

# **picolario talk**

**The telemetry system from**



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**Dear customer,**

Congratulations to your new Picolario talk. You have chosen an expandable telemetry system, which is designed and manufactured by Renschler Instruments in Germany. It is a joint development between Renschler Instruments and Thommys Modellbau. The knowledge of Renschler Instruments and the experience of Thommys.com in RC sailplanes was important to make it a professional system. It is also easy to operate and provides the information relevant for flying.

The main idea is to supply a lot of data, without distracting the pilot from flying. Cause it is not easy in critical situations, to move his eyes from the model, a voice data output was the optimum solution. With that the pilot is informed through a friendly woman voice.

Due to the wide spread of vario/ telemetry systems the Picolario uses a 64 channel transmitting module. A cheap 1 channel solution is insufficient due to the limited usage of just 1 pilot. The receiver is a license free standard RF unit (433 MHz in Europe) which could also be used for other communication purposes: f. e. searching a model in the wood.

Another point we want to mention is the update and upgrade ability of the Picolario Talk.

During turn on the voice tells you the version of the current software.

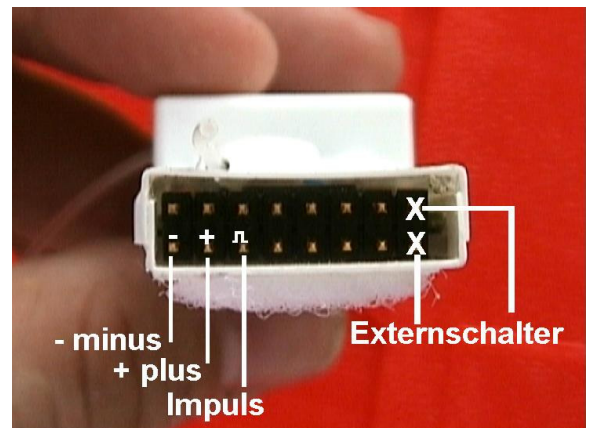
To get the latest news just, take a look at [www.picolario.com](http://www.picolario.com) .

**Please take care to plug the cable correctly.**

**Please take a look at the picture shown right .**

**Lay the Picolario on a table with the pins to the right side, so the small tube of the pressure sensor is next to you. The cable is plugged in on the pins on the other side.**

**Take the row next to the table and then minus (-), then plus (+) and then signal**

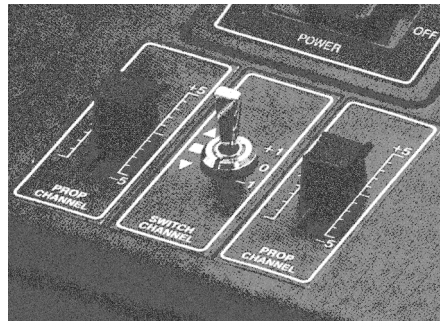


### **Mounting consideration for the vario :**

Stick the vario using the Velcro inside your model. If you have a carbon fuselage, then it is recommended to have the antenna outside. The antenna should also be straight and not parallel to other wires or metal pieces, cause this reduces the transmitting range. We have tested the Picolario with several 35 MHz receiver and we could not see a big impact in the range. But we recommend in general to make a range check with your model before first usage. (In every model you are using it). We think that this is generally a good idea after installation of new electronic components like servos, receivers or varios. If you ran into problems please contact us. In most cases of problems there has been a general problem with that specific installation and the vario makes a worse thing even more worse than it has already been. We could see a range decrease on some receivers, if the RC receiver antenna was close to servo wires, without even having a Picolario installed.

### First operation of the vario:

Plug the vario into a free channel of your receiver. This channel supplies the vario with power and is used to request information. The voltage the Picolario talks about, is exactly this voltage. Assign a switch (3 positions ) or a slider to this channel. Ensure that it has a +- 100% range. This switch is necessary to control the Picolario. You need it also to change parameters of the Picolario. The following table shows the logical assignment of the switch and it ´s practical impact:



Switch / Slider		During flight (set mode 6 option 1) <u>Request of altitude /voltage time automatic alt mode</u>	During programming
	100 %	Request of altitude /voltage <u>time automatic alt mode</u>	Increase value
	middle position	Vario signal and altitude and voltage automatic	-
	-100%	No vario signal, TX switched of only power supply monitor	decrease value

Select at your transceiver the same channel like selected on the Picolario. You can also use the scan feature of your transceiver to find the channel selected at the Picolario.

At a low squelch level it is possible that the transceiver sees the Picolario at several channels. So it is a good idea to verify the channel which you have selected on both sides of the transmission path. After a short initialization you will hear the vario signal. The first information of the voice is the version of the current software. (f. e. version 2.6).

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## Interference detection

If you are using ppm-receivers, the Picolario will tell you "attention", if there are interferences, just in the moment when they appear. Therefore the Picolario checks the pulses coming from the RX. If the jitter gets over the adjusted level, you will get an "attention". The level can be adjusted in the setmode 5. You can select from off to 6, where 6 means best sensitivity. Do some range checks with different values and select the value when the Picolario tells you attention just in the moment where your Servos jitter, but are still under control of your RC-transmitter.

If the signal is so bad, that there would be one attention followed the other, the Picolario changes the mode of interference detection, and you will get an attention followed by the number of attentions, the Picolario should have announced within the last 15 seconds. We call this summary mode. This will end automatically when conditions are getting better. Then the Picolario will tell you something like "attention 0 stop".

If you are using RX that do intelligent pulse decoding and restoration of disturbed signals, this feature may not work properly.

If you use the Picolario connected directly to the batteries, you have to turn these feature off. If you use PCM-RX, this feature does not work, turn it off and use the programmable failsafe of your RC-transmitter to turn the Picolario off while failsafe. So if the Picolario turns off, while flying, you know that you are in failsafe-mode.

## Vario function :

The vario indicates climbing through short „peeps“ and the higher the frequency the better the climbing. Also the interval between the „peeps“ gets shorter with increasing climb rate. A constant sound indicates falling. No sound is 0 or depending on your „quiet zone“ setting. You can select in set mode 2 the sink tone level, where the sink tone starts working. If you set this value to a little bit more than the standard sink rate of your glider, then you will have in normal flight no sound and only in sinking air a sink tone. But this depends on your taste.

## The voltage monitor of the receiver battery :

The receiver accumulator voltage is measured by the Picolario. Only if it decreases its value a voltage announcement will occur. This allows the usage of 2 batteries connected through a switch unit.

Again you are only told the voltage automatically if it has decreased by another 0.1 Volt step. If you want to know the current voltage then you can request this information at every time by the 3 position switch.

## Automatic altitude mode at middle switch position (100 ft automatic) :

The Picolario automatically zeros itself at turn on. So if you switch it on at 3000 ft altitude it will subtract this value from all future measured values. If you climb 7 feet to 3007 ft then the vario calculates  $3007 - 3000 = 7$  ft and this is the altitude it will tell you. The altitude automatic (only in middle position) will tell you every 100 ft automatically (without a request) the altitude. So if you climb to 270 ft you will hear „100 ft“ and „200 ft“ automatically. If you sink afterwards from 270 ft the next information will be „100 ft“. The reason for that is that it is not easy to decide voice output if your altitude varies about 200 ft in 1 ft steps ( 199ft -> 201 ft -> 199 ft)

### **Request of the altitude or the voltage and time automatic:**

Additionally to the automatic announcement of the altitude the precise altitude could be requested at any time. To do that the switch must be for about 2 seconds in the 100% position. Then you get a precise announcement of the current altitude: f. e altitude sixty nine feet. If you leave your switch in the 100% position during the announcement the voltage information will follow. If you leave your switch in this position for a longer period of time then after a programmable interval an announcement will occur. f. e. every 10 seconds. This announcement has no „altitude“ in front of it and simply tells „123 ft“. You can program this time interval in set mode 4 between 10 to 60 seconds in 10 second steps.

**Please Note.:** The first request of an altitude announcement starts the flight book recording.

### **Failsafe detection with PCM receiver ,**

which go into a predefined state. You can use the requested altitude information to detect if your PCM receiver has gone into failsafe mode. You have to program the channel of the Picolario that it goes to -150% (1 ms) during Failsafe. During flying you normally have your switch at high position . If your picolario switches off, you know that your PCM receiver has gone into Failsafe mode. Coming back from Failsafe you will get the complete announcement :”Altitude ... Voltage ...”. Even if you have not realized that the picolario has turned off, you will now realize that there is an announcement you had not requested .It is always amazing what our spirit lets us do.

### **Parameter setting**

You can set the delay time, the sink tone level, the acoustic scale range and the time interval for the time automatic. With that you can adapt the Picolario to various different models or weather conditions.

Normally you can select 800 ft/min as acoustic scale. For alpine soaring 1600 to 3200 ft/min is recommended. 400ft/min is only for very calm conditions early in the morning or late in the evening when there is no wind.

You can also specify sensibility of interference control and choose from different assignments of switch position and announcements.

To program a parameter set the switch into the middle position. You enter programming mode by pressing the small blue button DURING you switch on your model. Then the Picolario enters set mode and will announce this to you. Now you can select one of the 6 set modes with your switch (up or down). If you have reached the set mode you want to change again pressing the blue button enters the corresponding value setting. Then you can change the value with the 3 pole switch and store it by pressing a third time the little button on the Picolario.

The following summarizes the parameters you can change:

- 1.) delay time. (set mode 1) The vario needs some time from entering the vertical movement until the first „beep“. That is the delay time. Normally this time is set to one second. The main reason for that time is that a thermal could be too small to be used. If it beeps with a delay of 1 second, you can be sure that the thermal is big enough for circling.
- 2.) sink tone level (set mode 2). This level sets when the sink tone starts. There will be 3 different logical levels. Immediately will give you always a sink tone. (standard setting with 40 ft /min.) A little bit more than the sink rate of your glider, will give you a quite zone

if you fly in calm air with no rising or falling. Only if the air is also sinking then the sink tone will appear. Last a value of about 600 ft/min can be programmed by people who like it quiet during sinking, but want to get informed when a maximum sink level is reached.

- 3.) acoustic scale range (set mode 3) The Picolarios has different modulated frequencies for each direction. You can select the range in which the acoustic is used. The less the value the more nervous (and sensitive) the instrument. You can select between 400,800,1600 or 3200 ft/min. Using variometers for the first time, you should choose 1600 ft/min. The more you get used to your variometer the more it makes sense to choose 800 ft/min.
- 4.) automatic time interval for altitude (set mode 4) time interval for the automatic altitude announcement
- 5.) interference detection (set mode 5) Values from off upto 6 (0 high sensibility) setting this parameter we suggest that you are going to test at the ground the level of jitter where the warning starts. Due to the fact that the RX are quite different, it is up to you, which position is best for your RX/TX combination.
- 6.) assignment switch position and announcement  
Upto version 2.5 picolario was able to tell you altitude, voltage and a warning of interferences. With version 2.6 it will also report integral vario value.

Using the picolario gps modul, it is now possible to transmit speed, gliding ratio as well as position.

Therefor it was necessary to modify the concept of the three position switch. As you can see in the following table you can now choose from different options. The new tricky concept makes it possible to realize 4 different states using the three position switch. Depending from which side you come into middle position, you might choose different announcements.

For example if you choose option 7 in setmode 6 you will get in middle position an announcement of the altitude every 100 ft if you come from the upper side, or you will get gliding ratio or integral vario value, if you come from lower side.

In some modi it is also possible to switch off vario signal. This might be useful if you want to use picolario as an altimeter in motorplanes.

The modis listet in the table below are a first preselection. This will be modified in later releases.

If you like to have a special configuration, just let us know by mail and we will see if this could be realized in the next release.

Modi 1 to 6 are for use without GPS, modi 7 to 14 just make sense together with GPS.

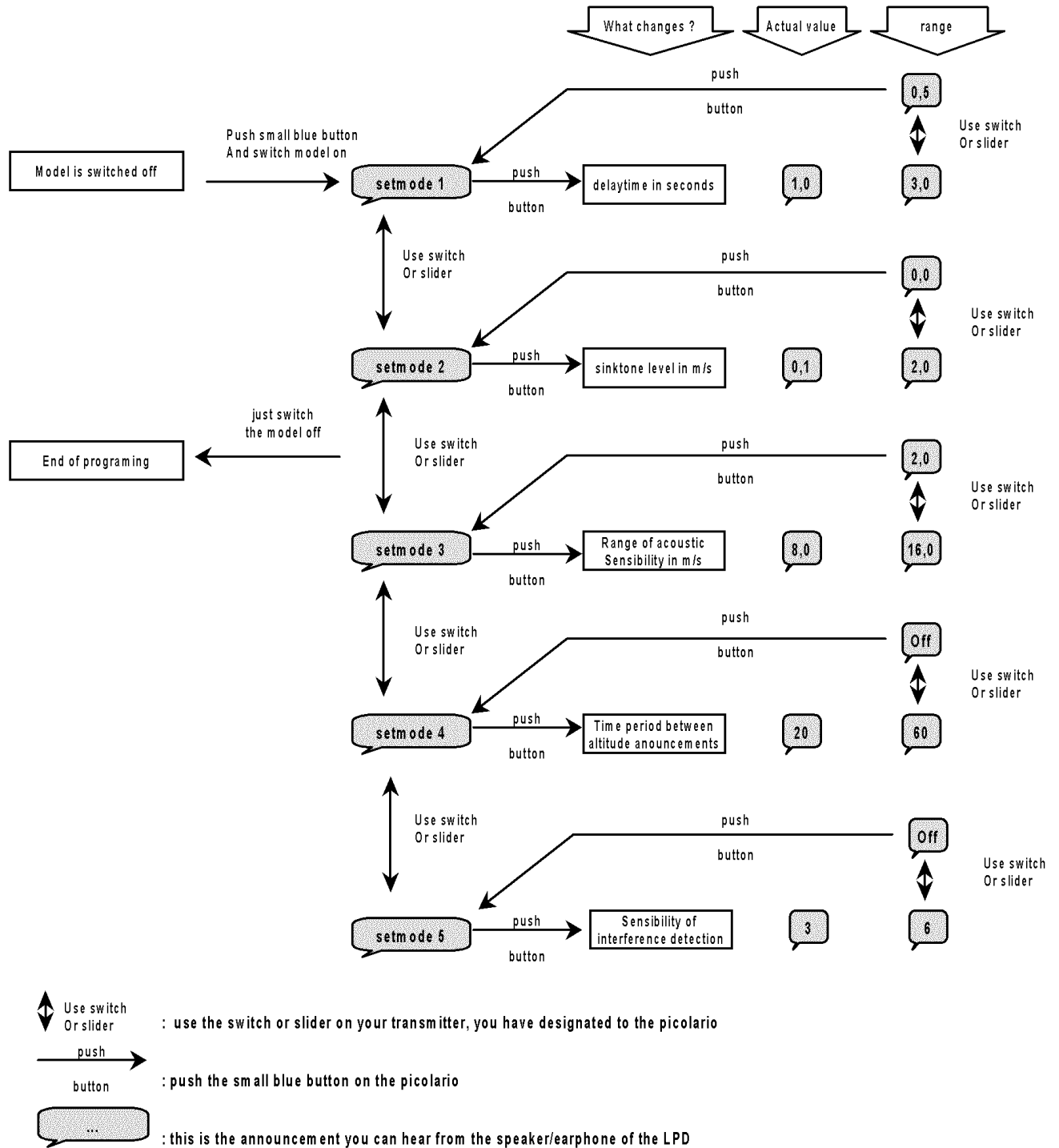
Modus	Variosignal	Middle position from upper side (long pulse)	Middle position from lower side (short pulse)	Lower position (short pulse)
1	On	Altitude every 100 ft	Altitude every 100 ft	Off
2	Off	Altitude every 100 ft	Altitude every 100 ft	Off
3	On	Altitude every 100 ft	Integral vario intervall	Off
4	Off	Altitude every 100 ft	Integralvario intervall	Off
5	On	Altitude every 100 ft	Altitude every 100 ft	Integralvario intervall
6	Off	Altitude every 100 ft	Altitude every 100 ft	Integralvario intervall
The following options just make sense, if you are using the GPS-modul				
7	On	Altitude every 100 ft	Gliding ratio/Integral vario	Speed
8	On	Gliding ratio/Integralvario	Gliding ratio/Integral vario	Speed
9	On	Speed	Gliding ratio Integral vario	Position/ Off
10	On	Speed	Gliding ratio Integral vario	Position every 30 sec
11	Off	Altitude every 100 ft	Speed	Off
12	Off	Altitude every 100 ft	Speed	Position /off
13	Off	Altitude every 100 ft	Speed	Position every 30sec
14	Off	Altitude every 100 ft	Altitude every 100 ft	Speed

**We recommend 800ft/min for the acoustic scale range and a delay of 0,8 seconds.**

At strong winds and thermal in the high mountains 1600 or 3200 ft/min with a delay of 0.8 second is recommended.

If the Picolario sounds to nervous to you, then you should select a higher delay time and a higher acoustic scale range setting.

# Programing the picolar10



## **The flight book :**

The Picolario continuously measures the voltage and altitude and also the climb and sink rate. If you want, you can store the maximum and minimum values after a flight by pressing the red button. **Please note that the recording starts after the first request of an altitude announcement.** You enter flight book mode by pressing the red button. Then the minimum and maximum values of the last flight will be announced and stored. If you don't press the red button after a flight the flight data are lost. There are 10 data sets available and you can select with your 3 pole switch the flight of interest. Flight number 1 is the most recent one. Flight number 10 is the oldest. It is a circular buffer. If you want to hear the data from flight number 2 (2 flights ago) then you bring the 3 pole switch in the middle position after „flight number 2“ has been announced. If you wait 2 seconds the minimum and maximum values will automatically be announced. To leave flight book mode switch of your model.

## **Some words about using a Picolario in the model plane**

- 1.) The altitude measurement is based on an air pressure measurement, which is very sensitive. If you have your model inside a building pressure changes of up to 0.5 m/s are possible. You can see that also if you simply open or close a door and the vario starts beeping. If the weather changes it is also possible that the zero altitude from takeoff changes by up to 100 ft. At thunderstorms or cold fronts even more.
- 2.) usage of the altitude information.  
The altitude information has several useful applications. If you have to land not directly close to you, the altitude could be very useful, if you have done some pre measurements. If you know the altitude difference between your place and the landing place, the altitude gives you an indication when it is time to think about a landing approach. If you already have lost 800 from 950 ft maybe some thoughts about landing direction would be helpful.  
Also at light thermals the altitude information is great. If you have in one part of the circle climbing and in the other sinking then the altitude information will tell you, if it is worth staying there or not. With the altitude announcement you also can stay at places where you only make 100 ft in 10 minutes. There a normal vario is at it's limits.  
During competitions it is also very useful to bring all pilots to exactly 600 ft.
- 3.) usage in electric gliders. The impact of the ventilation openings common at electric models are in most cases less than feared. Generally you should try to have a pressure which has minimum variation with speed. Sometimes it is possible that you can hear motor sounds through the Picolario. This is due to high frequency pulses on the power supply line.
- 4.) problems at big models with only few free receiver channels  
Very often big models have an insufficient amount of free channels at the receiver. You can use the vario together with a V wire, which splits the operation with other functions. The vario is operated in parallel. Ensure that no servo is operated above it's limits. There is also sometimes a limitation due to the paralleling.
- 5.) clever programming for easy operation  
it is recommended to have a 3 pole switch controlling the Picolario. With that switch you control the programming mode and the functions in operation. If you have an additional easy reachable switch you can program your RC transmitter in a way that you can get easy announcements.

**Technical data:**

sensitivity : approx. 5 cm/s  
resolution altimeter : 1 ft  
temperature : -20°C to + 50°C  
dimensions : 82 x 23 x 13 mm  
weight : ca. 24 g  
power supply : 4,4 V to 10 V through RC receiver  
current consumption 45 mA  
TX frequencies : 64 channels in the 433 MHz band  
Set modes : delay time, sink tone level, acoustic scale range

Functions: vario signal, announcement of altitude and voltage  
Flight book with minimum / maximum storage  
In preparation: modules for current, speed and other parameters  
PC-connection

If you have constructive feedback let us know.

**Sales and Information :**

Thommys Modellbau  
Rebenweg 27  
73277 Owen - Teck  
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Fax +49 721 9553869  
[www.thommys.com](http://www.thommys.com)  
[Picolario@thommys.com](mailto:Picolario@thommys.com)

**manufacturerer :**

Renschler Instruments  
Kirchtalstr.30  
70435 Stuttgart

**CE –Declaration :**




**The Picolario is compliant with the EG EMV specification 89/336/EWG, 91/263/EWG and 92/31/EWG. It has been RFI tested regarding EN50 082-1:1992, EN50 082-2: 1995 and EN50 081-1:1992. The TX module is registered at RegTP with No. ICT E811 229M.**

**Important note :**

**This system is designed for use in Germany. The use in Germany is legal and license free. If you use the Picolario and/or the LPD in other countries than Germany, you have to make sure that it is legal in these countries. You will use it on your own risk.**

# Picolario Talk short reference quick start :

1. Select the same channel at the Picolario and the Transceiver according to the table on the backside.
2. Mount the Picolario with the Velcro
3. Connect the Picolario to a free channel of your receiver
4. Program to this channel a 3 position switch or slider

Switch / Slider		During flight	During programming
	100 %	Request of altitude /voltage <b><u>time automatic alt mode</u></b>	Increase value
	middle position	Vario signal and altitude and voltage automatic	-
	-100%	No vario signal, TX switched of only power supply monitor	decrease value

5. Switch it on and do a range check. Then you can start

## Setting of the parameters

1. Bring the switch into the middle position and press the red button during turn on
2. Change values according to programming plan in the middle of this manual

Change with the 3 pole switch and select/program with the red switch

set mode 1 = delay time

set mode 2 = sink tone level




























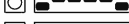
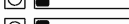

































set mode 3 = acoustic scale range

set mode 4 = time interval for time automatic model

set mode 5 = sensibility of interference detection

set mode 6 = assignment switchposition->announcements

3. to get out of programming mode, just switch off the power.

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