SLSS CANAnalyser Pro Software

CAN-Bus Software for use with Serosys Technologies hardware dongles

Document: V1.2.7.0 - August 2026

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Users Manual

Based on software version 1.2.7.0L

1. Getting started

You must use a USB 2.0 compatible cable with the CANAnalyser dongles, not a charge-only USB cable.

1.1. Hardware

For compatibility to the Pro version of SLSS CANAnalyser, please purchase one of our hardware variants. The latest list of variants can be found online here: https://serosys-tech.com/product-lineup/

Table 1. Supported Hardware Options

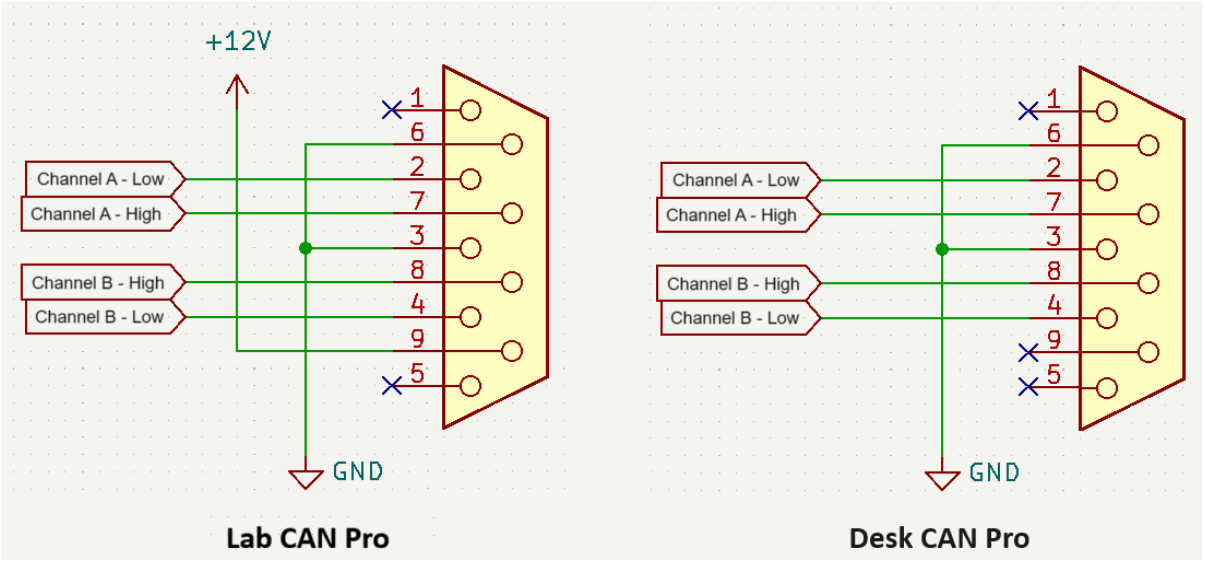
Hardware Model	Basic Feature Information
Desk CAN Pro 	**The starting point professional CAN hardware module with more features and power** Competitive high speed CAN bus traffic support and full dual CAN bus monitoring plus male and female DB9 ports for CAN traffic pass-through bus tapping, Stand-Alone sending, macro message sending, TCP/IP and API interface and much more out of the box!
Lab CAN Pro 	**Tailored for a more integrated hardware programmable lab environment** Desk CAN Pro with upgraded support for hardware logging on micro-SD, GPIO interface with 2 inputs and 2 outputs, qwiic peripheral interface, gateway function and CAN bus playback.

1.2. Connector Pinouts

1.2.1. DB9 (D-sub9) Connector

The pinout is the same for both Male and Female connectors. They are internally connected pin to pin and will pass through bus traffic even if unpowered.

Pin #	Function
1	No Connection
2	CAN bus CH-A Low
3	Ground
4	CAN bus CH-B Low
5	No Connection
6	Ground
7	CAN bus CH-A High
8	CAN bus CH-B High
9	12V B+ (only on Lab CAN Pro. All other variants this is N/C)



Power

- Only available on Lab CAN Pro
- Input power voltage supply range: +7 V to +28 VDC (nominal ~= 12 VDC)
- Reverse voltage and transient voltage protection

It is critical to avoid powering the Lab CAN Pro via both the USB connector AND pin 9 B+ at the same time!

Ground

- Ground pins are all connected internally

CAN Bus High / Low

- Even though the differential CAN Bus high and low pins do not require a ground reference, it is recommended that ground is carried with these pins for common-mode voltage rejection to avoid potential damage to the transceivers

1.2.2. GPIO Connector

Applicable to Lab CAN Pro only

GPIO pins 1 and 2 are inputs

GPIO pins 3 and 4 are outputs

These pins require a ground reference to be connected between the external device and the dongle. The ground reference can be acquired from pins 3 or 6 on either of the DB9 (D-sub9) connectors.

Electrical Parameters

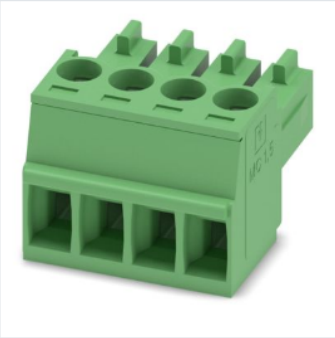
- Automotive grade I/O
- At overtemperature the regulator on the GPIO inputs is automatically turned off by the integrated thermal protection circuit
- 4 GPIO pins supported (2 input, 2 output)
- Output pins for sending CAN signals on GPIO triggers Input pins to trigger a GPIO based on a CAN input received
- Short Circuit Protection on all GPIO pins
- GPIO inputs protected from -28VDC to 28VDC
- GPIO outputs provide ~14mA steady state at CMOS logic levels (0V / 5V)
- GPIO outputs support input overvoltage protection to 28VDC

Mating Connector

Pluggable System Terminal Block. There are many suppliers of this style of connector. This is one example:

```
Phoenix Contact   1840382
LCSC Part # C480547
Package - Pitch = 3.5mm
```

https://www.phoenixcontact.com/en-us/products/pcb-plug-mc-15-4-st-35-1840382



MC 1,5/ 4-ST-3,5 - PCB connector

1840382

PCB connector, nominal cross section: 1.5 mm², color: green, nominal current: 8 A, rated voltage (III/2): 160 V, contact surface: Tin, contact connection type: Socket, number of potentials: 4, number of rows: 1, number of positions: 4, number of connections: 4, product range: MC 1,5/..-ST, pitch: 3.5 mm, connection method: Screw connection with tension sleeve, screw head form: L Slotted, conductor/PCB connection direction: 0 °, plug-in system: COMBICON MC 1,5, locking: without, mounting: without, type of packaging: packed in cardboard

1.2.3. USB Connector

Under normal operating conditions while connected to the SLSS CANAnalyser software, the USB power is provided by the USB port of the PC it is connected to.

Under the mode of operation in the StandAlone sending mode, if the dongle is powered by a USB connection that is not connected to a PC, the USB supplied current must be a minimum of 250mA for proper operation of the CAN bus line outputs.

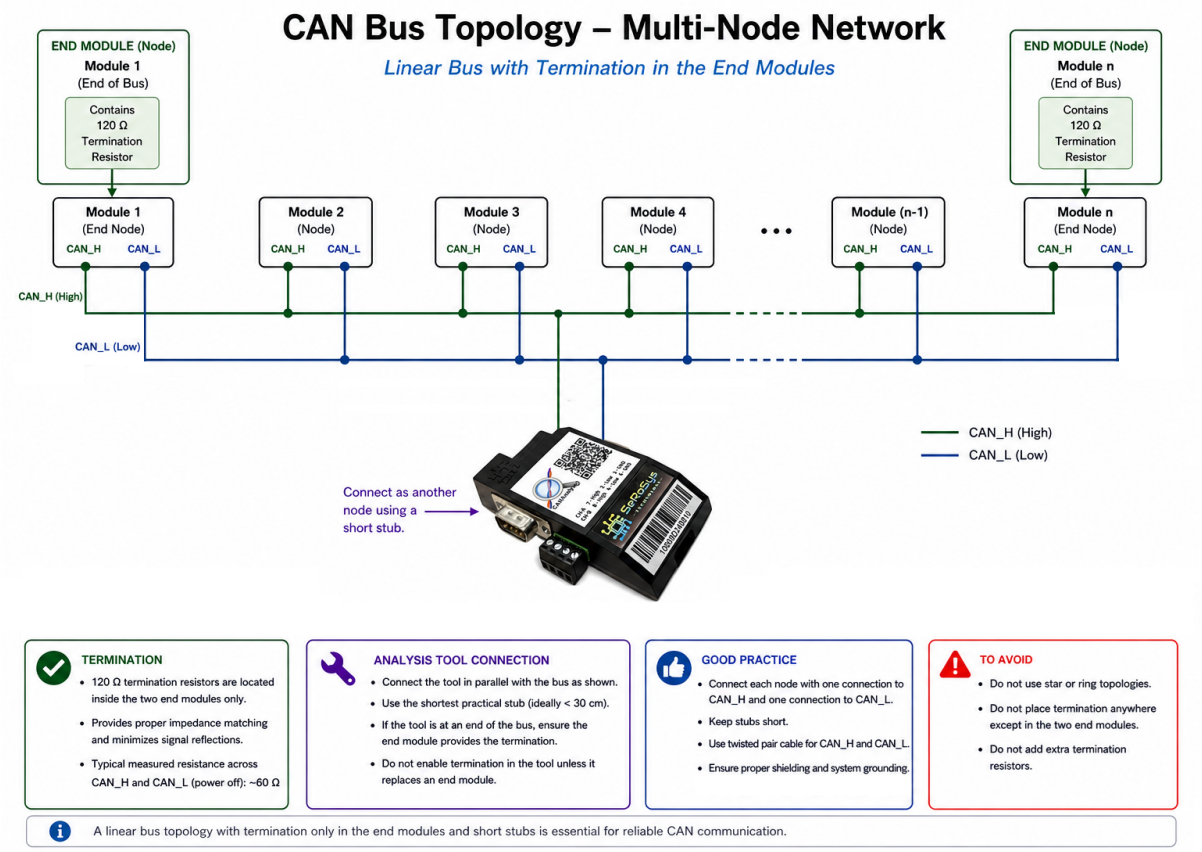
1.2.4. qwiic Connector

This connector supports the Sparkfun qwiic interface. This is a standardized interface created by Sparkfun. Please refer to their page for all the technical details and pinout information as maintained by their company.

https://www.sparkfun.com/qwiic

1.3. Connecting the SeRoSys Dongle to the Bus

It is critical to interface the CAN bus correctly to ensure proper behavior and accurate results. Failing to connect it correctly will potentially lead to data issues or even cause issues with other modules on the bus. CAN FD is particulary sensitive so pay careful attention to the information below.



There are 2 possible architecture configurations:

1. **Testing a single module with a terminating resistor**. In this scenario, the dongle is the end node. Verify that the bus resistance measures ~120 ohms when the modules are unpowered before connecting the dongle. Enable the SW configured terminating resistors on the dongle after confirming ~120 ohms.
2. **Testing a bus of multiple modules with terminating resistors on both ends**. In this scenario, the dongle **MUST BE connected between the end nodes**. Verify that the bus resistance measures ~60 ohms when the modules are unpowered before connecting the dongle. Disable the SW configured terminating resistors on the dongle after confirming ~60 ohms.

Data / communication errors may occur if the dongle is connected outside of the end nodes.

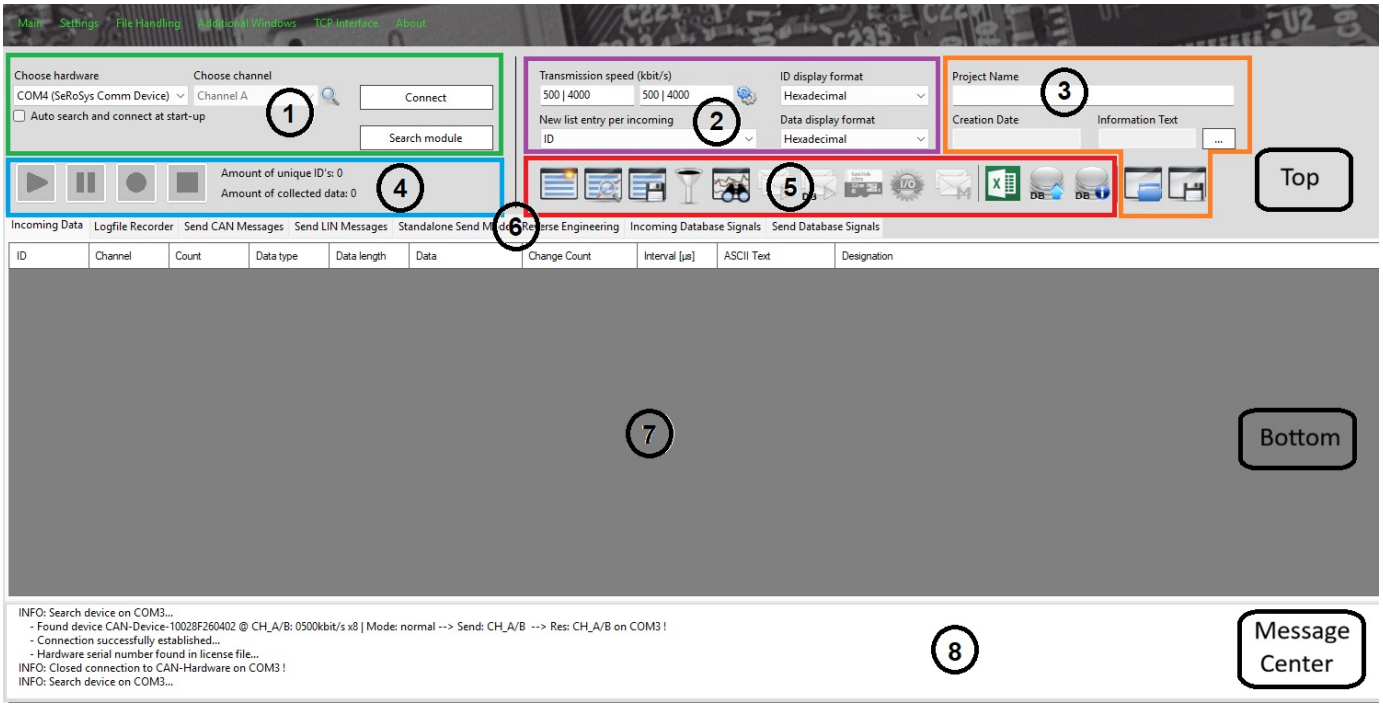
2. SLSS CANAnalyser Software

If desired to use more than 1 dongle on the same PC, please note that multiple instances of the CANAnalyser software may be run at once! So if you want to connect 2 dongles, you can run an additional instance of the software.

To ensure all buttons are accessible and all information is visible, a recommended resolution of 1920 x 1080 at 125% scale is suggested. Scale settings over 150% are not supported

Your PC should have a minimum of 8GB of RAM and keep system resources low for optimal performance.

2.1. The Main Screen Layout



The screen is broken into 3 main vertical regions: Top, Bottom and Message Center.

The Top area contains all the common functions that transpose into the bottom feature tabs and will be context adjusting based on which feature tab is open in the bottom. You will always have all the required controls within reach that are agnostic of which feature tab is open.

The Bottom area shows the CAN traffic or gives you access to the various functions within each feature tab.

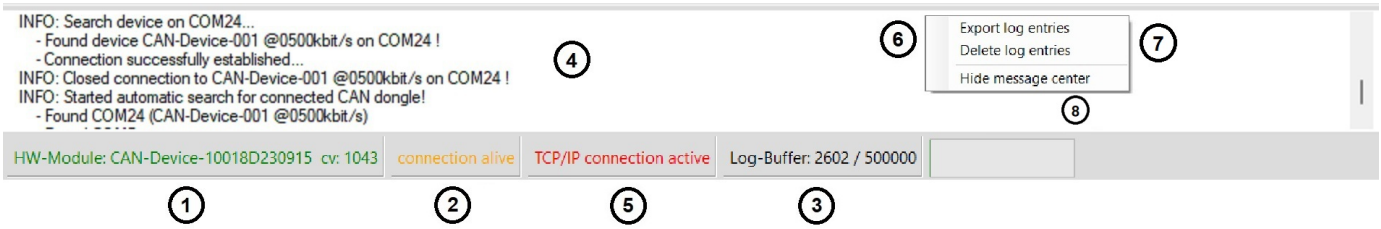
The Message Center area shows general log information and other important information.

Here is a description of each of the numbered zones on the main screen:

1. This is the area where all the module hardware physical connection options are made
2. This area controls the CAN connection speed and channel modes and lets you choose the format you want to see and record all data
3. The place to record information about your project that you desire to save notes and give titles and information for future reference. By default, a directory will be created and used under **Documents\SLSS CANAnalyser Projectspace**
4. Allows the user quick button access for recording / playing / pausing CAN data in the Incoming/Logging tabs and shows traffic data highlights
5. These first 3 buttons are context specific in some cases to the currently selected feature tab. In addition, the rest of the fixed buttons for other mode specific functionality and unique features. See section "Contextual Buttons and Features" for details on each button's functionality
6. This is where to select the desired feature tab
7. This is the Bottom area where all relevant information is displayed related to the selected feature tab
8. This is the Message Center area which shows information such as the connection status, hardware module information and connection speed and message buffer usage.
9. The software should install and start in English by default, however if a user desires to change the operating language to German, simply left-click on the flags to alternate between English and German language.

If the connection status (Connection Alive message in the bottom of the screen) is red then your PC has low resources. Please close other applications for improved performance.

2.2. Message Center Details

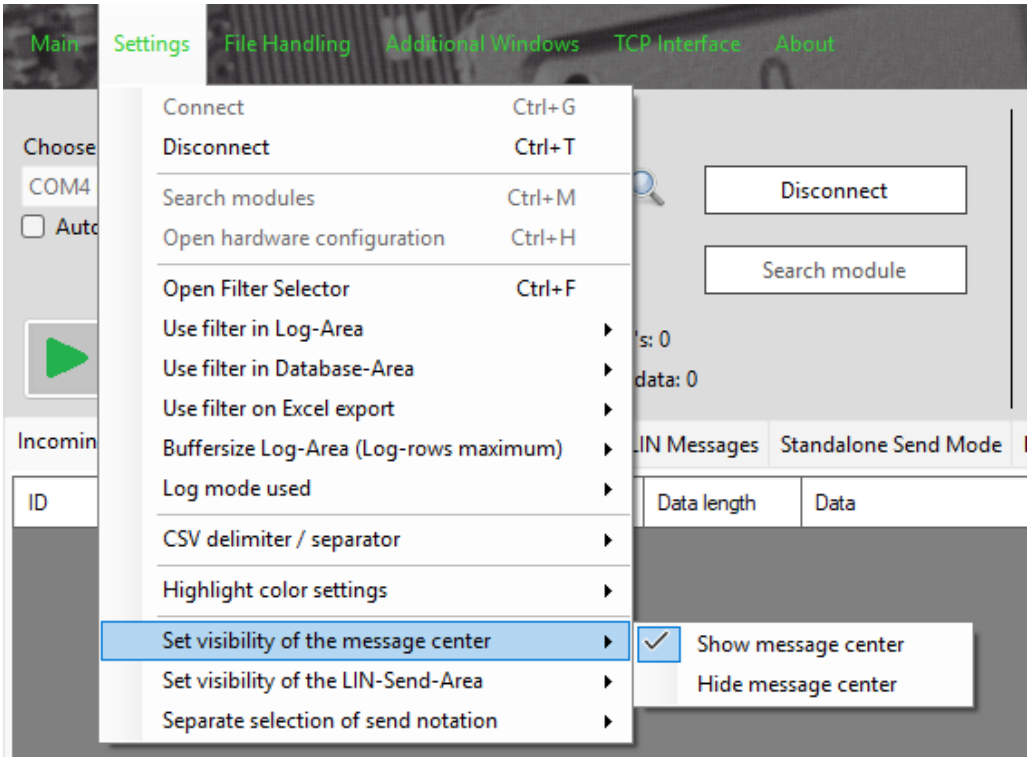


1. Hardware module connection information (once connected properly). Otherwise it states that there is no module connected.
2. Displays connection quality (if connected). (Green color / Yellow color / Red color) If Yellow and Red colors are blinking then consider closing other programs to free up system resources.
3. Shows the current log buffer size used and the maximum size. To increase the log buffer size, see section "Increase Log Buffer Maximum Size"
4. Logged Data from the SLSS CANAnalyser. This may be scrolled through (scroll-bar on the right) to view important chronologically listed SW log data
5. Informs the user that the TCP/IP port has been enabled for incoming connections

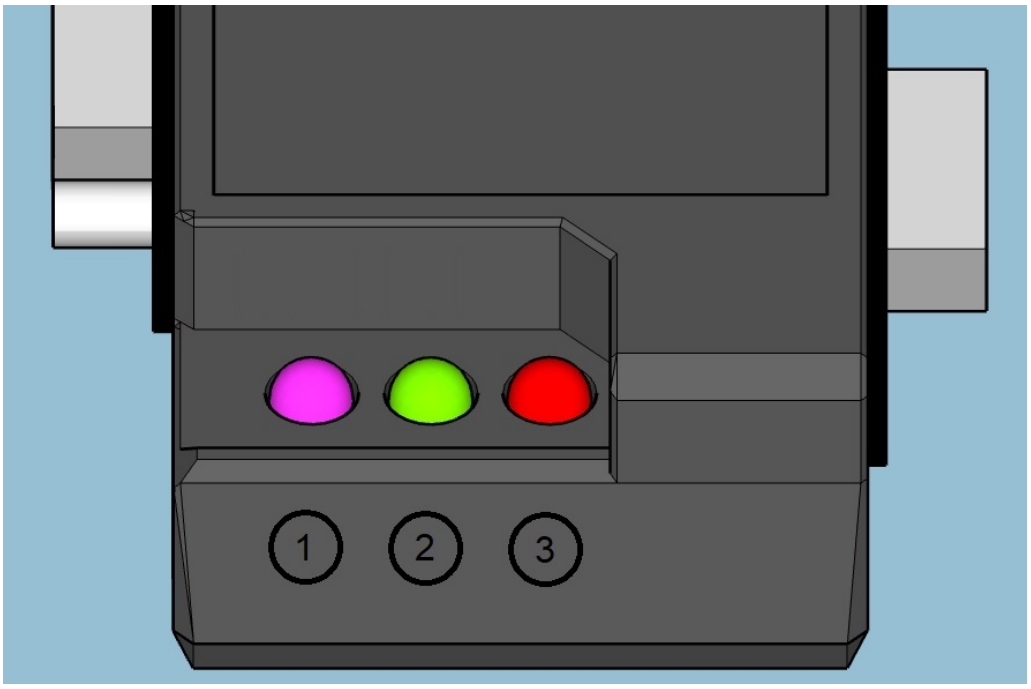
Right click menu activates these options inside the Message Center:

6. Button to export the SLSS CANAnalyser log data
7. Button to clear out the SLSS CANAnalyser log data
8. Hides this entire lower message center (it can be re-enabled from the Settings menu)

To reenable the Message Center:



2.3. Understanding the LEDs on the CAN Dongles



2.3.1. Standard Mode while connected to SLSS CANAnalyser

1. LED 1 - Power and Connection - **Solid Red** - Hardware module is powered up. - **Blinking purple** - Hardware module has an active live connection to the software.
2. LED 2 - CAN bus CH-B - **Green** - Incoming CAN traffic received. - **Red** - Outgoing CAN traffic is being sent. - **Amber** - Incoming and Outgoing traffic

3. LED 3 - CAN bus CH-A - **Green** - Incoming CAN traffic received. - **Red** - Outgoing CAN traffic is being sent. - **Amber** - Incoming and Outgoing traffic

2.3.2. StandAlone Mode while disconnected from SLSS CANAnalyser

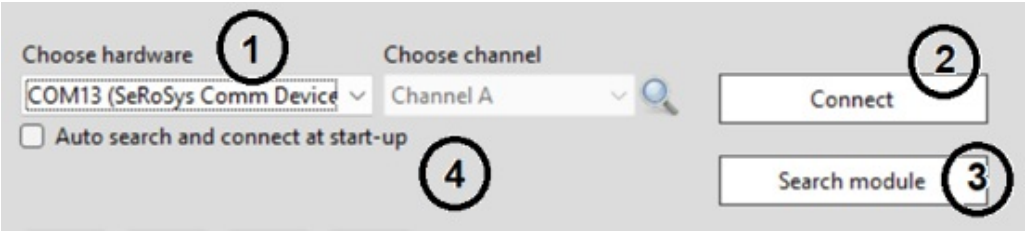
1. LED 1 - While a sent message list is stored on the dongle, this LED is always **Blinking purple** - Note that the blinking speed is slower in this mode to indicate it is in Standalone Mode
2. LED 2 - CAN bus CH-B - **Red** - Outgoing CAN traffic is being sent. - **Amber** - Error state indicator for sending CAN messages
3. LED 3 - CAN bus CH-A - **Red** - Outgoing CAN traffic is being sent. - **Amber** - Error state indicator for sending CAN messages

2.4. Establishing the Connection Between Software and CAN Dongle

2.4.1. Connecting to the Dongle Hardware

There are a few ways of connecting the hardware module to the software.

Please make sure you are using a USB 2.0 data cable and that the **Solid Red** color LED is lit up before trying to connect.



Manually selecting a COM port and then connecting

1. Select the COM port for your hardware dongle in the drop-down box
2. Select the Connect button

This will tell the software to look for the hardware dongle on that port. If it finds the hardware and connects to it, the hardware connection LED will begin blinking purple. If it does not find it, please select a different port and ensure the proper USB driver has been installed.

Automatically searching for your hardware dongle after the program has already been loaded

3. Select the Search Module button and let the software automatically search through the available COM ports to find your hardware dongle. If it finds the hardware and connects to it, the hardware connection LED will begin blinking purple. If it does not find it, ensure the proper USB driver has been installed.

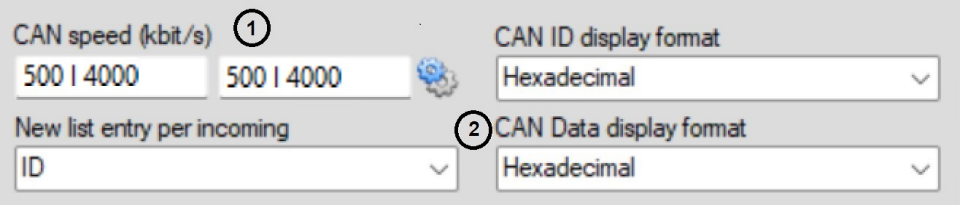
Automatically searching for the dongle may take up to 10 seconds. Direct connect is always faster by selecting the COM port from the drop-down.

Automatically searching for your hardware dongle upon loading the software

4. If desired, the check-box next to "Auto search and connect at start-up" may be selected. Once selected, the next time the software is loaded, it will automatically search for the hardware dongle upon start-up. If if finds the hardware and connects to it, the hardware connection LED will begin blinking purple. If it does not find it, ensure the proper USB driver has been installed.

Automatically searching for the dongle may take up to 10 seconds. Direct connect is always faster by selecting the COM port from the drop-down.

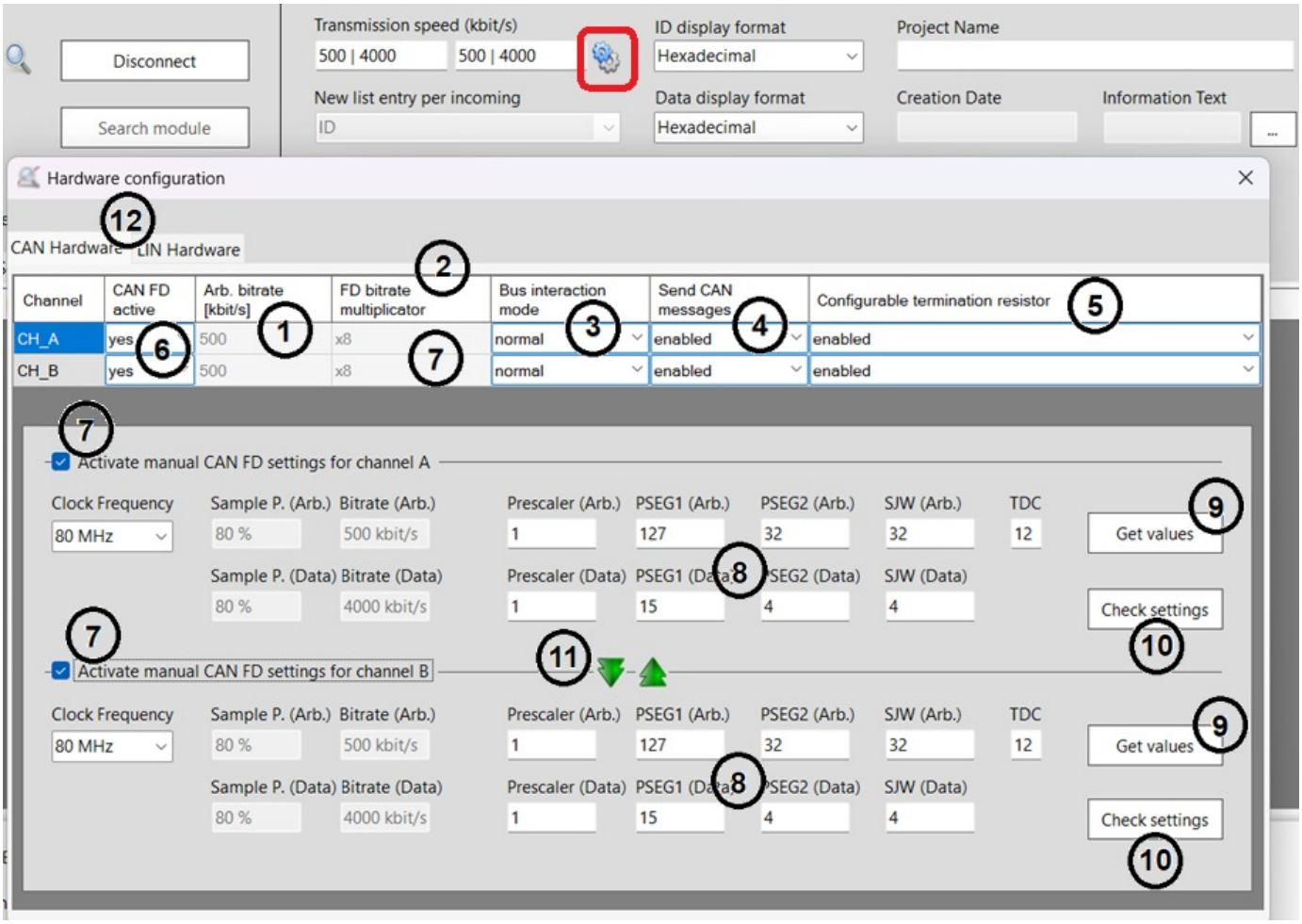
2.4.2. Connection Speed, Connection Mode and List Entry Style



500 kbit/s is the default standard used in most automotive applications so it is our factory default connection speed.

1. Shows the Connection Speed for each channel. The speed and mode can be changed from here
2. Select the option from drop-down menu to view Incoming Messages either by unique ID's or by pure scrolling messages
    - ID - Only 1 unique ID row is shown in all the data available in the Incoming CAN data tab and just the data changes
    - Data - Every message with changing data will be shown sequentially in a unique row, even if it is the same ID

2.4.3. Set the Connection Speed and Connection Mode for each Independent Channel



Press the image of the gears to open the Hardware Configuration window. The Connection Speed and Connection Mode for each channel can be adjusted here.

Settings menu is only accessible when the dongle is disconnected. Make the desired changes and then reconnect.

1. Select the desired Arbitration bitrate from the drop-down menu. They are able to be independently set for each channel.

2. For standard ISO CAN FD setup, select the FD bitrate multiplicator. They are able to be independently set for each channel.

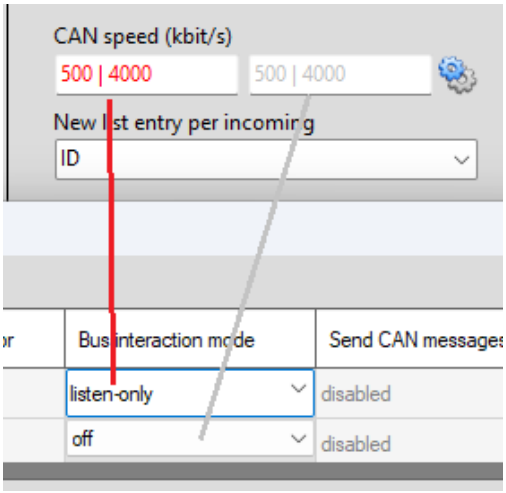
If the manual CAN FD settings are activated below, this box will be greyed out and not used in the speed calculations.

3. Select the desired bus interaction mode from the drop-down menu. It lets you choose between normal mode (*Allows full send and receive interaction on the bus*), Listen Only mode (*Only able to receive bus messages but not able to send*), or Off (*Channel is completely shut off, no receiving or*

sending possible).

In Listen Only mode, if the dongle is connected to a bus that has a single node only, the Incoming data will show a very fast message count. This is because it is not an active multi-node bus. Once there are at least 2 nodes on the bus plus the dongle, it will operate normally. Also, the software will allow the Sending tab to appear as if it is sending messages, however they will not be sent to the actual bus

When selecting "Listen-only", the CAN speed will be indicated in red color. When selecting "off", the CAN speed will be indicated in grey color.

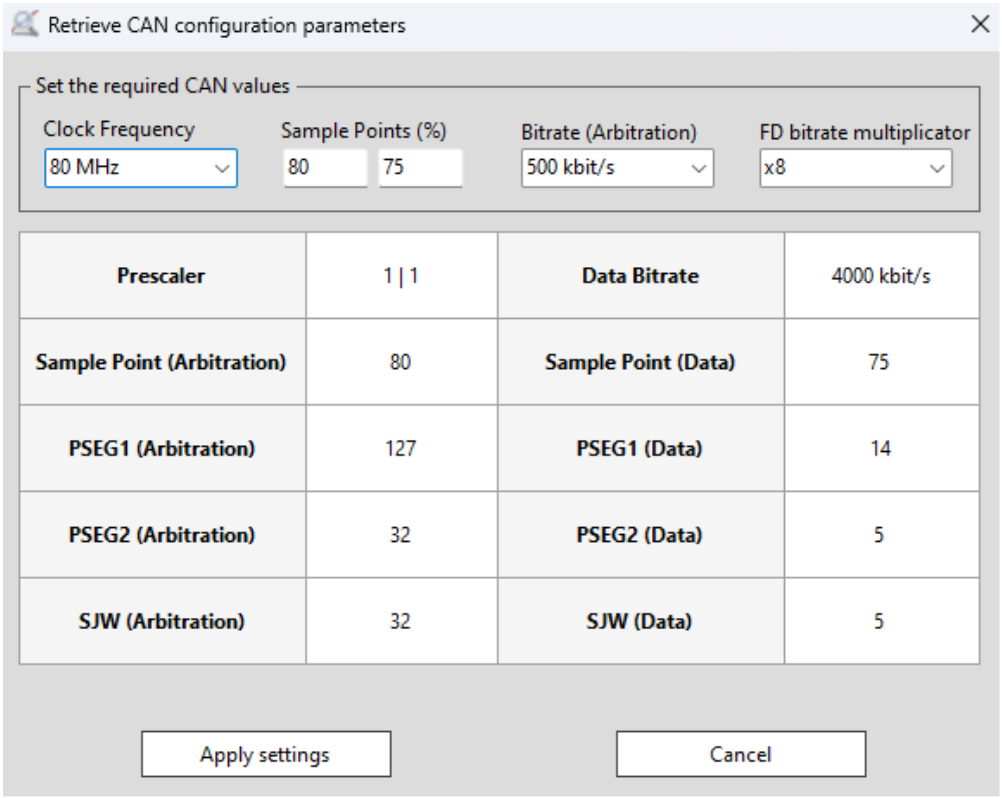


4. Choose to enable or disable message sending from the drop-down menu. This allows the user to lock out or enable each CAN channel from being able to send messages or not. If these are disabled, the Send CAN Messages Tab will not be functional
5. The drop-down menu allows a SW configurable option for enabling or disabling the 120 ohm bus terminating resistor (independently per channel)
6. CAN FD can be enabled or disabled from the drop-down
7. When selecting the checkbox to activate the manual CAN FD settings, the FD bitrate multiplicator box greys out as this overrides it

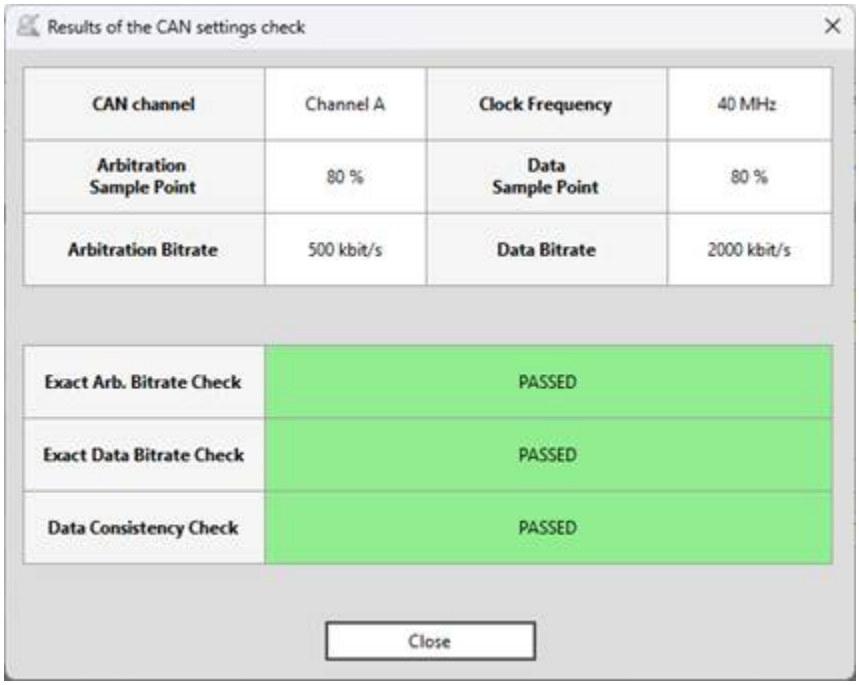
For CAN FD, settings can be very critical and sensitive. This will help to provide many options from generic settings to very custom settings to customize the connection flexibility.

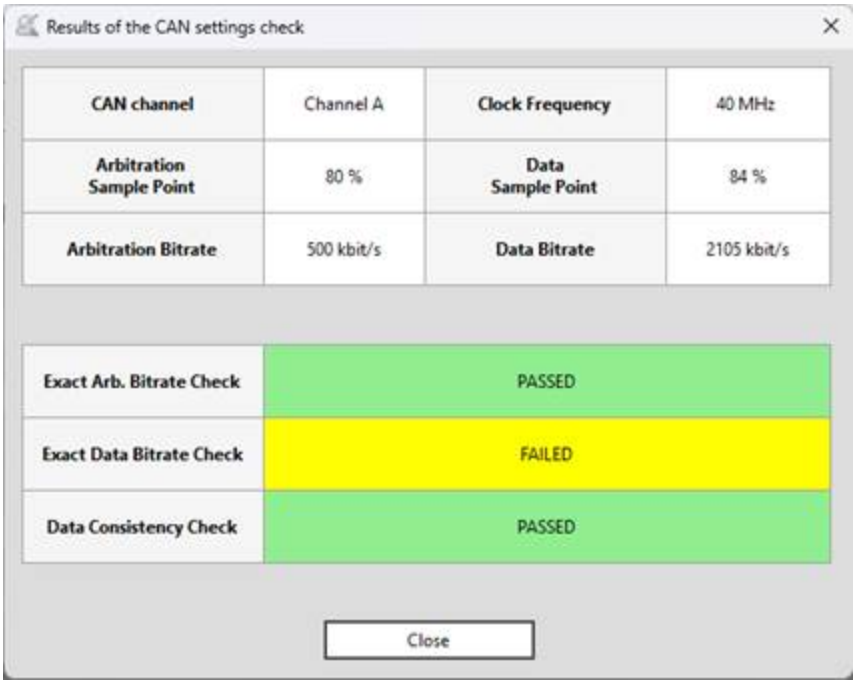
8. The values of all the critical CAN FD connection parameters may be manually set here. It is recommended to consult with a CAN FD bitrate calculator for best results
9. Selecting the **Get Values** button will open up a window to do the value calculations automatically based on a few user selectable inputs. The user will select the desired clock frequency, sample

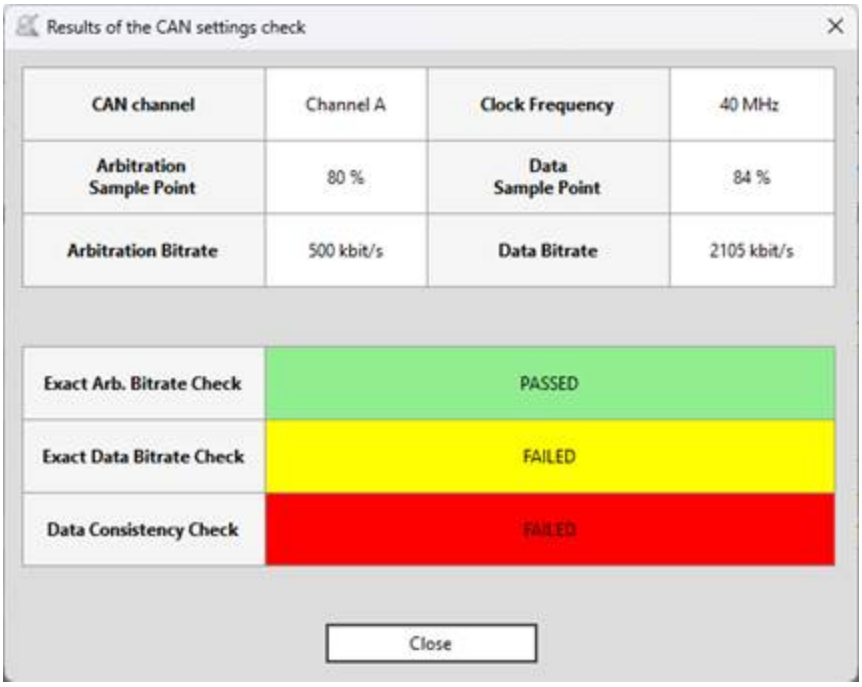
points (Arb / Data), the desires Arbitration bitrate speed and the FD bitrate multiplicator and the values will all be generated. Select **Apply settings** to set them



10. Selecting the **Check settings** button will conduct a check of the values that are entered to ensure a valid matching set of calculations will work. This way you can easily check if the chosen settings are valid or not (as shown in these 3 following examples).



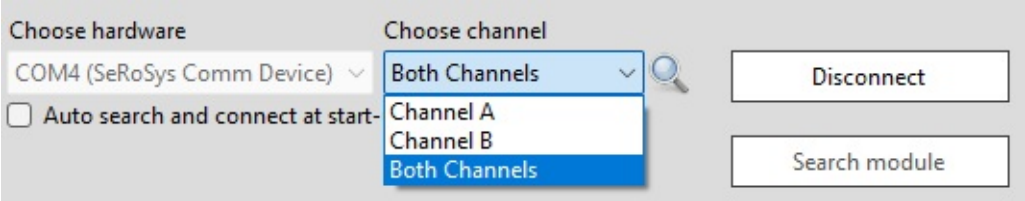




11. Select the arrow direction to copy the settings from either Channel A to Channel B, or from Channel B to Channel A.
12. Hardware variant tabs (CAN, LIN, qwiic/I2C)

2.5. Selecting Your Desired CAN Bus to Monitor

To change between CAN bus monitoring and sending between the CAN channels supported by your hardware.

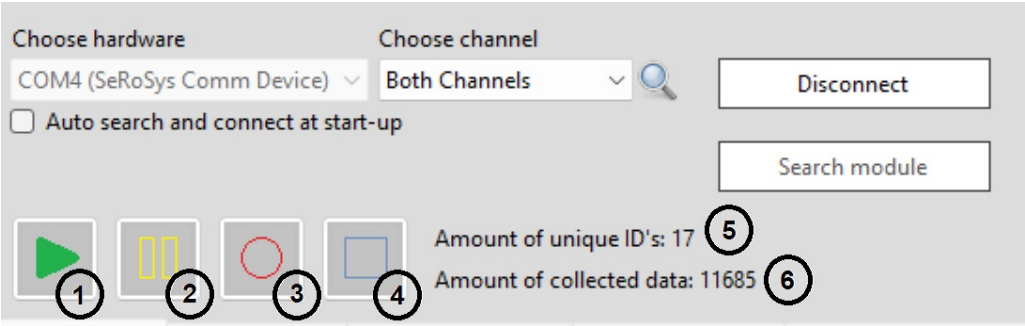


1. Select the drop-down to choose your CAN channel. Once selected, the software will showing incoming traffic and send outgoing traffic on the specified channel(s).

If the drop-down menu is greyed out or you cannot select Channel B, the license file does not match the hardware dongle connected to it!

2.6. Controlling the Recording / Displaying of CAN Traffic

The buttons allow control over the data recording and display as well as the showing the summary of ID's and amount of data collected



1. The **Play** button is activated by default to show all incoming CAN message data
2. The **Pause** button is used to pause the display and recording of CAN message data
3. The **Record** button is used to record the CAN message data in the buffer
4. The **Stop** button is used to stop the display and recording of CAN message data

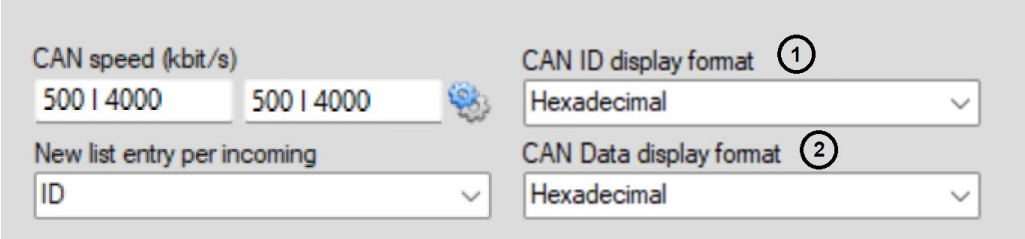
Keyboard shortcut for Play, Pause, Record and Stop are F5, F6, F7, F8

If a database file is loaded, a context box will ask if the user desires to enhance the log files. This will take some time to post-process and add all of the database human readable signal data to the logfile and will be available in the exports. See the section **Incoming Database Signals Feature Tab** for more details.

5. This displays the number of unique CAN arbitration ID's seen on the incoming data bus (regardless of which channel it is on)
6. This displays the total quantity of messages received (for all channels)

2.7. Selecting the Global Data format to view CAN ID and CAN Data

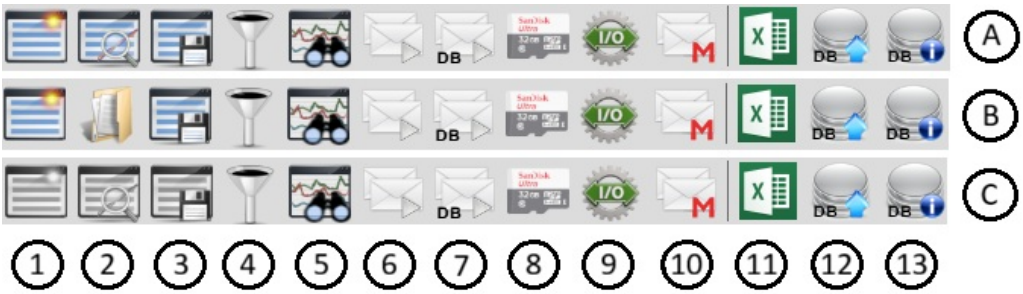
These 2 drop-down menus allow the user to select their preferred data format used throughout all feature tabs and data exports.



1. For Arbitration ID (CAN ID), choose between Hexadecimal, Decimal or Binary format
2. For CAN data, choose between Hexadecimal, Decimal or Binary format

3. Contextual Buttons and Features

These buttons offer some dynamic functionality. Depending on the selected analysis tab, some buttons dynamically change to fulfill the associated application purpose while others maintain functionality specific to the current analysis tab



Row A. These buttons are available in the following Feature tabs: "Incoming CAN Data" and "CAN Logfile Recorder"

Row B. These buttons are available in the following Feature tabs: "Send CAN Messages", "Standalone Send Mode", "Send Database Signals" and "Reverse Engineering"

Row C. These buttons are available in the following Feature tabs: "Incoming Database Signals"

Within each row, this is what each button does:

#	Row A	Row B	Row C
1.	Clears the current message list of all data and begins a fresh data view	Clears the current list of messages to be sent	This button is not available
2.	Loads a previously saved list of CAN data and opens it in a separate CAN data viewer window	Loads a list of previously saved data such as CAN messages or reverse engineering data	This button is not available
3.	Saves all currently displayed data from the currently active tab in a variety of format options	Saves all currently displayed data / configuration	This button is not available
4.	Opens the message filtering setup in a separate window	Opens the message filtering setup in a separate window	This button is not available
5.	Opens the Graphical Analyser Viewer in a separate window	Opens the Graphical Analyser Viewer in a separate window	Opens the Graphical Analyser Viewer in a separate window
6.	Starts or Stops messages in the active Send list from any mode	Starts or Stops messages in the active Send list from any mode	Starts or Stops messages in the active Send list from any mode
7.	Starts or Stops database Signal messages in the active Send list from any mode	Starts or Stops database Signal messages in the active Send list from any mode	Starts or Stops database Signal messages in the active Send list from any mode
8.	Opens the micro-SD card window from any mode	Opens the micro-SD card window from any mode	Opens the micro-SD card window from any mode
9.	Opens the GPIO interface window from any mode	Opens the GPIO interface window from any mode	Opens the GPIO interface window from any mode
10.	Enters Macro sending mode on the bottom of the screen (replacing the message center) **This can be toggled on / off at any time**	Enters Macro sending mode on the bottom of the screen (replacing the message center) **This can be toggled on / off at any time**	Enters Macro sending mode on the bottom of the screen (replacing the message center) **This can be toggled on / off at any time**
11.	Exports all data to Excel format (in multiple worksheet tabs)	Exports all data to Excel format (in multiple worksheet tabs)	Exports all data to Excel format (in multiple worksheet tabs)
12.	Opens a separate window with options to load a database file on Channel A or B independently as well as options to create / edit and save DBC files	Opens a separate window with options to load a database file on Channel A or B independently as well as options to create / edit and save DBC files	Opens a separate window with options to load a database file on Channel A or B independently as well as options to create / edit and save DBC files

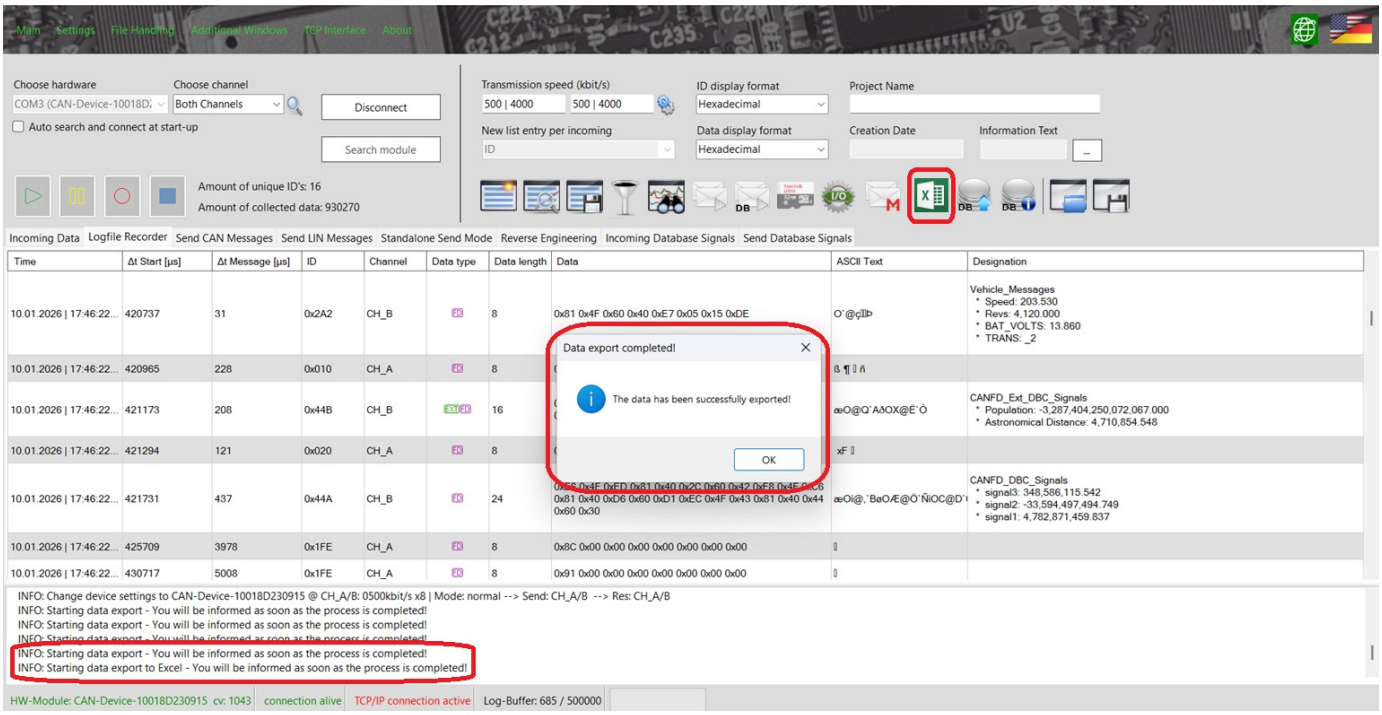
#	Row A	Row B	Row C
13.	Opens a separate window to explore the details of loaded database messages and signals including search functionality	Opens a separate window to explore the details of loaded database messages and signals including search functionality	Opens a separate window to explore the details of loaded database messages and signals including search functionality

3.1. Exporting Logged Data

3.1.1. Excel Format

Upon pressing the Export button, an Explorer window will open to request the location and file name to save your Excel file.

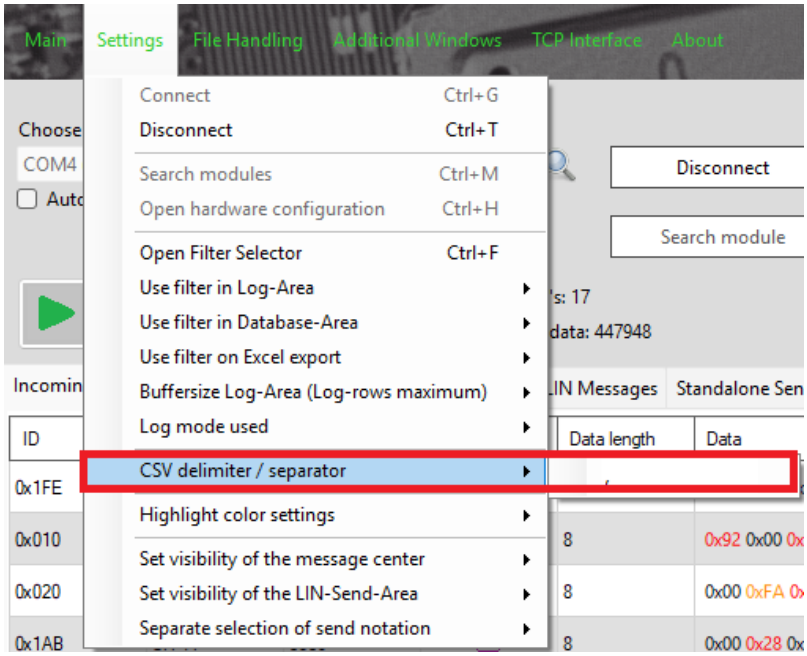
Once the export is completed, this message will be displayed:



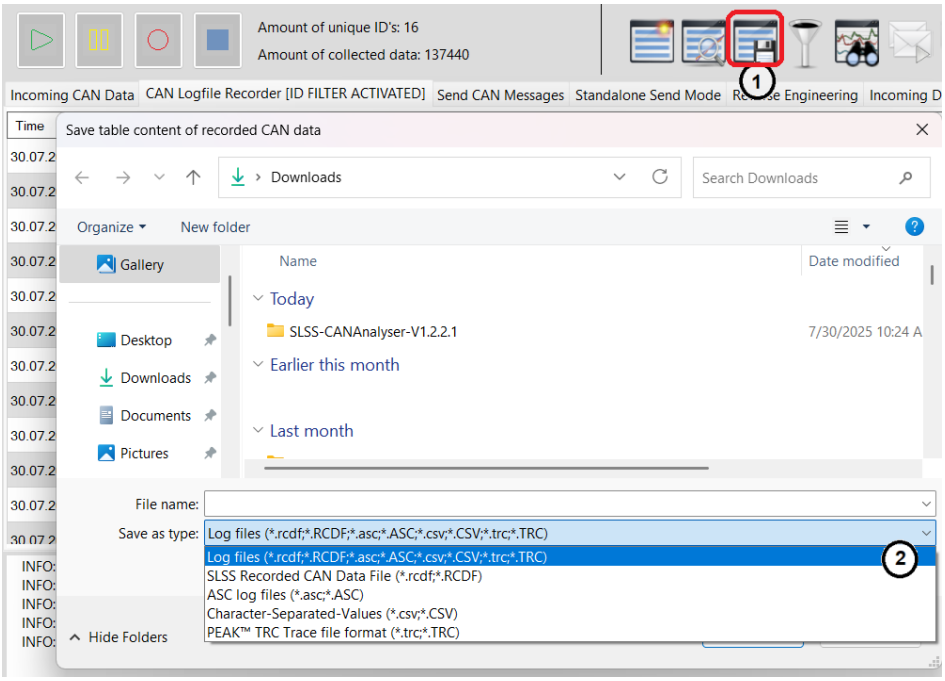
If you have a large amount of buffer data, the export may take a long time. If Excel export is chosen, the message center at the lower part of the screen informs the user that the export process has begun. The CANAnalyser software will continue normal operation until the export is completed and then a pop-up message will inform the user when the Export is complete. Avoid pressing the export button again before this process is completed to prevent it restarting the Export request. The CSV / ASC / TRC export is much faster!

3.1.2. CSV / TRC / ASC Formats

Unique to CSV only



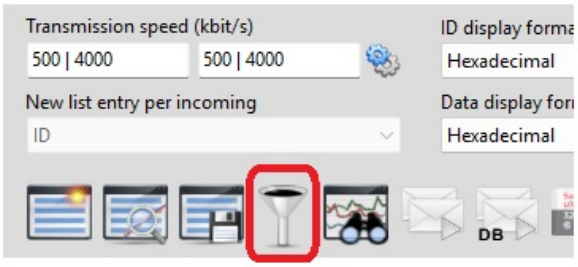
Since CAN data may contain ASCII characters that may conflict with a comma (standard default CSV delimiter), there is an option in the Settings dropdown to choose another delimiting character if desired.

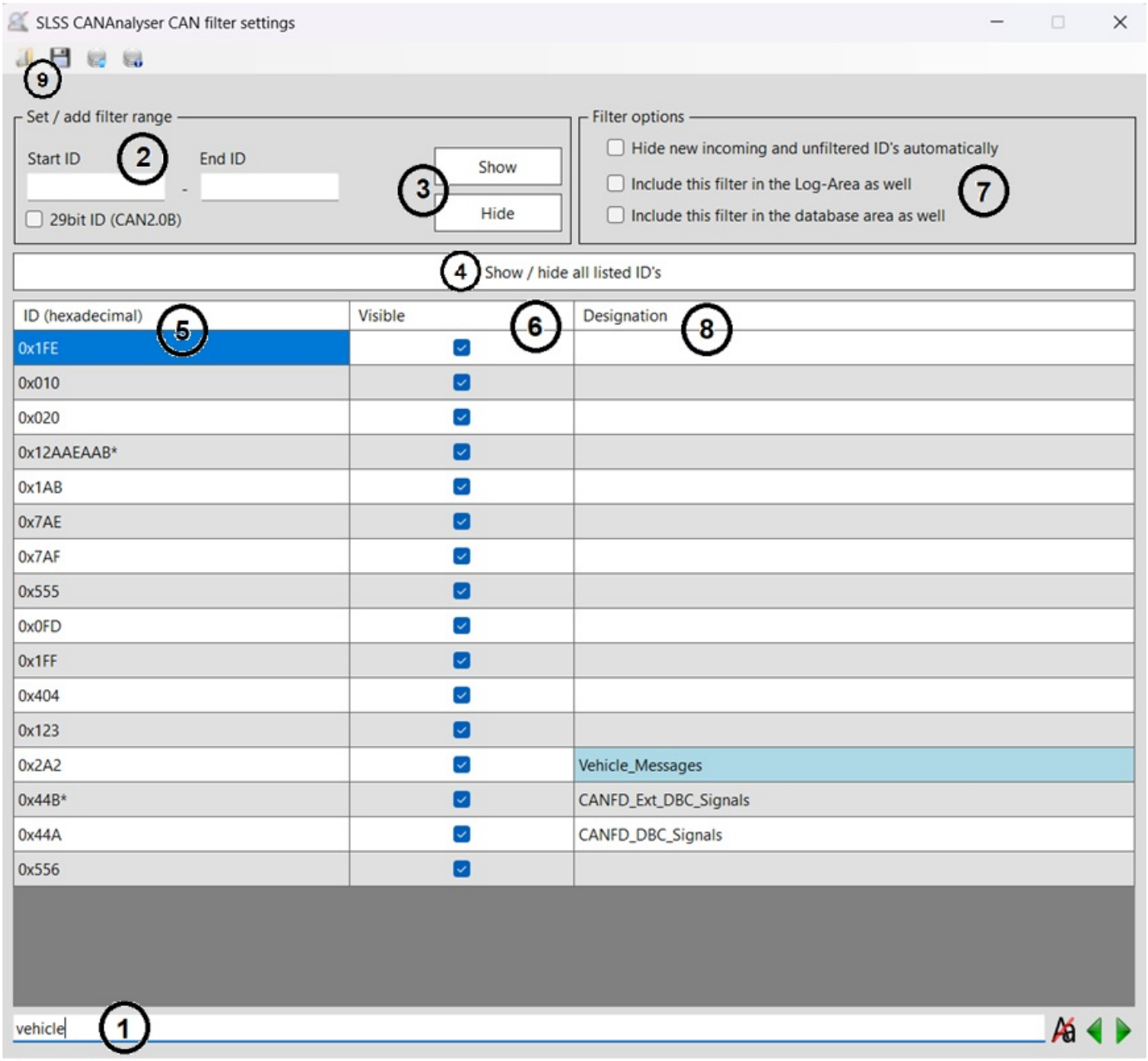


1. From the CAN Logfile Recorder Tab, press the Save button
2. From the drop-arrow, choose the desired CSV, TRC, ASC format and then provide the File Name and location to save

3.2. Message Filtering Button

This is a separate window that opens to be able to move to a separate screen or show as a separate window to be able to view the impact of adjusting filter settings on the fly in different feature tabs.

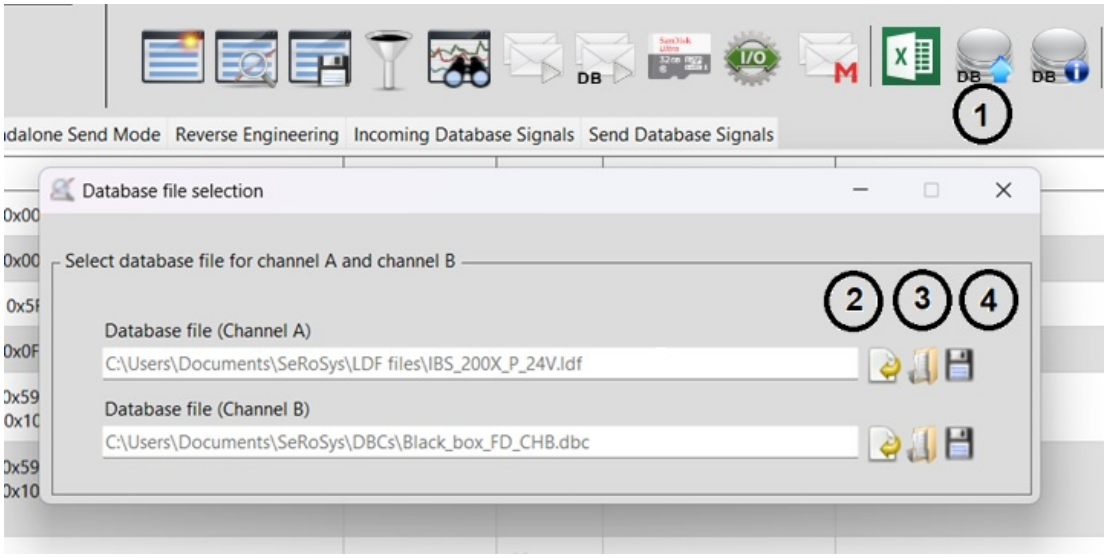




1. This is the textual search filter. All text entered here will be highlighted in the filter chart
2. Enter in a single CAN ID or a range (Start ID to End ID) to use as your filter criteria. Check the box for 29bit ID for filtering Extended IDs
3. After selecting your CAN ID or CAN ID range, select either **Show** or **Hide** to affect the checkboxes in the table below for visibility of the selected IDs
4. This button can be toggled to **Show** or **Hide** ALL visible ID's (checkboxes) in the table below
5. Lists all current received message ID's on the active bus
6. List of checkboxes to show which ID's will be shown or hidden
7. Checkbox options of where to apply the impact of the filter settings
8. If a database file is currently loaded, the human readable designations of the ID's will be shown here for reference
9. The filter settings may be saved and loaded for easier future access

It is possible to show both the Standard and Extended ID's in the same filter area. The * indicates an Extended ID

3.3. DB button (DBC, LDF)

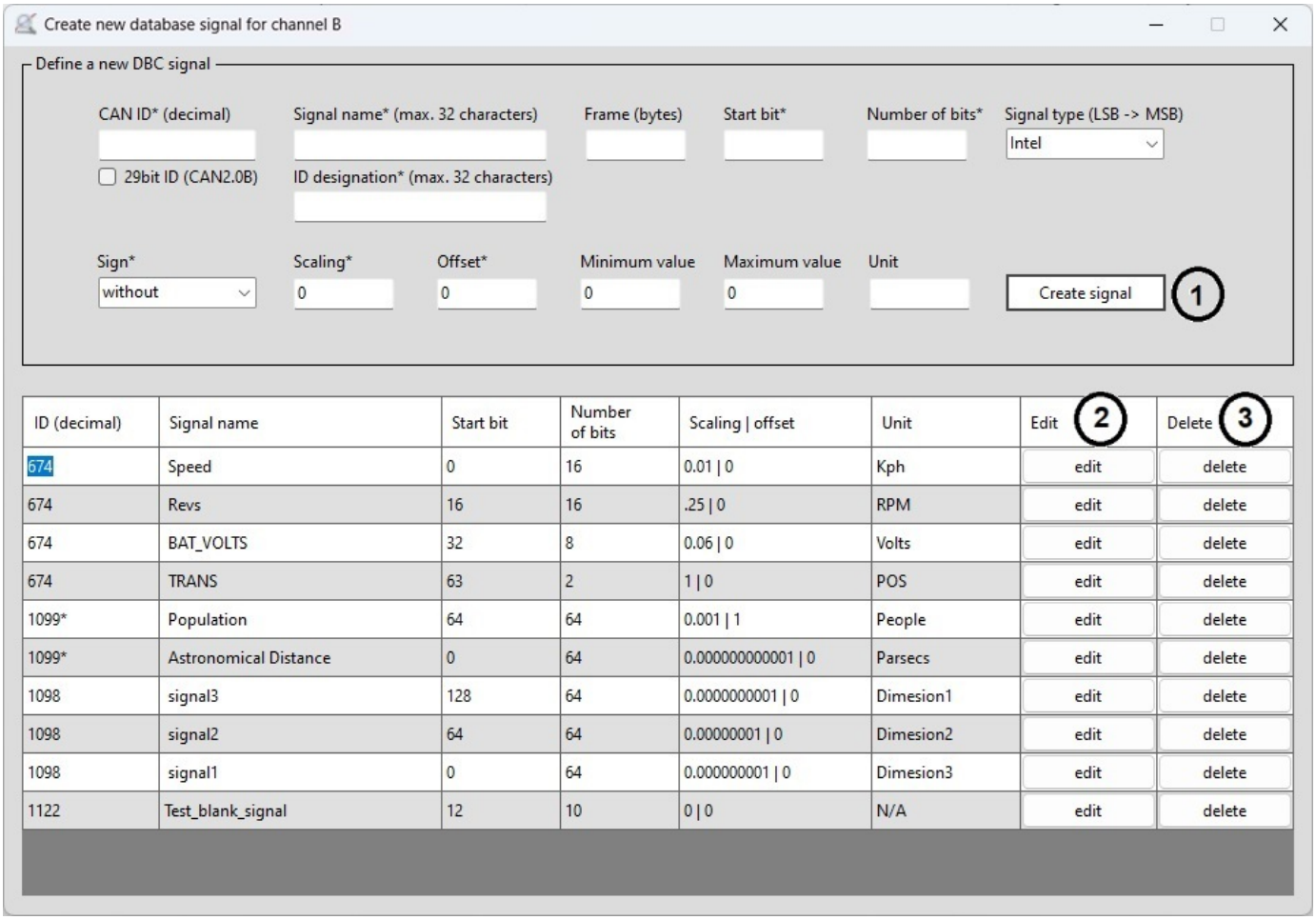


1. Press this button to open a dialog box to select a unique database file to load into each channel independently. Current supported database formats are DBC (CAN) and LDF (LIN)
2. This opens the database editor. See details on the editor in the next sub-section.

Only DBC files are supported currently in the editor

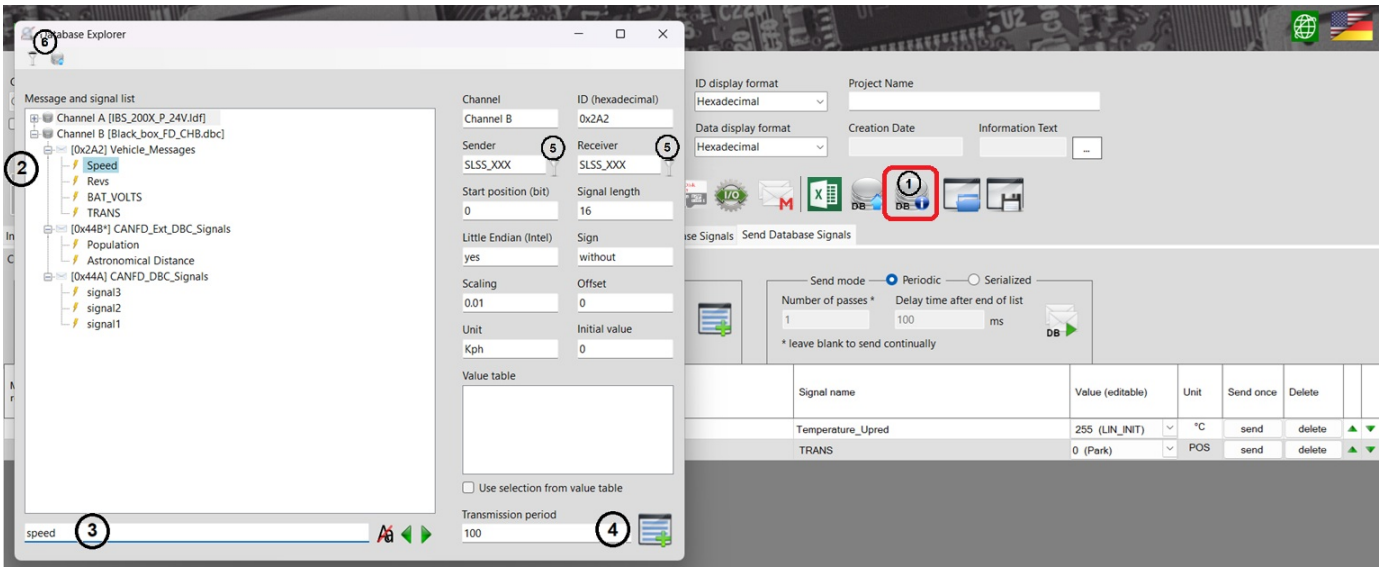
3. This is to open a valid database file
4. This will save your current active database file

3.3.1. DB Editor



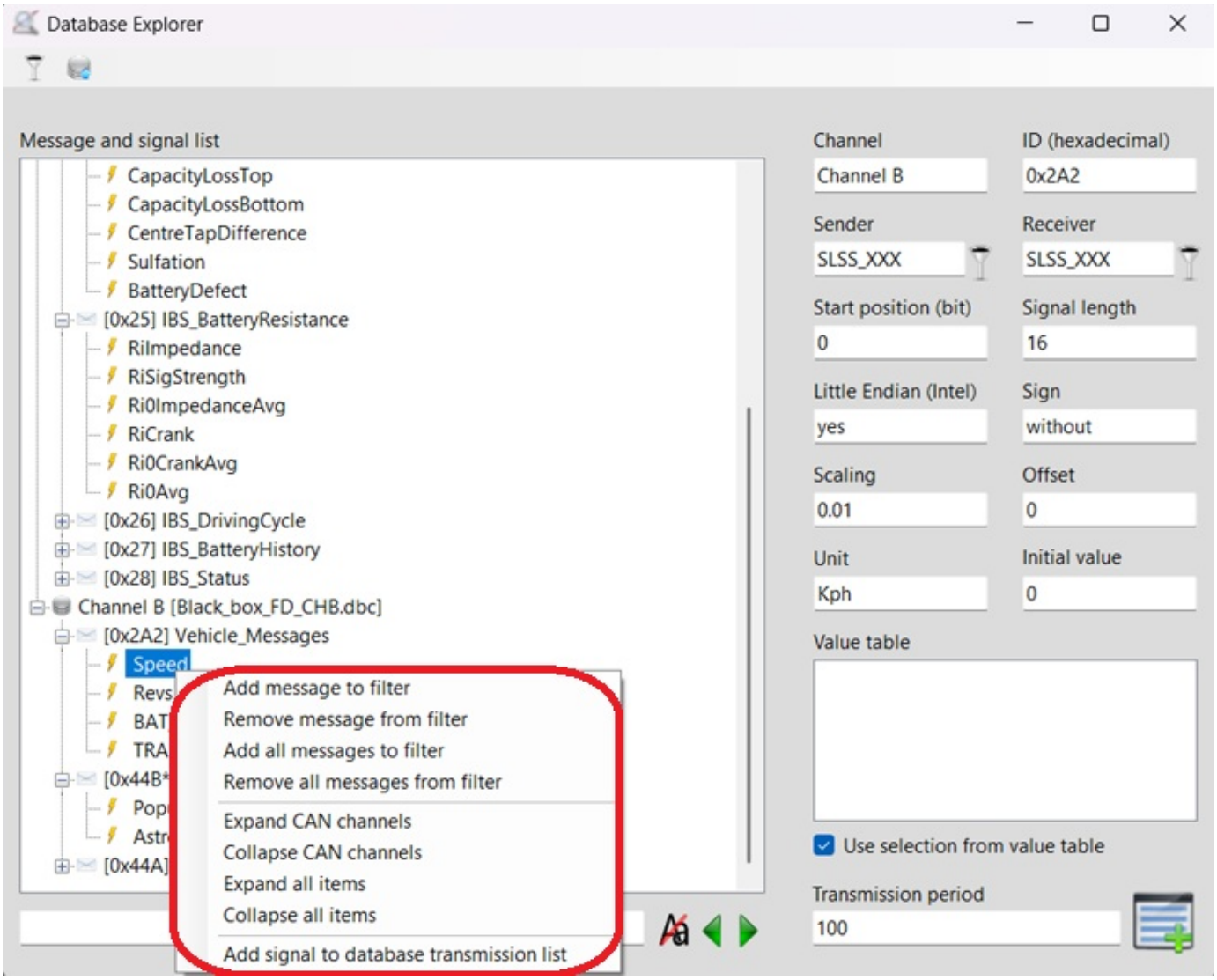
1. In this top box, all data to create a new signal may be input and then press the **Create signal** button to add it as an entry to the list (appending or a new list).
2. Pressing the **Edit** button will allow an existing signal to be edited.
3. Pressing the **delete** button will allow an existing signal to be deleted.

3.4. Database Explorer button (DBC, LDF)



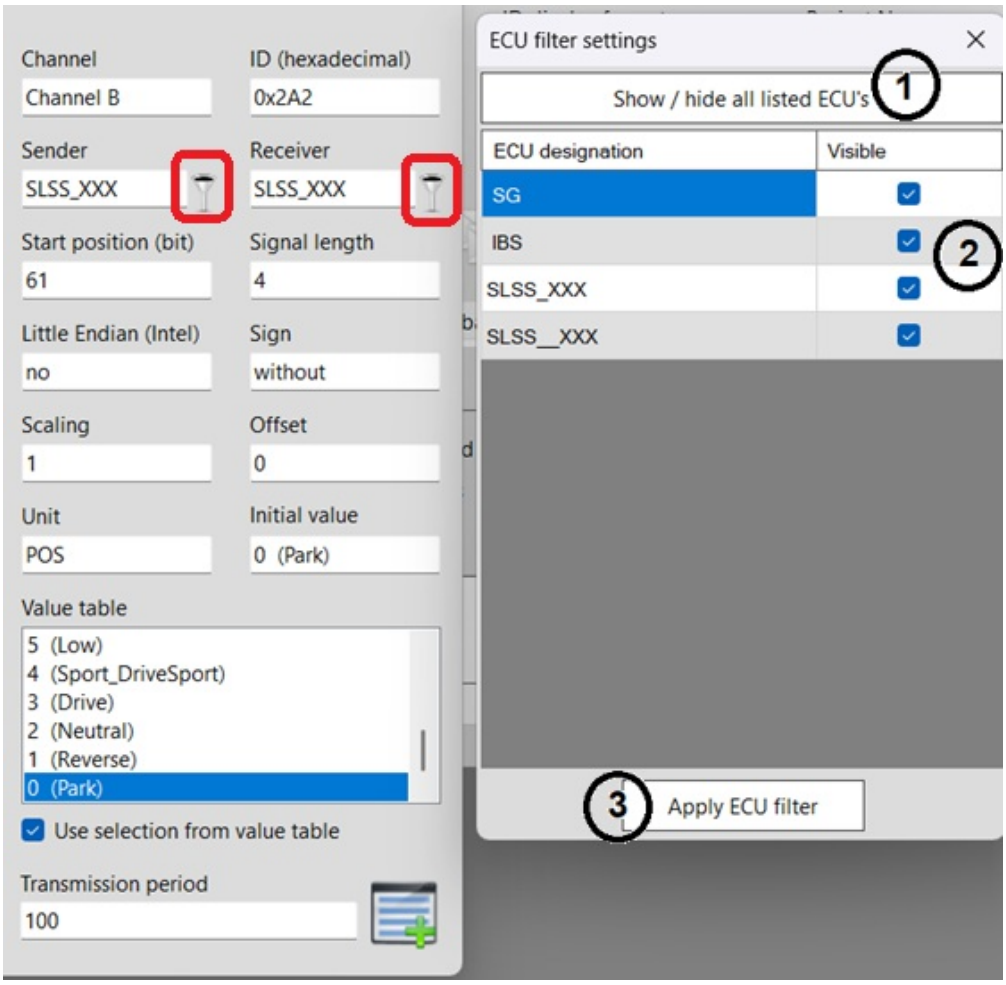
1. Press this button to open the Database Explorer window
2. All loaded databases on Channel A / Channel B will show (initially nested). Click the + / - buttons to expand or contract the tree of Message Signals
3. To quickly find the desired Signal, enter the Signal name in the textual search bar
4. The selected Signal may be directly add to the Send Database Signal tab of message to send. Specify the Transmission period and press the button to add it to the list
5. Selecting the filter icon next to the Sender or Receiver box opens a list of all the ECU's for filtering. See next sub-section for details
6. These 2 icons are shortcuts to the relevant Filter Settings and Database selection windows

3.4.1. Right-Click context menu



1. Right-Click on a Signal name to bring up powerful shortcut actions such as Filter impacts and adding the desired Signal to the Send Database Signals tab

3.4.2. ECU Filtering



1. Press this to quickly show or hide all the checkboxes in the list below
2. Manually check or uncheck boxes to specify the target ECU's to filter in or out
3. Press this to apply the ECU filtering. This impacts the overall Filters from the Message Filtering button on the main screen. Impacted message ID's that share the ECU type will all be checked or unchecked on that filter window

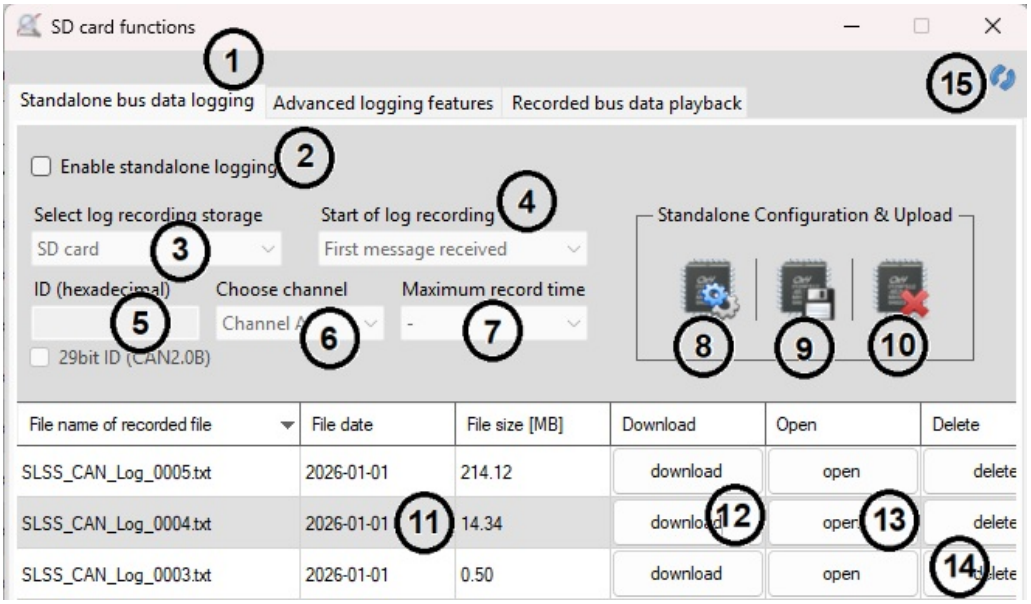
3.5. Micro-SD Card Window

Within this window is where all access to the functions pertaining to the Micro-SD card exist. This is used to configure the hardware dongle to be able to be disconnected from the SLSS CANAnalyser software and be able to be powered via the USB connector or the DB-9 connector to autonomously log CAN bus traffic to the Micro-SD card. Once the dongle is reconnected to the SLSS CANAnalyser software again, it will operate as if it were not in Standalone mode and the user may reconfigure it from the button again.

This button is only accessible once the software has connected to a LAB CAN Pro module, otherwise it is unavailable.

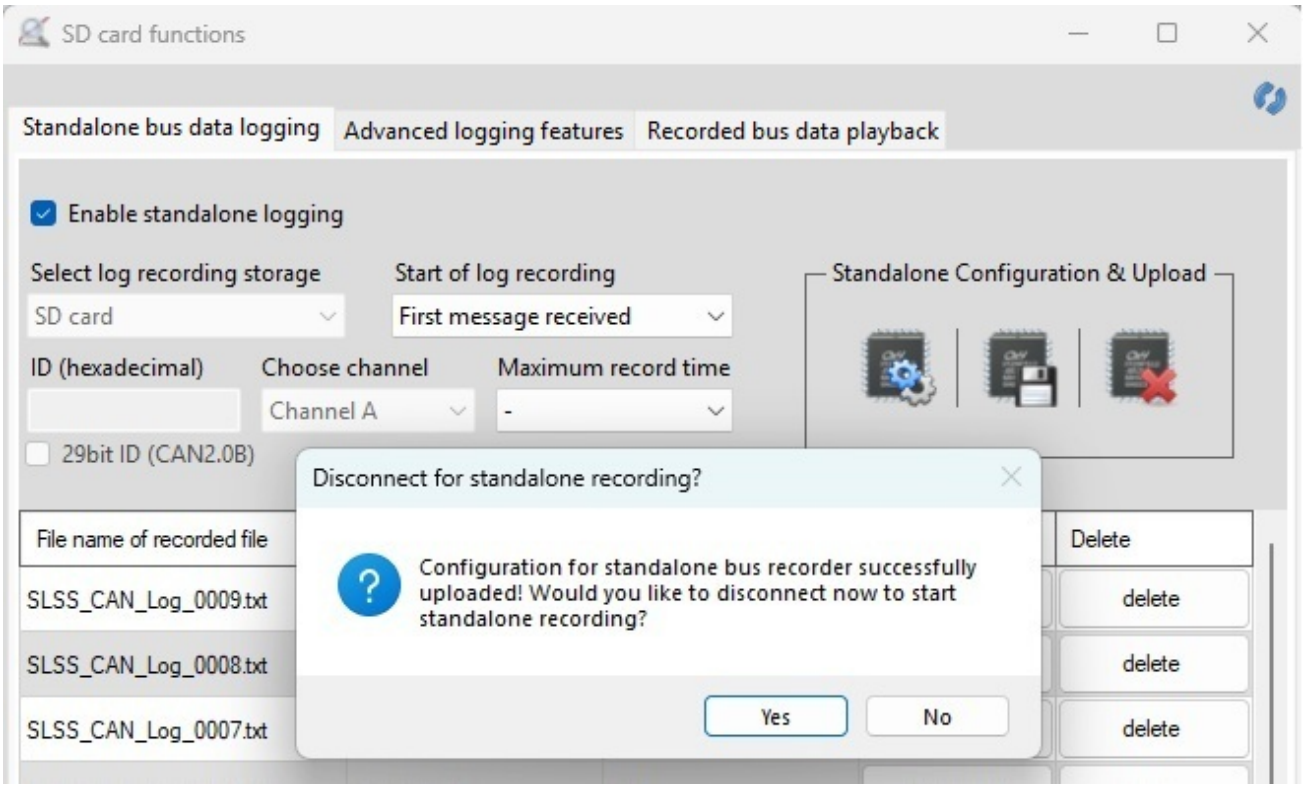
While this window is open, CAN logging and data viewing will not be processed

3.5.1. Standalone Log Recording



1. This is the first tab. This tab allows the configuration and setup for defining the offline hardware logging session to the Micro-SD card
2. When this box is checked, the user may access the "Start of log recording" functionality. Note however that the offline logging on the hardware is not enabled yet. That is defined in point **9**
3. This may not be changed at this time. Current hardware only uses the SD card as the logging storage location
4. This drop-down defines the method to trigger the start of the offline logging. There are options that are shown in the next sub-section
5. This is defined in the next sub-section
6. This is defined in the next sub-section
7. This is defined in the next sub-section

8. This is to configure the dongle hardware for its setup configuration for either CAN 2.0 or CAN FD for once it is disconnected from the SLSS CANAnalyser software and functioning independently in standalone logging mode. Note that this configuration menu is also independent from the configuration menu at the top. Settings may be different. All of the configuration options are in common with the primary software configuration options that are already explained
9. Pressing this button will send the current settings to the hardware dongle and then it will ask if the user wants to disconnect now to start logging or not. Note that the next time the user disconnects from the software, the Connect LED will be solid purple to show that it is in standalone logging mode. Once standalone logging begins, the 2 LEDs that represent the 2 channels will blink according to the traffic on the bus in the same way as when the hardware is connected to the software so that a user has visual indication of CAN traffic as it is being logged to the micro-SD card



10. Erases stored settings and configuration for standalone logging and will disable the standalone logging mode from the dongle when it is not connected to the SLSS CANAnalyser software
11. This is a list of the current logged files stored on the Micro-SD card

If a .txt file is manually placed on the Micro-SD card, it will be displayed in this list, however if it was not recorded from our offline logging format, it won't be able to be used in the software. We use a proprietary .TXT file format for the logs

12. The user may Download a .TXT log file from the Micro-SD card directly to another folder on the PC for analysis in the Offline Data Viewer or other TXT editor manually. The user may also directly delete a log file from the Micro-SD card

If a .txt file is large, a window will calculate the approximate download time and ask

the user if they want to proceed. Otherwise, it would be faster to eject the micro-SD card and use a card reader to directly transfer the file in Windows Explorer

13. The user may open a .TXT log file from the Micro-SD card directly by opening the offline Data Viewer and loading this log file into it for analysis

If a .txt file is large, a window will calculate the approximate download time and ask the user if they want to proceed. Otherwise, it would be faster to eject the micro-SD card and use a card reader to directly transfer the file in Windows Explorer

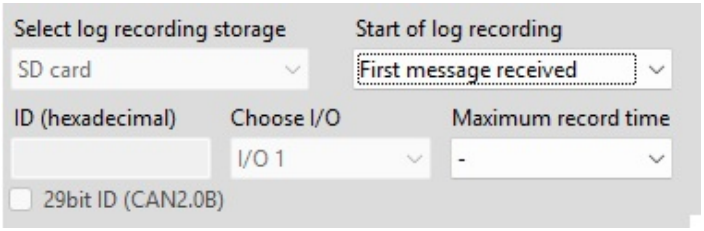
14. The user may also directly delete a log file from the Micro-SD card
15. If a micro-SD card is replaced in the dongle hardware, this button will refresh the list of recorded log files.

3.5.2. Start of Logging Trigger Options

There are 3 standalone logging trigger options. In all 3 of these options, the User may select a maximum recording time from the drop-down of options if desired, otherwise it will log until stopped or memory is full.

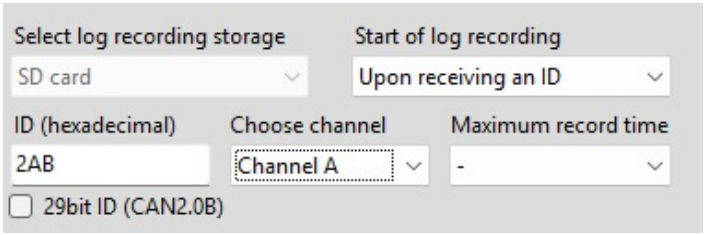
All of these options are purely to configure the TRIGGER to begin the hardware logging, not to configure what is logged. The logging channels are defined in the hardware configuration as noted above.

- First message received



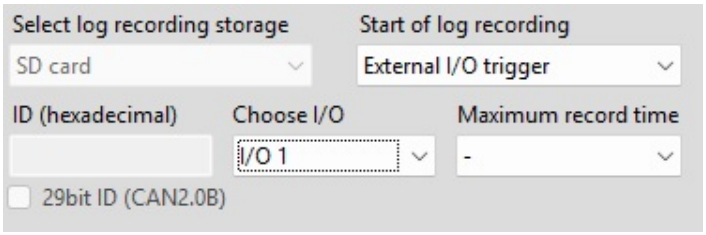
This setting will simply begin logging all traffic immediately once it detects traffic on one of the selected trigger channels from the drop-down. The user may choose to have it trigger from Channel A, Channel B, or either channels.

- Upon Receiving an ID



This setting will let a user select a CAN ID act as a trigger to start logging. Once any data is seen on the desired CAN ID on one of the selected channels from the drop-down, it will begin logging all traffic. The user may choose to have it trigger from Channel A, Channel B, or either channel.

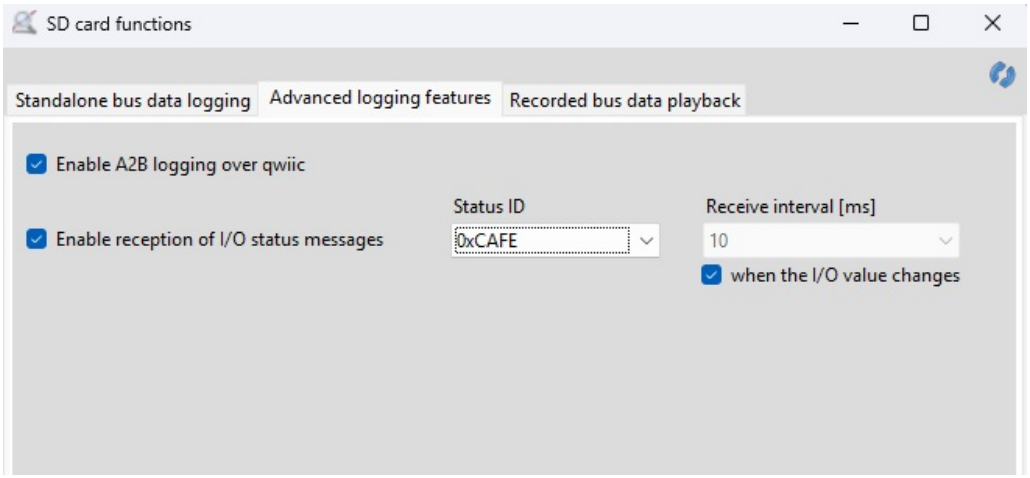
- External I/O trigger



This setting will allow a user to use an external electrical trigger such as a push-button or any other qualifying electrical GPIO input be used to remotely trigger a logging session to begin. GPIO 1 or 2 may be used from the drop-down to select which input pin to trigger on.

3.5.3. Advanced Logging Features

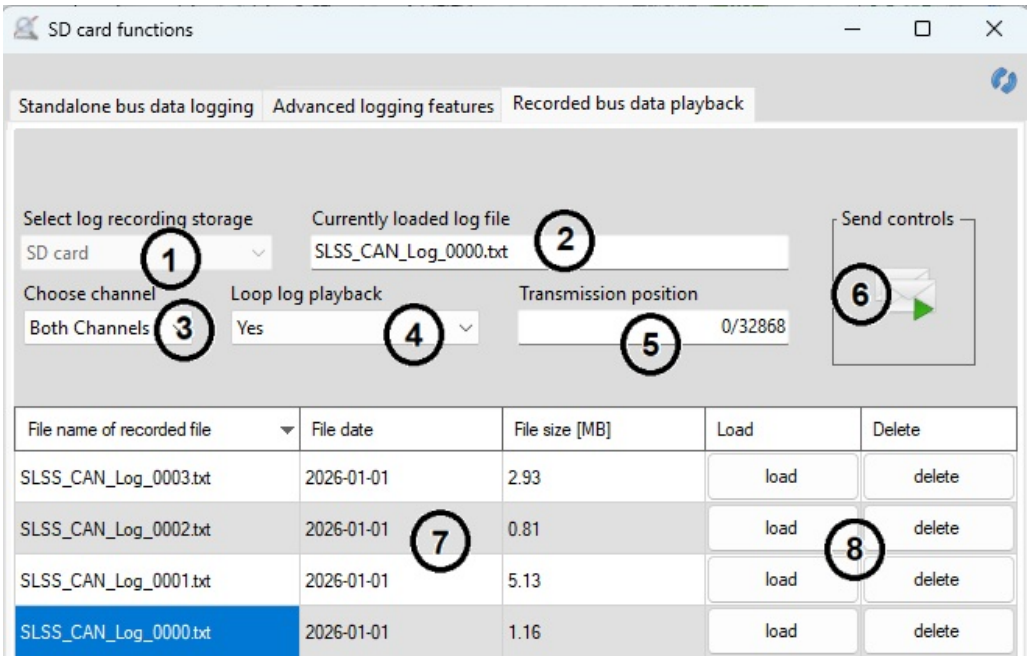
This window will provide advanced logging features as they apply to features and future peripherals.



We currently support 2 standalone advanced logging features.

1. When connected to the Flextech Bus Monitor via the qwiic connection, we support A2B logging when this is enabled
2. If there are inputs connected to the GPIO1 and/or GPIO2 pins, those GPIO events will be logged at one of the optional ID's that the user may choose from the dropdown. Select the checbox to have the event log whenever the I/O values changes, or if that box is unchecked, a receive interval may be selected instead

3.5.4. Standalone Bus Playback



1. This may not be changed at this time. Current hardware only uses the SD card as the logging storage location
2. When a log playback file is loaded, this shows the currently loaded file name
3. The user may pick to play back Channel A, Channel B or both channels
4. The user may choose to loop the log playback or let it play once and stop at the end of the log
5. This displays the live playback rows of data as the messages play back to the bus
6. Press this button to send the log file to the live bus
7. This is a list of the current logged files stored on the Micro-SD card

If a .txt file is manually placed on the Micro-SD card, it will be displayed in this list, however it won't be able to be played back to the bus. We use a proprietary .TXT file format for the logs

8. The user may Download a .TXT log file from the Micro-SD card directly to another folder on the PC for analysis in the Offline Data Viewer or other TXT editor manually. The user may also directly delete a log file from the Micro-SD card

3.6. GPIO Interface Window

Within this window is where all access to the functions pertaining to GPIO exist.

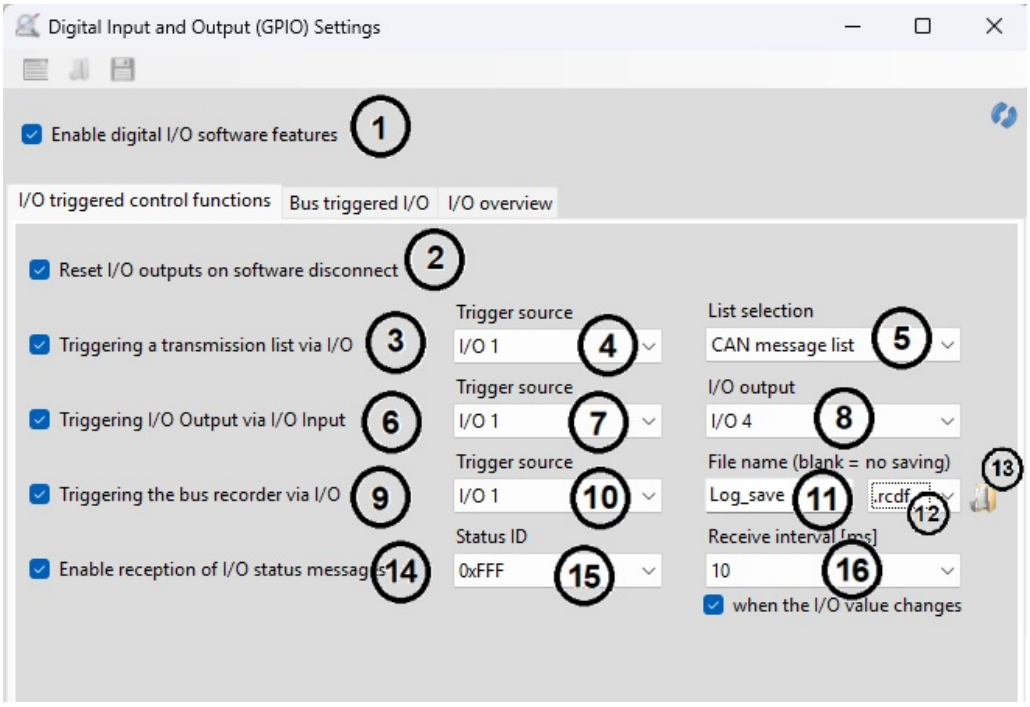
Remember to attach a common ground connection through either the male or female 9-pin connectors for a proper input or output ground reference

This button is only accessible once the software has connected to a LAB CAN Pro module, otherwise it is unavailable.

While this window is open, CAN logging and data viewing will not be processed

The primary tab is for controlling the I/O triggered functions.

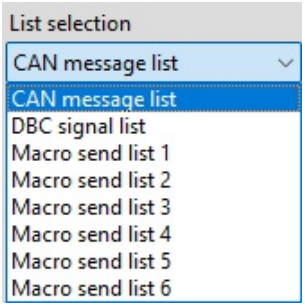
3.6.1. I/O Triggered Control Functions



1. Select or deselect this check box to enable or disable the entire GPIO functionality
2. If this is selected, upon disconnecting the hardware dongle from the SLSS CANAnalyser software, it will reset all GPIO inputs and outputs to the default off setting, otherwise the settings will persist as long as the dongle is powered

```
#4 & #5 are connected to setting #3
```

3. When selected, an input trigger will activate a list Send function. This will only work if the desired list is populated. For example, if "CAN message list" is selected, there must be a list of messages ready to be sent within the primary "Send CAN messages" tab.
4. Choose from the list of available GPIO input sources from the drop-down list
5. Select which List to send from this drop-down

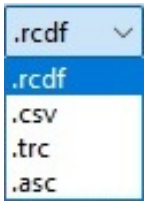



```
#7 & #8 are connected to setting #6
```

6. When selected, an input trigger will activate a GPIO output
7. Select the desired GPIO input trigger from the drop-down
8. Select the desired GPIO output to be triggered

```
#10 -> #13 are connected to setting #9
```

9. Selecting this will allow a GPIO trigger to start or stop a bus logging function. When the trigger is "high", the software logging function will begin and the red record button will activate. Then once the trigger transitions to the "low" state, the logging will end and the record button will stop being red
10. Select the desired GPIO input trigger from the drop-down
11. Type in the name of the logged file to be saved. Do not leave it blank or the log will not be saved!
12. Choose the log file format from the drop-down



13. Press this to directly open a Windows Explorer window to the folder where the log files are saved.

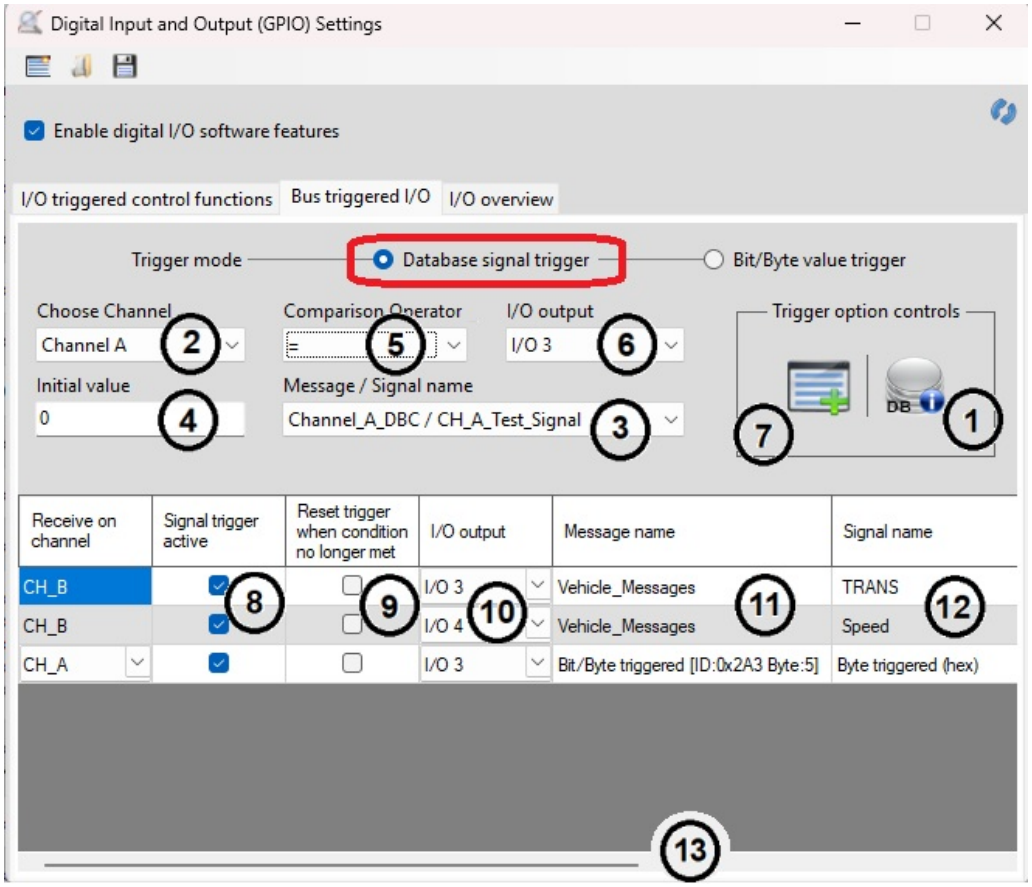
```
#15 & #16 are connected to setting #14
```

14. Select this to include an actual GPIO status message ID in the Incoming Data tab and the Logfile Recorder so that the state of the GPIO pins will also be shown in the same log format as CAN message. They will automatically be assigned Designation information in a human readable format (similar to having a DBC file loaded)
15. Choose a desired ID to use for the GPIO status from the drop-down list. This is the ID that will show the logged data
16. Select the checbox to have the event log whenever the I/O values changes, or if that box is unchecked, a receive interval may be selected instead

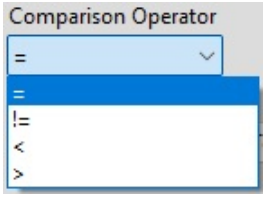
3.6.2. Bus Triggered I/O

Within this tab, the GPIO outputs may be configured to be triggered based on a mathematical programmable logic detection of either a Database signal or a specific Bit or Byte from a CAN ID.

- **Database signal trigger**

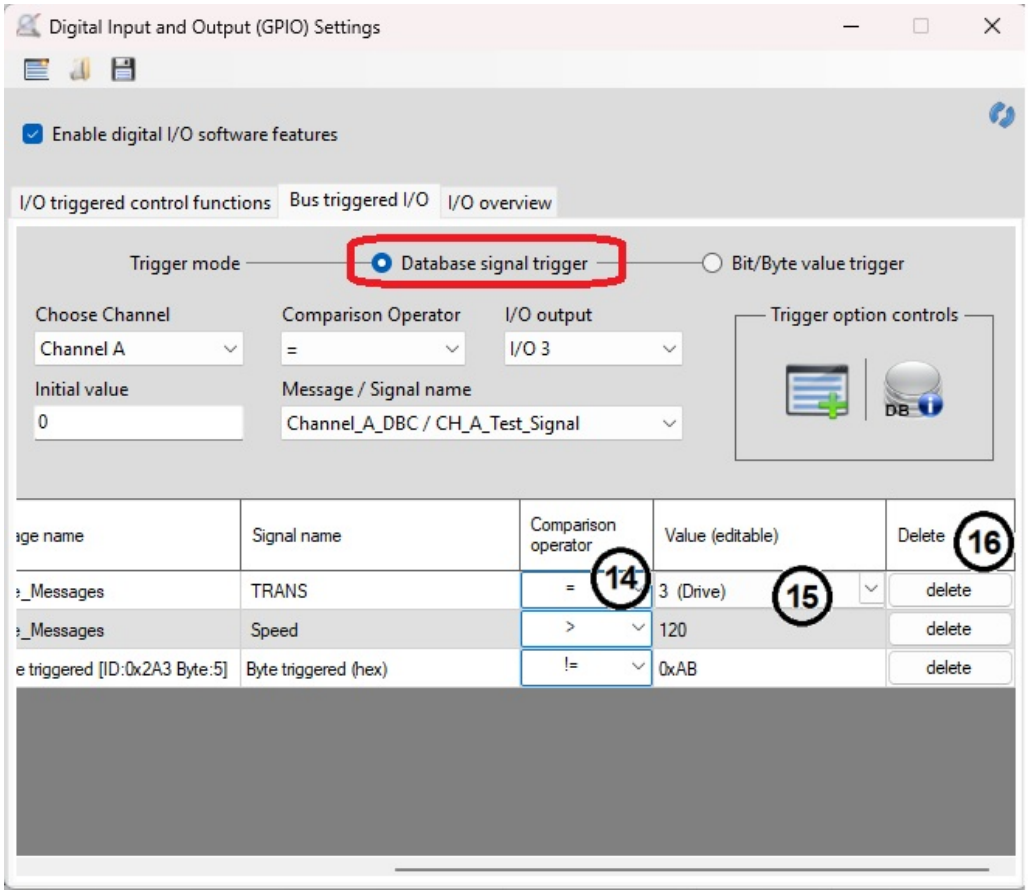


1. Press this to open the database explorer to review the currently loaded database. If a database file is not yet selected, or if a different database file is desired, you must load the desired file prior to selecting the desired trigger conditions
2. Select the Channel that the trigger shall be monitored from
3. Select the Message / Signal Name from the drop-down list of options
4. Select the initial state value. This may be either numerical or from an actual value drop-down from a DBC Signal selection
5. Select with mathematical operation shall be used



Equal / Not Equal / Less Then / Greater Than

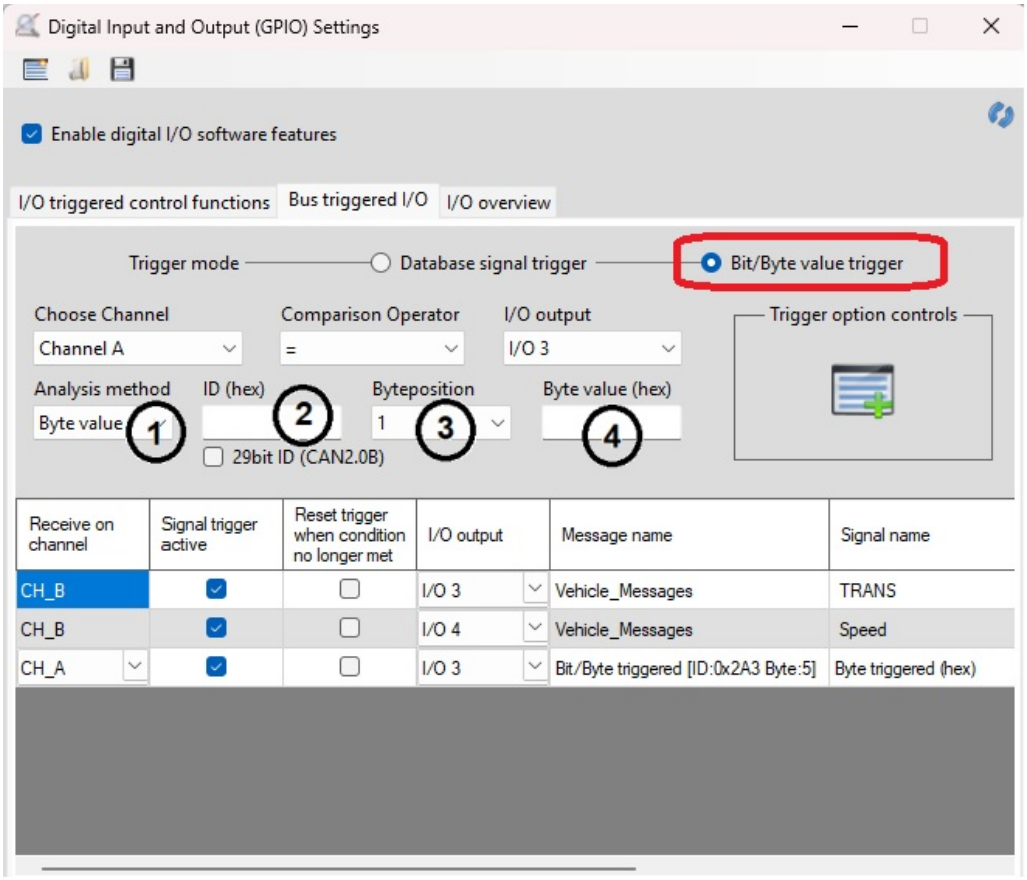
6. Choose which GPIO output shall be triggered when the condition is met
7. Press this to add the current selection to the list of Triggered Conditions
8. If the checkbox is enabled, the trigger on the respective row will be actively searching for a valid trigger condition, otherwise, that row will be ignored
9. If the checkbox is enabled, after each trigger, the GPIO will then reset back to "LOW" afterwards and ready to be triggered again. Otherwise if the checkbox is not enabled, each trigger is a "one shot" and will remain active "HIGH" for the remainder of the active session
10. The GPIO output pin may be dynamically altered anytime
11. Shows the selected Message Name to trigger against
12. Shows the selected Signal Name to trigger against
13. Move the horizontal scrollbar to the right to see the rest of the options on the Condition List



14. The mathematical operation may be dynamically altered anytime
15. The trigger value may be dynamically altered anytime
16. This will delete the selected row from the list

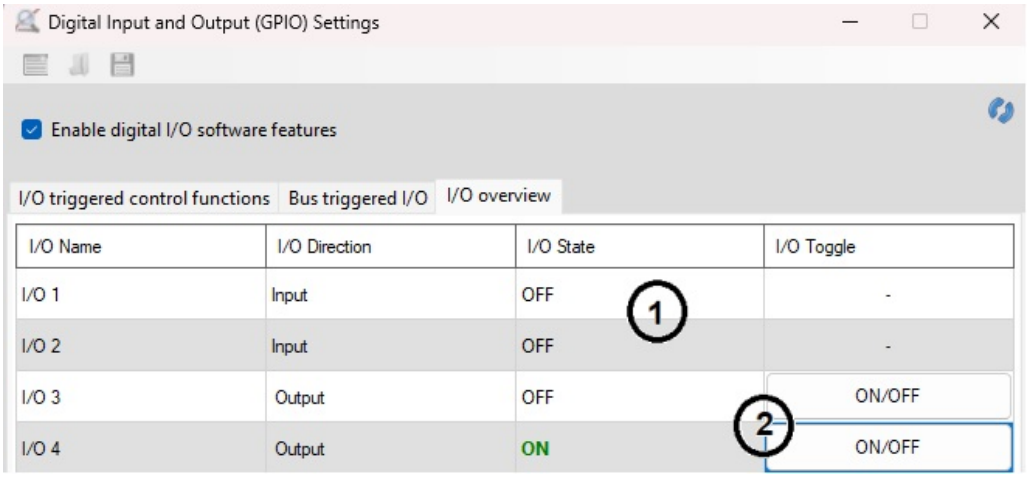
- **Bit/Byte value trigger**

Everything works the same as the Database signal trigger methodology with these minor differences that are specific in byte and bit triggering.



1. Select either byte or bit value from this drop-down.
2. Type in the CAN ID to trigger on
3. Select which byte position you want to trigger on (DLC can be any byte position between 1 and 64)
4. Specify the Byte value to trigger on. If #1 was set for Bit value, then specify the bit pattern to trigger on

3.6.3. I/O Overview

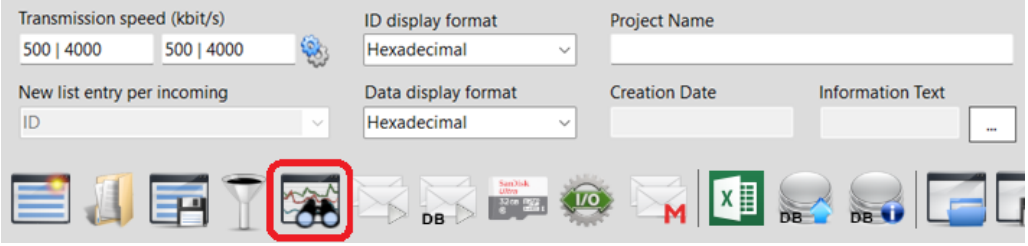


This is a GPIO test window to verify inputs and outputs only

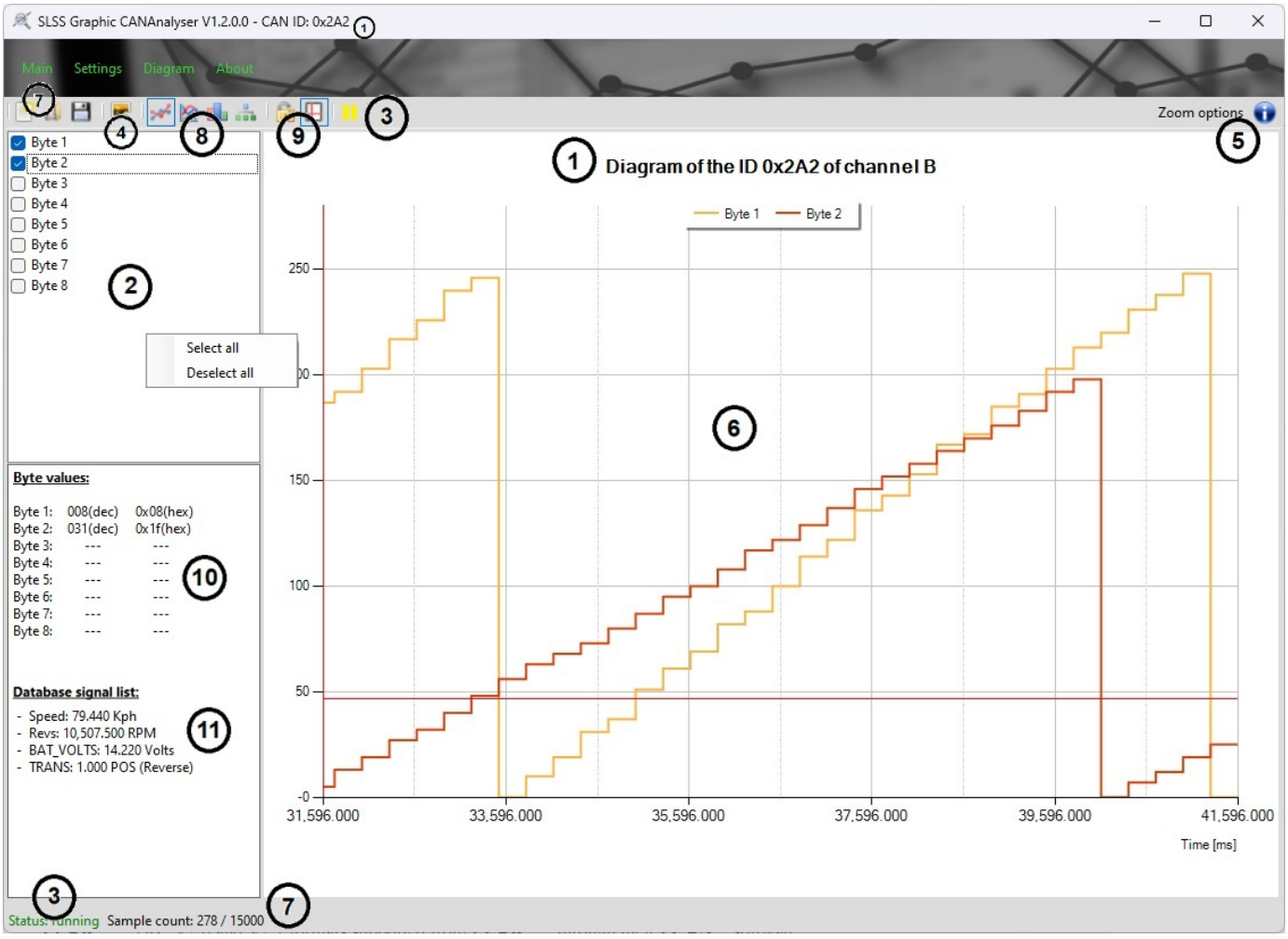
1. For the Inputs, the I/O State will show OFF or ON depending on the live status of the input.
2. For the outputs, press the ON/OFF button to toggle the ON/OFF state of the output pins to test your connections. The I/O state will show the current status

3.7. Graphical Analyser Viewer Button

Often it is easier to visually represent data to make it user friendly for simpler data analysis. This adjustable graphical interface allows analysis of data bytes independently and the user can save the graph image / data for future use.



Multiple windows may be opened to view more than one graph. Right-click on a message in the Incoming CAN Data tab will allow a CAN ID to be directly brought up in the graph as well as clicking the contextual button in the top part of the main screen.



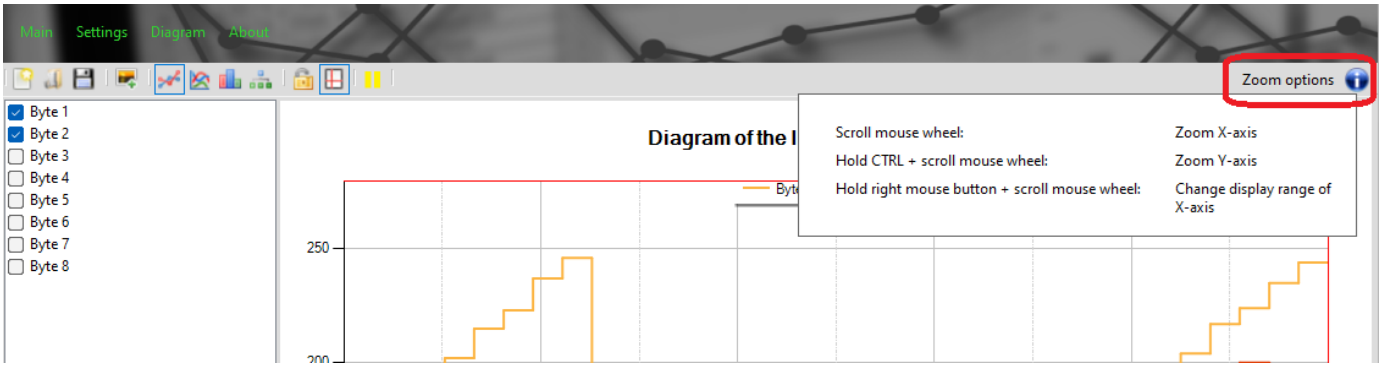
1. This shows the CAN ID identifier and Channel
2. Individual bytes may be enabled / disabled on the graphical viewer as well as buttons to turn them all on / off and reset them. (Right click to bring up the option to select / deselct all messages).

Support for all 64 bytes in CAN FD is possible

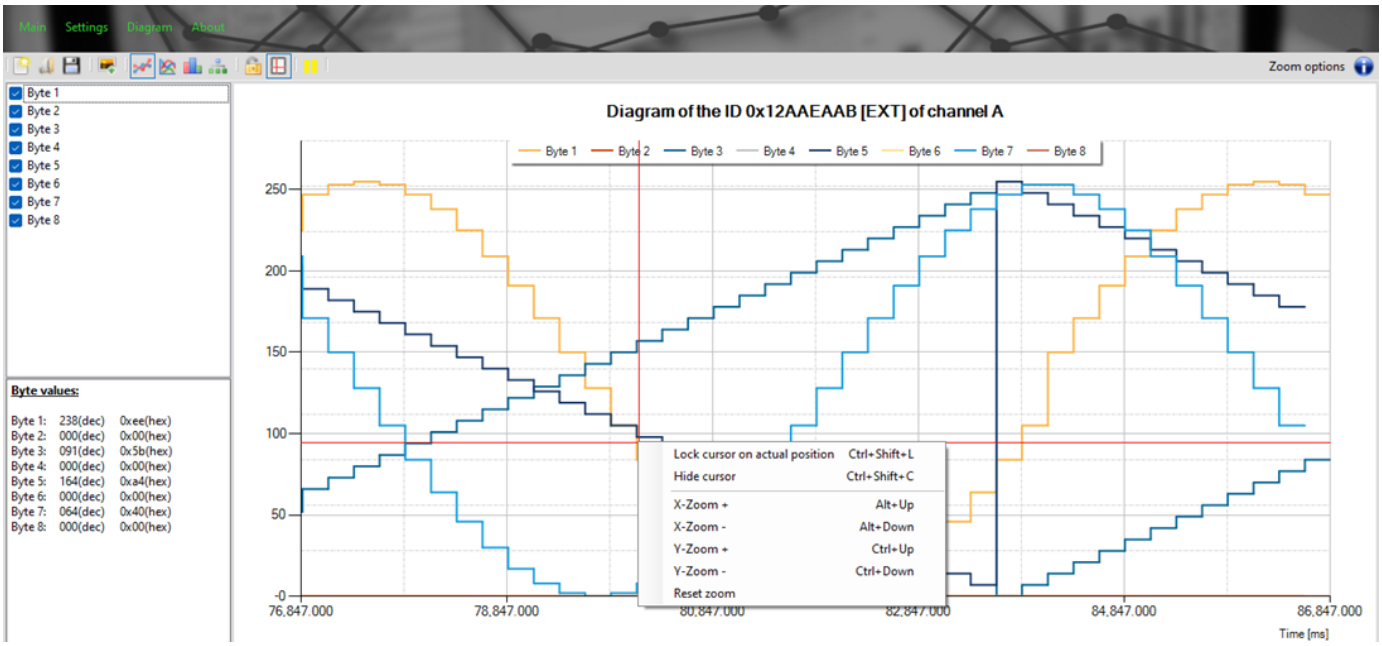
3. The **Play** and **Pause** button located in top bar of the viewer for easy access to pause the Incoming data whenever necessary and then play it again. Play and Pause status is shown in the bottom left corner
4. Pressing this button will export a screenshot of the graph in .PNG image file format
5. **Please see the next sub-section for details for changing and zooming the view options**
6. This is the main graphical viewing area. Moving the mouse in this area will also show the X and Y coordinates of the precise position.
7. This shows how many data samples have been collected during the graphical function processing
8. These buttons allow for different graph formats (standard / spline / area / point)
9. These button allow for hiding the cursor or locking its position
10. This area provides the updated matching byte values in DEC and HEX
11. If a database file is loaded, this area shows the human readable translation of the data in real time

3.7.1. Adjusting the View and Zoom of the graphical analyser

Hovering the mouse cursor over the blue i button in the top right corner will show this zoom option box. Those are the shortcuts for adjusting the desired zoom area.



By right-clicking anywhere in the graphing area, another zoom shortcut menu is seen for keyboard shortcuts to manipulate different zoom functions.

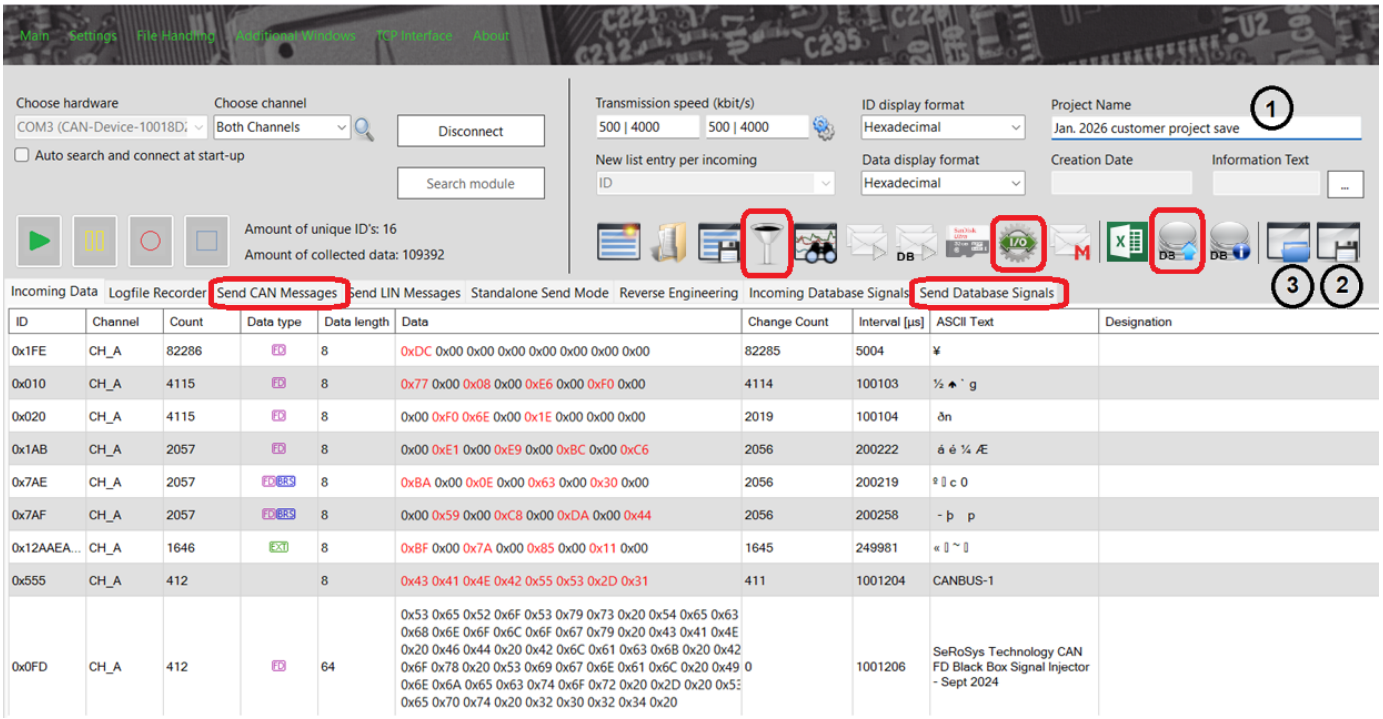


Anytime the graph view needs to be be reset, select "Reset zoom"

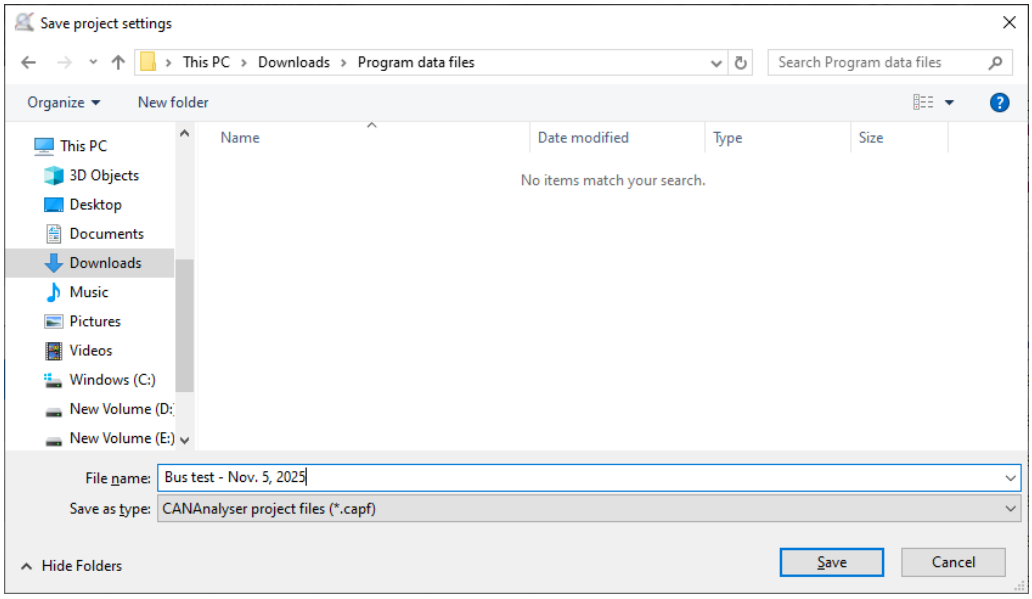
3.8. Storing / Recalling Full Sessions Containing all Settings

This is key for efficiency for testers work setup and sharing the setup with other testers / users

Once a session has been fully set up including loading database files, message send lists and filters, a User may save the full session setup and may even share that with others. The red box highlights in the screenshot here show all the locations of the saved settings.

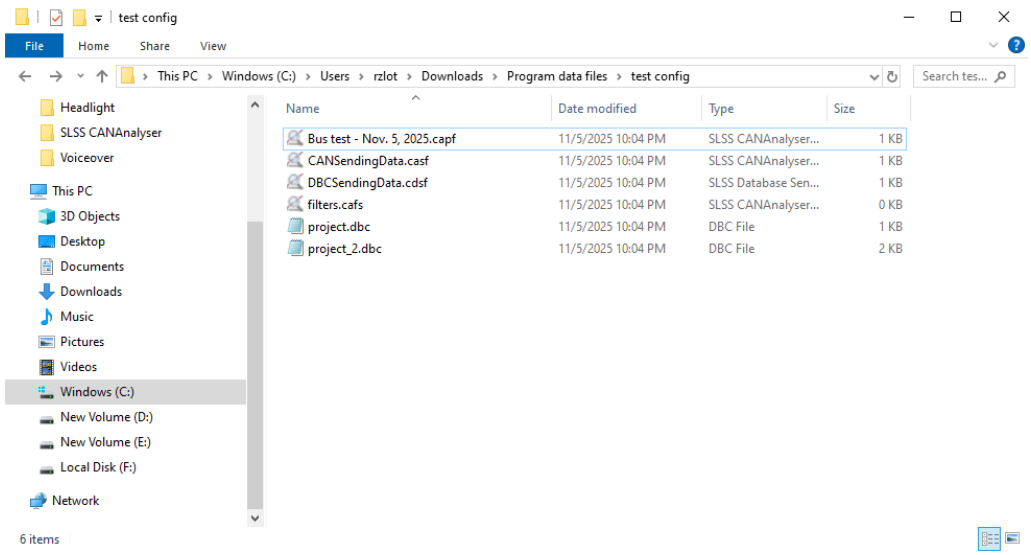


1. Enter a Project Name that is desired to be saved. Suggestions may include related dates, test cases, project names, tester name, etc.
2. Press this to save the session. Choose the folder to save to and provide a meaningful save name.



Note the folder location. Saving the file creates an entire folder with all setup information. A user may provide this intact folder to someone else to share a saved setup

3. To load a previously saved project setup, navigate to the folder location with the desired .CAPL file name and select it.

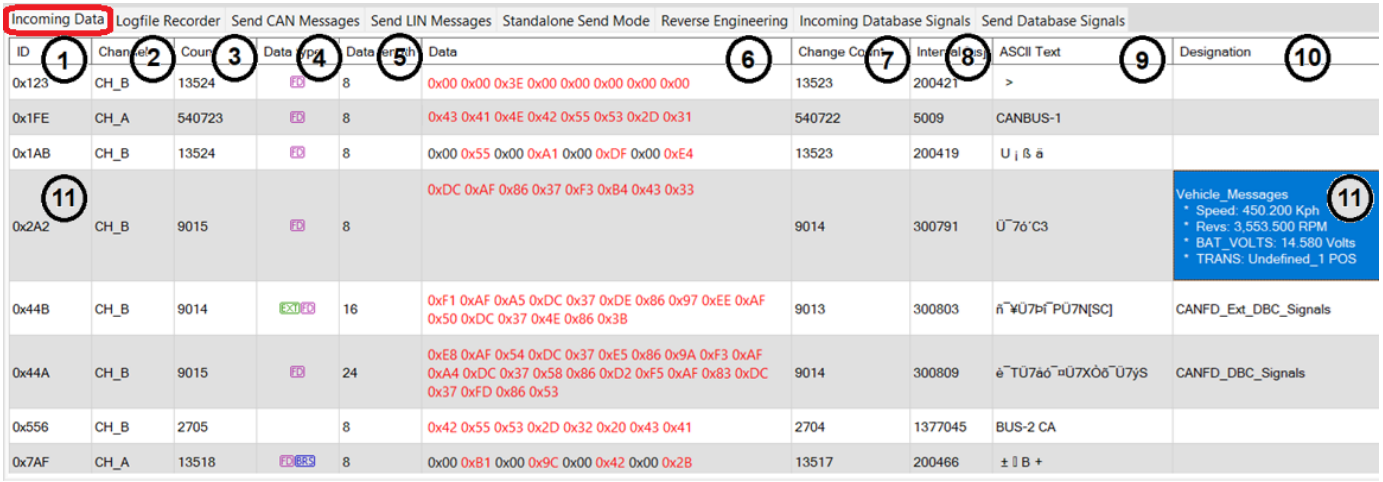


4. Feature Tabs

4.1. Incoming CAN Data Feature Tab

This is the default tab and the most important tab that gives an overview of all current incoming CAN data.

Each column may be shrunk or widened to suit individual preferences. Clicking on the header of each column will also sort the table order based on the column (low to high or high to low)



1. **ID** - Displays the Arbitration ID of each unique CAN message received or sent
2. **Channel** - Displays the source of the CAN data for each row:

Channel	Data Source
CH_A	Data received from the bus into the hardware module on CAN bus CH-A
CH_B	Data received from the bus into the hardware module on CAN bus CH-B
SEND_A	Data sent from the hardware module on to CAN bus CH-A
SEND_B	Data sent from the hardware module on to CAN bus CH-B

SEND_A and SEND_B entries will only be shown if the hardware dongle receives an acknowledgement on an active bus. Therefore if the dongle is not connected to a bus where the send function receives verification that the message was sent, these entries will not be shown on this view.

3. **Count** - The count of how many times the CAN ID was sent or received, regardless if there was any change in Byte data

4. **Data type** - This is the type of data for this row.

CAN Data Types

[STD] = CAN 2.0
[EXT] = CAN 2.0 Extended ID
[EXT] [FD] = CAN FD Extended ID
[FD] = CAN FD
[FD] [BRS] = CAN FD Bit Rate Switch

LIN Data Types

[LIN] = LIN
[SR] = Slave Response
[CCS] = Classic Checksum
[ECS] = Enhanced Checksum

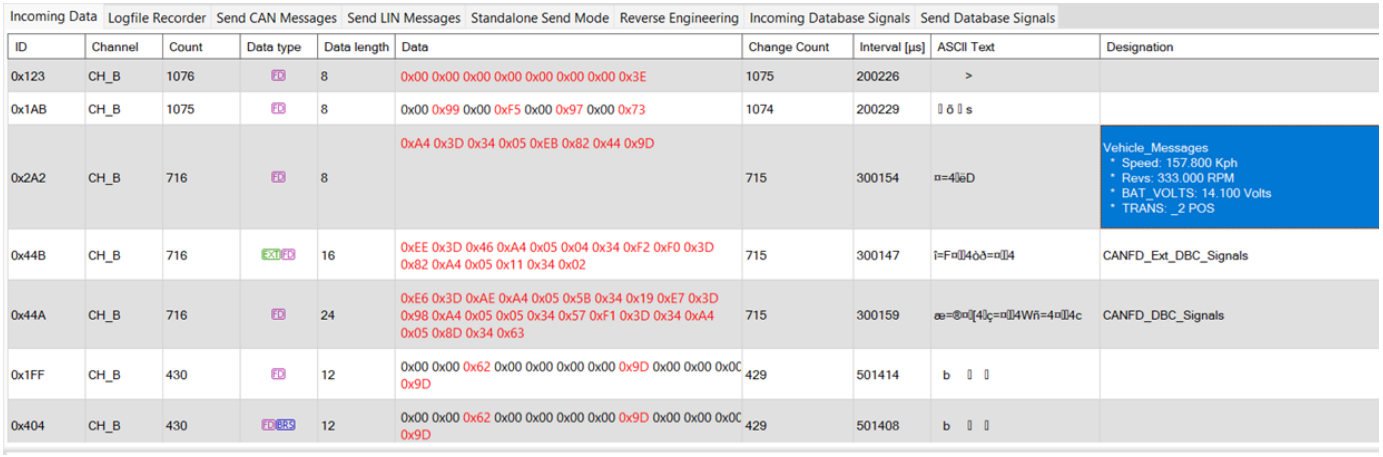
Special Data Types

[A2B] = A2B events
[GPIO] = GPIO pins status

5. **Data Length** - The number of bytes for the CAN ID
6. **Data** - Displays the data bytes (up to 64 for CAN FD) for the CAN ID. (*Note the red colored entries. This is the changing byte highlighting. This will be described in more detail in the next sub-section*)
7. **Change Count** - The count of how many times the data changed for the CAN ID
8. **Interval (µs)** - The time delta in microseconds between each time this message is received
9. **ASCII Text** - Displays the concatenated ASCII converted data of the data bytes for the CAN ID. Note that to display certain ASCII special items, this is the nomenclature to represent these special characters:

[CR] = carriage return [LF] = line feed [SC] = semicolon'

10. **Designation** - Human readable message name of the CAN ID. *This only populates if a valid database file has been loaded*
11. If a valid database is loaded and the Designation is shown, clicking on the CAN ID will expand that Designation box to show the human readable CAN signals for that row. If there multiple IDs with data in the Designation column, only the Designation name will be shown unless selecting the row to expand to view the signals for that Designation. Note only one row shows at a time. (see image here)



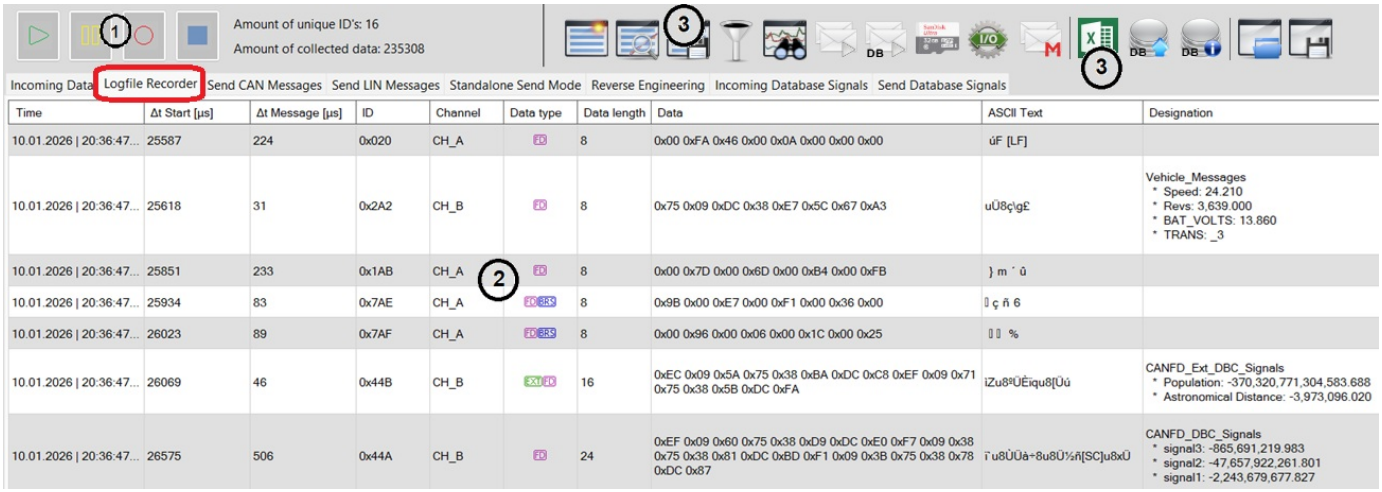
Incoming Data | Logfile Recorder | Send CAN Messages | Send LIN Messages | Standalone Send Mode | Reverse Engineering | Incoming Database Signals | Send Database Signals

ID	Channel	Count	Data type	Data length	Data	Change Count	Interval [µs]	ASCII Text	Designation
0x123	CH_B	1076	FD	8	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x3E	1075	200226	>	
0x1AB	CH_B	1075	FD	8	0x00 0x99 0x00 0xF5 0x00 0x97 0x00 0x73	1074	200229	▯ ð ▯ s	
0x2A2	CH_B	716	FD	8	0xA4 0x3D 0x34 0x05 0xEB 0x82 0x44 0x9D	715	300154	¤=4▯ëD	Vehicle_Messages * Speed: 157.800 Kph * Revs: 333.000 RPM * BAT_VOLTS: 14.100 Volts * TRANS: _2 POS
0x44B	CH_B	716	Ext FD	16	0xEE 0x3D 0x46 0xA4 0x05 0x04 0x34 0xF2 0xF0 0x3D 0x82 0xA4 0x05 0x11 0x34 0x02	715	300147	î=F¤▯4ò ð=¤▯4	CANFD_Ext_DBC_Signals
0x44A	CH_B	716	FD	24	0xE6 0x3D 0xAE 0xA4 0x05 0x5B 0x34 0x19 0xE7 0x3D 0x98 0xA4 0x05 0x05 0x34 0x57 0xF1 0x3D 0x34 0xA4 0x05 0x8D 0x34 0x63	715	300159	æ=®¤▯[4▯ç=¤▯4Wñ=4¤▯4c	CANFD_DBC_Signals
0x1FF	CH_B	430	FD	12	0x00 0x00 0x62 0x00 0x00 0x00 0x00 0x9D 0x00 0x00 0x0C 0x9D	429	501414	b ▯ ▯	
0x404	CH_B	430	FD BRS	12	0x00 0x00 0x62 0x00 0x00 0x00 0x00 0x9D 0x00 0x00 0x0C 0x9D	429	501408	b ▯ ▯	

The Maximum number of signals that may be viewed is 27 due to row height limit in the Incoming data tab. To view the full set of signals, use the "Incoming database Signals" tab or export and view in the datalogger to view output offline

4.2. CAN Logfile Recorder Feature Tab

This feature tab is used to display and store a running log of all data received sequentially. This data bay be saved or exported for further analysis.



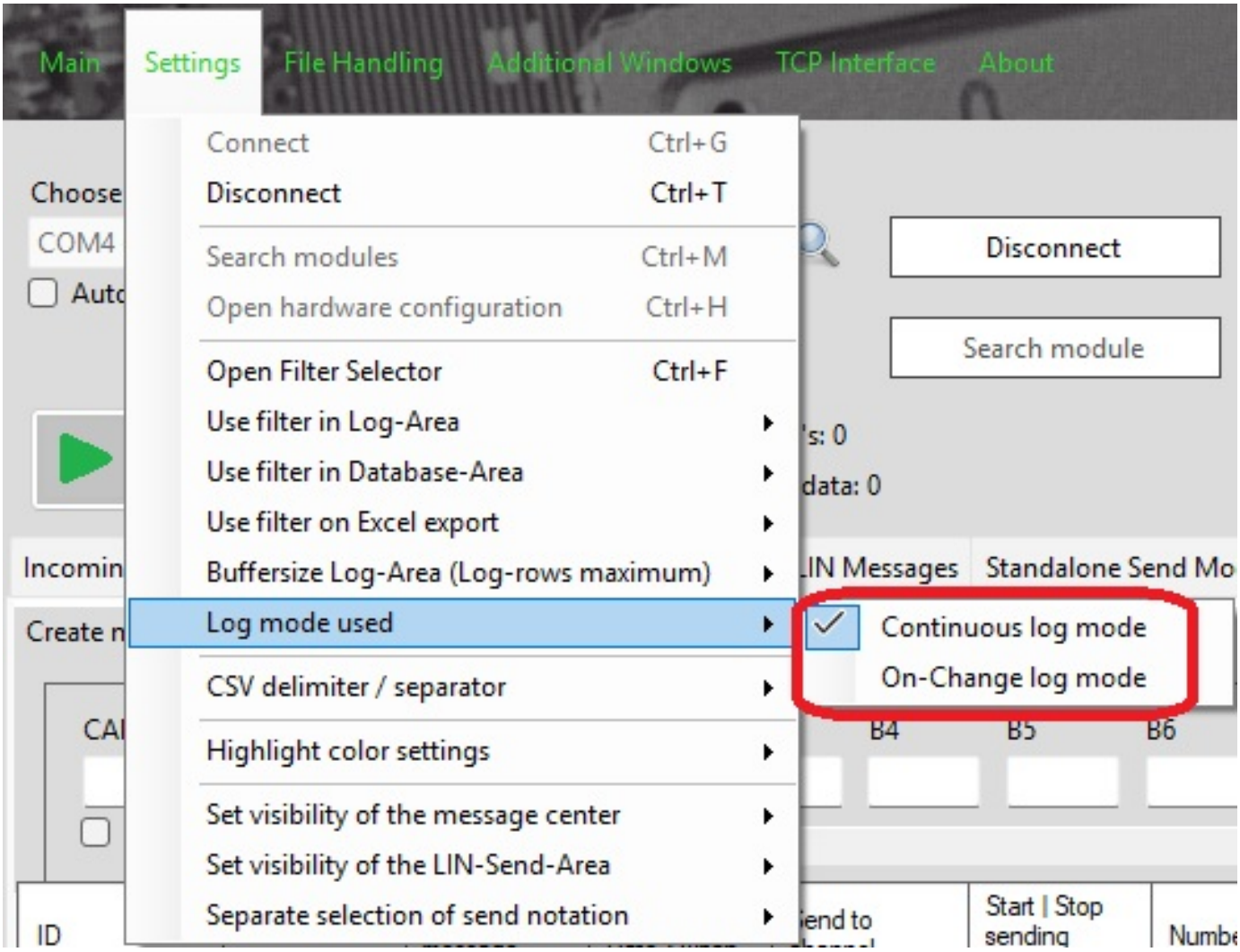
Time	Δt Start [µs]	Δt Message [µs]	ID	Channel	Data type	Data length	Data	ASCII Text	Designation
10.01.2026 | 20:36:47...	25587	224	0x020	CH_A	FD	8	0x00 0xFA 0x46 0x00 0x0A 0x00 0x00 0x00	úF [LF]	
10.01.2026 | 20:36:47...	25618	31	0x2A2	CH_B	FD	8	0x75 0x09 0xDC 0x38 0xE7 0x5C 0x67 0xA3	uÜ8ç\g£	Vehicle_Messages * Speed: 24.210 * Revs: 3,639.000 * BAT_VOLTS: 13.860 * TRANS: _3
10.01.2026 | 20:36:47...	25851	233	0x1AB	CH_A	FD	8	0x00 0x7D 0x00 0x6D 0x00 0xB4 0x00 0xFB	} m ´ û	
10.01.2026 | 20:36:47...	25934	83	0x7AE	CH_A	FD BRS	8	0x9B 0x00 0xE7 0x00 0xF1 0x00 0x36 0x00	▯ ç ñ 6	
10.01.2026 | 20:36:47...	26023	89	0x7AF	CH_A	FD BRS	8	0x00 0x96 0x00 0x06 0x00 0x1C 0x00 0x25	▯▯ %	
10.01.2026 | 20:36:47...	26069	46	0x44B	CH_B	EXT FD	16	0xEC 0x09 0x5A 0x75 0x38 0xBA 0xDC 0xC8 0xEF 0x09 0x71 0x75 0x38 0x5B 0xDC 0xFA	ìZu8ºÜÈïqu8[Üú	CANFD_Ext_DBC_Signals * Population: -370,320,771,304,583.688 * Astronomical Distance: -3,973,096.020
10.01.2026 | 20:36:47...	26575	506	0x44A	CH_B	FD	24	0xEF 0x09 0x60 0x75 0x38 0xD9 0xDC 0xE0 0xF7 0x09 0x38 0x75 0x38 0x81 0xDC 0xBD 0xF1 0x09 0x3B 0x75 0x38 0x78 0xDC 0x87	ï`u8ÜÙà÷8u8Ü½ñ[SC]u8xÜ	CANFD_DBC_Signals * signal3: -865,691,219.983 * signal2: -47,657,922,261.801 * signal1: -2,243,679,677.827

1. As described in earlier sections, the play / pause / record / stop buttons have a direct impact on the data logger and the summary of the unique ID's and total collected data are still displayed
2. The data will scroll down vertically with new data appearing in the top row and pushing older data down and off the screen
3. All recorded data may be exported either the native format or CSV, TRC or ASC formats

4.2.1. Log Mode Setting

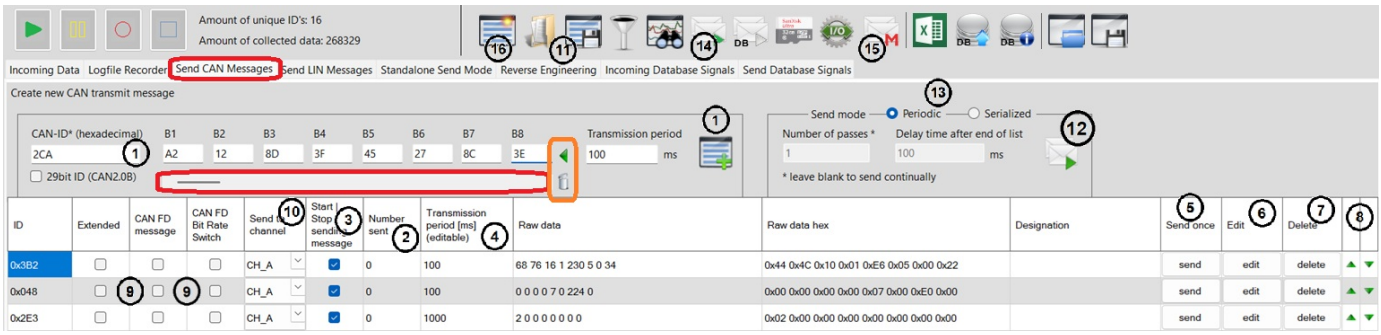
In the Settings menu, there are 2 log mode options.

1. **Continuous log mode** - This is a traditional logging method that logs every new entry without any biasing
2. **On-Change log mode** - This is a method of logging that is extremely helpful to avoid unnecessary log entries for ID's that do not have bytes that are changing. With this setting, a new log entry is only recorded if there was a change in byte values on an ID, otherwise it will be skipped in the log. This makes analysis much easier afterwards.



4.3. Send CAN Messages Feature Tab

This feature tab is used to allow the user to create and send single or multiple CAN messages onto the bus. By default, data will be sent in the Periodic mode. More details will be listed below.



1. Enter the ID and the byte data that is desired to be added to the send list. Only 8 bytes are displayed at a time. For a CAN FD message, use the scroll (red highlight above) to move through all 64 bytes. To jump back to B1, press the green arrow (orange highlight above). To delete all byte entries, press the trash can icon (orange highlight above). Once the message is fully entered, press the button with the green plus sign to add it to the end of the list below

CAN 2.0 supports sending any number of bytes from 1 to 8, however, moving beyond the first 8 bytes, CAN FD requires these sets of bytes to be fully populated. 12 bytes, 16 bytes, 20 bytes, 24 bytes, 32 bytes, 48 bytes, 64 bytes. Failure to fill in all bytes up to the next break-point will end up in a truncation of the additional bytes beyond the last valid byte barrier.

Do not add send messages with the same ID having CAN FD bit rate switch and without FD only (no bit rate switch) This will cause bus errors

2. When viewing this feature tab while messages are being sent, this column shows a count of how many times each message was sent.
3. When viewing this feature tab while messages are being sent, the checkboxes may be checked or unchecked dynamically to turn on and off sending of individual messages on the list if desired.
4. The transmission / delay period may be changed dynamically by double-clicking in the cells on this column if desired as a fast way to edit the transmission speed.
5. At any time, the user may press the **Send** button to manually send any message once (regardless of whether the messages are automatically sending or not).
6. To edit an existing message entry in the table, select **Edit** to open a window of parameters to change and then **Save changes**.

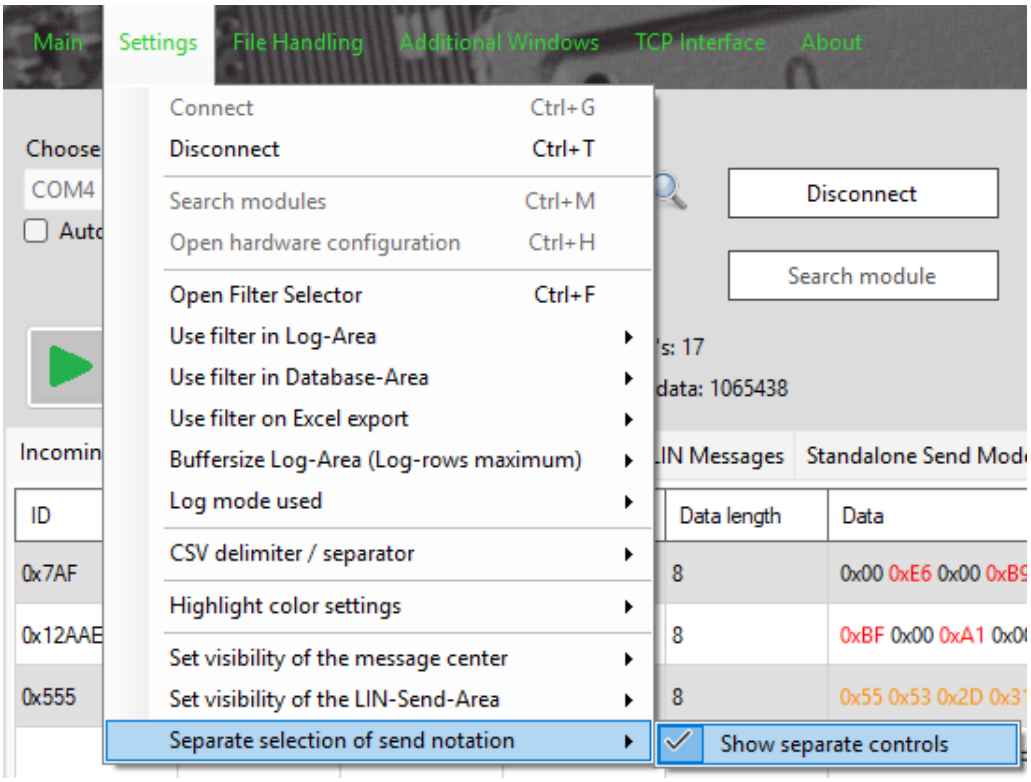
7. Select **Delete** to delete a message entry from the table.
8. The up and down arrows may be used to move a message up or down the list order. Note that this is not useful in Periodic mode but it is useful on the Serialized mode.
9. The data type of the message ID may be set by setting these checkboxes
    - Extended
    - CAN FD message
    - CAN FD bit rate switch (selecting this checkbox forces the CAN FD message checkbox to be selected)
    - Not selecting any of these checkboxes means that the message will be send as CAN 2.0
10. The drop-down box allows the message to be selected to send to either Channel A, Channel B or both channels
11. The load and save icons are used to load a previously saved list of messages to send or to save the current list. Note that a saved file can be also opened as a macro (see next sub-section)

Saved files from the Send Messages tab (.CASF) and the Standalone tab (.CSSF) and **PEAK** ™ (.XMT) may be opened

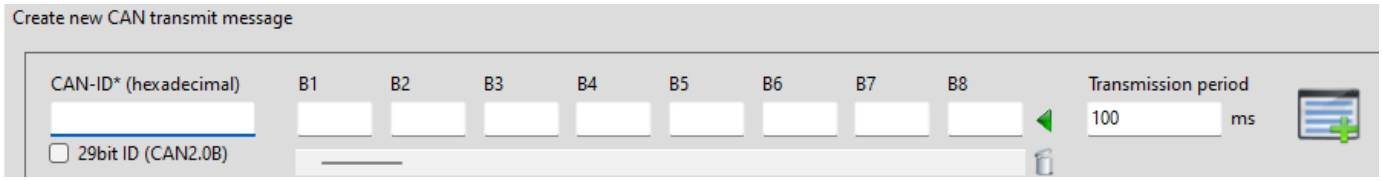
12. Pressing this button toggles between sending / stopping the list of messages to be sent to the bus.

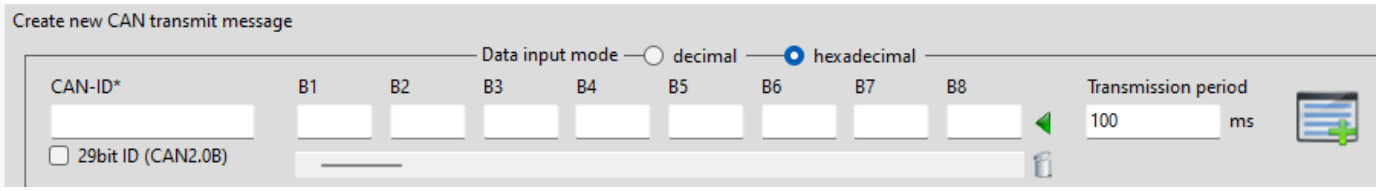
13. Select the box to move between Periodic or Serialized messages to be sent. When Periodic is selected, the 2 boxes under it are grayed out and not required, however, when Serialized is selected, the user may specify a set number of passes that the list should be sent and if a delay time is desired at the end of the list before starting the next pass.
14. The global Start and Stop and Database Start and Stop sending buttons work in all tabs. Note that the green arrow in the icon means that there are messages that can be sent and pressing it turns the arrow red to show that it is sending. If that arrow is red, pressing it will stop sending and then turn the arrow green. If the arrow is gray, that means there are no messages ready to be sent yet and messages will need to be added first
15. This will enter the Macro sending options mode (see next sub-section)
16. This button will erase the entire send list

4.3.1. Separate Selection of Send Notation



This menu item only impacts the Send Messages area. This allows the user to specify if they want to use separate send notations from the mean CAN ID display format. Note that using the separate send notification allows the user to specify either Decimal or Hexadecimal in the Send message formatting.

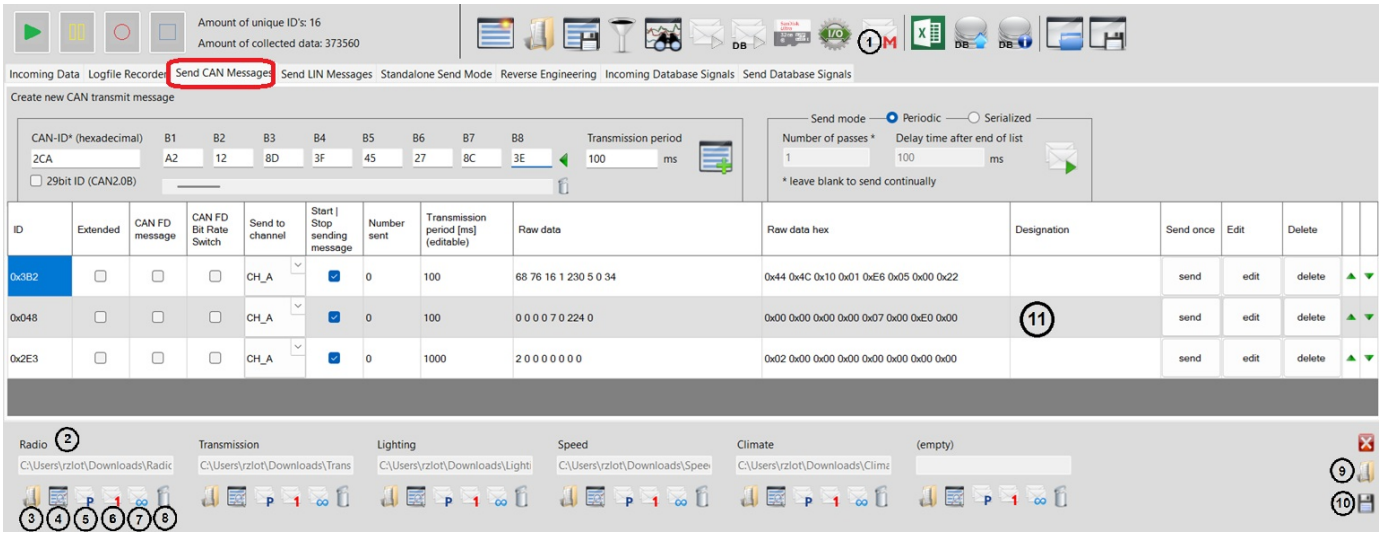




4.3.2. Send Macro Messages

This sub-section will describe how to make use of the macros feature. There are 6 macro slots that may be used.

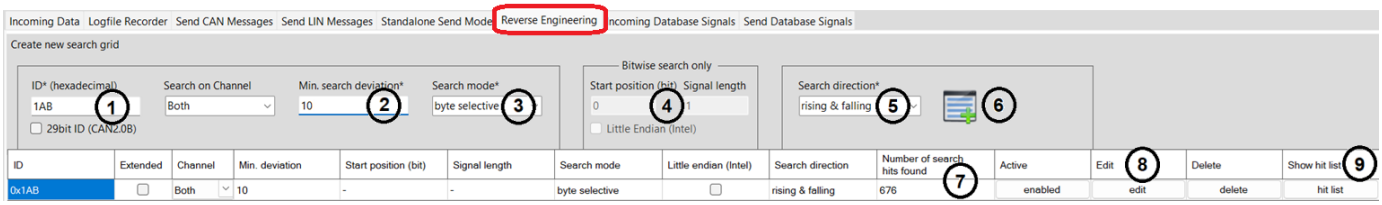
There can only be one visible send list so the active list of messages is still tied to the regular send button.



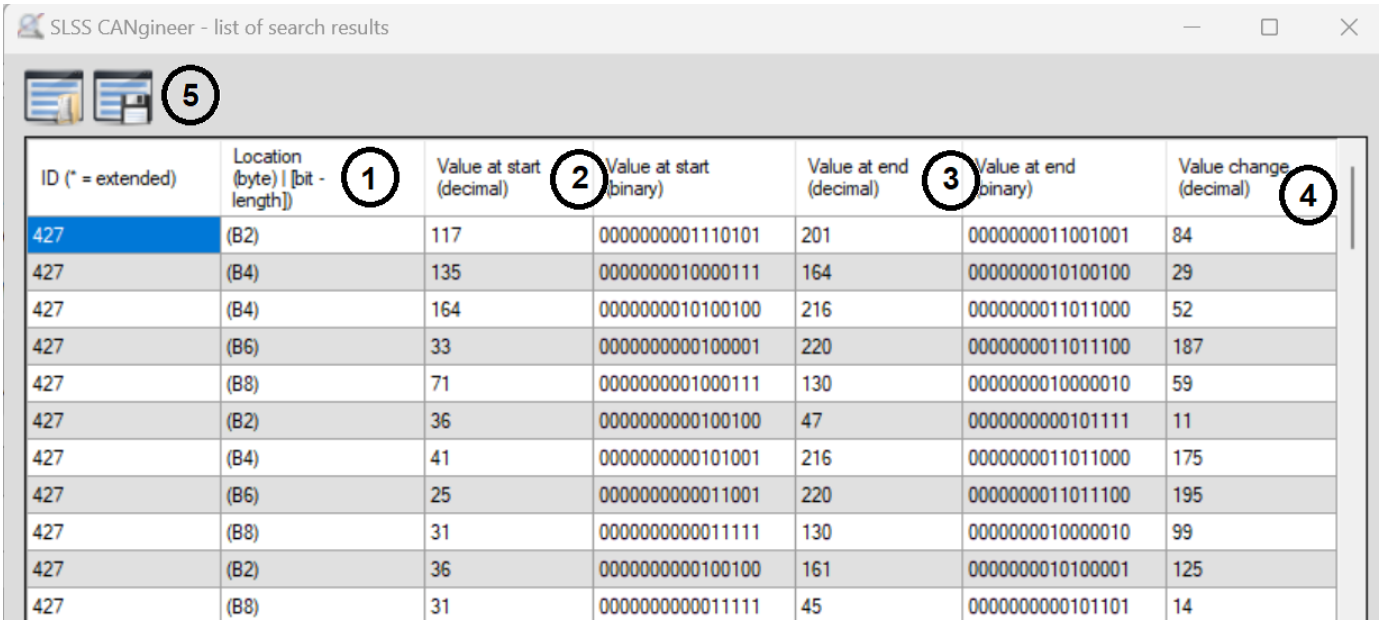
1. The red M button toggles the macros at the bottom of the active send list. **Note that the Macro button is on the main buttons at the top of the screen.** If the macros are toggled off, macros cannot be used
2. This is the name of the file of the loaded macro in each slot. If a file is not loaded in one of the slots, it will say (empty)
3. The open button allows a previously saved list of sent messages to be loaded as a macro
4. If it is desired to view / edit the messages from the macro, pressing this button will replace the active send list data with the data from the macro. **If the current visible send list has different data than the macro, a context box will ask if you want to save the current active send list before overwriting it**
5. Toggles the send mode between periodic and serialized
6. Sends the macro once
7. Sends the macro infinitely until stopped
8. Removes the macro from the list
9. Opens a master list of macros that prefills all 6 slots
10. Saves the current list of 6 macros into a single reloadable file to repopulate the macros
11. This is the active send list.

4.4. Reverse Engineering Feature Tab

This feature allows the user to locate the specific target bytes or bits that are changing in a specific Arbitration ID based on a set of criteria. This is useful if the user knows the ID of an action on the bus, however the user needs to find out the specific data that is changing within that ID. The data may be search by bytes or bits as a criteria.

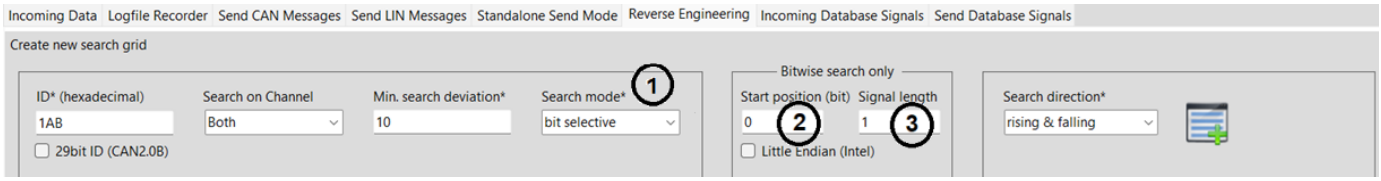


1. Specify the target Arbitration ID
2. Specify the deviation limit of data change (in decimal value) of what is being searched for in the data changes
3. This is the drop-down to select if the search should be done with the byte selective or bit selective method
4. This is only accessible when the user selects a bit selective search mode (see next sub-section for details)
5. To narrow down the deviation, the user may select a matching hit if the data deviation is either rising or rising and falling from the nominal value specified in the Min. search deviation
6. Pressing this button adds the search criteria to the list and the search begins immediately based on the current traffic on the bus
7. As the search criteria matches a hit on the bus, this number will increase to let the user know there is a match to the search criteria
8. There are 3 buttons here to interact with rows in the existing search items. The first button allows the search row to be enabled or disabled. The second button lets you edit the search criteria. The third button will delete that search criteria row
9. To view the matching hits, pressing this button opens the hit list window shown here:



1. This column shows which byte contains the target location of the matching hit in the specified arbitration ID (showing in Decimal)
2. These columns show the decimal and binary value of the start of the change
3. These columns show the decimal and binary value of the end of the change
4. This column shows the delta of the value change to match the hit criteria
5. The table may be saved and also a previously saved table may be loaded for reviewing again.

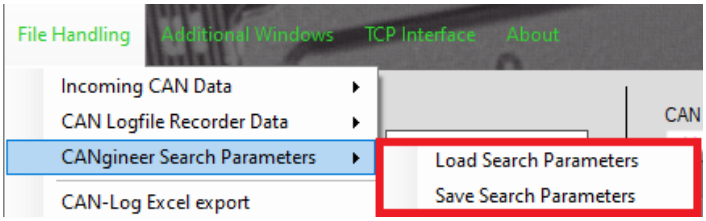
4.4.1. Bit Selective Method



1. With the search mode changed to a bit selective search, the options in the box to the right of this drop-down become available
2. Choose the starting bit position for the search criteria. Note that bits go from 0 to 63 on the bus data for CAN 2.0 (representing 8 bytes) or from 0 to 511 for CAN FD (representing 64 bytes)
3. Choose the number of bits in length. For example, if the starting bit position is 16 and the length is 16 bits then the search will be from bit position 16 to end at 32.

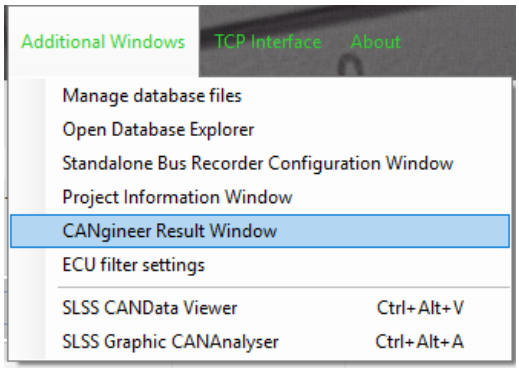
4.4.2. Reverse Engineering CANgineer Search Parameters

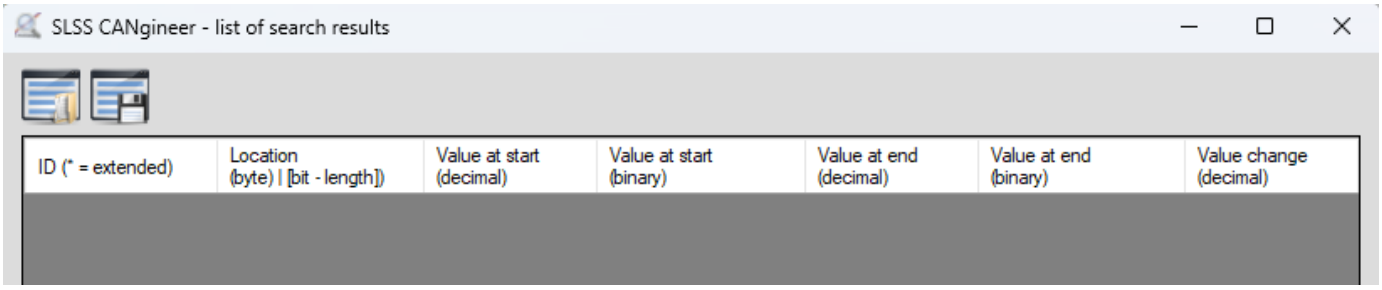
Load and save search parameters from Reverse Engineering Tab



4.4.3. Reverse Engineering CANgineer Result Window

View the data results from the Reverse Engineering feature.

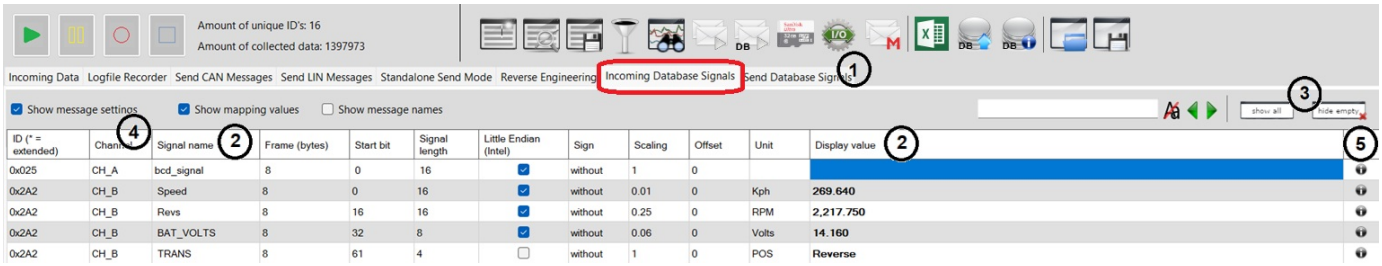




There is the ability to Load and save the data from the Result Window.

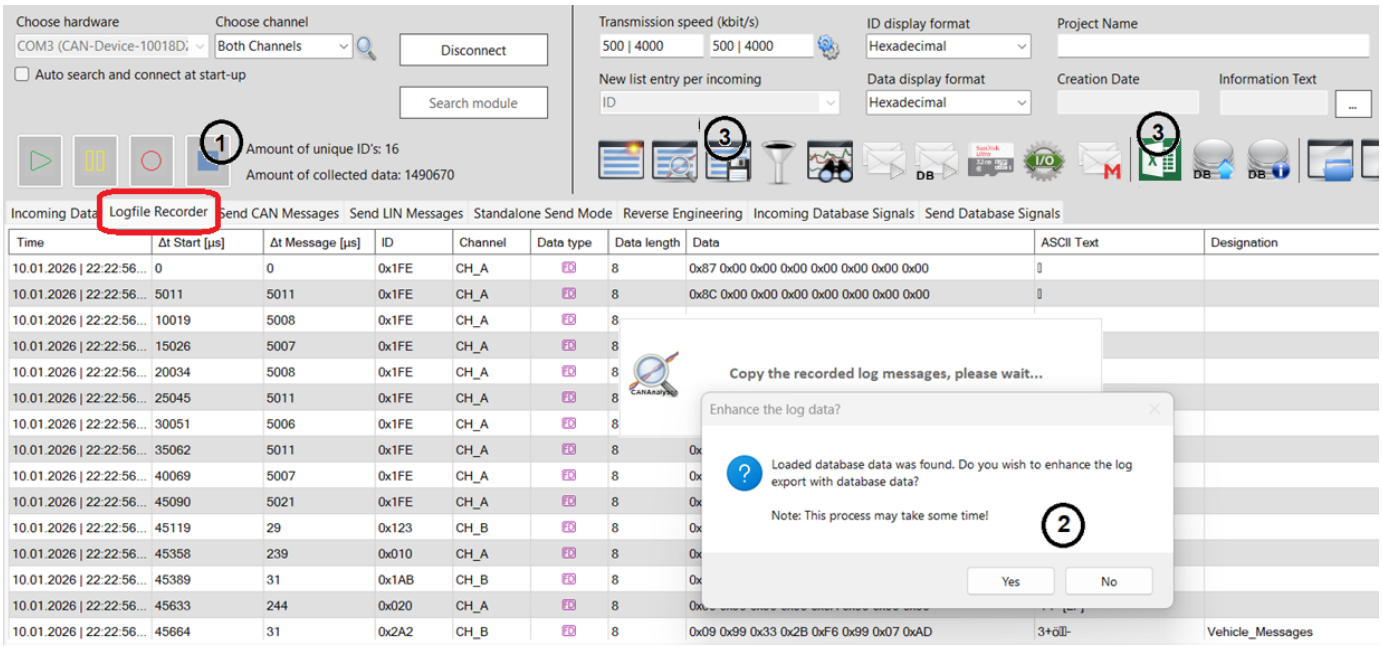
4.5. Incoming Database Signals Feature Tab

This feature tab is used to see the human readable information to match the CAN ID to the specific messages and signal names. Database data is able to be uniquely loaded for each channel independently. This tab also shows other non-human readable contextual data about the construct of the signals. Database support is provided for CAN 2.0 and CAN FD DBC files as well as LIN LDF files.

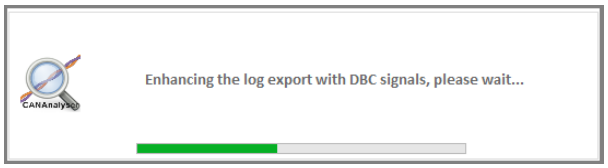


1. This opens a dialog box to allow the user to load a Database file to apply to each channel as well as editing and saving.
2. The human readable signal name, message name and display values are shown here.
3. By default, the Database will load and populate the view for ALL CAN ID's that match to the database file. If it is desired to monitor live CAN bus traffic data in real time to see only the actual data messages on the bus then pressing the **hide empty** button will hide all rows that do not match live CAN data on the bus to make it easier to view. Pressing the **show all** button will revert back to show the entire list again.
4. Informs the user which bus this database signal applies to.
5. The "i" button will be lit up blue if there is detailed additional information about that particular signal. Click on the blue "i" button for additional information.

4.5.1. Enhancing Logdata with Human Readable Signal Data



1. If a Database file is loaded and the user presses the STOP button, a context box will ask if the user desires to enhance the log files. This will take some time to post-process and add all of the Database human readable signal data to the logfile and will be available in the exports.
2. If the user chooses to enhance the log data, a pop-up window will inform the user of the short progress bar to enhance the logs and then the box will close when it is completed (see image below)
3. Upon the completion of the log enhancement process, any saving of the data or the export (CSV or Excel) will include an enhanced data logging file that includes the Designation as well as the list of all human readable signals for each Arbitration ID for each data change.



Example from an Excel export:

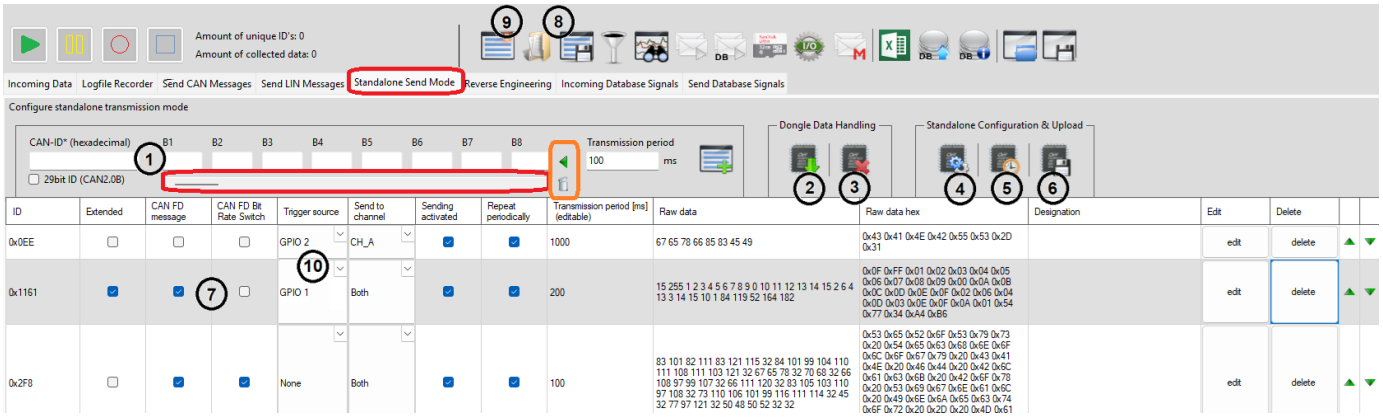
Overview CAN Logfile recorder view

SLSS CANAnalyser - Excel export creation time: Thursday, November 16, 2023 23:28:28.0575956

Time	Δt Start [µs]	Δt Message [µs]	ID	Channel	Raw Data	ASCII Text	Data B1	Data B2	Data B3	Data B4	Data B5	Data B6	Data B7	Data B8	Designation
16.11.2023 | 23:27:11.580	7999496	796	0x2A2	CH_B	39 154 95 105 234 9 162 172	_ié ¢¬	0x27	0x9A	0x5F	0x69	0xEA	0x9	0xA2	0xAC	Vehicle_Messages * KPH: 394.630 * RPM: 6,743.750 * BAT_VOLTS: 14.040 * TRANS: Neutral
16.11.2023 | 23:27:11.880	8299398	802	0x2A2	CH_B	51 163 113 111 234 144 76 16	3£qoêLI	0x33	0xA3	0x71	0x6F	0xEA	0x90	0x4C	0x10	Vehicle_Messages * KPH: 417.790 * RPM: 7,132.250 * BAT_VOLTS: 14.040 * TRANS: Park

4.6. Standalone Send Mode Feature Tab

This feature tab is used to configure the hardware dongle to be able to be disconnected from the SLSS CANAnalyser software and be able to be powered via the USB connector or the DB-9 connector to autonomously send a programmed list of up to 40 messages. Once the dongle is reconnected to the SLSS CANAnalyser software again, it will operate as if it were not in Standalone mode and the user may reconfigure it in this feature tab again.



Much of this interface is in common with the Send CAN Messages tab so most of the duplicate items will not be focused on here.

1. Enter a message as desired. Specify the ID and the byte data. Only 8 bytes are displayed at a time. For a CAN FD message, use the scroll (red highlight above) to move through all 64 bytes. To jump back to B1, press the green arrow (orange highlight above). To delete all byte entries, press the trash can icon (orange highlight above).

CAN 2.0 supports sending any number of bytes from 1 to 8, however, moving beyond the first 8 bytes, CAN FD requires these sets of bytes to be fully populated. 12 bytes, 16 bytes, 20 bytes, 24 bytes, 32 bytes, 48 bytes, 64 bytes. Failure to fill in all bytes up to the next break-point will end up in a truncation of the additional bytes beyond the last valid byte barrier.

2. Retrieves a stored list of messages and the hardware settings from the dongle (if the dongle currently has the messages and settings stored).
3. Erases stored message lists and standalone settings from the dongle and will disable the standalone mode from the dongle when it is not connected to the SLSS CANAnalyser software. This may be reenabled by sending a new list.
4. This is to configure the dongle hardware for its setup configuration for either CAN 2.0 or CAN FD for once it is disconnected from the SLSS CANAnalyser software and functioning independently in standalone mode. Note that this configuration menu is also independent from the configuration menu at the top. Settings may be different.

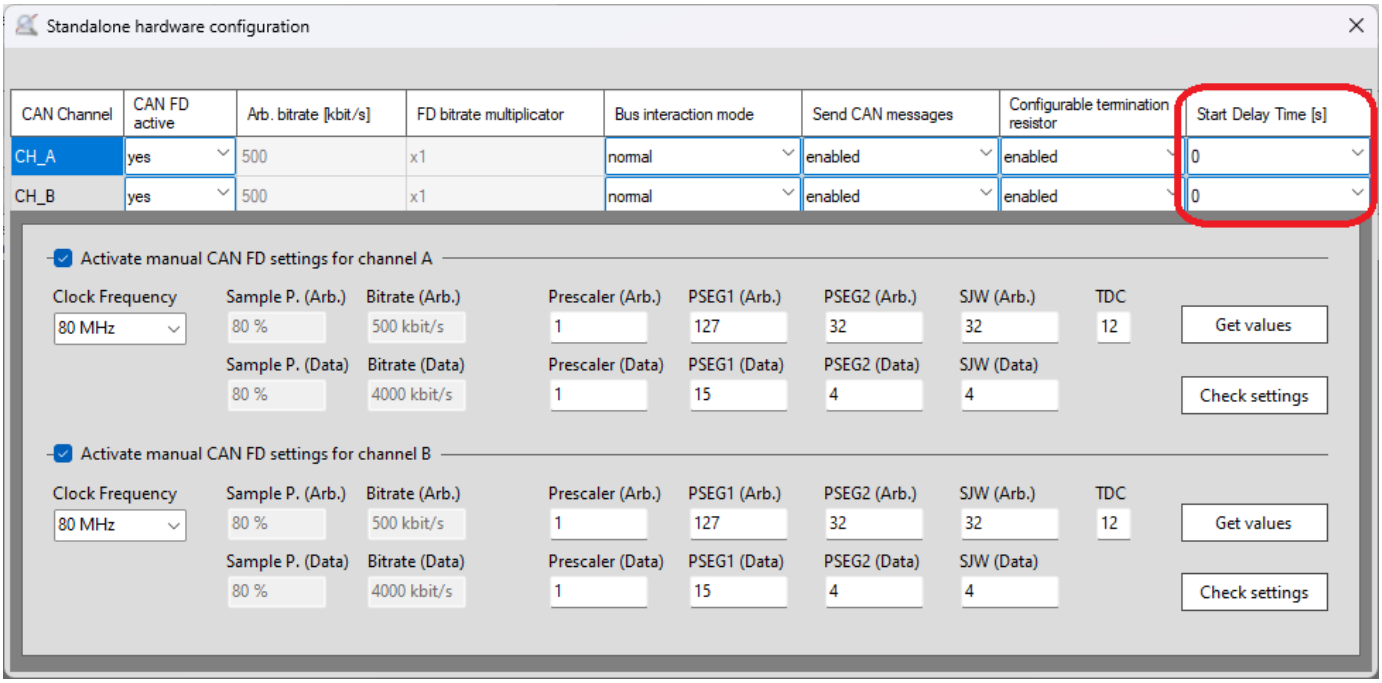
See connection setting details in the next sub-section

5. This is to send the standalone message list to the dongle as a temporary list. As long as the dongle is still powered, this list will remain in the dongle, however if power is disconnected, this list is not committed to the dongle.
6. This is to send the standalone message list to the dongle as a committed list. Once this is completed, if power to the dongle is disconnected, this list is permanently committed to the dongle until overwritten or erased. Any time the hardware dongle is powered up after this, the Standalone mode will be the initial default mode for the dongle. A connection to the SLSS CANAnalyser software will still allow for normal software connected functionality.
7. For the lower section of the message list itself, this is in common with the Send CAN Messages tab except that there are 2 new columns. A message may now be set as a CAN FD message and if so, it may also be able to be configured to enable the bit rate switch functionality.
8. The load and save icons are used to load a previously saved list of messages to send or to save the current list.

Saved files from the Send Messages tab (.CASF) and the Standalone tab (.CSSF) and **PEAK ™** (.XMT) may be opened

9. This button will erase the entire send list
10. There is an option to choose a GPIO input trigger to be tied to begin sending a particular message or multiple messages. This is a one-shot trigger to begin sending and has no effect on additional presses

4.6.1. Standalone dongle hardware configuration settings

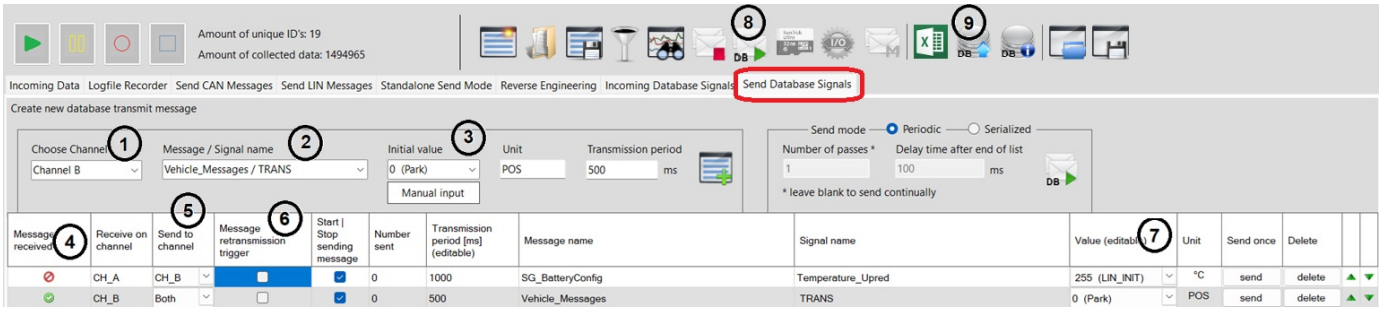


These configurations are independent for the standalone mode from the main SLSS CANAnalyser behaviors from the hardware configuration settings earlier in this manual

All of the configuration options are in common with the primary software configuration options that are already explained in the section above on the Hardware Configuration window, with the exception of the Start Delay feature. This allows a time delay to be added from the time that the dongle is powered up in Standalone mode until it begins broadcasting the standalone messages programmed into it.

4.7. Send Database Signal Feature Tab

To offer the convenience of simplicity for users to be able to directly send the real world values from a Database file without requiring to manual set your ID and byte data, we offer this feature.



This tab only provides functionality to add new Signals with a database file loaded!

Functionality of this tab is based on the **Send CAN Messages** tab so all common functionality operates the same and will not be the focus of this sub-section.

If the Database file gets updated after a send Signal list was stored, the Database Send list may need to be changed to match the Signal changes.

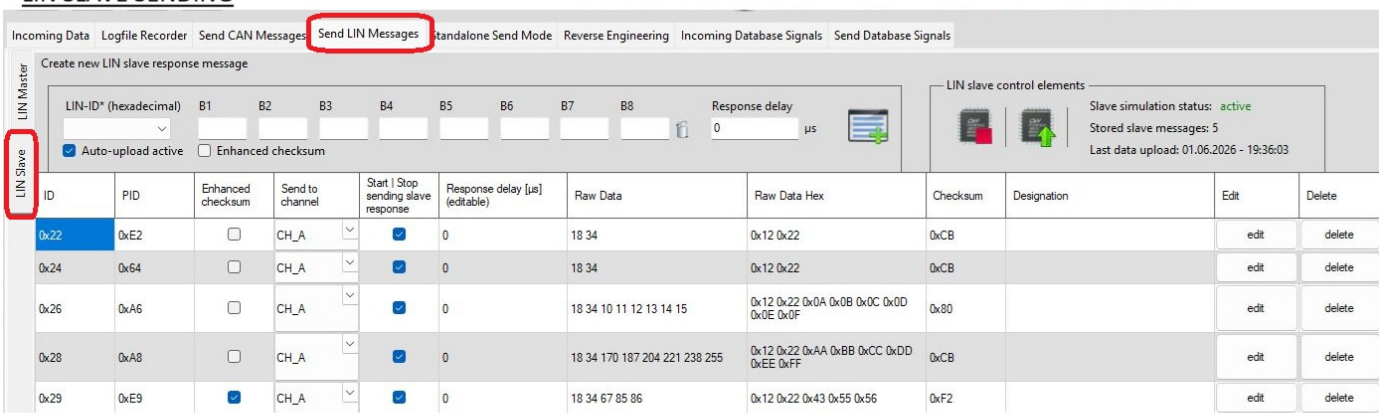
1. If 2 Database files are loaded, the list may be extremely large so it is possible to use this dropdown to allow a choice of which database channel to select the signal from, or both channels may be selected.
2. Select the desired Signal name from the dropdown that is intended to be used to send to the bus.
3. Enter the desired Signal value within the allowed range. If data is entered outside the database file determined range, a pop-up will inform the user of the minimum and maximum value range to select from. Values that are entered that do not match the scaler from the selected database file data will be rounded up to the next valid value (including decimal values). The units are automatically populated from the database data.
4. This column will show either a green check box or a red cross-out. The green check box means that this Signal is currently being received on the active bus. The red cross-out means that the Signal is not currently being seen on the active bus.
5. This drop down allows the user to send the desired Signal information to either bus. This is useful if one channel is actively receiving an ID and the value is intended to be modified and sent to the other bus (like a filtered Gateway in essence).
6. Selecting this box means that if the first column has a green check box and the remaining bytes of a CAN ID that are not being impacted by this Signal then this Signal will transit on this row with the remaining live data byte values retransmitted from the live incoming data.
7. The values of the Signal may be edited and updated directly here.
8. Global Start and Stop Database Signal send button.

4.8. Send LIN Messages Feature Tab

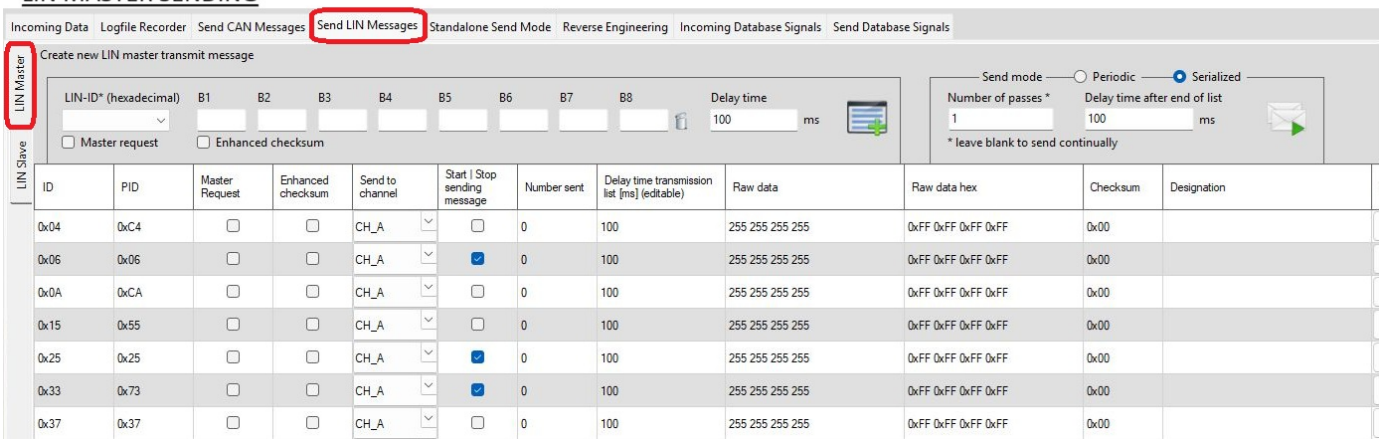
This tab will only be visible with the addition of the LIN support added to your license. We currently have not yet released the DESK LIN Pro dongles so this will become available in the near future.

Once available, SLSS CANAnalyser will add the ability to send LIN messages as either a Master or a Slave providing optimal flexibility.

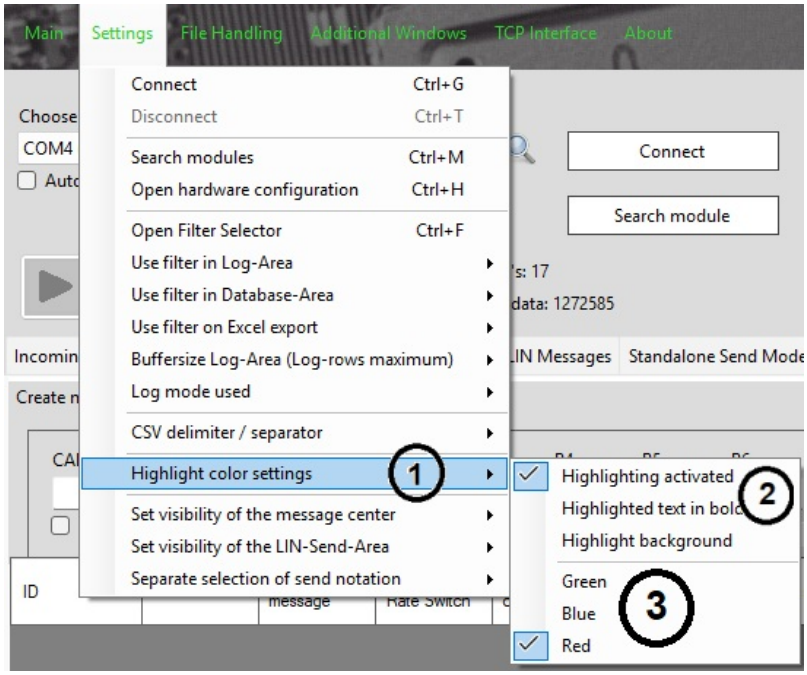
LIN SLAVE SENDING



LIN MASTER SENDING



5. Other Menu Options



5.1. Byte Highlighting

1. Enter this sub-menu to access the options of the byte highlighting behavior
2. Activate byte highlighting or disable it (It is on by default) or change modes to highlight the background or not
3. Select the color you prefer. Red is the default

This feature allows a visual aid to more easily detect the changing of data bytes. There are 2 styles used in this software.

Color changing of the data

Data
0x95 0x00 0x1E 0x00 0xB9 0x00 0x64 0x00
0x00 0x78 0x3C 0x00 0x0A 0x00 0x00 0x00
0x84 0x00 0xD5 0x00 0x14 0x00 0x5C 0x00
0x00 0x37 0x00 0x25 0x00 0xA8 0x00 0xA0
0x96 0x00 0xCE 0x00 0x31 0x00 0xFD 0x00
0x4E 0x42 0x55 0x53 0x2D 0x31 0x20 0x43

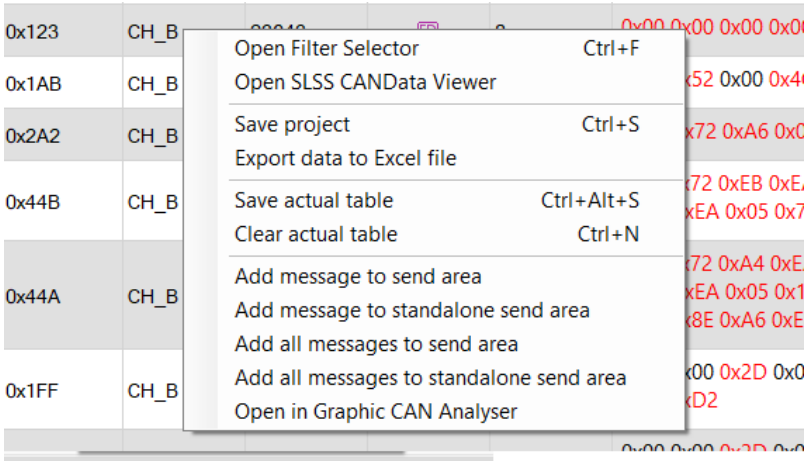
Color changing of the data cell

Data
0x5F 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x11 0x00 0x9C 0x00 0x0B 0x00 0x0E 0x00
0x00 0x9E 0x00 0x1F 0x00 0xE3 0x00 0xA8
0x00 0xFA 0x64 0x00 0x0A 0x00 0x00 0x00
0x00 0xBF 0x00 0x22 0x00 0x06 0x00 0x30

These methods are mutually exclusive and selectable in the setting menu. To change between these modes, you must disconnect first and then change the selection in the settings menu and then reconnect. See next section for details on the setting menu to alternate these or disable the feature.

5.2. Right-Click Menu

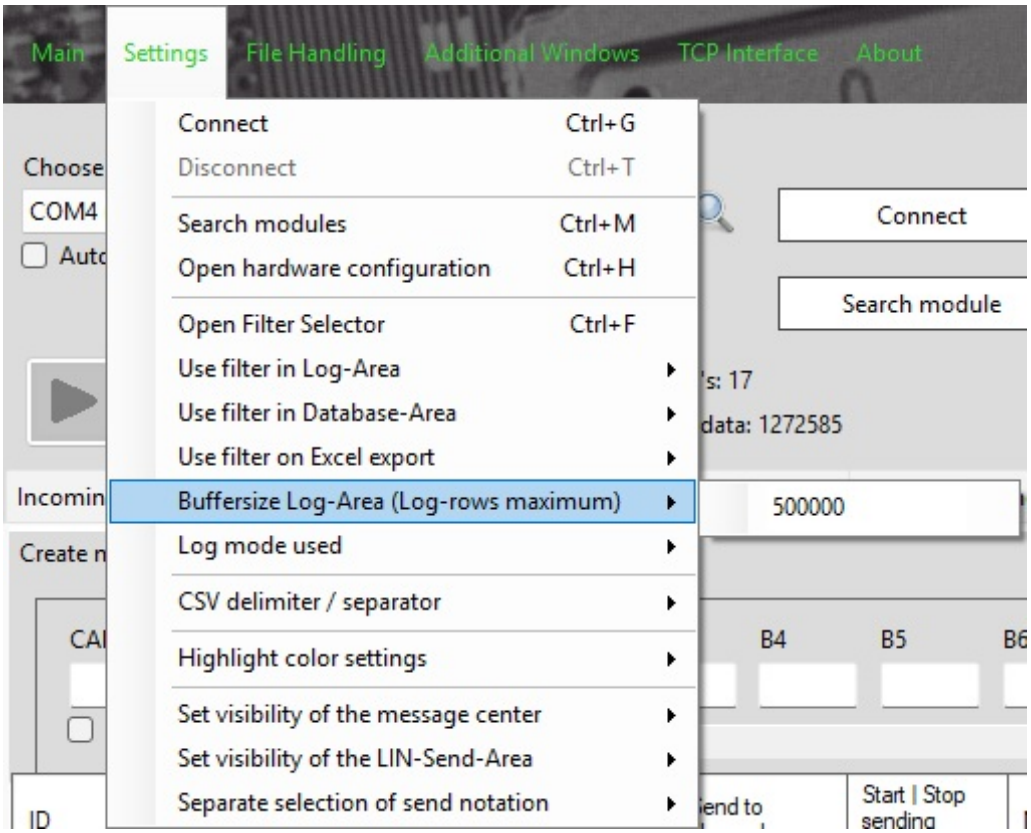
Using the mouse Right-click function on most of the tabs provides a menu of quick access tasks to access that are convenient from this location. It is good to left-click and select a cell in a row first to ensure the right-click context menu reacts to the data in the selected row.



Each of these menu items are shortcuts to the same feature / function offered in other parts of this manual so these are just brief descriptions for each one:

- Opens the message filtering setup in a separate window
- Loads the external CANData Viewer window
- Saves the current project parameters
- Opens the dialog box for choosing your export options and then exports data
- Saves current data from the Incoming CAN Data tab (snapshot of the current messages - 1 per ID)
- Clears the current Incoming data and is ready to be populated again
- Directly adds the current selected ID and data bytes of the selected row into the Send CAN Messages
- Directly adds the current selected ID and data bytes of the selected row into the Standalone Send CAN Messages
- Directly adds ALL IDs and data bytes of the selected row into the Send CAN Messages
- Directly adds All IDs and data bytes of the selected row into the Standalone Send CAN Messages
- Directly opens the current selected ID in the external Graphical Analyser window

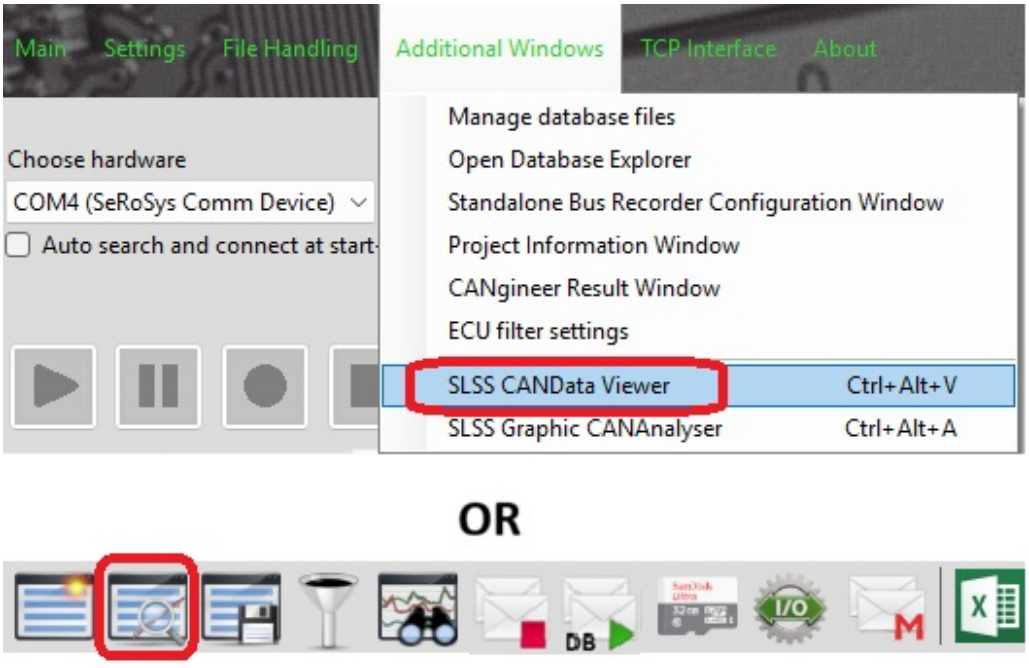
5.3. Increase Log Buffer Maximum Size



Going into this menu allows you to increase the maximum recording log buffer size. Note that the larger the log buffer, the longer it takes to save the exported data. A value entered higher than the allowed maximum will default to the maximum value.

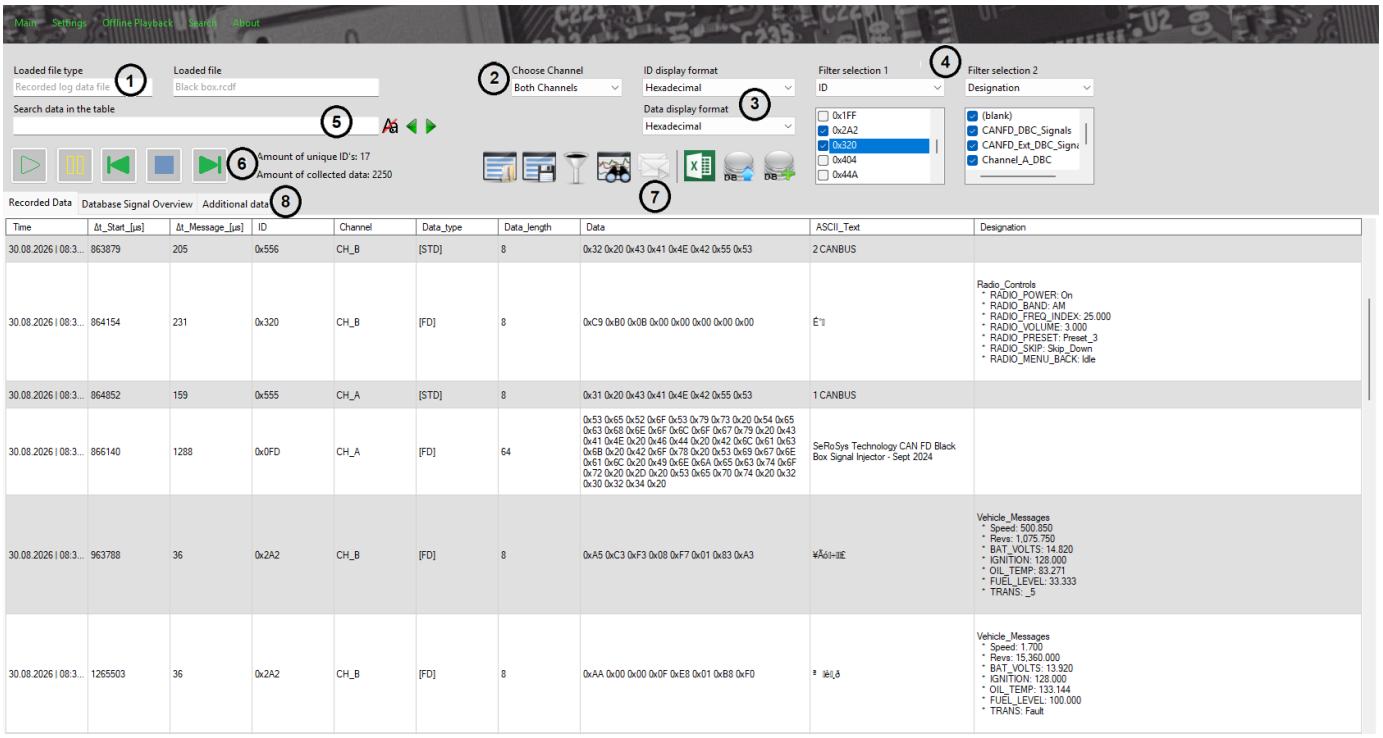
6. SLSS CANData Viewer

This menu option feature is used to be able to load in a previously saved data session and view the data inside the software

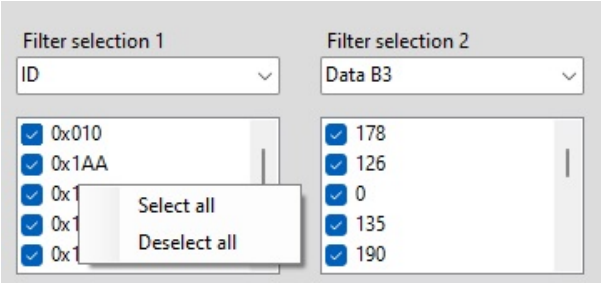


6.1. SLSS CANData Viewer Main Program

All of SLSS CANAnalyser saved file formats are supported.



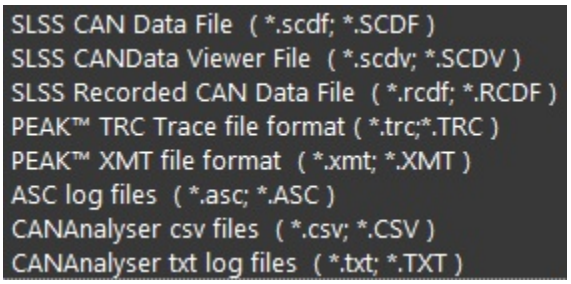
1. Information displayed based on the file loaded. It states the type of file and the file name that was loaded
2. This allows the view of only CH_A or CH_B or both channels from the loaded data
3. These drop-downs are used to change the format of either the ID or Byte data (HEX, DEC, BINARY)
4. Filter 1 and Filter 2 may be set to provide 2 layers of filtering of ID or bytes or designation to find the data that is desired. To select or deselect all messages in a filter list, right click on the list and select "Select all" or "Deselect all"



5. This is a data search field. Any text entered here will highlight a cell in blue color for matching criteria. Beside it is an icon to enable or disable case matching. The green arrows beside that will move to the next or previous matched cell
6. These are the data control buttons. From left to right is Play, Pause, Step backwards, Stop, Step forwards. Note, to play back the data, press the play button. **The play button must be enabled for the graphical viewer to show the graph**

7. These are the feature control buttons. From left to right is the Load data button (loads scdf, scdv, rcdf files), the save button to save a copy of your current filtered data, the advanced filter button (operates identical to this button in the main software), the graphical analyser button (operates identical to this button in the main software), the playback CAN button (**future application to play back recorded data back onto the live bus**), Excel export data button, load database file button and then the last button will go through the loaded data rows and enhance it with the loaded database file data
8. There are 4 tabs in the main viewing window. The first 3 operate identically to the way these 3 tabs operate in the main SLSS CANAnalyser software. The Recorded CAN Data tab shows the logged data rows (that can be played back). The Database Signal Overview tab shows all the decoded human readable database signal data that can also be played back to see dynamic data as it changes. The Database Data tab allows the direct viewing of the database file itself. The 4th tab "Additional data" is for imported data such as imported send message data that can be viewed and then converted / saved into the SLSS CANAnalyser format to load into the main software
9. The software currently supports these data import formats. **PEAK ™** .TRC V2.0 and V2.1 format log files, **PEAK ™** .XMT send message list files and **ASC** files may be imported. Additionally CSV files that were previously exported from SLSS and the standalone SD logging .TXT CANAnalyser formats may also be imported as well as the SLSS CANAnalyser native save formats

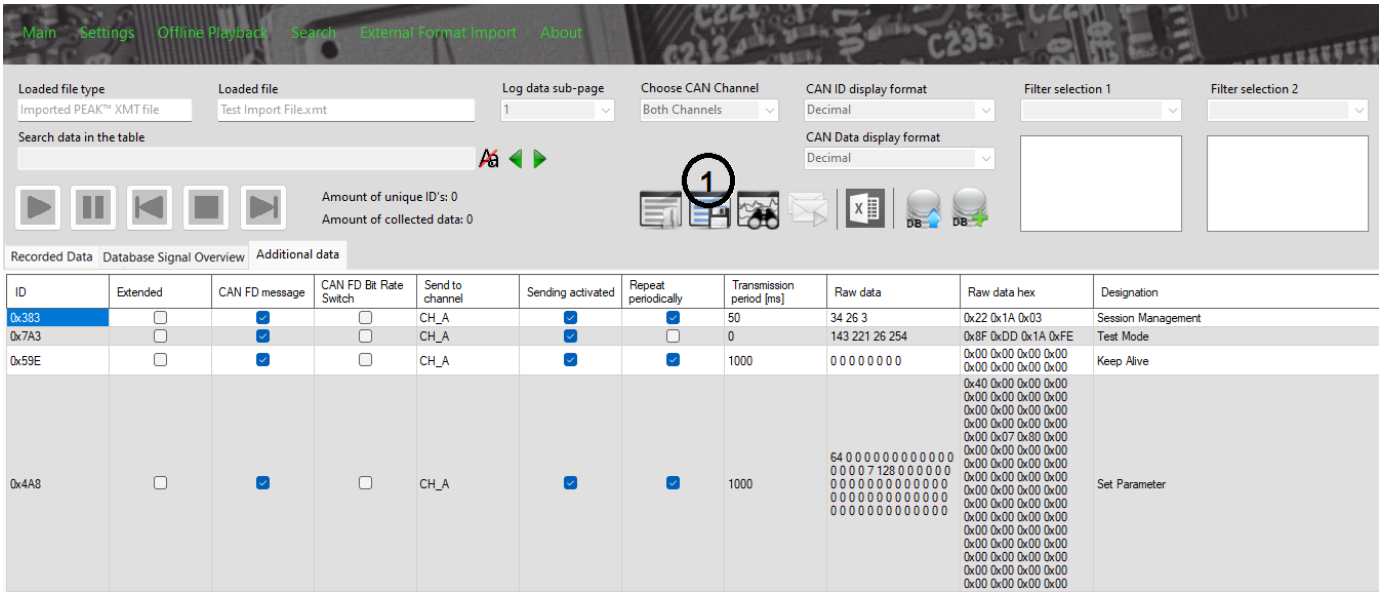
For CSV imports, ensure to select the correct delimiter character under the **Settings** menu.



6.2. Converting imported .XMT or .ASC files into native SLSS CANAnalyser formats

Step 1 - Import the desired .XMT or .ASC file

Step 2 - Press the save button

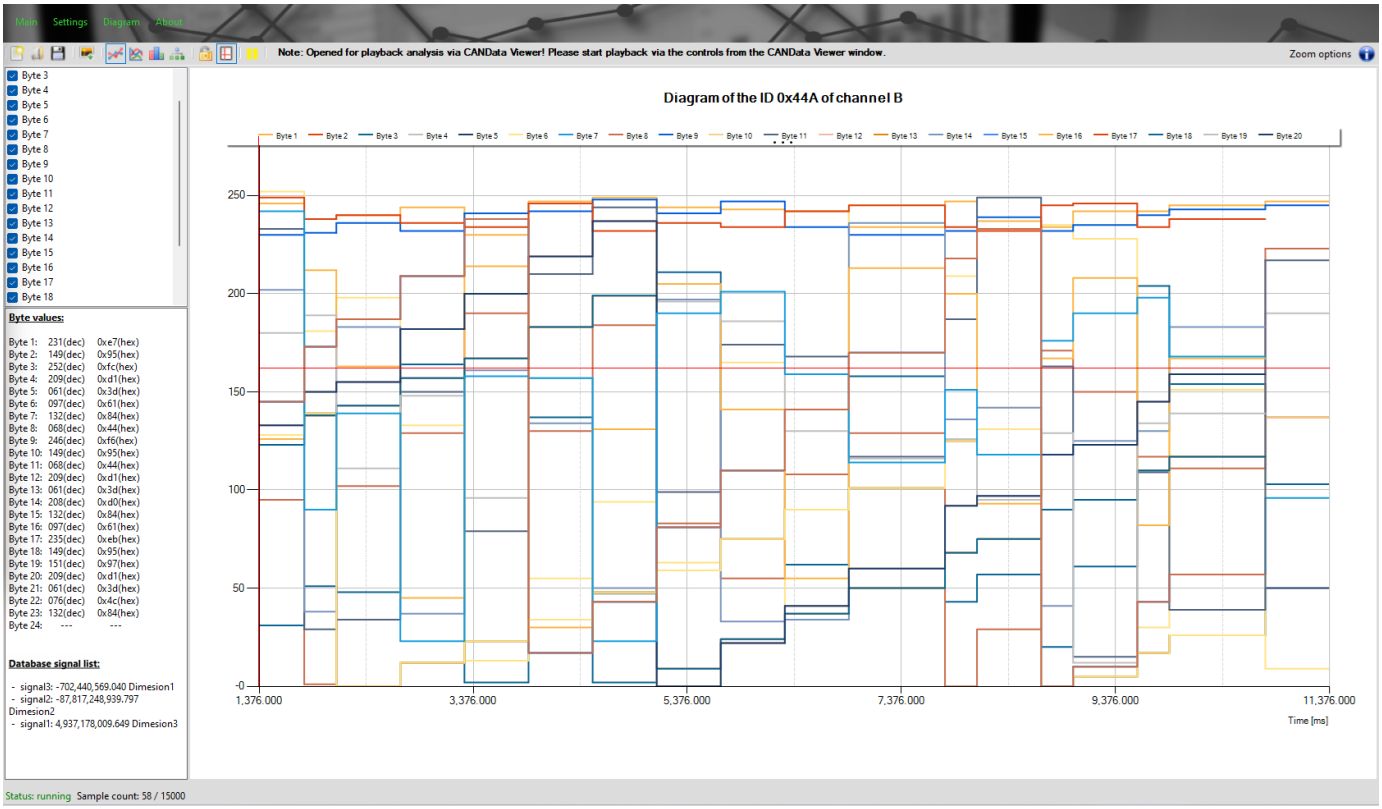


Step 3 - Choose the desired SLSS CANAnalyser native format To save it to and enter the file name

6.3. Playback Graphical Analyser from the Data Viewer

The selected ID will be displayed in the graphic viewer. Note that this operates identically to how the primary graphical analyser works from the main software. Refer to the other chapter for the details instructions.

For this graphical analyser to display the data, the PLAY button must be pressed in the SLSS CANData Viewer or else the graph will not display.



7. Qwiic Interface

7.1. Interface to Flextech Bus Monitor

For details on this interface, please reference the external document **"SLSS CANAnalyser Pro Software A2B Qwiic interface addendum"** which is downloadable from the website.

https://serosys-tech.com/downloads/

7.2. Interface to other Qwiic peripherals

Under development.

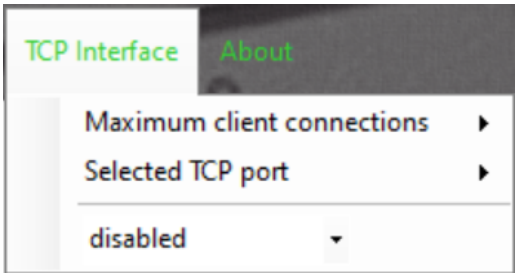
8. TCP/IP Communication Interface for Third-party applications

Using the TCP Interface, data can be passed to a third party application via TCP/IP network connection allowing CANAnalyser to be used as a server that can support multiple connected clients.

This makes it possible to create your own proprietary interface in scripting languages widely used in development, such as Python, Groovy or Lua, and to interface with the SLSS CANAnalyser software to control various functions and analyze the CAN data using a custom remote interface.

For an up to date list of currently supported functions via TCP/IP interface to the SLSS CANAnalyser software, please follow this link: https://serosys-tech.com/tcp-ip-commands/

Example Python examples are available to download and contained within the Python Class download here: https://serosys-tech.com/downloads/#tab-28493



TCP/IP can support multiple connections so the user may specify the maximum number of connections are allowed to be accepted to the software. If the number is increased, the server opens the given number of network ports, starting from the port that gets defined. It is possible to open and stay connected simultaneously on different ports.

The user must then specify the TCP port to be forwarded on the router to open up for the IP address.

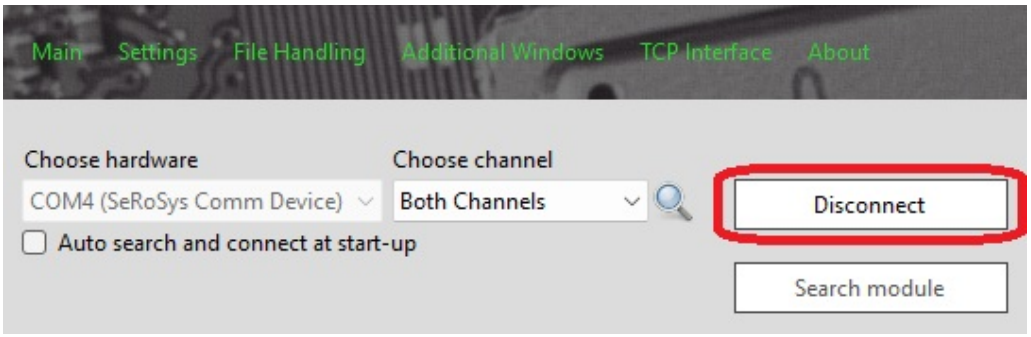
This interface may be enabled or disabled.

If the hardware dongle is disconnected during a TCP request, the CANAnalyser software will report a connection error

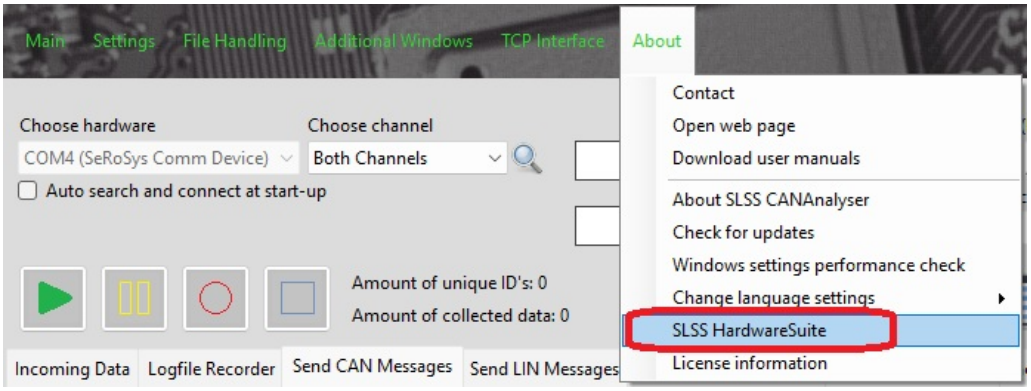
9. Hardware Dongle Firmware Updater

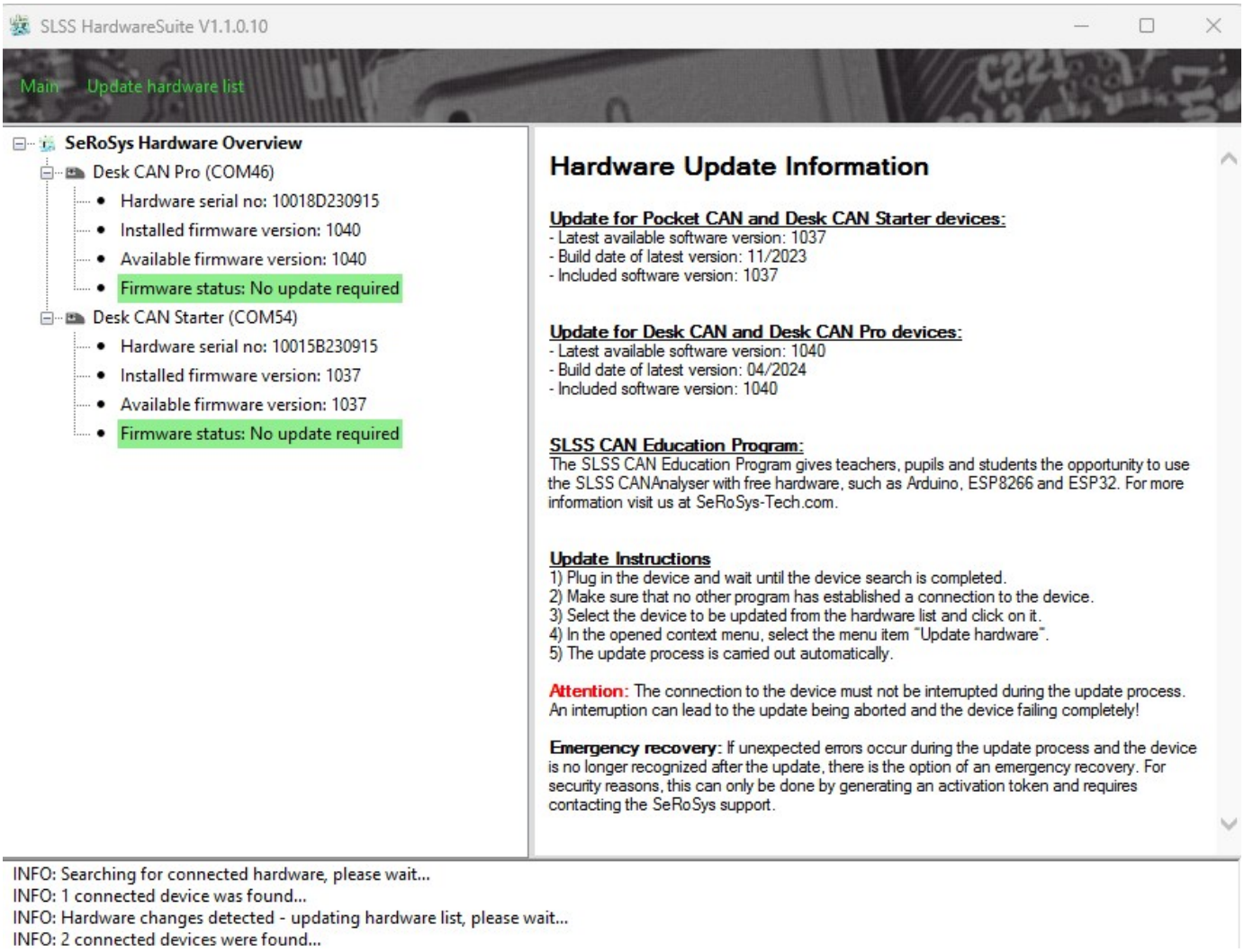
This menu option feature is used to update the firmware on your hardware dongle if required. To check to see if there is a required firmware update, follow this process.

Please press the "Disconnect" button before loading the SLSS HardwareSuite



Select "SLSS HardwareSuite" from the "About" menu.





When the HardwareSuite loads, after a few seconds, the Hardware Overview will show you the dongle that is plugged in and it will show the firmware status. If the firmware status is green then no update is required and the HardwareSuite may be exited. If the firmware status is yellow, that means there is an update required. Click on the yellow firmware status and follow the instructions.

Please read all the Hardware Update Information on the right side of the screen and follow the directions carefully. If there is a hardware technical issue or the dongle is disconnected during the update process and becomes unresponsive then contact SeRoSys technical support for assistance.

10. Troubleshooting

10.1. PC System resources

Check Task Manager

Too many open programs may have implications on available system resources such as memory and CPU availability and may cause poor performance of the tool:

- Open Task Manager and look for heavy users of system resources and shut down unneeded applications.
- Ideally you must have 16GB of RAM or more, however, ensure a minimum of 8GB of RAM is installed on the target PC

Display Issues

If the program has issues where the display of the tabs are cut off or columns appear truncated, a recommended resolution of 1920 x 1080 at 125% scale is suggested. **Scale settings over 150% are not supported**

10.2. Wiring and Hardware setup

Check wiring

If the dongle is connected properly to the SLSS CANAnalyser and there is no Incoming data, it may be caused by a wiring issue or a USB cable issue.

- Verify proper pinout for interfacing to the DB9 connector in the section titled "Connector Pinouts". **Make sure the polarity is correct for CAN H and CAN L.**
- Look for any loose, shorted or damaged wiring, especially in long buses.
- Verify that the ground is shared between all CAN nodes.
- Ensure that the USB cable is a USB 2.0 oS
- Ensure the bus is properly terminated with 120-ohm resistors at both ends of the bus.

If the dongle has no LEDs lit up at all then the dongle is either not receiving proper power or the dongle is defective.

- Ensure USB cable is tested as a good cable.
- If using the DB9 to power the dongle on **Lab CAN Pro**, verify >7VDC is applied to pin 9.

Noise issues

If the dongle is connected properly to the SLSS CANAnalyser and there are erroneous or unexpected or missing data showing, there may be a noise issue.

- If the bus is too long or not shielded properly, it may pick up noise.
- Implement twisted pair wiring for High and Low pins per channel to reduce noise.

Matching bus types

If the dongle is connected properly to the SLSS CANAnalyser and there is no Incoming data or only partial CAN 2.0 data, it may be caused by a mixture or mismatch of CAN 2.0 and CAN FD nodes.

- Ensure all nodes are using either CAN 2.0 or CAN FD-compliant nodes, as mixing CAN 2.0 and CAN FD nodes may cause unexpected results.
- IF CAN FD is required, ensure all nodes' controllers are CAN FD-compatible. CAN 2.0 controllers may misinterpret CAN FD messages, leading to errors.
- CAN 2.0 nodes are not compatible with CAN FD higher data rates

10.3. Dongle Hardware Configuration

A bus with CAN 2.0 only nodes is very forgiving on the hardware connection configuration settings, however a bus with CAN FD and especially with bit rate switch is extremely sensitive to precise configuration so please verify the settings carefully!

Check arbitration bitrate setup

- Ensure that all nodes on the bus are configured to use the same nominal arbitration bit rate.
- Typical rates: 500 kbit/s or 1 Mbit/s.

Check data bit rate setup (CAN FD only)

- Verify that the bit rate setting matches the target bus configuration
- Ensure that the data bit rate multiplier is properly configured (usually a multiple of the nominal bit rate).

Verify if manual settings are required or not (CAN FD only)

- When not using the manual settings, set the multiplier to provide the correct data bitrate. *Eg. Arbitration bitrate of 500 kbit/s with a multiplier of x8 equals 4000 kbit/s data bitrate*
- When not using the manual settings, note that the sample point percentage is a default of 75%. Use manual settings if another sample point is required.

Synchronize timing segments (CAN FD only when activating the manual settings)

- For both arbitration and data bitrates, adjust prescalers, PSEG1, PSEG2, SJW and TDC to optimize bus performance based on network size and wire length.
- Check sample point settings to avoid improper sampling of the signal.
- **Setting these improperly may cause unexpected problems and may even cause the bus to crash or go into bus off mode**

Specific other hardware configuration issues

Other causes of data not being seen in the Incoming CAN Data tab may be caused by one of these settings

- If bus interaction mode is set to **off**
- Incorrectly configuring the configurable termination resistor setting. A bus must be properly terminated with 120-ohm resistors at both ends of the bus so if interfacing to an existing terminated bus, set them to **disabled**, otherwise ensure they are **enabled**. CAN FD buses are more sensitive to this setting so be cognizant of this setting

If trying to send messages in the Send CAN Messages tab does not produce the actual messages being sent on to the bus, it may be disabled in the hardware configuration

- Ensure that the Send CAN messages are **enabled**.

10.4. Bit Rate Switch (BRS) Issues

If interfacing to a CAN FD bus that used bit rate switch messages, extra care is required to avoid bus crash issues and missed messages.

Mixed BRS modes on the same bus

- Ensure that all nodes are set to either use or not use BRS. Mixing nodes with BRS enabled and disabled can cause arbitration issues.
- Do not add send messages with the same ID having CAN FD bit rate switch and without bit rate switch

10.5. Diagnosing Specific Issues

Bus Off Errors

- This occurs when a node repeatedly fails to transmit or receive messages. If this occurs, try to reconnect the dongle to see if the dongle settings were the cause. If this does not work then the bus off error is caused by another node on the bus.

Only Channel A in available and certain features are not available

- If the drop-down menu is greyed out or you cannot select Channel B, the license file does not match the hardware dongle connected to it!
- Similarly, if certain features are not available, the license file does not match the hardware dongle connected to it!

10.6. Micro-SD Card and Standalone Logging

The micro-SD card button is greyed out or unavailable

The micro-SD card window is both hardware and license dependent.

- This button is only accessible once the software has connected to a **Lab CAN Pro** module. The other hardware variants do not have micro-SD logging hardware.
- If a **Lab CAN Pro** is connected and the button is still unavailable, the license file does not match the hardware dongle connected to it. See the section titled "Diagnosing Specific Issues".

Incoming data and logging stop while the micro-SD card window is open

- This is expected behavior and is not a fault. While the micro-SD Card window is open, CAN logging and data viewing are not processed. Close the window to resume normal traffic display and recording.
- The same behavior applies to the GPIO Interface window.

Standalone logging does not start after disconnecting from the software

Work through these checks in order:

- Checking the "Start of log recording" enable box alone does **not** enable the offline logging on the hardware. The configuration must then be sent to the dongle using the send button on the Standalone Log Recording tab.
- After disconnecting, verify the Connect LED is **solid purple**. Solid purple indicates standalone logging mode. A **slow blinking** purple LED means the dongle is in standalone **send** mode instead, which is configured from the Standalone Send Mode feature tab.
- Confirm the configured start trigger can actually occur:
  - *First message received* - traffic must be present on the selected trigger channel.
  - *Upon Receiving an ID* - that exact CAN ID must appear on the selected channel.
  - *External I/O trigger* - GPIO 1 or 2 must be correctly wired, including a common ground reference, and must physically change state.
- Confirm the trigger channel drop-down (Channel A, Channel B or either channel) matches the channel the traffic is actually on.
- Verify the dongle remains powered once it is disconnected from the PC, either via the USB connector or via DB9 pin 9 (+7 V to +28 VDC), and that the supply is not switched off part way through the session.

The standalone hardware configuration is **independent** from the Hardware Configuration window at the top of the main screen. A wrong arbitration bitrate, a wrong CAN FD setting, or a channel set to **off** in the standalone configuration will produce an empty log even though live monitoring worked correctly a moment earlier. Verify the standalone configuration separately.

It is critical to avoid powering the **Lab CAN Pro** via both the USB connector AND pin 9 B+ at the same time.

Logging stops before the end of the test

- A *maximum recording time* may have been selected in the trigger options. If no maximum is selected, logging continues until it is stopped or memory is full.
- Check the free space remaining on the micro-SD card. Logging ends when the card is full.
- Verify the supply to the dongle is uninterrupted for the whole session. An ignition-switched supply on pin 9, or a USB port that powers down, will end the session early.

A log file is listed but cannot be opened, downloaded or played back

- The offline logs use a **proprietary .TXT format**. A .txt file that is manually placed on the micro-SD card will still be displayed in the list, however it cannot be used by the software and cannot be played back to the bus.
- Confirm the file was actually recorded by the dongle's own offline logging function.

The log file list is empty or a new recording is not listed

- Press the refresh button on the file list. This is required after a micro-SD card has been replaced in the dongle hardware.
- Confirm the micro-SD card is fully seated in the socket.
- If the list is still empty after a test session, the logging session most likely never triggered. See "Standalone logging does not start after disconnecting from the software" above.

Downloading a log file from the card takes a very long time

- This is expected for large files. The software calculates the approximate download time and asks the user whether to proceed.
- It is faster to eject the micro-SD card and transfer the file directly with a card reader in Windows Explorer.

GPIO or A2B events are missing from the standalone log

- GPIO event logging must be enabled on the Advanced Logging Features tab, and an ID must be selected from the drop-down for the events to be logged against.
- Check the on-change / receive interval selection. If logging on change is selected and the input never changes state, no entries will appear.
- A2B logging requires the Flextech Bus Monitor connected via the qwiic interface and it must be configured via the proper LUA script to accept the interface.

The dongle keeps entering standalone logging mode when it should not

- Use the erase button on the Standalone Log Recording tab. This erases the stored settings and configuration and disables standalone logging when the dongle is not connected to the SLSS CANAnalyser software.

Standalone **logging** and standalone **sending** are stored and erased separately. Erasing one does not erase the other. The standalone send list is erased from the Standalone Send Mode feature tab.

Standalone Bus Playback puts no traffic on the bus

- Verify a valid natively recorded log file is loaded. Files manually placed on the card are listed but cannot be played back.
- Verify the playback channel selection (Channel A, Channel B or both channels) matches the bus being monitored.
- Verify the standalone hardware configuration for that channel is not set to **Listen Only** or **off**, and that message sending is enabled for the channel.
- Verify the bitrate and termination resistor settings match the target bus. See the section titled "Dongle Hardware Configuration".
- Check the loop setting. A single pass of a short log file can complete before it is observed on the analysis tool.

10.7. GPIO Interface

The GPIO button is greyed out or unavailable

- This button is only accessible once the software has connected to a **Lab CAN Pro** module. GPIO is applicable to **Lab CAN Pro** only.
- If a **Lab CAN Pro** is connected and the button is still unavailable, the license file does not match the hardware dongle connected to it.

Incoming data and logging stop while the GPIO window is open

- This is expected behavior. While the GPIO Interface window is open, CAN logging and data viewing are not processed. Close the window to resume.

A GPIO input never triggers

- **Ground reference.** The GPIO pins require a ground reference to be connected between the external device and the dongle. The ground reference can be acquired from pins 3 or 6 on either of the DB9 connectors. **A missing common ground is the most common cause of an input that never changes state**
- Confirm the master enable check box at the top of the I/O Triggered Control Functions tab is selected. Deselecting it disables the entire GPIO functionality.
- Use the **I/O Overview** tab to observe the live input state. If the state does not change there when the external signal changes, the problem is electrical or wiring related and not a configuration issue.
- Confirm the signal is wired to an input pin. GPIO pins 1 and 2 are inputs, pins 3 and 4 are outputs.
- GPIO inputs are protected from -28VDC to 28VDC. Verify the applied signal is within range and that it genuinely transitions between states.
- At overtemperature the regulator on the GPIO inputs is automatically turned off by the integrated thermal protection circuit. If the inputs stop responding after prolonged operation, remove the load, allow the module to cool and retry.

A GPIO input trigger does not send the expected message list

- The selected list must be populated. For example, if "CAN message list" is selected as the list to send, there must already be a list of messages ready to be sent within the primary "Send CAN messages" tab.
- Confirm the correct GPIO input source and the correct list are selected in the two associated drop-downs.
- Confirm message sending is **enabled** for the channel in the Hardware Configuration window and that the channel is not set to **Listen Only** or **off**.

A GPIO output does not drive the connected load

- GPIO outputs provide approximately **14mA steady state at CMOS logic levels (0V / 5V)**. This is not sufficient to directly drive relays, lamps, solenoids or other inductive or high current loads. Use an external driver, transistor stage or relay module with its own supply.
- Verify the pin itself is switching by using the **I/O Overview** tab. Toggle the output ON/OFF and measure the pin. If the pin toggles correctly but the load does not respond, it is a drive capability or wiring issue rather than a software issue.
- Confirm the load is connected to an output pin. GPIO pins 3 and 4 are the outputs.
- All GPIO pins have short circuit protection. A shorted output can appear dead until the short is removed.

GPIO states are lost, or unexpectedly retained, when the dongle is disconnected

- This is controlled by the reset check box on the I/O Triggered Control Functions tab. When selected, disconnecting the dongle from the SLSS CANAnalyser software resets all GPIO inputs and outputs to the default off setting. When it is not selected, the settings will persist as long as the dongle is powered.

GPIO triggered bus logging produces no log file

- The log file name must not be left blank. **If it is left blank the log will not be saved**
- Confirm the red record button activates when the trigger input goes "high". Logging ends and the record button stops being red once the trigger transitions to the "low" state.
- Confirm the log file format is selected from the drop-down. Use the folder button on the same tab to open the save location directly in a Windows Explorer window.
- Note that the log only runs for as long as the trigger is "high". A momentary push-button will produce a very short log. Use a latching or level-held signal for a longer session.

The GPIO status message does not appear in Incoming CAN Data or in the logfile

- Select the check box to include the GPIO status message ID, and choose the ID to be used from the drop-down list.
- Choose whether the event is logged on every I/O value change, or at a fixed receive interval. With on-change selected and a static input, no rows will appear.
- GPIO status rows are shown with the **[GPIO]** data type. If a message filter is active and that ID is hidden, the rows will not be visible. Check the Message Filtering window.
- Select a status ID that is not already present on the monitored bus, so that GPIO status rows are not confused with real bus traffic.

A Bus Triggered I/O database signal trigger never fires

- A database file must be loaded **before** the trigger conditions are selected. If no database is loaded, or if a different database file is desired, load it first and then build the condition list.
- Confirm the channel selected for the trigger matches the channel the signal is actually received on.
- Confirm the enable check box on that row is selected. An unchecked row is ignored and is not searched for a valid trigger condition.
- Review the mathematical operation (Equal / Not Equal / Less Then / Greater Than) and the trigger value. The value must be expressed consistently with the scaling and value table of the selected database signal.
- If the database file was updated after the condition list was created, the message and signal names may no longer match. Reload the database and rebuild the affected rows.

A bus triggered output fires once and then stays HIGH

- This is expected when the reset check box on that row is not enabled. Without it, each trigger is a "one shot" and the output will remain active "HIGH" for the remainder of the active session. Enable the reset check box to have the GPIO reset back to "LOW" after each trigger and be ready to be triggered again.

A Bit or Byte value trigger never matches

- Confirm the selected byte position exists within the actual DLC of the message. The DLC can be any byte position between 1 and 64.
- Confirm the CAN ID has been typed in the notation currently selected in the global data format drop-downs (Hexadecimal, Decimal or Binary).
- For a bit trigger, confirm the bit pattern is correct for the selected bit position.
- Use the Graphical Analyser Viewer or the Reverse Engineering feature tab first to confirm which byte or bit is actually changing, then build the trigger against it.
- Move the horizontal scrollbar to the right to review the operation and value columns of the Condition List that are off-screen by default.

10.8. SLSS CANData Viewer

The Graphical Analyser shows no graph in the CANData Viewer

- **The PLAY button must be pressed in the SLSS CANData Viewer or the graph will not display** This is the most common cause of an empty graph in the viewer.
- Confirm at least one byte is enabled in the byte selection area of the graph window.
- Confirm the selected ID is not being hidden by Filter 1 or Filter 2.

A file will not load into the CANData Viewer

- The native load formats are .scdf, .scdv and .rcdf.
- The supported imports are PEAK ™ .TRC V2.0 and V2.1 log files, PEAK ™ .XMT send message list files, .ASC files, CSV files previously exported from SLSS CANAnalyser, and the standalone SD logging .TXT format.
- A standalone SD .TXT file must have been recorded by the dongle's own offline logging format. A manually created or hand-edited .txt file will not load.

An imported CSV has misaligned columns or split data

- The CSV delimiter used at import must match the delimiter the file was written with. Ensure to select the correct delimiter character under the Settings menu before importing.
- CAN data may contain ASCII characters that conflict with a comma, which is why the delimiter is configurable on export as well. Check which delimiter was used when the file was exported.

An imported .XMT or .ASC file cannot be used in the main software

- Imported data appears on the "Additional data" tab of the viewer and must be converted first. Import the file, press the Save button, then choose the desired native SLSS CANAnalyser format and enter the file name. The converted native file can then be loaded in the main software.

The playback button in the CANData Viewer does not put data on the bus

- The playback CAN button in the viewer is a **future application** for playing recorded data back onto the live bus and is not yet functional.
- To play a recorded log back to a live bus today, use **Standalone Bus Playback** in the micro-SD Card window on a **Lab CAN Pro** module.

No human readable signal names or Designations are shown

- Load the database file with the load database file button, then press the last button in the feature button row to go through the loaded data rows and enhance them with the loaded database file data.
- Confirm the loaded DBC or LDF actually matches the data being viewed, and that it is applied to the correct channel.
- Alternatively, data that was enhanced in the main software before saving or exporting already contains the Designation and the list of human readable signals.

Messages are missing from the CANData Viewer

- Check the channel selector. The view can be set to CH_A only, CH_B only, or both channels.
- Filter 1 and Filter 2 are two independent layers of filtering and both remain applied. Right click on the filter list and select "Select all" to restore all messages.
- The advanced filter button in the viewer operates identically to the filter button in the main software. Check its settings as well.

The data search finds nothing

- Check the case matching icon beside the search field.
- Confirm the search text matches the currently selected display format for the ID and byte data (HEX, DEC or BINARY).

The CANData Viewer is slow or unresponsive with large files

- Large logs take longer to load, filter and export. See the section titled "PC System resources" for memory and CPU guidance, and note that the larger the log buffer, the longer it takes to save the exported data.
- For very large standalone SD logs, transfer the file with a card reader instead of downloading it over the USB connection.

11. Appendix / References

PEAK ™ .TRC V2.0 and V2.1 formats supported from **PEAK** ™ through their **PCAN** © software. https://register.dpma.de/DPMAregister/marke/register/397181558/DE