



EVAS CAN Bus

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User Guide

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1 Characteristics

1.1 Operating characteristics

Power supply	9 - 32VDC
Average consumption	180mA
Mean power	3W
Supported speed rates on CAN bus	125kb/s ; 250kb/s ; 500kb/s
CAN Bus standard	CAN 2.0A/B
Voice recognition type	Speaker-independent
Languages	French/English/German/Spanish/Italian
Bluetooth	4.2 ; HFP 1.6 protocol

1.2 Connectors

EVAS is equipped with a 5-pins M12 connector dedicated to power supply and CAN-bus communication. A USB port connects the USB microphone or the configuration USB key.



M12 connector pins are allocated as follows :

M12 5 voies	
1	CAN S
2	Vdc
3	GND
4	CAN H
5	CAN L

2 System operation

EVAS has 2 listening modes and several configurable parameters.

2.1 Continuous listening mode

Continuous listening is activated via a CAN frame with the value 0x01 or 0x05 (filtered continuous listening) on byte 0.

When continuous listening is enabled, the LED on the housing indicates that the system is listening. From this moment you will be able to say an order in the microphone. Once the order is said, it is interpreted by the system, recognized and transmitted on the CAN bus. You can then say another command until you disable continuous listening through a CAN frame with the value 0x02 at byte 0.

Continuous listening mode has the following 6 parameters, configurable via a CAN frame.

- Choice of language (bit 4 to 6, byte 0) ;
- Recognition filter (bit 2, byte 0) ;
- Choice of the order family (byte 1) ;
- Duration setting (byte 2) ;
- Volume adjustment (byte 3) ;
- Threshold adjustment (byte 4).

2.2 Impulse listening mode

Impulse listening is activated via a CAN frame with the value 0x03 or 0x07 (filtered impulse listening) on byte 0.

When pulse listening is enabled, the LED on the housing indicates that the system is recording. From this moment you will be able to say an order in the microphone. Once the order is said, it is interpreted by the system, recognized and transmitted on the CAN bus. It is possible to cancel an order being recorded by sending a CAN frame with the value 0x02 to byte 0. To say a new command, it will be necessary to send back an impulse listening activation frame.

Impulse listening mode has 5 parameters, configurable via a CAN frame.

- Choice of language (bit 4 to 6, byte 0) ;
- Recognition filter (bit 2, byte 0) ;
- Choice of the order family (byte 1) ;
- Duration setting (byte 2) ;
- Volume adjustment (byte 3) ;

2.3 Configurable parameters

2.3.1 Listening filter (bit 2, byte 0)

When this parameter is activated, EVAS searches for the exact order among the configured order list. The user must pronounce the order as clearly as possible otherwise EVAS will return an unrecognized order information on the CAN bus.

When this parameter is disabled, EVAS tries to recognize the most similar order among the configured order list, even if the user says an order that does not exist in this list. The response time is very fast.

The activation of this parameter makes the system reliable but it increases the response time (depending on the size of the order and the duration of the recording).

2.3.2 Language choice (bit 4 to 6, byte 0)

At any time, you can choose the language of the speech recognition among the languages French, English, German, Spanish and Italian.

Nevertheless, it's necessary that orders have been created in the requested language, otherwise an error code will be returned on the CAN bus.

IMPORTANT NOTE : Switching from one language to another may take a few seconds.

2.3.3 Order family choice (byte 1)

You have the possibility to create order families with the configuration software.

A family is made up of several orders, the fewer orders there are in a family and the faster and more reliable the system will be. You can create up to 100 families, each containing 100 orders.

You can change this setting at any time, which will change the order list of the EVAS system.

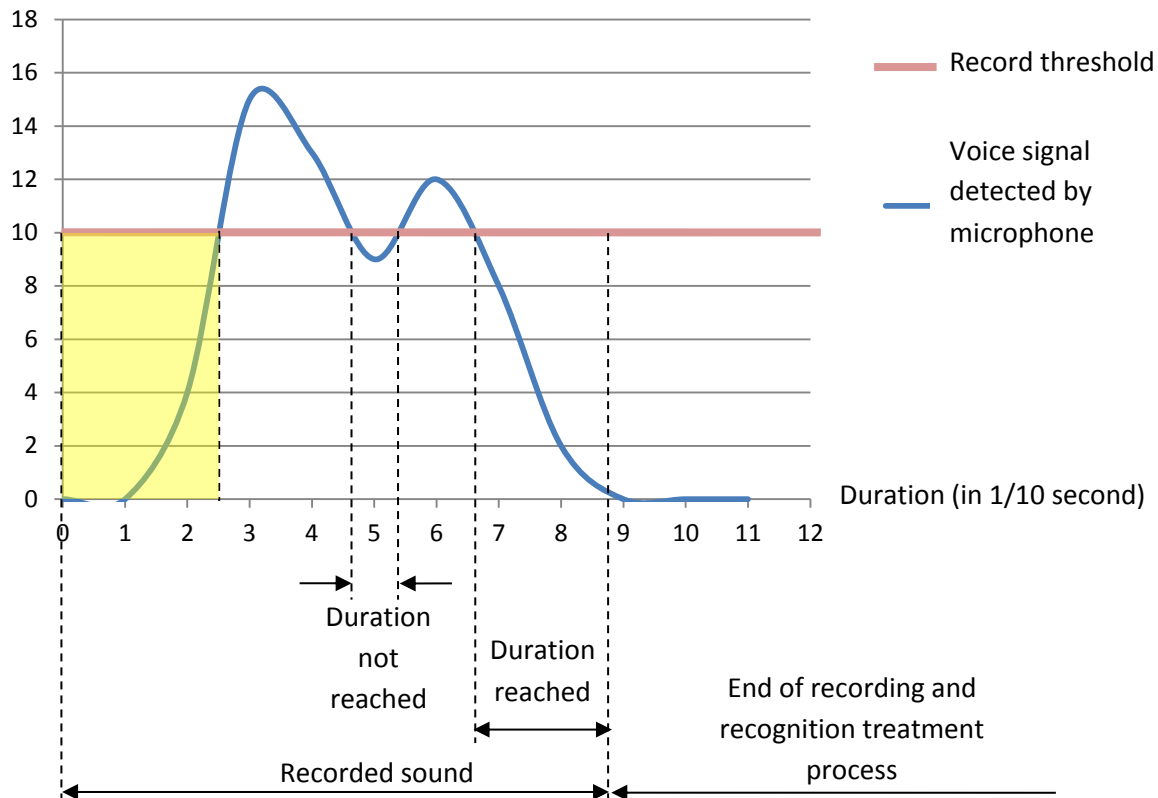
However, the family must exist otherwise an error code will be sent back on the CAN bus.

2.3.4 Duration setting (byte 2)

In pulse listening mode, this parameter indicates the duration of the recording (during which the user must say his order in the microphone) in seconds.

In continuous listening mode, this parameter indicates the duration in tenths of a second during which the user having started to say his order, begins to speak at a value lower than the value of the parameter "recording threshold of an order". If this duration is exceeded, the EVAS system stops recording and will attempt to recognize the order cited.

EXAMPLE : for a duration of 0.2 second (byte 2 = 2), in continuous listening :



Once the threshold is reached, the recording starts, to which is added the recorded sound for a fixed duration of 0.5 second before the threshold is reached (framed in yellow on the graph above). Then the recording stops once the duration parameter is reached (in our example: 0.2s).

You can choose a duration in seconds for impulse listening mode and in tenths of a second for continuous listening mode.

2.3.5 Volume adjustment (byte 3)

This is the microphone recording volume. The higher this parameter is, the more the record can be done away from the microphone but there will also be more noise.

This parameter is adjustable from 0 to 100.

2.3.6 Threshold adjustment (byte 4)

This is the minimum sound power threshold to be reached with the voice when speaking in the microphone for the EVAS system to interpret an order. Once this threshold is reached, the registration of the order is triggered and when the duration parameter is reached, the recording will end and the EVAS system will attempt to recognize the recorded order.

2.4 Microphones

EVAS can work with USB microphone or Bluetooth headset (COD = 240404).

2.4.1 Priority to USB microphone

If both microphones are activated, USB microphone has priority.

EXAMPLE : If a Bluetooth microphone is in listening mode and you connect an USB microphone then Bluetooth microphone will be deactivated and USB microphone will be in listening mode. If you disconnect an USB microphone (in listening mode) when a Bluetooth microphone is active then Bluetooth microphone will be in listening mode.

2.4.2 Connection to a Bluetooth Headset

To connect a Bluetooth microphone to EVAS, you have to set the connection HFP bit. Next EVAS will try to connect itself to the headset (with COD 240404 and HFP protocol) during 5 seconds.

HFP 1.6 is highly recommended to have reliable speech recognition.

Once EVAS is connected, it will automatically make a call to the headset then you can pick up the call to make Bluetooth microphone active.

3 EVAS configuration interface

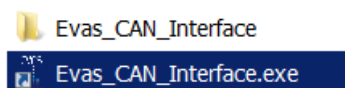
The software will allow you to configure CAN bus communication and add your different order lists by family and language. You will even be able to create your own orders (ex: proper names) that EVAS will recognize.

3.1 Software Installation

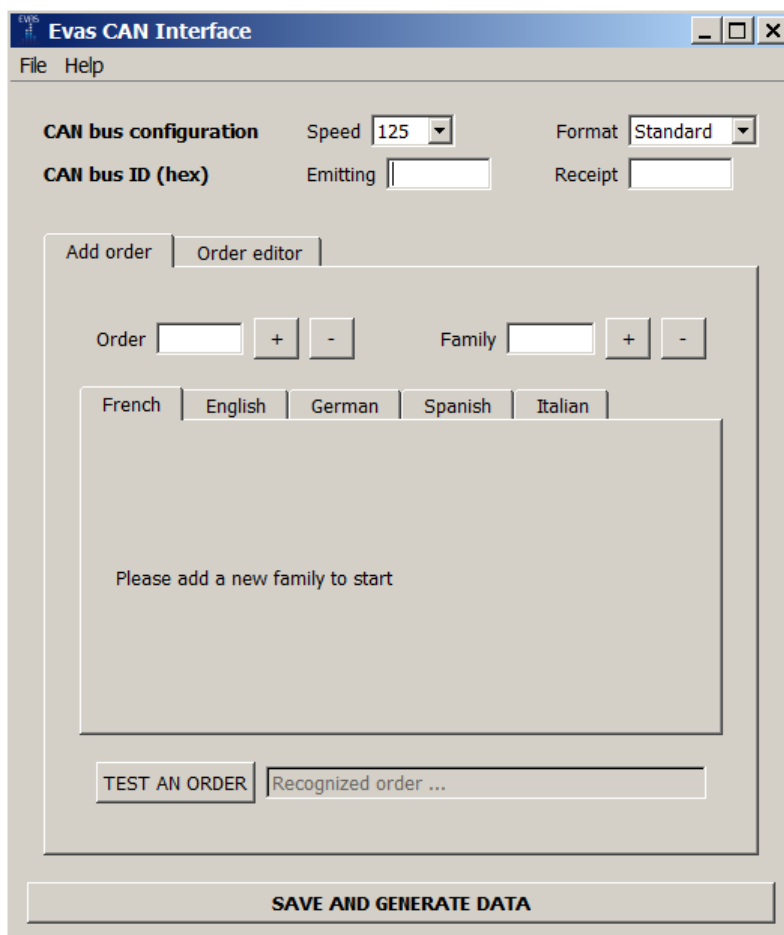
You don't need to install anything, the configuration interface is on the "efa" USB key provided.



Just click on the "Evas_CAN_Interface.exe" shortcut on the USB key.



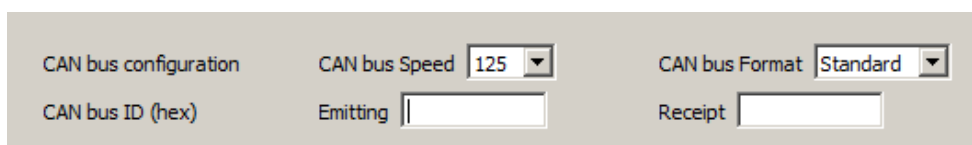
The following window will appear



3.2 CAN bus settings

You can configure reception ID and sending ID frames on the CAN bus. ID are in hexadecimal format.

You can also choose the extended (Extend) or standard format and the following speed : 125, 250 or 500 kb / s.



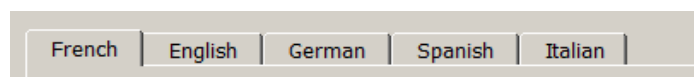
3.3 Add and test order

Click on the "Add order" tab.



3.3.1 Choose the language

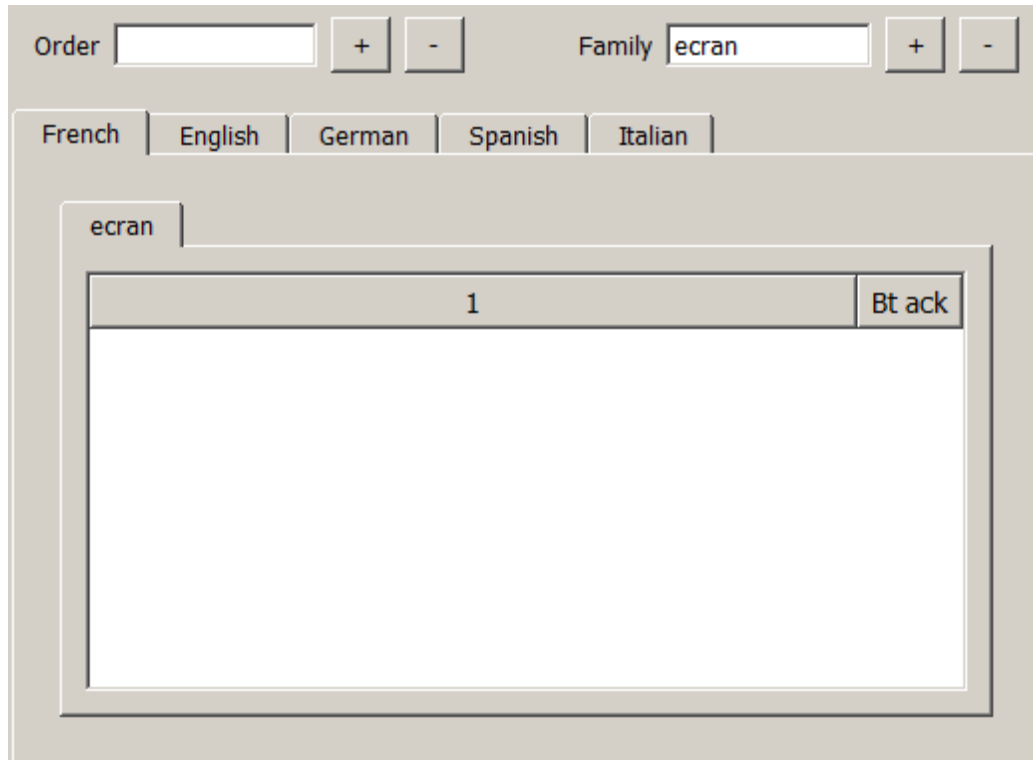
For language choosing, just click on the tab corresponding to the wishes one.



3.3.2 Add families

After language choosing, you must add a family before adding an order

To add a family, enter its name and click on the + button



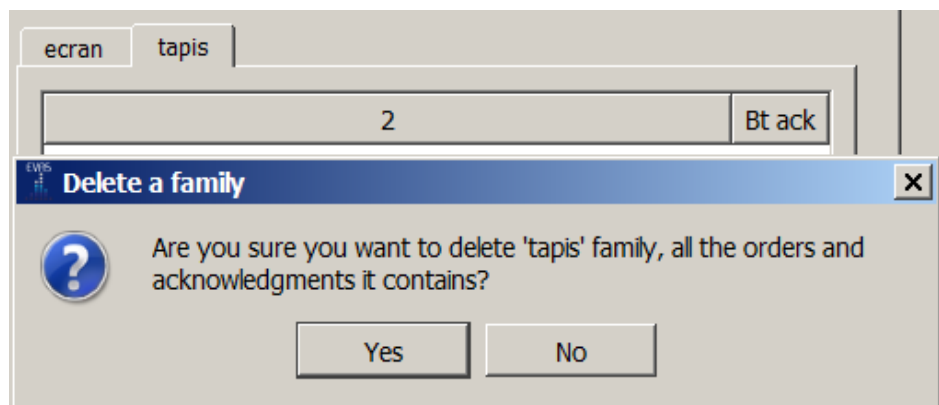
Then the family will appear as a new tab with a board on it.

The value to use for the created family on the Can bus is the one on top of the board (here "1")

3.3.3 Delete a family

To delete a family click on its tab to select it and then click on the "-" button

A pop-up ask you if you want to delete the associated order.

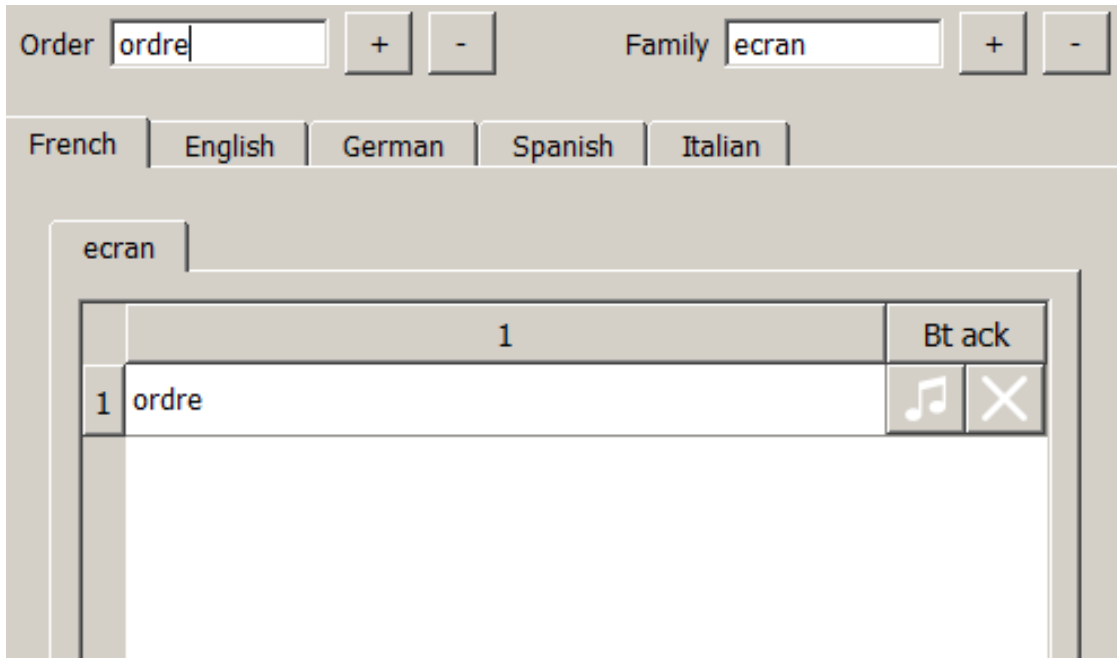


Click on Yes to validate

3.3.4 Add orders

You can now add orders. Choose the family you want to add order by clicking on it.

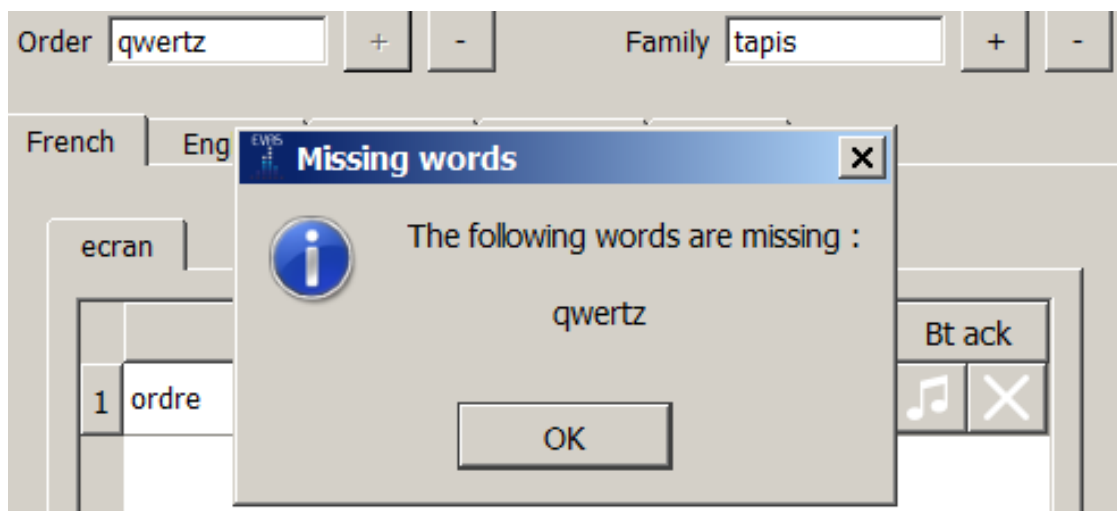
Type the order name in lower case in "Order", then click on "+" button.



Then an order is added to the chosen family

The value to use on can bus is the one at the left on the board

If a word in the order is not in the library yet, you'll see an error message



If necessary, you can create these words in the "Order Editor" tab.

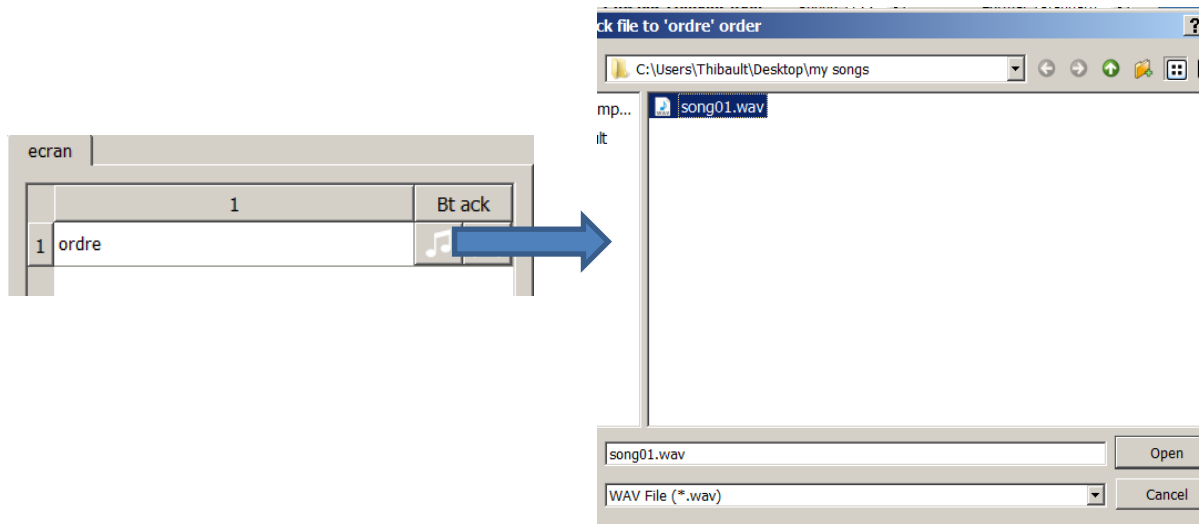
3.3.5 Delete orders

To delete an order, click on to select it, then click on "-" button.

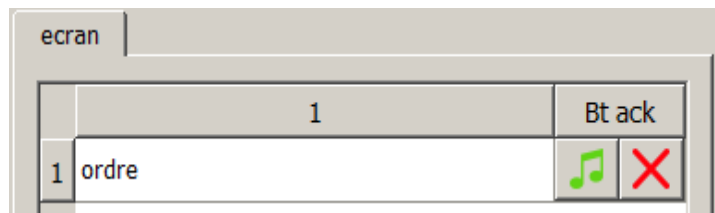
3.3.6 Add audio acknowledgement

When you add an order you can join to it an acknowledgment song.

To do this click on the music note button on the line of the order then choose your audio file (in WAV format).



Once the audio acknowledgement is added, the music note button will turn into green on the line of the order.



NOTE : When an audio acknowledgement is played you can't say an order. So choose a short song to play, not more than 1 or 2 seconds. If a same order exist in others languages or families, the song will be played too.

3.3.7 Delete audio acknowledgement

If you have joined an audio acknowledgement song, you can delete it by clicking on the red cross button on the line of the order.

A message asks you to confirm the song suppression, click on "Yes".



3.3.8 Order testing

You can test orders, for this, plug the microphone to your computer USB port.



Then click on the « TEST AN ORDER » button.

A message will appear, get ready : then you have 5 seconds to say an order in the microphone. Recognized order and its index value will appear in the text box next to the button.



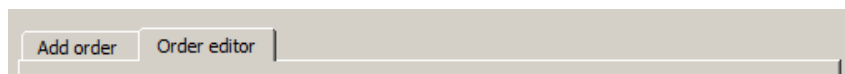
If the order is not well recognized, thanks to the "Order Editor" you can modify the pronunciation of the words that make up your order.

NOTE : Check USB microphone to computer connection in accordance with appendix 1.

3.4 Create and modify words

This function will allow you to integrate your own words that do not exist in the system with the pronunciation(s) of your choice.

To create a word click on the "Order Editor" tab.



Then follow the 3 steps :

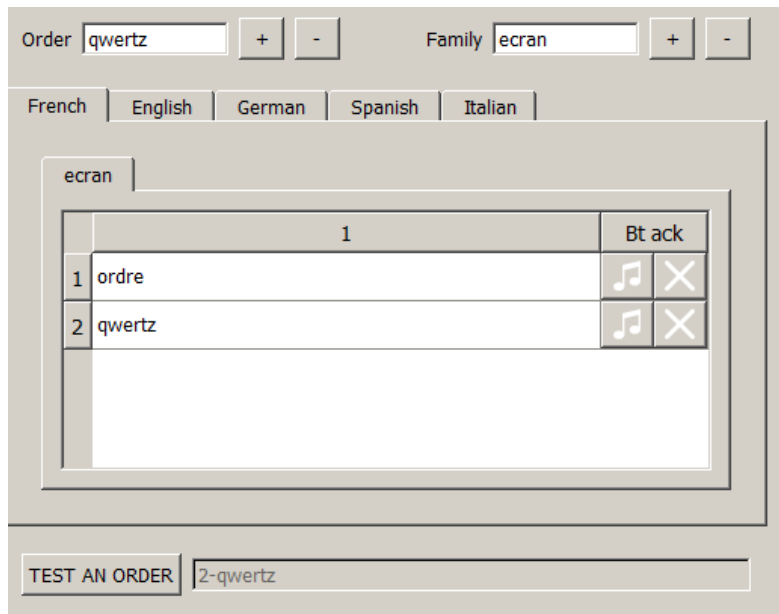
1. Choose the language of the word (French, English, German, Spanish or Italian) ;
2. Enter the word ;
3. Click the "Click and say the word" button.



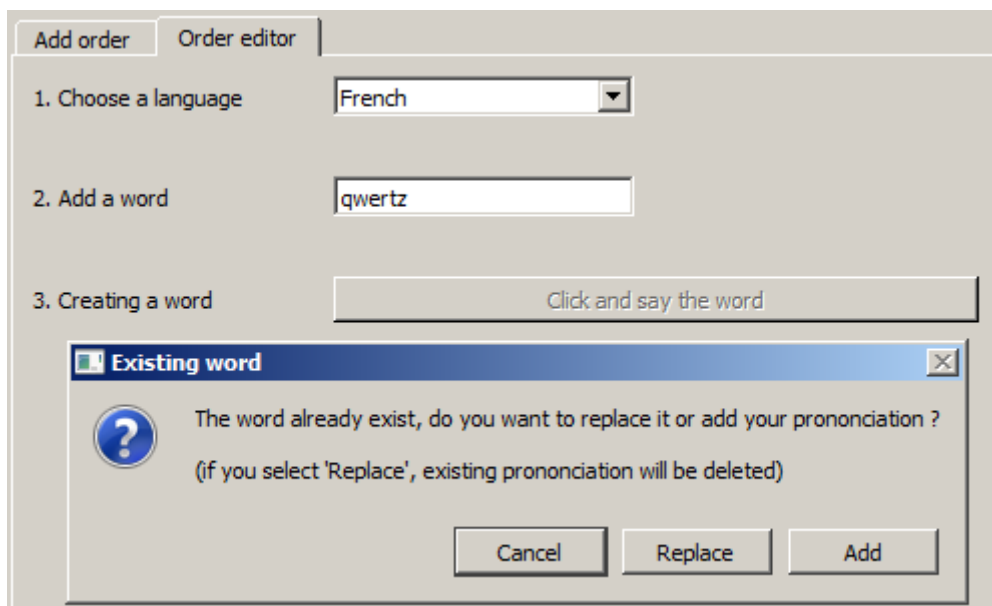
A message will invite you to say the word in the microphone, then you will have 5 seconds to say the word once.

Say the word once, make sure that no unwanted noise will interfere, do not touch the microphone or avoid any movement of the microphone while you say the word.

You can then test the word by adding it as an order in a family (see chapter "Testing Orders").



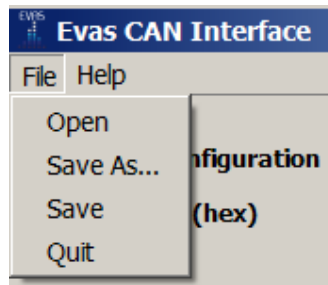
If you have several ways to pronounce this word or if you want to redo the pronunciation of the word, you can redo the 3 steps of creating a word. At the end of the creation of the word, a message will tell you that a pronunciation already exists on the word and propose you to either add ("Add") the new pronunciation or replace ("Replace") the existing pronunciation or cancel ("Cancel").



During each word creation, do not forget to test it in your order list.

3.5 Save/load data

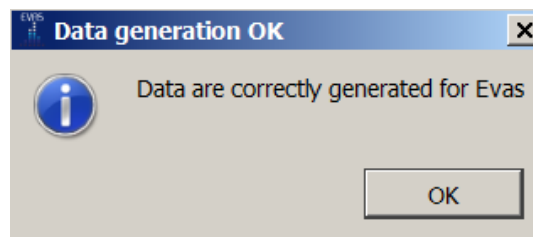
You can save/load your orders lists and CAN Bus settings by clicking on “File”.



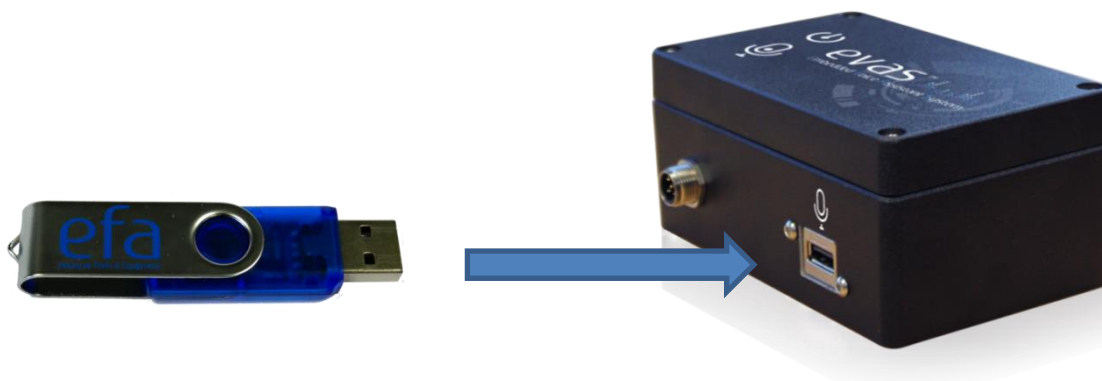
IMPORTANT NOTE : Only orders/families lists and CAN Bus settings are saved. Created words and audio acknowledgment files just stay in the USB key and are not exported.

3.6 Send data to EVAS

Click on the “SAVE AND GENERATE DATA” button. A message informs you than data are correctly generated.



Then you have to connect the USB key to EVAS. Before this, please make sure that EVAS is powered and ready (status indicator is active).



The status indicator is turned off and after few seconds turns on. Your new configuration is in EVAS, you can now use it.

4 Bus CAN Communication

4.1 Can Frame from EVAS

Once the system is ready, EVAS will send a frame on the CAN bus with the address configured via the software.

Here is the content of the frame from EVAS:

FUNCTION	BYTE	BITS	USE
EVAS statement	0	0 - 4	= 0 or 8 : system ready, no listening mode is activated ; = 1 or 9 : recording order in progress ; = 2 or 10 : continuous listening, waiting for an order ; = 3 or 11 : order recognition ; = 4 : error, microphone not detected ; = 5 or 13 : non-existing family ; = 6 or 14 : the language does not contain any order ; = 7 : HFP call to a Bluetooth headset ; Bit 3 = 1 : Bluetooth headset is active ; = 12 : HFP connection OK ; = 16 or 24 : load settings ; = 20 : HFP connection failed ; = 28 : trying to connect a HFP Bluetooth headset.
Recognized order	1	-	= 0 : unrecognized order = 1 to 254 : value of the recognized order = 255 : default state
Ambient sound	2	-	= 0 to 100 : detected ambient sound value

4.1.1 Recognized order (byte 1)

Byte 1 sent by EVAS constantly returns 0xFF except when an order, said in the microphone, has been processed. EVAS will then return the index value of the order. If the order is not recognized, EVAS will return 0.

EXAMPLE : with the software I added in the family "position" first the order "right", then the order "left". I start an impulse listening mode for family 1, "position". Once the system is recording, I say in the microphone the "left" order. EVAS processes the information and returns on octet 1 the value 2 which corresponds to the 2nd order of the family "position".

4.1.2 Ambient sound (byte 2)

You can use this parameter to help you choose the value of the microphone volume setting. If you do not say an order in the microphone, the ambient sound value should be as low as possible. If it is too high, reduce the microphone volume.

4.2 CAN frame received by EVAS

Once EVAS is ready, you can send it a frame on the CAN bus with the address configured via the software, at any time.

Here is the content of the frame received by EVAS :

FONCTION	BYTE	BITS	UTILISATION
Listening mode	0	0 - 1	= 1 : continuous listening mode = 2 or = 0 : disable listening mode = 3 : impulse listening mode
Listening filter	0	2	= 0 : filter disabled = 1: filter activated
HFP connection	0	3	= 1 : Connection to a Bluetooth headset
Language	0	4 - 6	= 0 : French = 1 : English = 2 : German = 3 : Spanish = 4 : Italian
Family	1	-	requested family value
Duration	2	-	Impulse listening: duration in seconds Continuous listening: duration in tenths of a second
Volume	3	-	= 0 à 100 : Microphone volume
Threshold	4	-	Detection threshold of an order

5 LED indications

EVAS has a power LED (green) and a system status light (red).



5.1 Power indicator

When you turn EVAS on, the power LED turns green and stays steady while EVAS is powered.

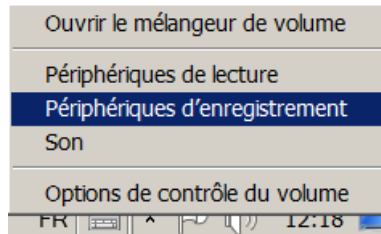
5.2 Status indicator

- **Red** : EVAS is ready for operation and waiting for activation of continuous or impulse listening ;
- **Green** : EVAS waits for the user to say an order in the microphone ;
- **Orange** : EVAS records what the user says in the microphone and processes the data ;
- **Off** : EVAS load a new configuration.

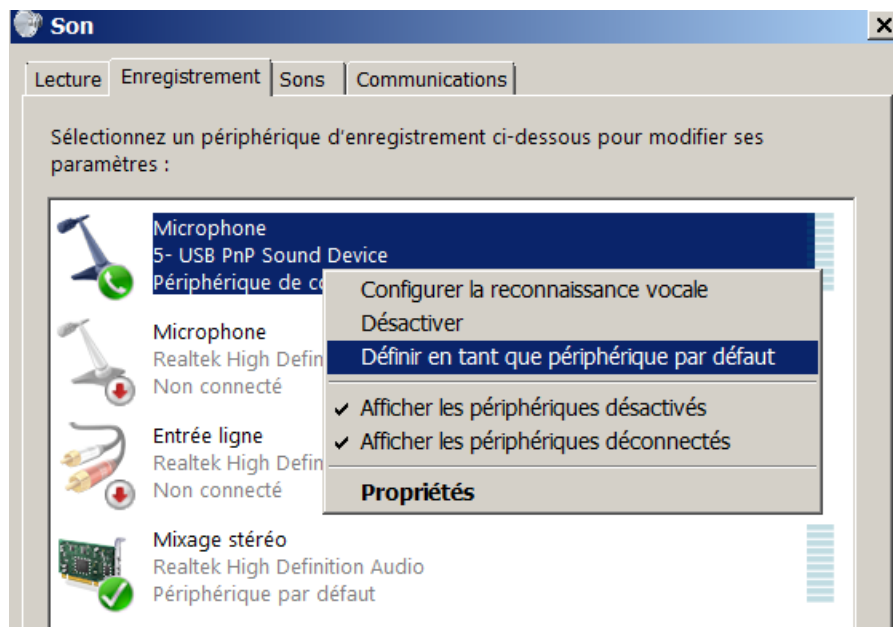
APPENDIX 1 : USB microphone settings

When you connect USB microphone to your computer please make sure that the USB microphone is the default recording device.

On your computer, right-click on the volume icon then click on « Recording device ».



You can see a recording devices list, if the USB microphone is not the default device, right-click on the USB microphone device and click on « Set as Default Device ».



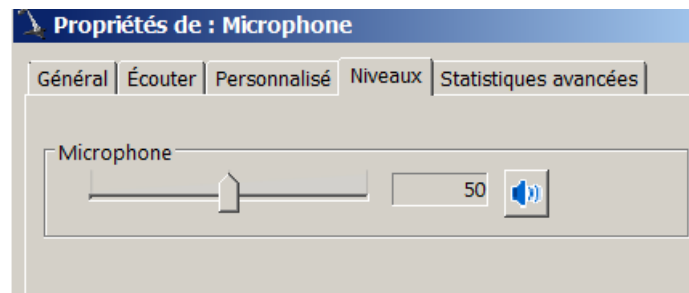
Then right-click and choose « Properties » to check USB microphone settings.



A window appears, go to « Custom » tabs and uncheck all effects.



Go to « Levels » tab and place the cursor value to 50.



Then click on « OK » to save settings and close windows. You can use now the USB microphone and recognize your orders with EVAS interface.