HORUS X12S

FrSky 2.4GHz Accst Taranis HORUS X12S Manual

SMART PORT

2.4GHz
ACCST

FrSky Electronic Co., Ltd.

www.FrSky-rc.com

2006 Year 8 Mou 26 Day

INTRODUCTION

Thank you for purchasing the FrSky HORUS X12S digital radio control telemetry system (*ACCST system). This device has a wide range of functions and is developed for beginners as well as advanced users. To ensure optimal use of the transmitter and maximize flight safety, we recommend that you read the manual carefully and thoroughly before use. If you encounter difficulties during use please check the manual, consult the FAQ (Frequently Asked Questions) online at http://www.frsky-rc.com/, contact a local dealer or FrSky technical support.

*ACCST: Advanced Continuous Channel Shifting Technology

USER'S MANUAL AND TECHNICAL SUPPORT

Our goal is to assist the user by thoroughly preparing and maintaining this manual. For any ambiguities or mistakes, please inform us of issues that you have found so we can take corrective action. In the event of unforeseeable program changes and/or upgrades to the product, the information contained herein is subject to change(s) without a timely notice. Your understanding and feedback is greatly appreciated.

RESTRICTIONS ON SALES AND TERRITORY

If you have any questions or service request, please contact your local FrSky dealer(s). It should be noted that all information and technical support provided in the manual only pertains to the devices sold within your region, and may be different from devices purchased in other regions. Please contact your local FrSky dealers for help.

PROVISIONS ON USE, EXPORT AND QUALITY GUARANTEE

1. This product is intended to be used for control of aerial models, ships and land machines such as vehicles and robots within the designated radio frequency range. It cannot be used for purposes other than remote control of models for hobby and/or entertainment.

2. Provisions on export:
   (a) If the product is sold from the country of production to abroad, it has been tested to meet   the relevant regulations regarding radio transmission frequency required in the importing country. Provided that the product is further exported to other countries, it shall also meet the relevant regulations of similar devices being sold in those other countries, which may require approval from the local

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USER SAFETY NOTES

Please read the following thoroughly for your own safety.

2.1 · Meaning of symbols

Contents marked with the following symbols in the manual require special attentions.

⚠ Dangerous- Such operation may lead to death or sever injury of the user or others.

⚠ Warning- Such operation may lead to death or severe injury of the user or others. High risk of minor injury and/or damages to the product.

⚠ Attention- Although such operation has low risk of severe injury to the user or others, personal injury and/or damages to the product is still possible.

Symbol ⚠ : Warning ❗ : Prohibited 🚫 : Required step ℹ : Information

2.2 · FLIGHT SAFETY PRECAUTIONS

Please read the following section thoroughly for your own and/or the safety of others.

⚠ **WARNING:** Avoid flying when a low battery (red) icon is displayed in the top right side of the screen. Do not rely on the low battery alarm function of the transmitter to tell you when to land. Check the battery voltage of the transmitter and of the model battery before each flight.

❗ **NOTE:** Maintain the transmitter properly to ensure correct operation. The data of HORUS X12S is saved to the SD card during each power off operation. The data will be lost if the battery is unplugged when the transmitter is powered on. Always follow the prompts when turning off the radio via the power switch. We suggest a complete inspection and if needed preventive maintenance service for the device at least annually to ensure safe operation.

2.3 · WHERE TO USE

We recommend you only use the transmitter at certified club sites for RC models. You can enquire at a local dealer to find model clubs and fields near your location.

❗ **NOTE:** Please pay close attention to the relevant regulations at the flying field, position of the spectators, wind direction, obstacles inside the flying field, civil/military aviation and the local wild life.

2.3 · AT THE FLYING FIELD

We recommend you only use the transmitter at certified club sites for RC models. You can enquire at a local dealer to find model clubs and fields near your location.

⚠**WARNING:** In order to remain in full control of the airplane, it is crucial to keep the plane well within the limits of your eyesight. We do not recommend you to fly behind large objects such as trees and buildings, which may cause a reduction in signal quality received by the model's receiver, this will also result in losing line of sight.

⚠**WARNING:** Don't block the internal antenna located above the transmitter screen, or the optional external antenna during use, this can significantly reduce the range of the transmitted radio signal.

⚠ **WARNING:** Never use the transmitter unprotected in the rain. Rain and/or moisture can enter the transmitter through the openings, which may cause erratic model behaviour and even a runaway. If the use of the system during damp conditions is inevitable (during competitions etc.), please be sure to cover the transmitter with a plastic bag or waterproof cloth. Flight is prohibited when lightning occurs.

⚠ **CAUTION:** When it is necessary to put the transmitter down on the ground or flight bench it is best and safest to place the transmitter on its back so that it rests as designed on the handle. If circumstances require that you must place the transmitter standing upright on the ground before taking off, make sure it cannot be accidently tipped over. If the transmitter is flipped on its front side, the throttle stick may rotate and lead to a sudden increase of the engines rpm. The tip over might also do damage to the transmitter.

⚠ **CAUTION:** Never point the antenna directly at the model. If you encounter a low signal warning or lose the connection during flight, check orientation and, if needed, move the antenna to the recommended angle relative to the model.

2.1 · SAFE USE AND HANDLING OF THE NI-MH BATTERIES

The user should only use power adapters supplied by FrSky or those that are approved by FrSky to charge the battery inside the HORUS X12S transmitter. It is important to be aware about the characteristics of the LSD Ni-MH battery. If you do not follow the instructions there is a high chance of inflicting terminal damage to the battery or transmitter and can even lead to fire.

Important notes

⚠ **DANGER:** A small increase in temperature can be observed during normal charging and discharging of a Ni-MH battery. However if the charger and/or battery is overheating, the charge/discharge cycle must be aborted immediately. Always monitor temperatures to avoid overheating the battery and/or charger. If you suspect that the battery has been damaged, we recommend to stop using it, and request you to discard it in an appropriate way (please recycle).

⚠ **WARNING:** Do not charge a Ni-MH battery with chargers that do not support Ni-MH batteries.

⚠ **WARNING:** Do not charge the Ni-MH batteries when the transmitter is powered on.

⚠ **WARNING:** Never charge the transmitter's Ni-MH battery with a current greater than 1 amps (0.5C).

⚠ **WARNING:** Do not discharge the Ni-MH batteries with a discharge current exceeding the maximum rate of 4 amps (2C).

⚠ **WARNING:** Never store batteries near an open flame and/or in other high temperature conditions. We recommend to store them at +/- 20 degrees Celsius (68 Fahrenheit).

⚠ **CAUTION:** When Ni-MH batteries indicate full charge in a cold environment, they might not be fully charged. The low temperature has a negative effect on the total battery capacity, this can result in an unreliable charge indication.

🛇 **CAUTION:** Ni-MH batteries must be kept at a safe location and out of reach of young children.

ⓘ **NOTE:** When charging the Ni-MH batteries outside of the transmitter we advise to charge the battery in a fire-proof container. Do not charge Ni-MH batteries near flammable products and/or liquids. It is good practice to install a fire alarm in close proximity of the charging area.

SD card
Please read the following thoroughly to insure correct operation.

2.6 · HANDLING RECOMMENDATIONS

🚫 **WARNING:** While transferring data on to the SD card, do not turn off the transmitter and/or extract the SD card. Loss and/or corruption of the data can occur.

⚠️ **CAUTION:** Keep SD card clean, avoid direct sunlight, away from moisture/water and/or any other type of potentially corrosive liquids.

🚫 **WARNING:** Never store the SD card in an environment subjected to strong electromagnetism.

❗ **NOTE:** Always check the orientation of the SD card before inserting to ensure correct installation.

TRANSMITTER HARDWARE
Please read the following notes thoroughly to get acquainted with the hardware.

· SUMMARY OF FEATURES OF THE X12S HORUS

Please read the following section thoroughly for your own and/or the safety of others.

- Industrial High Resolution TFT screen readable outdoor
- All CNC 6 Ball bearings gimbals with hall-effect sensor
- Internal and external antennas selectable for internal RF module
- Safe power switch(cover preventing accidental operation) with integrated trap base
- MP3 player
- Antenna detection (SWR) and warning
- Built-in GPS module and 6-axis sensor
- Audio Speech outputs (speaker and earphone) and haptic feedback
- Wireless trainer system
- External RF module bay
- Two rotary potentiometers, four sliders, two on rear of transmitter
  Six trim operating buttons
  Six three position, one two position and one momentary switch
  6-pos encoder for easier flight mode switch
- FrSky FrTX operation system installed and open source system supported
- Flight simulator (PC) compatible
- Logic switch programming
- Full telemetry and real-time telemetry data logging
- Programmable Fail Safe functions
- Pre-programmed support for different model types, aeroplane, helicopter, flying wing, V-Tail, glider, multicopter and custom(user defined)

3.2 · RECEIVER TYPES

Internal RF mode list for all compatible FrSky receivers:

HORUS X12S working mode	Compatible receiver	Output number of channels
D8	V8-II series in D mode (V8FR-II, V8R7-II, V8R4-II, VD5M, etc.) D series (D8R-II plus, D8R-XP, D6FR, D4R-II, etc.)	8 channels
D16	X series (X8R, etc.)	Up to 16 channels
LR12	L series (L9R, etc.)	12 channels

> ℹ **NOTE:** Obsolete V8 series receivers are not compatible with the internal RF module, but can still be used in combination with an external DJT module.

> ℹ **NOTE:** The internal RF module of the LBT version HORUS X12S (EU Version) is only compatible with FrSky D16 and LR12 Modes.

3.3 · DISPLAY

Industrial high resolution TFT screen (480x272), readable outdoors.

3.4 · STICKS

CNC milled aluminium gimbal rotating parts and frame, equipped with six ball bearings in a single unit (two on the return to centre mechanism) combined with Hall Effect angle sensors, for superior quality feel, precision and durability.

3.5 · INTEGRATED SENSOR

Built-in 6-axis sensor (3-axis gyro and 3-axis accelerator) to facilitate auxiliary control by tilting the transmitter.

3.6 · HAPTIC FEEDBACK

A programmable feature that notifies the operator by vibrating the transmitter, it can be selected for a wide variety of functions.

3.7 · ANTENNA DETECTION (SWR)

The SWR function monitors the efficiency of the transmitter antenna. If the value is above the selected value, an alarm can be generated by the system.

3.8 · RECEIVE SIGNAL STRENGTH INDICATOR (RSSI)

Telemetry data is used for real-time monitoring of the received signal quality. RSSI can be used to give the user a low signal strength warning.   If the value is below the selected value, an alarm can be generated by the system.

3.9 · ENTERTAINMENT FUNCTION

The transmitter has an internal MP3-player and 2 stereo speakers. MP3 files can be played directly from the SD card.

3.10 · WIRELESS TRAINER SYSTEM

Up to 8 channels can be shared between two HORUS transmitters using the wireless connection. Two different cable options can also be used for connection to other transmitters, Taranis/Futaba style and Graupner DSC style.

3.11 · LAYOUT
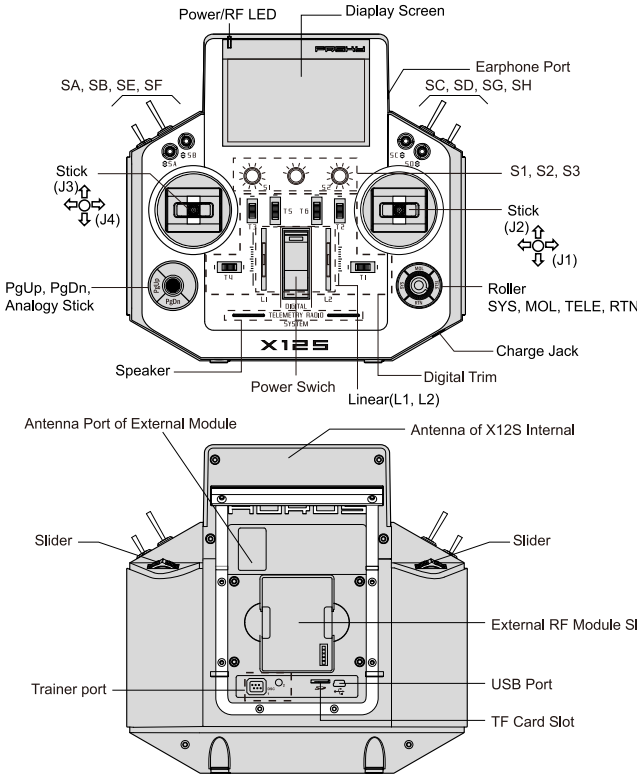
Overview
(Switch Default Settings)
- SA: 3 positions, Short Lever
- SB: 3 positions, Long Lever
- SC: 3 positions, Long Lever
- SD: 3 positions, Short Lever
  - SE: 3 positions, Short Lever
  - SF: 2 positions, Long Lever
  - SG: 3 positions, Short lever
  - SH: 2 positions, Momentary; Long Lever

You can choose the Switch and define its positions in the Mixer menu.

Internal Antenna Ports for X12S and External RF Port for X12S are selectable in software.

· Quick select options

Long press "TELE" button: this will generate a pop-up where the user can reset timer, telemetry values .etc.

Long press "RTN" button: this will instantly bring the user to the "MONITOR" menu, pressing "RTN" again, will return the user back to the previously opened menu.

Long press "PgUp" button: will (de)activate the button lock function, a lock icon will be displayed in the top right corner of the screen when activated.

3.12 · THE STORAGE SYSTEM

There is an internal flash IC installed in the radio and a Micro SD slot is provided in the back of the radio.

3.12.1   INTERNAL FLASH

The transmitter provided an internal flash chip that used to store default files that system needed.

3.12.2   MICRO SD CARD (SECURE DIGITAL MEMORY CARD)

The transmitter provide a MicroSD Slot, SD and SDHC type cards are supported. When installed correctly an SD card icon is displayed in the top right corner of the screen when power on.
There are some files will /need to be stored in MicroSD Card: logging file, update files,

⚠ **NOTE:** Make sure the transmitter is turned off during removal and installation of the MicroSD card, failing to do so can corrupt unsaved data.

🚫 **CAUTION:** The MicroSD card is a delicate component, never use excessive force when inserting or removing the micro SD card.

HOME SCREEN

Home screen (page 1/4)

The illustration above is the home screen of the transmitter (page 1/4), the pictured airplane represents the selected model. The currently selected flight mode, total flight time and throttle position (%) are displayed in the top left. On the right side are two timers followed by real-time data related to the RF system and receiver battery voltage. The telemetry data shown here is the same as the user can, or has chosen to be displayed on the first page of the telemetry menu screen. This can be programed in the "MDL" menu under "TELE SETUP" The long grey bars represent the trim position of the 6 available trim switches. A visual as well as a numerical trim position indication is displayed.

Displayed Icons

🔒 Hardware buttons locked (long press PgUp)

🔋 Transmitter battery state.

📶 RSSI signal quality.

📶 Internal RF module active.

📡 External RF module active.

M̂ Trainer mode active. M = Master, S = Slave (cable connection)

M̂ Trainer mode active. M = Master, S = Slave (wireless connection)

⚠️ Micro SD card icon, indicates connection state.

⚠️ Flash status indication.

Setting up timer

The illustration below is an example of the "TIMER" menu, to choose between the two available timer menus rotate the rotary button while being on the home screen, press "ENTER" to confirm your selection.

Timer menu screen

"MODE" : Allows the timer to count up or down.
"ALARM" : Determines after how long an alarm is triggered.
"SOUND" : Has as the following options:
 "MUTE": Produces no hearable warning.
 "BEEP": Gives of a beeping sound.
 "SPEECH": Produces as spoken value.
"START" : Has as the following options:
"ABS" : Disables the "START" option.
"THs" : Activates the "TIMER" while having a throttle setting above 0 (-100).
"TH%": The throttle setting determines the timer running speed, the higher the throttle setting the faster it counts.
"THt" : Uses the throttle as trigger to start the timer.
"SWx" : Uses a switch as trigger to start the timer.
"OFF" : Disables the "TIMER".

Home screen (page 4/4)

The home screen page 4/4 is used to display latitude and longitude information generated by the model and transmitter GPS modules.

SYSTEM MENU
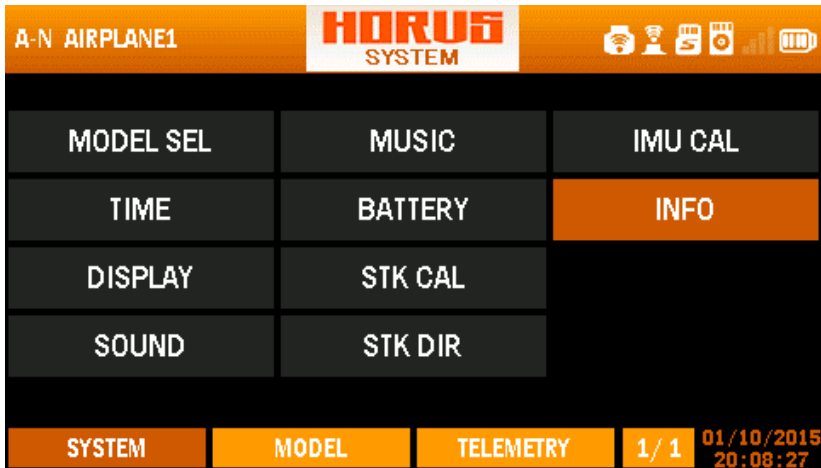
Overview of the system menu screen

System Menu Options

"MODEL SEL" : Is used to create, select, modify, copy or delete a model.

"TIME" : Is used to adjust time and date, and change the type in which the date is displayed.

"DISPLAY" : Allows adjustment to screen brightness and the active the sleep function. It is allowed to assign a knob or slider to manually adjust the intensity of the back-light.

"SOUND" : Volume and haptic adjustments, muting and assigning knobs and sliders to adjust individual sound levels manually can be done in this menu.

"MUSIC" : Gives access to the internal MP3 Player. Selection of audio files saved on the SD card and assigning a knob or slider for manual volume control can be done in this menu.

"BATTERY" : Displays the transmitter battery voltage, of which the range can be changed to accommodate battery's other than the one supplied by FrSky. The low-battery warning voltage and the range of the battery icon displayed in the top right corner can be adjusted in this menu.

"STK CAL" : Is used to calibrate the endpoints of the sticks, knobs and sliders.

"STK DIR" : Allows reversal of each individual stick, knob, slider and switch signal.

"IMU CAL" : Is used to calibrate the built-in 6-axis sensor.

"INFO" : Displays transmitter information and the installed firmware version.

5.1 · MODEL SEL
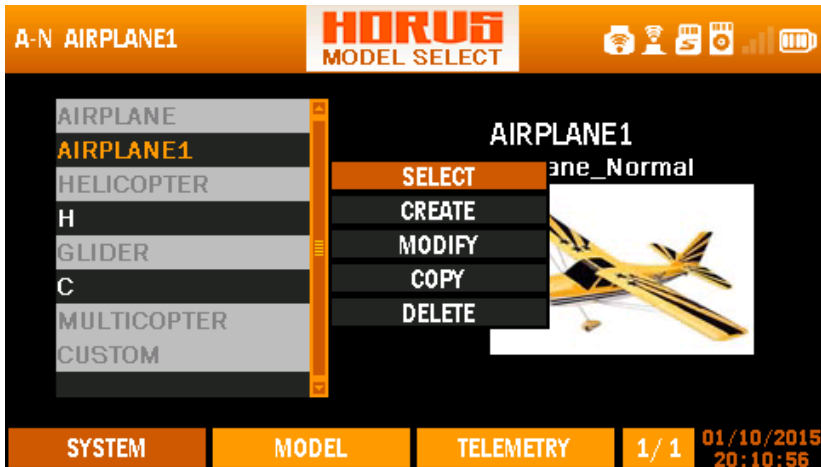
Overview of the model select menu screen

The illustration above is an example of the "MODEL SEL" menu, to enter this menu press the "SYS" button then select "MODEL SEL". Here the user can select, create, modify, copy and/or delete models. The name, model type and model image are displayed on the right side of the screen, and on the left is the selection part of the created model files. Select the left column to browse the available files of existing models. After selecting the desired option a pop up menu will appear to facilitate more navigation options.

"M-POS": (SWFLP1_6) Uses the M-POS knob as trigger to start the timer.

"RESET" : Allows and "SWx" or "M-POS" to reset the timer.

"MEMORY" : Has YES/NO as options, YES will allow the user to store the TIMER values when power off.

⚠ **NOTE:** The user can reset TIMER1/2 in any time by pressing and holding the "TELE" button and selecting the relevant option from the list.
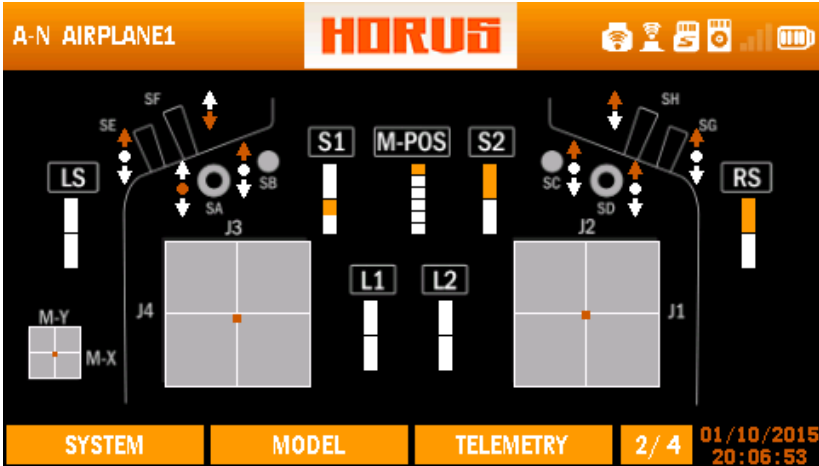
Home screen (page 2/4)

The home screen page 2/4 can be used to check if the sticks, switches, sliders and knobs are functioning properly.

Home screen (page 3/4)

The home screen page 3/4 illustrates the status of the programed logic switch lines, the programming line gets a white bar to indicate that the preassigned conditions are met.
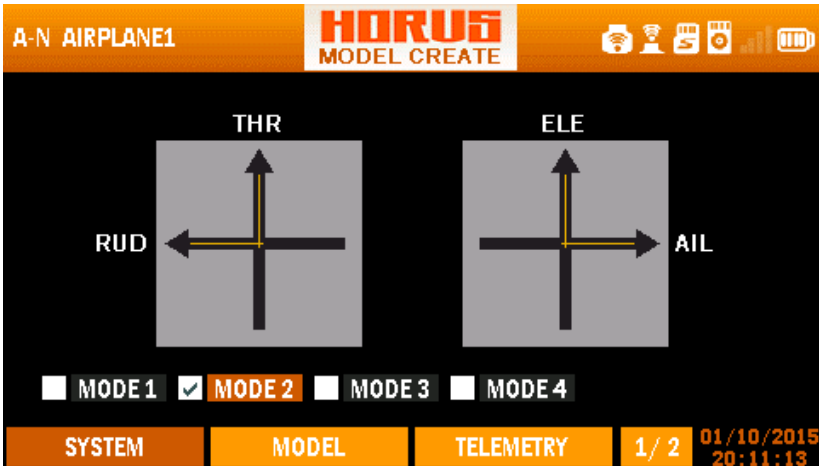
Overview of the stick mode selection menu screen

The illustration above is an example of the "STICK MODE" menu that is used when creating a new model. Here the user can choose one of the four available stick modes (MODE 1-4), this must correspond with the actual transmitter stick layout.
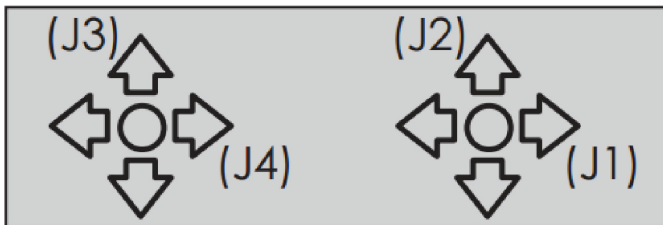
Mode	J1	J2	J3	J4
1	Aileron	Throttle	Elevator	Rudder
2	Aileron	Elevator	Throttle	Rudder
3	Rudder	Throttle	Elevator	Aileron
4	Rudder	Elevator	Throttle	Aileron

Description of MODE naming
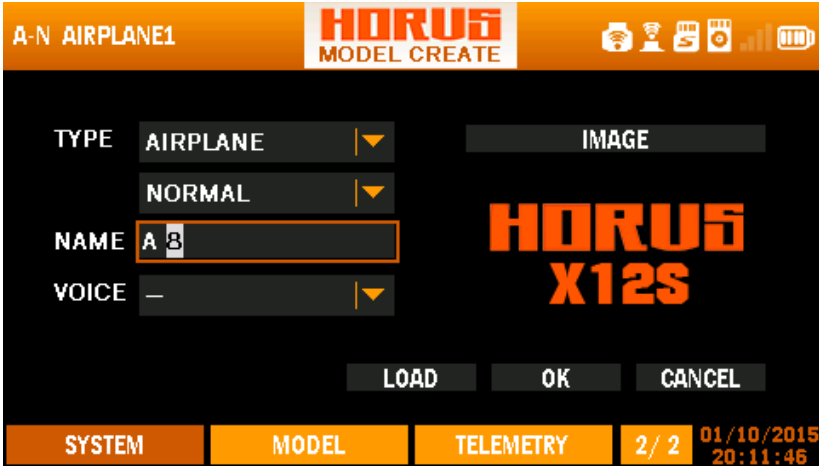
Overview of the model select menu screen

The illustration above is an example of the "MODEL CREATE" menu, to enter this menu press the "SYS" button, select "MODEL SEL", create a new model or select modify from the selection list on an existing model. Here the user can assign a name to identify the aircraft, select the model "TYPE", assign a "VOICE" (this will be called out when selecting the model), and assign an "IMAGE" that will be displayed on the main page. Selecting the correct model "TYPE" with the additional option boxes is critical during this process, as it determines how the "OUTPUT MAP" is configured in default.
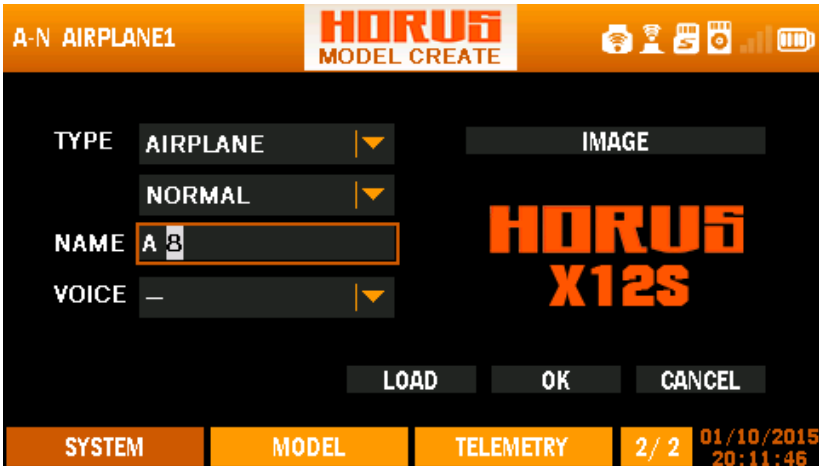
Overview of the model modify menu screen

ⓘ **NOTE:** Change TYPE will lose all your settings, be careful to do so.Change NAEM and VOICE will not lose your model settings but the name and the model voices.

5.2 · TIME
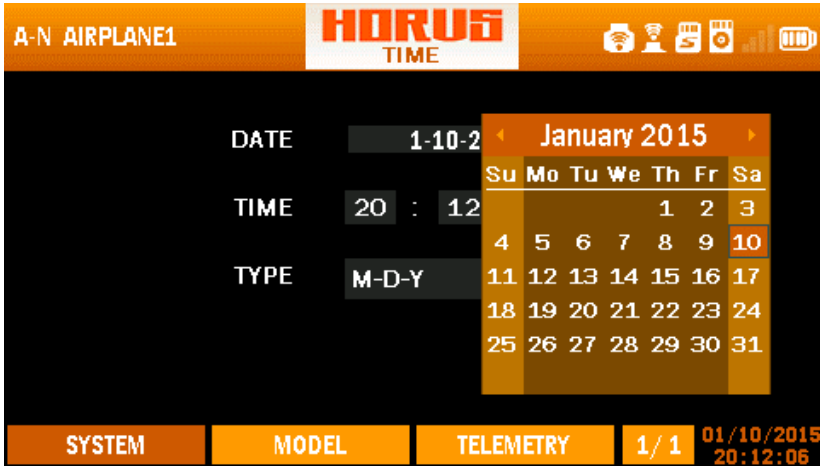
Overview of the time menu screen

The illustration above is an example of the "TIME" menu, to enter this menu press the "SYS" button, then select "TIME". Here the user can make changes to the time and date, and change the type of how the date is displayed. Time and date are always visible in the lower right corner of the screen.
Use PgUp / PgDn to select months in the calendar.

5.3 · DISPLAY
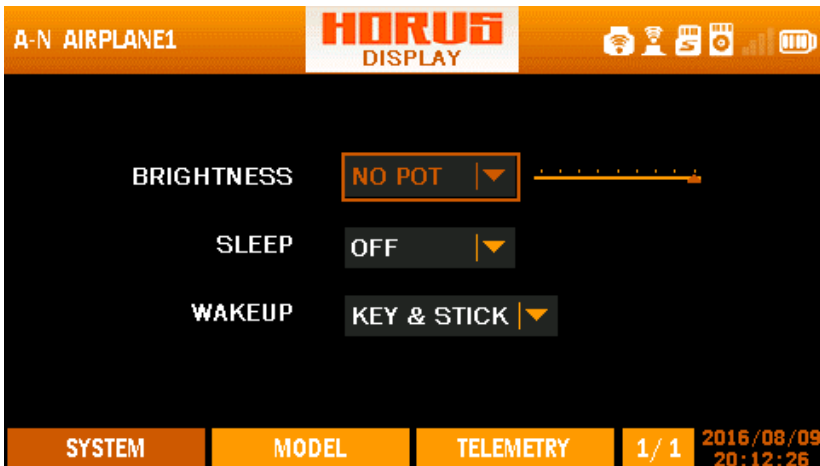
Overview of the display menu screen

The illustration above is an example of the "DISPLAY" menu, to enter this menu press the "SYS" button, then select "DISPLAY". Here the user can adjust the brightness of the screen and activate the sleep

function. Activating the sleep function will turn off the screen after the selected amount of time, and turn it on when the selected conditions for wakeup are met. According to personal preference and changes in light conditions, a knob can be assigned to manually change the brightness to achieve the desired visual effect, these settings can optimize readability and/or have a positive effect on battery endurance.

ⓘ **NOTE:** We recommend the user to ALWAYS set up the "SLEEP" function, due to the high intensity backlight there is possibility that it burns stationary menu icons in the screen when leaving the screen on for long periods of time.

5.4 · SOUND
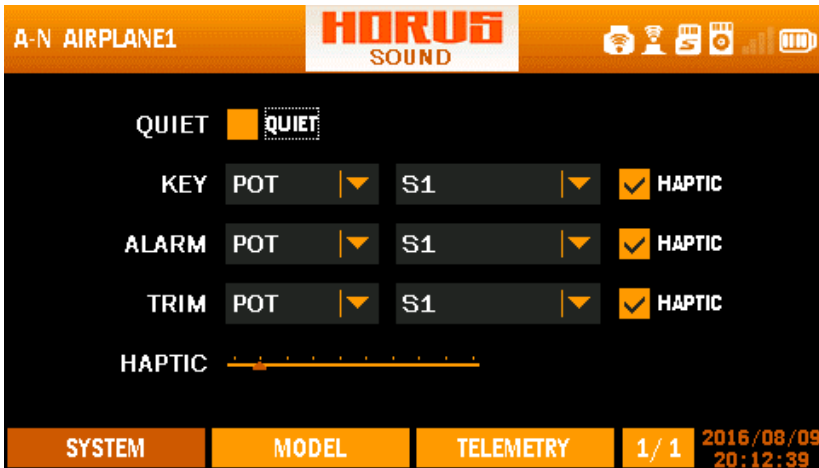
Overview of the sound menu screen

The illustration above is an example of the "TIME" menu, to enter this menu press the "SYS" button, then select "TIME". Here the user can make changes to the time and date, and change the type of how the date is displayed. Time and date are always visible in the lower right corner of the screen.
Use PgUp / PgDn to select months in the calendar.

5.5 · MUSIC
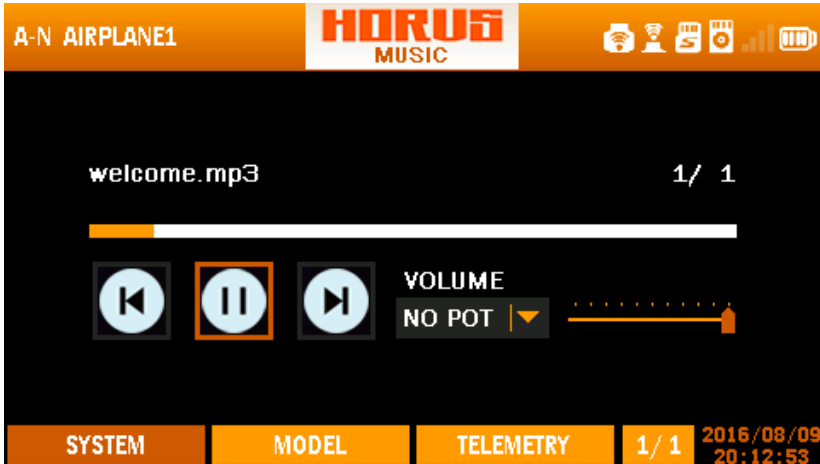
Overview of the music menu screen

The illustration above is an example of the "TIME" menu, to enter this menu press the "SYS" button, then select "TIME". Here the user can make changes to the time and date, and change the type of how the date is displayed. Time and date are always visible in the lower right corner of the screen.
Use PgUp / PgDn to select months in the calendar.

5.6 · BATTERY
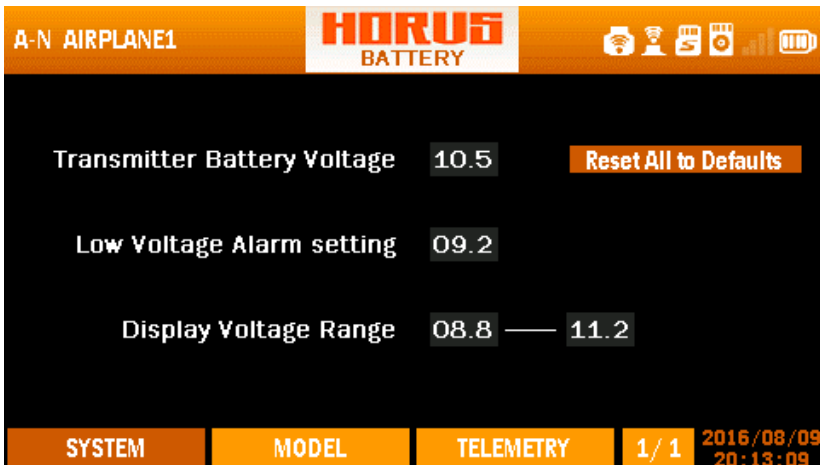
Overview of the battery menu screen

The illustration above is an example of the "BATTERY" menu, to enter this menu press the "SYS" button, then select "BATTERY". Here the user can see the actual voltage of the transmitter battery, and adjust the

total voltage of the battery via "TRANSMITTER BATTERY VOLTAGE". This to accept battery's up to 16 Volt (when fully charged), and allow room to follow battery evolution and be compatible with multiple types. The battery voltage shown on the battery screen is an accurate value, thus recalibration is very unlikely to be required. If changed by mistake, press the "Reset all to defaults" .The activation voltage for the low voltage alarm can be adjusted via the "LOW VOLTAGE ALARM SETTING" between 8.8 to 11.2 Volts. The working range of the battery icon can be adjusted via "DISPLAY VOLTAGE RANGE" to adjust the main-screen icon range. The "RESET ALL TO DEFAULTS" icon allows the user to set the settings back to factory default.

⚠️ **CAUTION:** The system will generate a low voltage alarm to alert the user to prevent a low voltage induced shut down of the transmitter. Never start or continue flying if the low voltage alarm has been triggered.

5.7 · STICK CAL
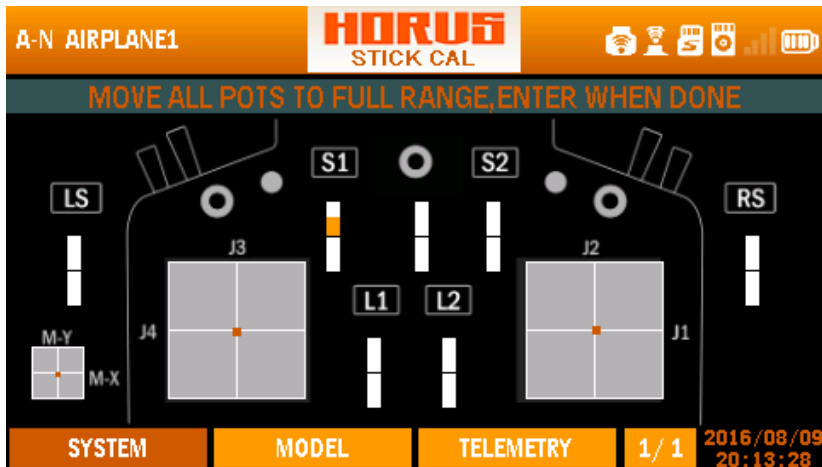
Overview of the stick calibration menu screen

The illustration above is an example of the "STICK CAL" menu, to enter this menu press the "SYS" button, then select "STICK CAL". Here the user can calibrate the sticks, knobs and sliders (J1-4, M-Y, M-X, S1-2, L1-2, LS, RS,) by following the onscreen instructions.

❗ **NOTE:** make sure you set the M-POS knob to the centre detent before starting the calibration process, failing to do so will prevent use off the full travel range (-100/+100) of it when using in the "MIXER" and/or "LOGIC SWITCH" menu's.

❗ **NOTE:** We advise you to check the output and perform this task after a long time not used of the radio.

ℹ️ **NOTE:** You can use this menu to readjust the zero/neural position, by starting the calibration process with the desired hardware input at an endpoint. By doing so the output signal will lose resolution as the total signal range is divided in half.

5.8 · STICK DIR

Overview of the stick direction menu screen

The illustration above is an example of the "STICK DIRECTION" menu, to enter this menu press the "SYS" button, then select "STICK DIRECTION". Here the user can reverse the signal direction of all hardware signals. Reversing the channel direction of the transmitted signal going to the RX can be done in "REVERSE", which can be found in the "MDL" menu.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related channels. Failure to do so can lead to unexpected deflection directions and reversal of the throttle channel, and may result in damage and/or serious injury.

5.9 · IMU CAL
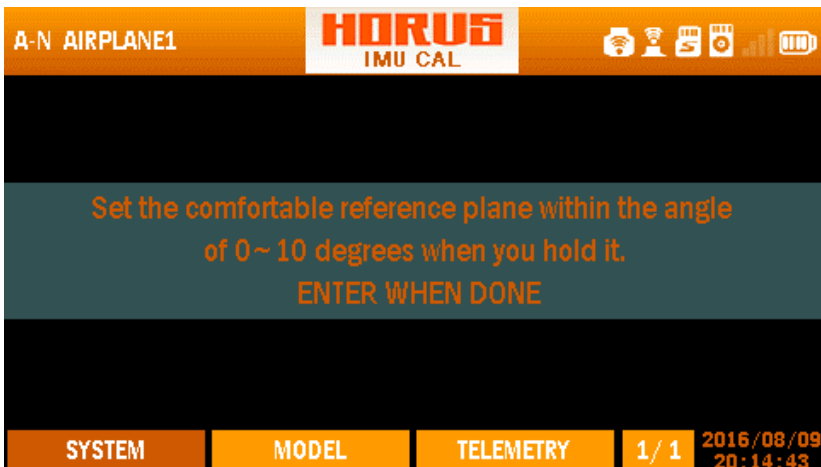
Overview of the IMU calibration menu screen

The illustration above is an example of the "IMU CAL" menu, to enter this menu press the "SYS" button, then select "IMU CAL". Here the user can calibrate the Inertial Measurement Unit (IMU) also known as an accelerometer that turns the transmitter housing into a signal source. The orientation of the transmitter determines the generated signals. Please follow the on-screen instructions and calibrate while holding the transmitter as you would during normal use. When calibrated, G-ROLL and G-PITCH become available for use as inputs. You will find G-ROLL and G-PITCH as inputs in INPUT MAP.

5.10 · INFORMATION

Overview of the information menu screen

The illustration above is an example of the "INFORMATION" menu, to enter this menu press the "SYS" button, then select "INFO". Here the user can find information about the transmitter version and the installed firmware. This menu can be used as a reference to check firmware versions to check if an update is required.
The meaning of the version string:

Hardware X12S   12   L   10

Radio Name	V1.2	L: EU VER F: NonEU	IXJT VER

Software   1.2.02

MODEL MENU

The "MODEL" (MDL button) menu is used to set up the selected model, the content of this menu changes with the type of model selected. There are predefined mixes, "LOGIC SWITCH" programming and "MIXER" available. The PgUp and PgDn buttons can be used to switch between the menu pages. The first section of this chapter contains the shared menus, thereafter it is divided in to the available model types/variations, except for fixed wing that also contains glider related menus, type specific menus will be discussed in their own sub chapter.

6.1 · OVERVIEW OF THE MODEL MENU SCREEN

Overview of the model menu screen

6.1.1   RF SYSTEM

The illustration below (next page) is an example of the "RF SYSTEM" menu, to enter this menu press the "MDL" button, then select "RF SYSTEM". Here the user can turn the internal and external RF modules on or off, as well as choosing the receiver type and the number of channels to be used. The RF SYSTEM menu is divided into two segments, setup options for the internal RF module IXJT (left column) and any installed external RF module (right column).

⊘ **NOTE:** We recommend to use an external antenna when using the internal RF and expect to fly far away and/or using FPV gear. The use of an external antenna will maintain a better signal quality when pointing the tip at the model. Pointing the antenna directly at the model should be avoided at all times!
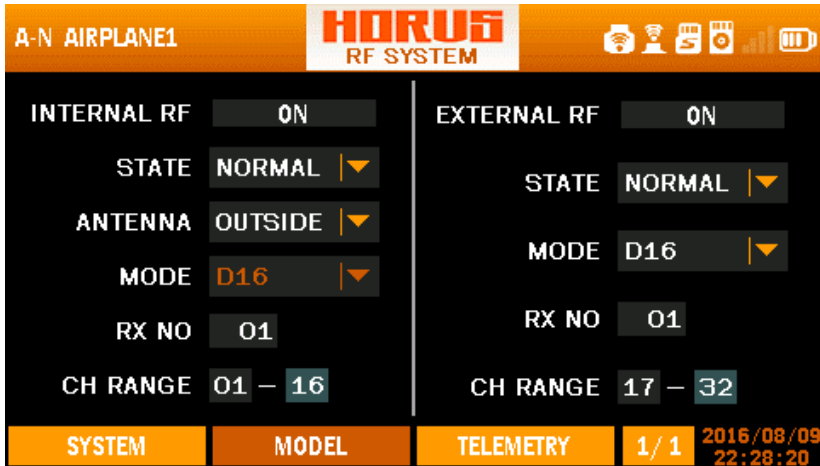
Overview of the RF system menu screen

INTERNAL RF MODULE

INTERNAL RF MODULE Select the icon to the right of the "Internal RF" to switch it ON or OFF using the ENTER button.

"STATE" : Is used to set the internal RF in either normal, bind or range check state. During range check the RF signal strength is only 1/30 of the normal setting, therefore always make sure to return the module to "normal" mode after a bind/range check procedure, failing to do so can lead to a loss of signal!

"ANTENNA" : Allows the user to activate the internal or external antenna port of the transmitter. The external antenna to be used will need to be fitted with a RP-SMA Connector.

"MODE" : Allows changing of the different working modes available on the internal RF module (IXJT). It is important to select the correct operating mode to match the receiver being used. See table in chapter 3.2. Select D8 Mode if using a D Series or V Series II receiver, D16 Mode for all X Series receivers and LR12 Mode for L Series Receivers.

"D16 mode" : The "RX NO" option allows the user to assign a number to the bound receiver. Numbering receivers therefore requires an X series receiver as data needs to be stored in the receiver. This allows the programmed model to be paired with a specific receiver and ensures that the receiver will only operate when the user has the correct model selected. This helps to prevent the possibility of accidental selection of the wrong model on the transmitter, and helps to avoid accidents such as spool up of an engine due to a reversed channel, etc. The user can configure up to 64 individual X series receivers.

"D8 mode" : 8 channel with telemetry mode

"LR12 mode" : without telemetry up to 12 channel long range mode

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ⓘ **NOTE:** European users (EU version) can select D16 and LR12 mode, all other users (Non-EU version (FCC)) have the D8, D16 and LR12 modes available.

EXTERNAL RF MODULE

When using an external DJT/XJT module, the available features are identical to the internal RF module.

When using non-FrSky external RF Modules the user first needs to acquire the operating characteristics and requirements of the module before select the required PPM setting.

PPM + & PPM mode are signals reversed.

> ℹ **NOTE:** When using only the external RF module make sure to set the channel range from 17-32 to 1-16.

> ℹ **NOTE:** To turn off the external module the user can cut its power supply via the "EXERNAL RF" on/off icon.

6.1.2 MONITOR

The illustration below is an example of the "MONITOR" menu, to enter this menu press the "MDL" button, then select "MONITOR", or press and hold the "RTN" button for 3 seconds to instantly jump to this menu. Here the user can monitor the output value of each individual channel with a visual aid and a numerical value. The PgUp and PgDn buttons can be used to switch between the 4 available menu pages to display the 32 available channels.
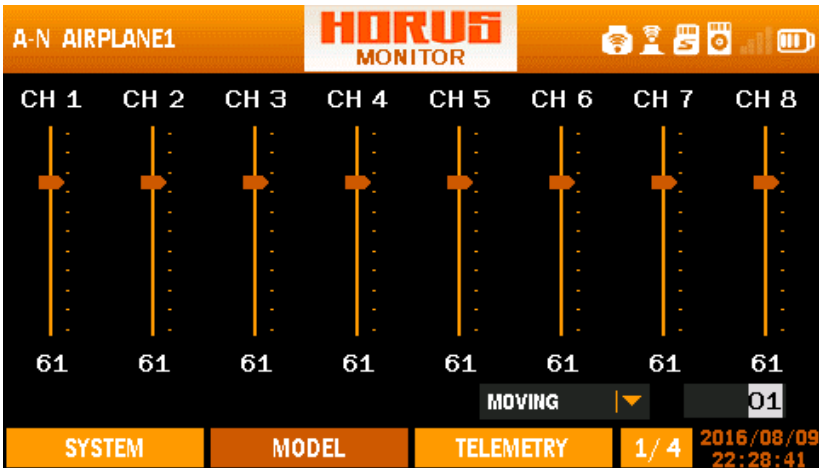
Overview of the monitor menu screen

The monitor feature can be used to check the output signals of the selected model, as well as checking the channel assigned mixes, switches, sticks, knobs, and sliders for correct function. After pressing ENTER the user can select "OFF", "NEUTRAL" and "MOVING". The "MOVING" setting allows for automated movement of all channels, and is a useful tool for checking travel range/clearance after setting up the end points as well inspecting hardware during maintenance. The travel speed can adjusted by varying the number next to next to "MOVING". The "NEUTRAL" setting can be used for finding the neutral position of a servo, useful during assembly of the servos/control rods on new models.

> ⚠ **DANGER:** Selecting "NEUTRAL" or "MOVING" will activate the throttle channel, and on electric powered models, will lead to the spool up of the motor! PLEASE disconnect the throttle channel before entering the test mode in case of accident!

> **NOTE:** At any time you can press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menus.

6.1.3   REVERSE

The illustration below/next page is an example of the "REVERSE" menu, to enter this menu press the "MDL" button, then select "REVERSE". Here the user can reverse the direction on all available RX channels, the PgUp and PgDn buttons can be used to switch between the two menu pages.
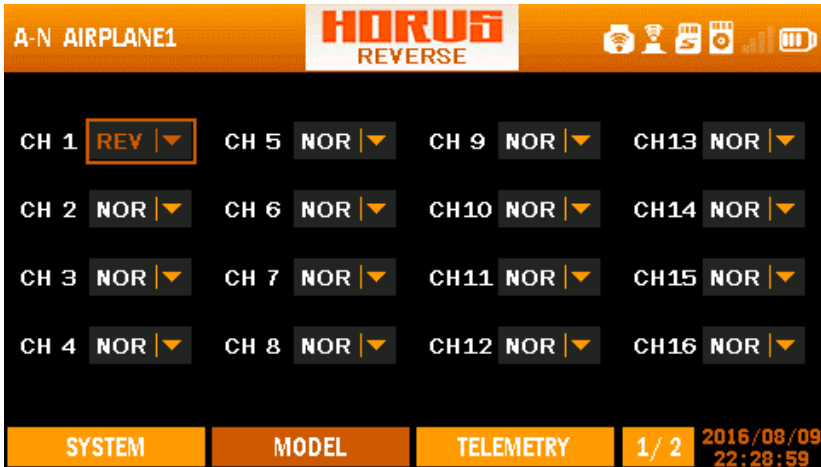
Overview of the reverse menu screen

Selection of the receiver channel of which the signal direction needs to be changed gives the user the following two options. "NOR" is the normal direction of movement and "REV" is the reversed movement option. The direction of the hardware signals can be changed via the "STK DIR" menu located in the "SYSTEM" menu.

> **CAUTION:** Always check for correct system operation, after making changes to flight control related channels. Failure to do so can lead to unexpected deflection directions and reversal of the throttle channel, and can result in damage and/or serious injury.

6.1.4 SPEED

The illustration below/next page is an example of the "REVERSE" menu, to enter this menu press the "MDL" button, then select "REVERSE". Here the user can reverse the direction on all available RX channels, the PgUp and PgDn buttons can be used to switch between the two menu pages.

Overview of the speed menu screen

The illustration below is an example of the "SPEED" menu, to enter this menu press the "MDL" button, then select "SPEED". Here the user can adjust the servo cycle duration time (in both directions) by adjusting the values for the corresponding channel. The higher the value the longer it takes for the servo to reach its programmed end point. It can be a useful tool setting up functions like retractable landing gears (doors), flaps, speed brakes etc. The PgUp and PgDn buttons can be used to switch between the four menu pages.

⚠️ **WARNING:** Never change the values on the primary flight control channels, failing to do so will result in delayed inputs during their operation. This menu allows this only because the transmitter has customizable channel mapping capabilities.

6.1.5   END POINT

The illustration below (next page) is an example of the "END POINT" menu, to enter this menu press the "MDL" button, then select "END POINT". Here the user can adjust the maximum travel range "LIMIT", normal "TRAVEL" point, and set up differential on channels such as the ailerons. After selecting the required channel, a travel range of +125 to -125 can be programed for each direction of travel.

Overview of the end point menu screen

After setting up the "LIMIT", the servo will never exceed this programmed limit, even if an activated mix demands an increase of servo travel, this to prevent damage to the servo and/or control service hardware. The normal "TRAVEL" range must also be set up in this menu, this to determine the normal travel range but when set lower as the "LIMIT" still allows for more deflection if required by a mix. On models without mixes, we recommend to set both "TRAVEL" and "LIMIT" at the same value. The PgUp and PgDn buttons can be used to switch between the menu pages.

⚠ **CAUTION:** Always check for travel clearance after making changes to end points. Failure to do so can lead to damage to the aircraft structure and or servo's. We recommend using the "monitor" menu "moving" feature to inspect endpoints, and recommend removing the propeller when setting up or modifying models.

⚠ **CAUTION:** Setting up the "TRAVEL" range larger than "LIMIT" should be avoided. It will result in loss effective stick travel, making the last part of stick travel useless. *SHOULD BE MADE IMPOSIBLE*

6.1.6   SUB TRIM

Overview of the sub trim menu screen

The illustration above is an example of the "SUB TRIM" menu, to enter this menu press the "MDL" button, then select "SUBTRIM". Here the user can change the neutral position of the servo/control surfaces which on models without adjustable control rods would be impossible. PgUp and PgDn buttons can be used to switch between the two menu pages. A range of -100 to +100 can be programmed, but when high numbers are required, we advise checking the hardware for proper installation.

ⓘ **NOTE:** Changes in "SUB TRIM" will not appear on the home screen trim position indication bars, giving the user the option to adjust these values to get a clean looking home screen.

6.1.7   TRIM SETUP

Overview of the trim setup menu screen

The illustration above is an example of the "TRIM SETUP" menu, to enter this menu press the "MDL" button, then select "TRIM SETUP". Here the user can customize the step size of the six available trim buttons. If the selected model supports multiple flight modes the following options are available in the bottom right side of the screen.

"COMB" : When selected it use the same trim value on all the available "FLIGHT MODES"

"SEPR" : will save a separate trim value for each available "FLIGHT MODES".

ℹ **NOTE:** Changes to step size do not affect the total trim range, only step size is affected. Trim values will be saved in different flight mode not trim step size when SEPR is selected.

6.1.8   FAIL SAFE (D16 RF MODE ONLY)

Overview of the fail safe menu screen

The illustration above is an example of the "FAIL SAFE" menu, to enter this menu press the "MDL" button, then select "FAIL SAFE". The "FAIL SAFE" feature establishes pre-set functions that the receiver will initiate if the control link back to the transmitter is lost.
The PgUp and PgDn buttons can be used to switch between the menu pages. This menu only applies when using X series receivers.

"ENABLE/DISABLE" : turns on/off the transmitter's "FAILSAFE" function, to allow for the   programed receiver settings (if present) to become active.

"HOLD" : The receiver continues to hold the last servo positions that was received before the losing the RF connection.

"CUSTOM" : The user can program the value of the each channel to establish the servo setting required during a loss of signal incident.

"NO PULSE" : During a loss of signal the receiver produces no pulses on the selected channels.

> ⚠ **CAUTION:** The transmitter setting that are programmed in this menu WILL OVERRIDE the settings of the receiver by the user when this function is ENABLED.

> ⚠ **CAUTION:** Take great care when holding the transmitter near the receiver, the RF connection may fail as the transmitter overpowers the receiver. A FAILSAFE will be triggered if programmed! If a FAILSAFE setting has been set on the throttle channel, electric and IC motor/engines can unexpectedly spool up! And can lead to damage and/or serious injury. It is recommended that users maintains an appropriate distance between the transmitter and receiver.

> ℹ **NOTE:** The Failsafe menu only applies when using X series receivers. Programing Failsafe in D8 Mode can only be done on the receiver.

6.1.9   LOGIC SWITCH

Overview of the logic switch overview menu screen

The illustration above is an example of the "LOGIC SW" menu, to enter this menu press the "MDL" button, then select "LOGIC SW". The use of Logic Switches and Special function provide the ability to create very powerful customized functions that are not pre-built in the system. Logical Switches have basic properties, the understanding of which is essential to maximizing the potential of Logical Switch/Special Function pairing.

Logical Switch Basics

• Do not exist physically, but are created by the firmware based on conditions set by the user.
• Do not directly cause a result; they compare inputs (conditions) and determine the state of the switch based on the comparison.
• Logical Switches exist in only two states: 'TRUE' and 'FALSE'
• Comparisons are grounded on a set of standard Boolean operators (greater than (>), less than (<), OR, etc.).
• May be sequenced (i.e.: daisy chained) to provide comparison of more than two conditions. (i.e.: Given three LSs (LS1, LS2, LS3), LS3 is TRUE only when both LS1 and LS2 are TRUE)
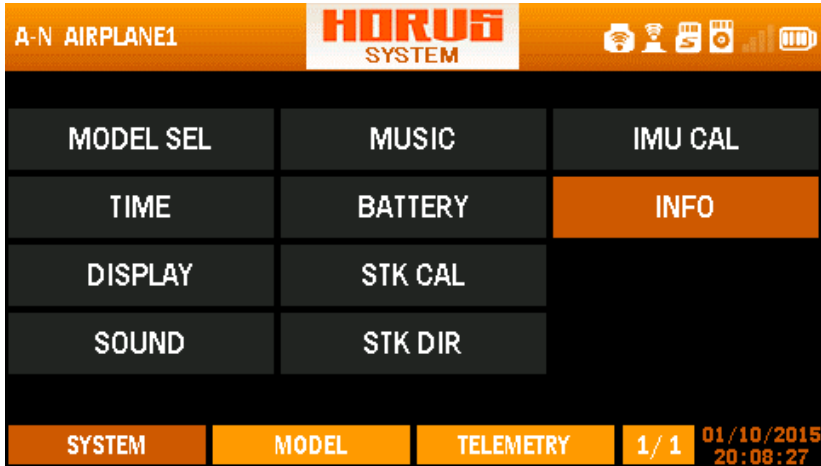
Overview of the system menu screen

Left side of screen

"OP." : Represents the Boolean Operator that can be selected, <, =, >, AND, OR, XOR
"SRC TYPE" : Represents the first source of the logic that can be selected (POT, SW, CHANNEL, LOGIC_SW, CONST, and TELEMETRY).
"SRC 1" : Represents the item within the "SRC TYP", e.g. "TELEMETRY" and "SWR".

Right side of screen

"SRC TYPE" : Represents the second source of the logic that can be selected (POT, SW, CHANNEL, LOGIC_SW, CONST, and TELEMETRY).
"SRC 2" : Represents the second item.

An example of a Logic Switch algorithm to create a custom RSSI warning

No.	1 type	src1	Op.	2 type	src 2
LSW 1	TELEMETRY	RSSI	<	CONST_VAL	45

The next step could be to use LSW 1 in the Special Functions so when LSW 1 is true (RSSI less than 45) a custom "track" will be played.

6.1.10   CURVE LIBRARY
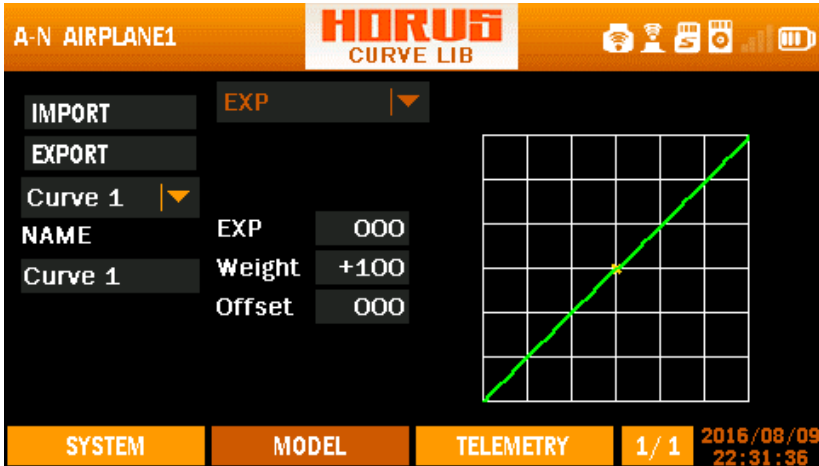
Overview of the curve library menu screen

The illustration above is an example of the "CURVE LIB" menu, to enter this menu press the "MDL" button, then select "CURVE LIB". Here the user can create custom curves that can be used via "MIXER", the operation of this menu is similar to setting up "EXPO" and "MIXER". Up to a hundred curves can be created when using custom type, all other model types support fifteen. The names can be customized to easily find back the curve during "MIXER" programming. Created curves can be copied to create new ones, to minimize the amount of programming tasks. .

Left side of the screen

"IMPORT" : Produces a list of saved curve files (if created) and they can be copied on the mounted curve page .
"EXPORT" : Creates an save file of the programmed curve.
"CURVE 1-99" : Represent the 99 available curves.
"NAME" : Allows the user to customize the curve name.

Centre of the screen

"SMOOTH" : Connects the individual curve points with a smooth line
"LINE" : Connects the individual curve points with a straight line.
"POINT1-7" : Represents the location of the value.

Right side of the screen

Depicts a visual aid to assist the user during programming.

> ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

> ℹ **NOTE:** IMPORT and EXPORT path in MicroSD Card: \SYSTEM\curves\

6.1.11 SPECIAL FUNCTION
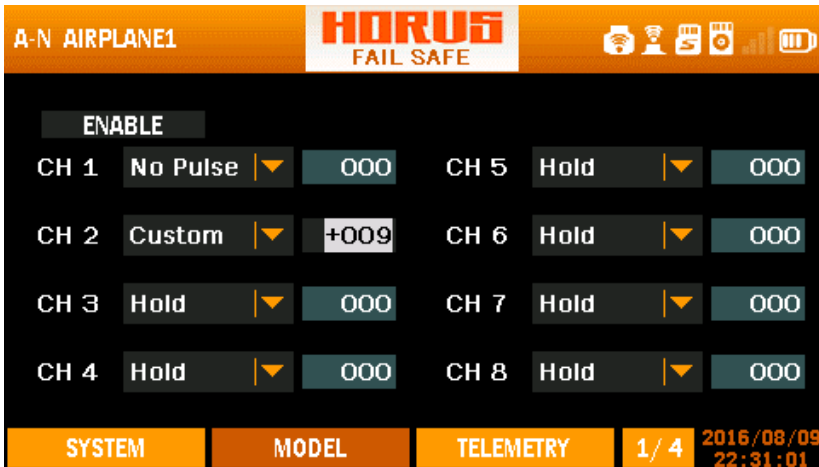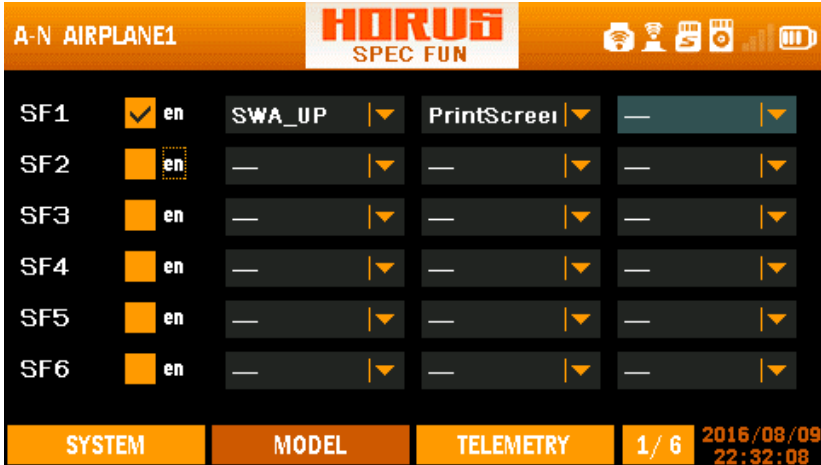

Overview of the special function menu screen

The illustration above is an example of the "SPECIAL FUNCTION" menu, to enter this menu press the "MDL" button, then select "SPECIAL FUN". Here the user can program the transmitter to produce alerts, sound and haptic, and play the values of telemetry data. Special Functions are also available to activate INSTANT TRIM, Clear Consumption, produce telemetry logs on the MicroSD card and play music. Special Functions can be activated by physical switches and logical switches. The PgUp and PgDn buttons can be used to switch between the menu pages.

First (left) column

Is used to activate/deactivate the special function of the corresponding program line. Long pressing of the ENTER button when mounting the square will allow the deletion of the programmed settings.

Second column

Allows the user to assign a switch, M-POS knob or "Logic Switch" by scrolling through the options with the rotary button or by operating the intended switch.

Third column

"Play Track" : Is used to assign a sound track to be played when a switch is triggered.

"Play Value" : is used to assign a switch to call out a predetermined telemetry value.

"Haptic" : Allows the haptic feature to be assigned to be activated when operating a switch or knob, this can be useful when on a noisy fling field. When having haptic active as warning notification (located in the "SYSTEM/SOUND" menu) "TRACK" and "VALUE" settings will already produce and haptic signal, and thus require no separate programing.

"Inst. Trim" : This allows the user to instantly trim a model during flight by means of a switch operation when flying in the intended orientation. This is a fast and but tricky way to trim new models, but we recommend deactivating it after setting up the model, this to avoid accidental switch operation during use. We advise to practice this feature on an expendable model and/or pc simulator, to learn its behaviour before use on your primary models.

"Clear Cons" : When triggered, this feature will reset the stored consumption data.

"Tele Log" : When active it will store the recorded telemetry data on the micro SD card and stored in the "LOGS" folder. This file can be opened with Excel PC software.

"Music next " : While playing music, this will allow to go to the next song in the list.

"Music prev" : While playing music, it will allow to go to the previous song in the list.

"Play/Pause" : is used to start or pause the music.

"Printscreen" : Is used to make a copy of the transmitter screen, it will be stored on the MicroSD card as an .BMP file. There will be a beep when printing screen is finished.

Fourth column

Only comes active if the previous selected column has additional options to choose from. Only "Play Track" and "Play Value" have this option, either stored sound files (.wav) or telemetry sources can be assigned.

NOTE: "Printscreen" will freeze the display so be careful to use and make sure disable it after you using it.

NOTE: "Play Track" is for users to play customized files, the maximum .wav file density is 100kbs, and up to 100 sound files can be stored on the MicroSD card. The path is: \SOUNDS\Track\ xxx.wav.

NOTE: The user can delete unused programming lines by positioning the cursor on the activation square and pressing and holding on ENTER, and then follow the on screen instructions.

NOTE: The user can instantly assign a knob or switch simply by operating it while the applicable menu option is mounted.

6.1.12 TELEMETRY SETUP
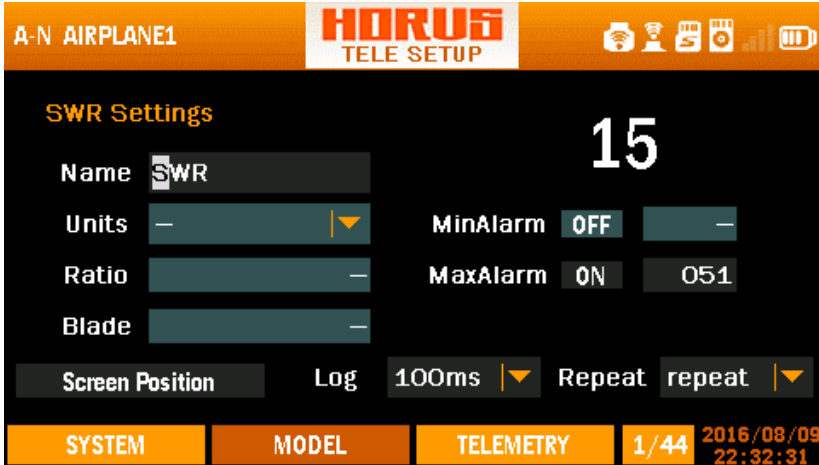
Overview of the telemetry setup menu screen

The illustration above is an example of the "TELEMETRY SETUP" menu, to enter this menu press the "MDL" button, then select "TELE SETUP". Here the user can choose from a variety of sensors and customize each one of them. The order in which the telemetry data will be displayed to the user (accessed by the "TELE" menu button) can be modified using the screen position icon located in the bottom left corner. The first page of the "TELE" menu will also be displayed on the "Home Screen" page 1/4. There is a separate screen for each telemetry sensor. The screens all follow a common layout, but the editable and non-editable fields change according to the nature of the sensor.
There will be a more detailed instruction in chapter 7.2 TELEMETRY SETUP MENU.

6.1.13 GENERAL

Overview of the general menu screen

The illustration above is an example of the "GENERAL" menu, to enter this menu press the "MDL" button, then select "GENERAL". Here the user can deactivate menu features such as start-up sound, pop-ups and warnings.

⚠️ **CAUTION:** Users are advised that warnings should not be deactivated except in exceptional circumstances.

6.1.14   SWITCH WARNING
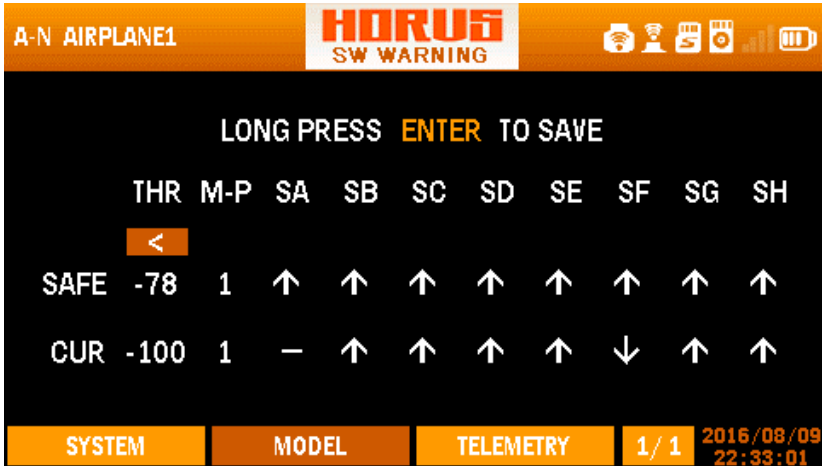
Overview of the switch warning menu screen

The illustration above is an example of the "SW WARNING" menu, to enter this menu press the "MDL" button, then select "SW WARNING". Most users will assign switches to functions like landing gear, flaps and engine/motor cut etc. Turning on the transmitter with an incorrect switch position may lead to an accidental spool up of the motor and/or activation of the flaps/landing gears etc. There is a safety feature in the start-up sequence of the transmitter which checks the position of the throttle and switches, this will generate a warning pop-up and pause the start-up if switches or throttle are not in their safe positions. After placing the switches and/or throttle in the safe position, any warning will be suspended allowing start-up of the transmitter to continue. The user can bypass the pop-up by pressing "ENTER". To alter the trigger location of the stick and switches, place them in the required safe position, and then press and hold "ENTER" for 3 seconds.

ℹ️ **NOTE:** The user can use the on screen position indicators to check witch switch, knob, slider and/or stick tripped the alarm, and can the take corrective actions.

ℹ️ **NOTE:** Warnings when power on can be deactivated in GENERAL menu in chapter 6.1.13.

6.1.15   TRAINER
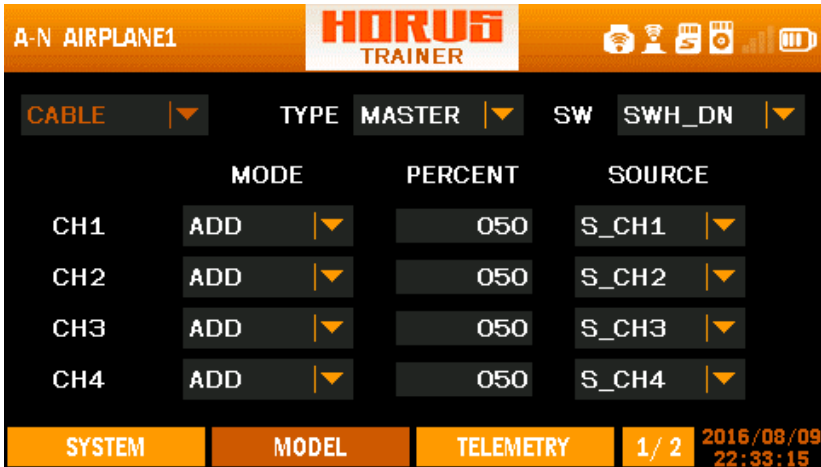
Overview of the trainer menu screen

The illustration above is an example of the "TRAINER" menu, to enter this menu press the "MDL" button, then select "TRAINER". Here the user can choose the preferred connection methods (cable or wireless). The "WIRELESS" selection allows two HORUS radios to be connected using their internal wireless trainer modules. "CABLE" selection supports both Futaba and Graupner style trainer cables that can be connected to sockets located on the rear of the transmitter (below the external RF module bay). Control can be selected either via a switch or by directly overriding the controls. The end points of the 8 available channels (Slave) can be reduced according to the proficiency of the student.

Top of the screen

"CABLE/WIRELESS" : Allows the selection of the desired connection type.
"TYPE" : Sets the transmitter in ether "MASTER" or "SLAVE" mode.
"SW" : When selecting "MASTER" the user has the option to set a intervene switch to retake control of the model.

Centre of the screen

"CH1-8" : Represent the eight available channels that can be controlled by the student, the student's transmitter will have an empty menu screen and can't make setting changes. "MODE" : Has three options "ADD", "REPLACE" and "OFF".
"PERCENT" : Allows the reduction of the travel range of the selected channels, this to allow students to fly with reduced rates that mirror there experience level.
"SOURCE" : Allows to change the channel arrangement to support multiple "STICK MODES" as this can change between users.
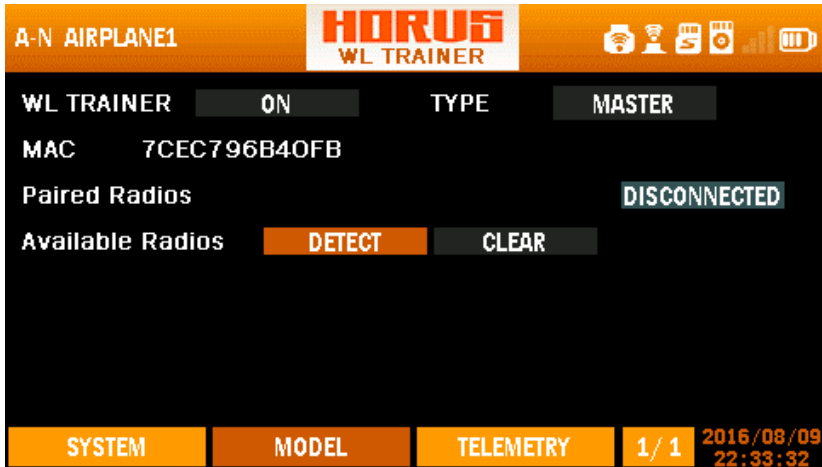
Overview of the wireless trainer pairing menu screen

Here the "MASTER" can connect to the "SLAVE" transmitter, both transmitters need to be set in "WIRELESS" mode for the pairing to succeed.

"WL TRAINER" : Allows to turn the connection on or off.
"MAC" : Displays the transmitter identification code that can be used to find the correct transmitter to pair with when multiple transmitters are in pairing state.
"Paired Radios" Displays the identification code of the connected transmitter.
"Available Radios" Displays the available transmitters that are in pairing mode.
"DETECT" Allows to refresh the list of available transmitters.
"CLEAR" Allows to clear the list of available transmitters.
"DISCONNECTED/CONNECTED" Displays the connection status of the "MASTER" transmitter.

⚠ **CAUTION:** Always check for correct system operation, after setting up trainer mode. Failure to do so can lead to unexpected system behaviour, and may result in damage and/or serious injury.

⊘ **NOTE:** In order to pair the transmitters the user must first choose "SLAVE" as type and turn on the student's transmitter (also as slave), then turn on "MASTER" side.

ⓘ **NOTE:** Wireless trainer can only be used when both users are using a HORUS transmitter.

6.1.16   INPUT MAP
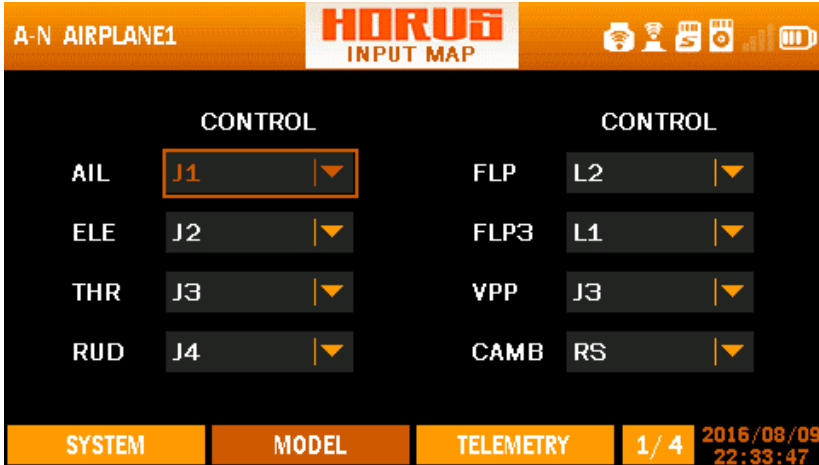
Overview of the input map menu screen

The illustration above is an example of the "INPUT MAP" menu, to enter this menu press the "MDL" button, then select "INPUT MAP". Here the user can reassign hardware inputs to the desired functions, this to allow the optimum control layout depending on the requirements of the user. The first page of this menu can be interpreted as the "source" and "switch" programing in "MIXER", only here it represents those of the preprogramed "predefined mixes". The PgUp and PgDn buttons can be used to switch between the menu pages.

Input map		Output map
AIL	=	AIL1-4
ELE	=	ELE1-2
THR	=	THR
RUD	=	RUD1-2
FLP	=	FLP(1) and FLP 2
FLP 3	=	FLP3 and FLP 4 -> BRKFLP = airbrakes/spoilers
VPP	=	VPP
CAMBER	=	CAMBER = flaperon mix
GEAR	=	GEAR

⚠️ **CAUTION:** Always check for correct system operation, after making changes to the INPUT MAP. Failure to do so can lead to unexpected system behaviour, and may result in damage and/or serious injury.
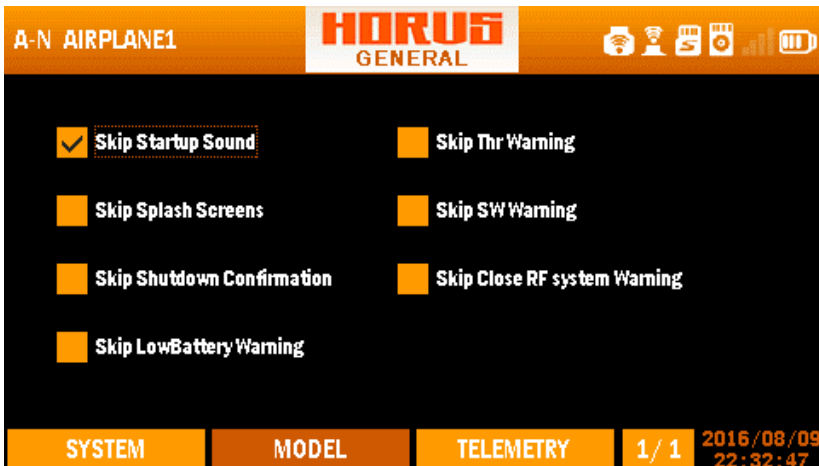
6.1.17   OUTPUT MAP

Overview of the output map menu screen

The illustration above is an example of the "OUTPUT MAP" menu, to enter this menu press the "MDL" button, then select "OUTPUT MAP". Here the user can assign functions to the available receiver channels, up to 32 channels can be selected for a variety of tasks. The PgUp and PgDn buttons can be used to switch between the menu pages.

Input map		Output map
AIL	=	AIL1-4
ELE	=	ELE1-2
THR	=	THR
RUD	=	RUD1-2
FLP	=	FLP(1) and FLP 2
FLP 3	=	FLP3 and FLP 4-> BRKFLP = airbrakes/spoilers
VPP	=	VPP
CAMBER	=	CAMBER = flaperon mix
GEAR	=	GEAR

⚠️ **CAUTION:** Always check for correct system operation, after making changes to OUTPUT MAP. Failure to do so can lead to unexpected system behaviour, and may result in damage and/or serious injury.

6.1.18 FLIGHT MODES

Overview of the system menu screen

The illustration above is an example of the helicopter "FLIGHT MODE" menu, to enter this menu press the "MDL" button, press PgDn and then select "FLIGHT MODE". The user can program up to eight different flight conditions when using "CUSTOM", Gliders, helicopters and multicopters have five. This feature is commonly used to combine multiple requirements under one switch, this can reduce the work load of the user. Switches can assign to all but the "NORMAL" conditions, in this example "HOLD" has the highest priority, this always (also on all other model types) degrades from the bottom to the top making "NORMAL" the lowest priority. Example: when the assigned switches of IDLE2 and HOLD are both activated, the system prioritizes and activates only the HOLD condition.
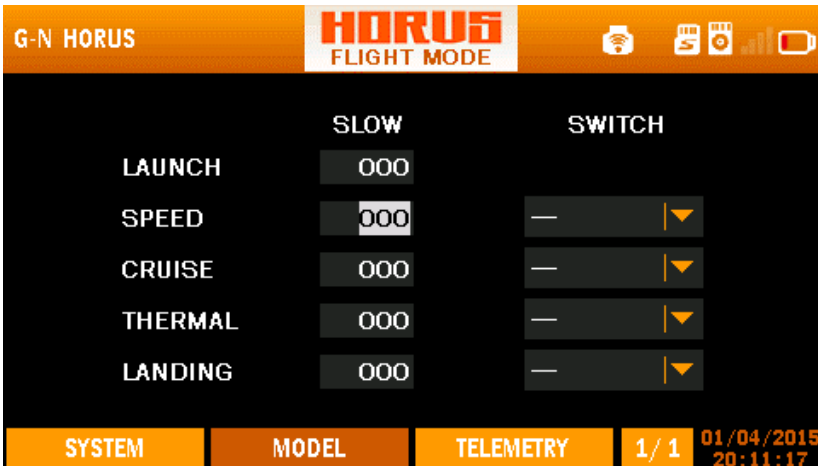
Overview of the flight mode (Heli) menu screen

The illustration above is an example of the glider "FLIGHT MODE" menu, operation is identical to the other model types. Priority starts with "LANDING" degrading upward resulting in that "NORMAL" is the lowest.
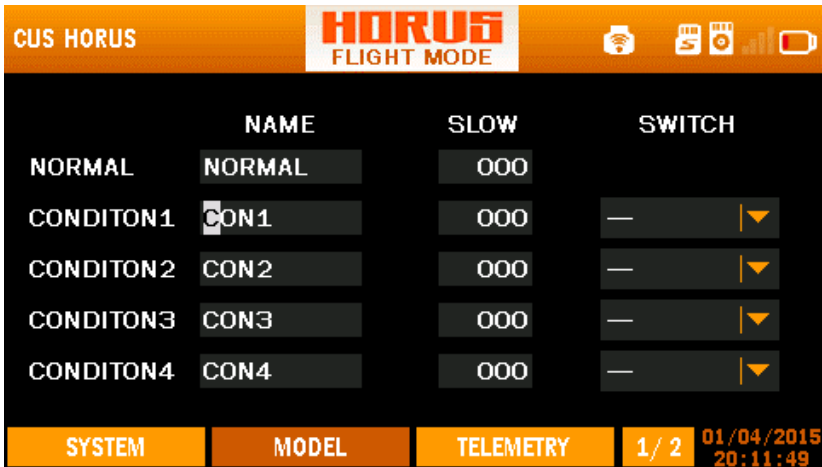
Overview of the flight mode (custom) menu screen

The illustration above is an example of the custom "FLIGHT MODE" menu, operation is identical to the other model types. Priority starts at the highest number degrading downward resulting in that "NORMAL" is the lowest. PgUp and PgDn can be used to navigate between the two menu pages.

Top of the screen

"NAME" : When using a custom model type, the "FLIGHT MODE" names can be changed to fit the requirements of the user.
"SLOW" : Allows the user to slow down the transition speed when switching to the required "FLIGHT MODE", this to avoid fast movement of control surfaces (like flap) and allow to user to recover from incorrect button operation before the selected task is completed.
"SWITCH" : Allows to assign a switch or M-POS knob to the required "FLIGHT MODE" condition.

ⓘ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

6.1.19   RATES/EXPO
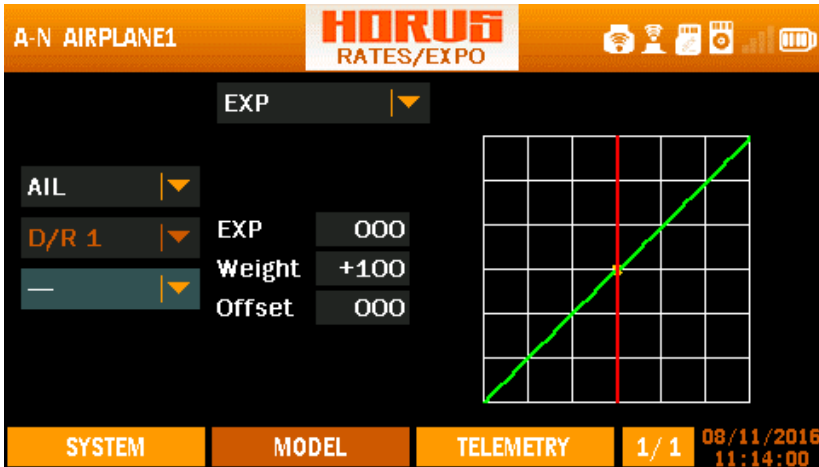
Overview of the rates/expo menu screen

The illustration above is an example of the "RATE/EXPO" menu, to enter this menu press the "MDL" button, then select "RATES/EXPO". Here the user can set up multiple deflection rates and exponential to create custom curves that can be assigned to a switch or "FLIGHT MODE". The operation of this menu is similar to setting up "CURVE LIB" and "MIXER".

Left side of the screen

Depending on the selected model type the user can either assign "FLIGHT MODES" or switches (Helicopter only) to active the programmed curve.

Centre of the screen

"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, increasing or reducing the sensitivity near the centre. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the centre position.
"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen

Depicts a visual aid to assist the user during programming.

ℹ **NOTE:** The user can instantly assign switch simply by operating it while the applicable menu option is mounted.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

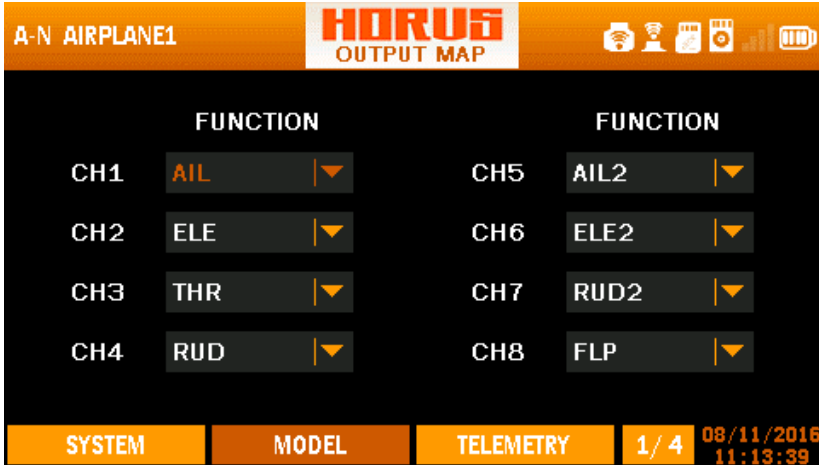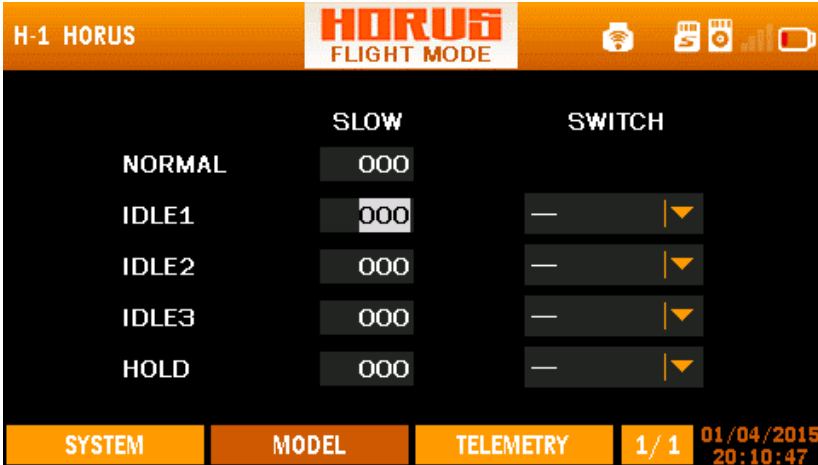### 6.1.20   THROTTLE CUT
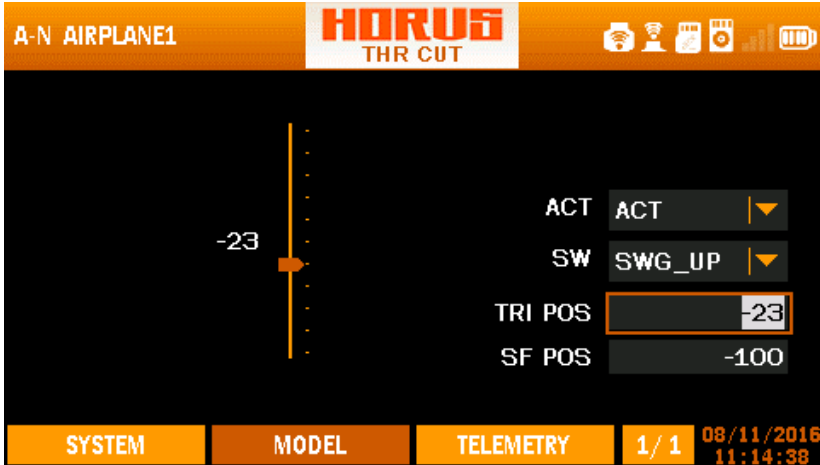
Overview of the throttle cut menu screen

The illustration above is an example of the "THR CUT" menu, to enter this menu press the "MDL" button, and if applicable press PgDn and then select "THR CUT". Here the user can set up the "throttle cut" on IC engines, or a throttle deactivation switch on electric powered models. Before programming SF POS, the user must first set the desired throttle end points in the "END POINT" menu.

IC engine powered models

This feature is used to shut down internal combustion engines. We recommend using this feature in combination with the "THROTTLE CURVE" feature on a three position switch to set up a ground and a flight idle position. A higher idle RPM during flight will prevent the engine turning off during violent low power setting 3D flight, or unexpected high speed stalls ending in a spin. Three parameters need to be set to ensure correct operation of the throttle cut feature.

After activating the menu feature, the first step is to assign a switch to activate the throttle cut, the second step is to set up the "TRI POS" (trip) by moving the throttle to the point where the engine runs at the desired (equal or just above idle) RPM (make sure servo travel allows a lower RPM setting that shuts down the engine). The third and final step is to set up "SF POS" (safe), it must be below the idle position to ensure the engine shuts down. TRI POS also determines the position of the throttle stick that is required to disarm the throttle cut feature. This means that the cut feature can only be deactivated with the throttle stick in the idle position (TRI POS).

Electric powered models

This safety feature is used to protect the user from accidental motor spool up when bumping the throttle stick or dropping the transmitter. We recommend always using this safety feature, preferably in combination with the "switch warning" feature (switch in save position), to ensure safe operation. Three parameters need to be set to ensure the throttle cut feature to operate safely.
After activating the menu feature, the first step is to assign a switch to activate the throttle cut protection, the second step is to mount "TRI POS" and move the throttle stick to max, or use the rotary knob to set it at +100, press enter to confirm the setting. The third and final step is to set up the save position by mounting "SF POS" and set it at -100 to -125 depending on the programmed "end point" of the throttle channel.

ℹ **NOTE:** TRI POS is the position of the throttle stick and SF POS is the output values in MONITOR, SF POS need to not exceed the LIMIT value set in ENDPOINT page.

⚠ **CAUTION:** We recommend to ALWAYS! Remove the propeller/rotor blades during testing, if this is not possible make sure you take the appropriate safety precautions.

6.1.21   THROTTLE HOLD

Overview of the throttle hold menu screen

The illustration above is an example of the "THR HOLD" menu, to enter this menu press the "MDL" button, then select "THR HOLD". Here the user can set up a switch to hold a preprogramed throttle position. It can be used to set up a predetermined power setting that overrules the throttle stick position. It can be used as a throttle deactivation switch on electric power models. Two parameters need to be set to ensure that the throttle hold feature operates as required. After activating the menu feature, the first step is to assign a switch to activate the throttle hold, the second step is to decide the throttle setting to which the setting should go to when activated.

⊘ **NOTE:** If your model is equipped with a throttle governor there is no need to activate the throttle hold function of the transmitter. Please refer to the manual of your governor system.

ℹ **NOTE:** This menu can be used in combination with "Pitch Curve" to set up an idle RPM when the blades have a capability to be set at a neutral pitch.

ℹ **NOTE:** This menu can be combined with "Throttle Cut" to set up 2 safety switches.

6.1.22 THROTTLE CURVE
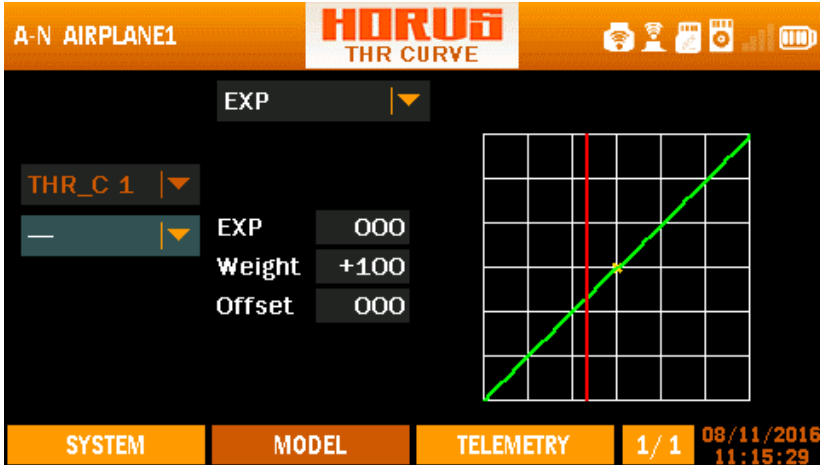
Overview of the throttle curve menu screen

The illustration above is an example of the "THR CURVE" menu, to enter this menu press the "MDL" button followed by PgDn, then select "THR CURVE". Here the user can adjust the throttle curve. The function of this menu is to adjust the correlation between the transmitters throttle stick position and the actual power units power setting. When using gas/glow engines throttle curves can be used to get a linear throttle response, by increasing the movement of the throttle servo were the engine generates less torque and reducing the movement on the top end to get the linear feel in the stick. When using electric setups throttle curve can be used to reduce the sensitivity on overpowered planes to have better control during landing. Electric 3D pilots can use this feature to set up an idle to prevent the esc from switching off during low power throttle pulsing, this by only changing the first data point up until the required setting is reached. This last feature works well in combination with the "throttle cut" feature on a 3 position switch. The user can customize up to seven points according to personal requirements, depending on the selected model. The operation of this menu is similar to setting up "CURVE LIBRARY" and "MIXER".

Left side of the screen

Depending on the selected model type the user can either assign "FLIGHT MODES" or switches (Airplane only) to active the programmed curve.

Centre of the screen

"EXP", "LINE" and "SMOOTH" are the types of programming option available to the user. "EXP" automatically generated Exponential curves are produced when using this feature, "weight" represents the "RATES", reducing the number will limit servo travel.

"LINE" and "SMOOTH" are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen

Depicts a visual aid to assist the user during programming.

> ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

> ⚠ **CAUTION:** We recommend to ALWAYS! Remove the propellers during testing, if this is not possible make sure you take the appropriate safety precautions.

6.1.23   V-TAIL

Overview of the V-tail menu screen

The illustration above is an example of the "V-TAIL" menu, to enter this menu press the "MDL" button followed by PgDn, then select "V-TAIL". Here the user can program the V-tail mix, if the model has a V-tail configuration. Depending on the selected model type "FLIGHT MODE" can be programmed.

Left side of the screen
"ELEVATOR UP/DOWN" is to set up the travel range and correlation between the rudder and elevator channel, when applying the elevator.
"RUDDER LEFT/RIGHT" is to set up the travel range and correlation between the rudder and elevator channel, when applying the rudder.

Right side of the screen
Depending on the selected model type the user can either assign "FLIGHT MODE" and/or switches to active the programmed curve.

> ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

> ⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

6.1.24 EXTRA MIXER REVIEW
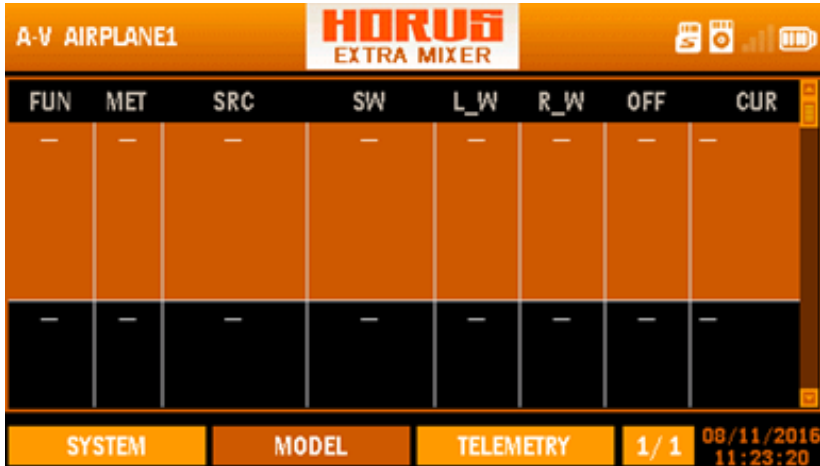
Overview of the extra mixer menu screen

In order to meet the demands of user's individual requirements to accomplish model customization, the user can customize the mixer setting to achieve configurations beyond the present transmitter mixes.

The user can edit 32 mixers in total from MIXER1 to MIXER32 and switch to different mixers through PgUp and PgDn. The first four mixers are named AIL, ELE, THR and RUD by default and the user can change names of each mixer. Each mixer can be considered as one channel, however there is no sequence differences among all of them. The detailed output sequence is determined by mixer of corresponding channels in output map.

Place the cursor to EDIT and press ok to enter the modification interface of each mixer and then press ok after modification to save. Place the cursor to the following mixer list and the first slot in the list will light up. At this time press ok to select slot and switch to different slots through ENTER and press ok again and an operation box will pop up for edit, create and delete.
Edit: Edit the currently selected slot.
Create: Create a new slot below the selected one.
Delete: Delete the currently selected slot.
Edit of slot.

PAGE 1/4

Overview of the mixer edit menu 1/4 menu screen

The interface is about some basic settings of the slot, which from the top to the bottom are ENABLE - control the effectiveness of the mixer; SRC – the control source of the slot; SW - enable switch; METHROD- algorithm of mixer control and FLIGHT CON- flight mode. The flight mode and SW has a relationship of "and", which means the slot will take effect and participate in the algorithm of mixer control only when the switch is on and it is in corresponding flight mode. If the option of "SW" is "-", it means on by default.

PAGE 2/4

Overview of the mixer edit menu 2/4 menu screen

The second interface is for the setting of coefficient (i.e. rate) when participating in the algorithm of mixer control. Separate setting shall be done divided into two parts at the midpoint of the control source and five different coefficients can be set in total. The user can configure switches for these five coefficients for on or being effective when entering a certain flight mode (SW and FLIGHT CON have a relationship of "or".). When several coefficients take effect, algorithm shall be executed based on w5 with top priority and w1 lowest.

PAGE 3/4

Overview of the mixer edit menu 3/4 menu screen

The third interface is for the setting of OFFSET values for five groups. The setting and execution relationship is basically the same as interface 2.

PAGE 4/4

Overview of the mixer edit menu 4/4 menu screen

This interface is for the setting of five curves for the slot and the curves are directly called, which need to be edited in CURVE LIB and other settings and execution relationship is basically the same as interface 2.

6.2 · MODEL (HELICOPTER) REVIEW IMAGES INTRO

This section of the manual goes specifically about predefined helicopters mixes, there are six types of swash plate settings available. During and/or after the creation of a helicopter model, the user can choose preprogramed settings from the second tab to select the desired settings.

stole images from futaba need to replaced
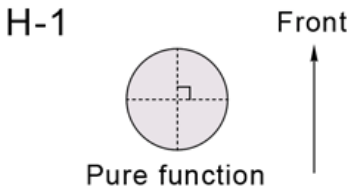
H-1 TYPE: Is commonly known as a "Pure Function" or "single servo" (most flybarless helicopters use this type).
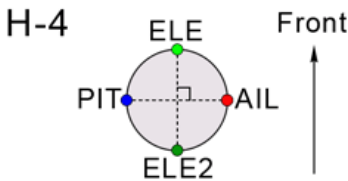
H-4 TYPE: Has the input points positioned as illustrated, and has a 4 servo CCPM, with the servos positioned at 90 degrees from each other.
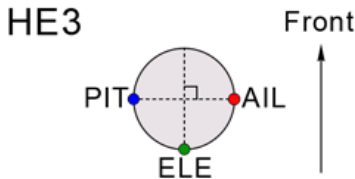
HE3 TYPE: Has the input points positioned as illustrated. The Aileron and pitch servos (at 180 degrees) tilt the swashplate left and right. The
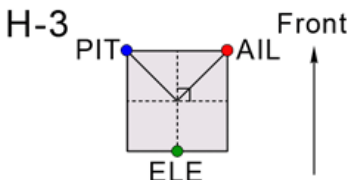
H-3 TYPE: Has the input points positioned as illustrated. The Aileron and pitch servos (at 80 degrees) tilt the swashplate left and right. The
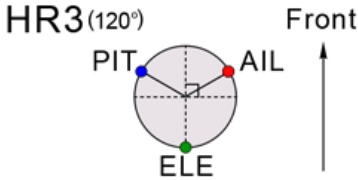
HR3 TYPE: Has the input points positioned at 120 degrees. Other than that H-3 operation is almost identical to HE3 and HR3.
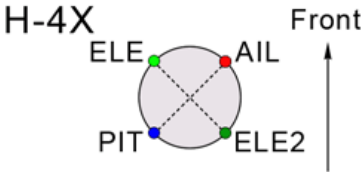
H-4X TYPE: Has the input points positioned as illustrated, and has a 4 servo CCPM, with the servos positioned at 90 degrees from each other, but at 45 degrees from the center line.

> **ⓘ NOTE:** "CCPM" stands fore "Cyclic-Collective-Pitch-Mixing", this can be done either mechanical or via channel mixing.

6.2.1   PITCH CURVE
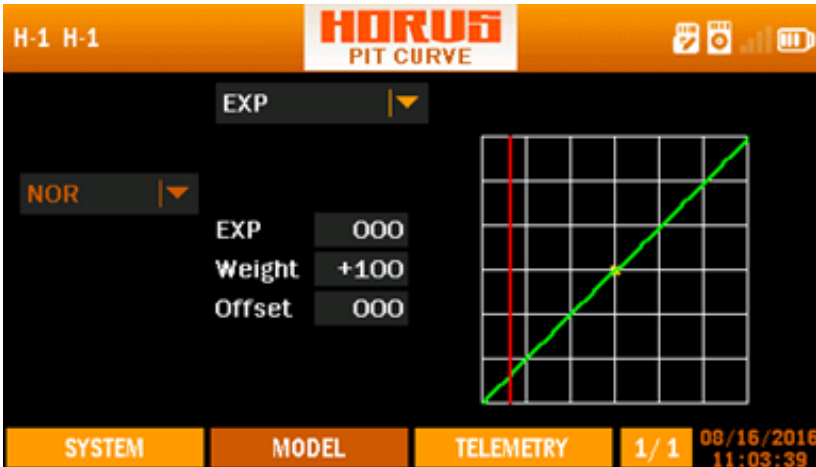
Overview of the mixer edit menu 4/4 menu screen

The illustration above is an example of the "PIT CURVE" menu, to enter this menu press the "MDL" button, and then select "PIT CURVE". Here the user can adjust the pitch curve on each individual flight mode to facilitate the required settings to ensure optimal operation. Pitch curve represents the main blade angles and should be setup according to the models limitations, these limits can be found in its user's manual. When setting up a model, the user can setup the pitch curve using a special pitch angle measuring tool to acquire the desired setting for each of the available "FLIGHT MODES". The operation of this menu is similar to setting up "CURVE LIBRARY" and "MIXER", there will be a more detailed instruction in the "setup guide" on how to use this menu.

Left side of the screen

"NOR", "IDLE1", "IDLE2", "IDLE3", "HOLD" represent the available flight modes that can be selected.

Center of the screen

"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.

"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to 7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen

Depicts a visual aid to assist the user during programming.

⚠️ **CAUTION:** Never exceed the maximum blade angle limits specified by the models manufacturer, failing to do so can lead to structural damage, and can lead to components being ejected from the model at high velocity!

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

6.2.2 THROTTLE MIX

The illustration below is an example of the "THROTTLE MIX" menu, to enter this menu press the "MDL" button, then select "THROTTLE MIX". Here the user can mix aileron, rudder and elevator with throttle, this to compensate for reduce of rpm caused by the angle change of main or tail blade. By activating the mix the user gets two "rate" options for the two side of the stick，user can set different rates for each flight mode and the possibility to assign the mix to a switch.

Overview of the throttle mix menu screen

Setting up throttle mix: "FLIGHT MODE" can be selected in the lower right corner of the menu (The default mode is NORMAL), In order to make changes the user must first activate (select and change the INH icon to ACT) the required throttle mix.

> **ℹ NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

> **⚠ CAUTION:** We recommend to ALWAYS! Remove the blades during testing, if this is not possible make sure you take the appropriate safety precautions.

> **❗ NOTE:** FBL systems do not require the use of the "THROTTLE MIX" function. This is only valid if your model is equipped with a fly-bar.

6.2.3   SWASH RING
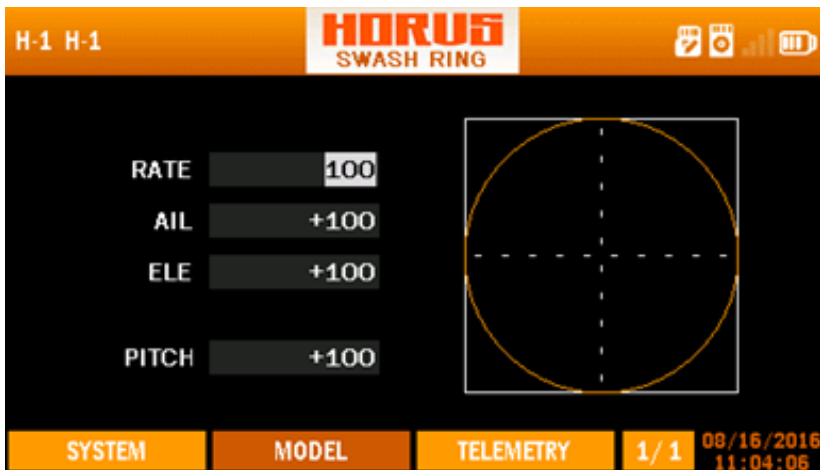
Overview of the swash ring menu screen

Left side of the screen

"RATE" : Represents the total deflection range of the three channels. Changes to this setting will effect "AIL", "ELE".

"AIL" : Represents the aileron channel, its deflection limit can be set up here.

"ELE" : Represents the elevator channel, its deflection limit can be set up here.

"PITCH" : Represents the pitch angle of the blades, the maximum defection angle can be set up here.

Right side of the screen

Depicts a visual aid to assist the user during programming.

> **ℹ NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

NOTE: FBL systems do not require the use of the"SWASH RING" (plate) menu. In order to adjust the cyclic servo travel limits, please refer to the manual that is supplied with the model.

6.2.4   PITCH→RUDDER

The illustration below is an example of the "PITCH->RUDDER" menu, to enter this menu press the "MDL" button, then select "PITCH->RUDDER". Here the user can mix "PITCH" with "RUDDER", this to automatically counter the generated torque created by the main rotor. When using a model with a tail rotor without variable pitch, the user can install a gyro to compensate for the generated coupling.
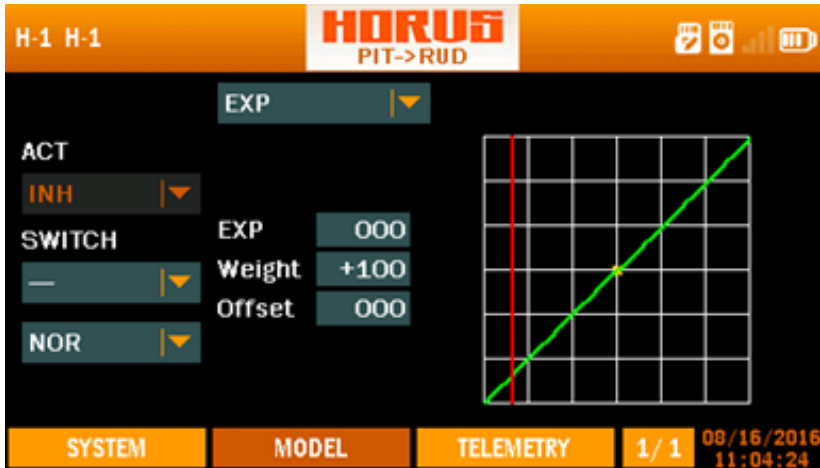
Overview of the pitch->rudder menu screen

Left side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.
"NOR", "IDLE1", "IDLE2", "IDLE3", "HOLD" represent the available flight conditions that can be selected.

Center of the screen
"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.
"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen
Depicts a visual aid to assist the user during programming.

NOTE: Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

6.2.5 GYRO

Overview of the pitch->rudder menu screen

The illustration above is an example of the "GYRO" menu, to enter this menu press the "MDL" button, then select "GYRO". Here the user can remotely (only if the installed model hardware supports this feature) adjust the gain on a 3 axis gyro on each of the 5 available "flight modes" (The default value is 50). To guarantee correct operation of the gyro, closely follow the manual recommendations supplied with the unit.

"NOR", "IDLE1", "IDLE2", "IDLE3", "HOLD" represent the available flight modes.

6.3 · MODEL (AIRPLANE)

This section of the manual covers fixed wing airplanes and the predefined mixes that are only shared with glider model types.

6.3.1 PITCH CURVE (FIXED-WING)
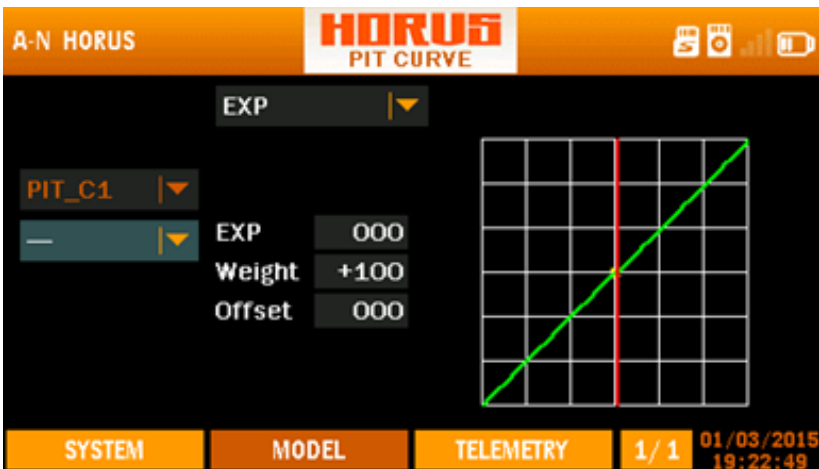
Overview of the pitch curve menu screen

The illustration above is an example of the "PIT CURVE" menu, to enter this menu press the "MDL" button, and then select "PIT CURVE". Here the user can set up five pitch curves when using a variable pitch propeller. Some planes are fitted with a variable pitch propeller to allow variable thrust at a constant RPM, 4D and scale models may allow reversal of the thrust direction. The operation of this menu is similar to setting up "CURVE LIBRARY" and "MIXER", there will be a more detailed instruction in the "setup guide" on how to use these menus.

Left side of the screen
"PIT_C1-5" represent the 5 available setup lines.

Centre of the screen
"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.
"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen
Depicts a visual aid to assist the user during programming.

⚠️ **CAUTION:** Never exceed the maximum blade angle limits specified by the models manufacturer, failing to do so can lead to structural damage, and can lead to components being ejected from the model at high velocity!

⚠️ **CAUTION:** We recommend ALWAYS! Remove the propellers during testing, if this is not possible make sure you take the appropriate safety precautions.

❗ **NOTE:** This feature requires a model that has a variable pitch propeller system.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.2   AILERON DIFFERENTIAL

Overview of the swash ring menu screen

Shown on the illustration above is an example of the "AIL DIFF" menu, to enter this menu press the "MDL" button, then select "AIL DIFF". Here the user can adjust the travel range of each roll direction. Up to 4 aileron channels can be programmed, to a range from -100 to +100. On wings without a symmetrical air foil, identical opposite aileron deflection will results in an uneven increase of drag and a reduction of lift, this due to the uneven aerofoil shape created after the movement of the control surfaces. This will lead to (unwanted) coupling, and can be reduced by programming aileron differential (uneven aileron deflection) to equalize the drag numbers and reduce the loss of lift. When in a banked corner, the lower wing aileron deflection is set up to deflect less than the upper wing. When using glider type the settings can be assigned individually to the five available glider "FLIGHT MODES".
"AIL1-4" : Represent the 4 available aileron channels.

"LEFT-RIGHT" : Allows setting up the aileron differential.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.3   FLAP SET

Overview of the flap setup menu screen

Shown on the illustration above is an example of the "FLAP SET" menu, to enter this menu press the "MDL" button, then select "FLAP SET" Here the user can adjust the travel range on up to 4 flap channels to a range from -100 (reversed signal) to +100 (default setting), and adjust their individual neutral positions by adjusting the offset value.
 When using glider type the settings can be assigned individually to the five available glider "FLIGHT MODES".

Left side of the screen
"FLP-FLP4" represents the four available flap channels assigned to the flap switch.
"UP-DOWN" allows programing of flap travel.
"OFFSET" allows changing the neutral position.

Right side of the screen
"ACT" turns the mix on or off.
"SWITCH" is used to assign the mix to a switch or knob.

⚠️ **CAUTION:** When setting up flaps with only 1 travel direction, we recommend to program them with the model powered, this to prevent damage to the model caused by the flaps hitting endpoints when the flaps are activated.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.4   AILERON→CAMBER FLAP

Overview of the aileron->camberflap menu screen

Shown on the illustration above is an example of the "AIL->CMBFLP" mix menu, to enter this menu press the "MDL" button, then select "AIL-CMBFLP" Here the user can mix ailerons with flaps. If the user experiences an insufficient roll rate during full aileron, deflection, or just wants to achieve the highest roll rate possible, the user can program flaps to function as ailerons (flaperons) via the "AILERON->CAMBER FLAP" menu. The intensity of the mix can be set up within a range of -100 / +100. A switch can be assigned to give the user the option to turn the mix on or off. Any dual-rate function applied to ailerons will automatically apply to flaps. The user must first activate the mix before changes can be made. Depending on airplane/glider configuration (Low-mid-high wing), elevator and/or rudder coupling characteristics may change when mixing flaps with ailerons.

Left side of the screen
"FLP-FLP2" : Represents the two available flap channels to be mixed with aileron.
"LEFT-RIGHT" : Allows programing of mix strength (-100/+100) on both deflection directions.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ⓘ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.5   AILERON→ BRAKE FLAP

Overview of the aileron brakeflap menu screen

Shown on the illustration above is an example of the "AIL->BRKFLP" mix menu, to enter this menu press the "MDL" button, then select "AIL->BRKFLP". Here the user can mix the brake flaps (spoilers) in with ailerons, this to counter the possible coupling generated during aileron operation.

Left side of the screen
"FLP3-FLP4" : Represents the two available brake flap channels to be mixed with aileron.
"LEFT-RIGHT" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.6 BRAKE FLAP→CAMBER FLAP

Overview of the brakeflap->camberflap menu screen

The illustration above is an example of the "BRKFLP->CMBFLP" mix menu, to enter this menu press the "MDL" button, then select "BRK->CMB". Here the user can program the camber flaps to function as brake flaps, and assign it to a switch. When the user experiences insufficient effect and/or unwanted coupling during brake flap operation, the option to mix in the camber flaps is available in this menu.

Left side of the screen
"FLP-FLP2" : Represents the two available flap channels to be mixed with brake flaps.
"UP-DOWN" : Allows programing of mix strength (-110/+100) on both deflection directions, for each of the available channels.
"OFFSET" : Allows changing the neutral position.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.7 AILERON→RUDDER

Overview of the aileron->rudder menu screen

The illustration above is an example of the "AIL->RUD" mix menu, to enter this menu press the "MDL" button, then select "AIL->RUD". Here the user can mix aileron with rudder to compensate for coupling than may be generated on certain airplane/glider configurations, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. On some airplanes (depending on layout, aerofoil type, etc.) a coupling moment on the rudder (yaw) axis is generated when applying aileron, this due to the differential of frontal drag numbers generated by the difference in the resulting aerofoil shapes (comparing LH and RH wing). To counter this some opposite rudder can be mixed, to reduce the work load of the pilot. The mix can be separately programed for each deflection direction, and on models fitted with dual tail/rudder surfaces and/or servos.

Left side of the screen
"RUD-RUD2" : Represents the two available rudder channels to be mixed with aileron.
"LEFT-RIGHT" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.8   RUDDER → AILERON

Overview of the rudder->aileron menu screen

The illustration above is an example of the "RUD->AIL" mix menu, to enter this menu press the "MDL" button, then select "RUD->AIL". Here the user can mix rudder with aileron to compensate for coupling than may be generated on certain airplane/glider configurations, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. On some airplanes (depending on layout, aerofoil type, etc.) a large coupling moment on both the aileron (roll) and elevator (pitch) axis is generated when applying rudder, this can occur on models where the rudder moment force is applied above/below of the center of gravity. To counter this some opposite aileron can be mixed in, to reduce the work load of the pilot. The mix can be separately programed for each deflection direction, and on models fitted with 4 aileron control surfaces and/or servos.

Left side of the screen
"AIL-AIL4" : Represents the four available aileron channels to be mixed with rudder.
"LEFT-RIGHT" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ⓘ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.9   RUDDER → ELEVATOR

Overview of the rudder->elevator 1/2 menu screen

The illustration above is an example of the "RUD->ELE" mix menu, to enter this menu press the "MDL" button, then select "RUD->ELE". Here the user can mix rudder with elevator to compensate for coupling than may be generated on certain airplane/glider configurations, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. . On some airplanes (depending on layout, aerofoil type, etc.) a large coupling moment on both the elevator (pitch) axis and aileron (roll) is generated when applying rudder. This can occur on models where the rudder moment force is applied above/below of the center of gravity. To counter this some nose up/down elevator can be mixed in, to reduce the work load of the pilot.

Left side of the screen
"ELE-ELE2" : Represents the two available elevator channels to be mixed with rudder.
"LEFT_RIGHT" : Allows programing of mix strength (-100/+100%) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.
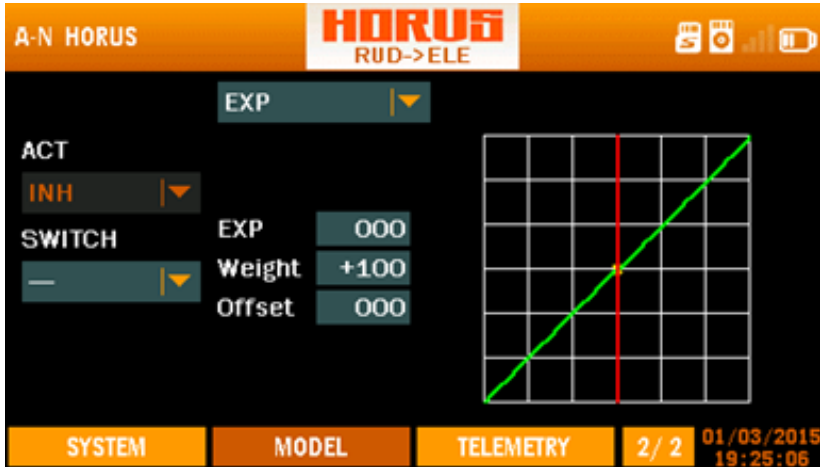
Overview of the rudder->elevator 2/2 menu screen

The illustration above is an example of page three of the "RUD->ELE" menu, here the user can set up the second half of the mix.

Left side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

Center of the screen
"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.
"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen
Depicts a visual aid to assist the user during programming.

⚠️ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

6.3.10   CAMBER MIX

Overview of the camber mix 1/2 menu screen

The illustration above is an example of the "CAMBER MIX" menu, to enter this menu press the "MDL" button, then select "CAMBER MIX". Here the user can ajusts the rate of camber operation for the wing camber（ailerons，camber flaps，brake flaps）in the negative and positive directions. The aileron，flap，and elevator rates can also be adjusted independently and attitude changes caused by camber operation can be corrected. In glider mode，user can set different rate for each flight mode.

Left side of the screen
"AIL-AIL4": Represents the four available aileron channels. "ELE" : Represents the elevator channel.
"UP-DOWN" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

Overview of the camber mix 2/2 menu screen

The illustration above is an example of page two of the "CAMBER MIX" menu, here the user can set up the second half of the mix.

Left side of the screen
"FLP-FLP4" : Represent the four available flap channels.
"LEFT_RIGHT" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended, and lead to damage and/or serious injury.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.11   ELEVATOR→CAMBER
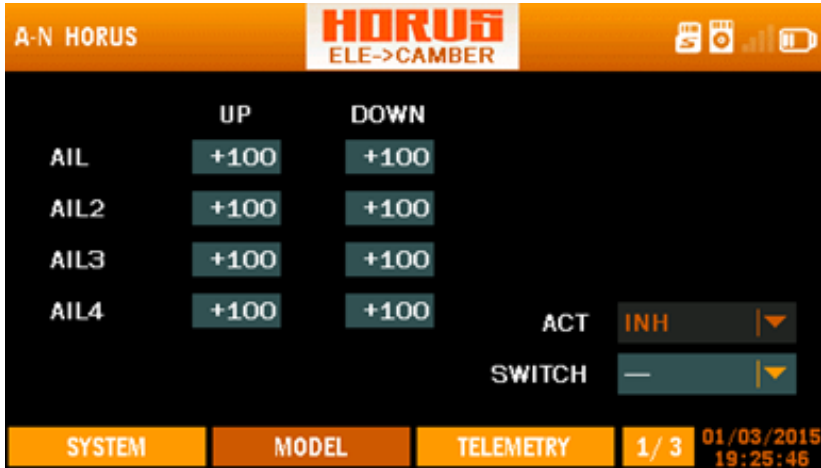
Overview of the elevator->camber 1/3 menu screen

The illustration above is an example of the "ELE-CAMBER" (elevon) mix menu, to enter this menu press the "MDL" button, then select "ELE-CAMBER". Here the user mix in ailerons (flaperons) with elevator, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen.

Left side of the screen
"AIL-AIL4" : Represents the 4 available aileron/flap channels.
"UP-DOWN" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

Overview of the elevator->camber 2/3 menu screen

The illustration above is an example of page two of the "ELE-CAMBER" menu, here the user can set up the second half of the mix.

Left side of the screen
"FLP-FLP4" : Represent the four available flap channels.
"UP-DOWN" : Allows programing of mix strength (-100/+100) on both deflection directions, for each of the available channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

Overview of the elevator->camber 3/3 menu screen

The illustration above is an example of page three of the "ELE-CAMBER" menu, here the user can set up the third part of the mix.

Left side of the screen

"ACT" : Turns the mix on or off.

"SWITCH" : Is used to assign the mix to a switch or knob.

Center of the screen

"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.

"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen

Depicts a visual aid to assist the user during programming.

⚠️ **CAUTION:** Beware of the lift bleeding effect (when using a negative setting) during high speed exit out of a dive, as the reduced/reversed lift will make the airplane slip (drift), this may result in a high speed collision with the ground.

⚠️ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.12   CAMBER FLAP → ELEVATOR

Overview of the camberflap->elevator 1/2 menu screen

The illustration above is an example of the "CMBRFLP-ELE" mix menu, to enter this menu press the "MDL" button, then select "CMBRFLP-ELE". Here the user can mix elevator with flaps to compensate for coupling than may be generated on certain airplane/glider configurations, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. On some airplanes (depending on layout, aerofoil type, etc.) a coupling moment on the elevator (pitch) axis is generated when applying aileron, this due to the differential of frontal drag numbers generated by the difference in the resulting aerofoil shapes (comparing LH and RH wing). To counter this some elevator can be mixed in, to reduce the work load of the pilot. The mix can be separately programed for each deflection direction, and on models fitted with two elevator surfaces/halves.

Left side of the screen
"ELE-ELE2" : Represents the two available elevator channels to be mixed with flaps.
"UP-DOWN" : Allows programing of two separate deflection rates for each of the available   channels.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

CAUTION: Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

NOTE: Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.13　AIRBRAKE (FIXED-WING)

Overview of the airbrake 1/2 menu screen

The illustration above is an example of the "AIRBRAKE" menu, to enter this menu press the "MDL" button, then select "AIRBRAKE". Here the user can assign a switch to function as airbrake. Airbrakes are commonly used to lose altitude on final, and/or to bleed lift directly after landing to reduce the roll out distance. When using 4 wing servos, the user can individually program them to extend in opposite direction (2 up, 2 down), this to maximize brake force will maintaining aerodynamic balance. The elevator can be mixed in to counter coupling (pitch axis) during brake operation, and/or to increase the maximum braking force.

Left side of the screen
"AIL-AIL4" : Represents the 4 available aileron channels, and allows changes to the deployment position.
"ELE" : Represents the elevator channel, and allows changes fore braking and/ or counter coupling.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.
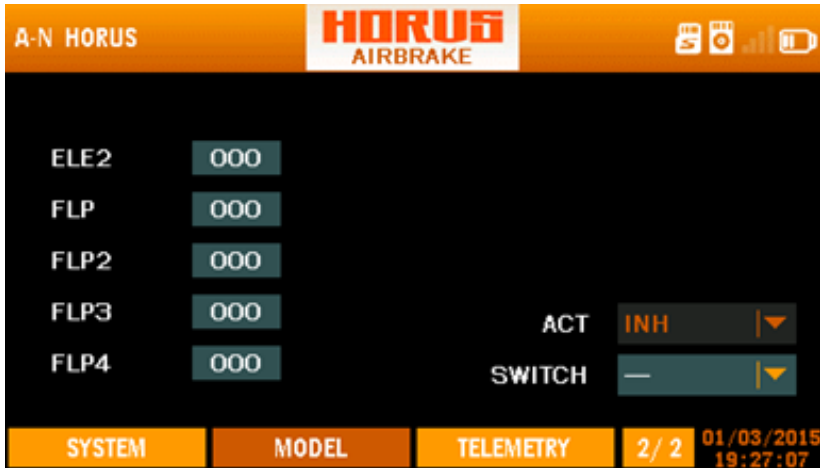
Overview of the airbrake 2/2 menu screen

The illustration above is an example of page two of the "AIRBRAKE" menu, here the user can set up the second half of the mix.
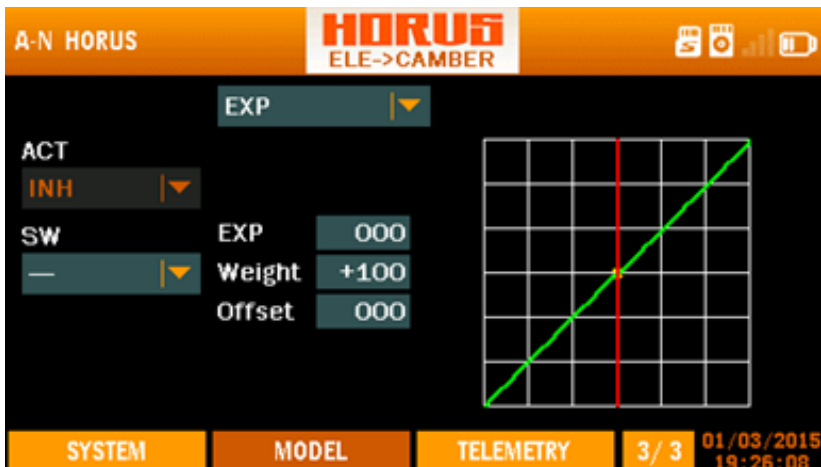
Left side of the screen
"ELE2" : Represents the elevator channel, and allows changes fore braking and/ or counter coupling.
"FLP-FLP4" : Represents the 4 available flap channels, and allows changes to the deployment position.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix to a switch or knob.

⚠️ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.14 SNAP ROLL

Overview of the snaproll 1/2 menu screen

The illustration above is an example of the "SNAP ROLL" menu, to enter this menu press the "MDL" button, then select "SNAP ROLL". Here the user can program the four directions of a snap roll and assign each direction to a separate switch as well as setting up the deflection rate of the three individual control surfaces. We installed a safety feature via an activation switch option to prevent accidental operation in the pits and/or during landings etc. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. Use PgUp and PgDn to scroll between the two menu pages. There will be a more detailed instruction in the "setup guide" on how to use this menu.
Left side of the screen

"R/U and R/D" : Represents the right hand side up and down programing line.
 "L/U and L/D" : Represents the left hand side up and down programing line.

Top of the screen
"AIL-AIL4" : Represents the four available aileron channels.
"SWITCH" : Represents the column were switches can be assigned to active to programmed snap-roll function.

Bottom of the screen
"ACT" : Turns the mix on or off.
"SF SW" : The "save switch" option is used to assign a switch to disarm the mix, to prevent accidental operation of the snap roll function.

Overview of the snaproll 2/2 menu screen

The illustration above is an example of page two of the "SNAP ROLL" menu, here the user can set up the second half of the mix.

Left side of the screen
"R/U and R/D" : Represents the right hand side up and down programing line.
"L/U and L/D" : Represents the left hand side up and down programing line.

Top of the screen
"ELE and EL2": Represents the two available elevator channels.
"RUD and RUD2" : Represents the two available rudder channels.
"SWITCH" : Represents the column were switches can be assigned to active to programmed snap-roll function.

Bottom of the screen
"ACT" : Turns the mix on or off.
"SF SW" : The "save switch" option is used to assign a switch to disarm the mix, to prevent accidental operation of the snap roll function.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.15   AILEVATOR

Overview of the ailevator menu screen

With mix inhibited adjusted limits elevator travel still active
The illustration above is an example of the "AILEVATOR" mix menu, to enter this menu press the "MDL" button, then select "AILEVATOR". Here the user can mix in elevator with ailerons, and assign it to a switch. To enable changes to be made, the user must first activate the mix by selecting the ACT icon it the bottom right of the screen. It is commonly used on jet type models, and on planes without ailerons, but it requires two elevator surfaces to function as intended.

Left side of the screen
 "ELE and EL2" : Represents the two available elevator channels.
"ELEVATOR" : Represents the programing line to set the elevator end points.
"AILERON" : Represents the programing line to set up the mix strength (-100/+100%).

Right side of the screen
"ACT" : Turns the mix on or off.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ⓘ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.3.16   RUDDER SETUP (FLYING WING)

Overview of the rudder setup menu screen

The illustration above is an example of the "RUD SET" menu, to enter this menu press the "MDL" button, then select "RUD SET". Here the user can assign and set up rudder deflection limits for both directions, there will be a more detailed instruction in the "setup guide" on how to use this menu.

"RUD-RUD2" : Represents the two available rudder channels.
"LEFT-RIGHT" : Allows programing of the deflection limits for both directions.

⚠️ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ️ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.4 · MODEL (GLIDER)

"GLIDER" shares a lot of predefined mixes with "FIXED WING", most of the will be covered in the "FIXED WING" chapter of the manual. The "setup guide" will go in to more detail about how to program a "GLIDER".

6.4.1   MOTOR CURVE
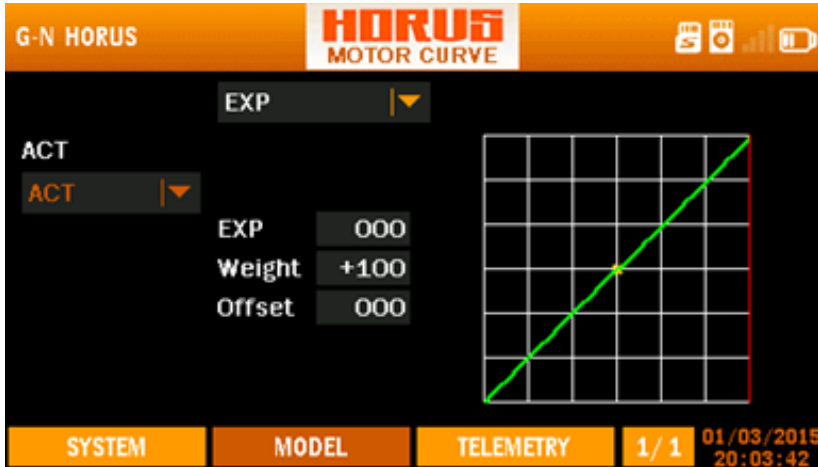
Overview of the motor curve menu screen

The illustration above is an example of the "MOTOR CURVE" menu, to enter this menu press the "MDL" button, then select "MOTOR CURVE". Here the user can adjust the throttle curve. The function of this menu is to adjust the correlation between the transmitters throttle stick position and the actual power units power setting.

Left side of the screen
"ACT" : Turns the mix on and off.

Center of the screen
"EXP" : Automatically generated Exponential curves are produced when using this feature, +100 to -100 can be programmed, with + reducing and – increasing the sensitivity near the center. "weight" represents the "RATES", reducing the number will limit servo travel. +100 (deflection until programmed end points) to -100 (complete reversal of travel direction). "offset" is used to relocate the center position.
"LINE/SMOOTH" : Are used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

Right side of the screen
Depicts a visual aid to assist the user during programming.

⚠ **CAUTION:** We recommend to ALWAYS! Remove the propellers during testing, if this is not possible make sure you take the appropriate safety precautions.

6.4.2   BUTTERFLY IMAGE(PAGE2)

Overview of the butterfly menu screen

The illustration above is an example of the "BUTTERFLY" menu, to enter this menu press the "MDL" button, then select "BUTTERFLY". Here the user can setup this menu to function as a crow mix. The control input to be used can be set up in "INPUT MAP" by adding the required input in the "BUTTERFLY" slot. The function of this menu can be to create a drag and/or lift by moving the ailerons, flaps and spoilers. When the user needs to compensate for coupling that results in a change in pitch, the option to mix in the elevator is available. If required "FLIGHT MODES" and/or switches can be assigned to allow multiple settings and/or changes in "RATES", "EPXO" and "WEIGHT", there will be a more detailed instruction in the "setup guide" on how to use this menu.

Left side of the screen
"AIL-AIL4" : Represents the 4 available aileron/flap channels.
"ELE" : Represents the elevator channel.
"UP-DOWN" : Allows programing of two separate deflection directions for each of the available channels, and can be setup independently for each flight mode.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the mix for each individual flight mode to a switch.
"LAUNCH", "SPEED", "CRUISE", "THERMAL", "LANDING" : Represent the available flight modes that can be selected.

6.4.3   TRIM MIX IMAGE(PAGE2)

Overview of the trim mix menu screen

The illustration above is an example of the "TRIM MIX" menu, to enter this menu press the "MDL" button, then select "TRIM MIX". Here the user can set up the required trim depending on the corresponding "flight mode". The user must first activate the mix by selecting the ACT icon it the bottom right of the screen. The primary function of this menu feature is to accommodate multiple trim settings depending on the selected "flight mode", giving the user the option to trim in each mode depending on the requirements.

Left side of the screen
"AIL-AIL4" : Represents the 4 available aileron/flap channels.
"ELE" : Represents the elevator channel.
"OFFSET": Use to set up the neutral position.

Right side of the screen
"ACT" : Turns the mix on or off.
"SWITCH" : Is used to assign the individual flight mode to a switch or knob.
"LAUNCH", "SPEED", "CRUISE", "THERMAL", "LANDING" : Represent the available flight modes that can be selected.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

NOTE: Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to check the made changes in the monitor menu, without having to scroll through the menu.

6.4.4   RUDDER SETUP

Overview of the rudder setup menu screen

The illustration above is an example of the "RUD SET" menu, to enter this menu press the "MDL" button, then select "RUD SET". Here the user can assign and set up rudder deflection limits for both directions on 5 different "flight modes/condition".

Left side of the screen
"RUD-RUD2" : Represents the two available rudder channels, and can be setup independently for each flight mode/condition.
"LEFT-RIGHT" : Allows programing of the deflection limits for both directions.

Right side of the screen
"LAUNCH", "SPEED", "CRUISE", "THERMAL", "LANDING" : Represent the available flight modes that can be selected.

⚠ **CAUTION:** Always check for correct system operation, after making changes to flight control related mixes. Pay close attention to surface travel near and at the endpoints, incorrect endpoint setup will cause the mix to stop working as intended.

ℹ **NOTE:** Press and hold the "RTN" button to instantly enter the "Monitor" menu, press "RTN" again to return to the previous menu. This shortcut allows the user to quickly check any changes made.

6.4.5   MOTOR

Overview of the motor menu screen

The illustration above is an example of the "MOTOR" menu, to enter this menu press the "MDL" button, then select "MOTOR". Here the user can assign a switch to set up a safe and a start position.

This function allows the user to assign a control to the MOTOR. Once this function an the switches was active, the channel of "MOTOR" can be operated normally. For example, when the motor of the glider is just used for getting enough attitude， then user can set a desired throttle value with the control source of "MOTOR", just use the swtiches to turn on/off motor.

"ACT" : Turns the function on or off.
"SWITCH" : Allows setting up the switch used to activate the MOTOR function.
"START" : Allows setting up the switch used to activate the INPUT control used to start (not stop) the motor.

⚠️ **CAUTION:**   We recommend to ALWAYS! Remove the propellers during testing, if this is not possible make sure you take the appropriate safety precautions.

6.5 · MODEL (MULTICOPTER)

The "MDL" menu of "MULTICOPTER" shares a lot of predefined mixes with the other model types , except for "RUD SET". The "setup guide" will go in to more detail about how to program a "MULTICOPTER" model.

6.5.1 MODE

MUL HORUS	HORUS MODE		
	OUTPUT	**SWITCH**	
MODE1	000		
MODE2	000	—	▼
MODE3	000	—	▼
MODE4	000	—	▼
MODE5	000	—	▼
SYSTEM	MODEL	TELEMETRY	1/1 · 01/03/2015 20:05:52
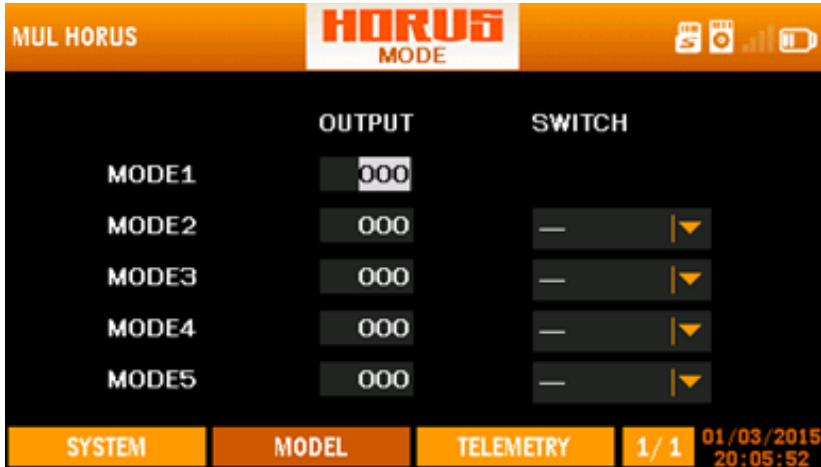
Overview of the mode menu screen

The illustration above is an example of the "MODE" menu, to enter this menu press the "MDL" button, then select "MODE". Here the user can program function "MODE" to send signal to FC，for changing the working mode of FC. Assign a switch to a output value wanted，the channel of "MODE" would output this value once the switch is triggered. If the switches of several modes were triggered the same time, the "MODE" with higher number will be actived.

Right side of the screen
"SWITCH" : Allows setting up the switch used to activate the desired "MODE".

6.5.2   GYRO

Overview of the gyro menu screen

The illustration above is an example of the "GYRO" menu, to enter this menu press the "MDL" button followed by PgDn, then select "GYRO". Here the user can remotely (only when the installed model hardware support this feature) adjust the gain on a 3 axis gyro on each of the 5 available "FLIGHT MODES" (The default value is 50).

6.6 · MODEL (CUSTOM)

Custom model type does contain preassigned mixes and "input map", as these can both be created using the "MIXER" "LOGIC SWITCHES" and "CURVE LBRARY" menus. It allows the user to start with a clean AETR setup on which he/she can add features as disired.

6.6.1   MIXER
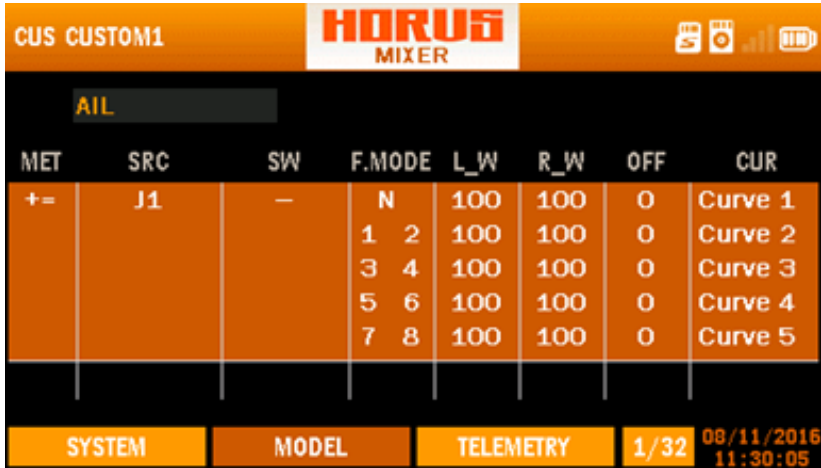
Overview of the mixer menu 1/32 screen

The illustration above is an example of the "MIXER" menu, to enter this menu press the "MDL" button, then press PgDn and select "MIXER". Here the user can program up to thirty-two channels to create new models from scratch.

"AIL" : Is the name that is assigned to this "MIXER" so it can be found and assigned in output map, "AIL,ELE,THR,RUD" are prebuild and represent the AETR. "MIXER5-32" represent the other available channels that can be programmed, the names can be edited to fit the requirement of the user.
"MET" : Method, allows to change the insertion method of the signal produced by the mixer.
   + add on the signal produced by the "MIXER" to the selected output channel.
   * multiply by
   : replace with
"SCR" : Source, allows the user to assign a hardware input to operate the "MIXER"
"SW" : Switches, allows to assign an activation switch to turn the mix on or off, this can be done with hardware switches and logic switches.
"F.MODE" : Flight mode, allows to determine during which mode the mixer is active.
"L_W" : Left Weight, allows to set the limits of the travel range of the signal to the left
"R_W" : Right Weight, allows to set the limits of the travel range of the signal to the right
"OFF" : Offset, allows to change the centre (0) position of the signal.
"CUR" : Curve, allows to add custom curves created in "CURVE LIBRARY" in to the "MIXER"

Page 1/4 Interface 1

Overview of the mixer edit menu 1/4 screen

The illustration above is an example of the "MIXER UPDATE" menu, it's the first of four program pages that can be edited. Here the user can create the basis of the channel, where is coming from (SRC), when it's active (SW and F.MODE), and how it behaves (METHODE).

Page 2/4
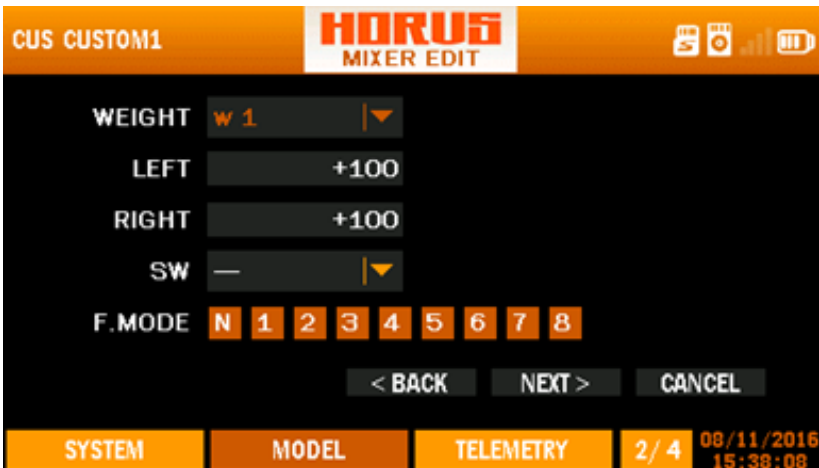
Overview of the mixer edit menu 2/4 screen

The illustration above is an example of the "MIXER UPDATE" menu, it's the second of four program pages that can be edited. Here the user can modify the limits of the signal, this is similar to setting up "WEIGHT" in "EXPO" and "CURVE LIBRARY". Up to 5 "WEIGHTS" (W1-5) can be programmed and can be connected with switches, "LOGIC SWITCHES" and "FLIGHT MODES" to determine when it may become active.

Page 3/4

Overview of the mixer edit menu 3/4 screen

The illustration above is an example of the "MIXER UPDATE" menu, it's the third of four program pages that can be edited. Here the user can modify the center position of the signal, this is similar to setting up "OFFSET" in "EXPO" and "CURVE LIBRARY". Up to 5 "OFFSET" (o1-5) can be programmed and can be connected with switches, "LOGIC SWITCHES" and "FLIGHT MODES" to determine when it may become active.

Page 2/4

Overview of the mixer edit menu 4/4 screen

The illustration above is an example of the "MIXER UPDATE" menu, it's the last of four program pages that can be edited. Here the user can assign created curve in "CURVE LIBRARY". Up to 5 "WEIGHTS" (W1-5) can be programmed and can be connected with switches, "LOGIC SWITCHES" and "FLIGHT MODES" to determine when it may become active. As "WEIGHT" and "OFFSET" are identical programming options as in "CURVE LIBRARY" the previous two menu pages can be skipped when the user uses curves created in "CURVE LIBRARY"

TELEMETRY MENU

7.1 TELEMETRY MENU

The "TELE" button gives instant access to the telemetry overview menu, here the user can monitor the connected telemetry sensor data. The order of the menu can be changed via the "MDL/TELE SETUP" menu, and the first page set in Screen position is also displayed on the home screen page 1/4.
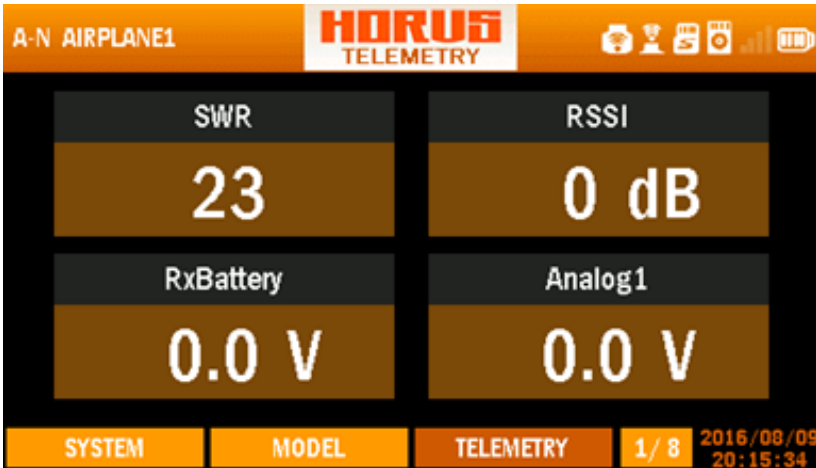
Overview of the telemetry menu 1/8 screen

The illustration above is an example of the "TELE" menu page 1/8, it can be used to monitor the incoming sensor data.
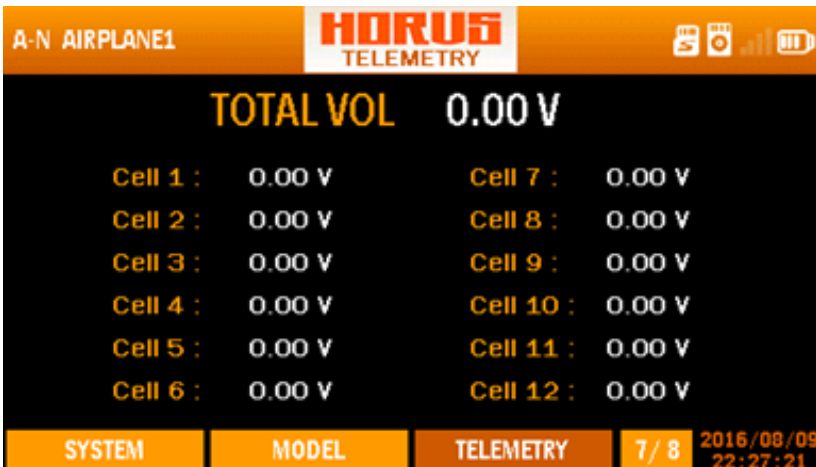
Overview of the telemetry menu 7/8 screen

The illustration above is an example of the "TELEMETRY SETUP" menu, to enter this menu press the "MDL" button, then select "TELE SETUP". Please refer to chapter 6.1.12, here more details will be introduced.

Left side of the screen

"Name" : Represents the name of the sensor type, and can be changed if required.
"Unit" : The appropriate units for the sensor will be chosen by the system and will appear under the sensor name. These can be changed by the user (Imperial/Metric ect.).
"Ratio" : ratio of voltage sensor, more details can be found in manual of voltage sensor.
"Blade" : When using an optical sensor the amount of propeller/rotor blades can be selected to display the correct RPM. On electric models and measuring from the motor leads, the pole count can be programmed in the sensor itself.

Right side of the screen
"MinAlarm" : If the sensor value falls below the MinAlarm value set by the user then an alarm will be generated.
"MaxAlarm" : If the sensor value goes above the MaxAlarm value set by the user an alarm will be generated.

Down side of the screen
"Log" : Log intervals can be adjusted to fit the need of the user.
"Repeat" :Warnings occur once or in repeat mode.
"Screen position" : Directs the user to the next telemetry menu.

Overview of the telemetry position setup menu screen

"S1-6" : Represent the six available menu pages to house the thirty-two available telemetry slots, each page is divided in to four sections.

The illustration above is an example of the "TELE" menu page 7/8, here the user can monitor the individual cells of the models battery. When using two FrSky FLVSS voltage sensors, 12 individual cells can be monitored in real time.
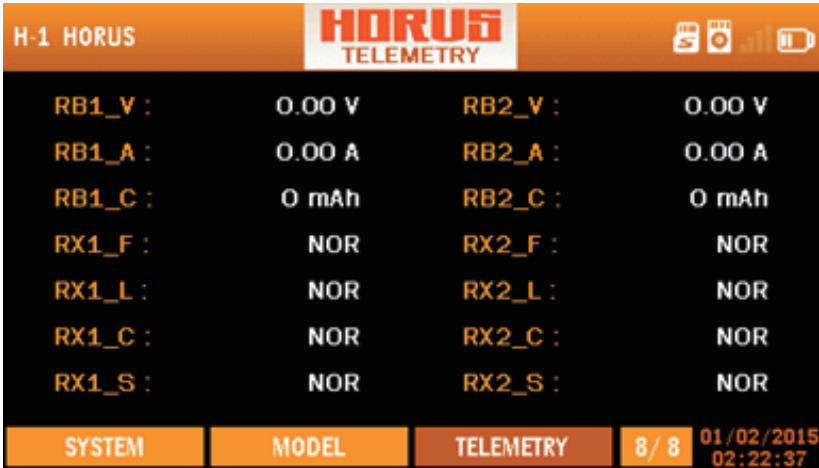
Overview of the telemetry menu 8/8 screen

The illustration above is an example of the "TELE" menu page 8/8, here the user can monitor the Redundancy Bus.

7.2 TELEMETRY SETUP MENU

Overview of the telemetry setup menu screen

Telemetry Sensor Names and their function

"SWR" : This is a measure of antenna performance. A value above 51 will represent a failed or broken antenna and the radio should not be used until the issue is resolved. We recommend to not change the factory default warning (51) of this menu.

"RSSI" : The RSSI (Received Signal Strength Indicator) measures the strength of the signal between the transmitter and the receiver as measured at the receiver. The measured value is sent back to the transmitter by telemetry for display and alarm purposes.

The transmitter will announce "RSSI WARNING" when the RSSI falls to a value of 43 db or below, we recommend to not change the factory default warning (43) of this menu.

"RxBattery" : The receiver measures the voltage of the power supplied to it and sends the data back to the transmitter for display and alarm purposes. If the power is coming directly from a battery in the aircraft the measure will be the battery voltage. Models powered by an electric motor(s) will often use a BEC supplying the receiver and the measure will therefore be the BEC voltage. Another method (on-board voltage/current sensor such as a FCS40 or FCS150) should be used to keep a track of battery voltage in this case.

"Analog1-4" : The receiver battery voltage with receivers. Set ratio to 4.

The four Analog values may be used by other third party sensors to measure, report and log battery voltage and other user/sensor determined values.

"Alti-V" : Vertical Altitude as measured by an on-board vario sensor at any given time.

"Spd-V" : Vertical speed. Rate of rise/fall (change in altitude) being measured by on-board vario sensor.

"Current" : The current being measured by the on-board current/voltage sensor.

"Volt-fas" : Voltage measured by on-board current/voltage sensor at any given time.

"Temp1" : The temperature being measured by the temperature sensor in the aircraft at any given time.

"Temp2" : As for Temp 1 but second sensor. Note that units and log intervals for both temperature sensors are automatically kept the same by the firmware. The maximum temperature able to be recorded reliably is 250 degrees Celsius.

"RPM" : The RPM of the aircraft motor. For the hub RPM sensor this is the reading from the optical sensor. For S.PORT the rpm sensor gets its signal from 2 of the 3 power leads between the motor and ESC. The sensor instructions show how to set the number of poles on the sensor.

"Fuel" : The percentage of fuel used as measured by an on-board fuel sensor. This relates to liquid fuel in an IC powered aircraft, not electric power.

"Alti-g" : Altitude as measured by on-board GPS unit.

"Spd-g" : Ground speed as measured by on-board GPS unit.

"Consump" : The aggregate consumption of electric power used since the last reset (milliamp hours). The setup screen allows the user to set a value that will trigger an alarm on the transmitter. This is useful to prevent over-discharge of on-board battery and/or in flight failures caused by lack of battery power.

"Power" : The power (watts) of the electric motor and/or other aircraft components being measured at any time.

"Course" : GPS heading in degrees. North is zero degrees.

"Dist-g" : Distance as measured by GPS unit. If the transmitter contains a GPS unit the distance will be measured between the transmitter and the on-board sensor.（还未添加） If the transmitter contains no sensor the distance will be measured between the place where the GPS unit first achieved GPS lock after switch on, and the on-board sensor.

"airspeed" : Airspeed as measured by on-board airspeed sensor.

"celNum" : The number of cells in the on-board battery as measured by a FLVS-01 sensor (hub) or FLVSS (SPORT sensor).

"celSum" : The aggregate voltage of all cells in on-board battery as measure by FLVS-01 or FLVSS.

"celmin" : The lowest cell voltage of all cells in on-board battery as measure by FLVS-01 or FLVSS.

"rb1(2)volt" : The aggregate voltage of all cells in on-board battery as measure by the redundancy bus port batt1(2).

"rb1(2)Amp-g" : The current flowing through the redundancy bus port batt1(2).

"rb1(2)Consum" : The aggregate consumption of electric power (measured on redundancy buss port batt1(2)) used since the last reset (milliamp hours). The setup screen allows the user to set a value that will trigger an alarm on the transmitter. This is useful to prevent over-discharge of on-board battery and/or in flight failures caused by a depleted battery .

"Maxspd-g" : Maximum GPS measured speed recorded by GPS unit since last reset.

"Maxalti-g" : Maximum GPS measured altitude recorded since last reset.

"Maxalti-v" : Maximum altitude recorded by on-board variometer since last telemetry reset.

"Maxvario" : Maximum climb rate recorded by on-board variometer since last telemetry reset.

"Minvario" : Maximum descend rate recorded by on-board variometer since last telemetry reset.

"Maxdist" : The maximum distance the aircraft was ever away from the transmitter since the last reset. This is the maximum dist-g recorded since the last reset.

"Maxcurr" : The highest current value (current) measured by the on-board voltage/current sensor since the last telemetry reset.

"Maxpower" : The maximum number of watts (power) measured since the last reset.

"Maxtemp1(2)" : The highest temperature measured by the Temp1 sensor since the last telemetry reset.

"MaxRPM" : The highest RPM recorded by the RPM sensor since the last telemetry reset.

"MaxSWR" : The highest SWR reading recorded since the last telemetry reset.

"MinRSSI" : The lowest RSSI reading measured since the last telemetry reset.

NOTE: More information of these parameters please refer to the manuals of the sensors.

NOTE: Telemetry data can be reset/cleared by pressing and holding the "TELE" button, then follow the on screen instructions. Consumption can be reset/cleared via the "SPECIAL FUNCTION" menu when assigned to a switch.

DATA STORAGE DRIVE

There are an internal flash chip and a MicroSD card slot provided in the radio.

8.1 FILE STRUCTURE

CONFIG   Configuration files that needed when new model created.
IMAGES   All the default and customized images for your models.
SOUNDS   All sound files needed for the audio system.
The MUSIC and SOUNDS folders contain, you guessed it, music and sounds used by your radio. Normally the sounds will be downloaded from the same place as are firmware upgrades. ADD Instructions for creating own sound files. Music files are whatever you want to hear on your radio in MP3 format.

SYSTEM   Transmitter files and model files created by yourself.
The SYSTEM folder is very important. Amongst other things it contains all of the model data that has been set up on the radio. The data is written to the SD card only when the radio is switched off or when the active model is changed.

MUSIC   All music files
The MUSIC and SOUNDS folders contain, you guessed it, music and sounds used by your radio. Normally the sounds will be downloaded from the same place as are firmware upgrades. Music files are whatever you want to hear on your radio in MP3 format.

FIRMWARES   Firmware files when you need to upgrade the radio or any other modules inside.

LOGS   Log files of telemetry data
The LOGS folder contains log files and will be automatically populated by the system whenever logging of telemetry data is active. The folder will contain one file per day. Log files can be downloaded from the card (see later) and viewed and manipulated in Excel.

ℹ **NOTE:** FIRMWARES LOGS MUSIC these three folders are always saved in MicroSD card to save more space of internal flash.

ℹ **NOTE:** System when power on will search for configuration files under flash driver firstly. If it not exist, system will search configuration files from MicroSD card.

⚠ **CAUTION:** If you choose to use MicroSD card to store your important files like your model files you should be always sure that the card is safely demounted when disconnecting the radio from a computer. Never remove the card when the radio is switched on. Never disconnect the battery or open the case with the radio switched on. *If you lose or damage the card without a backup you will have to manually re-enter all of your model*

ℹ **NOTE:** You may not find some folders under the driver but they will created automatically when you using the features that related to them. You can create them by yourselves if you need to add some customized files.

8.2 CREATING YOUR OWN FILES

Boot image limitations: It must be called "openshow1.gif", and must be equal or smaller then 100K and have the following dimensions 480x272.

USB icon limitations: It must be called "connect.jpg" and must be equal or smaller then 70k and have the following dimensions 480x272.

Model images: The size should be equal or smaller then 50K, 100 is the maximum allowed images in the folder, located in the folder "IMAGE/MODELIMAGES". The recommended size is 155x100 (colour: 16bit, RGB 565, 72DPI), smaller images will be displayed in the top left corner, larger images will be cut to fit the available space. Up to 50 characters are available for name creation, but 20 is recommended as a maximum in order to fit on the menu screen.

MP3: Should be between 32~320kbps, and must be of the .MP3 format

Track files: located in the folder "SOUNDS/en/TRACK/"The size should be equal or smaller then 100K, 100 is the maximum allowed images in the folder name length should be less than 10 characters and must have the .wav format.

8.3 AS DISK DRIVERS

HORUS can be connected to your PC using any good quality MINI-USB data cable. The flash and MicroSD card will appear on your PC as remote disk drives and can be used in the normal way.

It is prudent to make backups of the data periodically. Do this before each firmware re upgrade. Do this after making significant changes to models or adding new models. Assume that the data make sure that the names of the backups contain the date it was done making it easy for you to backtrack if

8.3 HOW TO UPGRADE

First step is to modify and add needed files to SD card.
Turn on HORUS and connect to USB. The big USB sign will appear and HORUS will act as mass storage device. Now you can find your SD card content.

If the released firmware archive contains a SD card folder, then this folder has updated content they should be copied and over write the existing SD card. Caution if the system has custom sounds or images copy the folder files from the new SD folder so custom files are not over written.
You should choose one file only for your mode and region.
Select the file needed and copy it to the SD card FIRMWARE folder.
Please note if you are not using a Windows computer your system may write other hidden files to the folder and the upgrade will not work. Only one file can be in the FIRMWARE folder.
When all files are copied correctly, use the drive eject feature on your computer and disconnect the HORUS from the USB cable. The HORUS will automatically turn off. Please note if you are not using a Windows computer your system my not correctly eject the USB connection if the USB cable is not removed within a couple of seconds.
To start the HORUS upgrade process press and hold down the Enter (wheel) button and power on HORUS. This procedure will cause the system to go to the FIRMWARE folder and look for firmware file to flash.
There will be information on screen.
You need to turn off HORUS manually after upgrade.
If the upgrade failed please retry the procedure above.

ⓘ **NOTE:** The internal module will be upgraded when you first power on your radio after upgrade and HORUS will power off self. Other internal device (Wireless Trainer) can be upgraded if there are upgrade firmware under FIRMWARE folder and HORUS will power off self.

ⓘ **NOTE:** The firmware file will be deleted after upgrade.

Once are all upgrades are done the HORUS should start normally.

TERMS AND ABRIVIATIONS USED IN THE MANUAL

Term *Details*

9.1 A

AC electrical outlet — AC power plugs and sockets are devices that allow electrically operated equipment to be connected to the primary alternating current (AC) power supply in a building.

ACCST — Advanced Continuous Channel Shifting Technology – The ACCST 2.4GHz system shifts the frequency hundreds of times per second, ensure there are no signal conflicts and interruptions.

AETR — Stands for AILERON-ELEVATOR-THROTTLE-RUDDER and is used to summarize the RX channels 1-4. The arrangement of the channel order varies between manufactures.

AIL — Aileron.

9.2 B

BEC — Battery Eliminator Circuit, provides the required voltage for the receiver by reducing the voltage received from the main battery.

BMP — The BMP file format, also known as bitmap image file or device independent bitmap (DIB) file format or simply a bitmap, is a raster graphics image file format used to store bitmap digital images, independently of the display device (such as a graphics adapter), especially on Microsoft Windows.

Boolean operators — The three basic Boolean operators are: < , =, >, AND, OR, XOR , these are conditions for a logic switch construction.

BRKFLP — Brake flap also known as spoilers.

9.3 C

CCPM — Cyclic-Collective-Pitch-Mixing, this can be done either mechanical or via channel mixing.

CMBFLP — Camber flap = flaperon and is an combined signal of aileron and flaps.

CYCLIC PITCH — The cyclic pitch control (often referred to simply as "the cyclic") allows the pitch of the main rotor blades to be varied throughout their 360-degree cycle.

CMB/CAMBER — In aeronautics and aeronautical engineering, camber is the asymmetry between the top and the bottom surfaces of an aerofoil. An aerofoil that is not cambered is called a symmetrical aerofoil.

CG/CoG — CG or CoG Centre of Gravity is a point around which the force of gravity appears to act. It is point at which the combined mass of the model appears to be concentrated.

Term   Details

CNC   Computer Numeric Control (CNC) is the automation of machine tools that are operated
                           by precisely programmed commands encoded on a storage medium (computer command
                           module, usually located on the device, as opposed to controlled manually by hand wheels
                           or levers, or mechanically automated by cams alone.

COLLECTIVE PITCH   The collective changes the pitch angle of all the main rotor blades collectively (i.e., all at
                           the same time) and independent of their position. Therefore, if a collective input is made,
                           all the blades change equally, and the result is the helicopter increases or decreases its
                           total lift derived from the rotor.

COMB MODE   When using "flight modes" this feature allows the same trim values to be valid for all modes.

CURVE LIB   Curve Library menu within the HORUS.

9.4   D

D8   V8-II series Receivers in D mode (V8FR-II, V8R7-II, V8R4-II, VD5M) or D Series Receiver
                           (D8R-XP, D6FR, D4R-II) with 8 Channels (international version only).

D16   X series Receiver (X8R, X6R, X4R, X4RSB, XSR, etc.) with up to 32 channels.

DJT   FrSky D series compatible external RF module.

DPI   Dots Per Inch, a measure for image resolution.

9.5   E

ELE   Elevator.

Ect   Etcetera.

ESC   Electronic Speed Controller.

EXP/EXPO   "EXP" automatically generated Exponential curves are produced when using this feature,
                           +100 to -100 can be programmed, reducing or increasing the sensitivity near the center.

9.6   F

FBL system   Most electronic flybar systems consist of the gyro sensors and the mixing/control unit/servo
                           Bus. These can be combined in one unit, or separate.

FCC   The Federal Communications Commission (FCC) is an independent agency of the United
                           States government. The FCC works towards six goals in the areas of broadband,
                           competition, the spectrum, the media, public safety and homeland security, and modernizing
                           itself.

FCS40   FrSky ACCST 2.4GHz Telemetry - Smart Port Current Sensor 40A.

FCS150   FrSky ACCST 2.4GHz Telemetry - Smart Port Current Sensor 150A.

Term	Details

FLAPERON — A "flaperon" on an aircraft's wing is a type of control surface mix that integrates flaps with the ailerons channel.

FLP — Flap.

Flying wing — A flying wing is a tailless fixed-wing aircraft that has no definite fuselage, although a flying wing may have various small protuberances such as vertical stabilizers, winglets and rudder.

Predefined mixes — Are preprogramed mixes that are commonly used to set up a model, these can vary depending on the selected model type.

9.7   G

G-PITCH — Inputs defined by transmitter movement (IMU) to create Pitch

G-ROLL — Inputs defined by transmitter movement (IMU) to create Roll

Gimbal — A gimbal is a pivoted support that allows the rotation of an object about a single axis.

GPS unit — Global Positioning System, is a device that accurately calculates geographical location by receiving information from GPS satellite.

GYRO — A gyroscope is a device that produces correction inputs to help stabilize a model.

9.8   H

Hall effect — The Hall effect is the production of a voltage difference (the Hall voltage) across an electrical conductor, transverse to an electric current in the conductor and a magnetic field perpendicular to the current.

Haptic feedback — Haptic or kinaesthetic communication recreates the sense of touch by applying forces, vibrations, or motions to the user. This mechanical stimulation can be used to assist and to enhance the remote control of machines and devices.

9.9   I

IC — Internal Combustion engine.

IMU — An inertial measurement unit (IMU) is an electronic device that measures and reports a body's specific force, angular rate, using a combination of accelerometers.

IMU CAL — IUM Calibration menu within HORUS.

INT — International

IXJT — FrSky Internal Transmitter module.

Term   Details

9.10   J

JPEG   JPEG is a commonly used method of lossy compression for digital images, particularly for those images produced by digital photography. The degree of compression can be adjusted, allowing a selectable trade-off between storage size and image quality. JPEG typically achieves 10:1 compression with little perceptible loss in image quality.

9.11   K

9.12   L

LBT   Listen Before Talk firmware (EU).

LIMIT   Maximum movement of a Servo channel.

LINE   LINE is used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

LSW   Logic Switch used in HORUS model configuration.

LSD   Low self-discharge.

LR12   L series Receiver (L9R, etc.) with 12 Channels.

9.13   M

M_X   Represents the X-axis of the "JOYSTICK".

M_Y   Represents the Y-axis of the "JOYSTICK".

M-POS   Multi-position switch or knob on HORUS.

MDL   HORUS Model Menu, this can be accessed via the MDL button.

MODEL SEL   HORUS menu were the user can create/modify/delete models.

MP3 player   An MP3 player is an electronic device that can play digital audio files.

MIXER   Mix is short for mixing, mixing is creating a program that will take a master input and control a slave output. For example: Mix a coupling between flaps and elevator for some rapid aerobatic loops. Mix in flaps and elevator the opposite way for a slow scale model to prevent ballooning when using the flaps. Mix rudder to ailerons for scale like turns. Mix throttle to elevator to flaps on a slow scale aircraft for a true scale flying experience.

Multicopter   A multirotor or multicopter is a rotorcraft with more than two rotors. An advantage of multirotor aircraft is the simpler rotor mechanics required for flight control. Unlike single- and double-rotor helicopters which use complex variable pitch rotors whose pitch varies as the blade rotates for flight stability and control, multirotors often use fixed-pitch blades; control of vehicle motion is achieved by varying the relative speed of each rotor to change the thrust and torque produced by each.

Term   Details

9.14   N

NiMH battery   A nickel–metal hydride battery, abbreviated NiMH or Ni–MH, is a type of rechargeable battery. The chemical reaction at the positive electrode is similar to that of the nickel–cadmium cell (NiCd), with both using nickel oxyhydroxide (NiOOH).

9.15   O

OFFSET   "OFFSET" is used to relocate the center position.

9.16   P

PPM   Pulse Position Modulation, effectively PPM is the old "analog" type of signal. PPM takes the position of the stick and adjust the width of a pulse transmitted over the air accordingly.

PC   Personal Computer.

9.17   Q

9.18   R

RATES   "WEIGHTS" represents the "RATES", reducing the number will limit servo travel. +99 (deflection until programmed end points) to -99 (complete reversal of travel direction).

RTN   Return to previous menu/cancel button.

RUD   Rudder.

RP-SMA   Coaxial RF connectors developed in the 1960s as a connector interface for coaxial cable with a screw type coupling mechanism. The connector has a 50 Ω impedance. SMA is designed for use from DC to 18 GHz.

RSSI   RECEIVE SIGNAL STRENGTH INDICATOR (RSSI) - Received Signal Strength Indication (RSSI) value used to monitor acceptable signal strength or distance. Measures the strength of the signal between the transmitter and the receiver as measured at the receiver.

9.19   S

SMOOTH   "SMOOTH" is used to manually adjust the shape of the curve. Up to7 segments can be adjusted either via straight lines or smooth curves, depending on the selected option.

STK CAL   Stick Calibration menu within HORUS.

STK DIR   Software signal reversal menu within HORUS.

SWASH PLATE/RING   A swashplate is a device that translates input via the helicopter flight controls into motion of the main rotor blades. Because the main rotor blades are spinning, the swashplate is used to transmit three of the pilot'scommands from the non-rotating fuselage to the rotating rotor hub and main blades.

SWR   SMART ANTENNA DETECTION - measure of transmitter antenna quality. Reading below 51 are normal.

Term   Details

SD card   Secure Digital is a non-volatile memory card format.

SEPR MODE   HORUS menu configuration which allows independent trimming of each available "Flight mode

SCR TYPE   Source type

SYS button   System Button menu on the HORUS.

9.20   T

TELE   HORUS Telemetry menu on the HORUS.

THR   Throttle.

TRAVEL   Travel range of a servo.

9.21   U

9.22   V

V-Tail   In aircraft, a V-tail or Vee-tail is an unconventional arrangement of the tail control surfaces
                         that replaces the traditional fin and horizontal surfaces with two surfaces set in a V-shaped
                         configuration when viewed from the front or rear of the aircraft.

VPP   Variable-pitch propeller is a type of propeller with blades that can be rotated around their
                         long axis to change the pitch (angle of attack) of the blade.

9.23   W

WEIGHT   "weight" represents the "RATES", reducing the number will limit servo travel. +100
                         (deflection until programmed end points) to -100 (complete reversal of travel direction).

WL Trainer   Wireless Trainer function, liking master and buddy TX via Wireless

9.24   X

XJT   FrSky X series compatible external RF module.

9.25   Y

9.26   Z