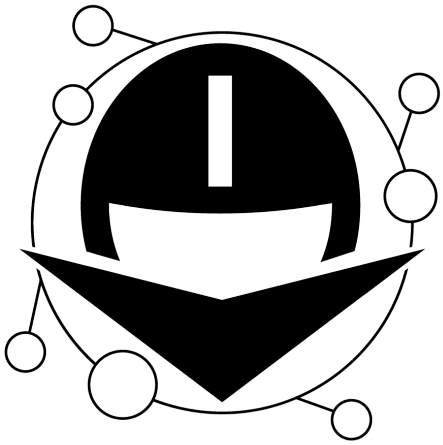
# Stick Hardware Manual

***Release 1.0***

**Embention**

**2023-11-28**

# CONTENTS



STICK | VERONTE AVIONICS

CHAPTER

ONE

# INTRODUCTION

Veronte Stick Expander (VSE) system is a single solution to generate sixteen channels PPM. VSE works as a USB to PPM converter, enabling flying with **USB joysticks** or **Virtual Sticks**.


Fig. 1: **Veronte Stick Expander**

CHAPTER

TWO

# QUICK START

This document describes how to install and use the VSE, including its technical specifications.

## 2.1 System Layout

The following image shows the standard VSE system layout for operation:

Fig. 1: **VSE layout**

## 2.2 Warnings

- **Power Supply**: Stresses above those listed in the power supply table (see *Power supply*) may cause permanent damage to the device. This is a stress rating only; functional operation of the device under these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CHAPTER

THREE

# TECHNICAL

## 3.1 Features

- 802.11 b/g/n/ac Wireless LAN
- 1x SD Card
- 2x USB2 ports
- 2x USB3 ports
- 1x PPM Connector

## 3.2 Mechanical Specifications

| | |
|---|---|
| Weight | 280g |
| Enclosure material | Black anodized aluminium |
| Dimensions | 90x64.5x33mm |

### 3.2.1 Dimensions

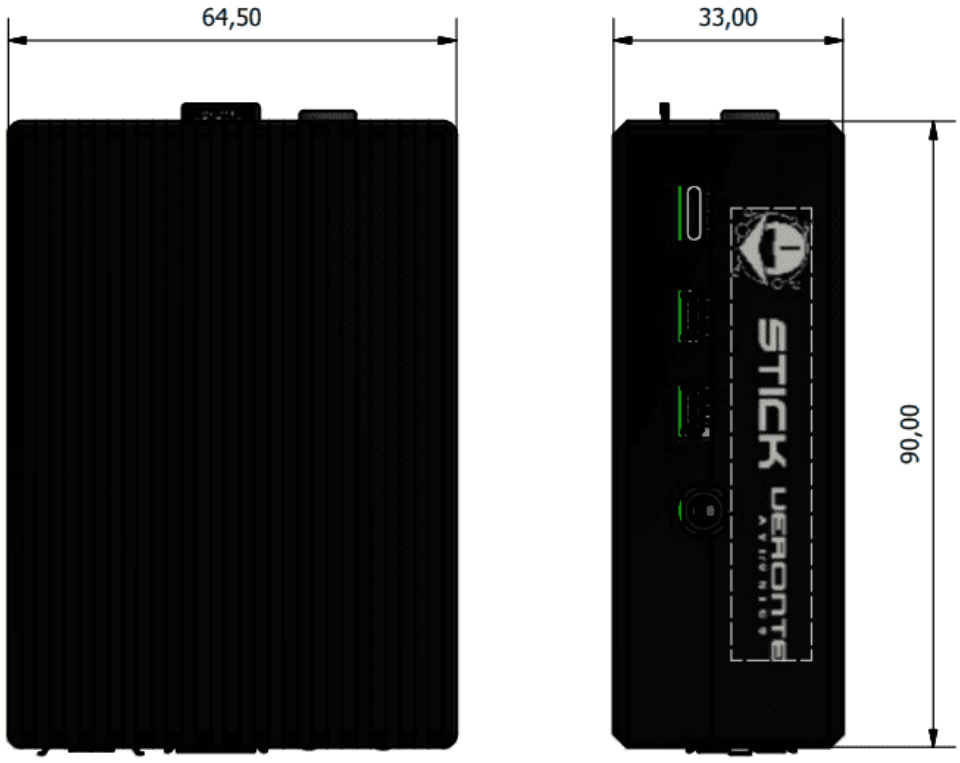



Fig. 1: **Stick dimensions**

## 3.3 Electrical Specifications

### 3.3.1 Power Supply

| | |
|---|---|
| USB-C input | 5.0V |
| Power Consumption | 15W - 3A |

### 3.3.2 I/O Specifications

**Input voltage/current**

- Power input: 5.0V up to 3A
- Minimum: -0.5V
- Maximum: 6.0V

**3.3V Output**

**Digital Input/Output (GPIO)**

- Voltage: 3.3V

- Current I (oh): 1.6mA and I (ol) = -1.6mA

## 3.4 Interfaces

There is only one interface connection, with the following connectors:


Fig. 2: **Interface connection**

| I/O Connections | | |
|---|---|---|
| Number | Connector | |
| 1 | Female | 1x Power input |
| 2 | Female | 2x USB2 ports |
| 3 | Female | 2x USB3 ports |
| 4 | Female | 1x PPM |
| 5 | Male | 1x SD Card |

CHAPTER

FOUR

# HARDWARE INSTALLATION

## 4.1 Mechanical installation

The following diagram represents the basic mechanical installation of the VSE.

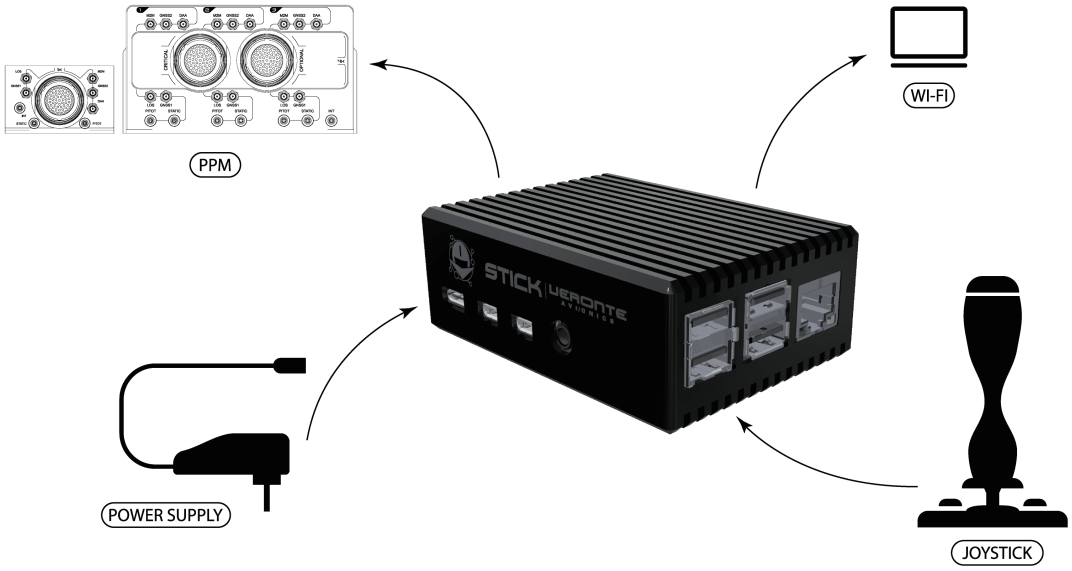



Fig. 1: **Mechanical installation**

CHAPTER

FIVE

# SOFTWARE INSTALLATION

A simple web application, **VSE Application**, allows the user to customize the number of channels and their output signals.

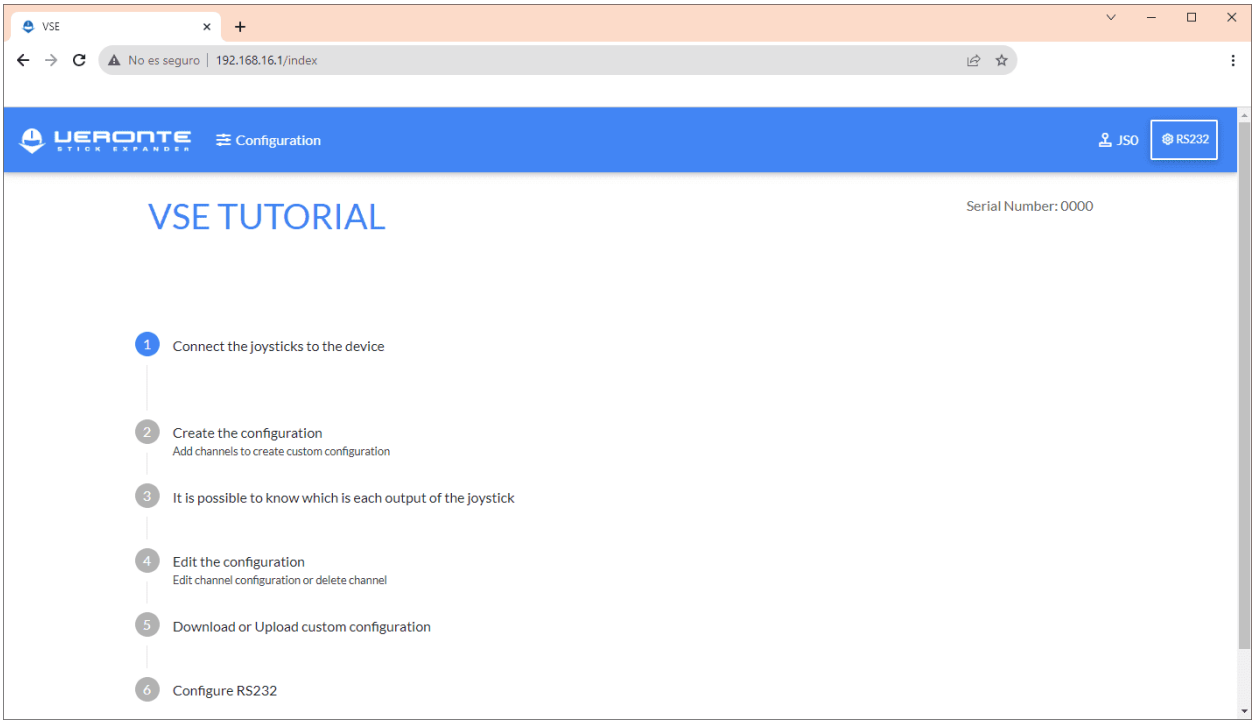



Fig. 1: **Web VSE Application**

To open this VSE Application it is necessary to follow these steps:

1. Connect the VSE:
   - To the **USB Joystick** through USB.
   - To **power supply**.
2. In the computer, click the Network icon and connect to the WiFi network named **VSE-0XXX**.

**Note:** VSE network may need a few seconds to be displayed.

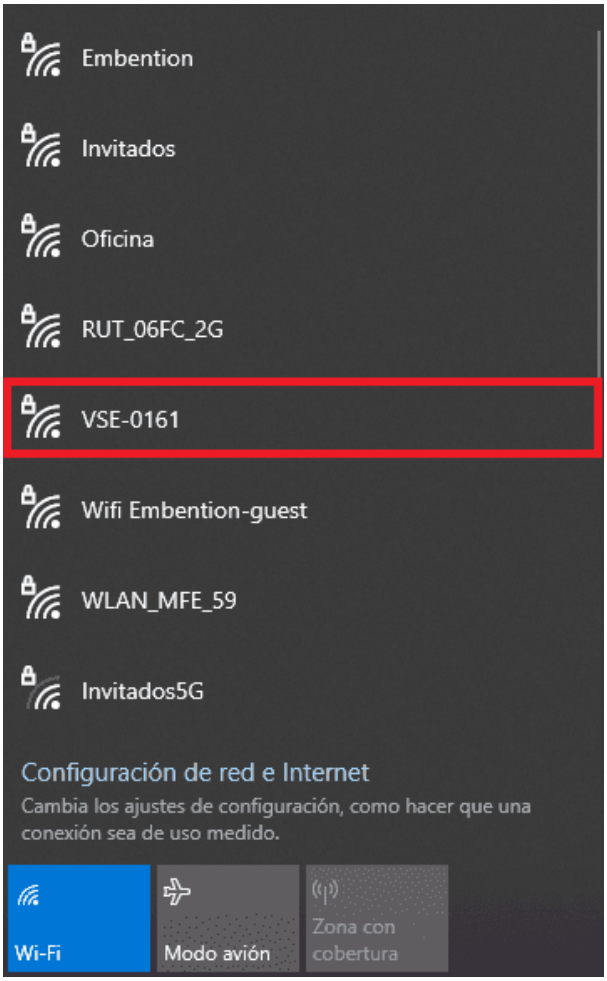



Fig. 2: **Select WiFi network**

4. Enter the WiFi password: **giy77uHQvOROoMoLEwKK**.
5. Once connected to the network, open the browser and go to the page **http://192.168.16.1**.

## 5.1 Configuration

This section explains in detail all the features of **VSE Application**.

### 5.1.1 Channels

Once in the application, to configure the channels:

1. Click in Configuration.

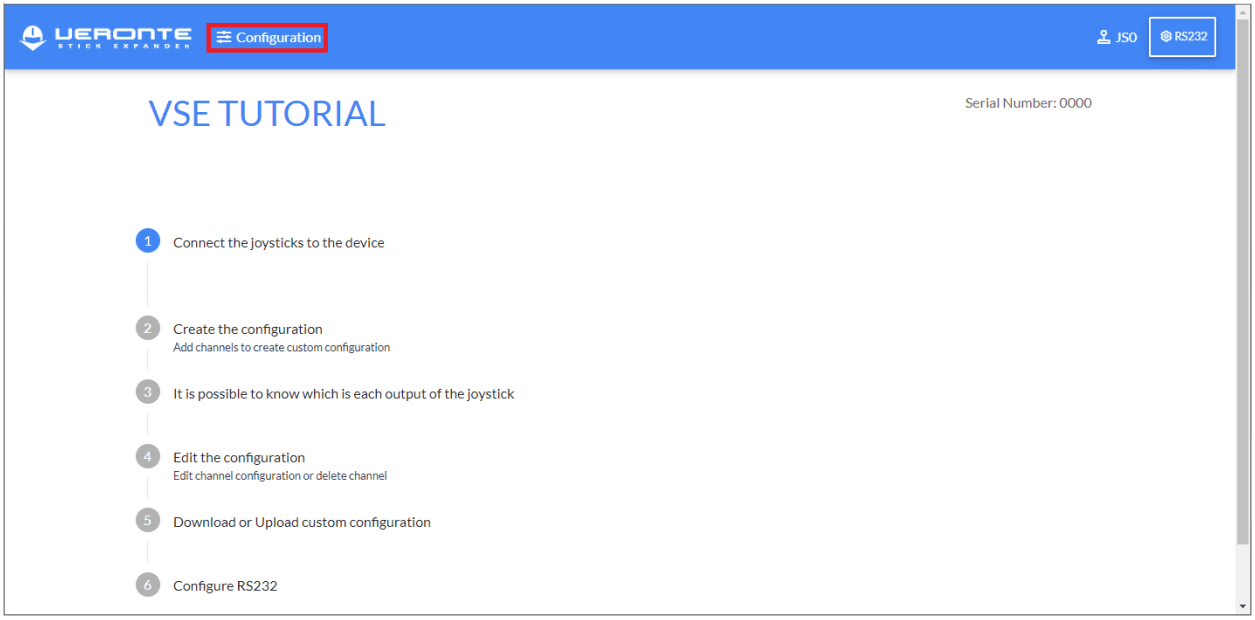



Fig. 3: **Configuration**

2. Click in Add Channel button.

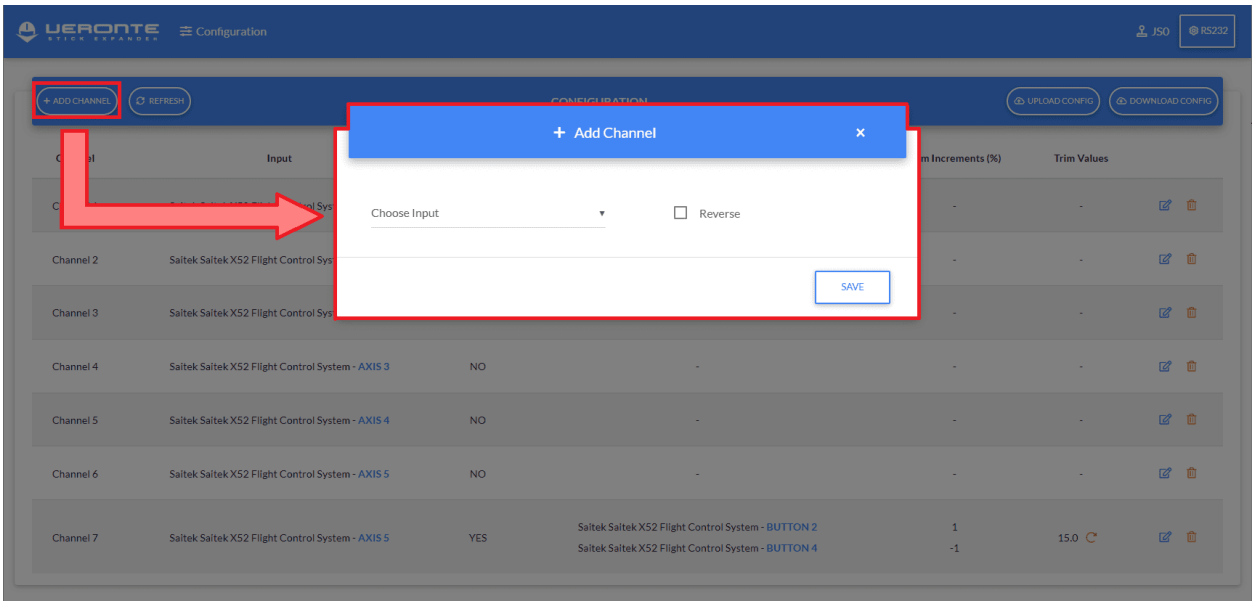



Fig. 4: **Add Channel**

3. Configure the channel as preferred:
    - **Choose Input**: Select joystick input (axes or button).
    - **Reverse**: Tick this checkbox to reverse the selected input.
    - **Trim**: Users can select which button to press to trim the raw value of the selected axis. Each click of the

selected button will apply the following **Trim equation** to the axis output signal:

$$Final\ trimmed\ value = Initial\ Stick\ Input\ value + \left( \frac{Increment(\%)}{100} \times Initial\ Stick\ Input\ value \right)$$

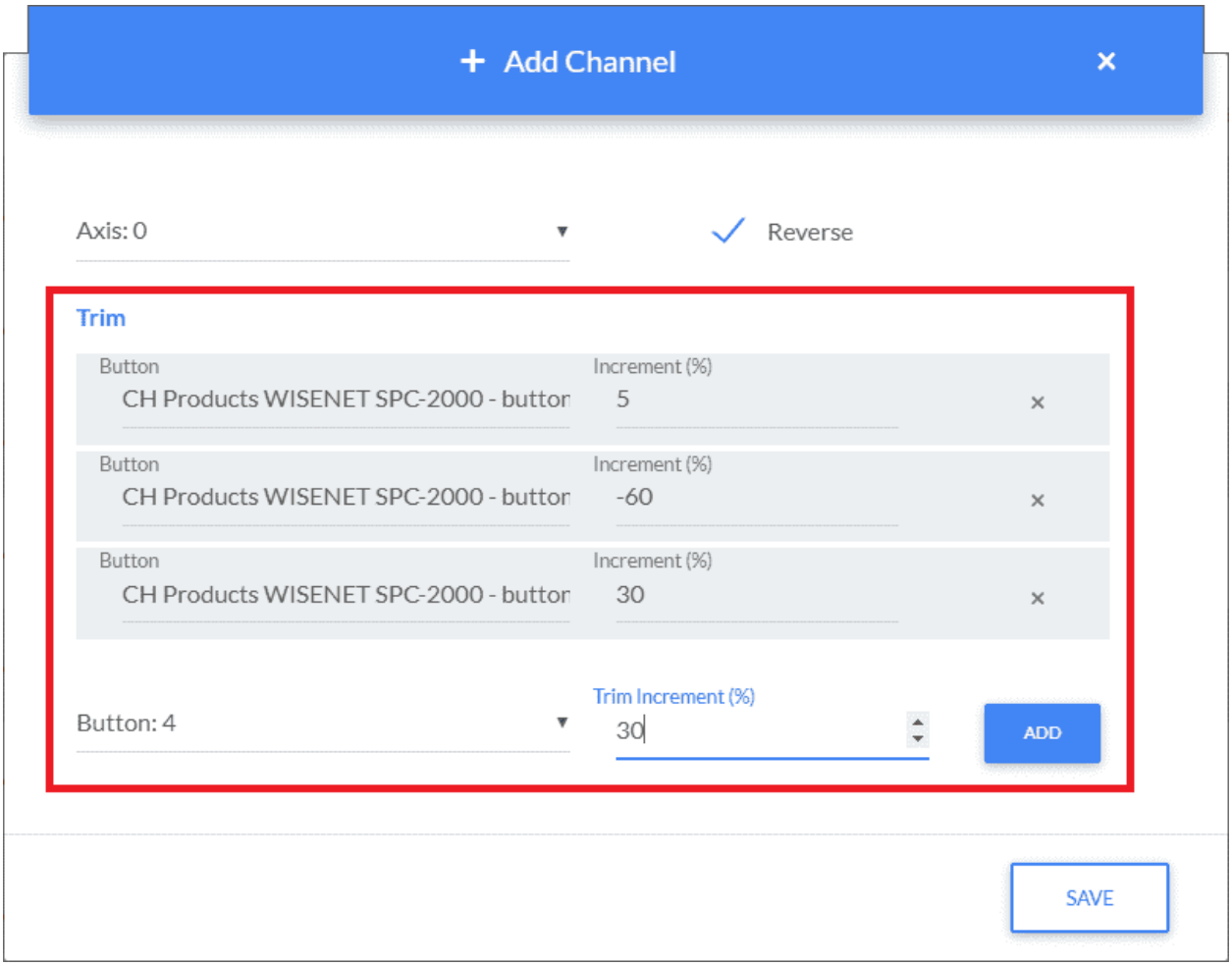



Fig. 5: **Trim parameters**

1. **Choose button**: Select the button which will trim the input value.
2. **Trim Increment (%)**: Percentage value used to calculate the trimed value.

   **Note:** Trim Increment can be positive or negative.

3. **Add**: Saves the configured trimming button.

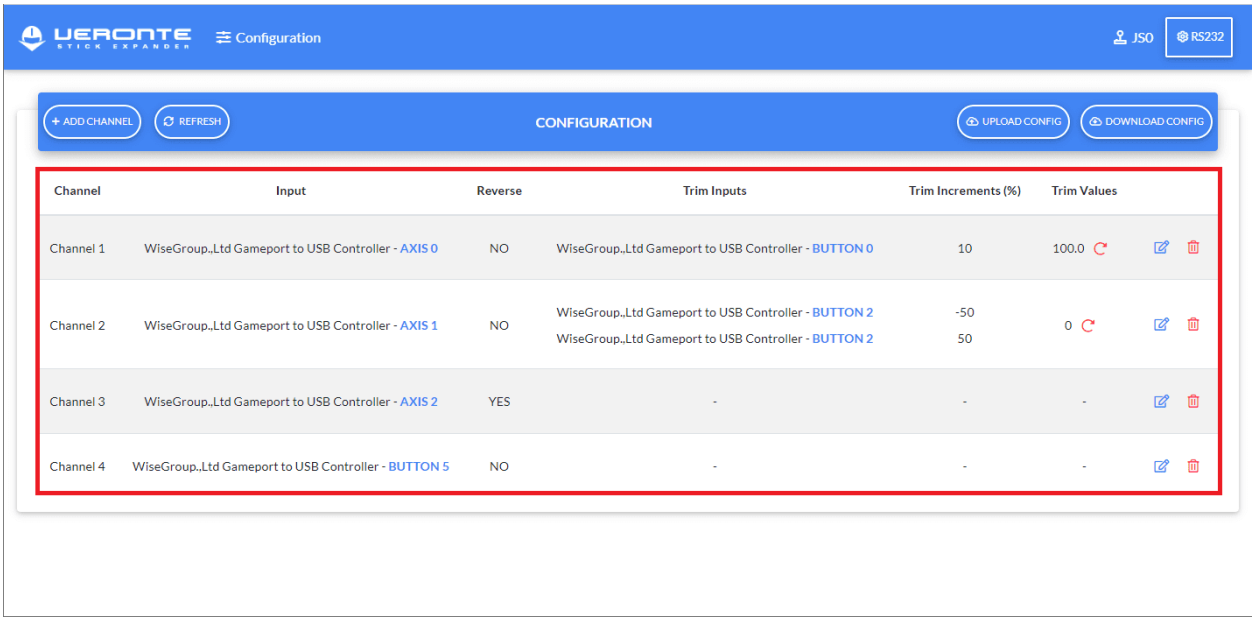
   **Note:** It is possible to add *N* customized trimming buttons to each axis, which will be listed in the Trim section of this *Add Channel* panel.

**Example**:

| Initial Stick Input (r1) | Trim Increment | Trimmed Stick Input (rounded) |
|---|---|---|
| 0.49 | 10% | 0.54 |

4. Save the configured channel.

The configuration parameters of the created channel are displayed in the following list:




Users can edit these parameters with *Channels buttons*.

### 5.1.2 Joystick Output View

To make easier the configuration of channels, the application shows the output values of every connected joystick.


Fig. 6: **Joystick View**

Joystick buttons are represented with ON or OFF status and the axes with their values between [-1, 1].

## 5.2 PPM Configuration in 1x PDI Builder

To properly use the **VSE** solution, it is important to configure the PPM inputs in Veronte Autopilot 1x using **1x PDI Builder** app. Users must perform the configuration corresponding to a **PPM Stick**, explained in further detail in VSE (Veronte Stick Expander) - Integration Examples section of the **1x PDI Builder** user manual.

The figure below shows the PPM signal that arrives to Veronte:

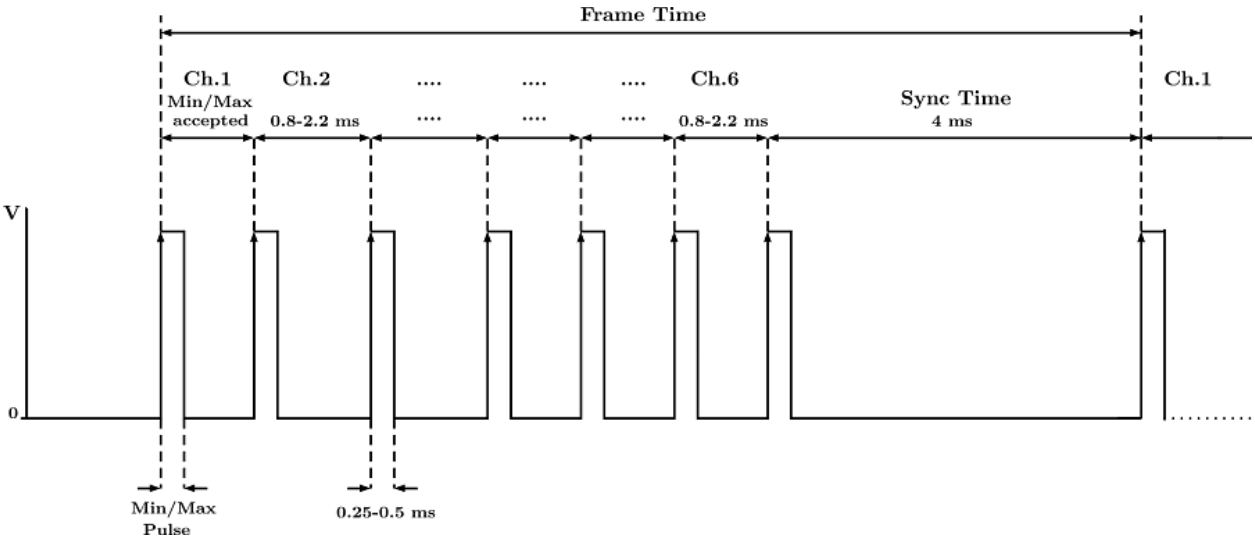



Fig. 7: **PPM Pulses**

CHAPTER

SIX

# OPERATION

## 6.1 Download Configuration Data

In the Configuration page, it is possible to download the configuration of the created channels by clicking on **Download Config** button.

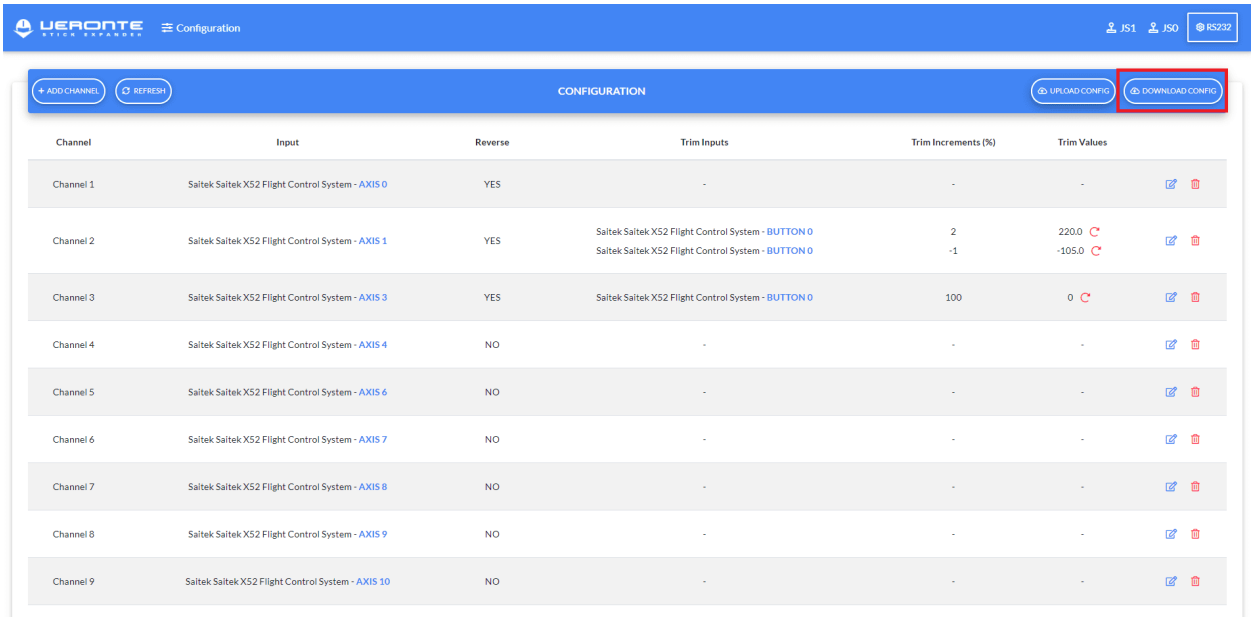



Fig. 1: **Download Button**

## 6.2 Upload Custom Configuration

In the Configuration page, channels can be customized importing a configuration file.

Click on **Upload Config** button and drag the file into the input area. Then click **Upload**.

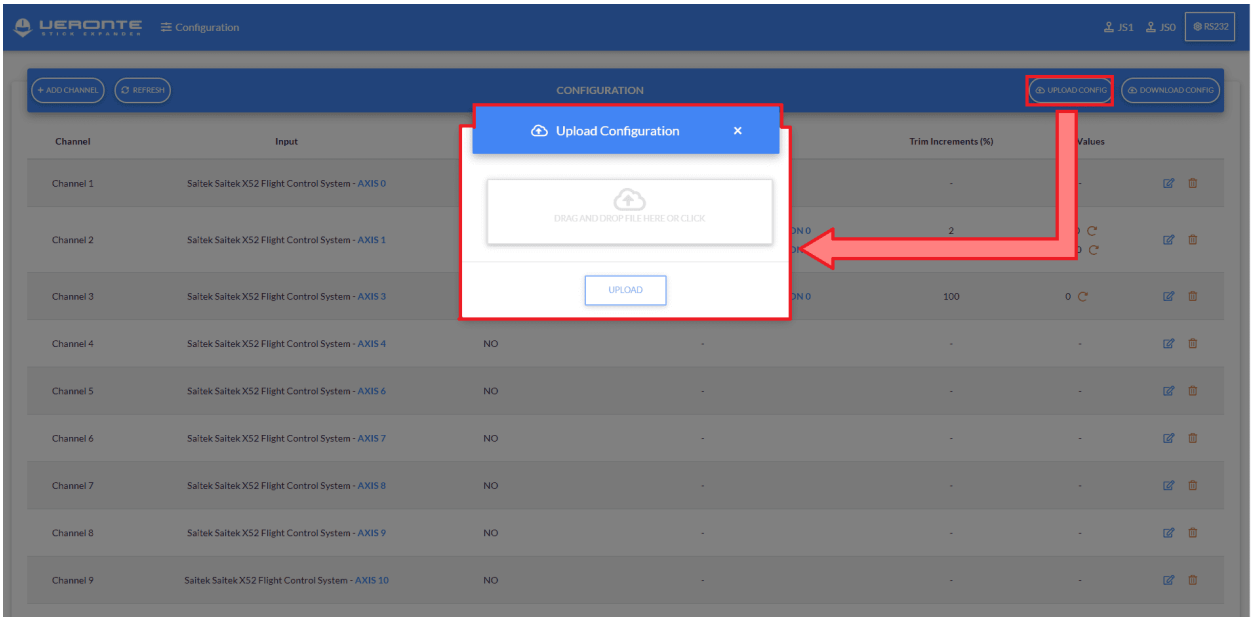



Fig. 2: **Upload Modal**

## 6.3 Refresh Joysticks

After connecting or disconnecting any Joystick, it is recommended to click **Refresh** button to reload and re-read all Joysticks again.

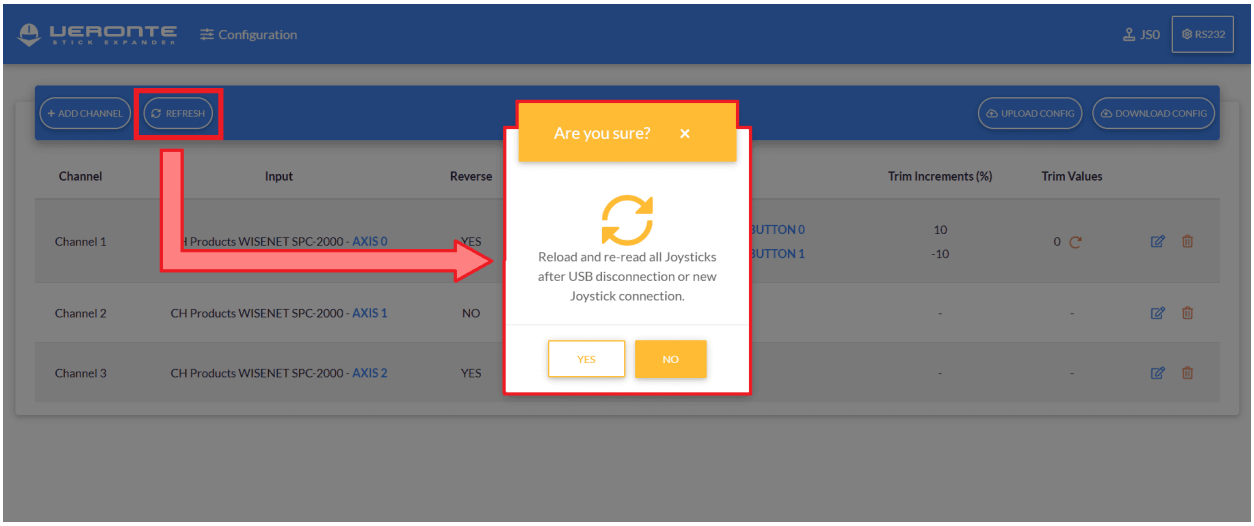



Fig. 3: **Refresh Button**

## 6.4 Channel buttons

Once the configuration of the channels is done, users can do the following:

1. **Reset Trim values**: If trimming buttons are clicked on too many times, users can reset the Trim value by clicking on the reset button.
2. **Edit Channel**: To modify a specific channel configuration.
3. **Delete Channel**: To remove a channel.

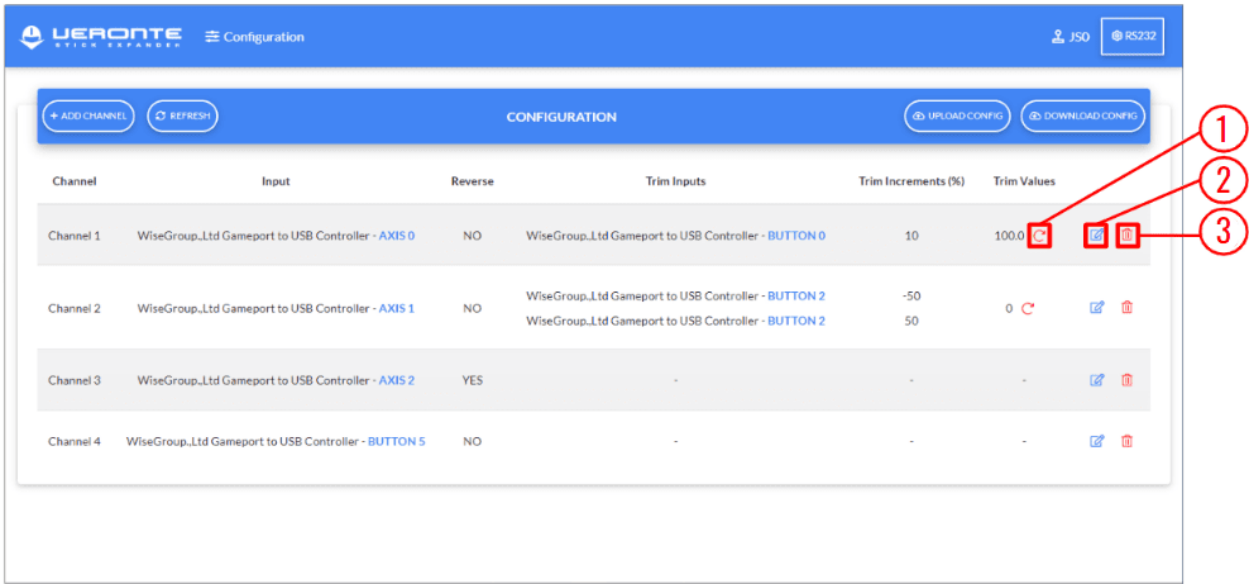



Fig. 4: **Channel Buttons**

CHAPTER

SEVEN

# MAINTENANCE

## 7.1 Software Update

The software version is updated using the executable program called **updater.exe** and the corresponding zip-folder with the new version. The customers will find these files in their FTP folder.

- Open the Command Line (CMD) in the folder where is the updater.exe.
- Write the command: ***updater.exe –path usb_ppm.zip***.

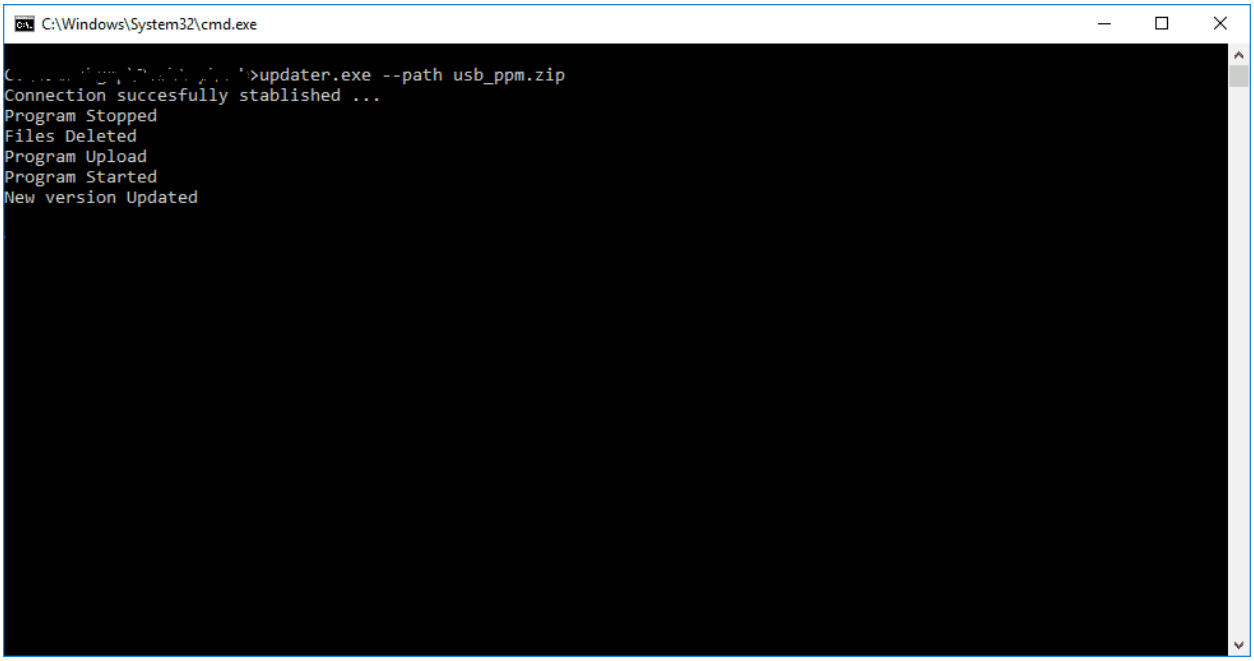



Fig. 1: **Update Script**

If the zip-folder is not in the same root that the updater.exe, it is necessary to insert the complete zip-folder path.

When the process is finished, the VSE software is updated.

CHAPTER

EIGHT

# ACRONYMS AND DEFINITIONS

| | |
|---|---|
| CMD | Command Line |
| GND | Ground |
| GPIO | General Purpose Input/Output |
| PPM | Pulse Position Modulation |
| RX | Reception |
| TTL | Transistor-Transistor Logic |
| TX | Transmission |
| USB | Universal Serial Bus |
| VCC | Voltage Common Collector |
| VSE | Veronte Stick Expander |

CHAPTER

NINE

# CONTACT DATA

You can contact Embention in any moment if you need further help and support from the acquired products. You can do that through email, telephone or by visiting our office.

Embention contact data is as follows:

Email: support@embention.com

Telephone: (+34) 965 421 115

Address: Polígono Industrial Las Atalayas, C/ Chelín, Nº 16, CP 03114, Alicante (España).