9XR Pro: Glossary of Terms for Ersky9x

This Glossary is intended to help understand the Turnigy 9XR Pro transmitter and its Ersky9x firmware. Acronyms, abbreviations and specific terms are organised by the names of the screens where they are first used. For a more detailed explanation of the function associated with each term please refer to *Ersky9x Explained,* available here:

http://openrcforums.com/forum/viewforum.php?f=7

Radio Setup

Internal FrSky Alarm: An alarm generated inside the transmitter from telemetry received by an FrSky transmitter module.

SD Card: A standard **S**ecure **D**igital non-volatile memory card, in this case in micro format. It typically has a minimum capacity of 2GB but may be larger. It is used to store sound files for use by the radio , firmware files for uploading to the radio and other information such as manuals in PDF format.

BMP: Bitmap image files. These are in raster image file format (128 x 64 pixels, 2-bit monochrome) and are used for the splash screen. They can be transferred to the radio by using Eepskye to embed them in the firmware and then uploading to the radio.

Sounds: monophonic sound track recordings sampled at up to 32kHz and saved in Waveform Audio (.wav) file format.

Trainer Multiplier: A value used to adjust the stick outputs of the student's transmitter (Slave) to meet the requirements of the instructor's transmitter (Master).

SVN: Subversion Number, part of a record keeping process used in software development, to keep track of multiple source code revisions over time.

VERS: The firmware version number stored in the transmitter's EEPROM non-volatile memory.

MOD: Which modification to the firmware is installed.

Haptic Strength: The strength of the tactile feedback vibration used for alarms.

BT baud-rate: Bluetooth wireless transmission data exchange rate; set to match the receiving media device.

Model Setup

Voice Index: Number of the voice file on the SD card used to make an announcement when the model is selected or the radio turned on.

Trim Inc: Increment by which trim settings change for each press of the trim button.

Trim Sw: Switch used to trigger the "InstaTrim" feature, thereby converting stick deflections to subtrim values in the Limits screen and resetting neutrals.

Timer 1, **2:** Two timers which can count up or down and can be started and stopped by a physical or virtual switch.

THs, **TH%:** Timer functions that use the throttle stick as the source. **THs** causes the timer to run when the stick is off idle. TH% adjusts the timer rate according to the throttle percentage.

T-Trim: Throttle Trim, which applies to the lower half of the stick throw only. This is used for fuel powered models only. Electric models normally do not use throttle trim.

T-Expo: Applies expo to the throttle curve across the whole range, rather than to each side of the centre point as the other controls require.

Auto Limits: Amount by which subtrim settings can over-ride the limits in order to keep the throw equal on both sides of centre.

Minute call: Timed voice enunciation of the timer count via loud speaker or audio jack.

RF: Radio Frequency transmission circuit used to send signals over the air between transmitter and receiver.

Failsafe mode: Transmitter mode which allows the receiver's failsafe settings to be changed from the transmitter. Functions only with certain RF module/receiver combinations.

PPM: Pulse Position Modulation, the usual way of sending digital signals by radio frequency (RF) transmission for radio control purposes. Each assembly of pulses for one cycle of data constitutes the PPM frame.

PPM frame: Assembly of pulses for one cycle of data in PPM transmission. The length is measured in milliseconds. The frame length, pulse spacing and polarity can be set in the transmitter to match the requirements of the module and receiver.

Heli Setup

Swash Type: Swash-plate design configuration in degrees: 90, 120, 120X (same as 120, but with the swash plate turned 90 degrees) or 140.

Collective Source: Virtual channel to be used on the MIXER page for pitch curve(s).

Swash Ring: Sets limits on swash servo travel. A physical swash ring is a circular metal plate which restricts stick travel to the same distance in all directions. This software function emulates its action.

Long cyc. Direction: Longitudinal Cyclical Direction refers to ELE action, which can be Normal (---) or Inverse (INV).

Lateral cyc. Direction: Lateral Cyclical Direction refers to AIL action, which can be Normal (---) or Inverse (INV).

Coll. Pitch Direction: Collective Pitch direction, which can be Normal (**---**) or Inverse (INV).

Flight Modes

FM0: Default flight mode.

FM1-FM6: Six additional flight modes that can be assigned to unique switch positions/combinations.

Expo/DR: Exponential and Dual Rate

Rud, **Ele**, **Thr**, **Ail:** The four gimbal stick axes, which can independently be assigned: Weighting (gain/rate) and Exponential. Ultimately, these stick inputs are assigned to output channels in the **Mixer** menu.

Weight: Percentage gain or rate used to determine the amount of servo throw.

Expo: Exponential This is a mathematical exponential function applied to stick travel each side of centre. In most transmitters, including those using Ersky9x, positive expo reduces stick sensitivity around neutral (note: in Futaba transmitters, this same action is called negative expo).

Mixes

Source: An input to be used in the mix line calculation. A pick list of possible inputs is provided.

Weight: Source value multiplier, in percentage, applied before calculating the mix line output value.

Offset: A value added to the Source value before calculating the mix line output value.

Trim: Applies stick Trim values in a mix. Always **OFF** when Source is not assigned to a stick.

HALF: A value of 0 to + 100 or 0 to -100

FULL: A value of -100 to +100.

3-POS: the three position switch as a source with three values: -100%, 0% and +100%

THIS: the combination of all mixes for this channel down to this point in processing.

Multpx: Multiplexing, a mathematical relationship with the line above. Options are **Add** (e.g., 10% + 50% = 60%), **Multiply** (e.g., 10% * 50% = 5%), or **Replace**. These are symbolically represented respectively by **+=**, ***=** and **:=**

Curve: Applies conditional logic or a custom curve to the **Source** in computing the mix line output value. One choice is **Diff** for differential.

Modes: Enables or disables the mix line in specific flight modes.

Delay: Time in seconds before the mix line output begins to be implemented.

Slow: Specifies a transition speed, referring to the time in seconds taken by the mix line output to cover the range -100 to +100.

CYC1, **CYC2**, **CYC3:** Helicopter cyclical mixer outputs.

PPM1, **PPM2**, ….. , **PPM7**, **PPM8: T**rainer port input channels.

GV1 – GV7: Global Variable 1 through Global Variable 7 used as an input.

Limits

Min, Max: Travel limits in percent.

(---): Servo travel direction normal.

(INV): Servo travel direction inverse.

Curves

Preset: Straight line curves pre-programmed into firmware.

Custom Switches

SW1 – SWO: 24 logic switches, programmable to compare values as true or false (active when true, inactive when false).

TimeOff, TimeOn: A timed pulse trigger function that sets the time in seconds the trigger is OFF/ON.

Comparison Functions

v>ofs, v<ofs, |v|>ofs, |v|<ofs
AND,OR,XOR
v1==v2, v1!=v2, v1>v2, v1<v2, v1>=v2, v1<=v2
Time

Comparison Operators: Arithmetic

> greater than

< less than

>= greater than or equal to

<= less than or equal to

|| absolute value of

= equal to

!= not equal to

Comparison Operators: Boolean Logic

AND: both true.

OR: either one is true.

XOR: either one is true, but not both.

Assignable as Variables

Stick Inputs: Rud, Ele, Thr, Ail.

Knobs: P1, P2, P3.

FULL: Special case variable with value from -100 to +100.

HALF: Special case variable with value from 0 to +100 or 0 to -100.

CYC 1, CYC 2, CYC 3: Inputs from Helicopter cyclic mix.

PPM1 through to **PPM8:** Trainer port input signals.

CH1 through to **CH24:** Outputs of other mixes used as inputs.

Safety Switches

CH1 S: Channel one Safety Switch (may also be set to type X for sticky safety switch, A for audio alarm, or V for voice alarm).

VS 15: Voice switch 15 (safety switch converted to voice switch).

Telemetry

All telemetry readings are from sensors mounted in the aircraft unless otherwise noted.

UsrProto: Specifies either Winged Shadow or FrSky altimeter.

A1, **A2:** analog input channels on FrSky telemetry receivers (3.3v maximum).

RSSI: Received Signal Strength Indication; strength at the receiver of the control signal from the transmitter.

TSSI: Transmitter Signal Strength Indication: Strength at the transmitter of the telemetry signal from the receiver.

Tim1, Tim2: Timer 1 and Timer 2 set in the Model Setup menu.

Alt: Altitude reading above ground level from the barometric sensor

Galt: Altitude reading above ground level from the GPS sensor

Gspd: Ground Speed from the GPS sensor.

T1, T2: Temperature sensor readings.

RPM: Revolutions Per Minute.

Fuel: Fuel tank capacity.

mAh, mAh1, mAh2: Battery energy consumption.

mAh Alarm Battery energy consumption alarm.

Cvlt: Voltage of lowest cell in LiPo pack.

Volt Alarm: Low voltage alarm for lowest cell in LiPo pack.

Batt: Transmitter battery voltage.

Amps: Current.

Ctot: Total value from the voltage sensor.

FasV: Pack voltage from an FrSky FAS40 or FAS100 current sensor.

FAS Offset: Correction factor applied to the FrSky FAS40 or FAS100 current sensor to calibrate the current value.

AccX, **AccY**, **AccZ:** Acceleration values in Gs for X,Y, and Z axes.

Fwat: Instantaneous power delivered from battery, calculated from current sensor voltage and amperage values.

RxV: Receiver voltage.

Hdg: Heading from the GPS sensor.

Num Blades: Number of propeller blades for RPM sensor.

GpsAltMain: Altitude source for the altitude alarm.

BT Telemetry: Bluetooth Telemetry.

FrSky Comm Port: Port on the motherboard to be used for telemetry communication.

Invert Comm 1: Telemetry signal at Communication Port 1, inverted.

Vario Source: Communication port from which the variometer readings are received.

Sink Tones: Low frequency tones signalling that the aircraft is losing altitude.

AltAlarm: Altitude alarm.

Vspd: Vertical speed (rate of climb or descent).

Log Switch: Switch that controls data logging.

Log Rate: Period between successive data records.

Global Variables

GV1 GV7: Variable values that can be assigned to any weight, offset, differential, or exponential setting used in **Expo/DR**, **Custom Functions**, **Custom Switches**, and **Mixer** menus.

Further Information

For additional information to help you understand and make best use of your Turnigy 9XR Pro, see the other manuals in this series and/or go to one of the forums dedicated to this transmitter and the open source firmware it uses.

9XR Pro Manuals

The following manuals are designed to help you get the most out of your Turnigy 9XR Pro. They are available at: http://openrcforums.com/forum/viewforum.php?f=7

1. 9XR Pro: Introduction to the Hardware
2. 9XR Pro: First Steps with Ersky9x
3. 9XR Pro: Ersky9x Explained
4. 9XR Pro: Communicating with a Computer
5. 9XR Pro: Using Voice with Ersky9x
6. 9XR Pro: Using the Eepskye Program
7. 9XR Pro: Glossary of Terms

Internet Forums

Help is always just a few clicks away on the internet forums where experienced Ersky9x users volunteer their knowledge and experience. Many of these people have been developing the firmware for years without remuneration; all they ask is donations to fund further development.

Open RC Forums: http://openrcforums.com/forum/index.php

Ersky9x index page: http://openrcforums.com/forum/

9XR index page: http://openrcforums.com/forum/viewforum.php?f=70

NOTICE

Ersky9x and Eepskye are free open source software, independently developed. This manual is provided to help you understand and use them specifically for the Turnigy 9XR Pro transmitter, though much of the information also applies to the Sky replacement boards produced as an upgrade for the 9x transmitter.

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For more information go to: http://openrcforums.com/forum/viewforum.php?f=7

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