ST87MXX GUI User Manual

1 General information

1.1 Acronyms and terms

Term	Definition
GUI	Graphical User Interface
RC	Release candidate
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
TE	Terminal Equipment, e.g. a computer (equal to DTE; Data Terminal Equipment)
UE	User Equipment

Table 1. Definitions of terms

1.2 Reference Document

The documents listed in Table 2**Error! Reference source not found.** provide further information.

Reference	Changes
[1]	ST87MXX_UM_AT commands description

Table 2. Document references

1.3 Revision history

Date	Version	Changes
2022-04-06	V0.1	First draft
2022-04-15	V0.2	First release after review
2022-05-09	V0.3	Add Trace description
2023-02-02	V0.4	Add NVM Panel description Change Console configuration
2023-06-01	V0.5	Add GNSS panel description
2023-09-14	V0.6	Add STEng description Add Console button separator description

Table 3. Document revision history

1.4 Table of content

2 Introduction

The ST87MXX GUI is the common graphic user interface designed to facilitate the control of the ST87MXX Board.

3 Installation

The ST87Mxx GUI software is designed to run on Microsoft® Windows 7 and 10.
To install the GUI:
STEP 1. Run setup.exe included in the package
STEP 2. Follow the installation instructions

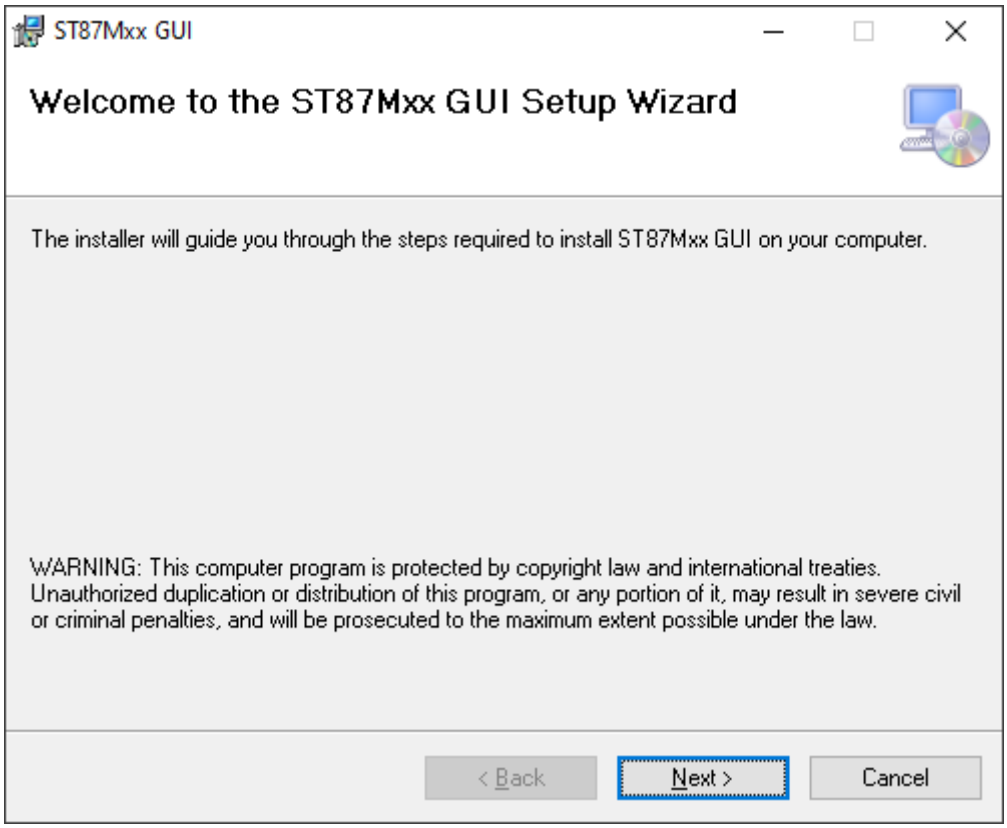
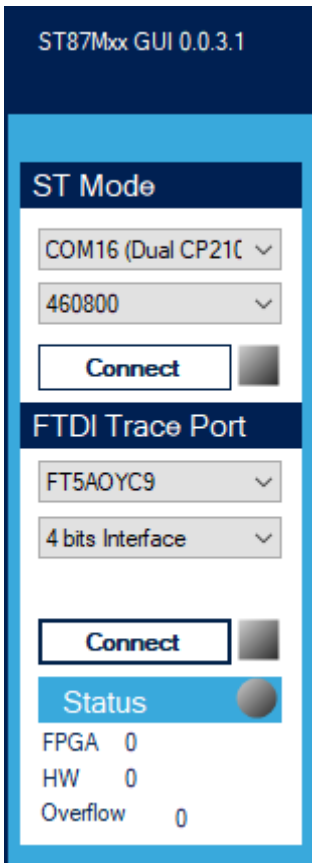


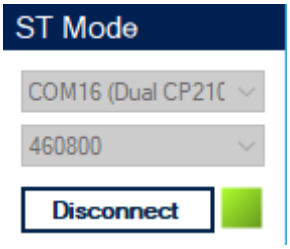
Figure 1 : ST87MXX GUI installation guide

4 Running the graphical user Interface

Step 1. Power up the ST87MXX board
Step 2. Connect the ST87MXX USB cable to the board and to your computer
Step 3. Launch the GUI from **[Start]>[STMicroelectronics]>[ST87MXX_GUI]**
Step 4. Select the COM port (Usually named “Standard COM Port”)
Step 5. Click the connect button (either ST Mode or FTDI Trace)

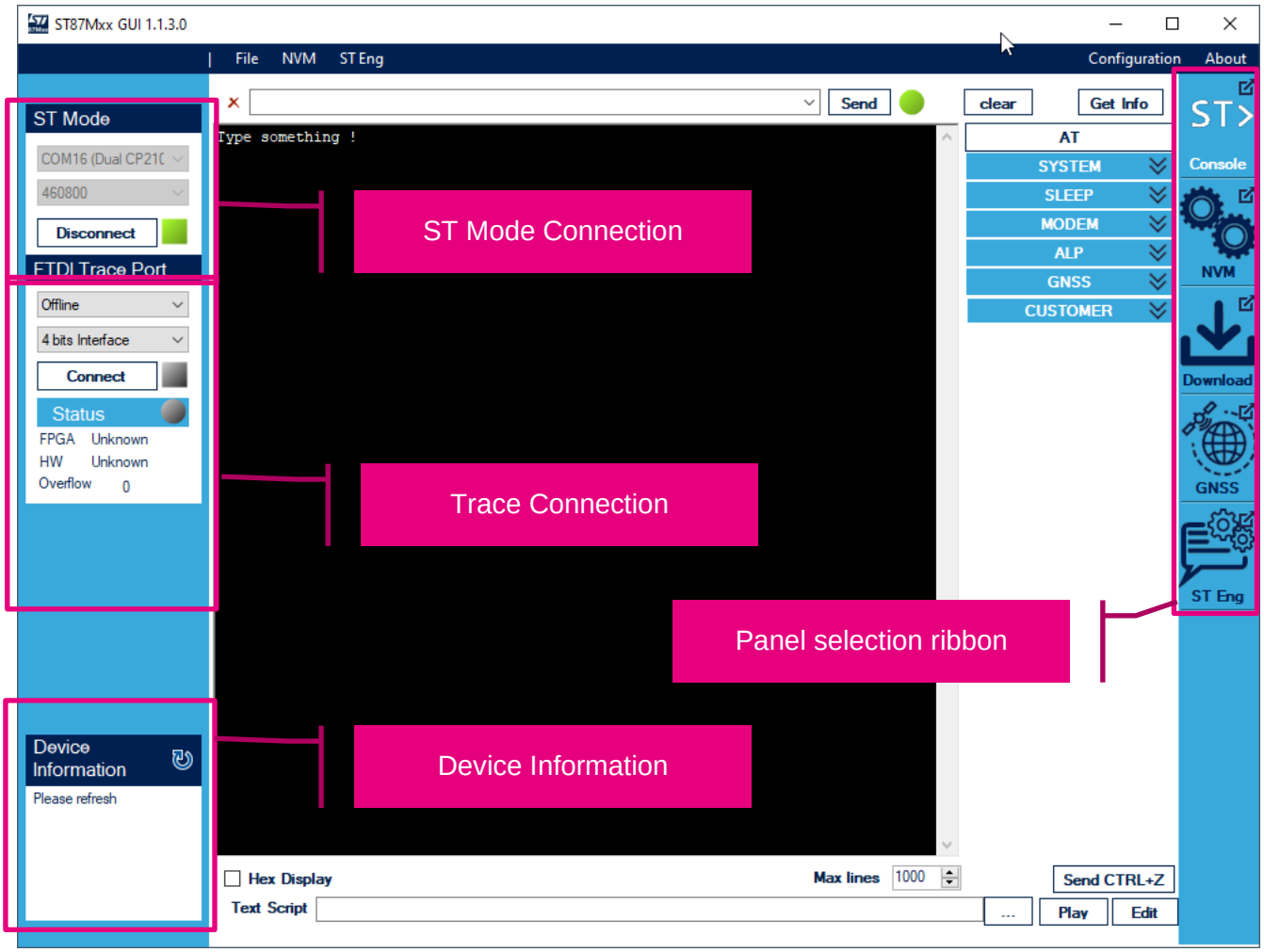


When connected, the square led becomes green.

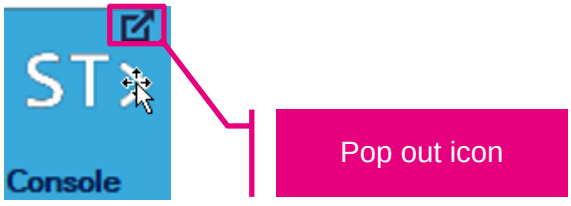


5 GUI windows and panel description

5.1 Panel selection



The user can select a panel containing a specific functionality by clicking on the icon in the right ribbon. The current selected panel is shown in white. A panel can be opened in another window by clicking the popout icon. Depending on the mode, different panels are shown.



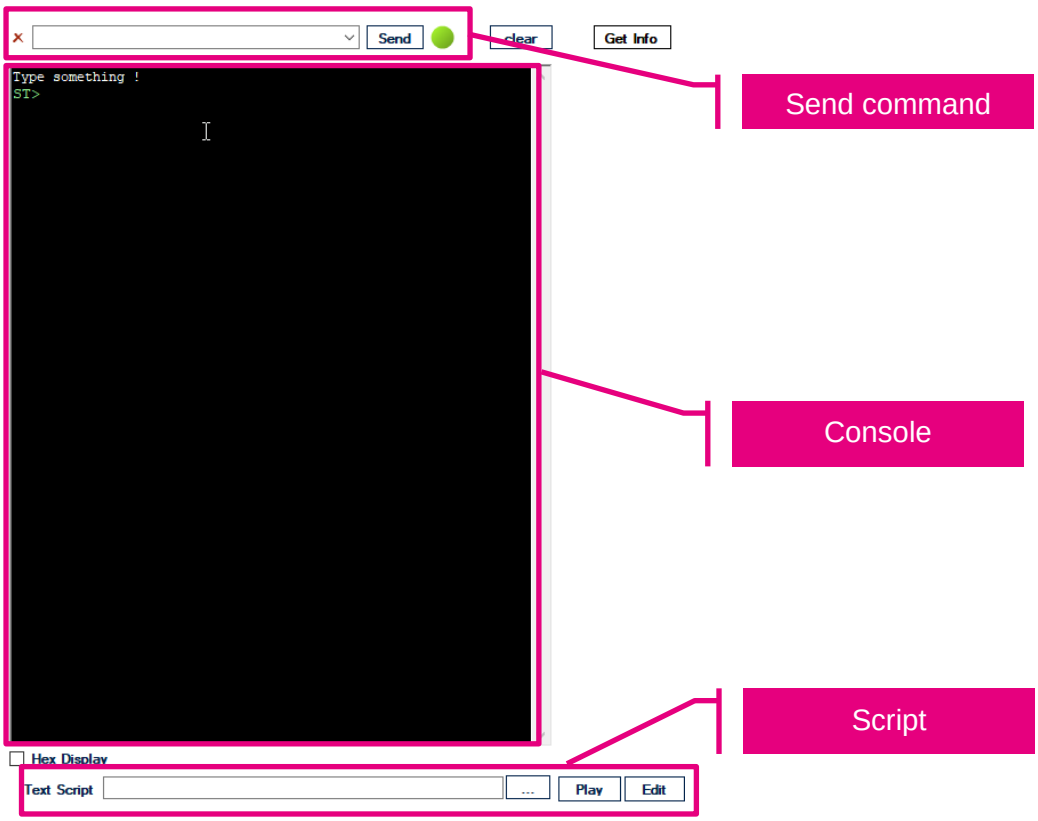
GUI displays various menus on top of its main window (File, configuration, about).

Menu
File->Exit : allowing to close the application
Configuration : Display a window containing configuration for each panel
About : information about the application.

Some menus are specific to plugins (panels) like (NVM or STEng) these menus will not be displayed if the corresponding panel is not loaded.

5.2 Console Panel

The console panel allows the user to send AT commands to the target.



5.2.1 Sending AT Commands

AT commands are sent by writing the command directly in the console part of the panel or in the send command part.
Every command sent by the send command part will be saved in the combo box for future use. The red cross allows the user to delete the current entry in the combo box.

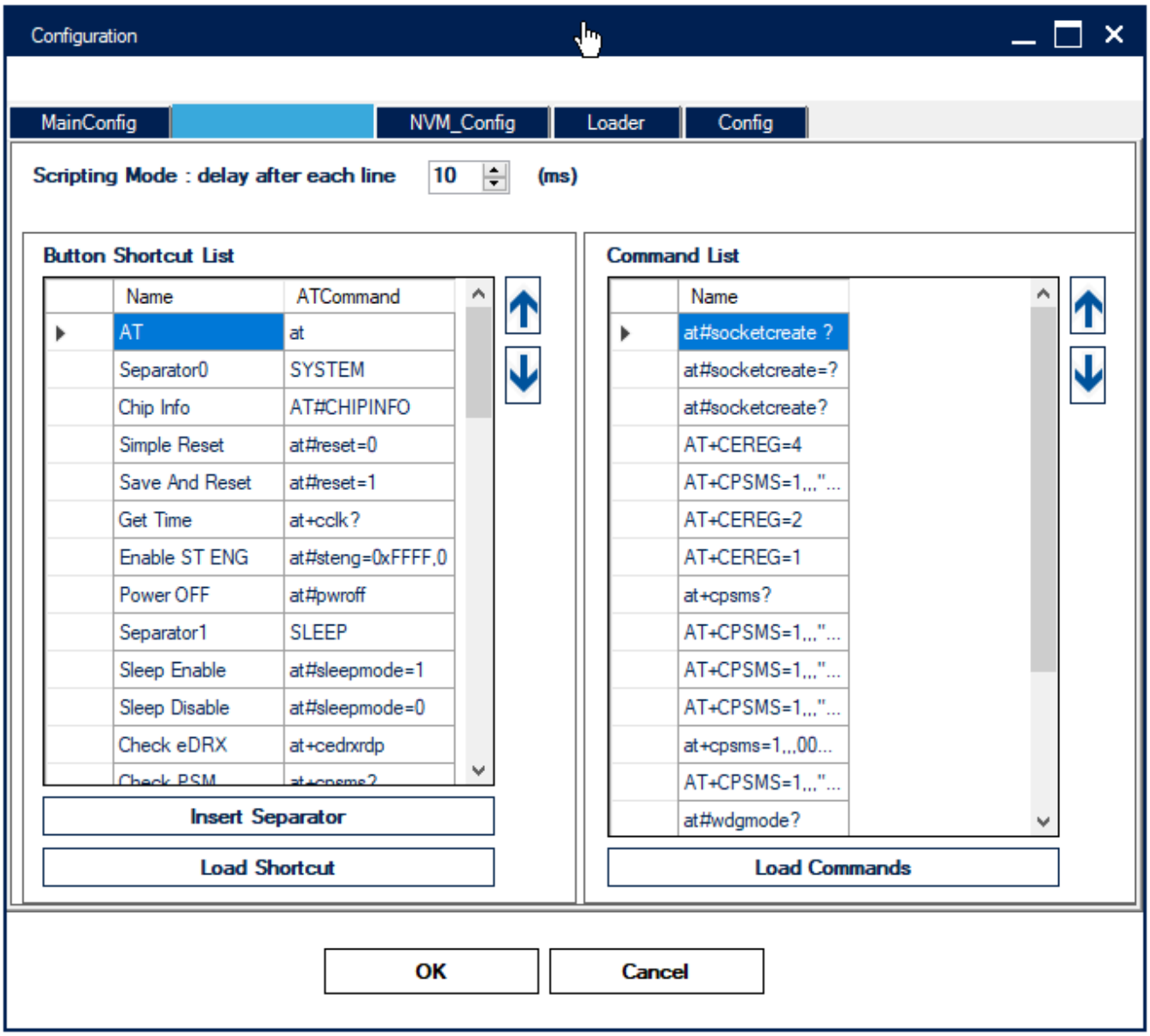
Commands entered by the user are in white, responses from the target are in green.
The clear button clears the console.
The Get Info button gives information about the target.

5.2.2 Script

Commands can be sent from a text file by selecting the text using the browse button (…), then it is played by clicking the Play button. Edit button allows editing the commands file.

5.2.3 Configuration

The configuration menu gives access to a configuration panel.



5.2.3.1 *Script Mode: delay*

The script mode delay can be used to add a delay between each line.

5.2.3.2 *Defining Commands List*

Commands list are accessible in the top combobox of the console panel.
They can be managed in the configuration panel in the command list table.

A line can be removed by clicking the left column and press the delete key.

5.2.3.3 *Defining Button Shortcut*

The command file will contain all the commands shortcut. It can be changed by browsing for another file using the browse (…) button.

The shortcut table allows the user to add custom button that will be showed in the panel and will send the corresponding AT command.
The name column contains the text displayed in the button, the AT commands column, the command.

A line can be removed by clicking the left column and press the delete key.

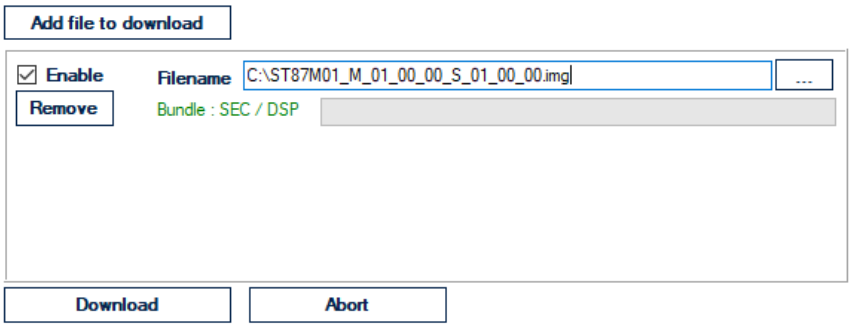
After validation, the defined buttons will be displayed at the right of the panel:

A left click on the button will copy the AT command in the clipboard.

Separators can be added to groups a list of command by type. They can be added using the Insert Separator button. Column “Name” correspond to the Separator followed by an index (two separators cannot have the same “Name”, in “AT Command” column, the separator text is set.

5.3 Download Panel

The download allows to download the FW to the target.



5.3.1 Managing files

The user can add files by clicking the Add file to download button. One or more files can be defined. Once a file is added, it can be removed by clicking the Remove button link to the file, it can also be disabled (not downloaded) by unchecking the enable button.

Information about the file is displayed in green.
The filename can be changed by clicking the browse button (…)

5.3.2 Download

Downloading is done by clicking the download button. Every selected file (enabled) will be downloaded in the current order. Download can be aborted using the Abort button.

5.3.3 Filename definition

The RC is really the version of Release Candidate version
If RC = 00, it is the official version
If 1<RC<99 it is a release candidate version

- Naming (all M, m, rc + 2 digits, key+key index 2digits)
  - ST87M01_A_M_m_rcxx_keyxx.img
  - ST87M01_M_M_m_rxxx_keyxx.img
  - ST87M01_S_M_m_rcxx_keyxx.img
  - ST87M01_ A_M_m_rc_M_M_m_rc_S_M_m_rc_keyxx.img for bundle

A : Application core
M : Modem Core
S : Secure core

M_m : Major.minor versions (2 digits for each)
rcxx : xx = version of release candidate
keyxx : xx = Version of key index

xx from 01 to 99

Example of official version for one core with encryption :
ST87M01_A_01_02_key01.img : official image for the application core for version V01.02 with encryption key index = 01

Example of releases chronology with RC and encryption:

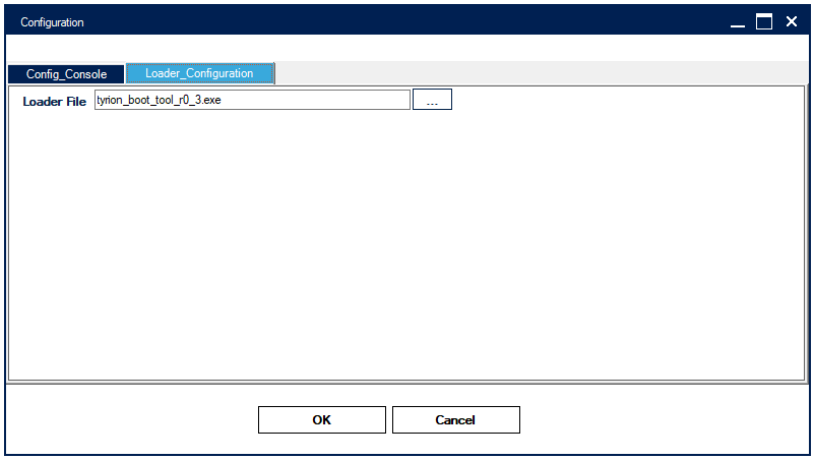
We have first the RC versions of the targeted version V01.03
ST87M01_M_01_03_RC01_key01.img : release candidate 01 of the image for the modem core with version V01.03 with encryption key index = 01
ST87M01_M_01_03_RC02_key01.img : release candidate 02 of the image for the modem core with version V01.03 with encryption key index = 01
ST87M01_M_01_03_RC03_key01.img : release candidate 03 of the image for the modem core with version V01.03 with encryption key index = 01

At the end, inside the official version , the RC number is removed
ST87M01_M_01_03_**key01**.img : Official release of the image for the modem core with version V01.03 with encryption key index = 01

Example for a full bundle
ST87M01_A_01_02_M_01_03_S_01_00_key01.img : official image for the application, modem and secure cores with V01.02, V01.03 and V01.00 versions respectively with encryption key index = 01
NB : only one encryption key is used for the 3 binaries inside the bundle

5.3.4 Configuration

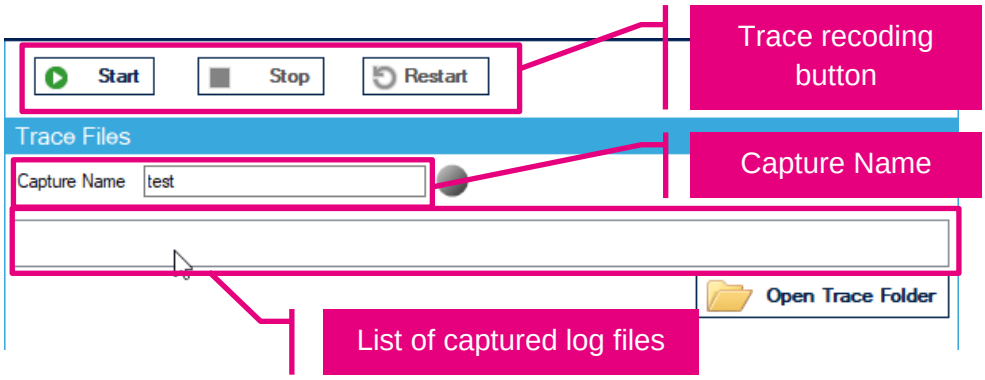
The Loader configuration is available by clicking the Configuration menu and selection the Loader_Configuration tab.



If necessary, the filename of the loader can be changed by clicking the browse (…) button

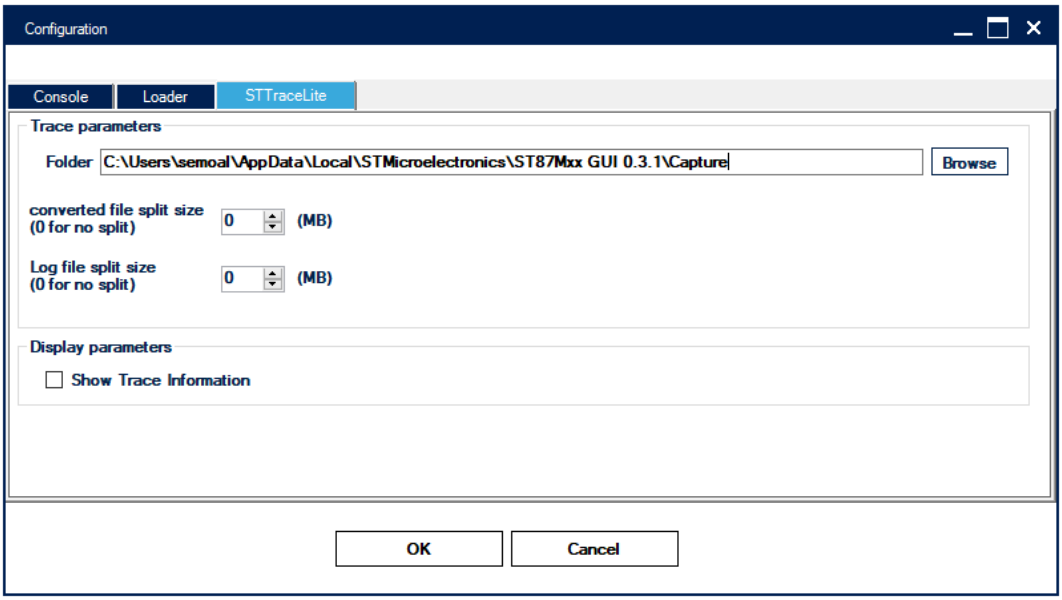
5.4 Trace Panel

The “Trace” panel allows the user to capture traces. The “Trace” panel is accessed by clicking on the “Trace” icon.



5.4.1 Managing trace files

The user may specify the location where trace files are stored by selecting the “Configuration” menu then selecting the “STTraceLIte” panel. The default path may be changed by clicking on the “Browse” button.

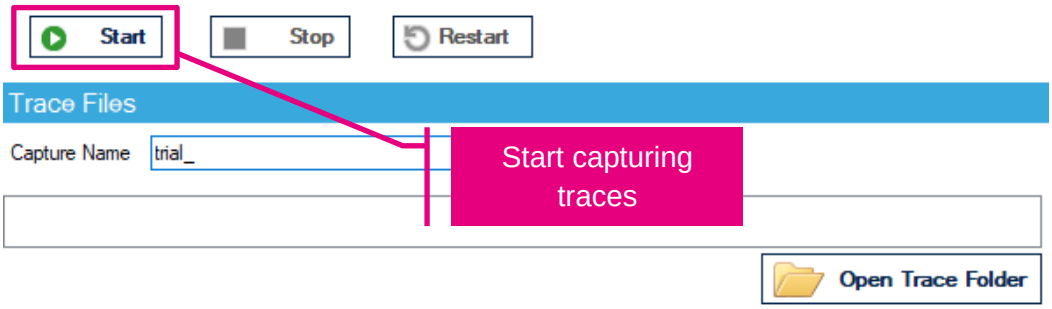


The trace files may be large. It is then possible to split them into smaller files with pre-defined size. The “Log file split size” helps defining this limit. For instance, 3 or 4 MB may be a first choice.

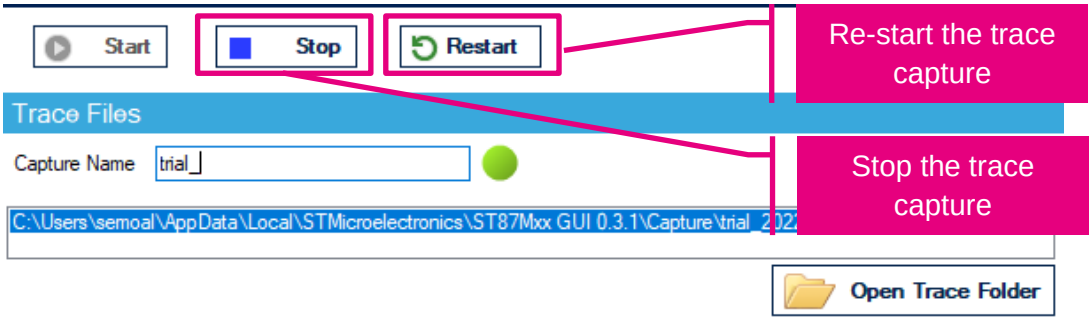
5.4.2 Trace capture

The root name for the trace files shall be specified in the “Capture Name” text box. The date and time are appended to the root name to build the trace file name.

In the following example the root name is “trial_”. The traces for the selected cores are captured by clicking the corresponding radio boxes.



Click on the “Start” button to start capturing traces.

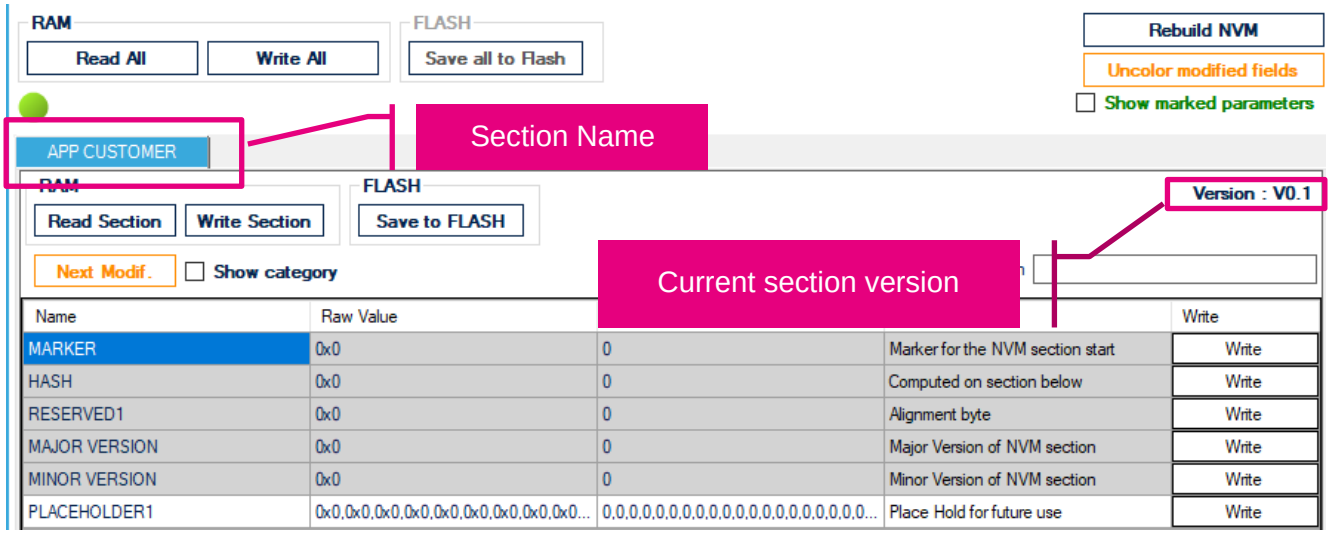


Click on the “stop” button to stop capturing traces (valid after starting to capture the traces).
Click on the “restart” button to start the capture again (this action erases what has been captured until clicking).

After stopping the capture of the trace, the trace file location and name are given in the text box. The “Open Trace Folder” button helps opening a Windows explorer in the trace folder.

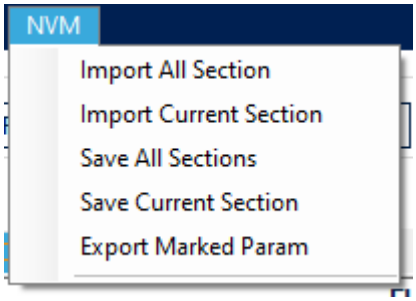
5.5 NVM Panel

The NVM panels used to read or write data to RAM and FLASH.
At start up, the RAM will contain the content of the FLASH.



There could be one or more section depending on the FW. In our example, only one section is available. The version of the section come from the FW, it is displayed on the top right of the selected section.

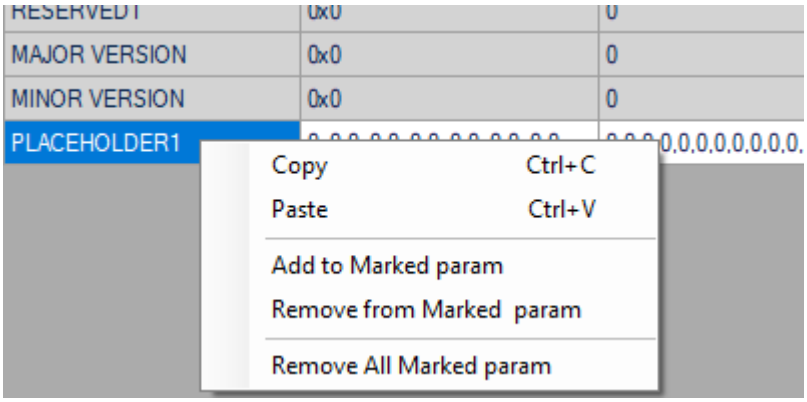
5.5.1 Menu



“Import All Section”: read all sections values from a file.
“Import Current Section”: read current section values from a file.
“Save All Sections”: save all sections to a file.
“Save Current Section”: save current section to a file.
“Exported Marked Param”: save only selected parameters to a file. See section Marked parameters for more information.

5.5.2 Section Management

5.5.2.1 Contextual menu

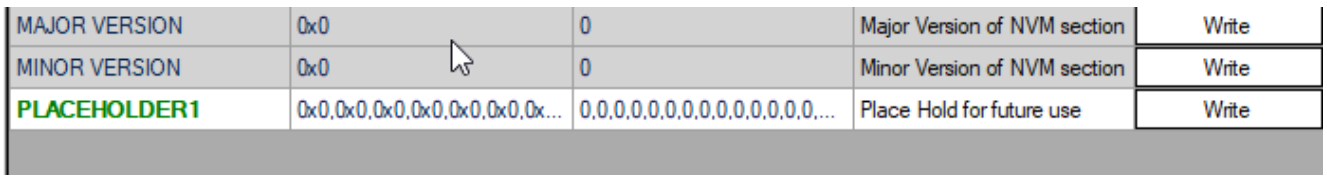


Copy/Paste : one or more cells can be copied between cells. Data can came from or go to an external editor (excel, notepad…).
Add to Marked param : add a parameter to the list of marked parameter
Remove from Marked param : remove a parameter from the list of marked parameter
Remove All Marked param : remove all marked parameter from the list

See section Marked parameters for more information.

5.5.2.2 *Marked parameters or partial files*

Partial file can be generated. This allows having only a selection of parameters in a file.
Marked parameters will appear in Green if the Show marked parameters checkbox is checked.

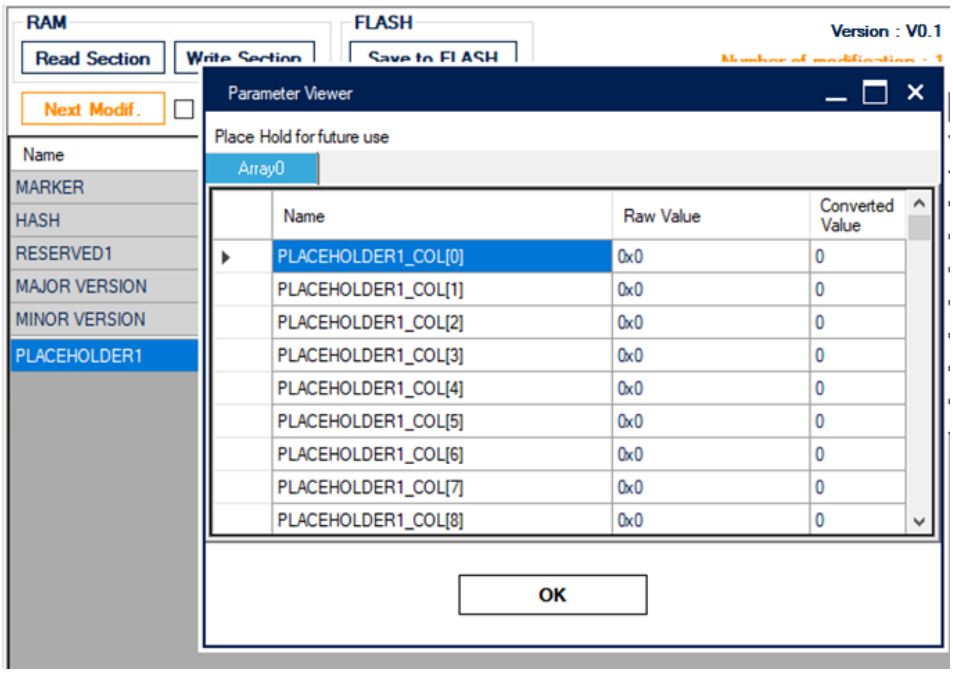


To add or remove a parameter from the marked list, use the contextual menu as shown in Contextual menu.

5.5.2.3 *Modifying parameters*

Parameters with gray background cannot be modified.
A parameter value can be changed by clicking the corresponding “Raw Value” or “Converted value” cell.
Values can be entered in hexadecimal format by preceding the value with “0x”.

In case of array, values can be entered by separating them with a comma. Individual values can also be changed after double clicking the parameter cells. A new window will display parameters as an array or structure depending on the parameter format.



5.5.2.4 *See modifications*

When a parameter is modified (after manual modification or by reading its value from RAM), it will appear in orange.

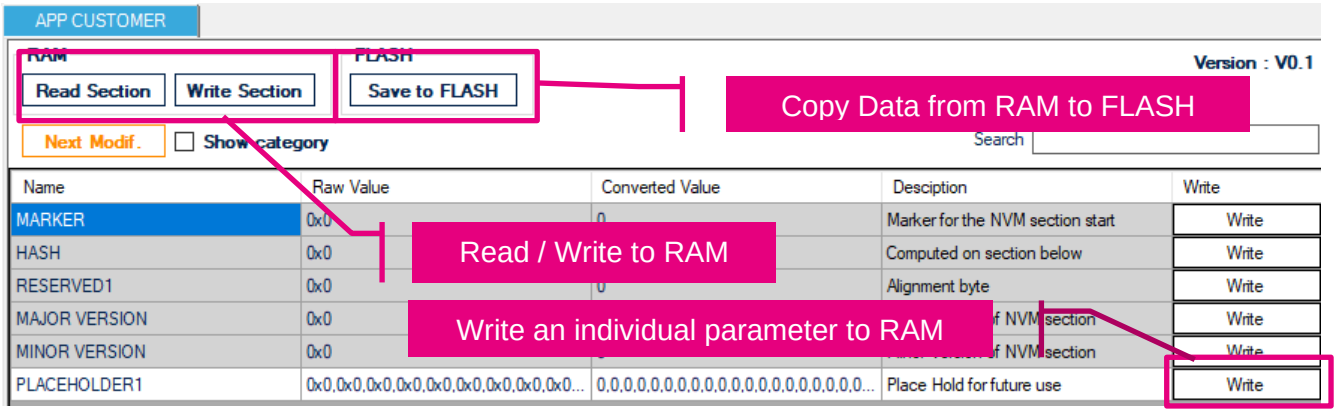
MINOR VERSION	0x2	2	Minor Version of NVM s...
SIMCLOCK	4500000	4500000	SIM Clock frequency

The “Uncolor modified fields” button in the top of the section will remove this color display.
The “Next Modif” button will select the next modified parameters.

5.5.2.5 *Search*

The search textbox allows the user to search for a parameter. Pressing the enter key in the textbox will switch the highlight to the next corresponding parameter.

5.5.2.6 *Section Read Write*

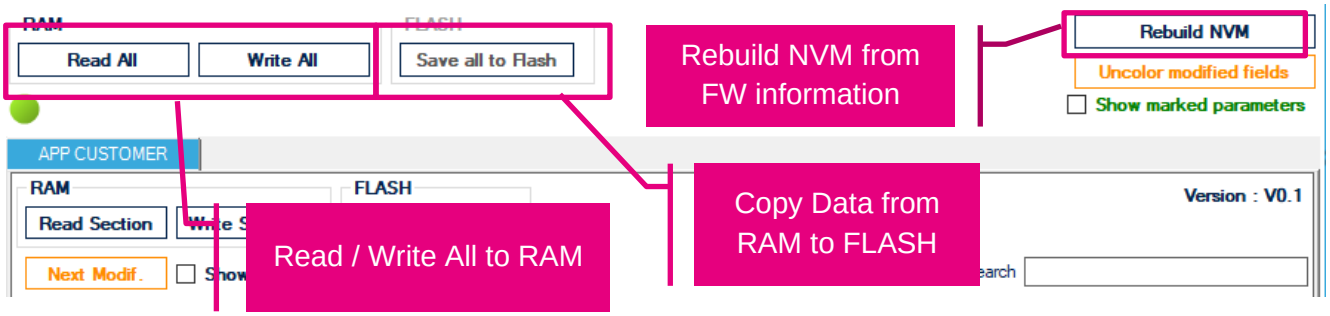


Section Data can be loaded into the GUI using the Read Section, data will come from the RAM. Data can be written to RAM using the write section to write all section. An individual parameter can be written using the corresponding write button.

The “Save to FLASH” button will copy the current section data in RAM to the FLASH. Note that to copy data from the panel to the FLASH, you must first write the section (Write Section button) then save it to flash (Save to FLASH button).

5.5.3 NVM management

The top part of the panel manages all loaded sections.

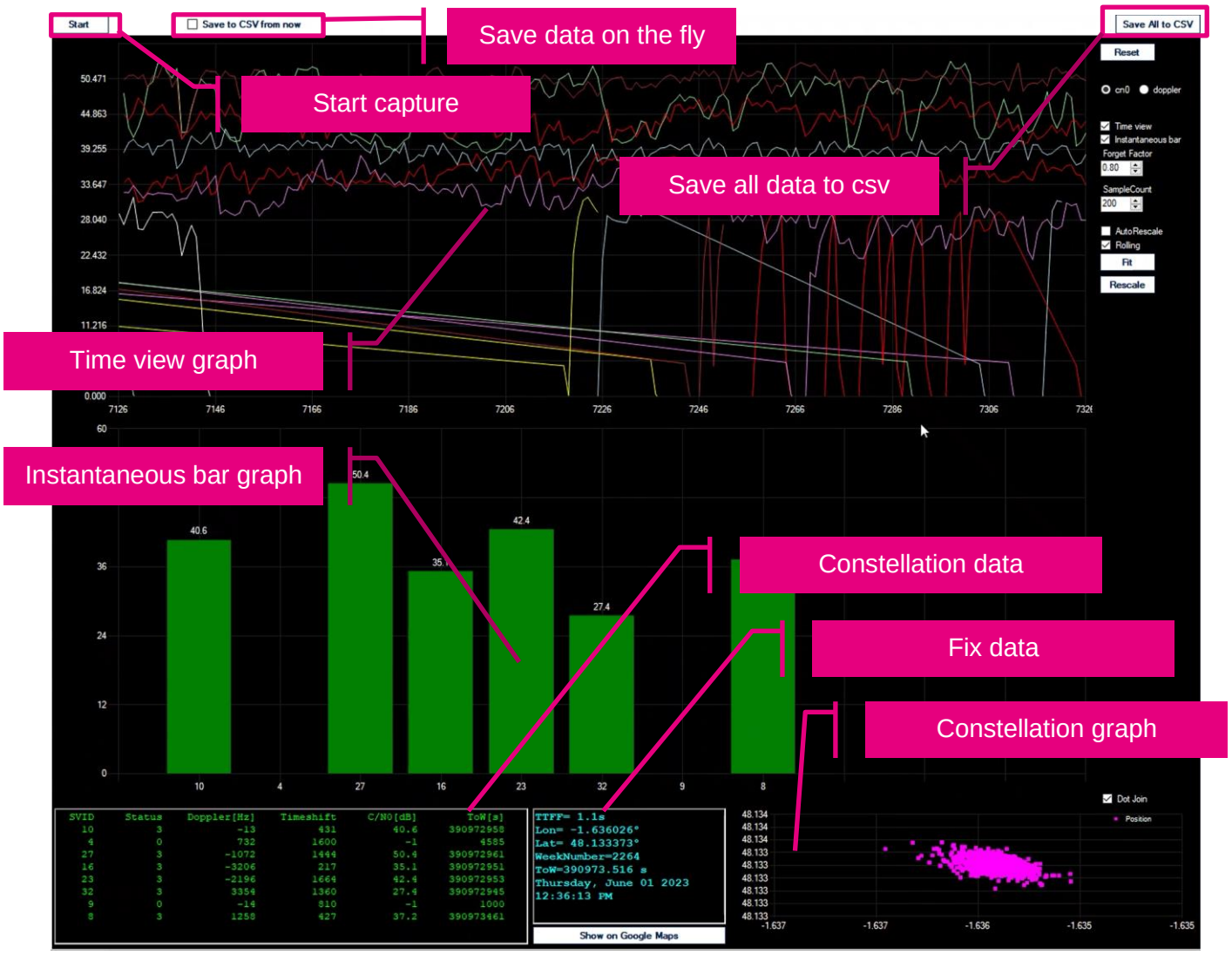


If the NVM is not aligned with the FW (after a download for example), the panel can be rebuilt using the “Rebuild NVM” button.

“Read all”, “Write All” and “Save All to Flash” buttons have the same effect as the one in the section (described in Section Read Write) expect that they are applied to all loaded sections.

5.6 GNSS Panel

The GNSS Panel allows decoding the console stream to show data using different graphs.



5.6.1 Start

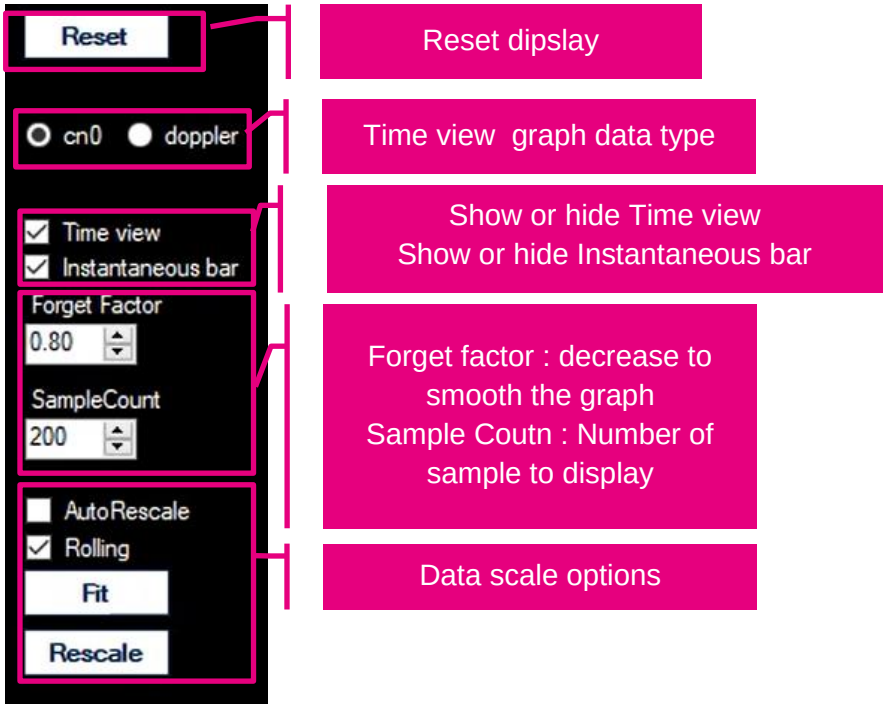
To start capturing, first GNSS logs must be enabled using AT commands, the console will display raw information. Those data while be redirected to the GNSS panel and decoded to display graphs.
The start button allows capturing.

5.6.2 Csv output

When checking the “save to CSV from now”, information will be saved in csv format in the capture folder. The capture folder is set in the “Configuration” menu in the GNSS tab.
The “Save all to csv” button will save all data in a csv file of your choice.

5.6.3 Graphs

5.6.3.1 *Graph display options*



5.6.3.2 *Constellation Data*

“Constellation Data” shows information on current constellation.

5.6.3.3 *Fix Data*

Fix Data displays information when GNSS is fixed.
The “Show on Google Maps” button will open the default internet browser to show the current fix on google maps.

5.6.3.4 *Constellation Graph*

The Constellation Graph shows all fix points in current session.

5.7 STEng Panel

The STEng Panel allows decoding the ST Engineering information concerning the device modem :

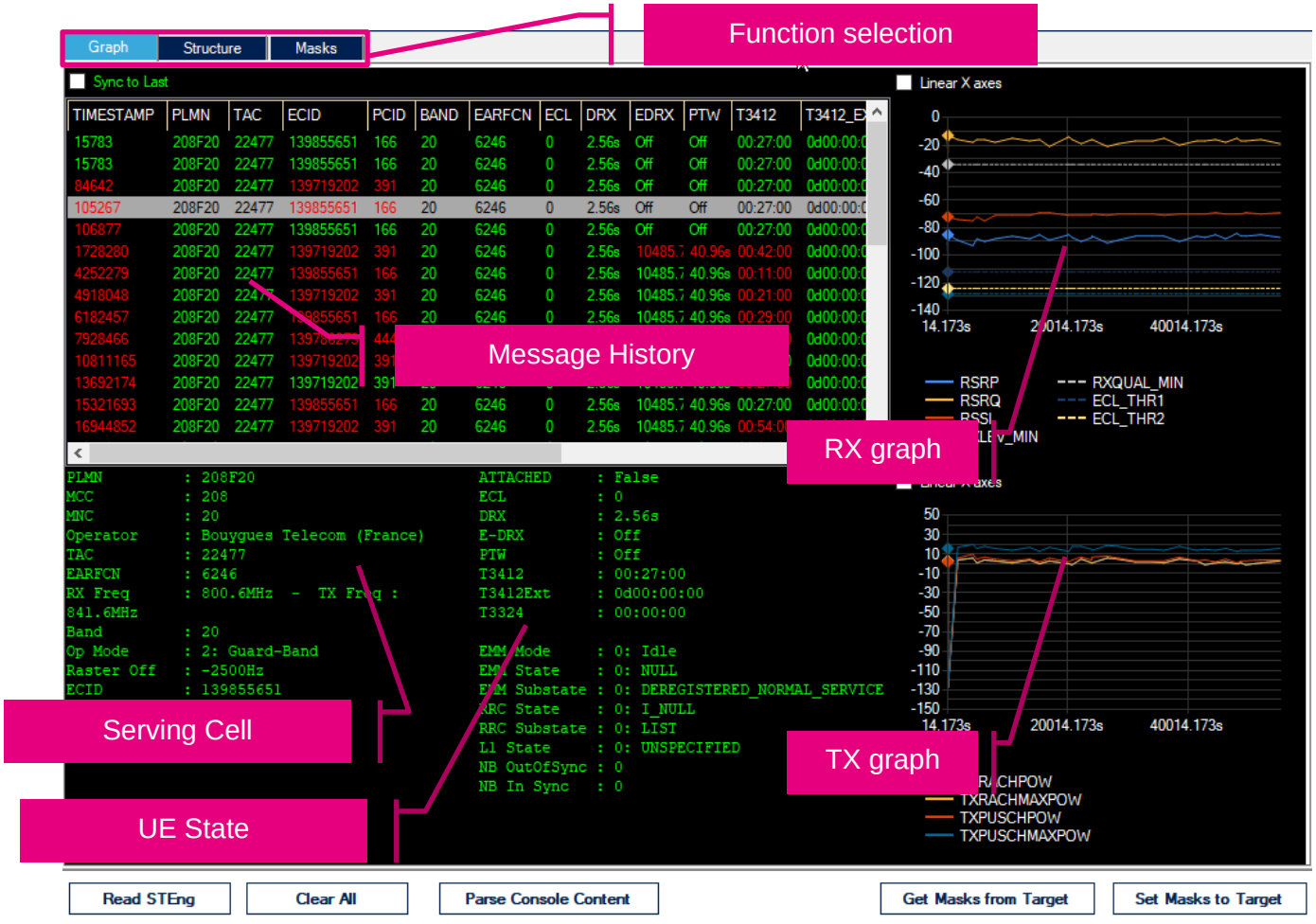
- Connection status : PLMN, Band, Frequencies
- Sleep mode
- RX & TX levels
- …

At the top of the panel, 3 functions are available :

- Graph : the decoding of messages in a graphical/text way
- Structure : the decoding of the messages through internal structures
- Masks : the selection mask for both asynchronous and asynchronous messages.

5.7.1 Graph panel

The function selection allows the user to select the Graph. The graph panel shows STEng decoding in text and graphical way.



5.7.1.1 History

The selected line in “Message History” is automatically decoded in Serving Cell, UE State panel, RX and TX graphs

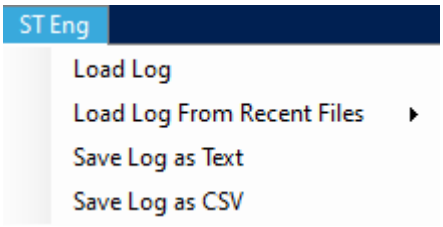
5.7.1.2 Graphs

Checking Linear X axis in both graphs will change the X axes to linear without using TIMESTAMP information.
Selecting a point in the TX or RX graph will synchronize with the corresponding line in the history.

5.7.1.3 Buttons

- Read STEng : Send a command to read STEng information. Received information can be selected using the Synchronous mask (see Masks panel)
- Clear All : clear all received messages
- Parse Console content : allows to decode existing messages from the console in the case there’s already asynchronous messages received before entering the STEng panel.
- Get/Set Masks From Target : get or set Asynchronous and Synchronous masks (see Masks panel)

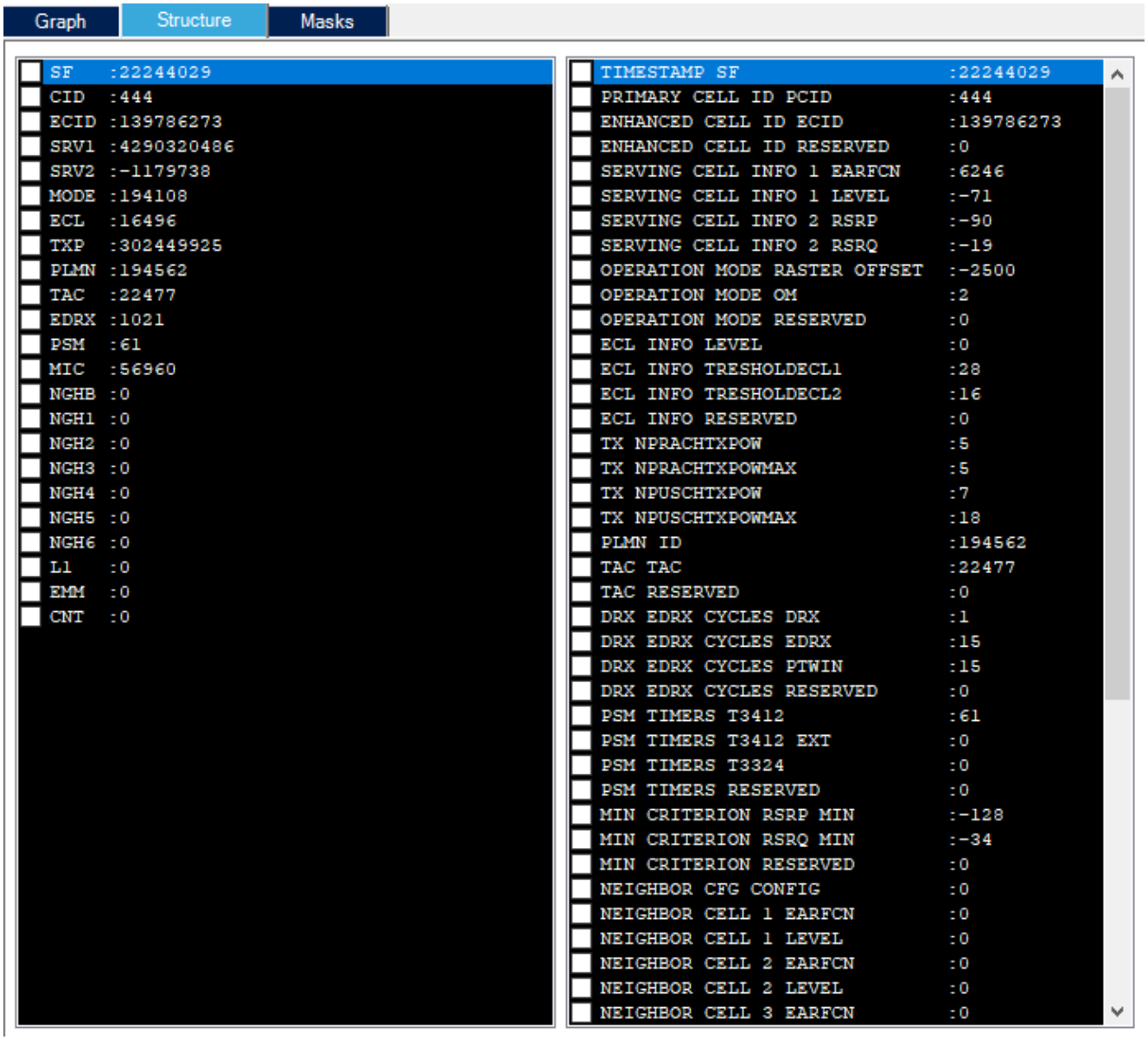
5.7.1.4 Menu



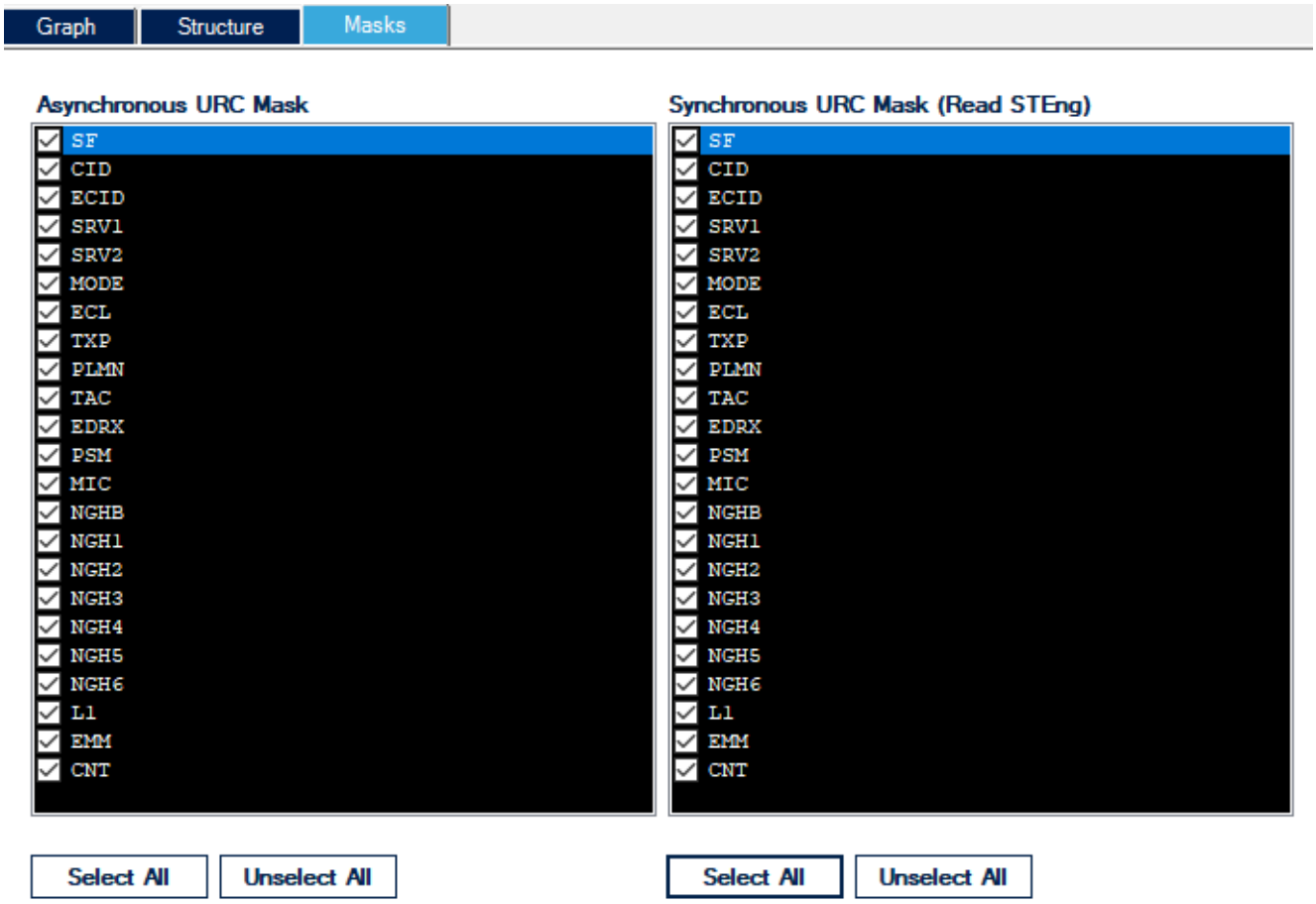
History can be saved as txt log files or CSV files using corresponding Save Log as menu. Load log allows to read txt log files or the content of the console panel as text. Recent loaded files can be loaded from the “Load Log From Recent Files” menu.

5.7.2 Structure Panel

The structure panel shows the STEng parameters in the left panel and decoded parameters in the right panel.



5.7.3 Masks Panel



Masks panel shows selected information in asynchronous and synchronous messages received from the target.
The “Get Masks from Target” button reads the current masks, the “Set Masks from Target” button sends the masks to the target.