Exercise# 1:
Vehicle Communication Protocols – Normal Readings using a Fluke 87 Series V DVOM with Peak Min/Max Functionality

NAME: _____ **Year/Make/Model** _____

DIRECTIONS:

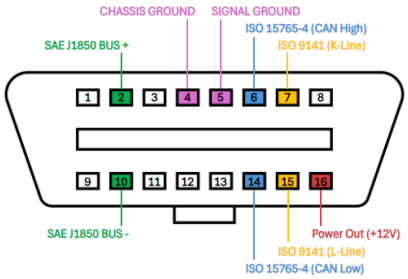
Using a **DLC Breakout Box**, proceed to make the required measurements as indicated in the instructions below. All pin numbers on the DLC will correspond to the numbers denoted on the **DLC Breakout Box**. The suggested **Fluke 87 Series V** DVOM with **Peak min/max functionality** is suggested to be used with this exercise. A **wiring diagram** will need to be obtained to promote an in depth understanding of this exercise. **Note: This Worksheet works well with vehicle designs prior to the Security Gateway Module. (Please review the "Important Notes Section" carefully)**

ON VEHICLE EXERCISE

See "Important Notes" First

Verify Good Feed @ Pin 16

Verify Good Grounds @ Pin 4, 5



Pin 6 = CAN High

Pin 14 = CAN Low

Diagnostic Link Connector

1. Turn the ignition switch to the **Key Off, Engine Off** position. Using a DVOM, you will measure the **resistance value** between pins **6** and **14** of the **DLC Breakout Box**. (Review "Important Notes Section")

2. Please record the resistance value noted on the DVOM here.
   _____ **Ohms**

Reading of 60.9 Ohms

Resistance Test No 1

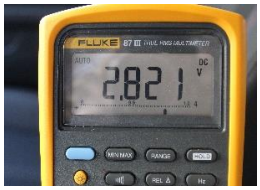
_____ **Instructor**

3. Turn the ignition switch to the **Key On, Engine Off** position. Using a DVOM, measure the voltage at DLC **pin# 6** to **ground (DLC Pin# 4 or 5 are ground circuits)**.
   a. Turn the ignition switch to the **Key On, Engine Off** position. Please record the **average voltage** noted on the DVOM _____ volts.

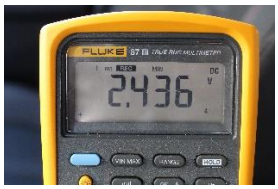
   b. Press the peak min/max button and record your findings below.

      Record the **min** voltage _____ volts.

      Record the **max** voltage _____ volts.



100*ms* **Avg Reading of 2.8**



250*us* **Min Reading of 2.4**

250*us* **Max Reading of 3.3**

4. Using a DVOM, measure the **average voltage** at pin# **14** to **ground (DLC Pin# 4 or 5 are ground circuits)**. (Review "Important Notes Section")

   a. Turn the ignition switch to the **Key On, Engine Off** position. Please record the **average voltage** noted on the DVOM _____ volts.

   b. Press the peak min/max button and record your findings below.

      Record the **min** voltage _____ volts.

      Record the **max** voltage _____ volts.

100*ms* **Avg Reading of 2.4**

250*us* **Min Reading of 1.5**

250*us* **Max Reading of 2.5**

_____ Instructor

IMPORTANT NOTES – Read Completely and Carefully

Steps 1 and 2:

A) Place the DVOM in the **Ohm Setting** as shown below.

B) Verify the CAN high-speed circuit integrity by measuring the resistance across DLC terminals 6 and 14 with a DVOM (**Please wait until all modules fall asleep.)** A normal reading would be **60 ohms +/– 5 ohms**.

Steps 3a and 3b:

C) Be careful with **concepts involving disconnecting the battery** prior to testing. **(a battery disconnect can cause resets to occur, please read the owner's manual carefully for details)**

D) Place the DVOM in the **DC Volts setting** as shown below

E) Verify the CAN high-speed circuit integrity by measuring the **average, min and max DC voltage values**. **Pin 6 is called CAN High**; the **average** value should be **slightly above 2.5 volts.**

F) The **min value** should be at or about **2.5 volts**

G) The **max value** should be at or about **3.5 volts**

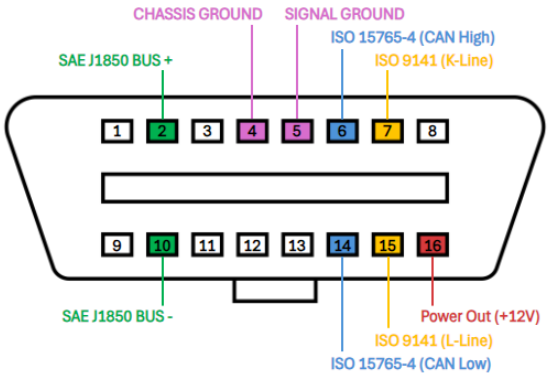
Steps 4a and 4b:

H) Maintain keeping the DVOM in the **DC Volts setting** as shown below

I) Verify the CAN High-speed circuit integrity by measuring the **average, min and max DC voltage values**. **Pin 14 is called CAN Low;** the **average** value should be **slightly below 2.5 volts**

J) The **min value** should be at or about **1.5 volts**

K) The **max value** should be at or about **2.5 volts**



Pin 1 _____

Pin 2 _____

Pin 3 _____

Pin 4 _____

Pin 5 _____

Pin 6 _____

Pin 7 _____

Pin 8 _____

Pin 9 _____

Pin 10 _____

Pin 11 _____

Pin 12 _____

Pin 13 _____

Pin 14 _____

Pin 15 _____

Pin 16 _____

Please indicate per the wiring diagram what information is housed at each individual PIN.

Step 2 Continued:

c. Maintain the ignition switch in the **Key Off, Engine Off** position. Using a DVOM, you will measure the **resistance value** between pins **6** and Ground **(Pin 4 or 5)** of the **DLC Breakout Box**. (Review “Important Notes Section”)

d. Please record the resistance value noted on the DVOM here.
_____ **Ohms**

Reading of 60.9 Ohms

Resistance Test No 2

_____ **Instructor**

e. Maintain the ignition switch in the **Key Off, Engine Off** position. Using a DVOM, you will measure the **resistance value** between pins **14** and Ground **(Pin 4 or 5)** of the **DLC Breakout Box**. (Review “Important Notes Section”)

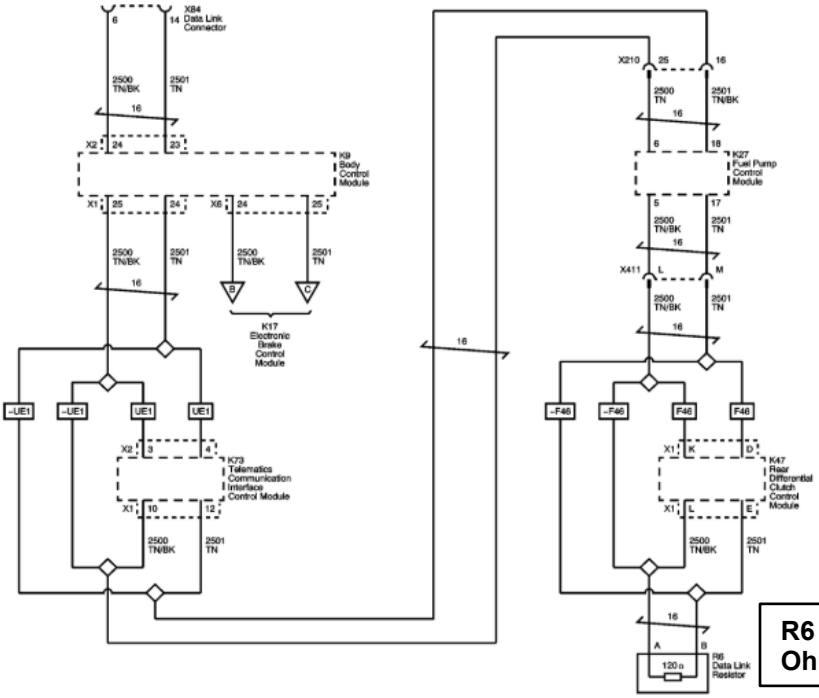
f. Please record the resistance value noted on the DVOM here.
_____ **Ohms**

Reading of 60.9 Ohms

Resistance Test No 3

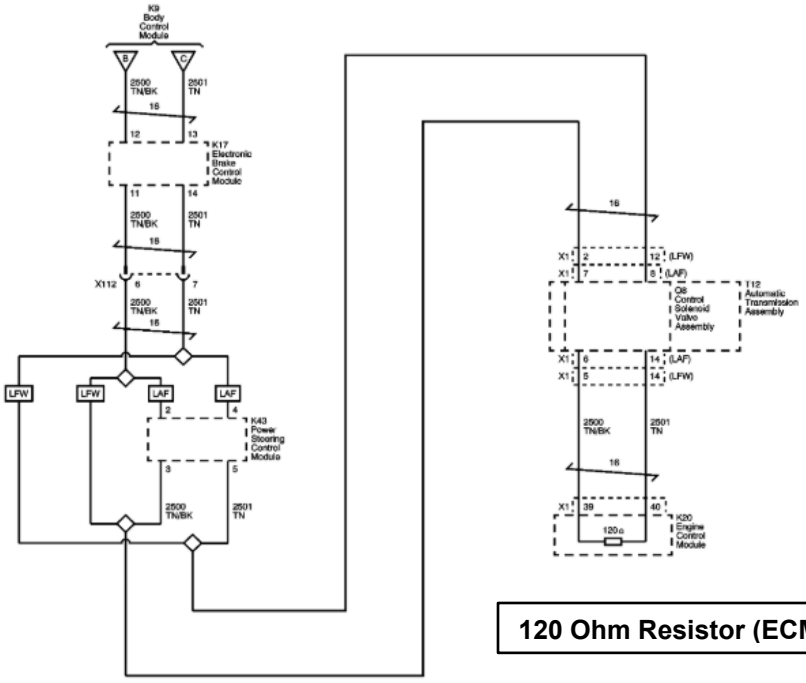
_____ **Instructor**

2012 Chevrolet Equinox



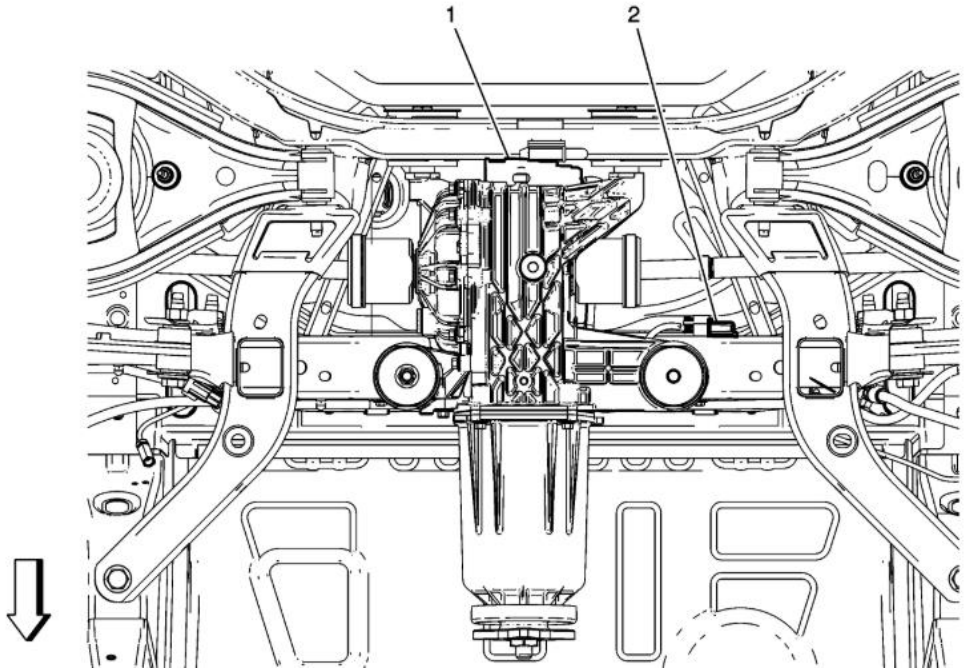
R6 Data Link Resistor (120 Ohm)

Diagrams Coursey of General Motors



120 Ohm Resistor (ECM)

R6 Data Link Resistor Location



(1) Rear Differential Clutch Control Module
(2) R6 Data Link Resistor – *Located under the rear of the vehicle, to the right of the rear axle*

Diagram Coursey of General Motors

R6 Data Link Resistor Location