



CANcheck Software

Manual

Warranty

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Revision & Hardware

Revision

Version	Date	Author	Description
1.1	2014/05/02	Johney	Add trend chart
1.0	2013/11/06	Johney	Release version

Hardware

Version	Supported Hardware
1.0	<ol style="list-style-type: none">1. PISO-CAN 100U2. PISO-CAN 200U3. PISO-CAN 400U4. PISO-CAN 800U5. PEX-CAN 200i6. PCM-CAN 2007. PCM-CAN 200P8. I-75309. I-7530-FT10. I-7530A11. I-7530A-MR12. I-7540D13. I-7540D-MTCP14. I-756515. I-7565-H116. I-7565-H2

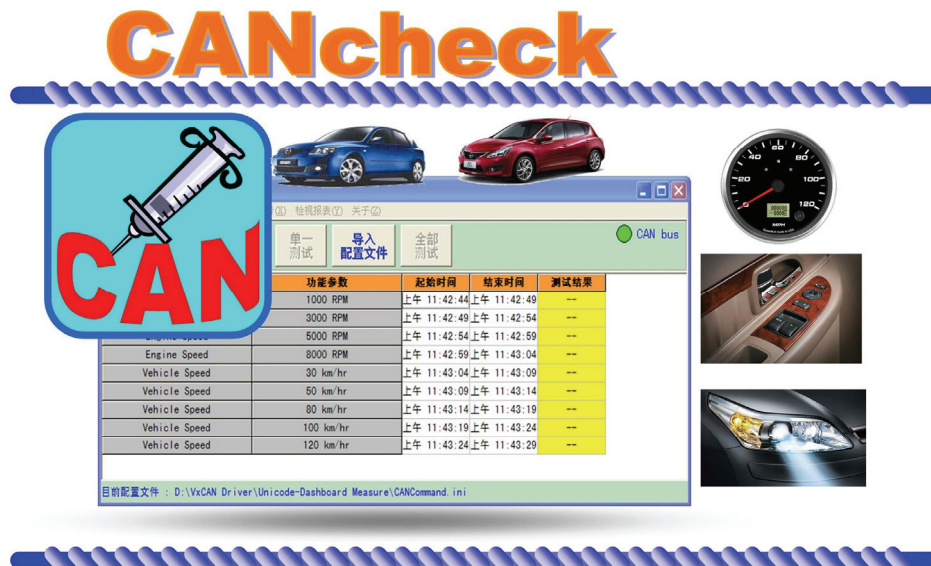
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1. CANcheck Software

1.1 CANcheck Introduction

The CAN Bus (Controller Area Network) is a serial two-wire communication specification which conforms to the international standard ISO-11898 standard communication interface, and has been popular in industrial automation as well as other applications. CAN-based applications have demonstrated high degree of security and stability. Until now the CAN bus technology has been applied in various application fields, such as medical equipment, vehicles, military use, electric power measurement, semiconductor equipment, elevator networks, railway applications or building automation.



The CANcheck is software which is used to verify the functions of CAN devices from any manufacturers. It provides users to design the test commands and the expected response, and arrange the test procedure for their CAN products. When starting the test, the software will go the predefined procedure to send the specific messages and check if the corresponding responses are correct. This is not only useful for the QC of the CAN devices such as light, dashboard ..., but also helpful to diagnostic the CAN application systems. Here shows the features.

- (1) No programming knowledge is needed. The graphical HMI provides easy-to-use operation interface for rule configurations and testing procedures.
- (2) Suits to test all kinds of CAN devices which follows the ISO 11898-2

specification.

- (3) The protocol configuration file protects private CAN communication protocol from disclosing the business or technique secret.
- (4) Supports the verification of the replied CAN messages from the tested units.
- (6) Supports CAN 2.0A and CAN 2.0B specifications.
- (7) Allows configuring the test commands, the test cycle, the test duration, the expected responses, and the description of the test procedure.
- (8) Saves the test procedures to the specific file.
- (9) Supports both the single-task and multi-tasks tests.
- (10) Provides time stamps to recode the start and end time of each test item.
- (11) Displays the CAN bus status immediately.

1.2 The installation steps of the CANcheck

In this chapter, how to install the CANcheck software is described. After finishing the installation process, the CANcheck and users' manual are copied to the PC. The CANcheck could be run in the Window 2000 / XP and Win 7 32-bit. **Before installing the CANcheck software, the VxCAN driver needs to be installed first.** Here shows the correct installation steps.

1.2.1 The installation steps of the VxCAN

Step 1: You can get the software "Virtual CAN Setup.exe" from the CD.

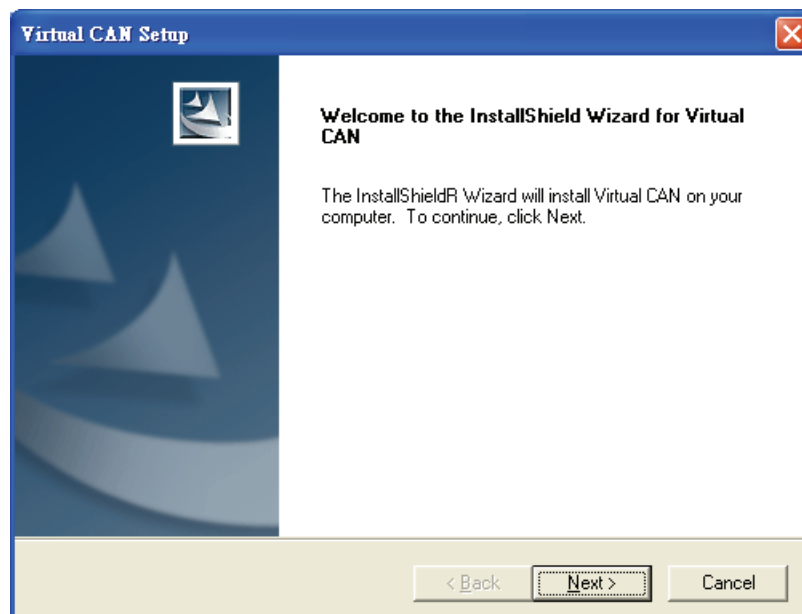
"CD:\fieldbus_cd\can\virtual_can\v30\Virtual CAN Setup_v30.exe"

or you can download it from

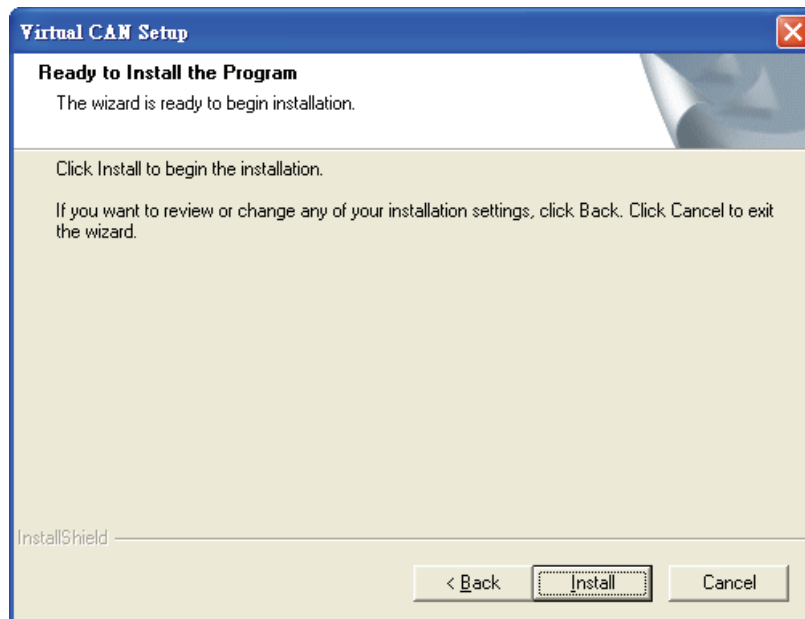
http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/virtual_can/v30/virtual_can_setup_v30.exe

Step 2: Double-click the "Virtual CAN Setup_v30.exe" to run the setup.

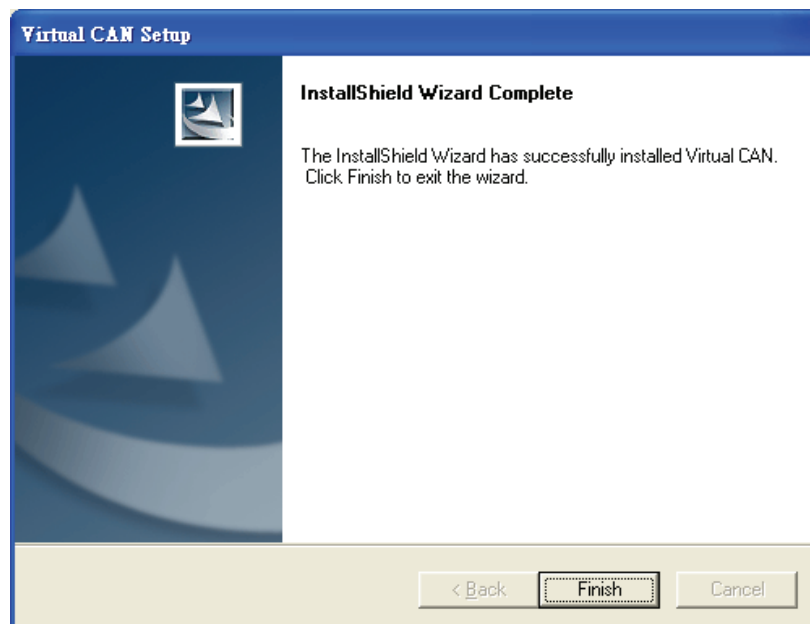
Step 3: "Next" button to continue the process.



Step 4: Click the “Install” button to install the VxCAN driver.



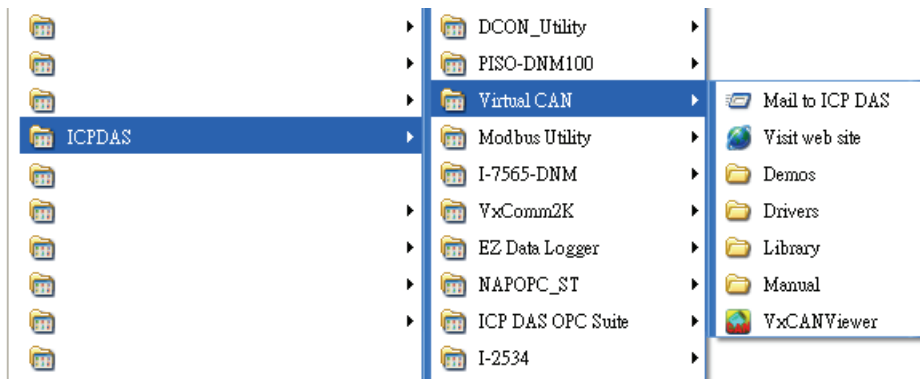
Step 5: Click the “Finish” button to finish the setup process.



The installed folder is in the following directory:

“C:\ICPDAS\VirtualCAN”

Here shows the directory in the [Programs]:



1.2.2 The installation steps of the CANcheck

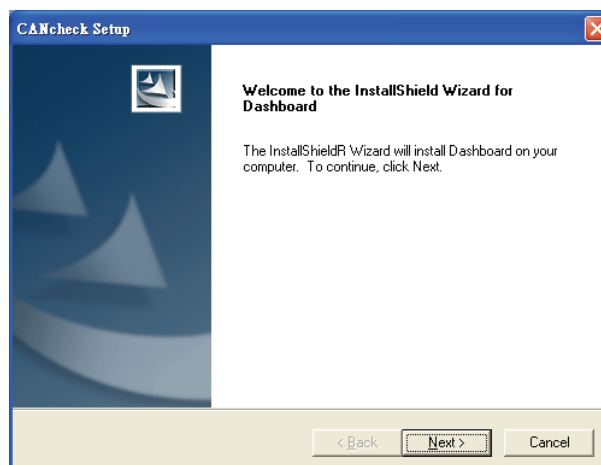
Step 1: Find the setup file from the CD or from the following website.

http://www.icpdas.com/products/Remote_IO/can_bus/CANcheck.htm

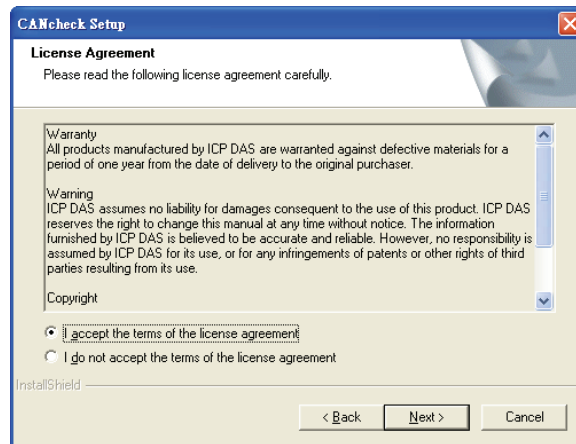
The file on the website will be the last version. Double click the setup file.



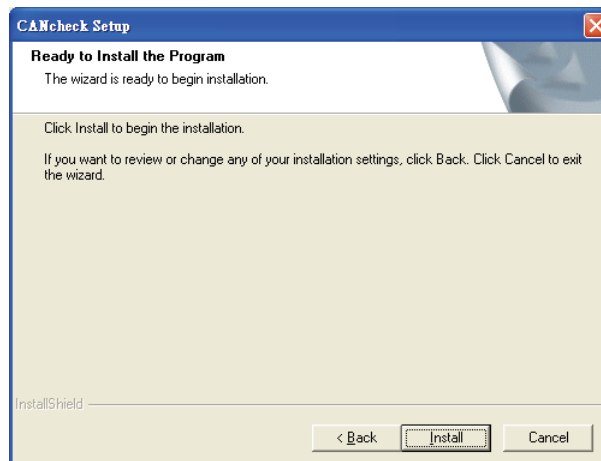
Step 2: Click the [Next] button to continue.



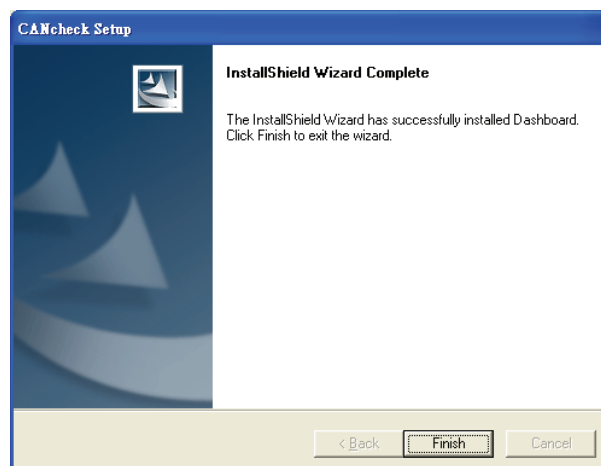
Step 3: The setup program will show the license agreement dialog. Check the [I accept ...] box and click the [Next] button.



Step 4: After clicking the [Install] button, the installation begins.



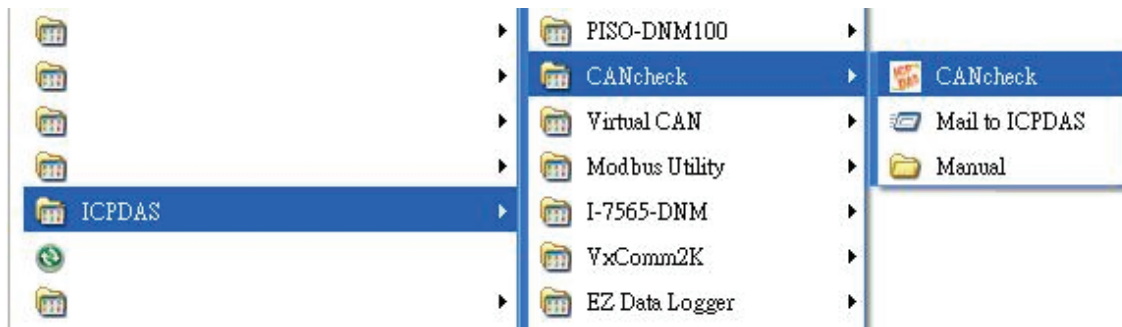
Step 5: After the completion of the installation, click the [Finish] to close the setup program.



The CANcheck software and the manual will be put in the PC. The directory is as follows:

“C:\ICPDAS\CANcheck”

Here shows the directory in the [Programs]:



After plugging the USB dongle, users are able to use the CANcheck software without time limitation. If users have no USB dongle, the CANcheck still can run 10 minutes with full functions. Here is the picture of the USB dongle.



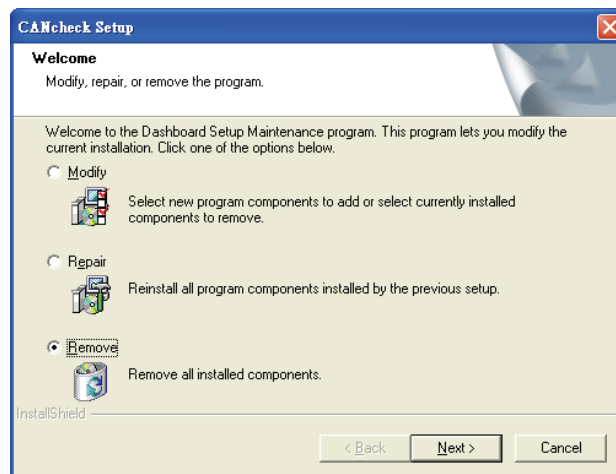
1.3 The Un-installation Step of the CANcheck

This chapter will show how to remove the CANcheck from the PC. Here shows the process step by step.

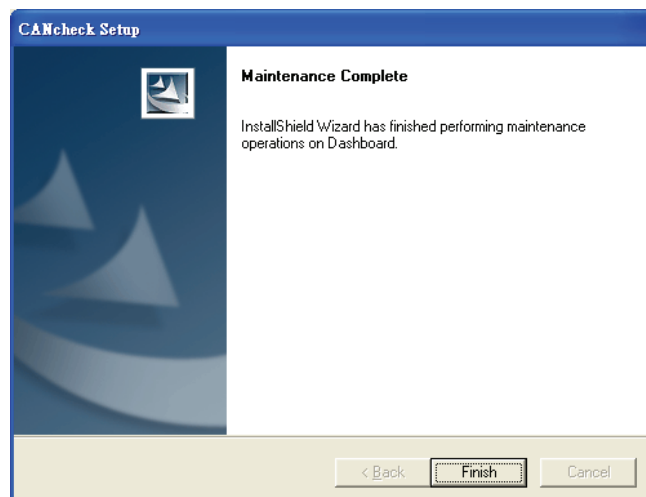
Step 1: Find the setup file from the CD and double click the setup file.



Step 2: After showing the dialog below, select the [Remove] item and click the [Next] button to remove the CANcheck.

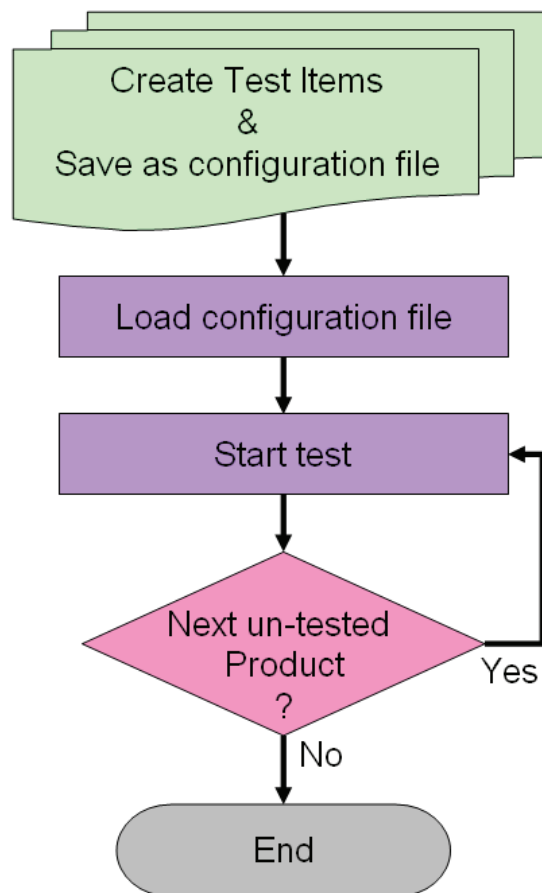


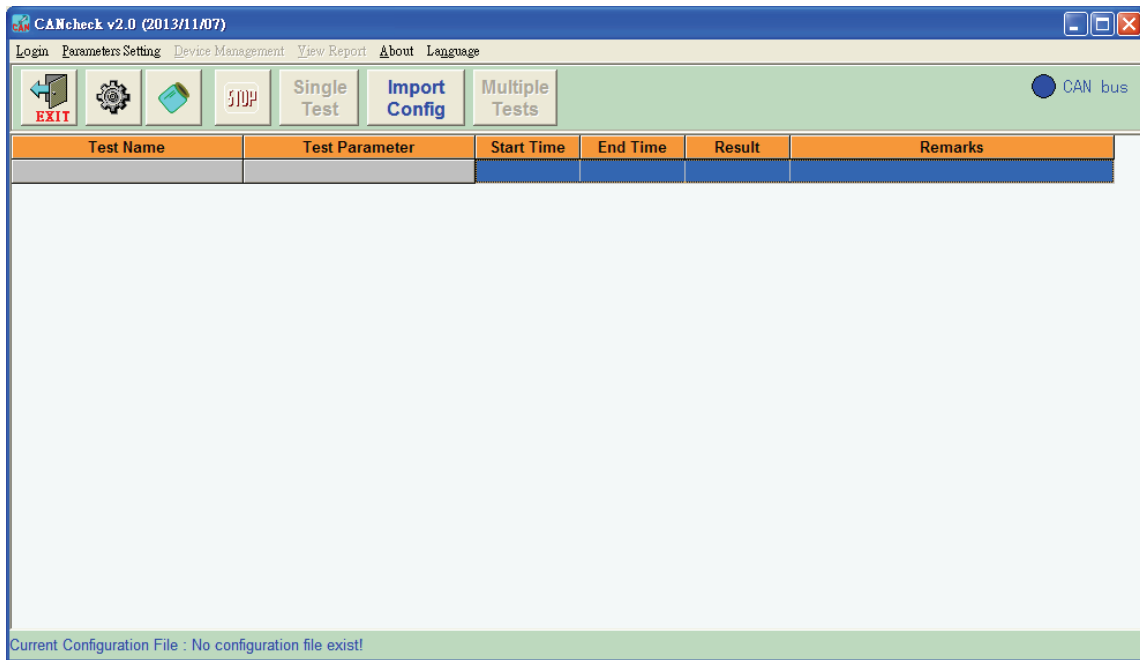
Step 3: After showing the dialog below, click the [Finish] button to close the un-installation process.



2. The operation of the CANcheck

This software provides the functions of implementing the testing sequence of CAN devices. In order to facilitate the processing of different products, the software uses the configuration file to save the arrangement of the entire test items. Users are able to freely load corresponding configuration file depended on different test items to fit the various production line or test procedure. The operation of the software and the testing flow can be shown as the following flowchart.

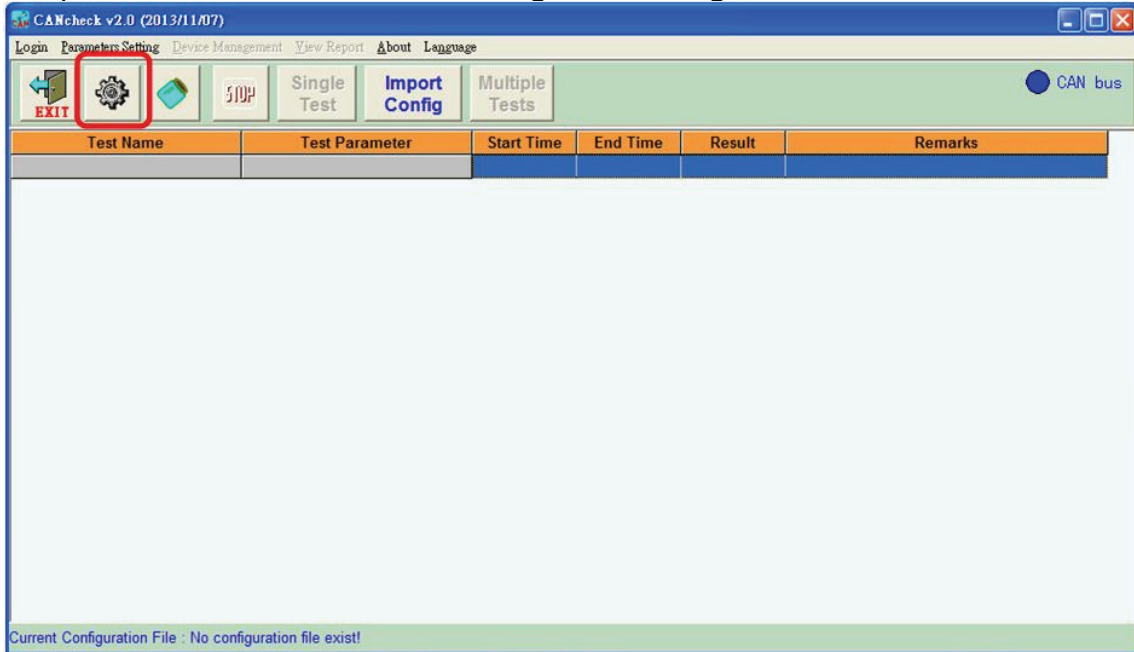




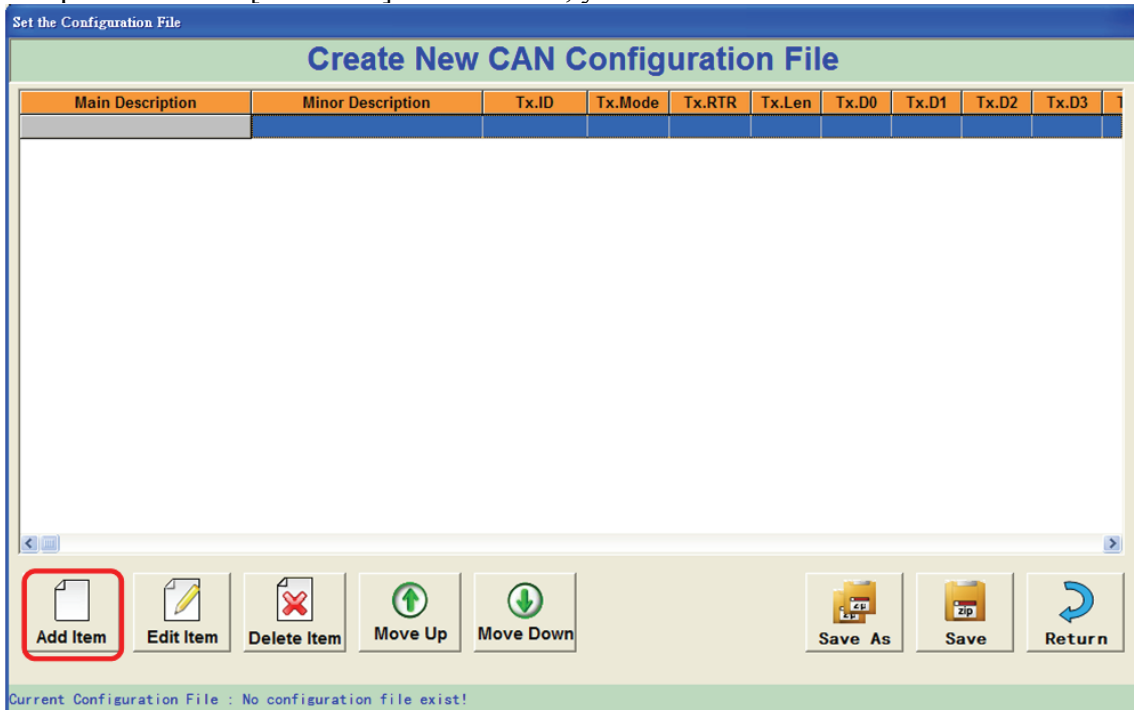
The start dialog of the CANcheck.

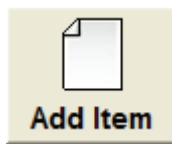
2.1 Create Configuration File

Step 1 : Click the icon below. The configuration dialog will be shown.

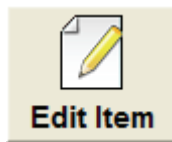


Step 2 : Click the [Add Item] button. Then, you can start to edit an test item.





: The button will create a new test item.



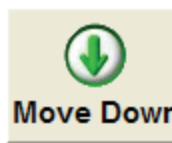
: The button can edit the existent test item.



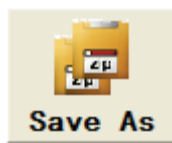
: The button can delete the existing test item.



: The button can move the selected test item up.



: The button can move the selected test item down.



: The button can save the configuration file to another new file.



: The button can save the configuration file.

Step 3 : Edit the test item in the dialog.

Add New Item

Create New Test Items and Replied Data

CAN Transmission Message

1 **Description** Vehicle Speed or Temperature.

2 **Parameter** 80km/h or 30 degrees.

3

29-bit ID	ID (Hex)	RTR	Len	D1	D2	D3	D4	D5	D6	D7	D8
No	123	No	8	11	22	33	44	55	66	77	88

4 **Item Interval** 1000 ms

5 **Total Time** 1 Sec

Compare the Replied CAN Message

6

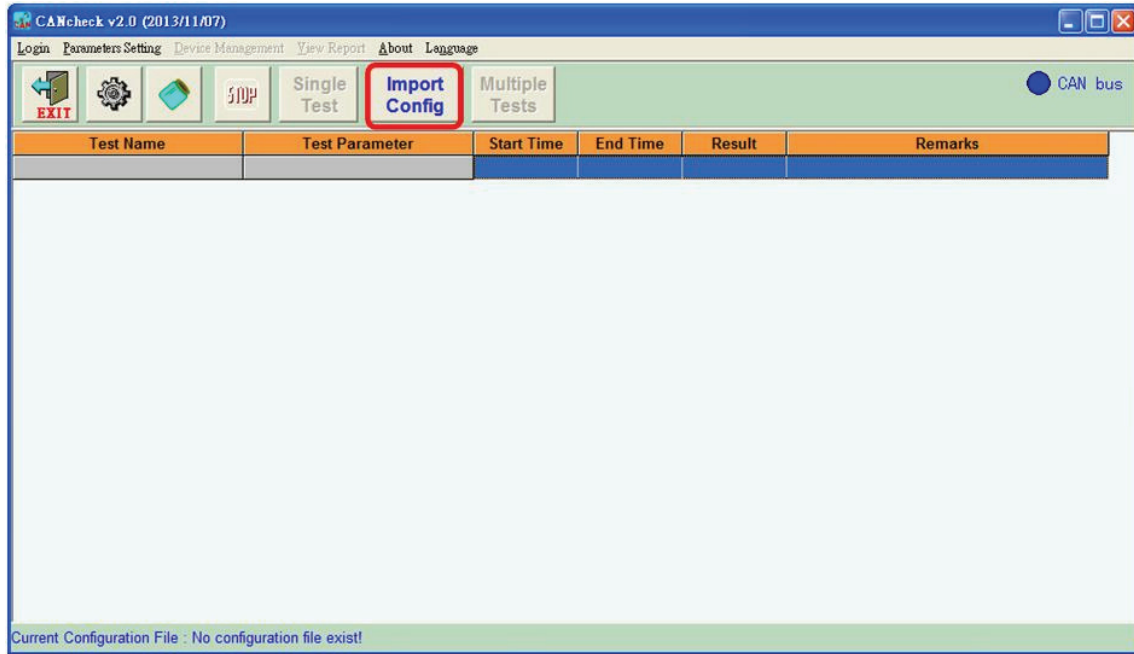
29-bit ID	ID (Hex)	RTR	Len	D1	D2	D3	D4	D5	D6	D7	D8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Add **OK** **Cancel**

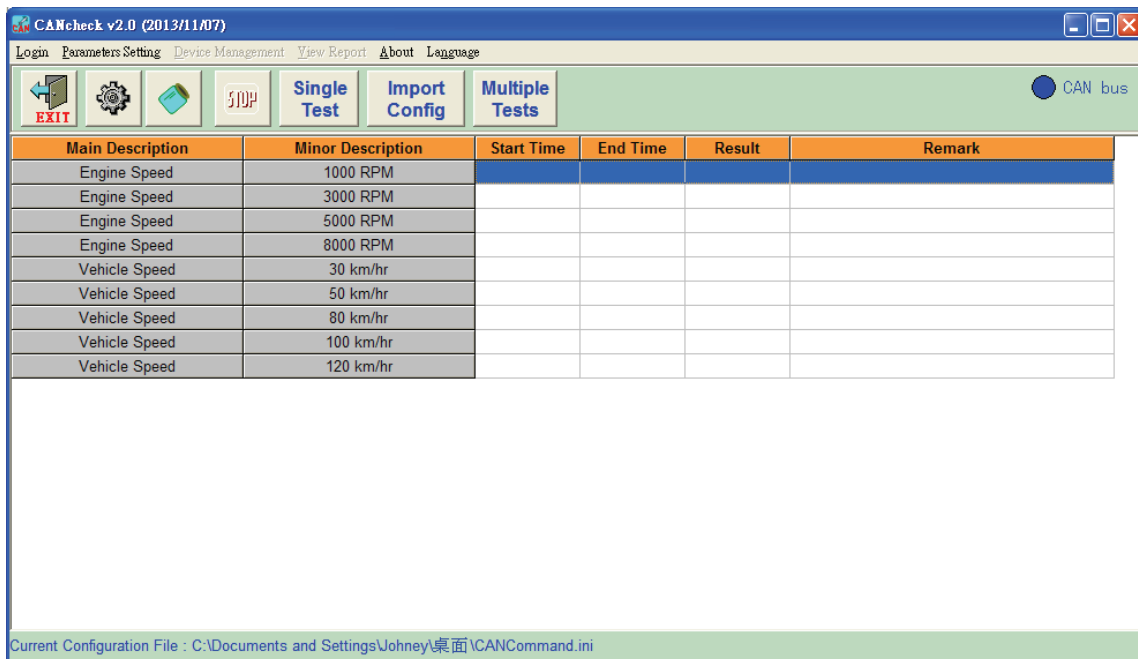
- (1) The description of the test item. Ex. vehicle speed or temperature.
- (2) The parameter of the test item. Ex. 80km/h or 30°C.
- (3) The CAN command for testing.
- (4) The time interval of sending each test CAN command. The time unit is millisecond.
- (5) The test duration of this CAN command. The test CAN command will be sent continuously until the time of the duration is up. The time unit is second.
- (6) The CAN message compared with the response from the devices. Users can specific the CAN message to check if there is any error in the response of the tested device.

2.2 Import the Configuration File

Click the [Import Config.] and the users can load the specified configuration file.

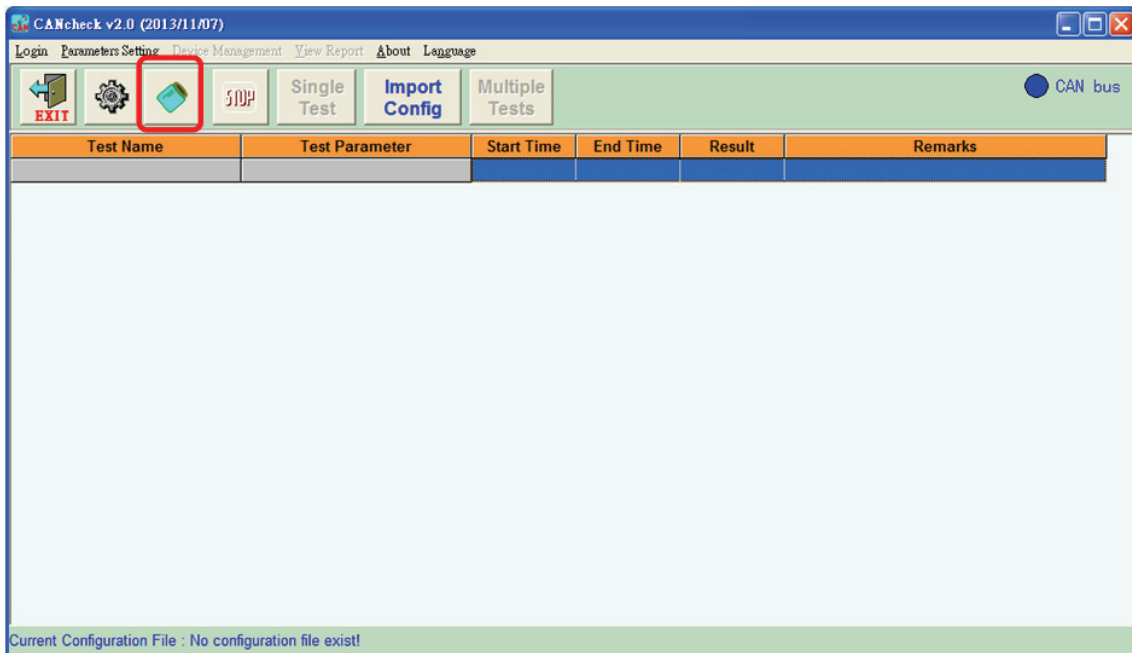


After selecting the configuration file, the dialog will show the entire test items.

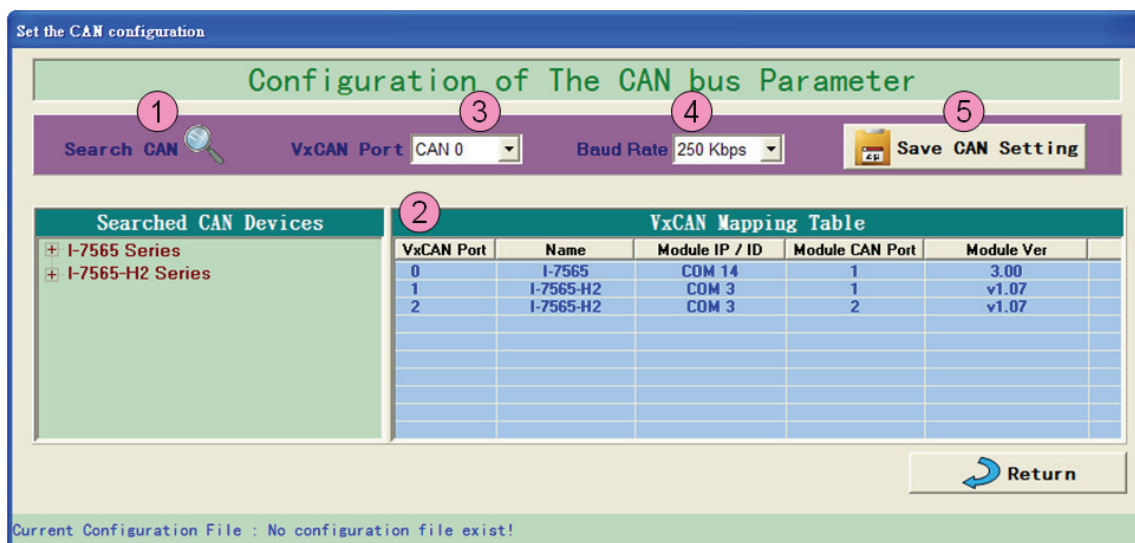


2.3 Configure the CAN interface

Here guides users to configure the CAN interface of the CAN converters or the CAN PCI boards. First of all, click the icon below and the CAN configuration dialog will be shown.



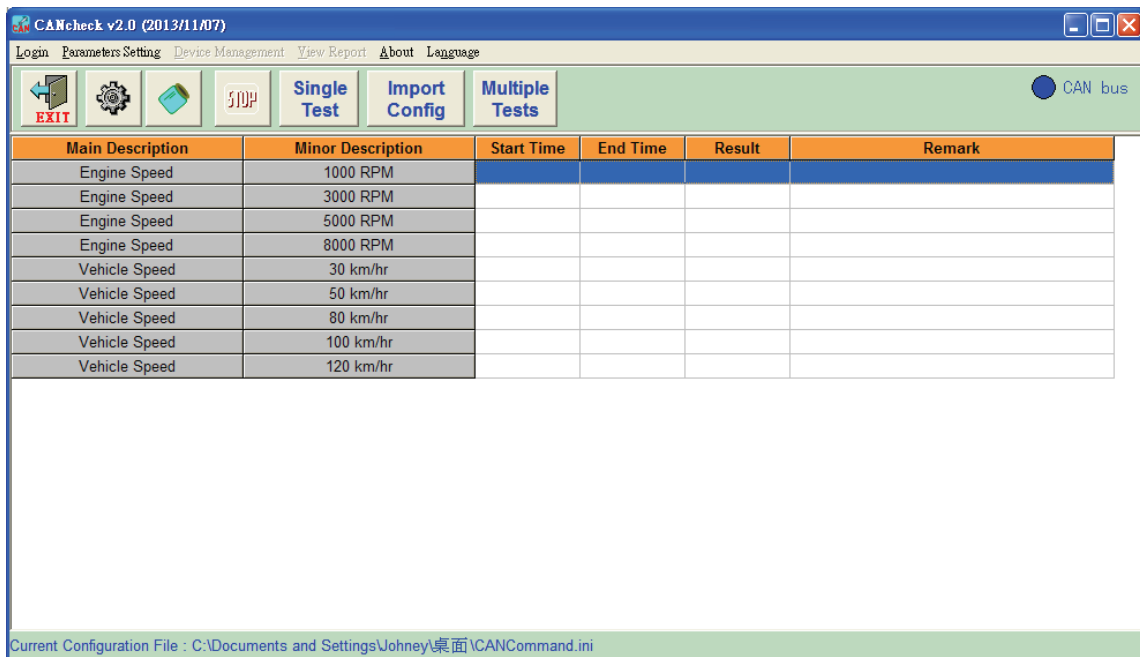
Search all of the available CAN ports in your PC first. Afterwards, the search result will be listed in the table. You can select one of these found CAN ports, configure the CAN baud, and run it to the CANcheck. These setting can be saved in the PC for future use. Here shows the description of each icon.



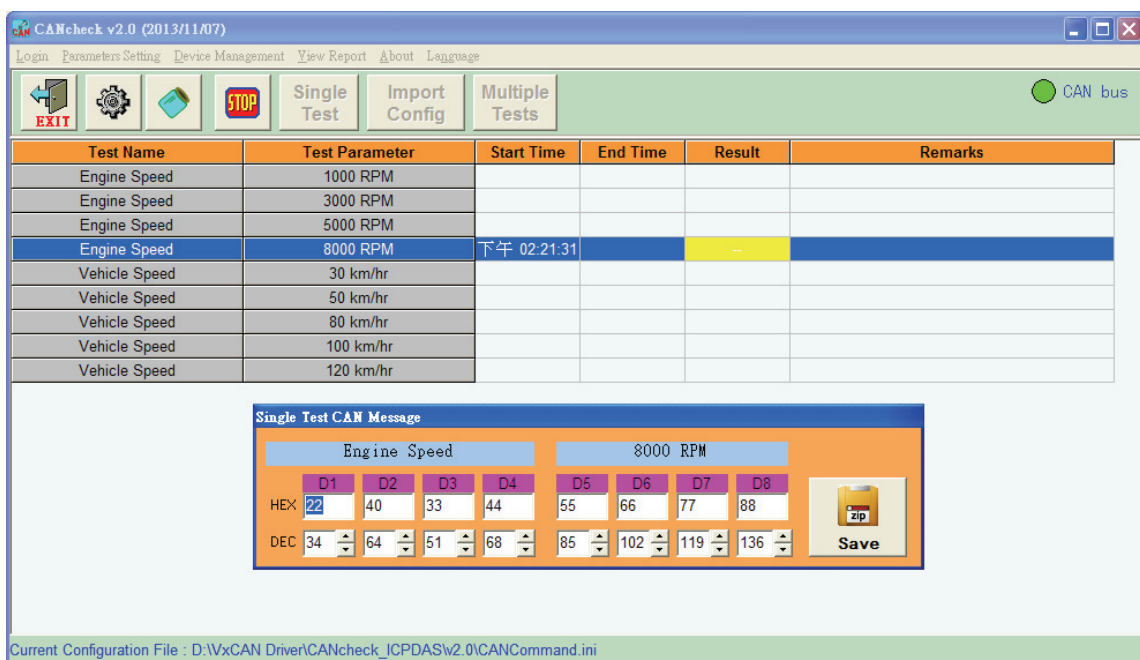
- (1) [Search CAN] button would help to search how many CAN converters or CAN PCI boards which developed by ICP DAS. Click the magnifier icon to start searching.
- (2) After searching CAN devices, the searched CAN devices would be listed in the [VxCAN Mapping Table] table.
- (3) The users are able to select the VxCAN port from the [VxCAN Mapping Table].
- (4) The baud rate of the selected CAN port.
- (5) Click the [Save CAN Setting] button and the CAN port configuration will be saved into the configuration file.

2.4 Single Test and Multiple Test

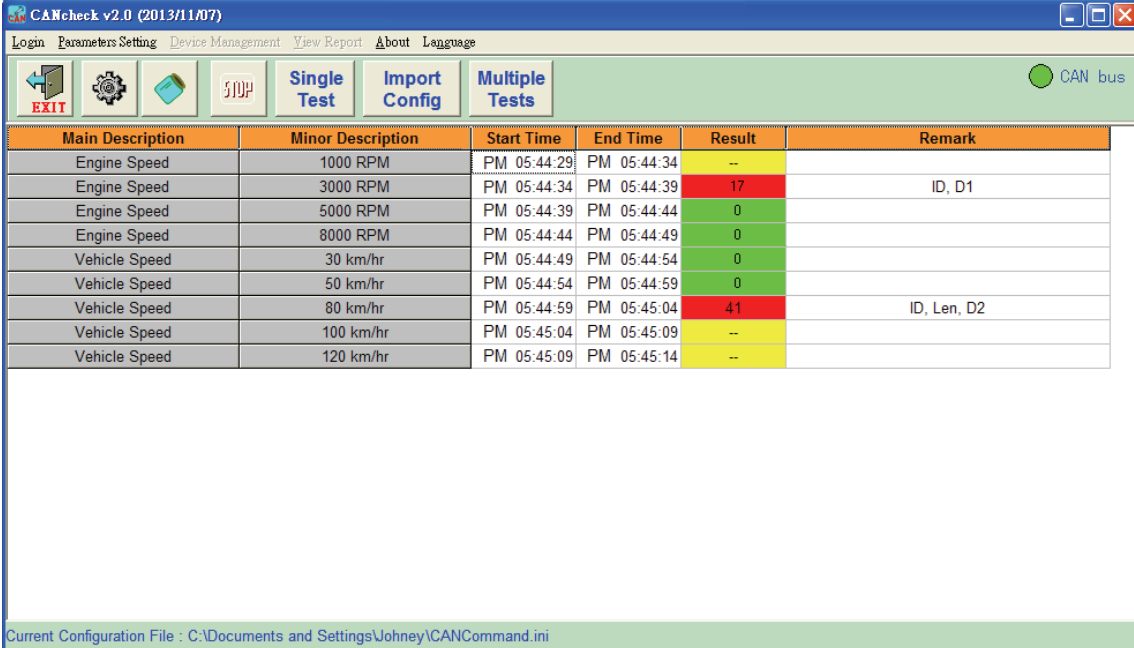
After importing the configuration file, the users could click the [Single Test] or [Multiple Test] button which implement the test of the single test item or all test items.



[Single Test]: After selecting the specific test item and click the [Single Test] button, the users can test the item until the [Stop] button has been clicked.



[Multiple Test]: When clicking the [Multiple Test], the software will start test from the first item and never stop until the time of the duration time is up. Afterwards, the test of the next item will automatically start to run. Until the last item has been complete, the multiple test process stops. During the testing, the users can click the [stop] button to break the test if needed.



Main Description	Minor Description	Start Time	End Time	Result	Remark
Engine Speed	1000 RPM	PM 05:44:29	PM 05:44:34	--	
Engine Speed	3000 RPM	PM 05:44:34	PM 05:44:39	17	ID, D1
Engine Speed	5000 RPM	PM 05:44:39	PM 05:44:44	0	
Engine Speed	8000 RPM	PM 05:44:44	PM 05:44:49	0	
Vehicle Speed	30 km/hr	PM 05:44:49	PM 05:44:54	0	
Vehicle Speed	50 km/hr	PM 05:44:54	PM 05:44:59	0	
Vehicle Speed	80 km/hr	PM 05:44:59	PM 05:45:04	41	ID, Len, D2
Vehicle Speed	100 km/hr	PM 05:45:04	PM 05:45:09	--	
Vehicle Speed	120 km/hr	PM 05:45:09	PM 05:45:14	--	

Current Configuration File : C:\Documents and Settings\Johney\CANCommand.ini

- (1) The result with yellow color represents that there is no specific CAN message compared with the replied CAN message.
- (2) The result with green color represents that all comparison items of the replied CAN message are correct.
- (3) The result with red color represents that more than one comparison items of the replied CAN message are not correct. The error code in the result field represents which CAN fields are not correct. Users can look up the following table to find out what kinds of wrong with the replied CAN message.

CAN Field	The error code of the correct comparison.	The error code of the <u>incorrect</u> comparison.
CAN ID	0	0x0001 (Dec 1)
29-bit	0	0x0002 (Dec 2)
RTR	0	0x0004 (Dec 4)
Len	0	0x0008 (Dec 8)
D1	0	0x0010 (Dec 16)
D2	0	0x0020 (Dec 32)
D3	0	0x0040 (Dec 64)
D4	0	0x0080 (Dec 128)
D5	0	0x0100 (Dec 256)
D6	0	0x0200 (Dec 512)
D7	0	0x0400 (Dec 1024)
D8	0	0x0800 (Dec 2048)

Example:

(1) The error code is 17 (Dec) = 1 + 16

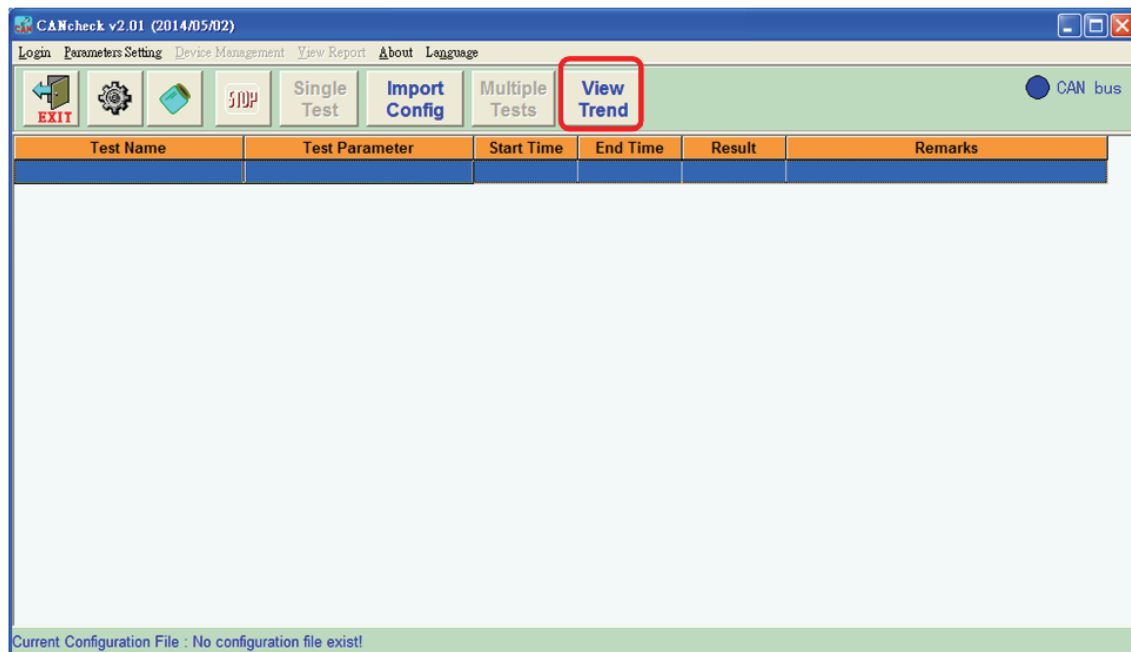
It represents that the CAN ID and D1 of the replied CAN message are not correct.

(2) The error code is 41 (Dec) = 1 + 8 + 32

It represents that the CAN ID, Len and D2 of the replied CAN message are not correct.

3. The operation of the “View Trend”

This CANcheck software provides the functionality of implementing the conversion of the CAN data. The users need not to do extra conversion when receiving the CAN messages. This will help the users to read the raw data more friendly. In addition, the CANcheck supports the user-defined math function. The users are able to freely edit their own mathematical combination. The software will calculate the corresponding math function. This will help user to obtain more physical information. The users can focus the control logic to figure out the operation of the system.



3.1 Configure the CAN ID for Trend

Before view the trend chart, the users need to set the trend information which is the CAN ID and its data conversion.

The screenshot shows the 'Form_View Trend' application window. The title bar reads 'Form_View Trend'. The window has three tabs: 'Trend CAN ID', 'Trend', and 'DataView'. The main content area is titled 'Configure CAN ID for Trend'. It contains several input fields: 'Description' with the value 'Y-Axis', 'Parameter' with 'Temperature', 'Data Type' set to 'double (8-byte)', 'Data Range' set to 'D1 ~ D8', and 'CAN ID' set to '2E8' (Hex). To the right of the 'Data Range' field is a 'CAN Data' section with eight slots labeled D1 through D8. Below the input fields is an 'Add.' button with a green arrow icon. At the bottom of the window is a table with five columns: 'Description', 'Parameter', 'CAN ID', 'Data Type', and 'Data Range'. The table contains six rows of data. Below the table are two buttons: 'Delete Item' with a red X icon and 'Save' with a folder icon.

Description	Parameter	CAN ID	Data Type	Data Range
X-Axis Motor	Position	0x183	long (signed 4-byte)	D1 ~ D4
X-Axis	Pressure	0x184	float (4-byte)	D3 ~ D6
X-Axis	Temperature	0x2E7	double (8-byte)	D1 ~ D8
Y-Axis Motor	Position	0x283	long (signed 4-byte)	D1 ~ D4
Y-Axis	Pressure	0x284	float (4-byte)	D3 ~ D6
Y-Axis	Temperature	0x2E8	double (8-byte)	D1 ~ D8

Description : The users could write the meaningful description freely. This will help to figure out the information of the CAN data, such as “X-Axis Motor” or “Room No.” or other information.

Parameter : The users could also write the meaningful description freely, such as “Motor position”, “Motor speed”, “Room service” or others.

Data Type : It provides the data conversion from the CAN data. The users need provide the data type of the conversion. The supported data types are list below.

- (1) “BYTE” is 1-byte unsigned integer.
- (2) “char” is 1-byte signed integer.
- (3) “WORD” is 2-byte unsigned integer.
- (4) “short” is 2-byte signed integer.
- (5) “DWORD” is 4-byte unsigned integer.

- (6) “long” is 4-byte signed integer.
- (7) “float” is 4-byte data which follow the IEEE 754 floating point conversion.
- (8) “double” is 8-byte data which follow the IEEE 754 double conversion.

Data Range : After selecting the data type, the users need to provide the start byte of the CAN data for converting correctly. The selection items will change according to the “Data Type”.

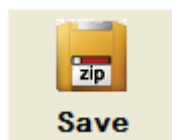
CAN ID : The users need to provide the specific CAN ID. The software will convert the specific data when receiving this CAN ID.



: After editing the data and click the button, the specific data will be added to the grid view.



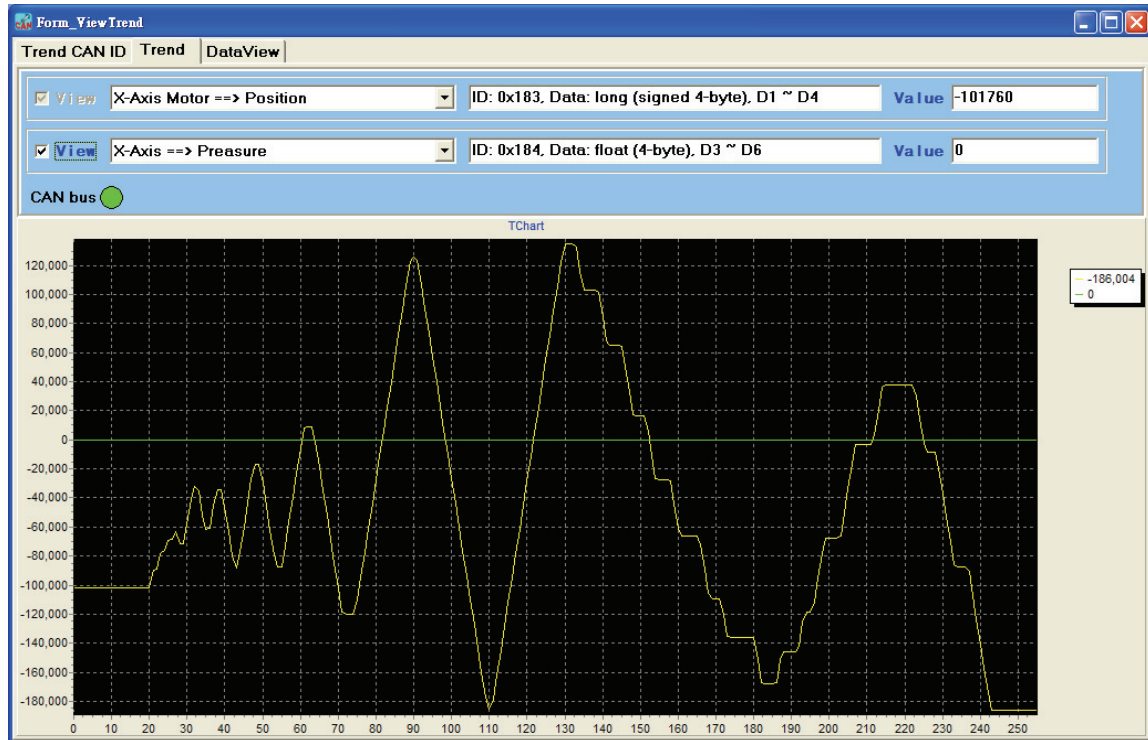
: The button can delete the existing test item.



: The button can save the configuration.

3.2 Trend Chart

The user could view the converted data with trend chart. When receiving the corresponding CAN message, the software converts the CAN raw data and shows it in the trend. The users could select the specific item which has been configured.



View : The user can enable or disable the item. If it is enabled, the users could choice the specific item which is in the drop-down combo-box.

3.3 View all Converted Data and Math Formulas

The user could view all the converted data in the grid. When receiving the corresponding CAN message, the software converts all the CAN raw data. This would help users to monitor the raw information of the application system.

There are four additional math formulas. The users could edit their own math function for further information. The users need not cost a lot of time to calculate the result manually.

The screenshot shows the 'Form_View Trend' software window. It has three tabs: 'Trend CAN ID', 'Trend', and 'DataView'. The 'DataView' tab is active, displaying a table with the following data:

Description	Parameter	CAN ID	Data Type	Data Range	Value
X-Axis Motor	Position (V1)	0x183	long (signed 4-byte)	D1 ~ D4	-101760
X-Axis	Pressure (V2)	0x184	float (4-byte)	D3 ~ D6	0
X-Axis	Temperature (V3)	0x2E7	double (8-byte)	D1 ~ D8	0
Y-Axis Motor	Position (V4)	0x283	long (signed 4-byte)	D1 ~ D4	25690105
Y-Axis	Pressure (V5)	0x284	float (4-byte)	D3 ~ D6	0
Y-Axis	Temperature (V6)	0x2E8	double (8-byte)	D1 ~ D8	0

Below the table, there is a 'CAN bus' status indicator (a green circle) and a section for editing math formulas. It contains four rows, each with a checked checkbox, a label, a formula field, and a result field:

Label	Formula	Result
1. Arm length	$\sin(V1) * 100$	62.283218
2. Angle	$\sqrt{259 * 259 + V4 * V4}$	25690106.001306
3. Valve pressure	$\tan(V4) * 100$	-123.297257
4. Valve temperature	$(259 + V1 * V2)$	259.000000

A 'Save' button is located to the right of the formula editor.

How to edit the math formula?

The users could find out that the contents in the “Test Parameter” field have been add extra “(V1)”, “(V2)”, “(V3)” and so on. The “V1” means the variable “V1”. The “V2” means the variable “V2” and so on. When editing the math formula, the users need to use the variable name to represent the converted data.

How to use the special math function?

- (1) $\sin(x)$: the sine of an angle of x radians.
- (2) $\text{asin}(x)$: the principal value of the arc sine of x , expressed in radians.
- (3) $\cos(x)$: the cosine of an angle of x radians.
- (4) $\text{acos}(x)$: the principal value of the arc cosine of x , expressed in radians.
- (5) $\tan(x)$: the tangent of an angle of x radians.
- (6) $\text{atan}(x)$: the principal value of the arc tangent of x , expressed in radians.
- (7) $\text{pow}(\text{base}, \text{exponent})$: the base raised to the power exponent. $\text{base}^{\text{exponent}}$
- (8) $\text{exp}(x)$: the base-e exponential function of x , which is e raised to the power x : e^x .
- (9) $\text{abs}(x)$: the absolute value of x : $|x|$.
- (10) $\text{ceil}(x)$: the smallest integral value that is not less than x .
- (11) $\text{floor}(x)$: the largest integral value that is not greater than x .
- (12) $\log(x)$: the natural logarithm of x .
- (13) $\text{sqrt}(x)$: the square root of x .