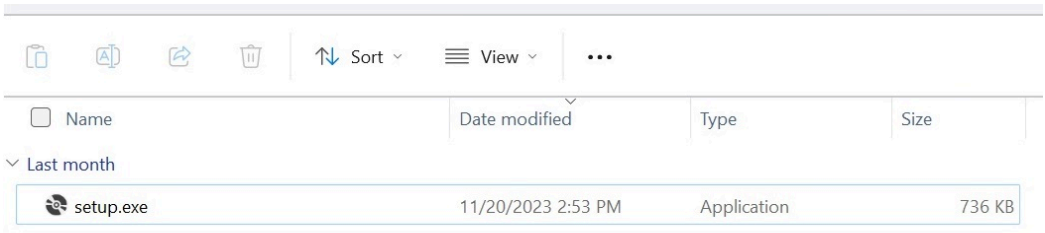
SLSS CANAnalyser

Quick Start Guide

Based on software version 1.2.0.0L

1. Installation of the Windows Software "SLSS CANAnalyser"

1. In the folder where you downloaded the SLSS CANAnalyser installation ZIP file, unzip it into a new directory.
2. Run the "setup.exe" contained therein.



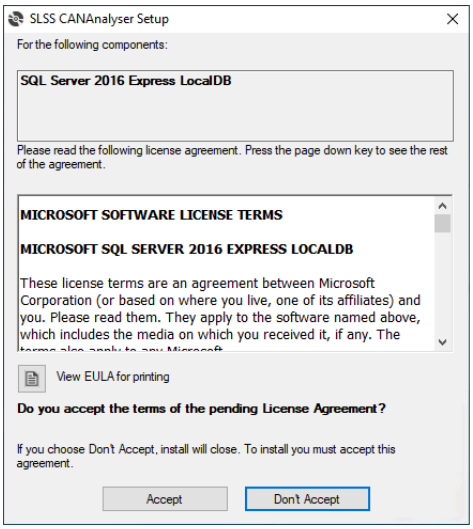
Run setup.exe

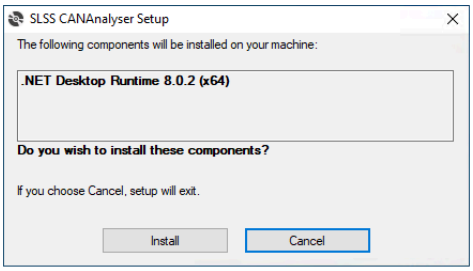
3. Follow the Windows Installer instructions and install the SLSS CANAnalyser on your local hard drive.

> Due to the TCP/IP interface included for communication with external add-ons, you need "administrator rights" to be able to install the software!

4. Ensure that all checkboxes are selected to install all the features of the software

> If the installer asks you to install additional dependencies (eg .Net Runtime or SQL Server), please also carry out these installations.

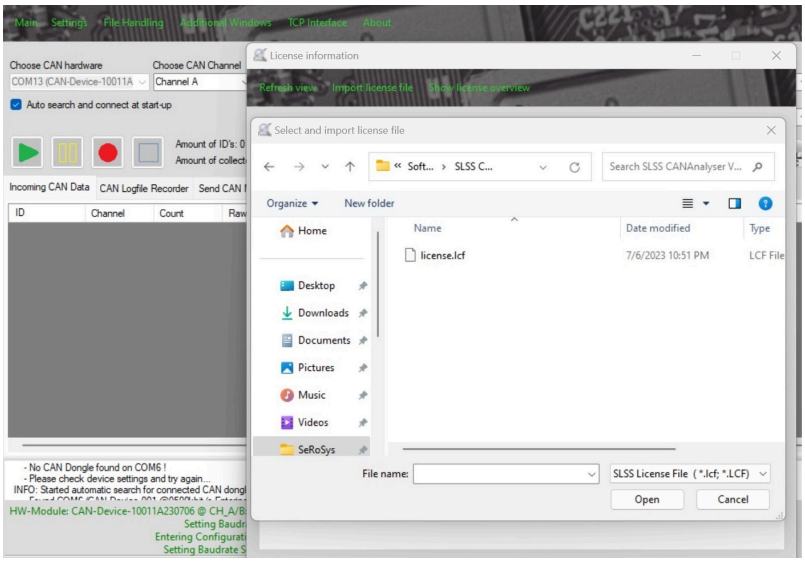




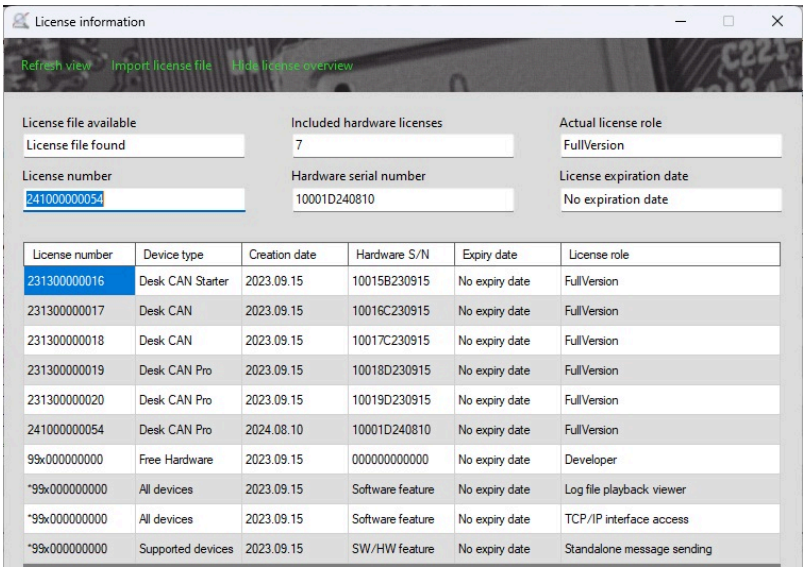
5. Once the installation process has been successfully completed, you will find a corresponding entry in the start menu and a desktop shortcut with which the software can be started. This completes the installation process of the SLSS CANAnalyser and the software is ready for use!

2. Activating your License File!

1. **After the installation process is complete and you run the SW the first time, you will need to enter your license key information. Please follow the instructions carefully.**
2. In the top menu bar of the SLSS CANAnalyser software, go to **"About"** and then **"License Information"**.
3. In the new window that opens, select "Import license file" from the top menu items and then navigate to the location with your .lcf license file.



4. After the license file is imported, it will restart the SW and then your license will be active for your professional version.
5. To verify your license information, open the "License Information" window again and you can view it to see what features / hardware / serial numbers are active



License number	Device type	Creation date	Hardware S/N	Expiry date	License role
231300000016	Desk CAN Starter	2023.09.15	10015B230915	No expiry date	FullVersion
231300000017	Desk CAN	2023.09.15	10016C230915	No expiry date	FullVersion
231300000018	Desk CAN	2023.09.15	10017C230915	No expiry date	FullVersion
231300000019	Desk CAN Pro	2023.09.15	10018D230915	No expiry date	FullVersion
231300000020	Desk CAN Pro	2023.09.15	10019D230915	No expiry date	FullVersion
241000000054	Desk CAN Pro	2024.08.10	10001D240810	No expiry date	FullVersion
99x000000000	Free Hardware	2023.09.15	000000000000	No expiry date	Developer
*99x000000000	All devices	2023.09.15	Software feature	No expiry date	Log file playback viewer
*99x000000000	All devices	2023.09.15	Software feature	No expiry date	TCP/IP interface access
*99x000000000	Supported devices	2023.09.15	SW/HW feature	No expiry date	Standalone message sending

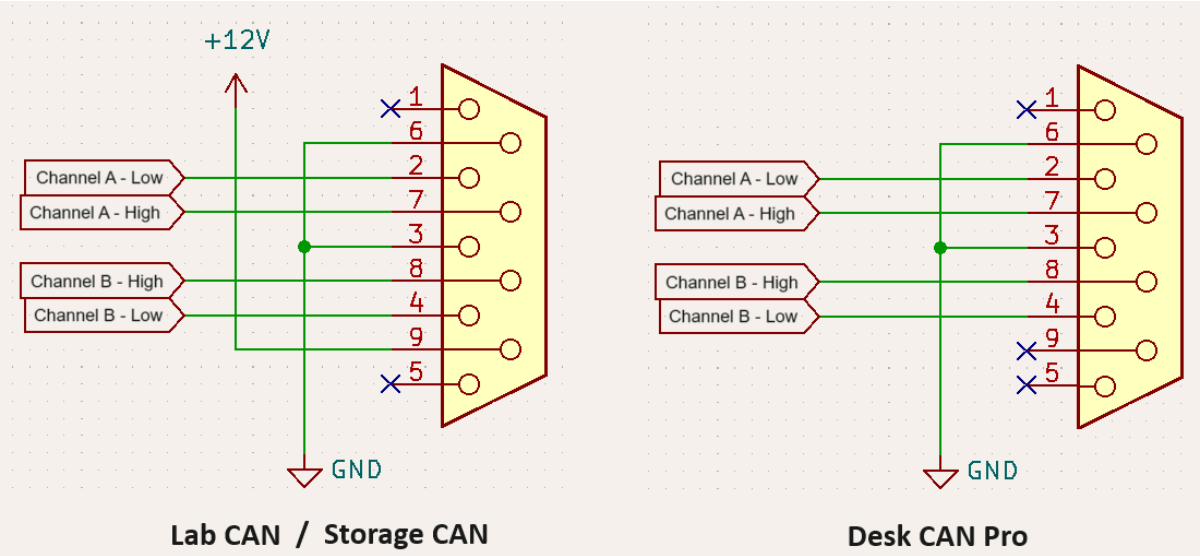
Failure to install a valid license or match a valid serial number from your hardware module will prevent access to the Pro features and only provide access to the free trial version.

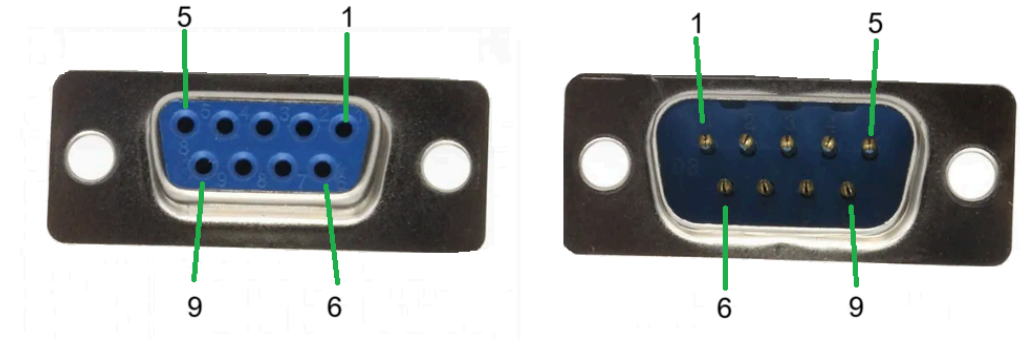
3. Connect the Dongle

You must use a USB2.0 compatible cable with the CANAnalyser dongles, not a charge-only USB cable.

3.1. DB9 (D-sub9) Connector Pinout

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.





Power

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

Ground

- Ground pins are all connected internally

CAN Bus High / Low

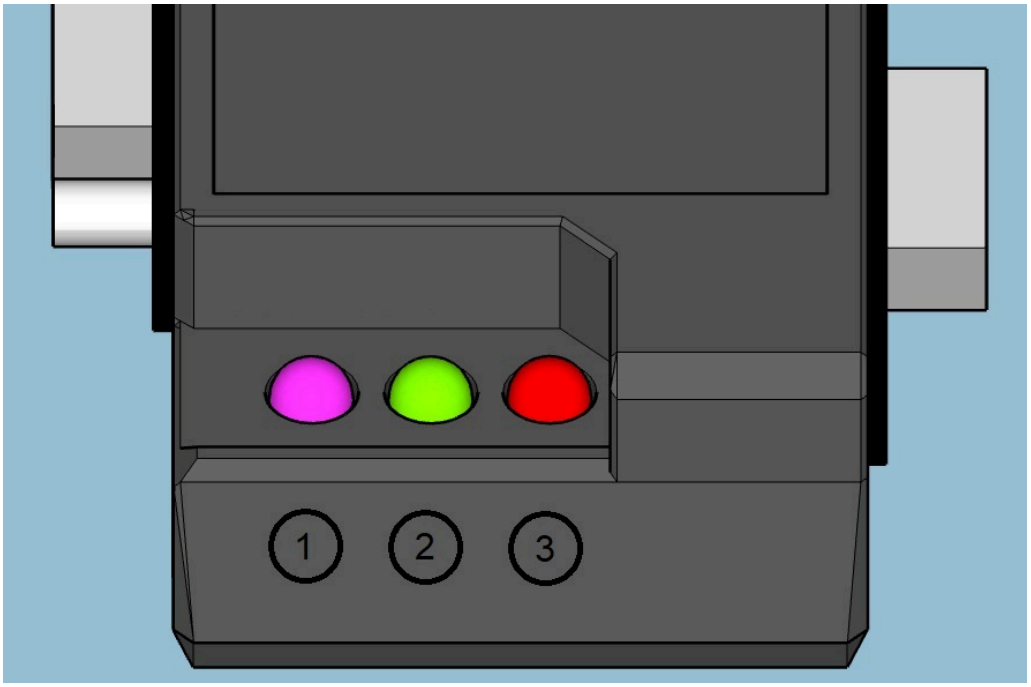
- Even though the differential CAN Bus high and low pins do not require a ground reference, it is recommended that ground is carried with these pins for common-mode voltage rejection to avoid potential damage to the transceivers

3.2. 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.

3.3. Understanding the LEDs on the CAN Dongles



3.3.1. 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

3.3.2. 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

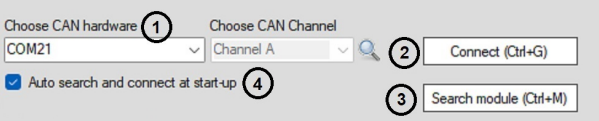
4. SLSS CANAnalyser Software

4.1. Establishing the Connection Between Software and CAN Dongle

4.1.1. 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 if 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

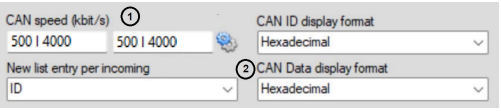
3. Select the Search Module button and let the software automatically search through the available COM ports to find your hardware dongle. If if finds the hardware and connects to it, the hardware connection LED will begin blinking purple. If it does not find it, ensure the proper USB driver has been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

Automatically searching for 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.

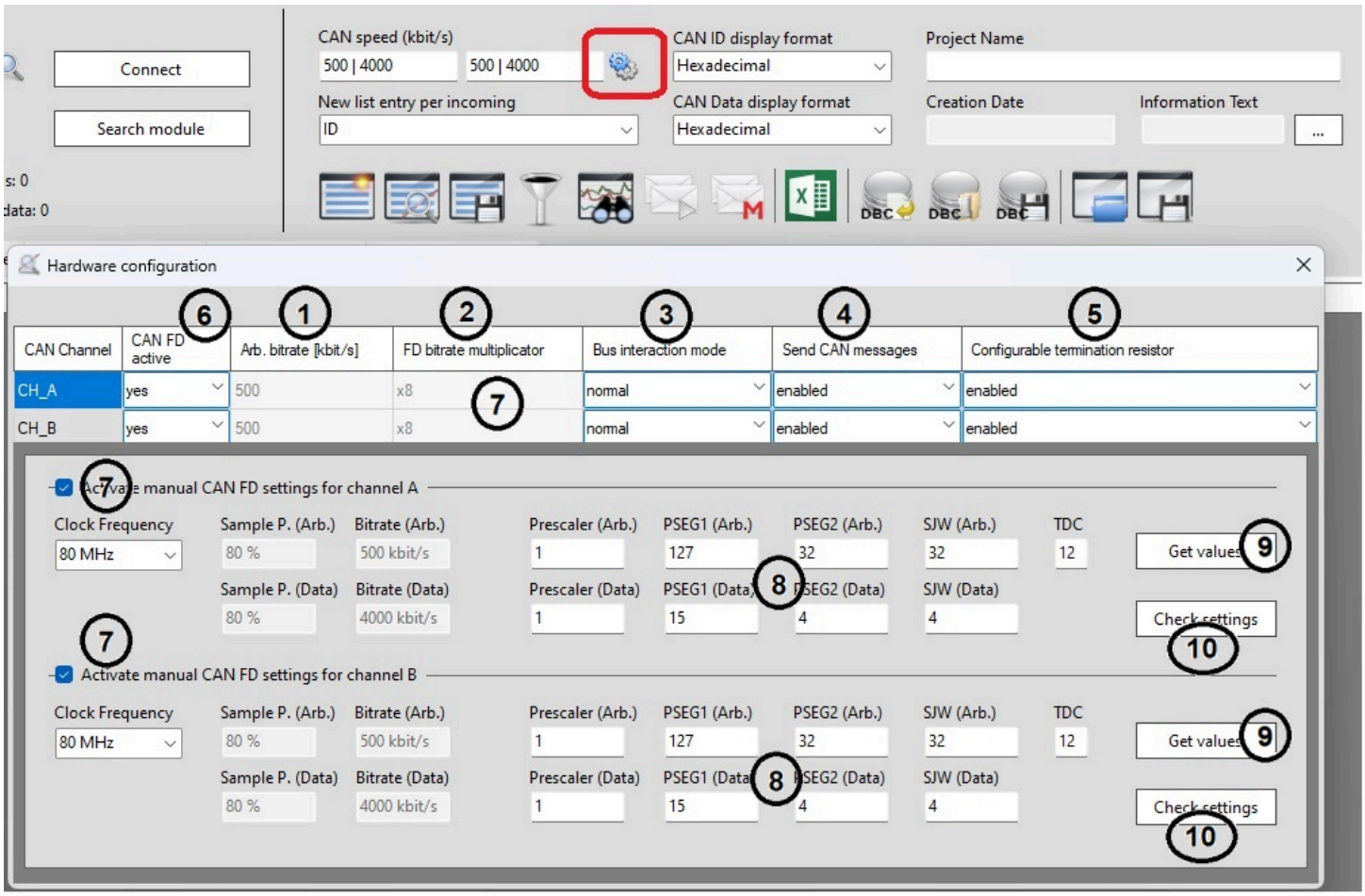
> Automatically searching for the dongle may take up to 10 seconds. Direct connect is always faster by selecting the COM port from the drop-down.

4.1.2. Connection Speed, Connection Mode and List Entry Style



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

4.1.3. 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.

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

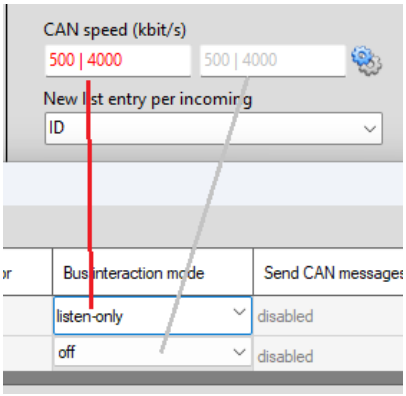
2. For standard ISO CAN FD setup, select the FD bitrate multiplicator. They are able to be independently set for each channel.

> 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

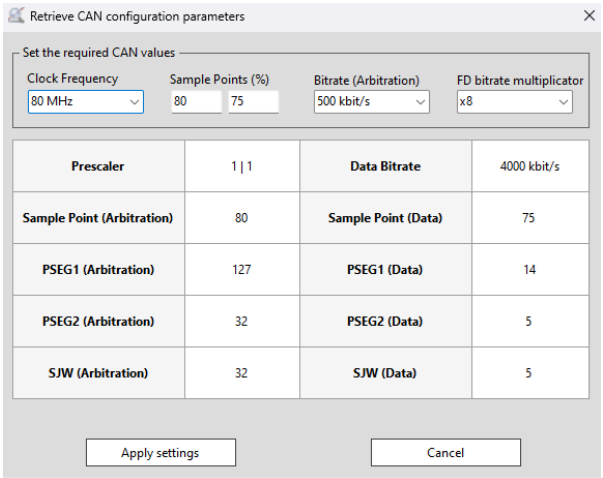
When selecting "Listen-only", the CAN speed will be indicated in red color. When selecting "off", the CAN speed will be indicated in grey color.



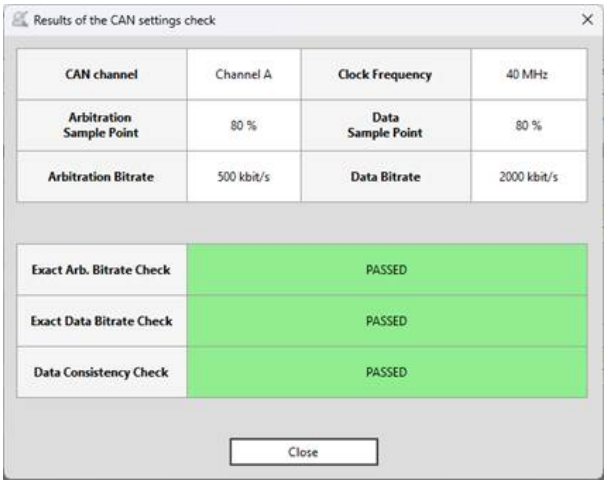
4. Choose to enable or disable message sending from the drop-down menu. This allows the user to lock out or enable each CAN channel from being able to send messages or not. If these are disabled, the Send CAN Messages Tab will not be functional
5. The drop-down menu allows a SW configurable option for 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

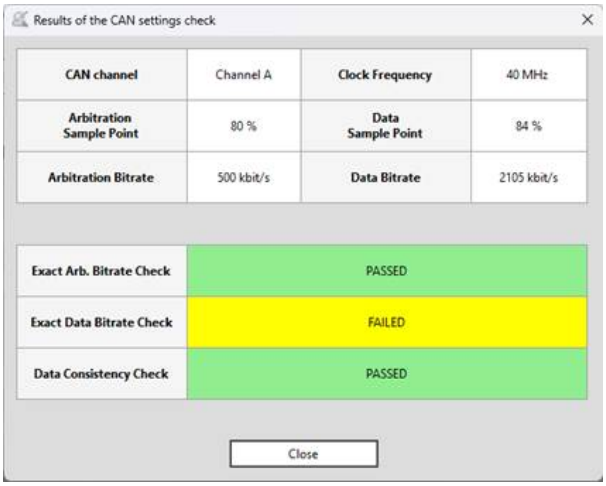
For CAN FD, settings can be very critical and sensitive. This will help to provide many options from generic settings to very custom settings to customize the connection flexibility.

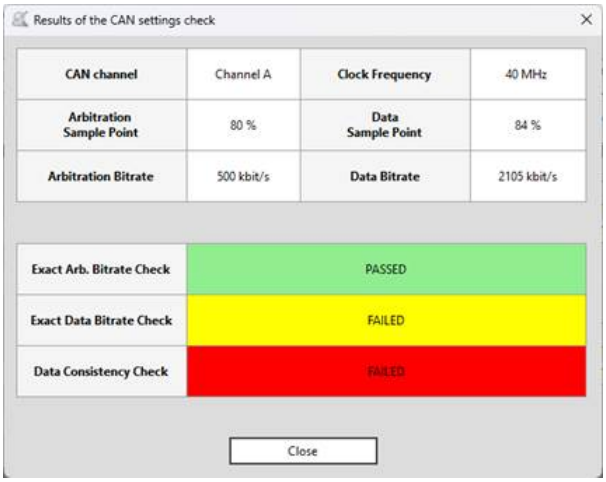
8. The values of all the critical CAN FD connection parameters may be manually set here. It is recommended to consult with a CAN FD bitrate calculator for best results
9. Selecting the **Get Values** button will open up a window to do the value calculations automatically based on a few user selectable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

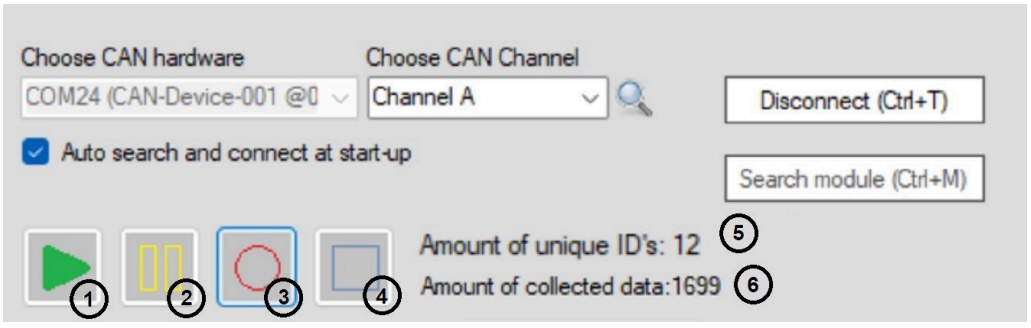






4.2. Controlling Recording / Displaying of CAN Traffic

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

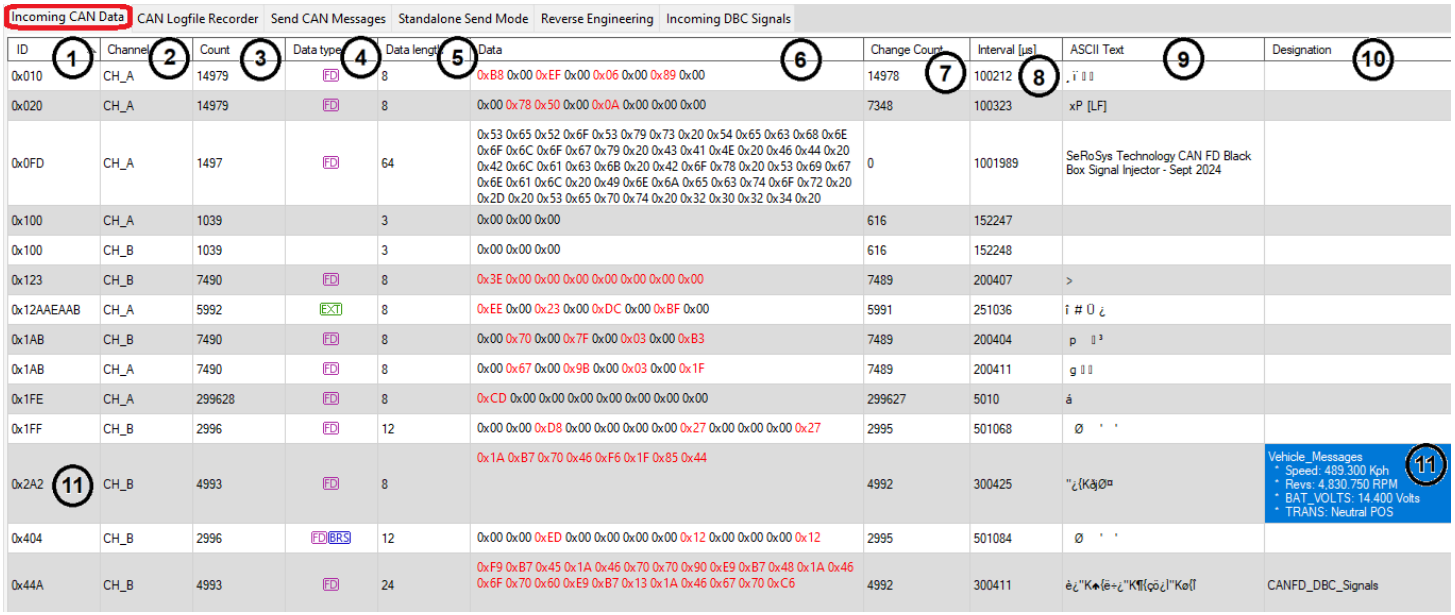
4. The **Stop** button is used to stop the display and recording of CAN message data
5. This displays the number of unique CAN arbitration ID's seen on the incoming data bus (regardless of which channel it is on)
6. This displays the total quantity of messages received (for all channels)

4.3. 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

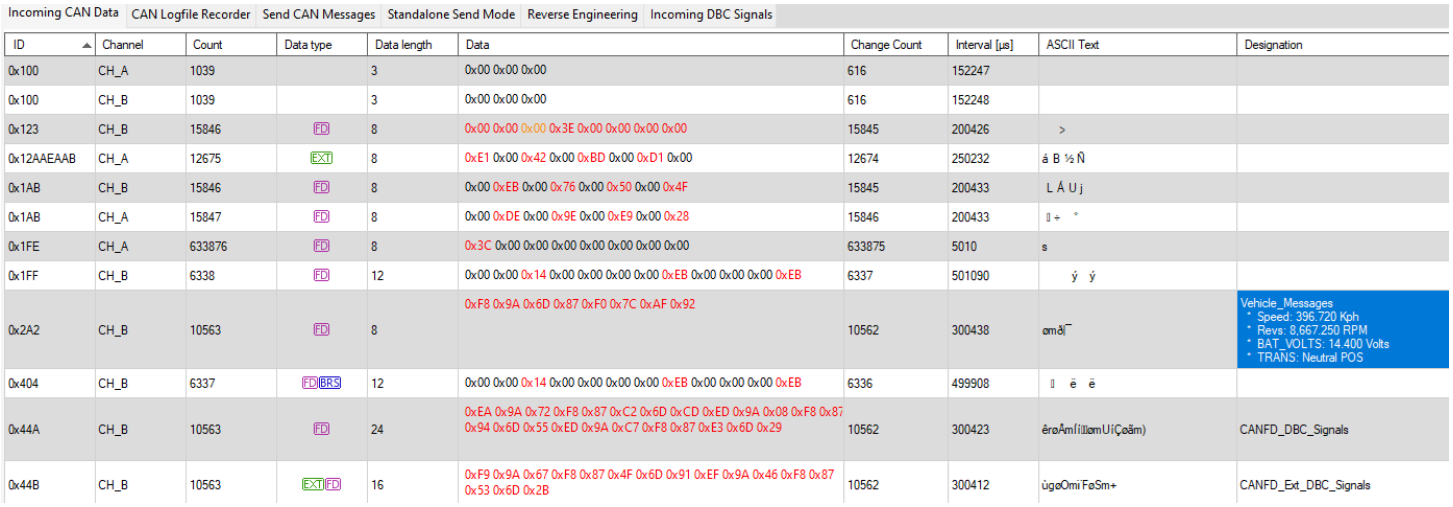
3. **Count** - The count of how many times the CAN ID was sent or received, regardless if there was any change in Byte data
4. **Data type** - This is the type of data for this row. **If this field is blank then the message is a CAN 2.0 format**

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

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:

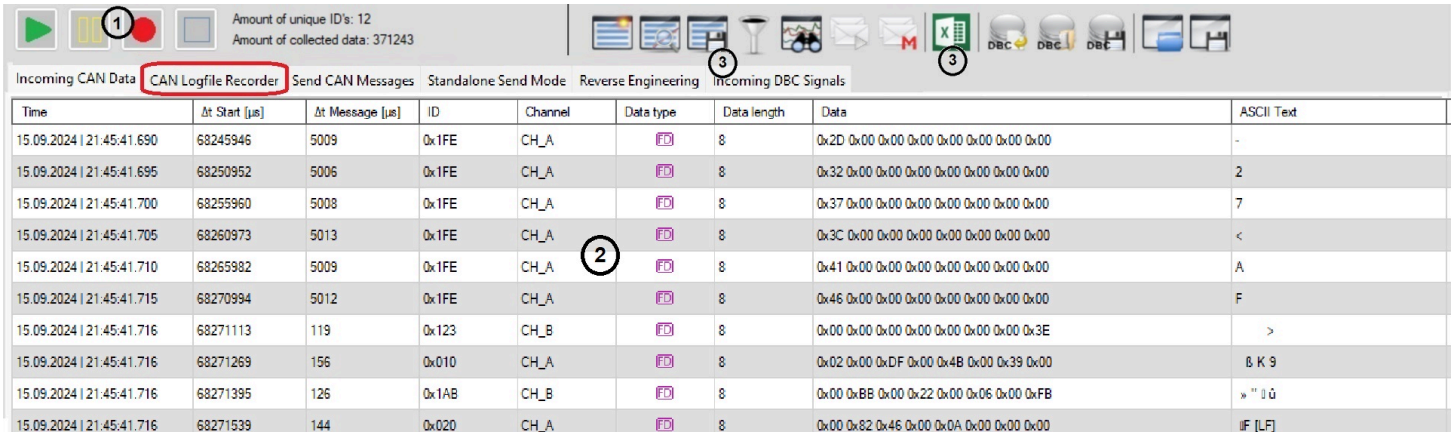
[CR] = carriage return
[LF] = line feed
[SC] = semicolon

10. **Designation** - Human readable message name of the CAN ID. *This only populates if a valid CAN DBC has been loaded*
11. If a valid CAN DBC 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)



4.4. 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.

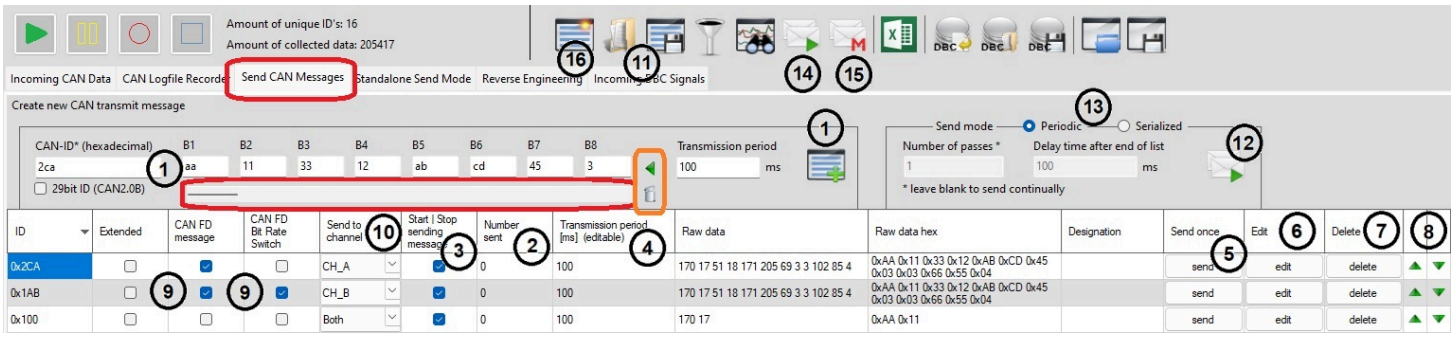


Time	Δt Start [µs]	Δt Message [µs]	ID	Channel	Data type	Data length	Data	ASCII Text
15.09.2024 I 21:45:41.690	68245946	5009	0x1FE	CH_A	FD	8	0x2D 0x00 0x00 0x00 0x00 0x00 0x00 0x00	-
15.09.2024 I 21:45:41.695	68250952	5006	0x1FE	CH_A	FD	8	0x32 0x00 0x00 0x00 0x00 0x00 0x00 0x00	2
15.09.2024 I 21:45:41.700	68255960	5008	0x1FE	CH_A	FD	8	0x37 0x00 0x00 0x00 0x00 0x00 0x00 0x00	7
15.09.2024 I 21:45:41.705	68260973	5013	0x1FE	CH_A	FD	8	0x3C 0x00 0x00 0x00 0x00 0x00 0x00 0x00	<
15.09.2024 I 21:45:41.710	68265982	5009	0x1FE	CH_A	FD	8	0x41 0x00 0x00 0x00 0x00 0x00 0x00 0x00	A
15.09.2024 I 21:45:41.715	68270994	5012	0x1FE	CH_A	FD	8	0x46 0x00 0x00 0x00 0x00 0x00 0x00 0x00	F
15.09.2024 I 21:45:41.716	68271113	119	0x123	CH_B	FD	8	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x3E	>
15.09.2024 I 21:45:41.716	68271269	156	0x010	CH_A	FD	8	0x02 0x00 0xDF 0x00 0x4B 0x00 0x39 0x00	ß K 9
15.09.2024 I 21:45:41.716	68271395	126	0x1AB	CH_B	FD	8	0x00 0xBB 0x00 0x22 0x00 0x06 0x00 0xFB	» " û
15.09.2024 I 21:45:41.716	68271539	144	0x020	CH_A	FD	8	0x00 0x82 0x46 0x00 0x0A 0x00 0x00 0x00	‚F [LF]

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 in the export format of the CANAnalyser SW (to be able to be loaded again) or as an export for external data analysis in either Excel or CSV formats.

4.5. 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.

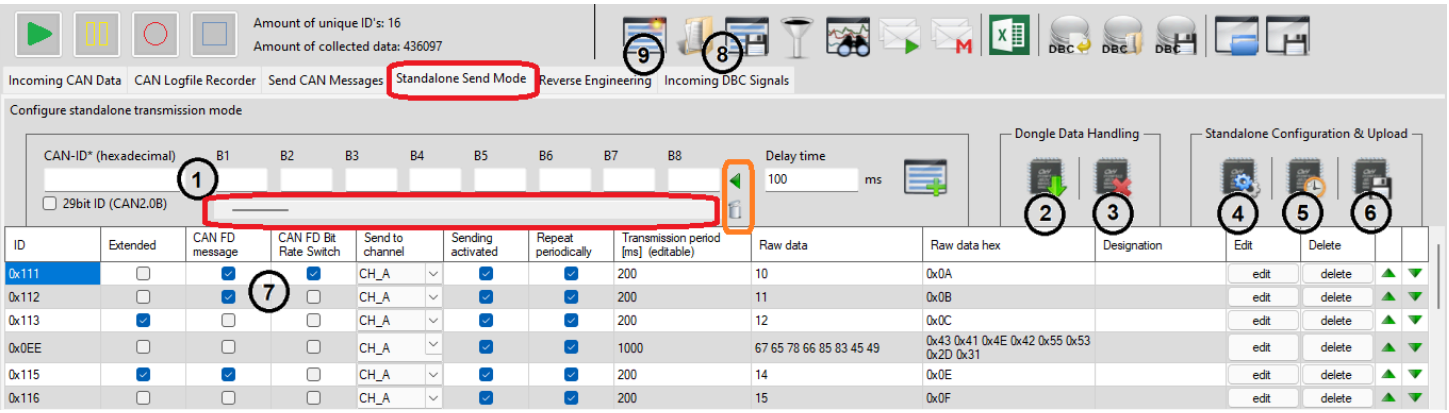


1. Enter the ID and the byte data that is desired to be added to the send list. Only 8 bytes are displayed at a time. For a CAN FD message, use the scroll (red highlight above) to move through all 64 bytes. To jump back to B1, press the green arrow (orange highlight above). To delete all byte entries, 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
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
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 sending button works 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 grey, 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

4.6. 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).
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 stand alone 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.
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.
9. This button will erase the entire send list