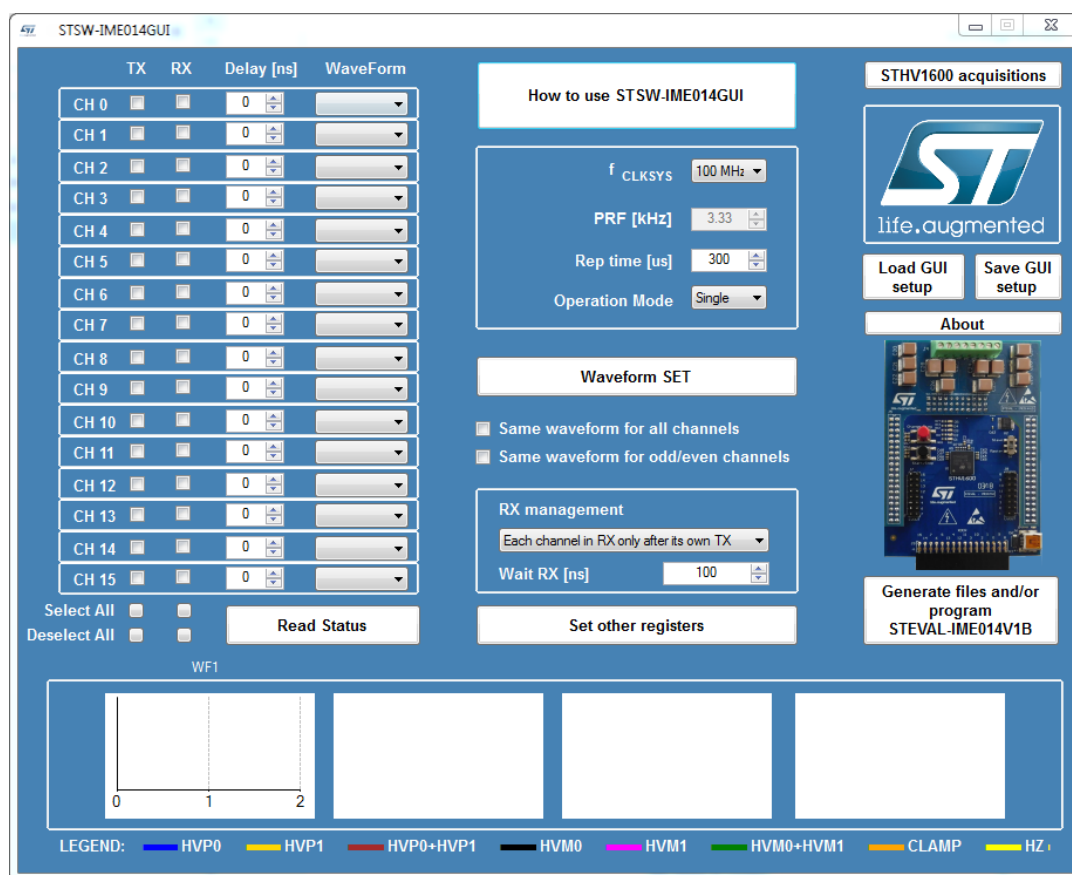# How to use the graphical user interface for the STEVAL-IME014V1B evaluation kit

Introduction

The graphical user interface for the STEVAL-IME014V1B evaluation kit helps you configure the STHV1600 16-channel high voltage pulser for ultrasound imaging applications, and build specific waveforms on which to test the device.

You can use the GUI to set up environment variables like clock and pulse frequencies, as well as waveform operating modes.

Figure 1. STSW-IME014GUI main window

UM2384 - Rev 1 - April 2018
For further information contact your local STMicroelectronics sales office.

www.st.com

1 How to run the GUI

This software is designed and tested for Windows 7 and requires Microsoft .NET Framework 4.0 to run.
The minimum screen resolution is 1024 x 768.

1.1 Download the GUI

Step 1. You can download the GUI from the following location on the ST website:
STEVAL-IME014V1 product page

1.2 How to connect STEVAL-IME014V1B to your PC

Step 1. Connect a type A to mini type B USB cable between the USB connector on the STEVAL-IME014V1 board and a USB port on your PC
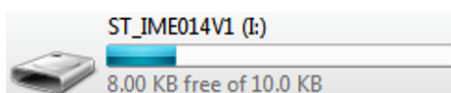
Note: *Do not use the USB connector on the Nucleo board, only the STEVAL-IME014V1 board.*
Normally no power supplies from the STEVAL-IME014V1 module are needed.

Figure 2. USB connection
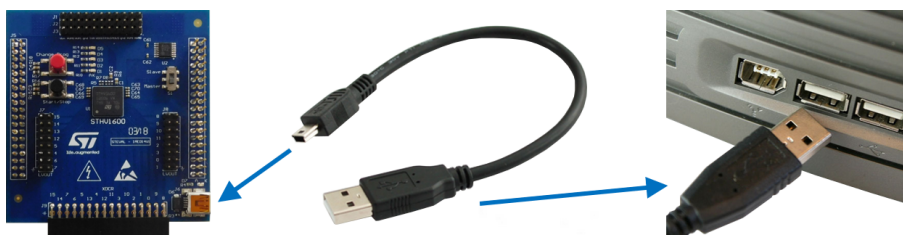
Step 2. A removable disk appears in the Computer Resources.
The name of the disk is ST_IME014V1 and has 10 KB capacity
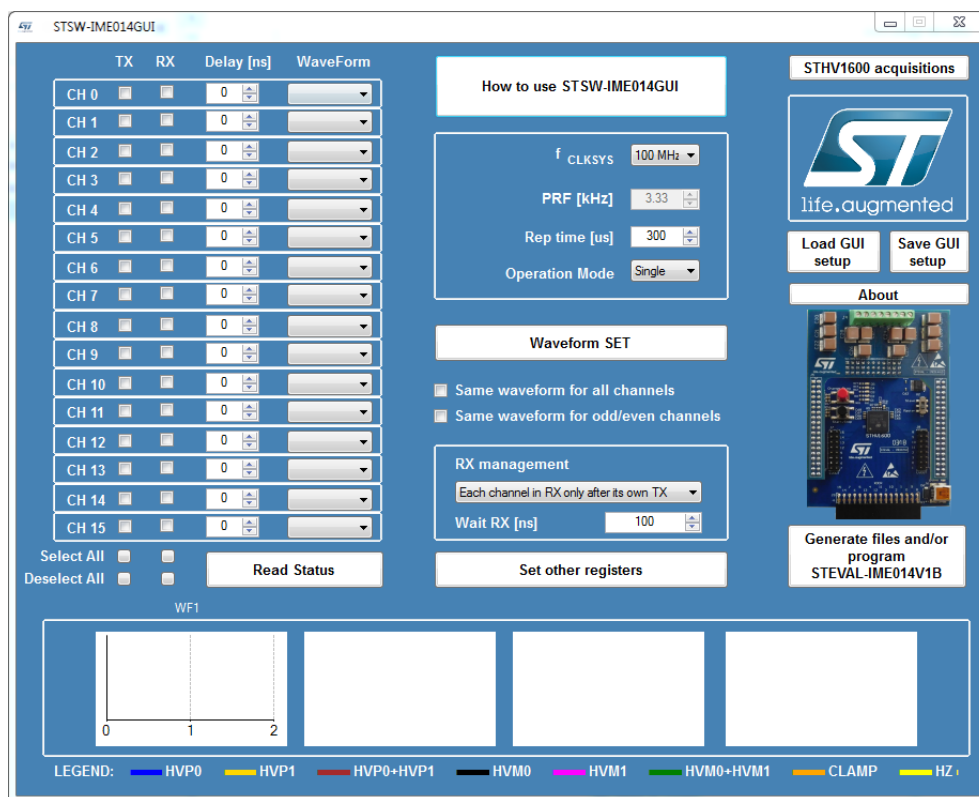
Figure 3. ST_IME014V1 disk drive

1. If the USB device is not recognized use a USB + charging port with the ⚡ symbol.
2. If this doesn't work, provide VEXT (pin 4) power supply and GND (pin 5) on the STEVAL-IME014V1D power supply module before connecting the USB cable.
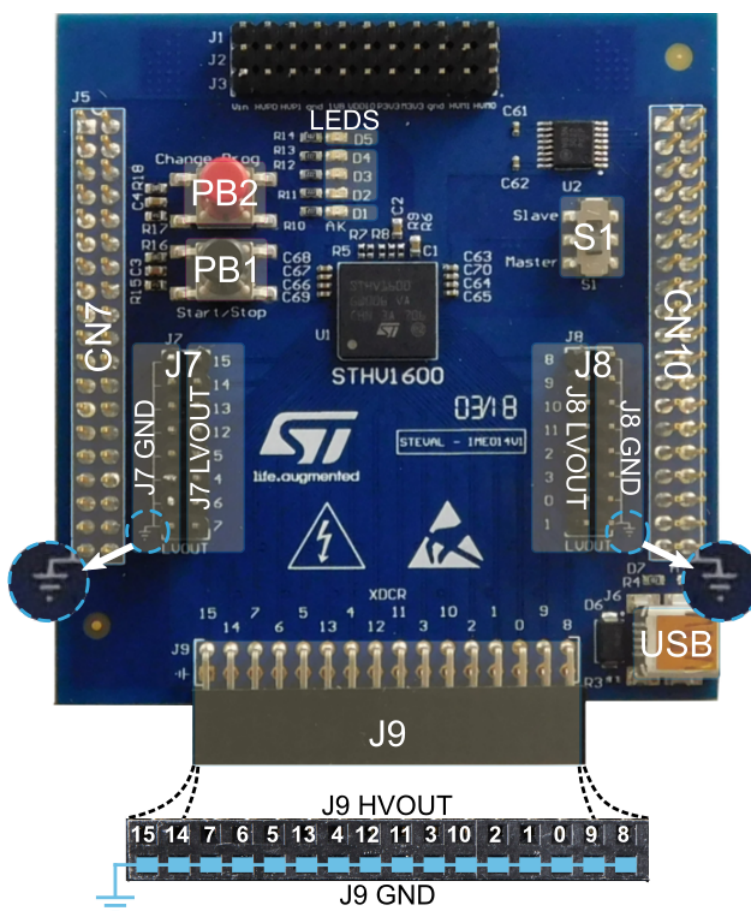
1.3 Run the GUI

Step 1. Run the STSW-IME014_V1_0_3.exe file.
The STSW-IME014GUI main window opens.

Figure 4. GUI main window

Step 2.   Press buttons [**PB1**] and [**PB2**] on the STEVAL-IME014V1 evaluation board to control waveform generation.

–   [**PB1**] starts and stops waveforms

–   [**PB2**] selects waveforms

Figure 5. PB1 and PB2 location

2 How to configure the board with the GUI

## 2.1 Set the environment parameters

The environment parameters you can modify are given below:

- [f_{CLKSYS}] allows you to select one of the available CLKSYS frequencies for the STHV1600:
  - 10 MHz
  - 50 MHz
  - 100 MHz
  - 200 MHz

Note: *The system may not function properly at 200 MHz because the STEVAL-IME014V1B interface is CMOS.*

- [**Operation mode**] selects how the waveform is driven:
  - Single: one trigger event is generated whenever [**PB1**] is pressed. On XDCRs, the waveform is repeated once only.
  - Continuous: a trigger event is generated every time interval indicated in the [**Rep time**] box. On XDCRs, waveforms are repeated until [**PB1**] is pressed again.
  - CW: a continuous switching wave is generated until [**PB1**] is pressed again.

Figure 6. STEVAL-IME014V1B operating mode
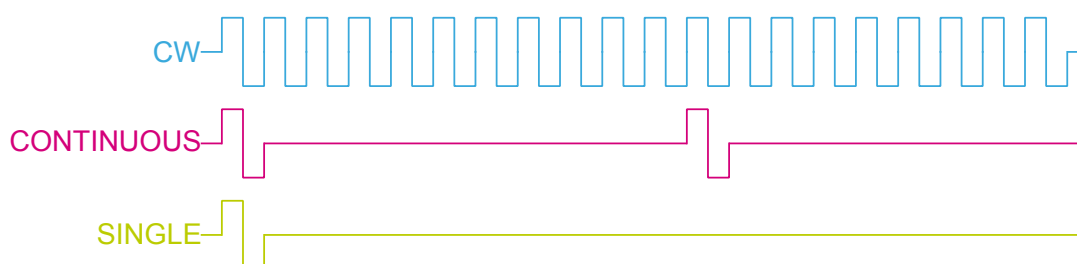
- [**Rep time**] box (Continuous mode only): is the time between the rising edge of a trigger and the next one; that is, the time between two consecutive TX phases.

The trigger signal generated by STEVAL-IME014V1B is defined as following:

- State 0: the trigger is set to a low logic level for 500 ns. This interval cannot be modified by the user.

Note: *The time interval only applies to this application; if you use the STHV1600 in another application, this value may change*

- State 1: equals the value in the [**Rep time**] box minus 500 ns

Figure 7. Environment parameters panel
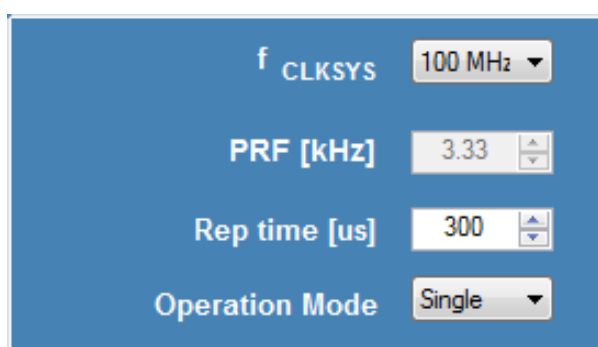
2.2 Enable and disable channels

Every channel on the STHV1600 16-channel high voltage pulser can be enabled in TX or in RX.

If a [**TX**] or [**RX**] box is checked for a given [**CHxx**], that channel is enabled in TX or RX, respectively; if neither is unchecked, the channel is disabled.

You can check the [**Select All**] and [**Deselect All**] boxes to control the channels collectively.

Figure 8. Channel enable management
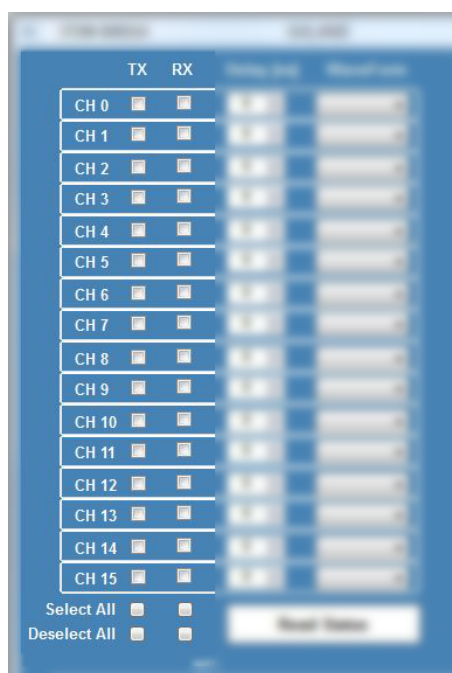
2.3 PW waveform management

Follow the procedure below to create and edit PW waveforms.

Step 1. Ensure the selected [**Operation mode**] box is [**Single**] or [**Continuous**].

Step 2. Click the [**Waveform SET**] button.
The Waveform management window opens.

Step 3. Select the [**WF x**] tab you wish to view or edit, or click the [**+**] tab to create a new waveform
You can build up to 100 waveforms

Figure 9. Waveform editor
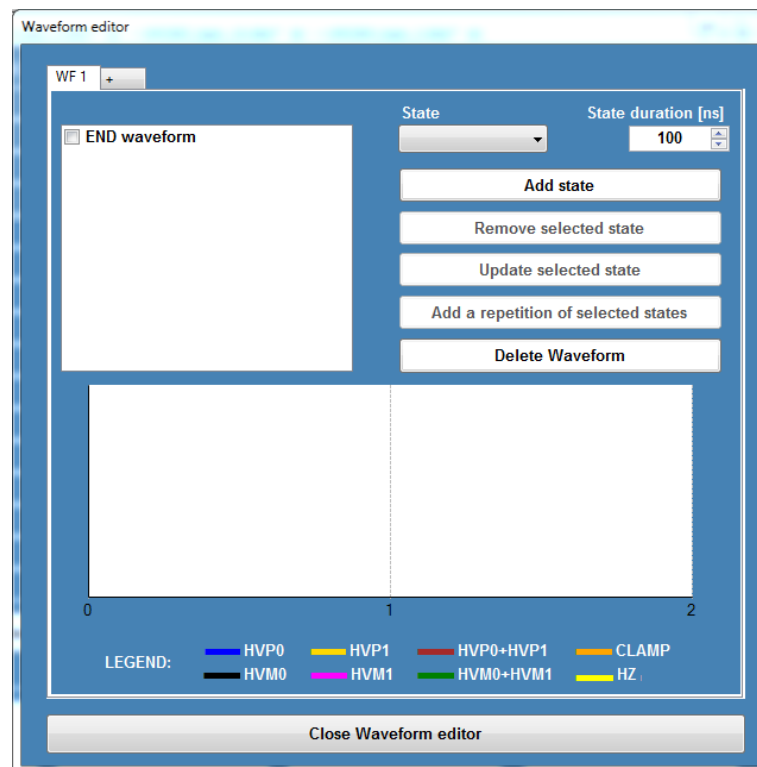
Step 4. Use the state panel to set a functional state and its duration before adding or editing it on the waveform.

Figure 10. Waveform state panel
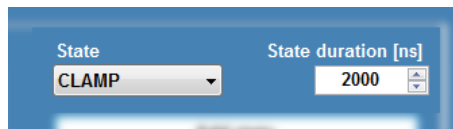
Step 5. Use the build panel to create, change or delete states.

It has five buttons that are enabled or disabled according to the currently selected item in the waveform view panel.

a. [**Add state**] button: adds a new state to the waveform. Normally it adds the state described in the state panel at the end of waveform, but if a state is selected in the view panel, you can add the new state before or after the selected state.

b. [**Remove selected state**] button: removes any selected states from the waveform.

c. [**Update selected state**] button: substitutes the state selected in the view panel with the new parameters in the state panel.

d. [**Add a repetition of selected states**] button: repeats two or more consecutive states selected in the view panel after the selection, for the number of specified iterations.

e. [**Delete waveform**] button: deletes the waveform.

Figure 11. Waveform build panel
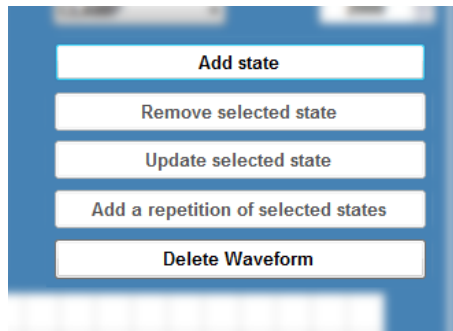
Step 6. Use the waveform view panel to view the individual states of a selected waveform.

You can use this panel to check a waveform or select a single state or a group of states. The selected states can be edited or deleted in the waveform build panel.

Figure 12. Waveform view panel
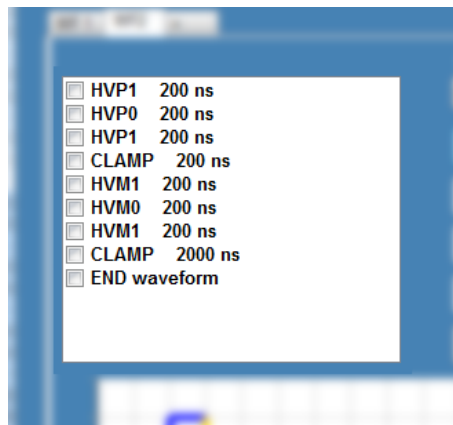
Step 7. View the graph panel to observe the shape of a waveform

Different states are indicated by the colors in the corresponding legend

Figure 13. Waveform graph panel
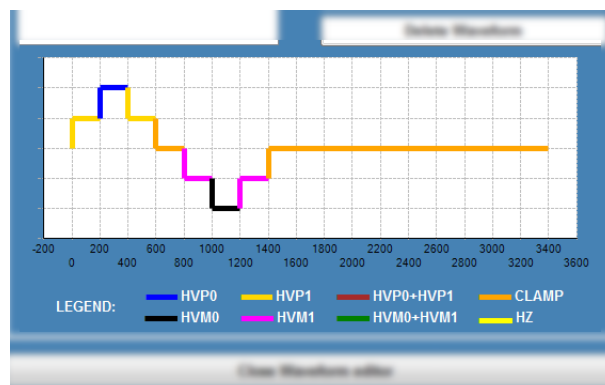
2.4   CW waveform management

Follow the procedure below to create and edit CW waveforms.

Step 1. Ensure the selected [**Operation mode**] box is [**CW**].

Step 2. Click the [**CW Waveform SET**] button.

The CW waveform management window opens.

Figure 14. CW waveform management window
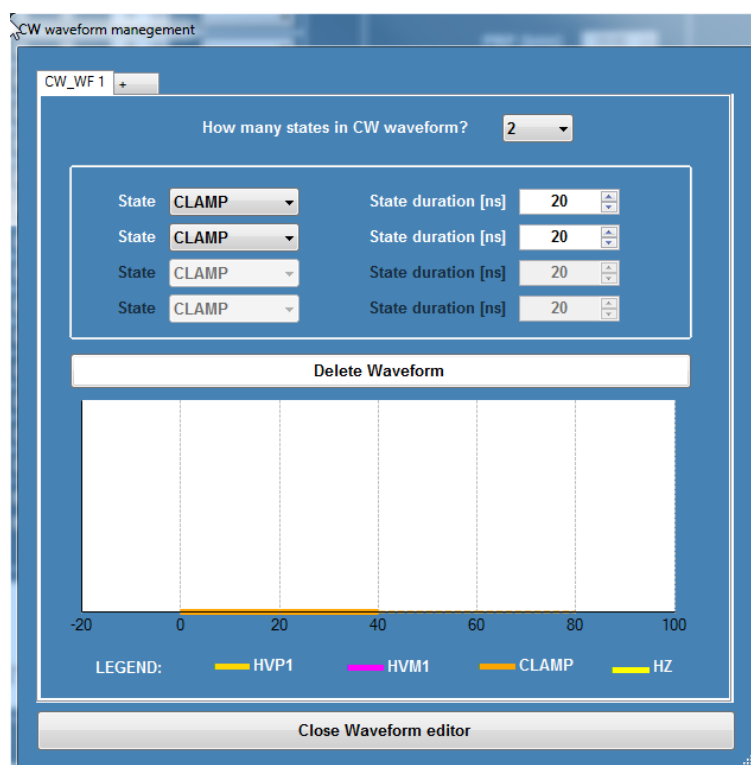
Step 3.   Select the CW_WF x tab you wish to view or edit, or click the + tab to create a new waveform

You can build up to 100 waveforms

Step 4.   Use the CW waveform view panel to view the individual states of a selected CW waveform.

In this area, you can set the number of states (from two to four) and define the type and duration of different states.

Figure 15. CW waveform view panel
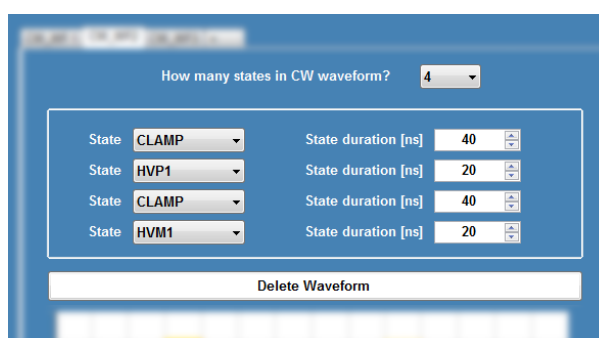
Step 5.   View the graph panel to observe the shape of a waveform

Different states are indicated by the colors in the corresponding legend

Figure 16. Waveform graph panel
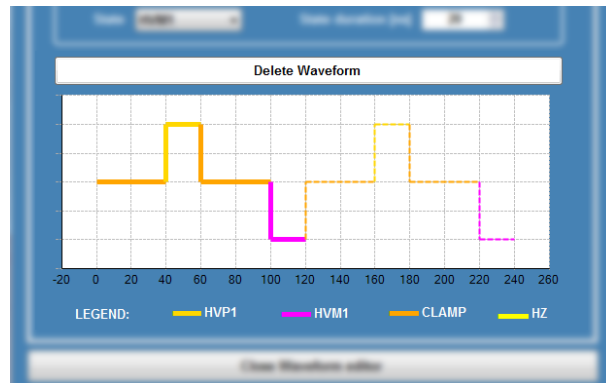
2.5   Assign waveforms to channels

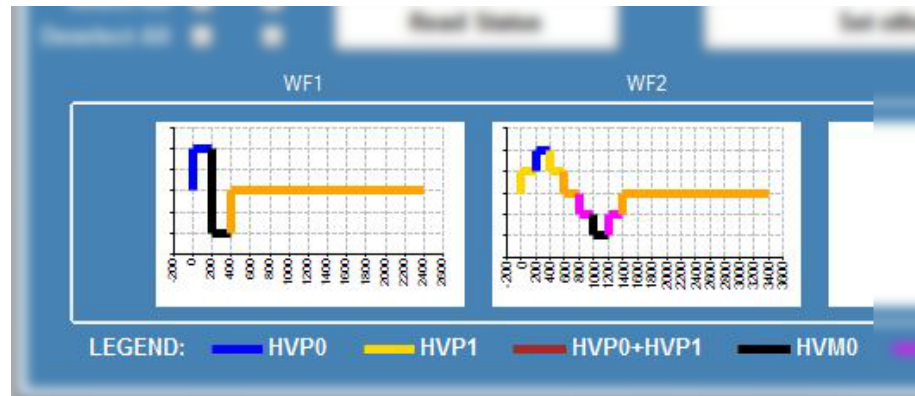Follow the procedure below to assign waveforms to channels

Step 1.   Use the selector panel to assign a waveform to a channel.

Figure 17. Waveform selector panel
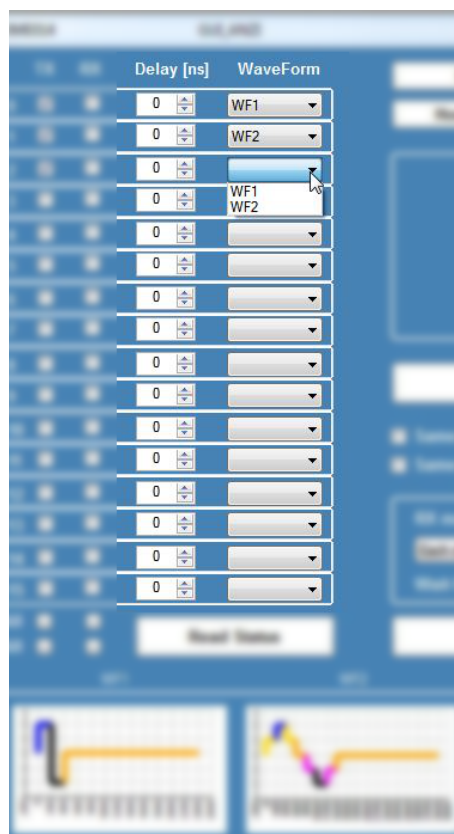
Step 2.   Use the graph section to check the waveforms corresponding to those you have chosen.

Figure 18. Waveform graph panel

Step 3. Use the [**Same waveform for all channels**] and [**Same waveform for odd/even channels**] buttons to set the waveforms collectively.

2.6 Set beamforming delay and manage RX channels

Follow the procedure below to set beamforming delays and manage the RX settings.

Step 1. Use the delay panel to set the beamforming delay for each channel.
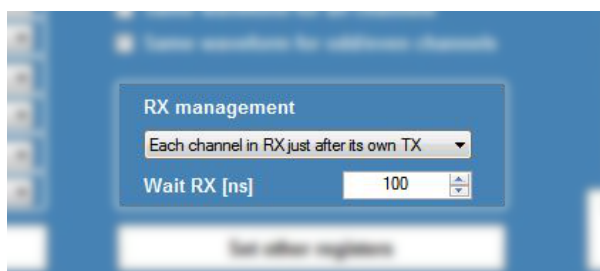
Figure 19. Beamforming delay panel
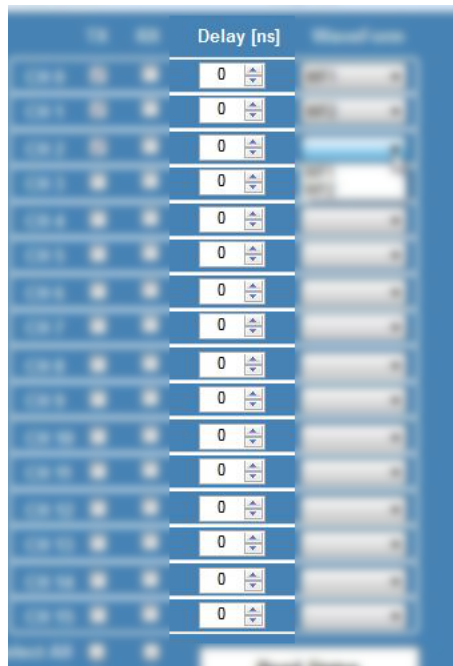
Step 2. Use the RX panel to manage the RX phase.

The available selections are:

– All channels enter the RX simultaneously, after the last TX

– Each channel enters RX from its corresponding TX after the delay set in the [**Wait RX**] box.

Figure 20. RX management panel

Step 3. Use the [**Set registers**] button to open a new form where you can set the STHV1600 registers that are not managed by the GUI.

2.7 How to load settings onto the STEVAL-IME014V1B

Use the GUI to configure the board settings before you load them onto the evaluation board.

Use the following procedure to load the .bin configuration file onto the STEVAL-IME014V1B evaluation board.

Step 1. On the GUI, click the [**Generate files and/or program STEVAL-IME014**] button.

The software will prompt you whether you want to program the STEVAL-IME014V1B board with the new file.

Step 2. Click [**Yes**] to generate the config file and program the device.

[**No**] generates the config file only.

A popup window appears with instructions to connect the board and save the bin file to the appropriate location.

Step 3. Ensure the USB port on the board is connected via cable to your PC.

Step 4. Click the [**OK**] button.

The Save the STEVAL-IME014 configuration binary file window appears

Step 5. Select the root folder of the Mass Storage Device corresponding to the STEVAL-IME014V1B (ST_IME014V1 drive) and enter an appropriate file name.

The previous file will be deleted.

Step 6. Click [**Save**]

A popup window will prompt you whether you want to save the text and bin configuration files.

Step 7. Click [**Yes**] to save the files in both formats.

They can be useful because:

– txt file lists all the registers set

– bin file can be saved and reused

One popup will appear to prompt you for the txt file name, and another will appear to prompt you for the bin file name.

3 Troubleshooting: check status register after a fault

If LED D5 lights on (red), a fault has occurred and a log file (STEVAL-IME014_log.txt) is written to the board mass storage drive on your PC.

Figure 21. STEVAL-IME014V1B fault LED D5
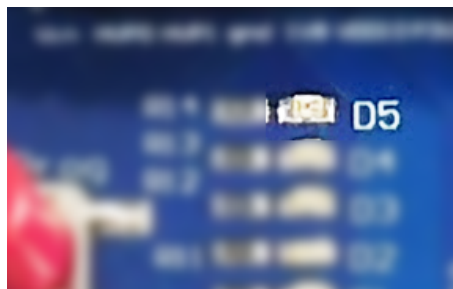
Use the procedure below to identify the causes of any fault events.

Step 1. On the GUI, click the [**Read Status**] button

The first time you do this, an Explorer window will appear for you to select the log file location.

Step 2. Select the root folder of the ST_IME014V1 drive that is created on your PC when it is connected to the board via USB.

Step 3. Check the log file path in the path panel and click the [**Change path**] button if you need to change it.

Figure 22. Log file path
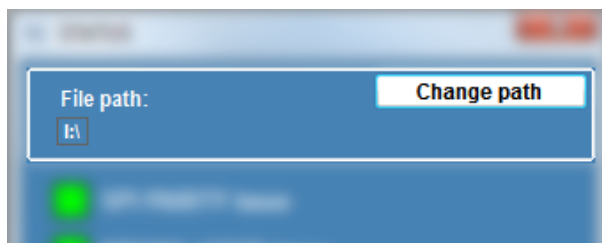
Step 4. Check the status panel to identify any issues.

RED boxes indicate a problem. Channels with thermal issues are indicated at the bottom of the panel

Figure 23. Fault status panel
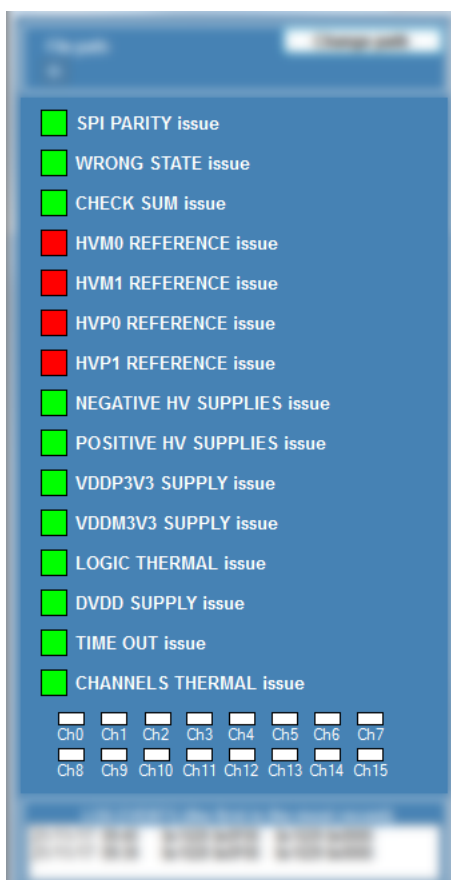
Step 5. Check the log panel to view the interrupt events recorded in the log file from the time the GUI was launched.

Figure 24. Events log panel
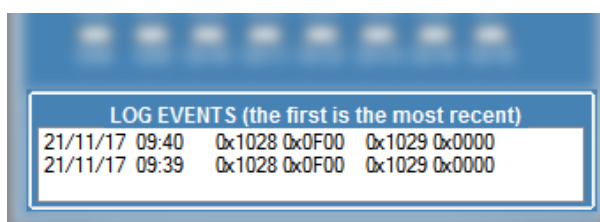
4   Other GUI features

Other buttons on the GUI are listed below.

- [**How to use STSW-IME014GUI**] opens a GUI user guide
- [**STHV1600 acquisitions**] provides a collection of oscilloscope screenshots regarding the main performance characteristics of the STHV1600 device
- [**Load GUI setup**] and [**Save GUI setup**] are used to save and reload GUI configuration files (waveforms, channel settings, environment setting, etc.)
- [**About**] button for support contact information

5   How to start TX activity and overwrite default board waveforms

Once the previous steps are completed, a .bin file is stored in STEVAL-IME014V1B RAM.

From the RAM, you can run program 1 on the board.

Step 1.   If you are using a high supply voltage value, disconnect the USB cable from the PC before starting waveform generation.

Step 2.   Press Push button 1 (PB1) on the STEVAL-IME014V1B board to start generating waveforms.

In Single mode, the waveform stops automatically at the end of the program.

Step 3.   Press Push button 1 (PB1) again in Continuous or CW mode to stop the waveform.

Note: *The program in the RAM is lost when you remove power supply from the board.*

Step 4.   To store program 1 in the permanent Flash memory, press and hold Push button 2 (PB2) on the board for 3 seconds.

The board must be powered externally or via USB during this operation.

Figure 25. Push button 2
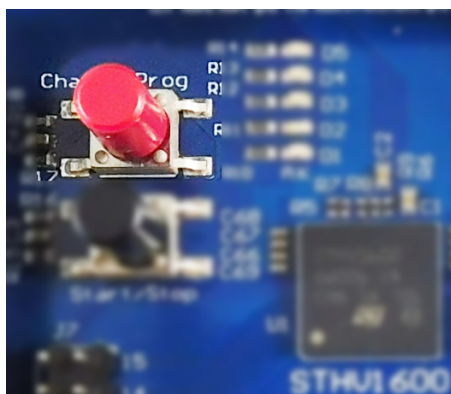
LED D1 will light on (red).

Figure 26. LED D1

Revision history

Table 1. Document revision history

Date	Version	Changes
06-Apr-2018	1	Initial release.

Contents

List of figures

IMPORTANT NOTICE – PLEASE READ CAREFULLY