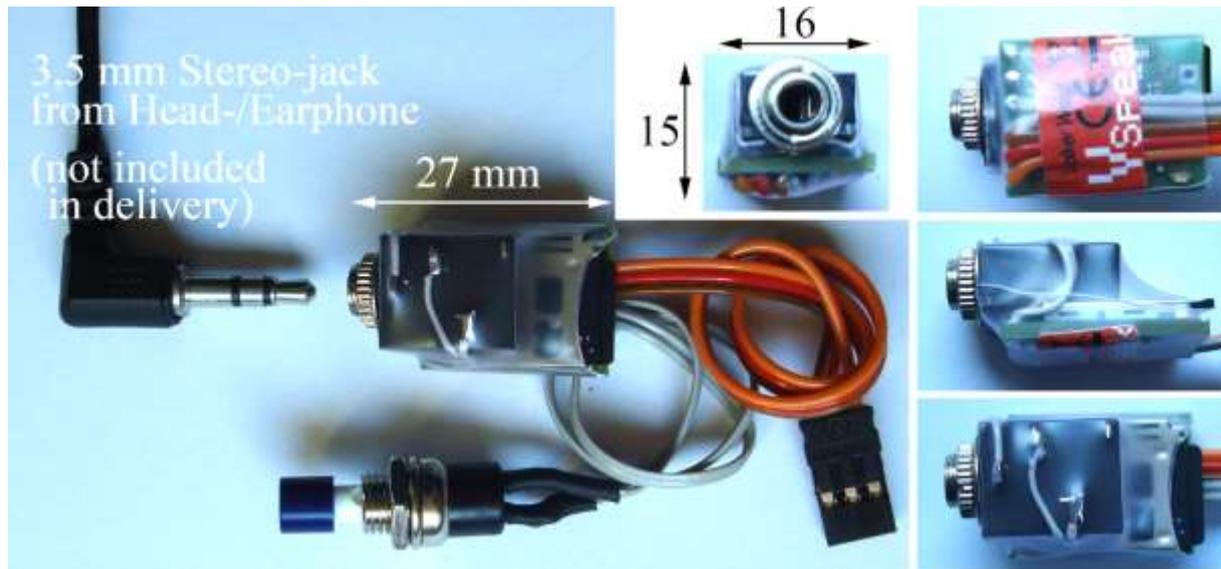




- for -

FRSky

Manual Version 1.4



Introduction

This module allows data which is transmitted in accordance with the FRSky "Two-way system protocol" and recorded with the "Frame Protocol of FRSky Telemetry Hub System (V2.0)" compatible sensors on the receiver side to be transferred and transmitted as voice on the radio side.

Both protocols are disclosed by FRSky (www.frsky-rc.com)

In the realization of the module the focus is on:

- **no** influence on the radio-/receiver-system
- minimum dimensions to have the module fit even to the smallest hand radio

The operation of the speech module is provided through a switch which is designed as a non-latching switch.

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1 Installation

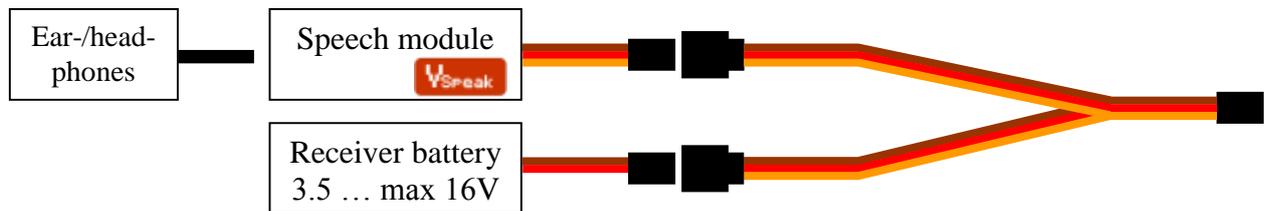
The speech module can be screwed on the male threads of the 3.5 mm stereo jack plug in the radio housing.

The switch is to be positioned in a good accessible place.

2 Connection

2.1 Testing the functionality

With a V-cable (Graupner/JR), a receiver battery and ear- or headphones, the speech module can be connected and tested for function according to the following diagram. The speech module reports with the announcement of their version as soon as the battery is connected.



2.2 DFT / DJT / DHT / XJT - Transmit-Modules

(tested on DHT – applies analog for DFT, DJT and XJT modules)

By means of the "FrSky Vspeak-adapter" the speech module can be connected to the DHT-transmitter module.

The speech module **must NOT directly be plugged** into the DHT (DFT / DJT/ XJT) module as this might damage both the DHT (DFT / DJT / XJT) module and the speech module. For the operation the "FrSky Vspeak-adapter" must be used.

2.2.1 Connection with Display FLD-02

On to the plug of the FLD-02 is a Graupner / JR servo mating cable to be soldered according to the following diagram. To connected are: GND, 5V and Txd (Insulate solder joints from each other using heat shrink tubing!). At the Graupner/JR servo cable counterpart, the "FrSky Vspeak-adapter" is connected followed by the speech module Vspeak.



The operation with the display FLD-02 is always necessary when the parameters are set for the alarms of the analog values 1 and 2 and the Rx and Tx signals (see section 3.2.1).

2.2.2 Connction *without display*

A visual display is not necessary to use the speech output. The plug on the "FrSky VSpeak-adapter" can be connected directly to the DHT (DFT / DJT / XJT) module as shown in the following graphic. The RxD pin remains unused.



2.3 DHT-U (compact) - Transmit-module

On the DHT-U no signals corresponding to the "two-way system protocol" are transmitted externally - thus so **NO connection for the speech output module VSpeak is available yet.**

2.4 Communication

If properly installed, the speech module does not affect the functionality of the transmission system.

The speech module does NOT interfere with the data exchange, i.e. there is no signal output to the transmission system. In a way, the speech module "listens" to the HF part, interprets the data and transfers that as speech as described in the following sections.

2.5 Operation display

Error-free operation of the speech module is indicated by the "flashing" blue LED light.

3 Speech output

There are 3 types of the speech output:

3.1 Announcement of the sensor values

The start of the announcement of the sensor values is made either by key operation - or timed. Furthermore the announcements of capacity (using current sensor) and altitude can be triggered if an adjustable difference is exceeded. The corresponding settings are described in section 5. It is possible to select the announced sensor values individually. Also ALL announcements can be switched ON / OFF, whereby it can be selected with ON between MIN / current and MAX - thus the since the last announcement occurred MIN / MAX values or at the time of the announcement actual readings are announced.

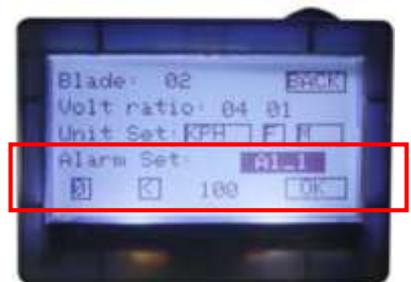
The values are announced according to the order in the table in section 5.3.

3.2 Announcements of the alarms

3.2.1 *FRSky standard alarms*

6 alarms can be generated from FrSky. These are all acoustically given by a "beeper". Two2 alarms each, for A1 and A2 and for Rx and Tx can be set in the "Menu Screen" of the FLD-02. The alarm level can also be selected:

Alarm-Set	Level	Meaning
0	OFF	OFF
1	yellow	low
2	orange	medium
3	red	high



The speech module announces the alarms in the form:

```
<Alarm> <1> <yellow> <Value + Unit>
          <2> <orange>
          <Rx> <red>
          <Tx>
```

The parameters for the alarms are adopted/updated into the speech module by connected FLD-02 displaying the "Menu Screen". (Calculation of alarms -> see 8.1.2).

3.2.2 *VSpeak alarms*

If a hub + FLV-01 (LiPo voltage sensor) are connected on the receiver, the speech module can output the following alarm:

```
<Alarm> <Cell voltage> <Value + "Voltage">
```

In section 5.3 the parameterization of the alarm threshold for the single-cell monitoring is described.

3.2.3 *Alarm pause*

In order to prevent a "permanent" upcoming alarm (e.g. A1, receiver voltage <as alarm value) "blocking" the announcement, a alarm pause can be set. During this time the alarm announcement is suppressed for this sensor value - only after its expiry and then - still / or again - the upcoming alarm would be announced.

3.3 Announcement of the settings (Setup)

A variety of settings on the speech module can be made with the keys (see section 5.3), those will be announced.

4 Vario sound

If a hub + FVAS-01 (variometer sensor) are connected to the receiver - or the "VSpeak Vario" delivers the measurements, a in the frequency proportional vario sound for rising/falling can be generated from the speech module during the speech pause. In order to better distinguish between rising and falling, the tone for the rising is also interrupted. The interruption duration decreases with increasing climbing. The zero slide, neither rising nor falling, is soundless.

The "Vspeak Vario" sends compared to FrSky-Altimeter FVAS-01 not only the barometric altitude values, but also the resulting vertical speed determined for the generation of the Vario signal. In Vspeak Vario an expensive signal processing is realized, in whose result is a Vario signal can be transmitted with a minimum resolution of 0.1 m/s

For the vario sound a number of settings can be made in the settings (see section 5.3):

Vario sound rising: ON/OFF

Vario sound falling: ON/OFF

Vario sensitivity 1, 2, 3 ... , 8, 9 (1...highest // 9...lowest sensitivity)

... with connected "Vspeak-Vario":
1, 2, 3 ... complies 0.1 m/s
4, 5, 6 ... complies 0.2 m/s
7, 8, 9 ... complies 0.3 m/s

Vario sound volume: 1, 2, 3, 15, 16, 15, 14,3, 2

For a long climb passages, e.g. E-gliders, F-trail, or just during "gymnastics" can the Vario-sound be switched OFF and the ON again by double-clicking (2x short activation).

5 Operation of the speech module

The speech module VSpeak is operated with the switch (non-latching switch). To check the function of the key a blue LED is lit for the duration of the operation.

The key can be pressed in four different ways:

5.0 "long key stroke"

If the key is pressed and held (> 2sec) the timed announcement is switched OFF or ON. The setting is announced, either:

"Timed announcement is OFF" - or - "timed announcement is ON"

Thus, only the cyclically recurring announcements of the reading is switched OFF / ON.

Using "single-click" the announcement can be started anytime. Also, the announcement of the alarms is done regardless of the setting made here.

The setting is saved.

5.1 "single click"

Using "single-click" (Button 1 x pressed briefly) the "regular announcement" is started (see section 3.1).

Is the speech module in mode "settings" (see section 5.3), then, by pressing the key, the reading-switching or changing takes place. In addition, the setting menu can also be stopped.

5.2 "double click"

By "double-clicking" (key 2 x pressed in quick succession) the vario tone is turned OFF or ON.

The setting is announced, either:

"Vario sound is OFF" - or - "Vario sound is ON"

The setting you make is NOT saved.

5.3 "triple click"

Using "triple-click" (key 3 x pressed in quick succession) you get into the mode "settings" of the speech module. You can configure 3 different parameter-sets, which can be changed quickly.

During the announcement is the key on 'confirmed' always asked in the times that are stored in the table below "yellow", i.e. in the "value" AND "waiting time".

All settings are saved - except for the setting parameter No. 5, "wav test".

During the announcement of the "setting parameters" ("gray" background) the setup can be cancelled by pressing the key. The changes made until the abortion will be saved.

Table settings			
No	Setting parameter	Value	waiting time
1	"VSpeak: settings"	"1" "2" "3"	
2	"language"	< selection language >	
3	"voice of"	< selection voice >	
4	"volume"	< value >	
5	"wav test"	"ON" / "OFF"	
6	"stop timed announcements"	< value > "seconds"	
7	"announcement RX link quality indicator in dbm"	"min" / "actual" / "OFF"	
8	"announcement TX link quality indicator in dbm"	"min" / "actual" / "OFF"	
9	"announcement analog 1"	"min" / "actual" / "max" / "OFF"	
10	"announcement analog 1 in"	"volt" / "ampere"...	
11	"divider 10 analog 1"	"0" "10" "20" ... "90"	
12	"divider 1 analog 1"	"0" "1" "2" ... "9"	
13	"announcement analog 2"	"min" / "actual" / "max" / "OFF"	
14	"announcement analog 2 in"	"volt" / "ampere"...	
15	"divider 10 analog 2"	"0" "10" "20" ... "90"	
16	"divider 1 analog 2"	"0" "1" "2" ... "9"	
17	"break alarm"	< value > "seconds"	
18	"announcement cell voltage in V"	"min" / "OFF"	

Table settings			
No	Setting parameter	Value	waiting time
19	"alarm cell voltage 1 V"	"1" "2" "3" "4"	
20	"alarm cell voltage Point V"	"0" "1" "2" "3" ... "9"	
21	"announcement tank level in % tank level"	"min" / "actual" / "max" / "OFF"	
22	"announcement temperature 1"	"min" / "actual" / "max" / "OFF"	
23	"announcement temperature 2"	"min" / "actual" / "max" / "OFF"	
24	"temperature in"	"°C" / "°F"	
25	"announcement altitude"	"absolutely" / "relatively" / "OFF" "5"/"10"/"20"/"25"/"50" "..."	OFF
26	"altitude in"	"m" / "ft"	
27	"vario sound rising is"	"ON" / "OFF"	
28	"vario sound falling is"	"ON" / "OFF"	
29	"vario sensitivity"	"0" "1" "2" "3" ... "9"	
30	"vario sound volume"	< value >	
31	"announcement rotation speed in rpm"	"min" / "actual" / "max" / "OFF"	OFF
32	"blade number 10"	"0" "10" "20" ... "90"	
33	"blade number 1"	"0" "1" "2" ... "9"	
34	"announcement speed"	"min" / "actual" / "max" / "OFF"	OFF
35	"speed in"	"km/h" / "mph"	
36	"announcement voltage in V"	"min" / "actual" / "max" / "OFF"	
37	"announcement current in A"	"min" / "actual" / "max" / "OFF"	
38	"announcement power in W"	"min" / "actual" / "max" / "OFF"	
39	"announcement current consumption in mAh"	"ON" / "OFF" "100"/"200"/"500"/"1000" "mAh"	
40	"announcement acceleration X-axis in g"	"min" / "actual" / "max" / "OFF"	
41	"announcement acceleration Y-axis in g"	"min" / "actual" / "max" / "OFF"	
42	"announcement acceleration Z-axis in g"	"min" / "actual" / "max" / "OFF"	
43	"end of settings"		
44	"changes have been saved"		

To 1: < *VSpeak: settings* >

There are 3 sets of different parameters available. You can change the parameter sets here easily.

To 2: < *selection language* >

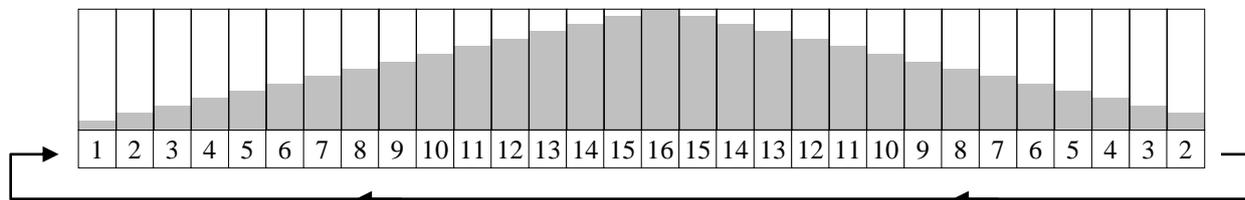
german, english, french, spanish, czech, Russian, portuguese, italian, dutch and hungarian

To 3: < *selection voice* >

(see section 6 "wav files") The voices are in each "Voice directory" in the directory "voice" saved. The directory "XYZ" (available in each "language directory") can be used for self-recorded wav files.

To 4: "*volume*"

The volume of the announcements can be adjusted in 16 steps.



To 5: "*wav test*"

Is "wav Test ON" selected it is immediately jumped to no. 43. Following this all wav files are played to the selected voice. This is an endless loop which can be stopped by pressing a key.

The wav-test serves "creative" users to test their self-recorded wav files. The setting is not saved.

To 6: "*stop timed announcements*" < *value* > "*seconds*"

The following values can be set for the interval time (in seconds):

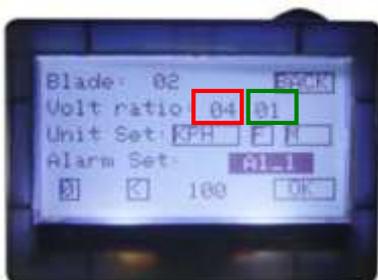


To 9 10 / 13 14:



For the analog values 1 and 2 respectively, the following units may be selected for the announcement:
V, A, 1/min, °C, °F, m/s, mph, km/h, km, m, ft

To 11 12 / 15 16:

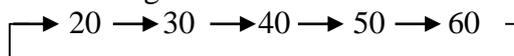


Analog 1 = **04**: divider 10 = **0** (No 11...tens)
+
divider 1 = **4** (No 12...one)

Analog 2 = **01**: divider 10 = **0** (No 15...tens)
+
divider 1 = **1** (No 16...one)

To 17: "*break alarm*" < *value* > "*seconds*"

The following values can be set for the interval time (in seconds):



All parameters from no. 18 are effective for the hub connected to the receiver and the corresponding sensors and telemetry data, which the "frame protocol of FrSky Telemetry Hub System (V2.0)" support.

To 18: "*announcement cell voltage in V*"

By connected FLV-01 (LiPo voltage sensor) is the cell number with the lowest voltage and the voltage value announced.

To 19/20: "alarm cell voltage"

Parameter set up for alarm single cell monitoring

Example: "alarm cell voltage **1** V" (before decimal point) = **3**

"alarm cell voltage **Point** V" (after decimal point) = **2**

When the voltage of a cell falls below **3.2 V** (e.g. 3.1 V) then the message:

"Alarm cell voltage 3.1 V" is announced.

To 25: "announcement altitude"

If you set the value to 5,10,20,25 or 50, you will get the current altitude if you press the button or if you have timed announcements. Additionally you get an announcement if the altitude changes by the set value.

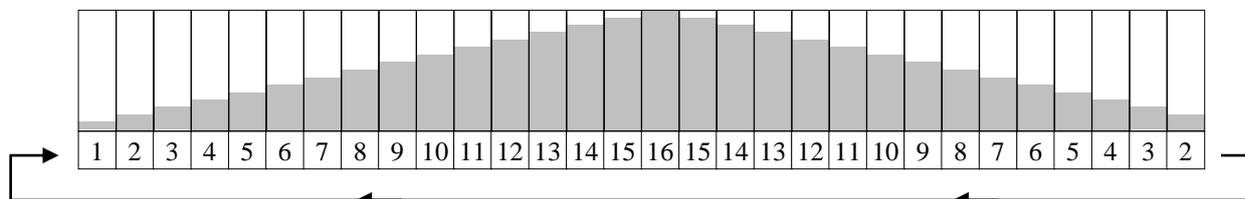
By choosing "relatively" (or 5,10,20,25,50) is with each call of the setup menu ("triple-click") the current altitude set and stored to "altitude NULL".

To 29: "vario sensitivity"

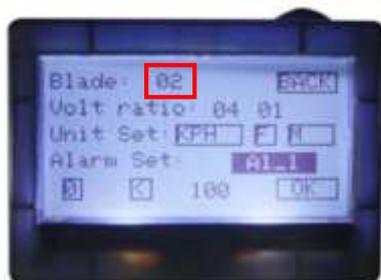
1, 2, 3 ... , 8, 9 (1... highest // 9... lowest sensitivity)

To 30: "vario sound volume"

The vario sound can be adjusted in 16 steps in its volume. While setting a tone is generated, which corresponds to the "least falling."



To 32 33: "blade number"



Blade = **02**: blade number 10 = **0** (No 32...tens)

+

blade number 1 = **2** (No 33...one)

To 36: "announcement voltage in V"

When connected, the voltage of the FAS is announced, otherwise when the FLVS is connected the cell sum voltage.

To 39: "announcement current consumption in mAh "

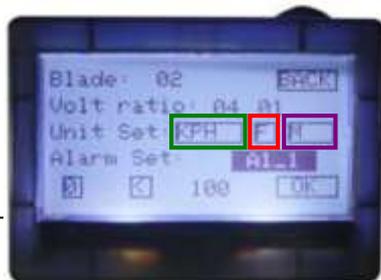
If you set the value to 100,200,500 or 1000 mAh, you will get the current consumption if you press the button or if you have timed announcements. Additionally you will get an announcement if the consumption changes by the set value.

To 44: "changes have been saved"

If settings were made under the previous points they are only saved **now at this point** - if no changes were made - this announcement is not applicable.

Accidental - or - incorrect entries can thus be discarded by switching off the radio before reaching this announcement.

Units:



No 35: "speed in"

"kmh" / "mph"

No 24: "temperature in"

"°F" / "°C"

No 26: "altitude in"

"m" / "ft"

5.4 Notes on useful settings and operation

As described above, a number of settings can be made for the speech module VSpeak. If the sensor values are present and not turned to the "OFF" position, the sensor values are all announced at once (without a break ...), according to the order of the table in section 5.3. The start of the announcements can be either timed (at the end of time "stop timed announcements") or requested ("single-click").

Furthermore you can enable the announcement of altitude and current consumption on a set difference (and no other announcement is happening at this moment).

To avoid being distracted by too many announcements one should **only allow a few announcements** for the timed announcement or announcement to "single-click" (Immediate Start).

6 wav files



The wav files (audio files of the announcements) are arranged in accordance with the adjacent picture in directories according to the country code (e.g. DE for German) and voices: (e.g., Robbi, Rolf, Silvia ...).

The directory "XYZ" is available in any language. The available wav files can be replaced by "diligent" users of the Vspeak module by own recordings, i.e. can be overwritten.

To create your own wav files there's useful information on the website: www.VSpeak-modell.de under downloads.

The self-generated wav files can be easily tested in VSpeak (see section 5.3):

1. Settings choose <language> and <voice>
2. settings "wav test ON"
(the wav files are played in an infinite loop)

"Creative self-generated voices" can be mailed for review and inclusion in the selection of voices by VSpeak at the address mentioned in section 14.

7 Update

The processor on the speech module contains a SD bootloader with a version counter.

If firmware updates are available they will be sent via mail. The information in the mail files are copied on the Micro SD card (formatted FAT or FAT16), this is inserted into the speech module and power turned on. The boot loader will recognize the new software version, boots (blue LED "flickers") and is now up to date.

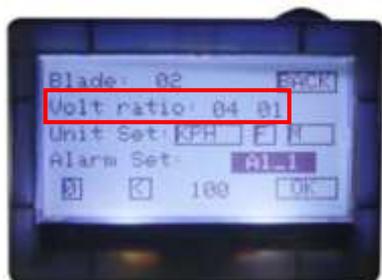
Everytime with the first turning on the current version number is announced.

8 Supported sensors

8.1 Telemetry Receiver D-series and S.Port Telemetry X-series

- announcement RX link quality in: % signal level + alarms
- announcement TX link quality in: % signal level + alarms
- announcement analog value 1 in: ... + alarms
- announcement analog value 2 in: ... + alarms (only D-series)

8.1.1 analog inputs A1, A2 – "Volt ratio"



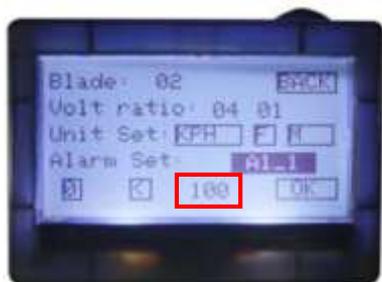
At the analog input A1 is usually the internal receiver-voltage connected. To A2 another analog voltage can be connected and brought to display.

The max. voltage for A2 as well as for A1 is 3.3 V.

To view larger voltages, voltage dividers must be used while ensuring that the maximum possible voltage of the voltage divider is a multiple of 3.3 V (i.e. only "integer" voltage divider).

For example, from the "Instruction manual for FrSky Two-Way system" section 9.2.1 can be seen that the internal voltage divider is designed for a max. battery voltage of 13.2 V, which is exactly 4 times of 3.3 V. Thus, by a "Voltage ratio" for A1 the value of **4** is to be set (... for the speech module VSpeak according to the table in section 5.3 no.11 & 12).

8.1.2 analog inputs A1, A2 – "Alarm Set"



For the analog inputs A1 and A2, two independent alarms can be programmed:

A1_1 A1_2 and A2_1 A2_2

Setting the alarm level (0,1,2,3) and the comparison value ("<" / ">") is quite simple - a little more complicated is the determination of the to be adjusted alarm value (Which alarm threshold is set in the example at 100 and in the 8.1.1 predicted, voltage ratio set = 4??).

To calculate the alarm values use the following two formulas:

1. Wanted: to be set alarm threshold Given: Volt ratio, alarm value (inV)

$$\text{to be set alarm threshold} = \frac{\text{alarm value} \times 255}{3.3 \text{ V} \times \text{Volt ratio}}$$

2. Wanted: alarm value (in V) Given: Volt ratio, set alarm threshold (in V)

$$\text{alarm value} = \frac{\text{set alarm threshold} \times 3.3 \text{ V} \times \text{Volt ratio}}{255}$$

Thus, with Formula 2 the above question will be answered with: 5.1 V

What alarm threshold was set for an alarm on receiver voltage <4.2 V at A1? With the help of formula 1 (and Volt ratio = 4) is the result: 81

The alarm thresholds for the RX and TX are in turn easy, they are entered 1-1.

8.2 "Sensor Hub (V2.0) and Sensors"

8.2.1 FAS- . . . "Ampere Sensor" (40, 100 ...)

- Announcement voltage in: V
- Announcement current in: A
- Announcement power in: W
- Announcement current consumption in: mAh

8.2.2 FBVS-01 "Battery Voltage Sensor"

- Announcement analog value 1 / 2 in: + alarm

8.2.3 FGS-0 "Fuel Gauge Sensor"

- announcement tank level in: % tank level

8.2.4 FLVS-01 "Lipo Voltage Sensor"

- Announcement cell number with minimal voltage in: V + alarm
- Announcement cell sum voltage in: V

8.2.5 FVAS-01 "Variometer Sensor"

- Announcement altitude in: m / ft
- Vario sound

8.2.6 GPS-01 "GPS"

- Announcement speed in: kmh / mph

8.2.7 RPMS-01 "RPM Sensor"

- Announcement rotation speed in: rpm

8.2.8 TAS-01 "Triaxial Acceleration Sensor"

- Announcement acceleration X-axis in: g
- Announcement acceleration Y-axis in: g
- Announcement acceleration Z-axis in: g

8.2.9 TEMS-01 "Temperature Sensor"

- Announcement temperature 1 / 2 in: °C / °F

8.3 Sensors for FrSky Telemetry data-port (Tx, Rx, GND)

The following sensors can be connected directly to the FrSky-Telemetrie Port (Tx, Rx, GND) (... more information is given in the manual of these sensors):

8.3.1 FAS- . . . "Ampere Sensor" (40, 100 ...)

- Announcement voltage in: V
- Announcement current in: A
- Announcement power in: W
- Announcement current consumption in: mAh

8.3.2 Hub-less FrSky "Variometer Sensor"

- Announcement altitude in: m / ft
- Vario sound

8.3.3 „VSpeak-Vario“

- Announcement altitude in: m / ft
- Vario sound
- Announcement acceleration X-axis in: g
- Announcement acceleration Y-axis in: g
- Announcement acceleration Z-axis in: g
- Announcement temperature 1 in: °C / °F

with connected Balancer:

- Announcement cell number with minimal voltage in: V + alarm
- Announcement cell sum voltage in: V

8.4 Smart-Port-Sensors for FrSky-S.Port

Tested have been:

8.4.1 Hub-less FrSky „Variometer Sensor“

- Announcement altitude in: m / ft
- (only pseudo-) Vario tone

By connecting the vario to the S.Port there is no information of the climb rate at the output of the FrSky- Transmit-Modules (DHT, DFT ...) The VSpeak module generates the vario tone by a calculation based on the altitude. This is not the best way.

If you connect the vario to the receiver that supports the old telemetry port (Tx, RX GND) the VSpeak module can get the vario value directly and can generate a better vario tone.

8.4.2 UniSens-E from sm-modellbau

- Announcement altitude in: m / ft
- (only pseudo-) Vario tone

By connecting the vario to the S.Port there is no information of the climb rate at the output of the FrSky- Transmit-Modules (DHT, DFT ...) The VSpeak module generates the vario tone by a calculation based on the altitude. This is not the best way.

Other FrSky-Sensors with S.Port have not been tested so far.

9 Accessories

The "FrSky VSpeak-adapter" must be ordered separately via www.vSpeak-modell.de.

Graupner / JR servo counter cable and earphones are not included as these are often already present.

Suggestions for receiver / speaker / BT devices:

1. **Wired earphones** www.conrad.com article no.: 386308.
(in our opinion the best price-performance ratio)
2. Hama mini-speaker www.conrad.com article no.: 343151.
3. Wireless via Bluetooth transmitter "B-SPEECH TX2" from www.reichelt.de
The BT transmitter functions with just about every BT headsets except those devices specified in the manual (mobile phone accessories).
Note: In order to enable the B-SPEECH TX2 in pairing mode, hold down the On button until the red **AND** the blue LED flashes (about 7s). At this point, the manual is a bit "thin".

Position BSpeech module and active speaker at a sufficient distance to 2.4 GHz radio antenna!

10 Technical data

Power supply	3.5 ... max. 16V
Power usage	ca. 18 .. 30 mA
Dimensions	27 x 16 x 15 mm
Weight	7 g
Connections	3.5 mm stereo jack, short-circuit-proof output for earphone Graupner / JR servo plug input

11 Instructions for disposal



Equipment marked with the symbol should not be disposed of within household waste.

12 EG Declaration of Conformity

Manufacturer

VSpeak-Modellbau (Volker Weigt)
Priestewitz



We hereby declare that the product

Speech module VSpeak

complies with the following European directives:

2004/108/EC	EMC Directive
2006/95/EC	Low Voltage Directive (LVD)
2011/65/EC	Restriction of Hazardous Substances (RoHS)

The presumption of conformity is taken by applying the following harmonized standards:

EN60065	Audio-, video- and similar electronic apparatus - Safety requirements
EN60332	Tests on electric and optical fibre cables under fire conditions
EN60950	Information technology equipment - Safety
EN61000-6-1	Electromagnetic compatibility (EMC)
EN61000-6-3	
EN55022	Information technology equipment - Radio disturbance characteristics

Priestewitz, 2012/06/01

.....
Signature

Volker Weigt

Managing Director

13 Version history

Vers.-No	Date	Comment
1.0	06.2012	First retail version
1.1	11.2012	Adjustment to changed accuracy of current measurement (FAS-100) Support of the "VSpeak-Vario" new voices in Czech and Russian
1.2	01.2013	Correction voltage, power, power consumption (FAS-...)
1.3	09.2013	Correction of occasional erroneous announcements (altitude, total cell voltage, at logging of the VSpeak Vario) Correction announcement RX link quality indicator in dbm new voices in portuguese, italian, dutch and hungarian
1.4	01.2015	Altitude and capacity difference triggered announcement is possible Support for 3 different parameter sets

14 Contact

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