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CAN3 Simulator

User Manual V2.10

Installation
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Preliminary

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1. Preface

This document describes the control and features of the ***CAN3 Simulator*** to simulate CAN Node Message signals on to a CAN network.

2. Introduction

This ***CAN3 Simulator*** for CAN Node Message simulation is an integral part of the CAN3 package to assist in the design and implementation of ECU connecting to the CAN Network.

With the absent of other suppliers' ECU modules, it is difficult to carried out parallel development- design & implementation of a CAN based ECU module to function properly prior to the system integration; thus it is essential for the message signals of other ECUs be simulated i.e bench tested vigorously with normal and abnormal signals for function conformity.

We understand that fast access to a repeatable simulation data is crucial to the responsible personnel to carry out the duty; henceforth this ***CAN3 Simulator*** removes the time consuming task of writing programming or scripting codes, i.e. user doesn't require to have software programming skill to use this ***CAN3 Simulator***. User simply import the CAN Node Message Data (INI) file- generated by the ***CAN3 Writer***; each message signal then is ready for simulation with adjustable controls. It is quick and simple; a huge saving of time and money.

Traditionally, building a dedicated analysis and software tool for each individual project can be costly and time consuming for developers. Also some leading CAN Bus Solution provider charge noblest price; which put a heavy weight on the development cost.

CAN3 Simulator is FREE of licence fee; all-rounded development tools to support multi CAN Node Message Simulation, which suitable from Network Design to Development & Testing Stages throughout the process of R&D cycle.

3. System Requirement and Installation

3.1. System Requirement

- CPU Speed: Pentium 1.6GHz minimum or equivalent or higher.
- Memory: 512MB Memory or above
- Connectivity: USB Port or PCI Slot or PCI Express Slot on the PC for Kvaser CAN Product Range

All Kvaser CAN Device are required to have firmware version 1.9 or above and Kvaser System Driver for Windows V5.12.0 or above; which can be downloaded from http://www.kvaser.com/downloads/. Also please ensure "Microsoft Visual C++ 2010 x86 Redistributable" is installed; following link provides more details: https://www.microsoft.com/en-au/download/details.aspx?id=1639

Note: For Laptop user, please ensure the laptop is main power and not using battery power, this is because when Laptop is using battery power its operating speed will be greatly reduced and the performance will not at its best.

3.2. Operating System Requirement

The CAN3 Simulator supports the followings Operating System:

- Windows 2000
- Windows XP 32-bits
- Windows Vista 32-bits
- Windows 7 64/32-bits
- Windows 8 64/32-bits

CAN3 Simulator requires Microsoft .NET Framework Version 3.5 be installed. For more information about this, you can visit http://www.microsoft.com/downloads/en/default.aspx Search for the key words ***.NET Framework 3.5.*** This .Net Framework 3.5 covers .Net Framework 2.0 & 3.0.

3.3. Installation

To install ***CAN3 Simulator*** simply clicks ***Setup.exe*** and follows the instruction given on the screen.

The ***CAN3 Simulator*** will be installed into the ***Start Menu*** under the ***CAN3 Utility*** folder.

4. Starting up

4.1. Start CAN3 Simulator

To start the application, Go to ***Start Menu →All Programs →CAN3 Utility*** Folder; click ***CAN3 Simulator***. Once the application is started, a Device Configuration Window will be popped up. User can modify the followings Configuration of the CAN Device:

- Choose available CAN Device (See section 4.2 below)
- Baud rate
- Sampling Point
- SJW (Synchronise Jump Width)

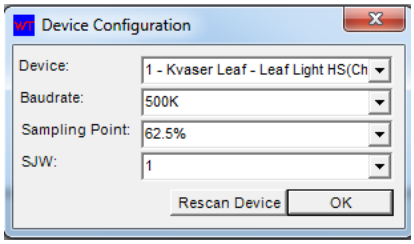


Figure 1: Device Configuration

After ***OK*** button has been clicked, the setting will be memorised. User can change the device setting by clicking the ***Device Configure*** on the top menu bar.

Note:

a) User can only adjust the device configure when the device is in ***Offline*** Status. ***Device Configuration*** is not available during ***Online*** Status.
b) ***CAN3 Monitor*** and ***CAN3 Simulator*** can share one Leaf Light device.

4.2. USB & PCI type devices

There are basically two type of connecting devices from Kvaser, namely the USB and PCI. The USB device would have the Key enabled by the supplier upon purchased and is transparent to the user;

whilst the PCI would require user to manually import the Access key that is provided by the supplier. Following example shows the procedures for importing the Access Key for PCI devices:

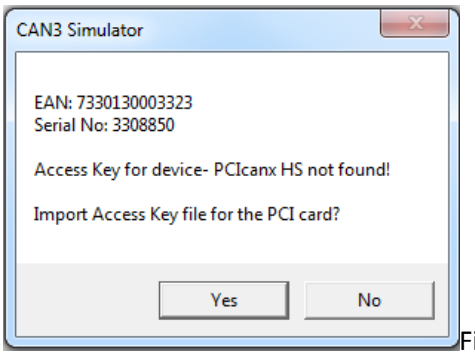


Figure 2: Example of prompt message for missing Access Keyshows the example of screen display when a PCI device is selected with a missing Access Key. User has the option to import the Access Key or to abandon the operation.

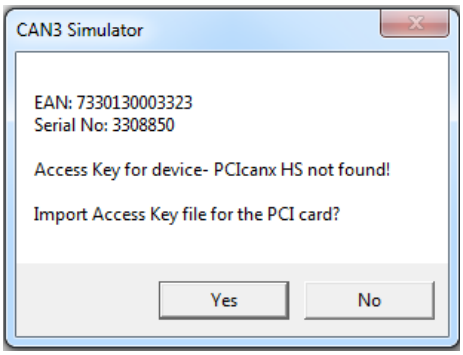


Figure 2: Example of prompt message for missing Access Key

After clicking the "Yes" button, a new screen will pop up for user to provide the location of the Access Key file that was provided by the supplier. After the Access Key file has been selected, click "Open" button to complete the operation. Please note that once the valid Access Key file has been provided, it will not ask for it again.

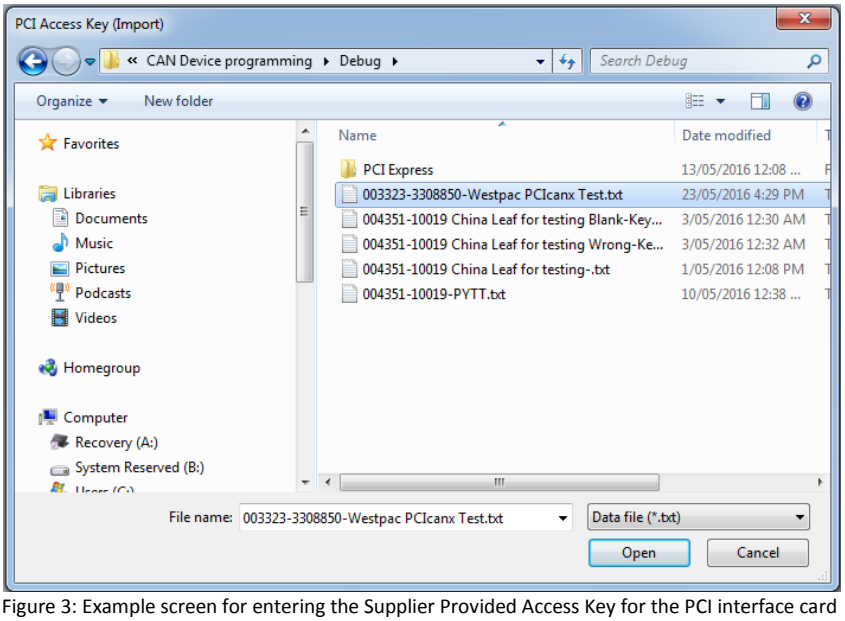


Figure 3: Example screen for entering the Supplier Provided Access Key for the PCI interface card

5. Load Parameter Data File

The parameter Data File contains the entire CAN Node Messages Information which the application is going to simulate.

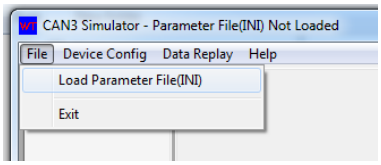


Figure 4: Load Parameter (INI) file

Base on the Information from the Parameter Data File, CAN Message Data and User Interface will be generated. For more information about how to prepare the Initialize Data File, please see the ***CAN3 Writer*** User Manual for details.

At the top menu bar click ***File → Load Parameter (INI) File,*** an open file dialog will be popped up (like the example in Figure 4) and user can choose the Data Parameter File for simulation here.

Once the Parameter Data File has been successfully loaded, details of the CAN Messages and its signal will be shown. See Figure 5

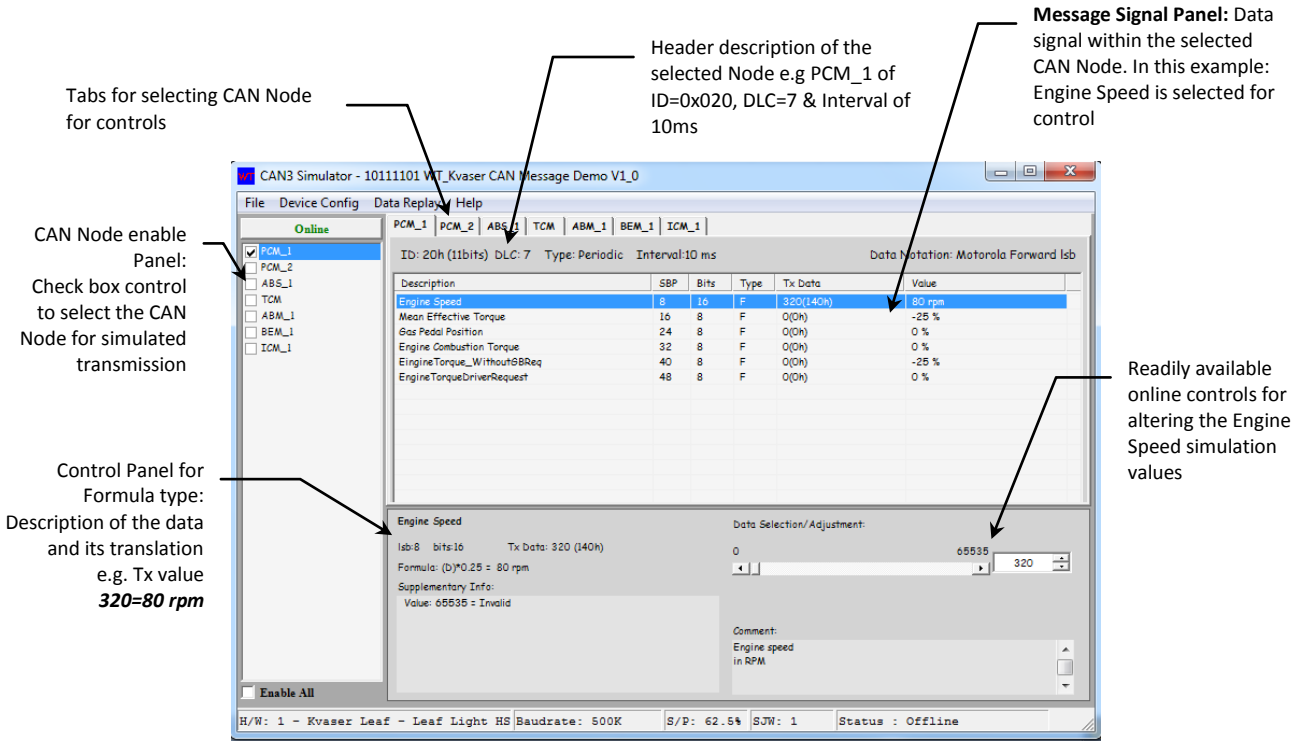


Figure 5: Loaded Parameter Data (INI) file

6. CAN Node Message Simulation

The operation for the simulation can be separated into 3 areas as follows:

- CAN Node Message Simulated Transmission
- CAN Node Message Information Overview
- Message Signal Data Selection and Adjustment controls for simulation

6.1. CAN Node Message Transmission

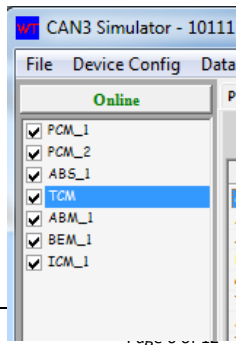


Figure 6: Online button & CAN Node selection checkbox

In this section, user can click the ***Online/Offline*** Button- See Figure 6, to enable/disable the connection of Kvaser's CAN interface device to the CAN Network.

Once ***CAN3 Simulator*** is online, the CAN node with the check-box checked will be transmitted automatically in accordance to the setting proided in the Parameter Data (INI) file[1]; i.e. CAN Node ID, Interval time, etc. In the example of Figure 6, all 7 CAN nodes are selected and thus they are Simulation active.

6.2. CAN Node Message Information Overview

Please refer to Figure 5 as reference to the following discussion.

The entire CAN Nodes are available for selection as a TAB button at the top of the information screen. Figure 7 shows the selection of PCM_1 and showing its header details.

Figure 7: TAB buttons to select CAN Node simulation

Upon the CAN Node is selected; the entire message signal with its data position & start-up value will be shown in the Message Signal Panel. See example in Figure 8.

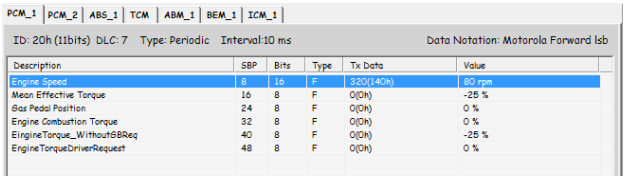


Figure 8: Message Signal Panel with the selected CAN Node

To view the full detail of the particular signal in Figure 8; simple click the desired signal and the details will be displayed in the Control Panel. Figure 10: shows the example of the Engine Speed Signal and its simulation controls.

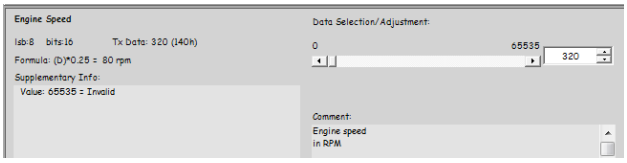


Figure 9: Control Panel for Formula Type

6.3. Message Signal Data Selection and Adjustment controls for simulation

Further to the discussion in section 6.2 above; when a particular signal is selected; the control panel for the selected signal will exhibit the control media associate to the data type that is defined. In the example shown in Figure 11, the data type for Engine Speed is defined as Formulae; thus a scroll-bar and text box is available for user to change the simulation value in a simple and direct way.

The adjusted value will be transmitted immediately on the next interval and its interpreted value that the human can understand will also be shown. E.g. In Figure 12, the transmit value is 320 with the formula of divided by 4, it displays the interpreted Engine Speed of 80 rpm

7. Control media for simulation values

Subject to the data type defined for the message signal, the appropriate control media will be shown in the Control Panel for Simulation usage. Following describes the type of media usage:

- Scroll Bar: User can move the scroll bar to adjust the data value.

[1] ***CAN3 Writer*** is the editing tool for the Parameter Data (INI) file

- Drop-Down List: A list of options base of the configuration from the Initialize Data File will be available in a drop down list for user to choose.
- Check Box: A check box control will adjust the bit position value (0/1). When the box is checked, it represent the value is 1 in that bit position. When the box is un-checked, it represent the value is 0 in that bit position.
- Text box: Direct entry of the simulation value

Following examples illustrate the control media available for the selected Data Type:

7.1. Example of Control Panel for Value- Type (V)

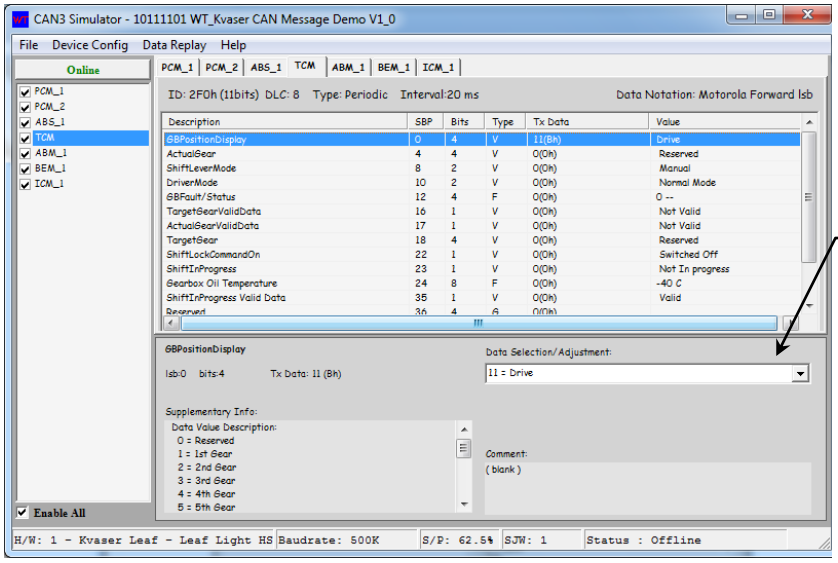


Figure 13: Example of Control Panel for Value-Type (V)

7.2. Example of Control Panel for Formula- Type (F)

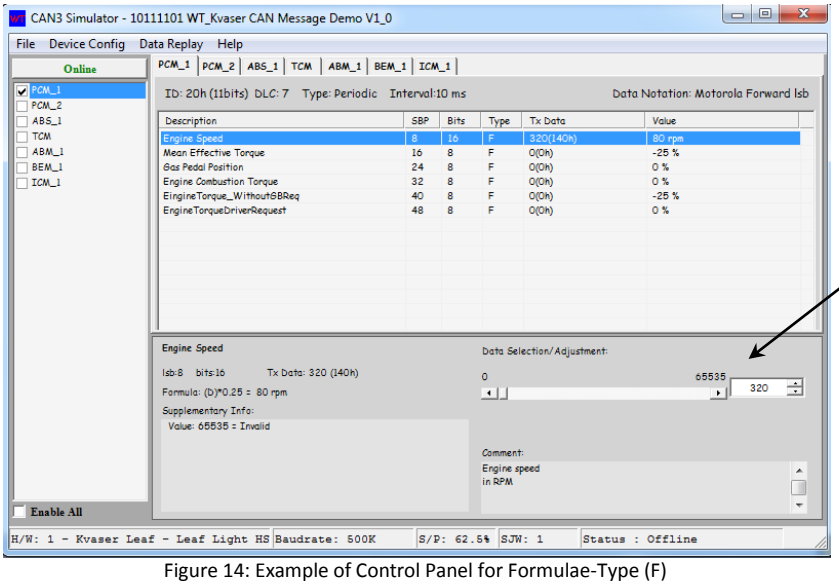
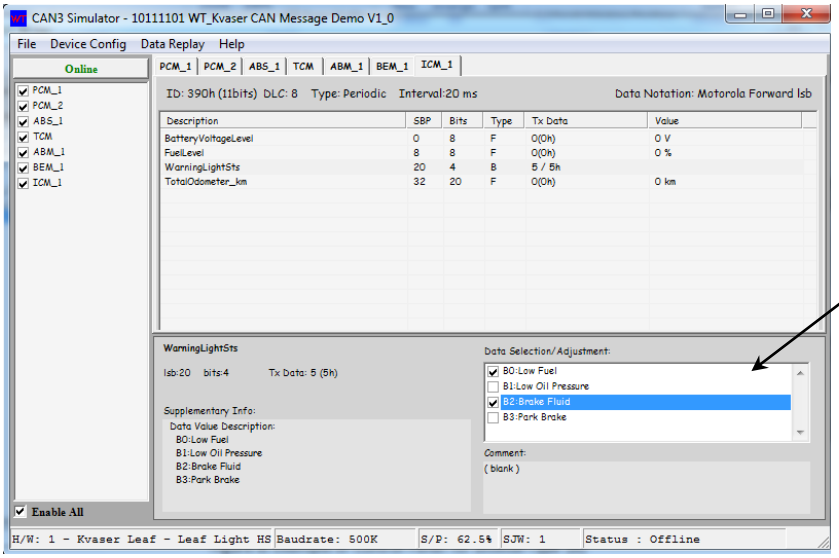


Figure 14: Example of Control Panel for Formulae-Type (F)

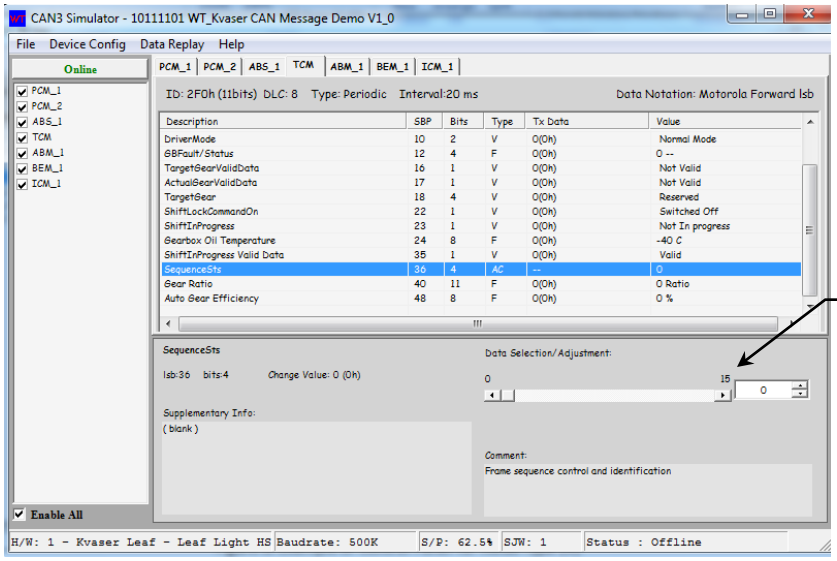
7.3. Example of Control Panel for Bitwise- Type (B)



Check-Box for the bit status to be simulated

Figure 15: Example of Control Panel for Bitwise-Type (B)

7.4. Example of Control Panel for Alive Counter- Type (AC)



The Slide-Bar and text box to set the increment value to be added on each succession of transmit message frames

Figure 16: Example of Control Panel for Alive Counter-Type (AC)

7.5. Example of Control Panel for Rolling Counter- Type (RC)

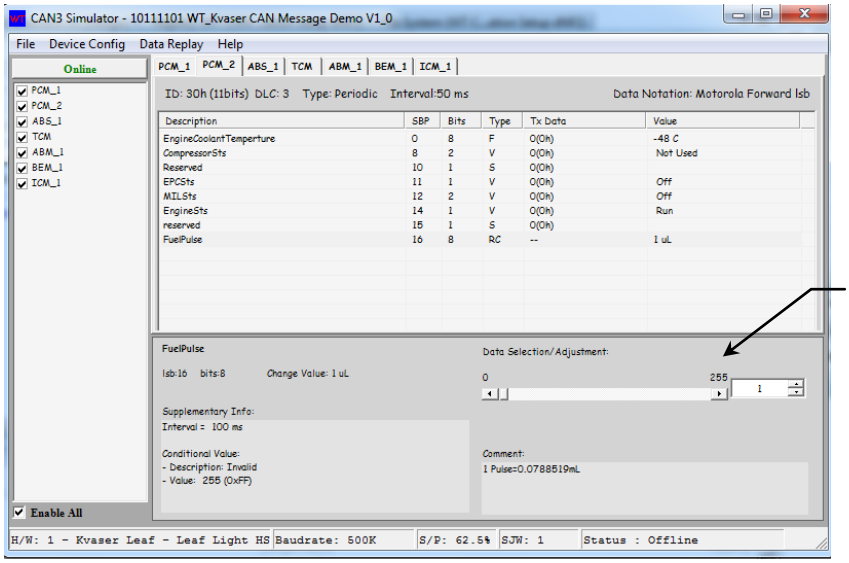


Figure 17: Example of Control Panel for Rolling Counter-Type (RC)

Note: The different between the Rolling Counter and the Alive Counter is that Rolling Counter has a conditional value shown as ***Supplementary Info*** i.e. 255= Invalid or 200=Max; when the increment value exceed the set condition, it roll over from zero.

For Example if the condition is set to 100=Max with increment value of 1, its counting would be 0, 1, …., 98, 99, 0, 1, …., and so on.

7.6. Example of Control Panel for General Type (G)

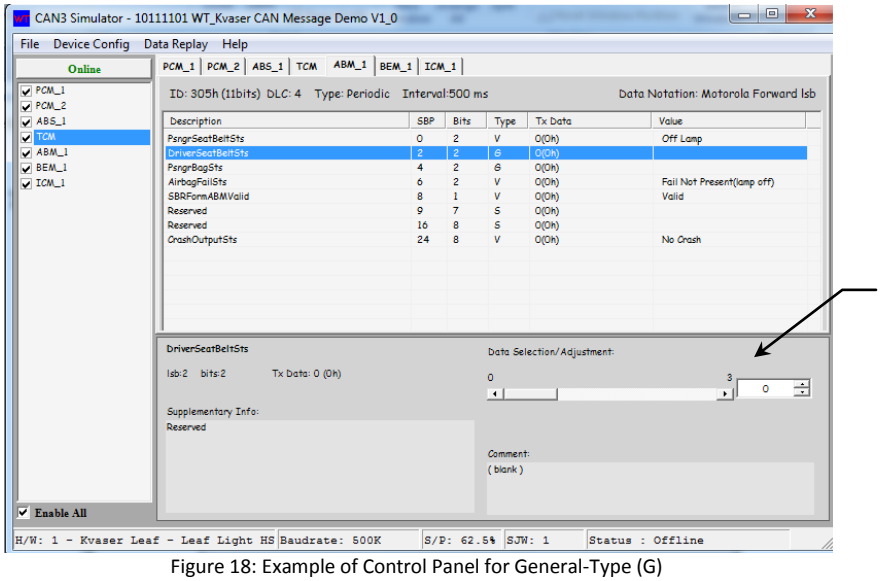


Figure 18: Example of Control Panel for General-Type (G)

7.7. Example of Control Panel for Spare- Type (S)

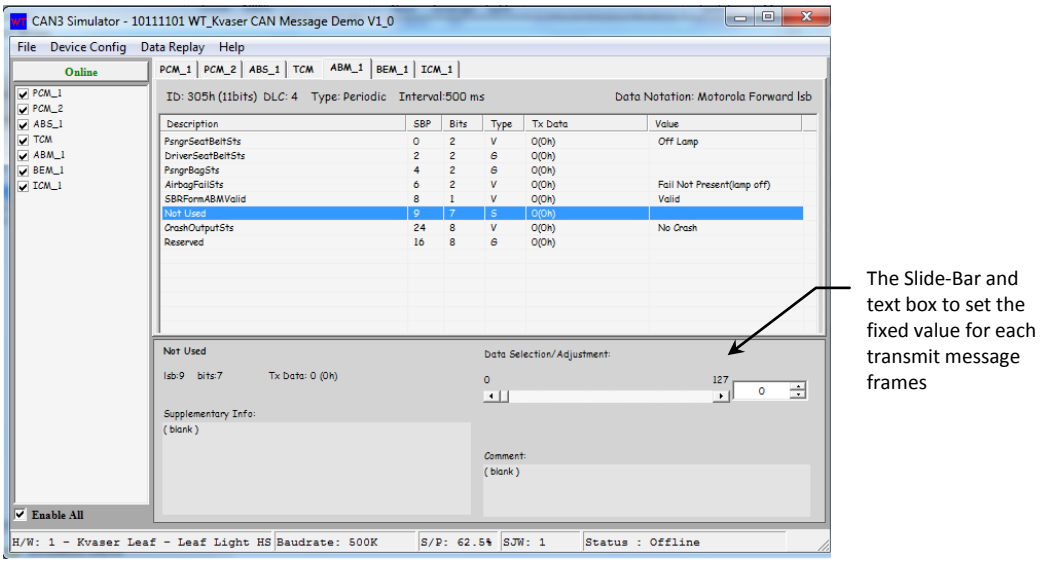


Figure 19: Example of Control Panel for Spare-Type (S)

8. Data Replay Feature

This feature is included especially useful for troubleshooting field problems. Often the field problem is difficult to analyst at the remote site- where resources are limited; the practical way to analyst the root caused to this type of problem would be by repeating the data on bench testing.

To replay the field problem, it requires the CAN Node Message in question be recorded, it can be done by using recording feature in the CAN3 ***Monitor*** and then imported into ***CAN3 Simulator*** to replay the recorded CAN Node Messages; the replay can be repeated until the fault is identified and fixed.

The illustrations below show the controls to activate and operate this ***Data Replay*** feature.

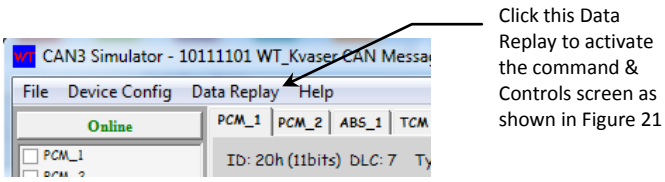


Figure 21: Menu option for ***Data Replay*** selection

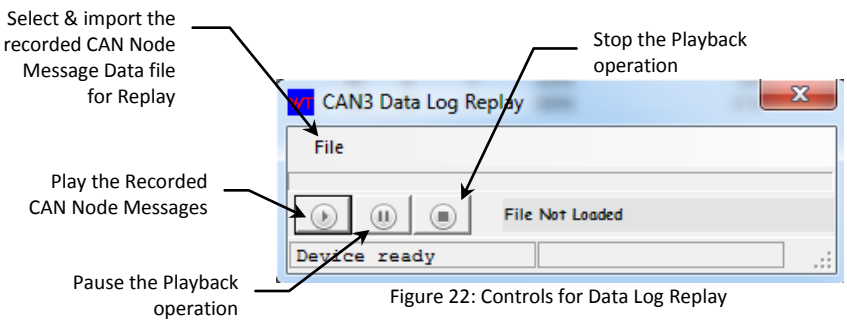


Figure 22: Controls for Data Log Replay

9. Revision History

Version	Date	Description	Edited by
1.00	10.10.21	First Draft	
1.01	11.03.11	Update System Requirement Information	
1.02	11.03.30	General Clean up	
1.03	15.04.29	Fixed rolling counter update when the set data=0, no limit & invalid condition will be applied Added more information to the "Supplementary" section screen	Paul
2.00	15.10.21	Updated the installation for WIN7 & WIN8 64 bits	Paul
2.10	16.06.04	Added manual entry of Access Key file for PCI cards	Paul