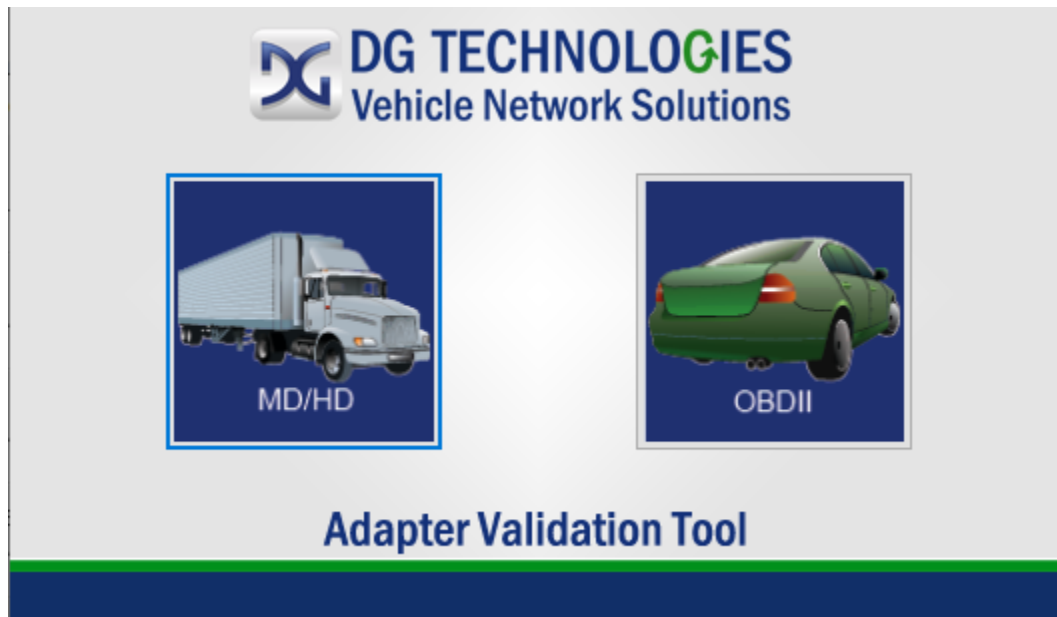




**DG TECHNOLOGIES**  
Vehicle Network Solutions

# Adapter Validation Tool (AVT)

## User Manual



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## IMPORTANT

To ensure your success with this product, it is essential that you read this document carefully before using the hardware. Damage caused by misuse of the hardware is not covered under product warranty.

When using this manual, please remember the following:

- ❑ This manual may be changed, in whole or in part, without notice.
- ❑ DG assumes no responsibility for any damage resulting from the use of this hardware and software.
- ❑ Specifications presented herein are provided for illustration purposes only and may not accurately represent the latest revisions of hardware, software or cabling.
- ❑ No license is granted, by implication or otherwise, for any patents or other rights of DG or of any third party.

DG understands that there are numerous safety hazards that cannot be foreseen, so we recommend that the user read and follow all safety messages in this manual, on all your shop equipment, from your vehicle manuals, as well as internal shop documents and operating procedures.



## Safety First

- ❑ Always block drive, steer, and trailer wheels both front and back when testing.
- ❑ Use extreme caution when working around electricity. When diagnosing any vehicle, there is the risk of electric shock both from battery-level voltage, vehicle voltages, and from building voltage.
- ❑ Do not smoke or allow sparks or open flames near any part of the vehicle fueling system or vehicle batteries.
- ❑ Always work in an adequately ventilated area, and route vehicle exhaust outdoors.
- ❑ Do not use this product in an environment where fuel, fuel vapor, exhaust fumes, or other potentially hazardous liquids, solids, or gas/vapors could collect and/or possibly ignite, such as in an unventilated area or other confined space, including below-ground areas.

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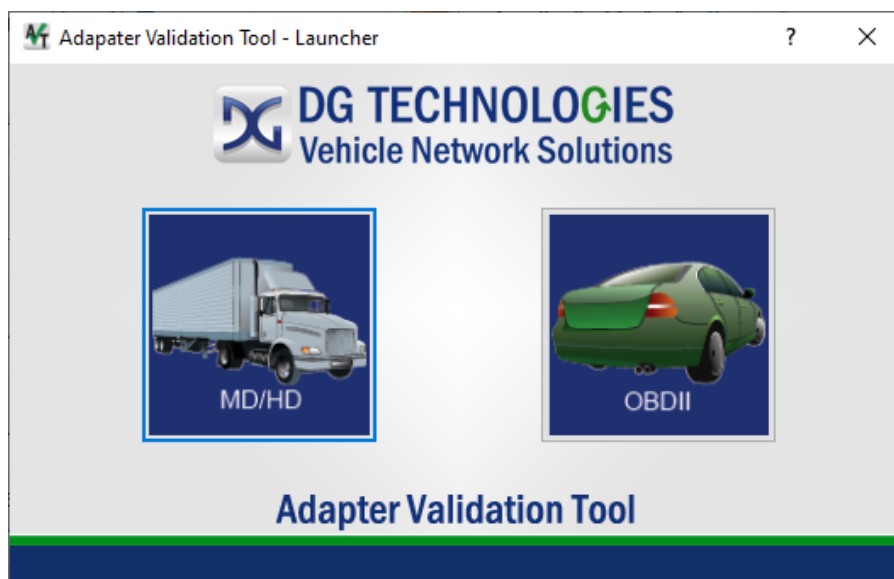
## 1 Troubleshooting Diagnostic Tool with Adapter Validation Tool (AVT)

If your OEM application is having trouble communicating with the Diagnostic Tool, you can use the Adapter Validation Tool (AVT) to help troubleshoot this problem. AVT allows you to determine:

- If your drivers are installed correctly.
  - If a connection to your tool can be made.
  - Detection of data link activity.
- ❑ **AVT cannot be used to troubleshoot whether there are problems with setting up the OEM application and the Diagnostic Tool.**

### 1.1 Adapter Validation Tool Startup

A shortcut to *Adapter Validation Tool* can be found the desktop or in the Start Menu.




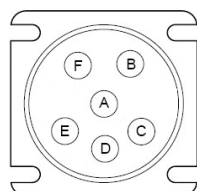
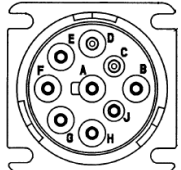
*AVT Launcher*

### 1.2 Select the Correct AVT Launcher Button

The functionality of AVT has been split out into two different applications. One is targeted for medium or heavy-duty vehicles and connects to the vehicle using TMC RP1210 compatible tools. The other is targeted for light or medium duty vehicles and connects to the vehicle using SAE J2534 tools.

## 1.2.1 MD/HD Button


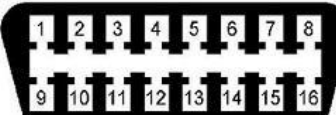
Click on the MD/HD truck button if you have a 6 or 9-pin connector. This is most typically found on medium and heavy-duty vehicles. J1939/ISO15765 and J1587/J1708 are the most common protocols.

|   |   |   |
|---|---|---|
|  |  <p><i>J1708 Connector (6-pin Deutsch)</i><br/>This connector only has the J1708/J1587 protocol.</p> |  <p><i>J1939 Connector (9-pin Deutsch)</i><br/>OEMs switched to this connector when they moved to J1939. J1708 may not be available.</p> |
|---|---|---|

*MD/HD Button*

## 1.2.2 OBDII Button

Click on the OBDII car selection if you have an OBDII vehicle. This is most typically found on light and medium-duty vehicles. CAN/ISO15765, J1850, ISO9141, and ISO14230 are the most common protocols.

|  |   |
|--|---|
|  |  |
|--|---|

*OBDII Button*

## 2 Adapter Validation Tool for Heavy and Medium-Duty Vehicles

This section covers all TMC RP1210 tools. The automated test mode is displayed by default when the software is launched. This allows for quick scanning of the most common protocols associated found on HD vehicles. Should you need to test individual protocols using specific baud rates you can do this by accessing the **Advanced Test** functionality.

### 2.1 AVT HD Automated Testing

The screenshot shows the DG Technologies - Adapter Validation Tool (MD/HD) window. At the top, there are two dropdown menus for 'Vendor' (set to 'DGDPASMA - DG Technologies DPA 5 Multi Application') and 'Device' (set to '1 - DG DPA 5 Dual CAN (MA) USB - USB'). To the right of these is a 'Test Connections' button. Below the dropdowns, there is a language selection section with checkboxes for 'English' (checked), 'Espanol', and 'Francais'. Next to it are buttons for 'Fix RP121032.INI File' and 'Advanced Test'. A large text area below these contains the title 'RP1210 Status Window (PC - VDA)' and the text 'DG Technologies - Adapter Validation Tool (MD/HD)'. At the bottom, there is a 'Protocol Status' section with four input fields for 'CAN 1', 'CAN 2', 'CAN 3', and 'CAN 4'. To the right of these fields is a 'J1708' input field and a 'Help' button. Below the input fields, there is a legend: 'Red Connection not opened', 'Green Connection opened AND data detected', 'Orange Connection opened no data read', and 'Black Not supported'. At the very bottom, there is a logo for 'DG TECHNOLOGIES Vehicle Network Solutions' and contact information: '33604 West Eight Mile Road Farmington Hills, MI 48335', '248.888.2000', 'www.dgtech.com', and 'sales@dgtech.com'.

AVT HD Automated Mode

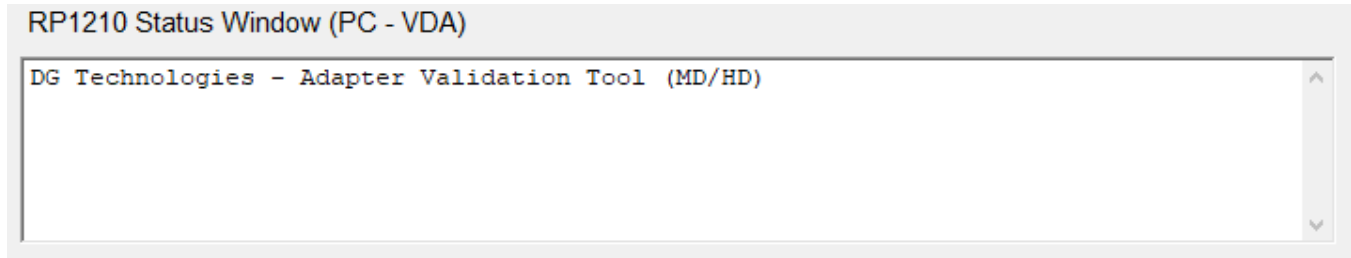
#### 2.1.1 Select the Diagnostic Tool

To establish a connection to a tool you must select the **Vendor** and the **Device ID** associated with your tool using the two drop down boxes at the top of the screen.

## 2.1.2 Run the Automated Test

Click the **Test Connections** selection after your hardware has been identified. Depending on the results of the test, both the **RP1210 Status Window Message** will turn **green** (pass) or **red** (fail).

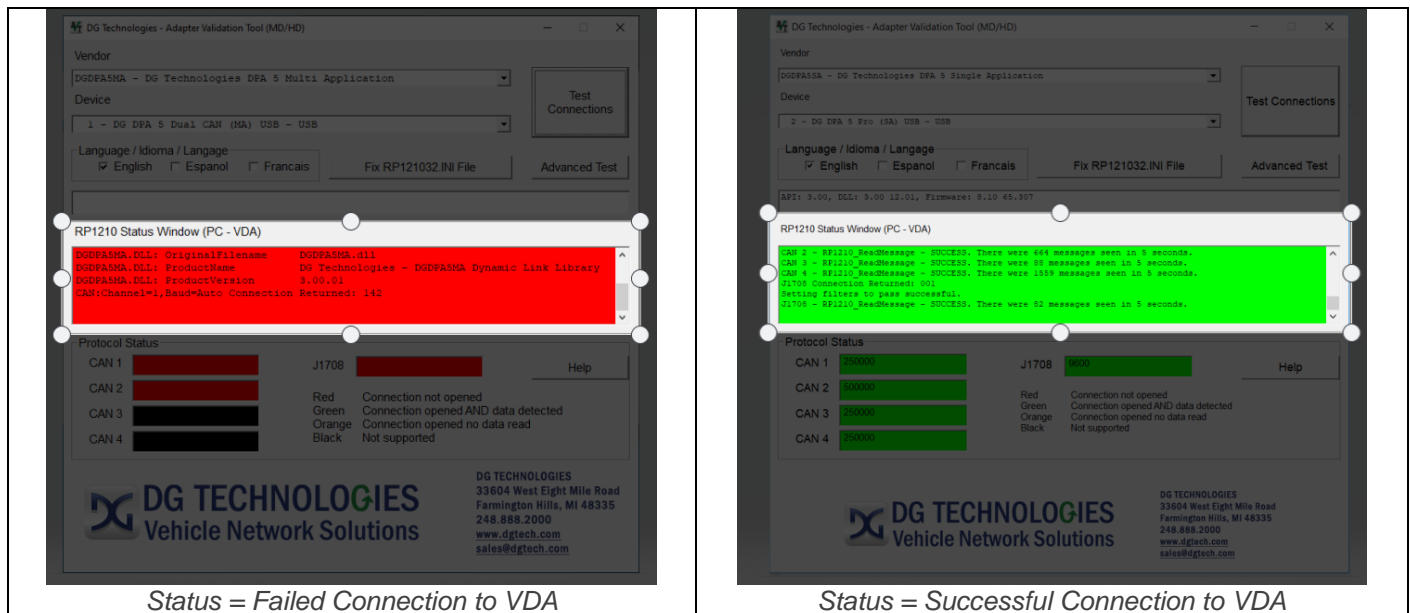
## 2.1.3 RP1210 Status Window (PC – VDA)



AVT HD Automated Test RP1210 Status Window (PC-VDA)

If the **RP1210 Status Window** turns **red**, there is a problem causing the PC to not communicate with the Diagnostic Tool. Disconnect the Diagnostic Tool from the vehicle and PC; then reconnect them. If you are using a wired connection to the computer try using another port or cable to help identify if you are dealing with a hardware problem. Should your connection to the diagnostic tool fail a new window with troubleshooting instructions will be displayed to help in taking steps to correcting the problem.

If the **RP1210 Status Window** turns **green**, then the PC is connecting to the Diagnostic Tool.







## 2.1.4 Protocol Status

Protocol Status

|       |                      |        |                                     |                      |
|-------|----------------------|--------|-------------------------------------|----------------------|
| CAN 1 | <input type="text"/> | J1708  | <input type="text"/>                | <a href="#">Help</a> |
| CAN 2 | <input type="text"/> | Red    | Connection not opened               |                      |
| CAN 3 | <input type="text"/> | Green  | Connection opened AND data detected |                      |
| CAN 4 | <input type="text"/> | Orange | Connection opened no data read      |                      |
|       |                      | Black  | Not supported                       |                      |

AVT HD Automated Test Protocol Status Section

The **Protocol Status** section of the automated test screen shows details about what protocols are supported by the tool, what baud rate they are running at and if data was detected on them. Up to 4 CAN channels can be scanned, as well as J1708. The colors of the protocol status bars are color coded for ease of understanding.

|        |   |  |
|--------|---|--|
| Red    |  | Unable to connect to protocol. This color should be displayed when the connection to the tool failed.  |
| Green  |  | Successfully connected to protocol. The baud rate was determined, and data was received. The baud rate that the link is running at will be displayed in the status bar of the protocol |
| Orange |  | Successfully connected to protocol. The baud rate may have been able to be determined, but NO data was received.   |
| Black  |  | Protocol not supported by the tool selected.   |

AVT HD Protocol Status Color Coding

Protocol Status

|       |         |        |                                     |                      |
|-------|---------|--------|-------------------------------------|----------------------|
| CAN 1 | Unknown | J1708  | 9600                                | <a href="#">Help</a> |
| CAN 2 | Unknown | Red    | Connection not opened               |                      |
| CAN 3 |         | Green  | Connection opened AND data detected |                      |
| CAN 4 |         | Orange | Connection opened no data read      |                      |
|       |         | Black  | Not supported                       |                      |

Example of Automated AVT HD Orange and Black Protocol Statuses

Protocol Status

|       |        |        |                                     |                      |
|-------|--------|--------|-------------------------------------|----------------------|
| CAN 1 | 250000 | J1708  | 9600                                | <a href="#">Help</a> |
| CAN 2 | 500000 | Red    | Connection not opened               |                      |
| CAN 3 | 250000 | Green  | Connection opened AND data detected |                      |
| CAN 4 | 250000 | Orange | Connection opened no data read      |                      |
|       |        | Black  | Not supported                       |                      |

Example of Automated AVT HD Green Protocol Statuses



## 2.2 Advanced Testing Dialog (Vendor/Device/Protocol)

Should you need to scan other protocols to see if they are present, you can do so by using the Advanced Test Interface. This allows you to choose baud rate and channel that a Vendor/Tool supports. This option is mainly used for engineering purposes and requires some knowledge of the vehicle's diagnostic link setup.

Choosing the **Advanced Test** button on the main AVT HD will bring up the Advance Test interface.

The Vendor and Device functionality of the Automated Test are also used in the Advanced Test. In the sections below the other selections are briefly described. You will need an understanding of the TMC RP1210 API to fully understand all these settings. Again, this is an engineering level tool and should be used accordingly.

DG Technologies - AVT (MD/HD) - Advanced Test

Vendor  
DGDPA5MA - DG Technologies DPA 5 Multi Application

Device  
1 - DG DPA 5 Dual CAN (MA) USB - USB

Protocol  
CAN ☒ Vendor Supports CAN Auto Baud

Baud Rate  
Auto ☒ Use Baud Rate

Channel  
1 ☐ Use Channel

Protocols Supporting Baud=XXX  
☒ CAN ☒ J1708  
☒ J1939 ☒ ISO15765

Run Advanced Test Back Help Quit

RP1210 Status Window (PC - VDA)

RP1210 Data Message Window (VDA - Vehicle)

AVT HD Advanced Test Dialog

### 2.2.1 Baud Rate Drop Down List Box

The **Baud Rate** drop down list box allows the user to select one of the supported protocol speeds for the selected protocol. The entries in this list box come from the VDA vendor's INI file. Click the **Use Baud Rate** checkbox to activate a "Protocol:Baud=XXX" connection. If both the **Use Baud Rate** and **Use Channel** checkboxes are checked, then AVT will initiate a "Protocol:Baud=XXX;Channel=X" connection.

### 2.2.2 Channel Drop Down List Box

The **Channel** drop down list box allows the user to select one of the supported channels for the selected device. The entries in this list box come from the VDA vendor's INI file. Click the **Use Channel** checkbox to activate a "Protocol:Channel=X" connection. If both the **Use Baud Rate** and **Use Channel** checkboxes are checked, then AVT will initiate a "Protocol:Baud=XXX;Channel=X" connection.

### 2.2.3 Vendor Supports CAN Auto Baud Checkbox

This checkbox indicates whether the API supports CAN (CAN, J1939, ISO15765) automatic baud detection. Even though this variable may be set to TRUE, the next four fields indicate whether the API supports Baud=XXX connect formats for CAN, J1939, and ISO15765. This field is just an informational field, and not all VDA vendors will support this feature.

### 2.2.4 Protocols Supporting Baud=XXX

These checkboxes indicate whether the API supports setting a specific baud rate (or automatic baud detection) for a specific protocol. These entries come from the VDA vendor's INI file. These fields are just for informational purposes. Not all VDA vendors will support this feature.

### 1.1.1 Advanced Testing Commands – No Error Checking

When using this dialog box to initiate an advanced test, there is no error checking done to prevent the user from initiating a "Baud=XXX" or "Channel=X" connection to a VDA even if the vendor does not support that connection format.

### 1.1.2 RP1210 Data Message Window

When data is read from the data link the message data is displayed here and the window is turned **green**. If no data is read the window is turned **red**.

#### RP1210 Data Message Window (VDA - Vehicle)

```
TS[1644571]:[01][18][FE][CA][00][FF][FF][64][00][02][00][FF][FF]
TS[1644571]:[01][0C][F0][02][03][D0][00][00][FF][F7][00][00][03]
TS[1644579]:[01][18][FE][EE][00][9D][FF][FF][FF][FF][FF][FF][FF]
TS[1644580]:[01][0C][F0][02][03][D0][00][00][FF][F7][00][00][03]
TS[1644590]:[01][0C][F0][02][03][D0][00][00][FF][F7][00][00][03]
TS[1644595]:[01][0C][F0][0C][03][00]
```

*AVT HD Advanced Test – RP1210 Data Message Window (VDA – Vehicle) indication of success with data.*

## 2.3 Not Seeing Diagnostic Tool device in HD OEM Application VDA Selection List

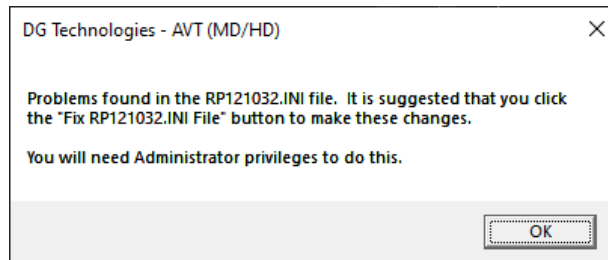
If you have installed the Diagnostic Tool drivers and can get AVT to a RP1210 Status of Green you should be able to configure your diagnostic application to use the Diagnostic Tool. If your diagnostic application does not display in the VDA selection dialog box, this could indicate one of three things:

1. The application is not RP1210 compliant and does not work with the Diagnostic Tool.

- a. Some applications require a specific, proprietary adapter.
2. Application is compliant, but Diagnostic Tool does not support the protocol needed.
3. Problem with the main INI file – See Fix INI file.
  - a. Some VDAs create issues with the INI file when they install/uninstall.
  - b. Many OEM diagnostic applications are aware of this issue and can read through the errors.

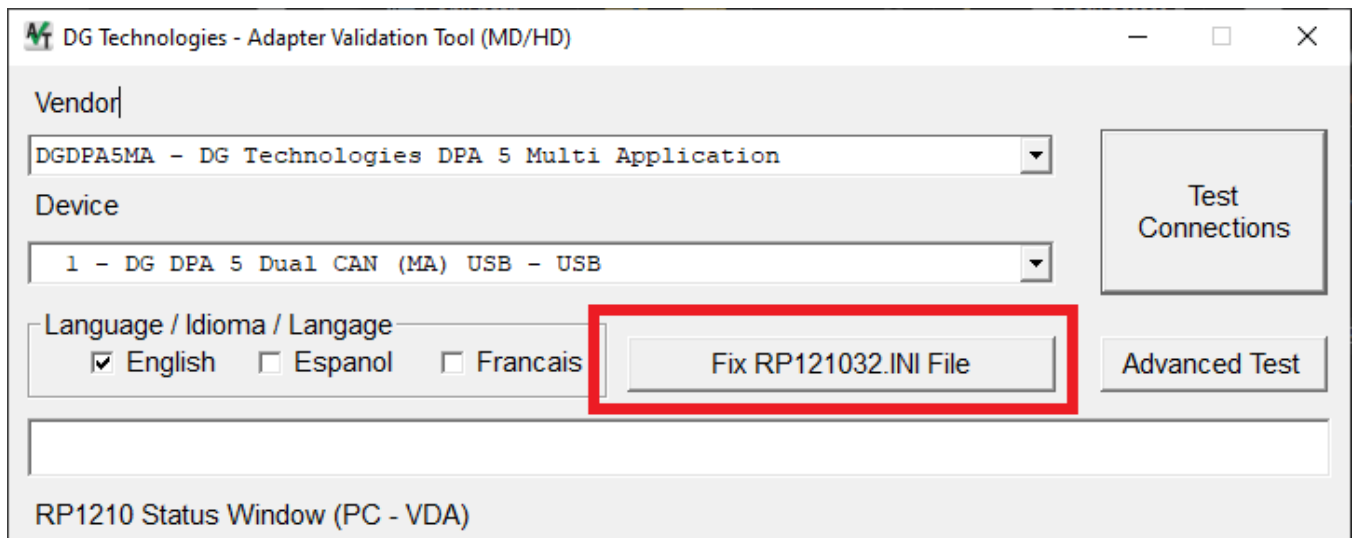
### 2.3.1 Fix INI Application

When the AVT HD software is launched, you will be told if a problem exists in the RP121032.INI file.



*AVT HD dialog displayed at program launch notifying of RP121032.ini problems.*

If you wish to fix this issue, which is **strongly recommended**, press the **Fix RP121032.INI File** button on the main AVT HD screen. If your PC is running Windows or Windows 7, you will be prompted for administrator privileges. The following is the dialog box that will appear when AVT is launched and a problem is found in the main INI file.

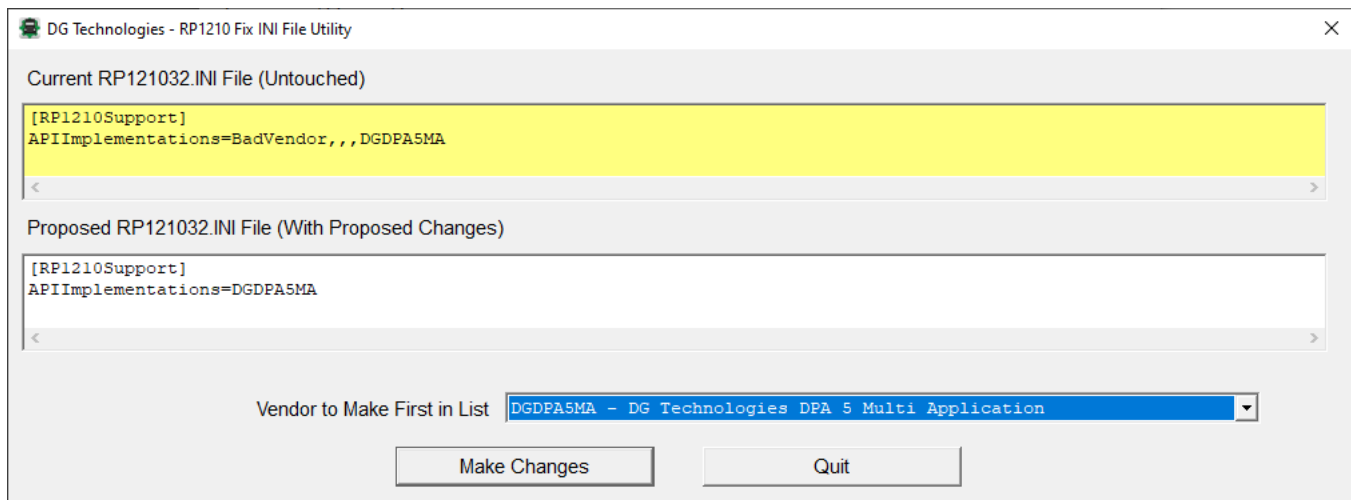


*AVT HD Fix RP121032.INI File Button*

When you choose the **Fix RP121032.INI File** selection, AVT will bring up a separate program called **Fix INI** that will allow you to view and fix the INI file if there are errors detected.

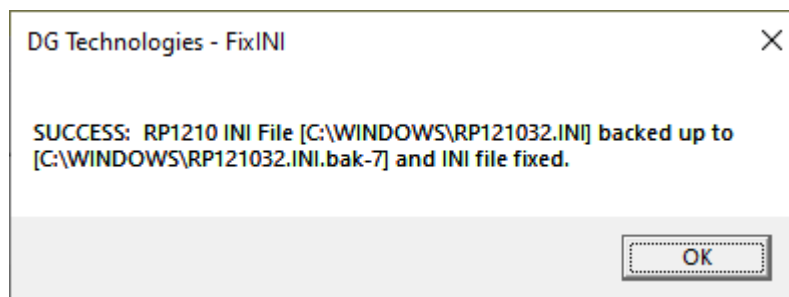
The **Current RP121032.INI File (Untouched)** box shows what is currently in the global file that vendors are defined in. In the example below this is colored yellow to indicate that there is a problem with it.

The **Proposed RP121032.INI File (With Proposed Changes)** box shows what the Fix INI program will do to correct formatting errors in this file. Only after you select the **Make Changes** button will the application save the changes to the file.



*Fix INI showing original and edited RP121032.ini file.*

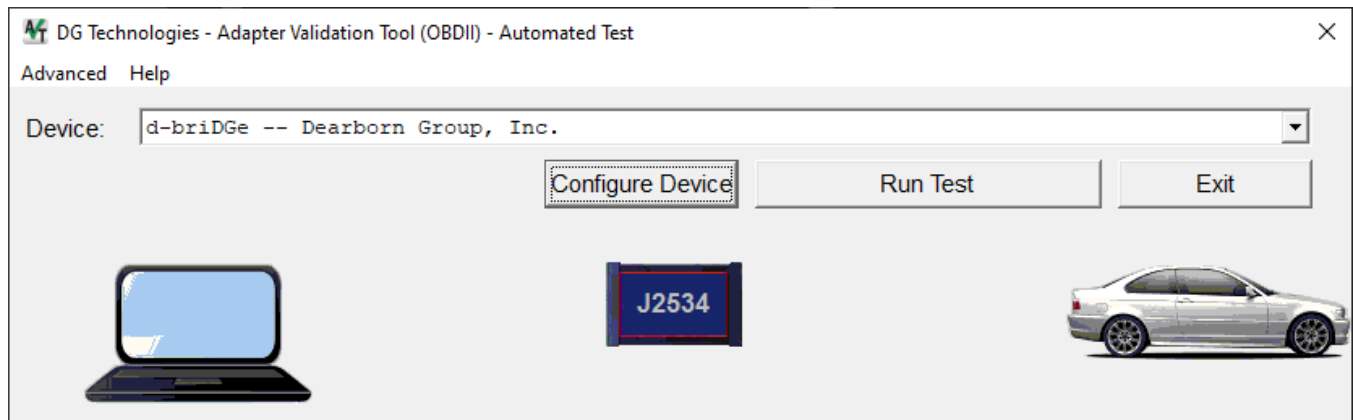
If you choose the **Make Changes** button you will be presented with a message box indicating that the edits were successfully made or not. Should you want to return to the unedited version of the RP121032.ini file the original file is saved on the computer with a unique file name.



*Dialog confirming that changes were successfully made to the RP121032.ini file.*

### 3 AVT (OBDII) – Adapter Validation Tool for Light and Medium-Duty Vehicles

This selection covers all J2534 tools. By default, AVT OBDII launches in Automated Test mode. All J2534 protocols and at a variety of common baud rates are scanned in this mode to determine what protocols are present on the vehicle. To switch between Automated Test mode and Manual Test mode use the menu bar.



*AVT OBDII Automated Test*

#### 3.1 AVT OBDII Automated Test





##### 3.1.1 Configure Device

To configure the Device currently selected choose this button. This will launch the vendor supplied configuration application. This applications contents and appearance vary by vendor so consult the tools documentation on how to use this software.

##### 3.1.2 Run Test

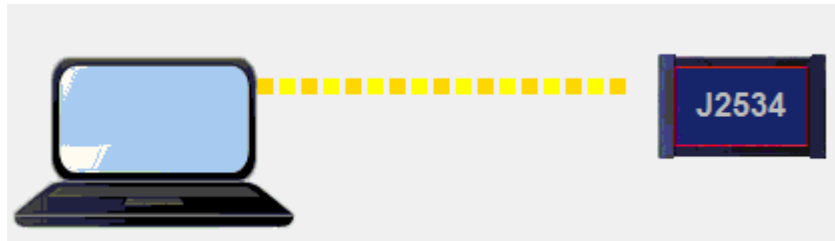
When you choose this button all the common OBDII protocols and baud rates are scanned if a connection to the tool can be established. Colored coded lines between the PC, tool and vehicle images on the screen keep you informed of what is going on and the status of each step.

- Ensure proper connections of Diagnostic Tool to vehicle and PC.
- Turn ignition key to "On" and click on **Run Test**.
- The connection to the tool will be attempted and if established the OBDII protocols will be scanned.
- This is a Pass/Fail test. During the test process the line colors will change. Look at the table and images below to gain an understand of what the different colors mean during AVT OBDII Automated Test mode.
- Click on **Exit** when done.

|        |   |   |
|--------|---|---|
| Red    |    | Unable to connect to tool or no protocols detected                                  |
| Green  |    | Green Line from indicates a successful test of either the tool or protocol sections |
| Orange |   | Connection to tool or protocol being attempted                                      |

*AVT OBDII Automated Mode Color Coding Chart*

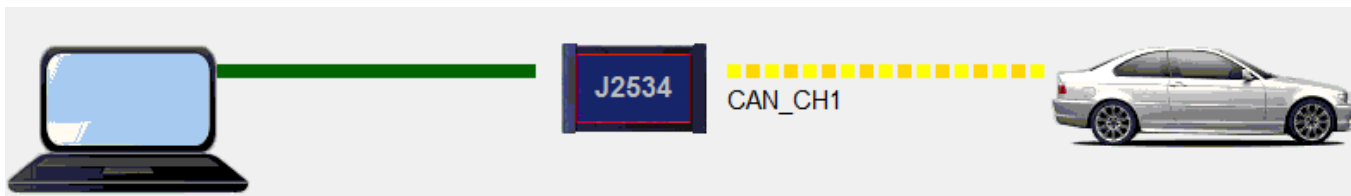
### 3.1.2.1 Run Test Screen Examples



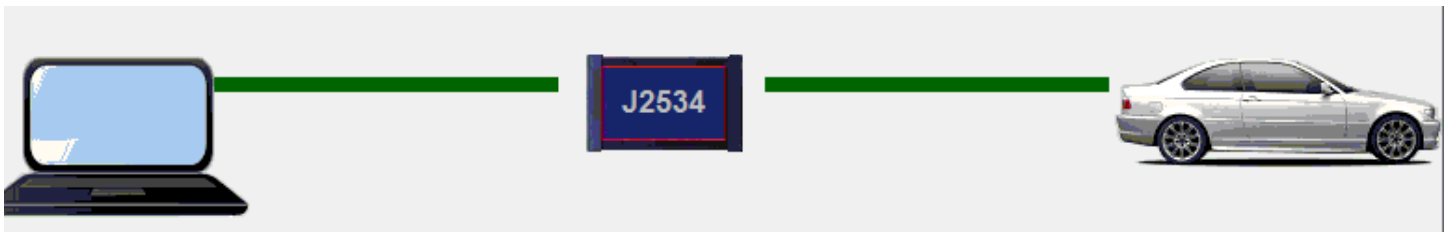
*AVT OBDII Automated Test attempting to connect to tool*



*AVT OBDII Automated Test example of failed connection to tool*



*AVT OBDII Automated Test example of successful connection to tool and vehicle protocol CAN\_CH1 being scanned.*



*AVT OBDII Automated Test example of successful connection to tool and vehicle protocol.*

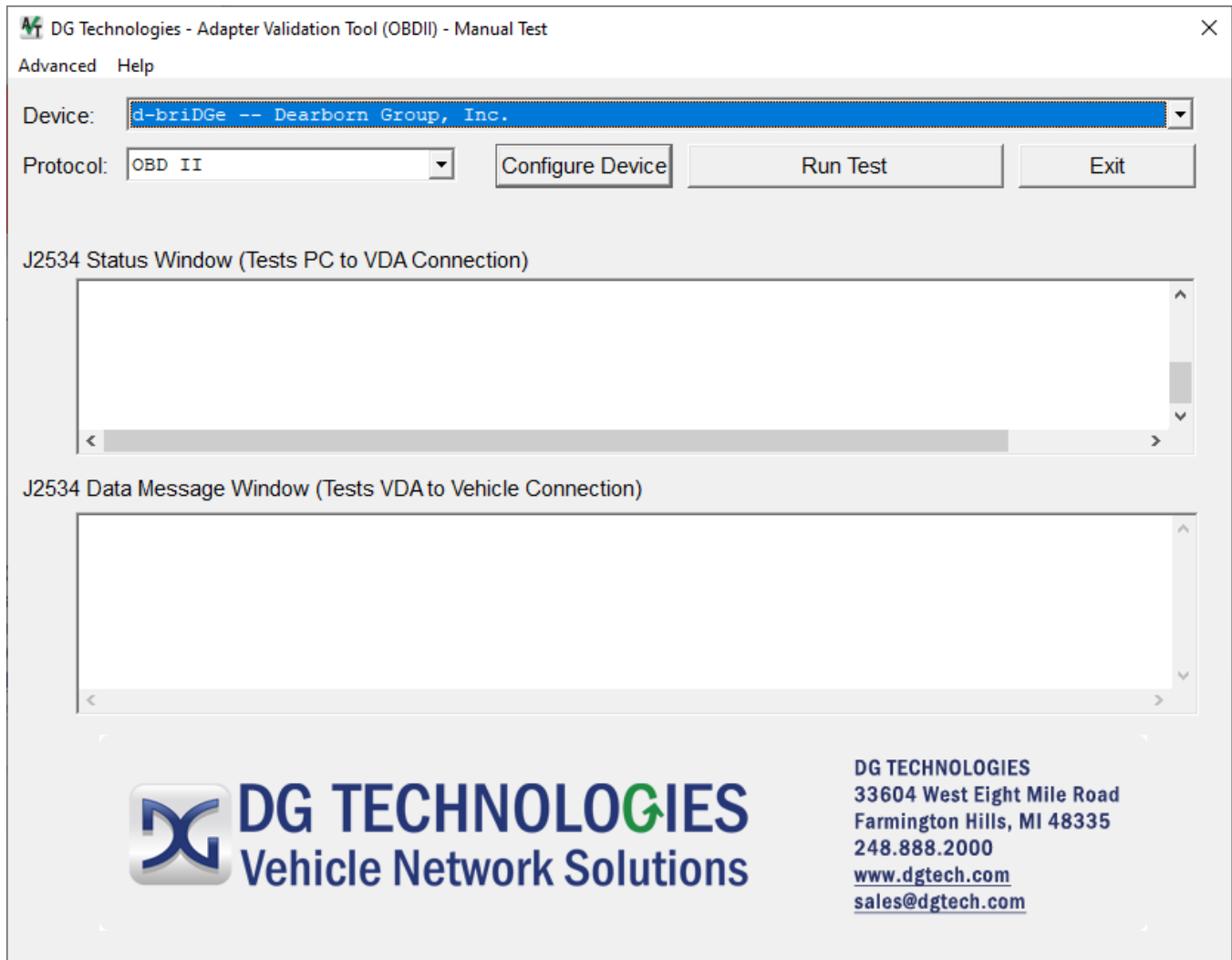
### 3.1.3 AVT OBDII Automated Test Outcomes

Should the connection to the tool fail no protocol connections will be attempted. A screen detailing what steps you can take to try to fix the tool to PC connection failure will be displayed.

- Ensure both connections at each end of USB cable, between the J2534 device and the PC, are secure.
- Ensure J2534 device was properly installed on PC and possibly re-install.
- Ensure the J2534 device is powered with power light illuminated.
- If problem persists, try a different cable.
- If after following the **Test Results Discussion and Next Steps** screen, you cannot get the adapter to read data contact the tool manufacture technical support.

### 3.2 AVT OBDII Manual Test

This is the engineering interface to the J2534 tool selected. An understanding of the vehicle network and the SAE J2534 API will be needed to successfully use this part of the application. Using the **OBD II** protocol selection means that AVT will attempt to connect using all OBDII protocols that the selected adapter supports (i.e. J1850VPW, ISO9141, ISO14230, ISO15765, etc.) and with all OBDII options and OBDII speeds for that protocol (i.e. CAN 1Mb 11-bit, CAN 1Mb 29-bit, CAN 500Kb 11-bit, CAN 500Kb 29-bit, etc.). DG recommends using the OBDII protocol setting initially since all vehicles after 1996 must support an OBDII protocol.



AVT OBDII Manual Test

#### 3.2.1 AVT OBDII Manual Test Outcomes

If the connection to the tool can be established, then the connection to the Protocol specified in the drop-down box will be attempted. The user is responsible for knowing details about what protocols are present on the vehicle if choosing anything other than OBDII. Detailed information about the connection status to the tool will be displayed in the **J2534 Status Window (Test PC to VDA Connection)** window. Details about the data link messages read will be displayed in the **J2534 Data Message Window (Tests VDA to Vehicle Connection)** window.

If a connection cannot be established, then the window will turn **red**. A window with the color of **green** indicates success.

## Technical Support

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### 4.1 Technical Support

After reading and following the troubleshooting and validation procedures in this document please check the FAQ page at [www.dgtech.com/faqs](http://www.dgtech.com/faqs). If you are still not able to resolve an issue, please feel free to contact DG technical support. For users in the United States, technical support is available from 9 a.m. to 5 p.m. Eastern Time. You may also fax or e-mail your questions to us. For prompt assistance, please include your voice telephone number and the serial number located on your DG Technologies product.



#### DG Technologies Technical Support

Phone: (248) 888-2000  
Fax: (248) 888-9977  
E-mail: [techsupp@dgtech.com](mailto:techsupp@dgtech.com)  
Web site: [www.dgtech.com/tech-support](http://www.dgtech.com/tech-support)

Users not residing in the United States should contact your local DG representative.



## Limitation Statements

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### 5.1 Limitation Statements

#### 5.1.1 General Limitation and Risk Assignment

To the maximum extent permitted by applicable law, DG Technologies and its suppliers provide support services on an “as-is” basis and disclaim all other warranties and conditions not specifically stated herein, whether express, implied or statutory, including, but not limited to, any warranties of merchantability or fitness for a particular purpose, lack of viruses, accuracy or completeness of responses, results, lack of negligence or lack of workmanlike effort, and correspondence to description. The user assumes the entire risk arising out of the use or performance of the device, its operating system components, and any support services.

#### 5.1.2 Exclusion of Incidental, Consequential and Certain Other Damages

To the maximum extent permitted by applicable law, in no event shall DG Technologies or its suppliers be liable for any special, incidental, indirect or consequential damages whatsoever, including but not limited to: damages for loss of profit, loss of confidential or other information; business interruption; personal injury; loss of privacy, failure to meet any duty (including good faith or of reasonable care); negligence; and any other pecuniary or other loss related to the use of or the inability to use the device, components or support services or the provision of or failure to provide support services or otherwise in connection with any provision, even if DG Technologies or any supplier has been advised of the possibility of such damages.

#### 5.1.3 Limitation of Liability and Remedies

Notwithstanding any damages that you might incur for any reason whatsoever (including, without limitation, all damages referenced above and all direct or general damages), in no event shall the liability of DG Technologies and any of its suppliers exceed the price paid for the device. The user assumes the entire risk and liability from the use of this device.

#### 5.1.4 Right to Revise or Update without Notice

DG Technologies reserves the right to revise or update its products, software and/or any or all documentation without obligation to notify any individual or entity.

#### 5.1.5 Governance

The user agrees to be governed by the laws of the State of Michigan, USA, and consents to the jurisdiction of the state court of Michigan in all disputes arising out of or relating to the use of this device.

#### 5.1.6 Contact

Please direct all inquiries to:

DG Technologies  
33604 West 8 Mile Road  
Farmington Hills, MI 48335  
Phone (248) 888-2000  
Fax (248) 888-9977

## Appendix B – List of Acronyms

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Various acronyms have been used throughout this document.

| Acronym | Description                          |
|---------|--------------------------------------|
| API     | Application Programming Interface    |
| AVT     | Adapter Validation Tool              |
| CAN     | Controller Area Network              |
| CD      | Compact Disk                         |
| CD-ROM  | Compact Disk - Read Only Memory      |
| DG      | DG Technologies                      |
| DPA     | DG Technologies Protocol Adapter     |
| DTC     | Diagnostic Trouble Codes             |
| ID      | Identification                       |
| ISO     | International Standards Organization |
| LED     | Light Emitting Diode                 |
| OBD     | On Board Diagnostics                 |
| OEM     | Original Equipment Manufacturer      |
| PC      | Personal Computer                    |
| RAM     | Random Access Memory                 |
| RP      | Recommended Practice (see TMC)       |
| SAE     | Society of Automotive Engineers      |
| TMC     | Technology and Maintenance Council   |
| UAC     | User Account Control                 |
| USB     | Universal Serial Bus                 |
| VDA     | Vehicle Datalink Adapter             |