

9XR Pro: Ersky9x Voice Explained

Programming Voice Files and Making Your Own

Introduction: Using Voice on the 9XR Pro.....	1
Part 1: Programming Audio on the 9XR Pro.....	1
Part 2: Making Your Own Voice Files.....	7
Where to now?.....	9
Further Information.....	10
Appendix A: Sounds List – File Numbers.....	11

Introduction: Using Voice on the 9XR Pro

The 9XR Pro transmitter with its ersky9x firmware has the ability to announce warnings and messages and play music using sound files stored on its micro SD card. The sound files that come with the transmitter cover a wide range of basic situations, including the opening message, timer count-down, switch positions, flight mode and telemetry readouts.

Additional or replacement voice files (.wav) may be downloaded from the Sound Pack Library <http://openrcforums.com/forum/viewforum.php?f=64> in many languages and accents, added to the Voice folder on the Micro-SD card and programmed to be played by the transmitter at the appropriate moment.

As well, you can make your own voice files to suit specific needs. The most obvious such need is to create a file that will announce the name of a model when it is selected in the transmitter.

The basic principle of the voice feature of ersky9x is very simple. Some 200 or more short sound clips are stored in .wav format on the transmitter's Micro-SD card. Each voice file is named with a dedicated four-digit number. So, for example, 0028.wav is the welcome message that plays when the transmitter is turned on, while 0031.wav warns "Flight battery low!" and 0142 says "Flaps down!" The firmware is already programmed to use some of these files, while others, through the use of voice switches, can be set to play when certain conditions occur.

The audio format used for the voice files is mono 16 kHz WAV (Microsoft) signed 16 bit PCM. Be sure the files you obtain or make use exactly this specification as there are other systems which are incompatible with Ersky9x.

Part 1 of this manual deals with how to program the Ersky9x firmware on your 9XR Pro to use voice files. Part 2 shows how to make your own voice files. Appendix A provides a list of voice file numbers showing how some are already allocated to specific functions, while others are available for custom use.

Part 1: Programming Audio on the 9XR Pro

This part of the guide explains how to use the ersky9x voice feature on the 9XR Pro.

Managing Voice Files on the Micro-SD Card

Voice files to be accessible to the transmitter programming must be stored in a folder called 'Voice' on the Micro-SD card. While almost any Micro-SD card can be used, 2GB is plenty for most purposes.

Files can be added and managed by two methods. First, the Micro-USB card, which is located behind the rubber cover on the bottom of the transmitter, can be removed and inserted into an adapter which then fits into either a USB port or a card reader on your computer. Alternatively, the transmitter can be started in 'boot loader mode' by holding the two horizontal trim switches towards the centre while turning on. The transmitter can then be connected to a computer via USB cable. For details see the manual *9XR Pro: Communicating with a Computer*.

For tasks that may take considerable time, such as creating voice files, it may be better to use the first method rather than having your transmitter connected to a computer for extended periods.

Be sure to make regular backups of the contents of the Micro-SD card on your computer.

Voice File Organization

Voice files for the 9XR Pro must have a file name in the form XXXX.wav, where XXXX means a four digit number starting with zero. So for example 0269.wav.

Appendix A shows the mandatory naming and organization of the files so that the ersky9x firmware knows where to get the individual announcements. The appendix also shows where you may insert model names and special announcements which you make yourself.

Files in RED/BOLD must NOT have their file number changed. These are needed by the ersky9x operating system.

Files in Blue/Italic are for Model names.

Other voice files can use any available number (coloured black).

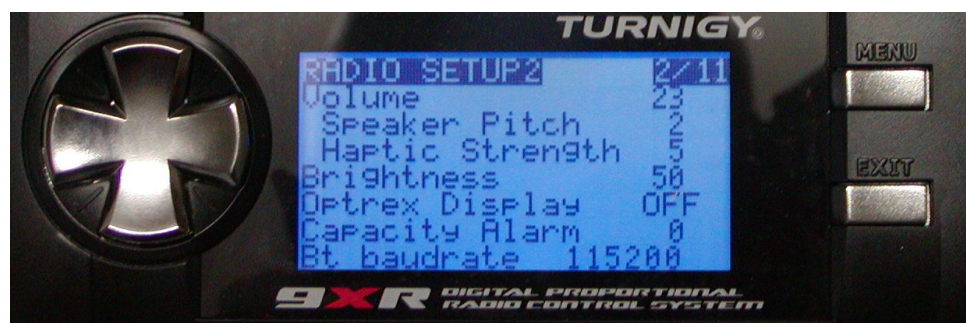
Radio Setup for Audio

The first step is to configure your radio in the Radio Setup page. This is page 1/11 and can be reached from the 'Home' pages by a long press LEFT.



To use spoken alarms instead of the variety of beeps, gurgles and chirps that otherwise play, you need to activate some other options. For the welcome message to sound, the splash screen must be 'on'. For throttle, switch, memory and alarms to be spoken, they also must be 'on'.

A short press RIGHT takes you to page 2/11 of Radio setup. Here you can set the volume and the pitch of the speaker.



Announcing the Model Name

Having the model name announced at start-up can help you to avoid taking off with the wrong model selected in your radio.

Go back to the 'Home' pages. Go to the Model Setup menu by pressing long RIGHT, and then press short RIGHT to get to SetUp 01 (page 1/13). Here on the second line you can enter a number for the voice file that plays the name of the selected model. For model names, only file numbers starting at 0260 are allowed. In the example shown below the Voice Index is 275, meaning that the file 0275.wav will play at startup or when you change from one model to another.

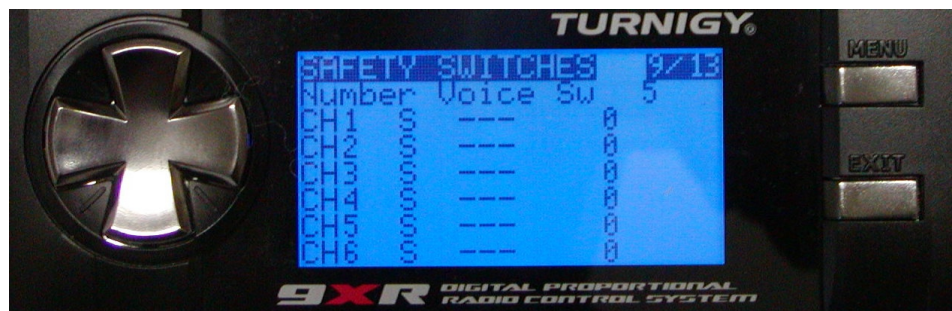


Of course, you have to have a file that speaks the correct model name already loaded in the Voice folder on the Micro-SD card. If necessary, you can make the file yourself, as explained in Part 2 of this manual.

Triggering a Voice Event

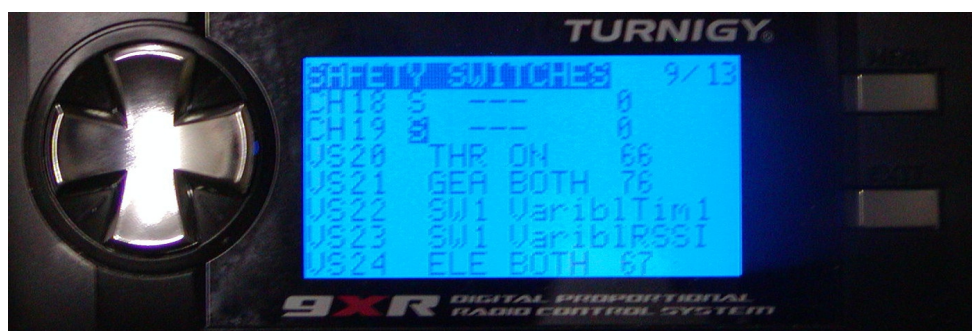
A voice event could be changing the position of a switch; for example, when the flap switch is moved, the transmitter could announce “Flaps first position.” Or it could be a telemetry input, such as altitude, reported at set intervals.

To program a switch to trigger such a voice event, go to the Model Setup menu, page 9/13, Safety Switches. The number on the first line specifies how many of the safety switches have been converted to voice switches. Zero is the default value, but here the number has been changed to 5.



Using this option, you can replace some or all of the safety switches with voice switches. In this case, the last five safety switches will be replaced by five voice switches. Accordingly, safety switches 20 to 24 have been replaced by voice switches 20 to 24, as shown below.

Every voice switch has three configuration options. The first allows you to select the switch that triggers it, which can be any of the physical or custom switches. The second allows you to select how the voices and telemetry events will be played. Finally, on the right side you can select the voice file to play or, depending on the middle option, the telemetry event to be played.



In the screen shot above, VS20 (Voice Switch 20) uses the THR physical switch to play voice file 0066.wav from the SD card. In VS23, the SW1 virtual switch plays the telemetry value for RSSI (signal strength) when programmed correctly, as explained below.

In the middle column you have the following options:

- On** – Plays a voice file when the selected switch is turned ON.
- Off** – Plays a voice file when the selected switch is turned OFF.

Both – Plays two files using only one switch. When the switch is turned ON, it might, for example, play file 0100.wav, and then when the switch is turned OFF, would play the next consecutive file, 0101.wav. Each file will play only once for a given pair of switch movements. Note that this option requires that the on and off audio files have consecutive numbers. Using this feature, you only have to program the “on” file number.

15 / 30 / 60 Seconds – This option will play the selected file number every 15, 30, or 60 seconds when the trigger switch is on.

Varibl – When you select this option, a telemetry event will be played once when the trigger switch is on. In this case on the right side instead of file numbers you will have a choice of telemetry events: e.g.,: A1=, A2=, Alt, RPM, etc...

Examples

Using a Two-Position Switch to Play Voice Files

How to program a voice switch that will play a voice once:

VS20	THR	ON	172
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This will say ‘Thermal Mode’ when the THR switch is turned ON.

How to play a voice file once when the switch is ON and the consecutive file number when the switch is OFF:

VS24	GEA	BOTH	150
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In this case, when you turn the GEA switch ON, voice file 0150.wav will be played (Landing gear up) and when you turn the GEA switch OFF voice file 0151.wav (Landing gear down) will be played.

Using the Three-Position Switch

How to program a 3-position flap using ID0, ID1 and ID2. This one is a bit tricky but uses only two voice switch to play three different voice files at appropriate times.

Voice files used are:

0144 “Flaps up” When ID0 is on

0145 “Flaps 1” When ID1 is on

0146 “Flaps 2” When ID2 is on

0147 “Flaps 1” When going from ID2 back to ID1.

For this to work, on the SD card you will need to make a copy of file “Flaps 1”, i.e., 0145.wav, rename it 0147.wav and place it after the file for ID2 (0146.wav).

The relevant files on the SD card will then be:

0144.wav “Flaps Up”

0145.wav “Flaps 1”

0146.wav “Flaps 2”

0147.wav “Flaps 1”

We use two consecutive Voice Switches say VS10 and VS11 like so:

VS 10	ID0	BOTH	144
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This will play the file 0145 (Flaps 1) when the switch is moved to the middle position (ID1) and 0144 (Flaps Up) when it is moved back to ID0.

VS 11	ID2	BOTH	146
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This will play the file 0146 (Flaps 2) when the switch is moved from ID1 to ID2. When the switch is moved back to ID1, the file 0147 (Flaps 1) will play. That's why a renamed copy of the file for ID1 must be placed right after the file for ID2.

Programming a Telemetry Event with a Switch

This example uses the THR switch to trigger the announcement of a telemetry value (signal strength) and time.

In the Custom Switch menu (page 8/13) shown below the left column has custom switches listed as 'S1' though 'SO' simply because there is not enough space for the three letter acronym used elsewhere (SW1 to SWO).



On this menu you find the custom switches. In the left column, among all the logical statements, you will also find an option called Time. When you select it, you will be able to choose the OFF and ON durations. This option is used in the Voice Switches to allow repetition of a voice or telemetry event in a loop with a pre-set time interval defined by the custom switch SW2.

So in the example above we see:

SW1	Time	Off 27	On 3	THR
-----	------	--------	------	-----

This means that when the THR switch is on SW1 will be on for 3 seconds and then off for 27 seconds repeating every 30 seconds until THR is turned off.

SW1 is the switch we are going to use to trigger the telemetry voice event on the safety/voice switches menu, as shown in the last picture on page 3.

There we have VS22 and VS23 programmed to play two different telemetry events in a loop every 30 seconds. As explained above, we use SW1 to trigger both voice switches. One is set to play the RSSI event and the other to play the Tim2 (i.e., Timer 2) value. The order of the files played in the loop is the same as the order of the Voice Switches. In this case the RSSI info will be played first and then the Timer 2 time, but only when THR switch is 'on' causing Custom Switch SW1 to come 'on' and 'off' as programmed.

Programming Voice Alarms.

A particularly useful application of the voice feature is programming a spoken alarm to sound when, for example, the pack voltage or the RSSI drops under a certain value. To do this, in Custom Switches, page 9/13 of the model setup screens, we enter:

S5	v<ofs	A1=	4.8v
S6	v<ofs	RSSI	45

So here we have two custom switches. One will turn on if A1 voltage falls under 4.8v, and the other will turn on if RSSI (Received Signal Strength Indication) is less than 45dBi. The logic statement **v<ofs** means 'a value (v)' is less than a 'set point value (s)'.

The software monitors the value of the pack voltage and RSSI and compares them with their respective set point values. When either falls below the set point, the appropriate switch is turned on and triggers the alarm.

Now we have to specify which alarm message is played by using SW5 and SW6 to control voice alarms in the Safety/Voice switches menu. This is a little different from programming the spoken telemetry events as we will use safety switches rather than voice switches.

Safety switches have four options. The first two, S and X, perform the safety function by replacing the value of the throttle stick with a predetermined safe value (see the manual *Ersky9x Explained* for details).

The options that interest us here are A (audio) and V (voice). These play a sound or voice clip to serve as an alarm:

A – Triggers a pre-programmed audio alarm that sounds continuously, chosen in the right column from a list of available beeps, other sounds and vibrations.

V - Triggers a voice file that will play continuously to provide a voice alarm.

In this case, we want continuous voice alarms for the two conditions, so set up the following safety switches:

CH1	V	SW5	31
CH2	V	SW6	70

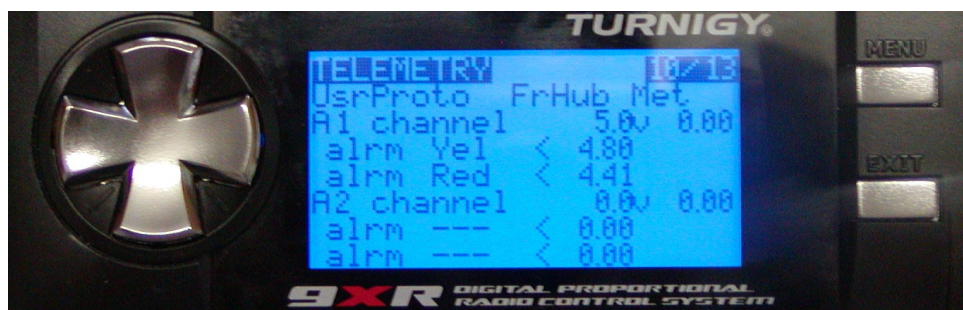
On-screen, it looks like this:



Note that these safety switches are set to "V" to play the files in a continuous loop.

The switch on CH1 will be ON when SW5 is ON and it will play voice file 31. If you look in Appendix A you will see that 0031.wav plays 'Flight Battery Low'.

The switch on CH2 will be ON when SW6 is ON and will play voice file 70, 'RSSI Alert', again in a continuous loop.



Oh, and just so you know.... If there are no values entered in the Telemetry screen 10/13 for the A1 Voltage alarms then you won't be able to enter a value into the Custom Switch screen 8/13 for the value of A1. No value for the A1 telemetry voltage alarm turns it off.

Part 2: Making Your Own Voice Files

While a ready-made voice file set is provided with the 9XR Pro, and others are available, you will probably want to make some of your own voice files, if only for such purposes as naming models. You have several options, depending on your preferences and equipment.

You will need an audio editor which is user friendly. Audacity is recommended. It is free and is more than adequate. Search for 'Audacity Audio Editor' and download the appropriate version for your computer. Audacity supports drag and drop to open files.

Start by creating a "script" listing the voice clips you wish to create.

Option 1: Using your own Voice

In either a Mac or a Windows computer, open *QuickTime Player* (you may have to download and install it first – it's free).

In the drop down menu 'File' select 'New Audio Recording'. A graphic similar to an audio playback graphic will appear. It will have a red dot in the middle.

Click on that dot and speak the first voice clip into the computer microphone (on a Mac it's at the top of the screen, on a PC you may have to plug one into the sound card). When finished, click on the black square (which replaces the red dot) to stop.

Save the file to the desktop, using as the file name the appropriate four digit number corresponding to the list in Appendix A. Select a number which is vacant and not reserved for the system (unless you want to replace a system file).

Open *Switch Audio Converter* or similar audio conversion utility.

Drag and drop the .mov file into the big space in the middle of the application.

At the bottom left corner select .wav as the output format.

Press Encoder Options at the bottom of the page. Select 'Custom' as the 'Settings' option.

Select 16 bit for ErSky9x use and click OK. It doesn't matter what else you select, they will revert to 'auto' anyway. (No; I don't know why!)

Select the location where you want the file to end up (such as a folder '9XR Pro Voice') and then click on the 'Convert' button.

That's your .wav file finished. You can play it in QuickTime to check it out before adding it to the Voice folder on the card.

Option 2: Using a Mac Voice

Mac computers have built-in text-to-speech conversion capability. Highlight any text or list of names and numbers and press the appropriate keyboard shortcut (in my case, it's 'apple' + 'esc' but your Mac may be different - see later) The computer will speak the text.

To record a .wav file for your SD card: open iTunes, TextEdit and Audacity.

Write your text items (e.g., model names or switch events) each on a single line in TextEdit, highlight it and press 'ctrl' + click the mouse (or "Right Click" on your trackpad),

From the menu select 'Add to iTunes as a spoken track'.

Go to iTunes page 'Recently Added'. Drag and drop the resulting .mp4 file into the Audacity window. Select the .wav format, then select the Custom Encoder option and 16000 Hz (as explained in the notes regarding Audacity on page 8 below).

Press Convert and Export the file as **'WAV (Microsoft) signed 16 bit PCM'**.

Rename the file with a four digit number corresponding to the list in Appendix A. Select one which is vacant and not reserved for the system (unless you wish to replace a system file). You are done.

Now for a little more detail. There are many Mac voices and the default (Alex) is probably not what you want, as people prefer female voices. Go to System Preferences and open the Speech Preferences.

Depending on the age of your Mac the number and quality of voices will vary. My iMac with OS 10.8 has six voices total all of good quality. You can also download 20 or so voices specifically for different languages, such as Italian. I used the Australian English voice 'Karen' which is a fairly close match to available voice files. In recent OSs the voice can be found under 'custom' in the list of voices.

Your shortcuts may be different depending on the age of your Mac. Look in System Preferences - Keyboard Shortcuts - Services . Here you can tick the box for 'Add to iTunes as a Spoken Track' and define your own shortcut. This command line will then appear in your ctrl + click menu.

Option 3: Using a Voice from the Web on your PC

To create voice files using a Windows PC you will first need a text-to-speech application. Here's one which has been found to be good:

<http://www.acapela-group.com/text-to-speech-interactive-demo.html>

You will also need a user friendly audio editor. Audacity is recommended. It is free and is more than adequate. Search for 'Audacity audio editor' and download the appropriate version for your computer. It supports drag and drop to open files.

Open your text to speech application. Type the text you wish to have spoken, press "Listen!" and record the output as a file on your desktop.

Open the file in your audio editor. Set the project rate to 16000 Hz and Convert and Export the file as a 'WAV (Microsoft) signed 16 bit PCM'. Rename the file with a four digit number corresponding to a number on the list in Appendix A. Select one which is vacant and not one reserved for the system (unless you intend to replace a system file).

Here's what the Audacity main screen looks like:

The large blank field in the middle is where you drag and drop the spoken text. The box in the bottom left corner is where you set the project frequency rate to 16,000Hz for Ersky9x (and Er9x). The volume of the spoken text is adjusted by the slider in the box to the immediate left of the waveform. Just above this box is another with a green arrowhead. Click on this to play the individual track. The slider to the right sets the playback speed. If you want to join two tracks together load both into the field in the middle.

Using the tool which looks like a double headed arrow (available from the box in the middle of the top row of symbols) move one track so that it is aligned at the end of the other. You will now have one track following another. In the drop down menu 'Tracks' click on 'Mix and Render' Audacity will make one continuous track from the two (or more).

In the drop down menu 'File', click on 'Export' and select 'WAV (Microsoft) signed 16 bit PCM' as the file format (delete as many of the fields as you wish – they add information that is useless for our purposes) and export. Rename the file and add it to your 'Voice' folder. When you have your new folder complete upload it to your SD card.

Creating many audio files

Audacity has a command 'analyze>sound' finder. It will split a .wav into multiple files, then when you're happy with the split (you can adjust the label track), you can select "export multiple" from file drop down menu."

Use of that feature in Audacity saves hours of time, allows automatic cropping of the quiet periods both before and after the sound and makes multiple exports in the correct sequence. You type up all the sounds you want to record in one long list, highlight the lot, generate one long audio file, drag and drop this voice file into the Audacity new file window, set the project rate at 16000 Hz, select "analyze sound" from the "Analyze" drop down menu, set the before and after quiet periods to 0 seconds, and then hit "export multiple".

Where to now?

You could make a .wav file from a piece of music or a siren and call that up when your allowable flight time has expired. Or you could record a message in your own voice to give you some colourful advice when an alarm condition is activated.

What about if, when the throttle cut switch is activated, your radio says: 'Great flight dude'?

The possibilities are endless. 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>

Sound Pack Library: <http://openrcforums.com/forum/viewforum.php?f=64>

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>

Appendix A: Sounds List – File Numbers

0000- Zero	0055- DB
0001- One	0056- Meters
0002- Two	0057- Meter
0003- Three	0058- No Telemetry
0004- Four	0059- Receiver Voltage Low
0005- Five	0060- Temperature Warning
0006- Point zero	0061- Altitude Warning
0007- Point one	0062- Watt
0008- Point two	0063- Watts
0009- Point three	0064- Knot
0010- Point four	0065- Knots
0011- Point five	0066- Milliamp
0012- Point six	0067- Milliamps
0013- Point seven	0068- Milliamp/Hour
0014- Point eight	0069- Milliamps/Hour
0015- Point nine	0070- RSSI Alert/RF signal low
0021- Warning	0071- RF Signal Critical
0022- Error	0072- Receiver signal lost
0023- Alert	0073-
0024- Feet	0074-
0025- Foot	0075-
0026- Minus	0076-
0027-	0077-
0028- Welcome Message	0078-
0029- Limit	0079-
0030- RPM	0080-
0031- Flight Battery Low	0081-
0032- Radio Voltage	0082-
0033- Current	0083-
0034- Altitudet	0084-
0035- Point	0085-
0036- Volts	0086-
0037- Volt	0087-
0038- Minutes	0088-
0039- Minute	0089-
0040- Pack Voltage	0090-
0041- 30 Seconds	0091-
0042- 20 Seconds	0092-
0043- 10 Seconds	0093-
0044- Percent	0094-
0045- Inactivity Alarm	0095-
0046- Radio Battery Low	0096-
0047- Degrees	0097-
0048- Degree	0098-
0049- Receiver Voltage	0099-
0050- Temperature	
0051- Amps	
0052- Amp	
0053- Seconds	
0054- Second	
	0100 - Hundred
	0101 To 0109 - HUNDREDS from One
	Hundred to Nine Hundred

0110 - Thousand

0111 to 0119 - THOUSANDS from One Thousand to Nine Thousand

0120 to 0130 - TEN THOUSAND to TWENTY THOUSAND

0131- Smoke On
0132- Smoke Off
0133- Crow On
0134- Crow Off
0135- Engine Off
0136- Flaps 1st Position
0137- Flaps 2nd Position
0138- Flaps 3rd Position
0139-
0140- Flaps Down
0141-
0142- Full Flaps
0143-
0144- Flaps Up
0145- Flaps 1
0146- Flaps 2
0147- Flaps 1
0148- Throttle Enabled / Throttle-Cut Inactive
0149- Throttle Disabled /Throttle-Cut Active
0150- Landing Gear Up
0151- Landing Gear Down
0152- Lights On
0153- Lights Off
0154- Beacon On
0155- Beacon Off
0156- Strobe On
0157- Strobe Off
0158- Throttle Hold Inactive
0159- Throttle Hold Active
0160- Throttle-Cut Active
0161- Throttle-Cut Inactive
0162- Aileron Rate Low
0163-
0164- Aileron Rate High
0165- Elevator Rate Low
0166-
0167- Elevator Rate High
0168- Gear Up
0169- Gear Down
0170- Vario On
0171- Vario Off
0172- Thermal Mode
0173- Normal Mode
0174- Landing Mode
0175- Acro Mode
0176- Flight Mode 1
0177- Flight Mode 2
0178- Flight Mode 3
0179- Flight Mode 4

0180- Flight Mode 5
0181- Flight Mode 6
0182- Flight Mode 7
0183- Flight Mode 8
0184- Acro
0185- Stabilized
0186- RTH
0187- Loiter
0188- Heading Hold
0189- Altitude Hold
0190- Position Hold
0191- Speed Mode
0192-
0193-
0194-
0195-
0196-
0197- Data Logging Started
0198- Data Logging Stopped
0199- Trainer On
0200- Trainer Off

0260 – [Model Name]

0261 - [Model Name]

0262 - [Model Name]

0263 - [Model Name]

0264 - [Model Name]

0265 - [Model Name]

0266 - [Model Name]

0267 - [Model Name]

0268 - [Model Name]

0269 - [Model Name]

0270 - [Model Name]

0271 - [Model Name]

0272 - [Model Name]

0273 - [Model Name]

0274 - [Model Name]

0275 - [Model Name]

0276 - [Model Name]

0277 - [Model Name]

0278 - [Model Name]

0279 - [Model Name]

0280 - [Model Name]

0281 - [Model Name]

0282 - [Model Name]

0283 - [Model Name]

0284 - [Model Name]

0285 - [Model Name]

0400 To 0499 - Numbers from “Zero” to “Ninety Nine”

NOTE

Files in RED/BOLD must NOT have their file number changed

Files in BLUE/Italic are Model Names

Other files can have any available number (This could change!)