



Solution

Title (customer effect)	Volvo Chassis - Data Link Diagnostics - Diagnostic Trouble Codes (DTC) / Fault Codes From Multiple Components - Unable To Connect To Chassis, Programming Failure With Premium Tech Tool (PTT) Errors - Oscilloscope Instructions
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Cause	To provide information on data link diagnosis, including how to use Tech Tool and the Oscilloscope to reference the J1939 data link signal.
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Solution

Overview

Data link codes may cause multiple issues with a chassis, from programming failure to performance and Engine Aftertreatment System (EATS). If multiple modules or components are setting Diagnostic Trouble Codes (DTC) / Fault Codes for the Data Link, it may be necessary to use an Oscilloscope to locate the faulty component or isolate a shorted or broken harness.

Diagrams for each Data Link can be viewed [here](#).

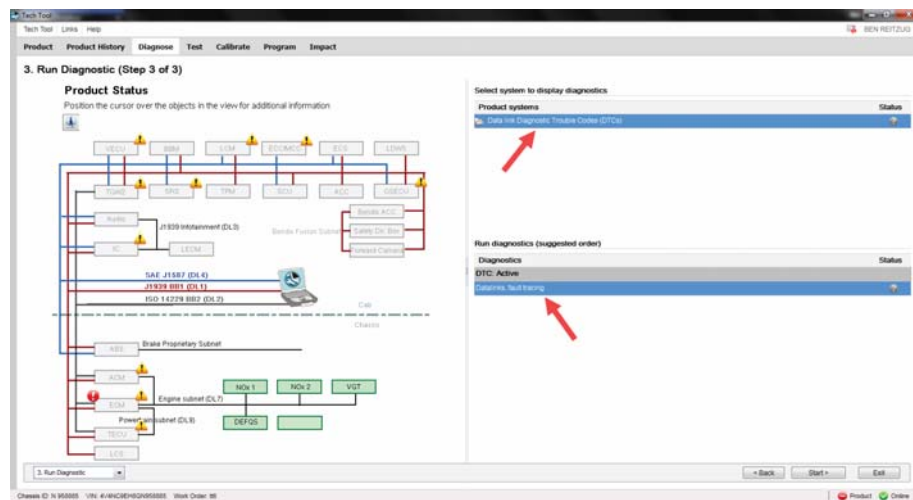
Repair

Prior To Beginning In-depth Diagnostics

1. Check power supply
 - Ensure that batteries have proper voltage and pass load test
 - Make sure that all battery connections are clean and tight
 - Check that grounds are clean and tight
 - Check that any modules coding have good power and ground
2. Verify that there are no non-OEM modules that have been installed on the data link
 - Aftermarket-installed driver computers, GPS, data logs, tracking devices (etc) can interfere with communication between chassis and powertrain modules

If Further Diagnostics Are Required

A. PTT should be utilized prior to proceeding with the below steps. Guided Diagnostics (GD) for Data Links can help to isolate the module or system causing the problem and should be a selectable option with data link codes logged as seen below



Note: Pre-OBd vehicles will have a different operation than the one shown above depending on the codes that are set. Diagnostic steps will be similar to those used for OBD chassis.

B. Begin by checking data link voltages and resistances. Diagnostic steps are outlined in Data Links, Fault Tracing (SB 371-49), which can be found in [IMPACT](#).

- Search by the article title, not bulletin number.
- Also listed under Function Group 371

C. If voltage and resistance are within spec, an Oscilloscope can be used to check signals on the J1939 data link(s) present in the chassis

- The 4-Channel Oscilloscope is the current tool used for diagnosis, part number 88890040, and is available through Parts



- If necessary, a 2-Channel Oscilloscope can be utilized as well. Part number for the 2-channel scope is 9998489. *This tool is no longer available from Parts and is included for reference only.*

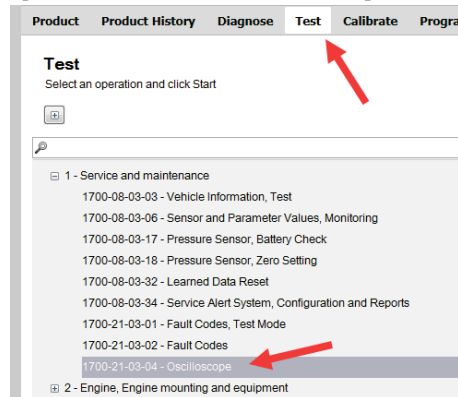


Oscilloscope Procedure

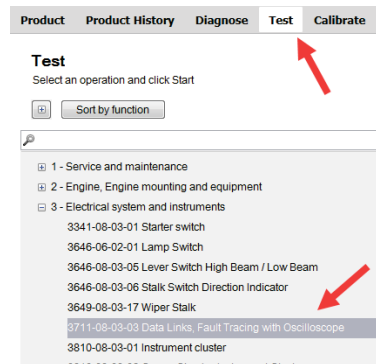
1. Connect the Oscilloscope to the computer

2. Under the Test tab in PTT select the correct operation

- For Pre-OBD chassis (US10 emissions and older, 9-pin Diagnostic Connector), select operation 1700-21-03-04 Oscilloscope

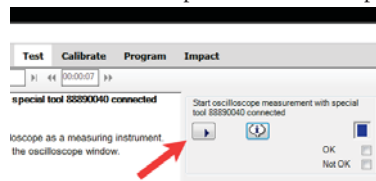


- For OBD chassis (US13 emissions and newer, 16-pin Diagnostic Connector), select operation 3711-08-03-03 Data Links, Fault Tracing With Oscilloscope



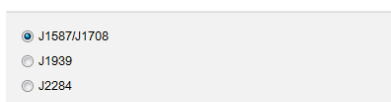
2a. Follow the steps in PTT to open the TiePie Multi Channel software

- For Pre-OBD chassis, pressing the Play button in the upper left-hand portion of the Test screen will open the Oscilloscope program



- For OBD chassis, PTT will provide a button to push that opens the Oscilloscope program following verification steps. Make sure the correct data link is selected

Action



Press the button below to open the program

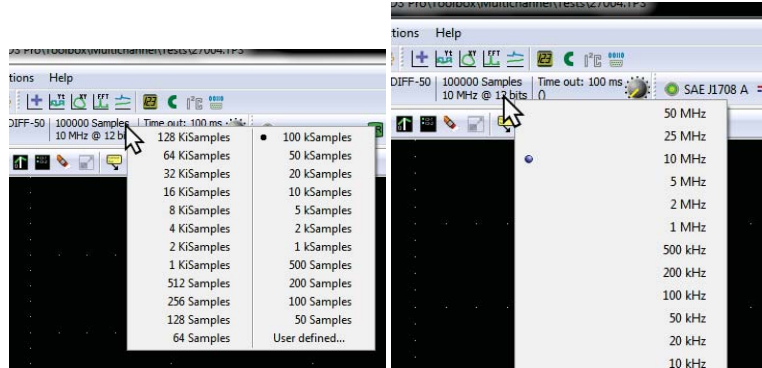


3. Once the program opens, ensure that the graph is properly configured.

- Refer to the screenshot below for the correct settings:



- Values can be set by right-clicking on the value to be changed:

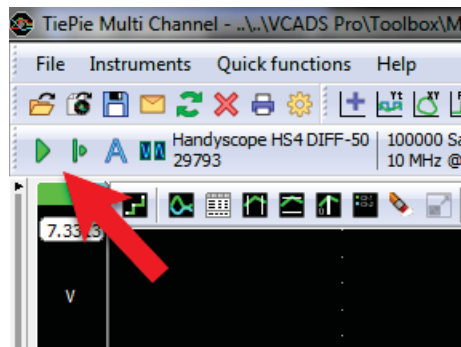


- Channels can be added to or removed from the graph by clicking on the channel number in the menu bar where graph scale is selected.
- Channels can be moved from one side of the window to the other by clicking and dragging on the colored tab at the top of the axis.

4. Connect the Oscilloscope probes to the correct pins for the high and low side of the data link to be metered

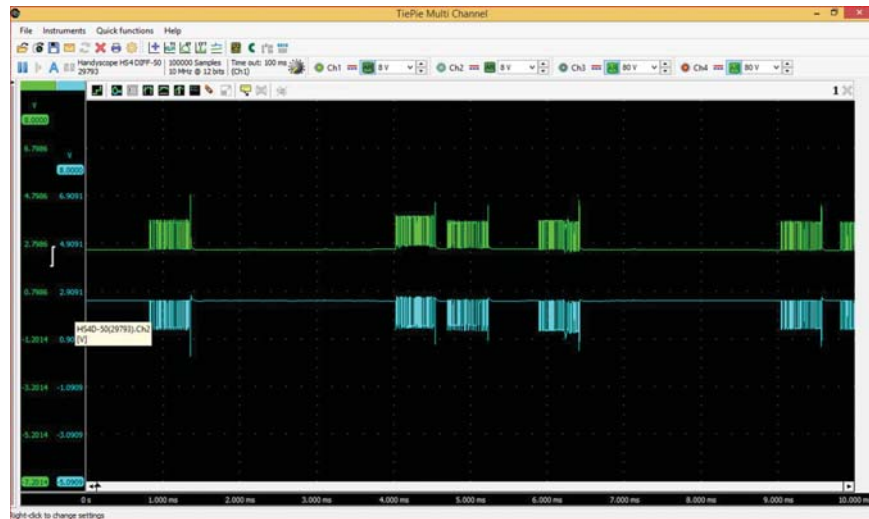
- Diagnostic connector information is included in the Data Link Fault Tracing document indicated in Step B.
- The 4-channel Oscilloscope can monitor two connections at once, which is useful for comparing signal at a component with that at a module.

5. With the probes connected to the correct pins, press the Play button in the upper left corner of the screen

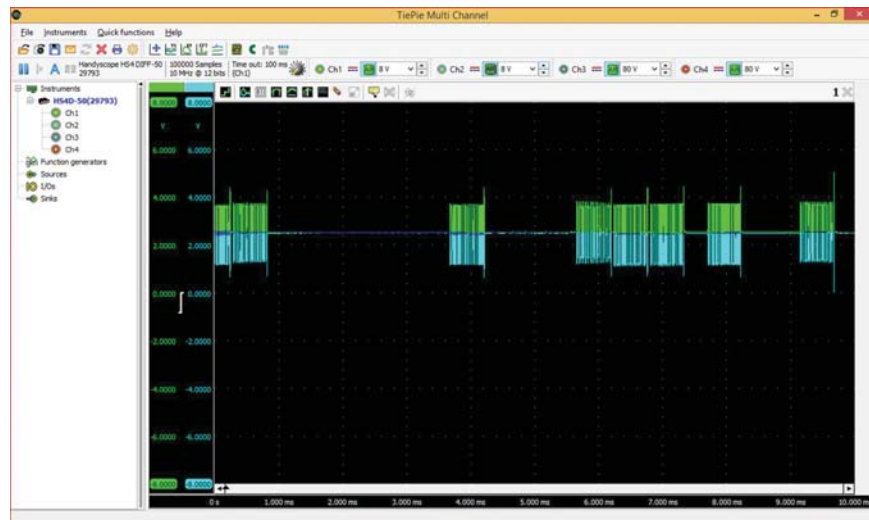


6. Review the J1939 Reference Signals below:

- Two channel:



- Four channel:



7. Compare the results of the reading from the chassis with the reference signals.

- Examples of common component checks can be reviewed in the PDF document attached [here](#)

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Internal comments (BO)	HTML: Page breaks
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Solution visibility	Dealer distribution
.....	
Function(s)/component(s) affected	
.....	
Function affected	CV electronic control unit , 1 1 0 EMS , 3 1 0 TECU , 12 1 0 TGW2 , MID 128 – EMS , MID 130 – TECU , MID 140 – IC04 / IC05 , MID 144 – VECU , Diagnostic tool
.....	
Function Group	
.....	
Function Group	080 General , 083 Electrical system and instrumentation , 090 General , 2841 Electronic Control Unit
.....	
Customer effect	
.....	
Main customer effect	stumble , calibration/programming/pairing/missing operation , diagnostics/methodology , efficiency/abnormal behavior , fault code/display
.....	
Fault code(s)	
.....	

OBD 2013 Diagnostic
Trouble Codes

NETWORK , U010C , U02A3 , U3017

Conditions

Vehicle operating mode when driving , when stationary

Frequency of occurrence of
problem random

Administration

Author A241298

Last modified by RU4469V

Creation date 27-01-2017 21:01

Date of last update 17-11-2017 16:11

Status Published

Average score 5

Number of scores 1

NA_VOLVO_Vehicle_Range

NA_VOLVO_Vehicle_Range Conventional , VNR , VT , VNX , VNL , VNM , VHD , VAH

Engine family

Engine family Cummins , Volvo , D12 , 11L Engine , 13L Engine , 16L Engine

Emission Standard

Emission Standard OBD2017 , US17 GHG , US14 CNG , US04 , US16 , US15 , US07 , US10 , US13
OBD , US14 GHG
