Brain2 Rescue menu	5/14
Use Auto Level:	---
Use Rescue:	---
Maximum Angle:	---
Auto Level Gain:	---
Rescue Pitch Max:	---
Rescue Pitch Duration:	---

Brain2 Thrott.&Gov. menu	6/14
Throttle Out MIN:	---
Throttle Out MAX:	---
Pulses for Rotation:	---
Main Gear Ratio:	---
Tail Gear Ratio:	---
Telemetry Input:	---
mAh Correction Factor:	---
mAh Max Usable:	---
Speed 1:	---
Speed 2:	---
Speed 3:	---

Brain2 Input menu	7/14
Stick Deadband:	
Cyclic Stick Deadband:	---
Tail Stick Deadband:	---
Input Exponentials:	
Aileron Exponential:	---
Elevator Exponential:	---
Tail Exponential:	---
Pitch Exponential:	---
Input Dynamics:	
Tail Dynamic:	---
Pitch Pump:	---

Brain2 Tail menu	8/14
Tail Regulations:	
Integral Gain:	---
Derivate Gain:	---
Pitch Precompensation:	---
Cyclic Precompensation:	---
Tail Asymmetry:	---
Tail Rotational Speed:	---
Proportional Gain by SW:	
Prop.Gains are set in SW:	---
SW Proportional Gain:	---
SW Heading Lock:	---

Brain2 Cyclic menu	9/14
Aileron:	
Proportional Gain:	---
Integral Gain:	---
Derivate Gain:	---
Feed Forward Gain:	---
Rotational Speed:	---
Elevator:	
Proportional Gain:	---
Integral Gain:	---
Derivate Gain:	---
Feed Forward Gain:	---

Brain2 Gov + Level menu	10/14
Governor:	
Use Governor:	---
Governor Use Bailout:	---
Auto Level:	
Use Auto Level:	---
Use Rescue:	---
Maximum Angle:	---
Auto Level Gain:	---
Rescue Pitch Max:	---
Rescue Pitch Duration:	---

Brain2 Diagnostic menu	12/14
Sample Rate:	---
Log Ch.1:	---
Log Ch.2:	---
Log Ch.3:	---
Log Ch.4:	---
Log Ch.5:	---
Log Ch.6:	---
Log Ch.7:	---
Log Ch.8:	---
Log Ch.9:	---
Log Ch.10:	---

NEVER use Brain2/iKon2 Integration while you are flying! For example, changing the ESC brand of ESC telemetry in the Governor menu will generate a reinitialization of the communication port and the radio signal is lost for a couple of seconds.

Note1: Never use the FrSky Brain2/iKon2 Integration together with the Windows application and/or Android app and/or iOS app. Use only one app at time.

Note2: Speed: Integration uses for data transport the same Smart.Port used for telemetry. Therefore, the integration speed is inversely proportional to the number of telemetric values that must travel consecutively and repeatedly on the Smart.Port bus. Thus, when no physical sensors are connected and Brain2/iKon2 telemetry has not been activated, integration travels at maximum speed. When the ESC telemetry is activated, Integration begin to slow down. If other physical sensor on the Smart.Port bus, Integration speed is further reduced and depend to the number of sensors.

Note3: X10S: due to a bug in actual OpenTX, long press on PgUp/Dn don't work. This bug will be fixed with version 2.3 of OpenTX, but none know the release date/ETA. In the meantime, the "SYS" and "TELE" keys have been activated as workarounds to be able to navigate the pages not only forward but also backwards.

Note4: The FrSky telemetry & Integration was developed and tested with FrSky HORUS (X12S) with OpenTX firmware version 2.2.4 of 2019/July/11, Companion 2.2.4 of July-11-2019 and with FrSky receiver X8R with firmware version 151118.

Note5: Due to the big amount of FW code to load and use, FrSky integration works only on the new Brain2/iKon2 units that have more memory for the additional FW code and more power to execute.

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