Ford SCME Ground Wire Repair and Modification

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Introduction

Ford vehicles with heated and cooled seats use a Front Seat Climate Control Module E (SCME) to control the heating and cooling. On F-150s the module is mounted under the passenger seat. The problem is the ground wire connection in one of the electrical connectors overheats and, if left, melts the connector and results in the heated seats malfunctioning.

Although there are several threads on different forums related to this issue, the thread from F150forum.com. originally posted by ***Musclford*** explained the problem and offers a solution. ***Musclford*** deserves the credit for the following.

I have edited the content for the purposes of creating this document. Since my truck is a 2016 F1-50, I have added the information related to that Model Year, knowing that many of the 2015+ F-150s are the same or similar.

Background

The SCME has three electrical connectors which provide the control signals and power to operate the heated and cooled front seats on the F150 equipped with that option. Figure 1 shows the wiring operating the passenger side seat. Figure 2 shows the wiring for the driver side seat. Figure 3 shows the power, ground, and communications circuits.

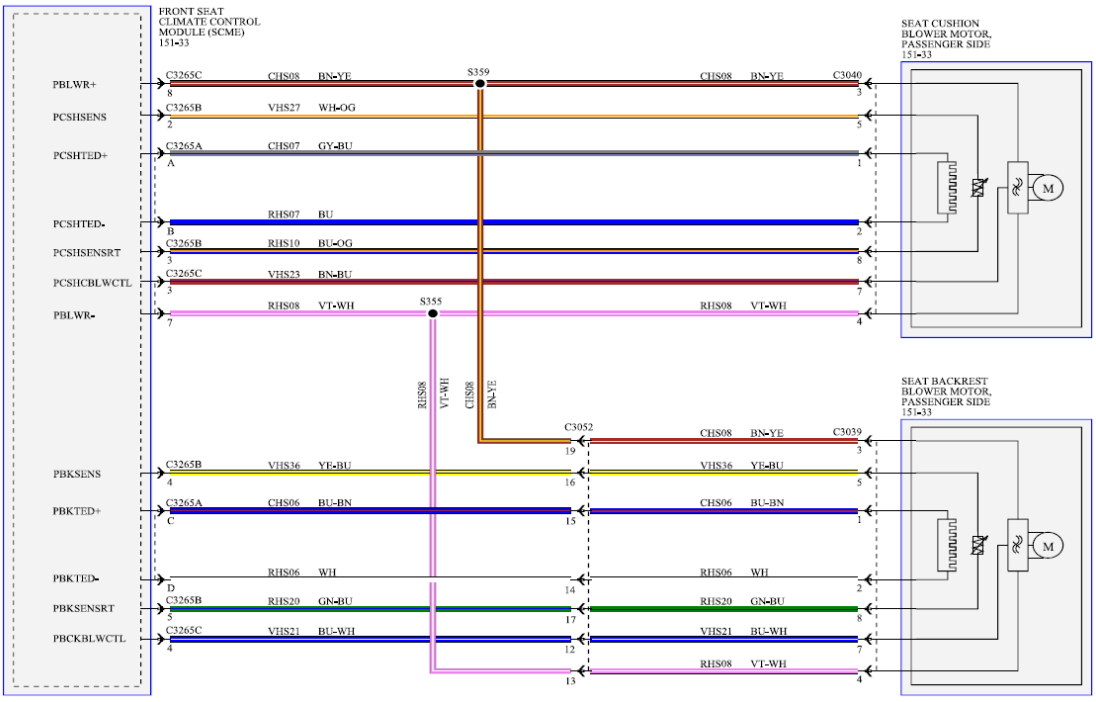

Figure 1 – Passenger Side Climate Controlled Seat Wiring Diagram

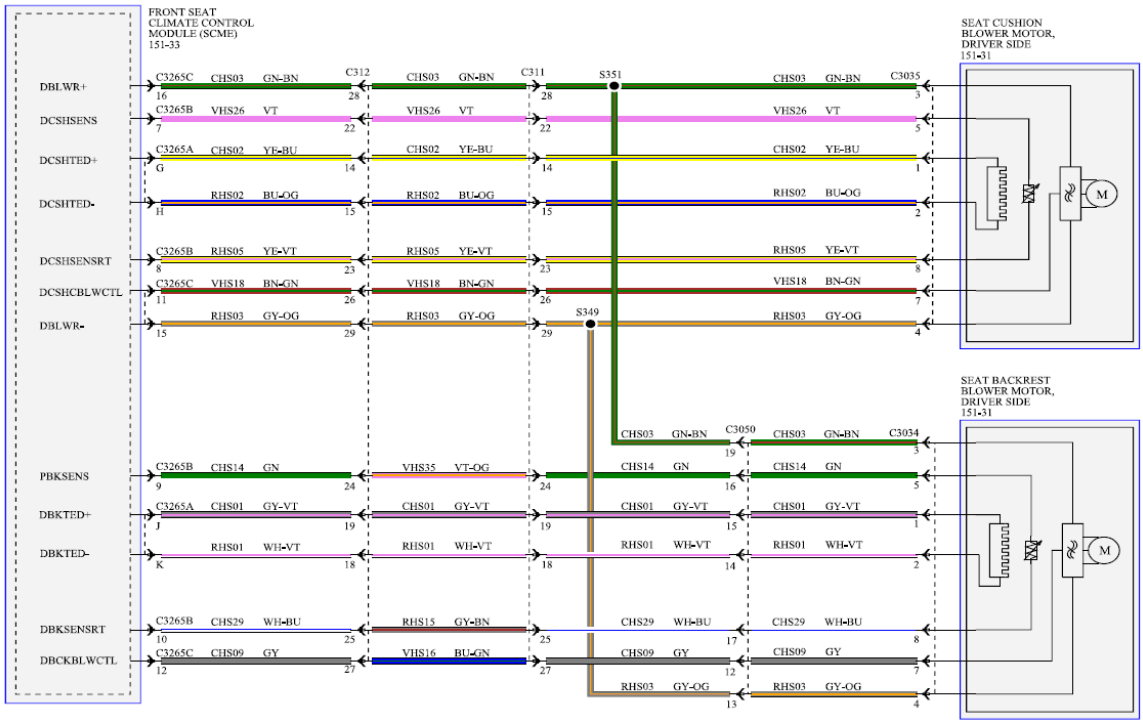

Figure 2 - Driver Side Climate Controlled Seat Wiring Diagram

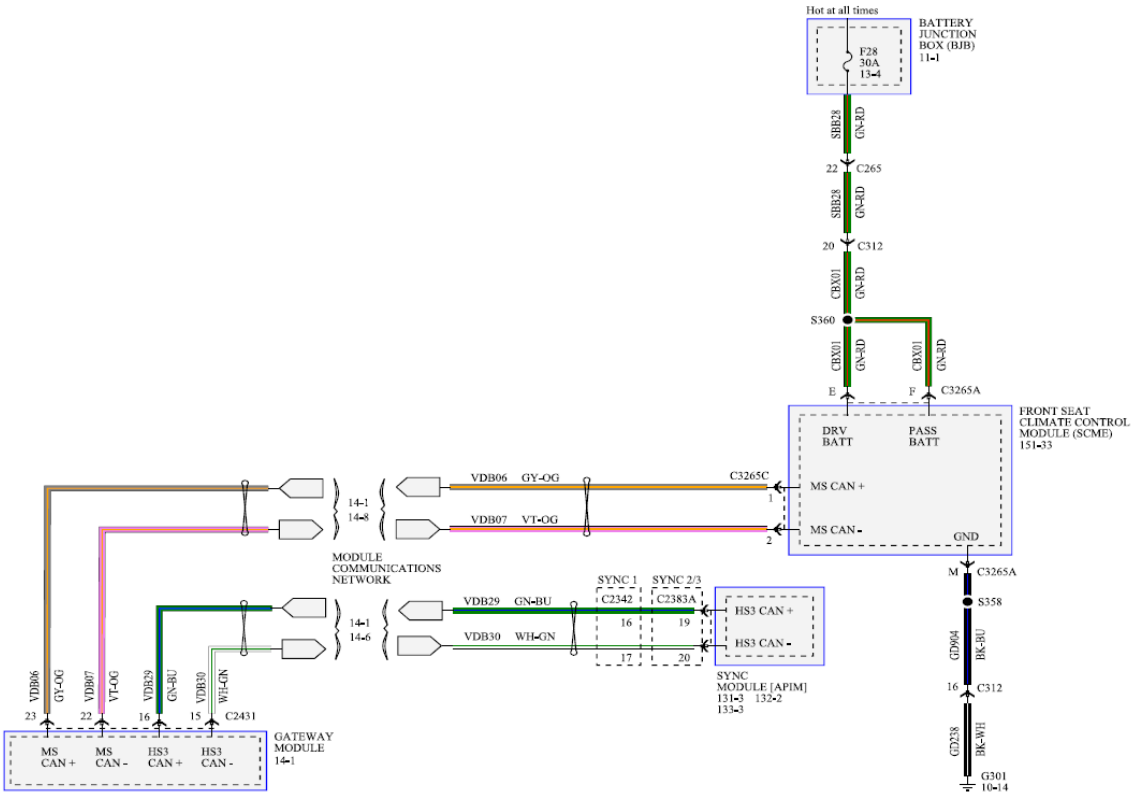

Figure 3 - SCME Power and Communication Wiring Diagram

The three electrical connectors for the SCME are connectors C3265A, C3265B, and C3265C. Figure 3 clearly shows the problem area, that being the ground wire connection in connector C3265A, Pin-M. Extended operation of the heated seats overheats the connection, melting the connector and causing the heated seats to malfunction.

Connector C3265A

This is a 12-pn connector and supplies the power to the heater elements. Pinouts and shown in Table 1 below.

Table 1 - Connector C3265A Pinout

Pin	Circuit No.	Wire Gauge	Colour Code	Description
A	CHS07	14	GY-BU	Passenger Seat Cushion Heater (+)
B	RHS07	14	BU	Passenger Seat Cushion Heater (-)
C	CHS06	14	BU-BN	Passenger Back Heater (+)
D	RHS06	14	WH	Passenger Back Heater (-)
E	CXB01	14	GN-RD	Run/Start Seat Power
F	CXB01	14	GN-RD	Run/Start Seat Power
G	CHS02	14	YE-BU	Driver Seat Cushion Heater (+)
H	RHS02	14	BU-OG	Driver Seat Cushion Heater (-)
J	CHS01	14	GY-VT	Driver Back Heater (+)
K	FHS01	14	WH-VT	Driver Back Heater (-)
L	—	—	—	Not Used
M	GD904	14	BK-BU	Ground

The connector has two pins providing power to the module (Pins-E, F) and only one pin for ground (Pin-M). This results in an overloading of the ground connection, Pin-M.

Note: *If a bare housing is used, the terminals required to complete the assembly are described later in this document.*

Connector C3265B

This is a 10-pin connector and primarily supplies the signal power and return to the temperature sensors. The connector is available as a pigtail assembly, Ford AU2Z-14S411-BLA or Motorcraft WPT-1174. Pinouts and shown in Table 2 below.

Table 2 - Connector C3265B Pinout

Pin	Circuit No.	Wire Gauge	Colour Code	Description
1	—	—	—	Not Used
2	VHS27	20	WH-OG	Passenger Seat Cushion Temperature Sensor
3	RHS10	20	BU-OG	Passenger Seat Cushion Temperature Return
4	VHS36	20	YE-BU	Passenger Back Temperature Sensor

5	RHS20	20	GN-BU	Passenger Back Temperature Return
6	—	—	—	Not Used
7	VHS26	20	VT	Driver Seat Cushion Temperature Sensor
8	RHS05	20	YE-VT	Driver Seat Cushion Temperature Return
9	CHS14	20	GN	Passenger Indicator High
10	CHS29	20	WH-BU	Driver Seat Heater Switch

This connector will not be repaired or modified during this operation.

Connector C3265C

This is a 16-pn connector and primarily supplies the power and return to the cooling fans and network communications. The connector is available as a pigtail assembly, Ford AU2Z-14S411-BGA or Motorcraft WPT-1165. Pinouts and shown in Table 3 below.

Table 3 - Connector C3265C Pinout

Pin	Circuit No.	Wire Gauge	Colour Code	Description
1	VDB06	20	GY-OG	Medium Speed CAN Bus – High
2	VDB07	20	VT-OG	Medium Speed CAN – Low
3	VHS23	20	BN-NU	Passenger Seat Cushion Blower Speed Control
4	VHS21	20	BU-WH	Passenger Back Blower Speed Control
5	—	—	—	Not Used
6	—	—	—	Not Used
7	RHS08	18	VT-WH	Passenger Fan (-)
8	CHS08	18	BN-YE	Passenger Fan (+)
9	—	—	—	Not Used
10	—	—	—	Not Used
11	VHS18	20	BN-GN	Driver Seat Cushion Blower Speed Control
12	CHS09	20	GY	Passenger Indicator Low
13	—	—	—	Not Used
14	—	—	—	Not Used
15	RHS03	18	GY-OG	Driver Fan (-)
16	CHS03	18	GN-BN	Driver Fan (+)

This connector will not be repaired or modified during this operation.

SCME Removal

Prior to any work being preformed, the battery positive (+) terminal should be disconnected from the battery. This should be done anytime electrical connectors are unplugged and plug in. This practise will help ensure that no power spikes are introduced into any of the modules in the vehicle.

The SCME is found under the front passenger seat. The module is held in place by two 25mm long Torx head cap screws. Figure 4 below shows the SCME location.

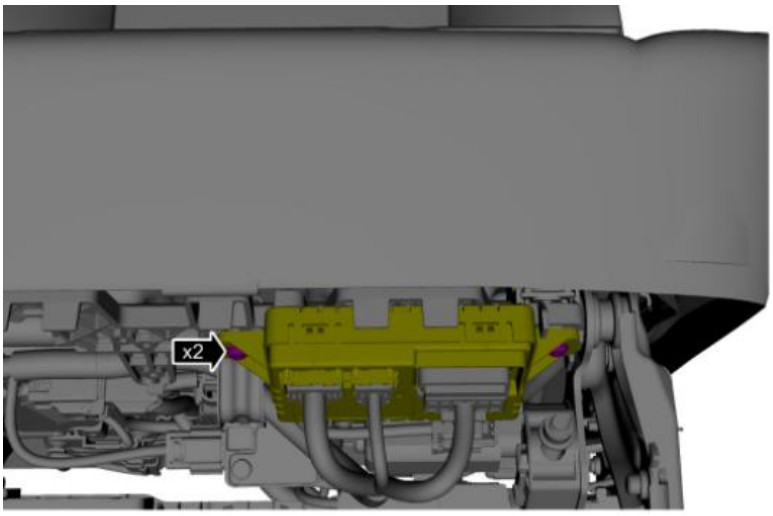

Figure 4 - SCME Location Under Passenger Seat

There are two smaller (C3265B and C3265C) connectors and one larger (C3265A) connector on the module which can easily be removed. The smaller connectors have a blue CPA (Connector Position Assurance) which needs to be lifted to unlock the connectors. The larger connector (C3265A) has a lever tab which needs to be pushed against the housing while lifting to unlock it.

Note: *It may be difficult to disconnect the C3265A large connector if a failure has occurred due to the plastic housing melting and fusing to the module. It may be necessary to pry the connector while wiggling it in order to remove it.*

Figure 5 below shows the SCME with the three connectors that need to be removed.

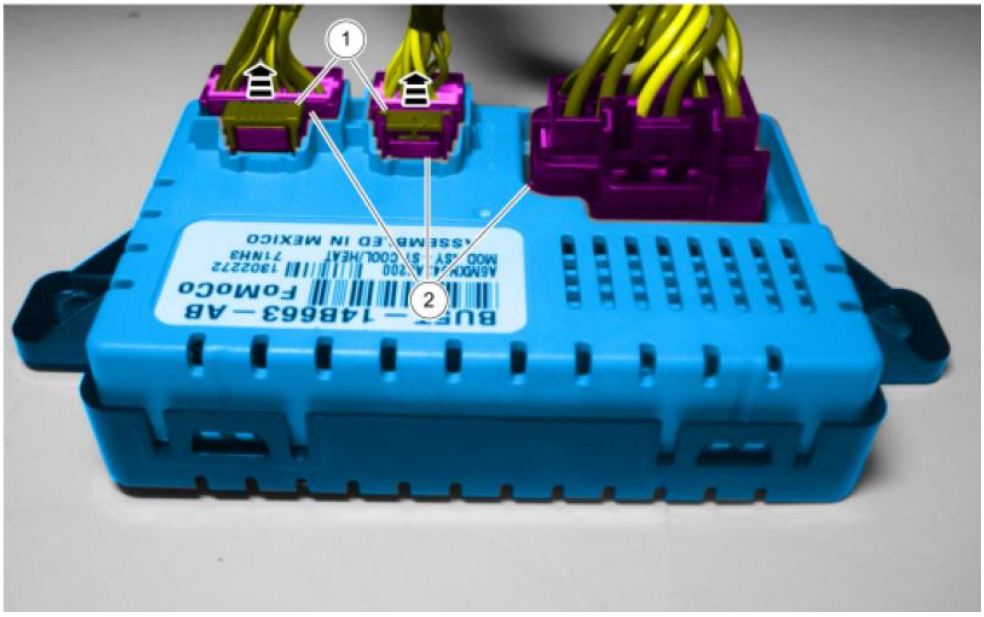

Figure 5 - SCME Module with Electrical Connectors to be Removed

Inspection

The larger C3265A connector should be inspected for any damage, even if your seat heaters are working. Figure 6 shows what to look for on the wire out end of the connector while Figure 7 shows a typical failure on the terminal side. Notice the discoloration of the BL-BU ground wire at Position M.

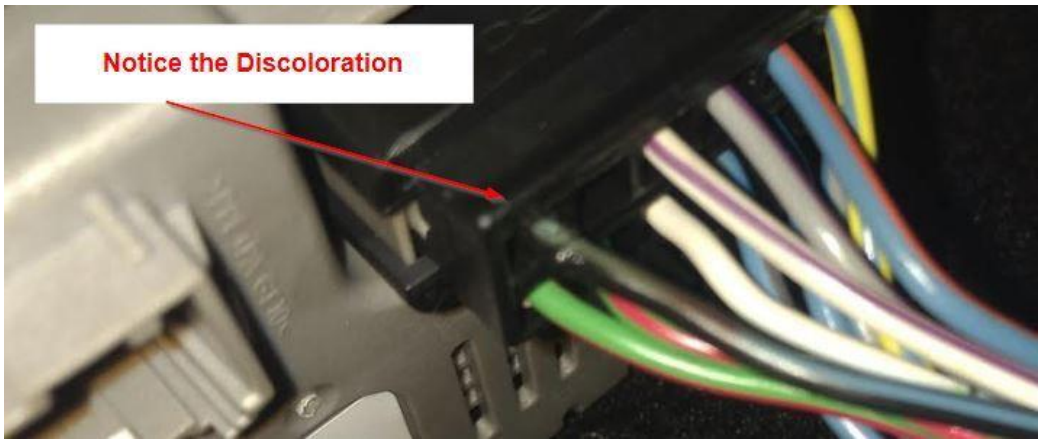

Figure 6 - Wire Side Defect

Figure 7 - Terminal Side of Connector with Failure

The above picture is typical of what the connector will look like after a failure. Figure 8 shows the damage to the outside of the module. This damage residue will need to be removed as part of the operation.

Figure 8 - SCME Damage from Terminal Failure

Figure 9 shows the damage to the module pin. The pin next to it is not used in the factory connector. This is obviously a design flaw which results in the failure after extended use of the heated seats.

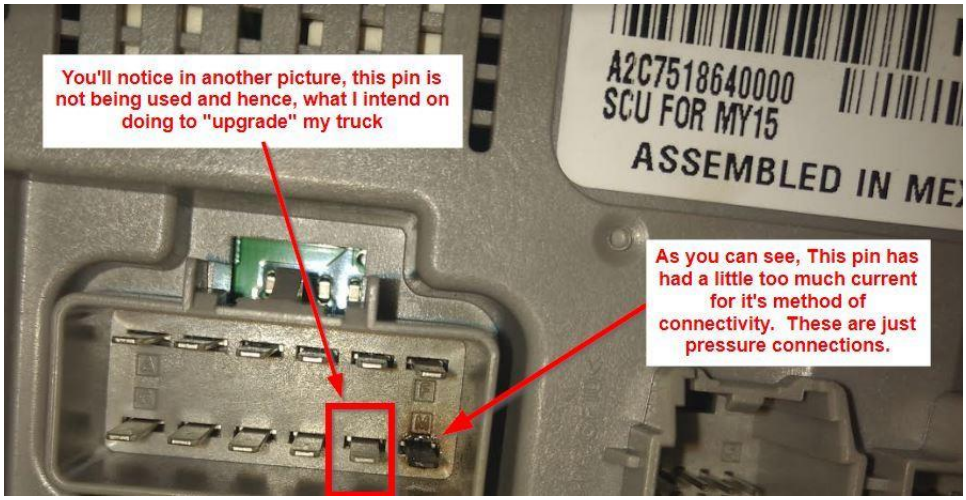

Figure 9 - SCME Pin Damage

SCME Repair

Figure 10 below shows how to open the module case. It is a simple lifting of the four plastic tabs off the stops and the cover can be removed to get access to the PCB (Printed Circuit Board).

As previously discussed, if a failure has occurred, the pin for Position M needs to be cleaned and its connection to the circuit board inspected and repaired if necessary.

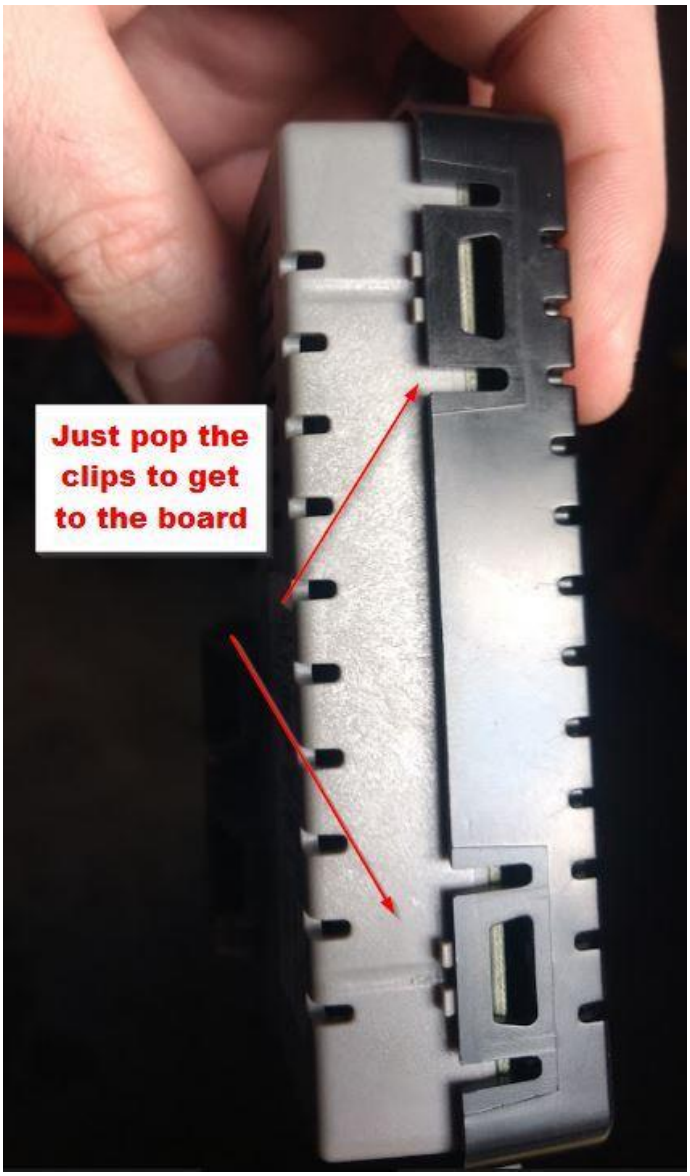

Figure 10 - SCME Cover Removal

Figure 11 shows the typically damaged pin on the removed PCB. A damaged pin must be cleaned for the repair to be effective. A small wire wheel, brush, or fine steel wool can be used to clean the pin. After cleaning, the PCB should be blown with air to ensure the assembly is clear of any debris from the cleaning process.

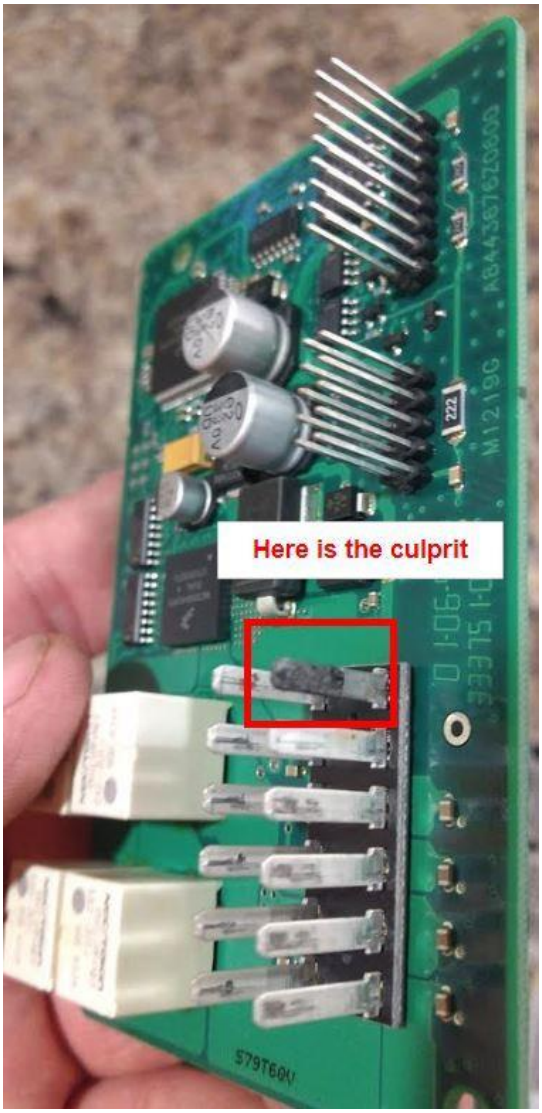

Figure 11 - Damaged PCB Pin

The pin connection to the PCB must be inspected for damage and re-soldered if need necessary. A multi-meter should be used to ensure a proper connection between the pin and the board.

The pin next to the damaged one should be checked for continuity as well. This pin is a second ground and will be utilized to modify the wiring and eliminate any overheating issues which caused the failure (or potential failure). Continuity between these two pins should be confirmed as well at this time.

Figure 12 shows the pin connections to the back of the PCB. Re-solder any of the connections if required.

It is recommended to use a small, low wattage soldering iron for any repairs. Be careful not to overheat the PCB during soldering operations. Remove any residual flux or debris from the re-soldering operation. Figure 13 shows a successfully cleaned pin.

Once the repairs have been completed and pin continuity confirmed with a multi-meter, the PCB can be re-installed in the module housing and the cover replaced. Ensure that all four lock tabs have properly seated.

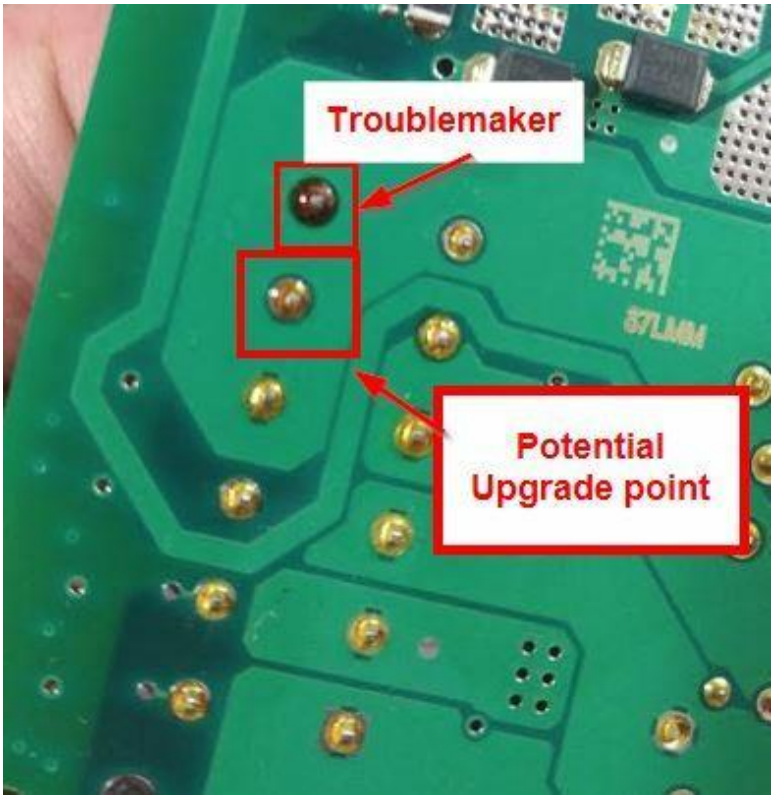

Figure 12 - Pin Connection to Back of PCB

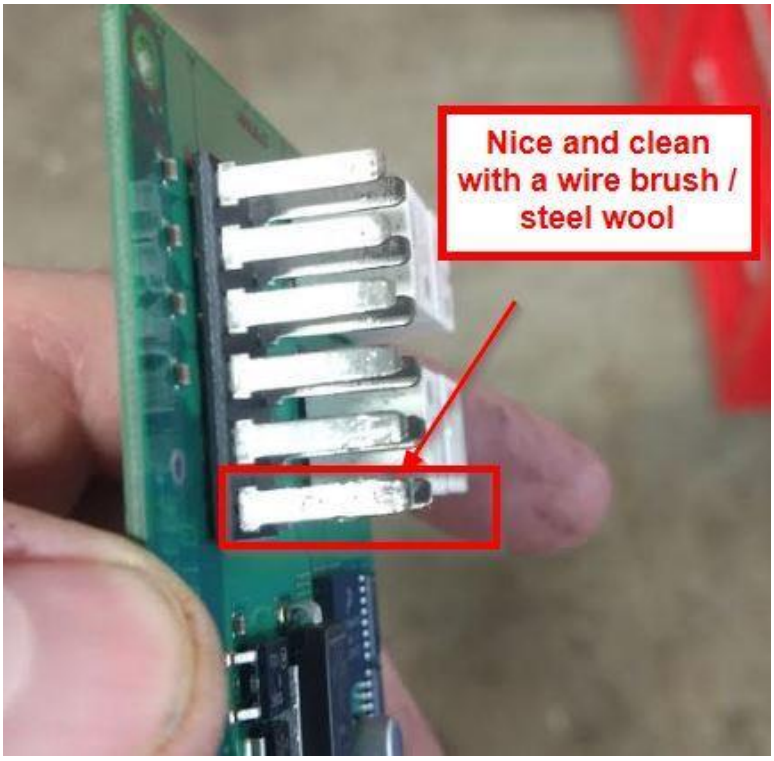

Figure 13 - Repaired Pin

Connector C3265A Replacement

If this connector has been damaged and needs replacement, either a pigtail assembly can be used, or a bare connector housing and terminals can be utilized. If a failure has not yet occurred, it may be more economical to purchase a new crimp terminal and simply install it in Position L (originally empty) on the existing connector. Depending on location and shipping costs, it may be more economical to use a pigtail assembly.

Pigtail Parts

The pigtail is available from a variety of suppliers under the Ford P/N 3U2Z-14S411-ZMB or Motorcraft P/N WPT-928. The package includes crimp connectors and heat shrink tubing to facilitate splicing in the new wires with pre-crimped terminals along with an instruction sheet. This is handy if you do not have a proper terminal crimper. Figure 14 shows the components of the package.

Figure 14 - Motorcraft WPT-928 Package Contents

Connector Parts and Tools

All the required parts can be ordered as a connector housing assembly and the appropriate crimp terminals. The connector is known under several OEM names including: Aptiv, Delphi, Packard, PED, and AC Delco.

The connector is part of the unsealed GT 280 Series. Figure 15 shows the individual parts that make up the complete connector assembly, although an 8-pin connector is shown.

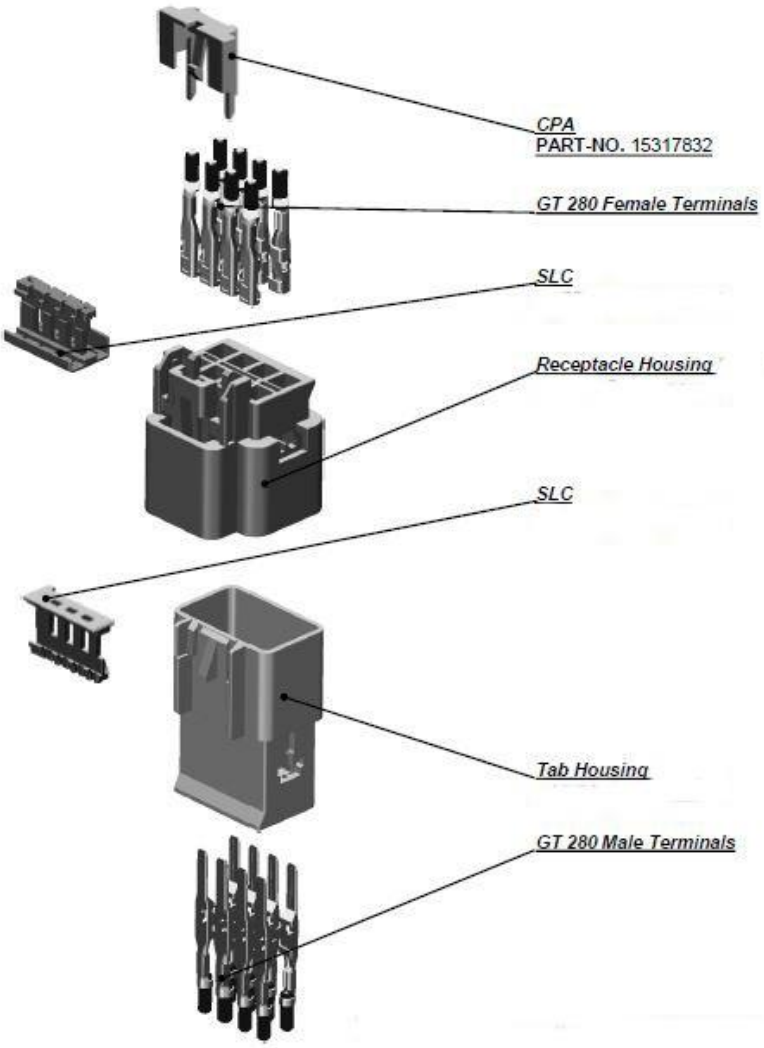

Figure 15 - Delphi GT-280 Series Connector Parts

The tab (male) housing, tab housing SLC (Slide Lock Cover), and male terminals are not required as they are essentially replaced by the parts included in the SCME module assembly. The Receptacle does not utilize a CPA (Connector Position Assurance) as it has nothing to lock on.

The 12-way unsealed receptacle housing without CPA is available as a pre-assembly, P/N 15326110 or the newer P/N 13513830, and includes the following:

- Qty 1, 12-Way Receptacle Housing, P/N 15326108 or the newer P/N13523063
- Qty 1, SLC (female), P/N 15326109

Any one of the following crimp terminals are compatible:

- P/N 15336198, Material CuSn3Zn9, Tin plated for 1.25-2.50 mm² wire (AWG 16-14)
- P/N 15304712, Material CuSn3Zn9, Tin plated for 1.50-3.00 mm² wire (AWG 16-12)
- P/N 15345940, Material CuNi3SiZnMgFe, Tin plated for 1.50-3.00 mm² wire (AWG 16-12)

Figure 16 shows a typical crimp type terminal.

Figure 16 - Crimp Type GT 280 Female Terminal

Delphi recommends the following tools:

- P/N 10804886 SLC Removal Tool
- P/N 10714738 Terminal Removal Tool

These above tools, although recommended, can be substituted by appropriately sized slotted screwdrivers. While using screwdrivers extra care should be employed to prevent damage to the connector parts.

A crimper tool for crimping Delphi 280 Series terminals should be used of crimping the terminals. This is essential for achieving a proper crimp with good conductivity and wire retainment. Crimpers of various quality and expense are available from many on-line suppliers.

Connector Disassembly

Before the connector can be modified or replaced, the connector must be disassembled. A damaged connector may require some additional work to separate the pieces as they may be welded together. It may be necessary to break a damaged connector apart in order to remove the existing terminals.

First step (after it has been disconnected from the SCME) is to remove the SLC. This is accomplished by pushing the SLC out the side of the receptacle housing. Be careful to ensure the tool does not slip and injure you. Figure 17 shows the SLC being removed.

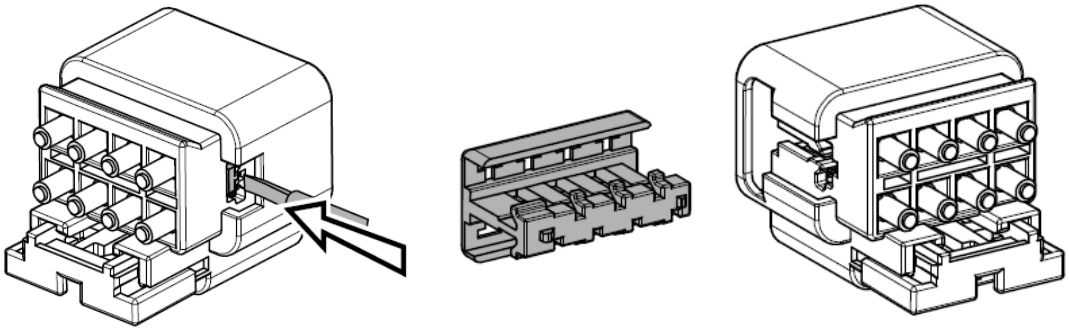

Figure 17 - SLC Removal from Receptacle Housing

Once the SLC is removed the terminals must be unlocked from the housing. Locate the locking arm at the front of the cavity. Insert the terminal removal tool (or small jeweller's slot screwdriver) into the channel of the cavity, deflect the locking arm to unseat the terminal and gently pull on the wire to remove the terminal from the housing. Figure 18 shows the terminal removal and Figure 19 shows a frontal view of the channel cavities.

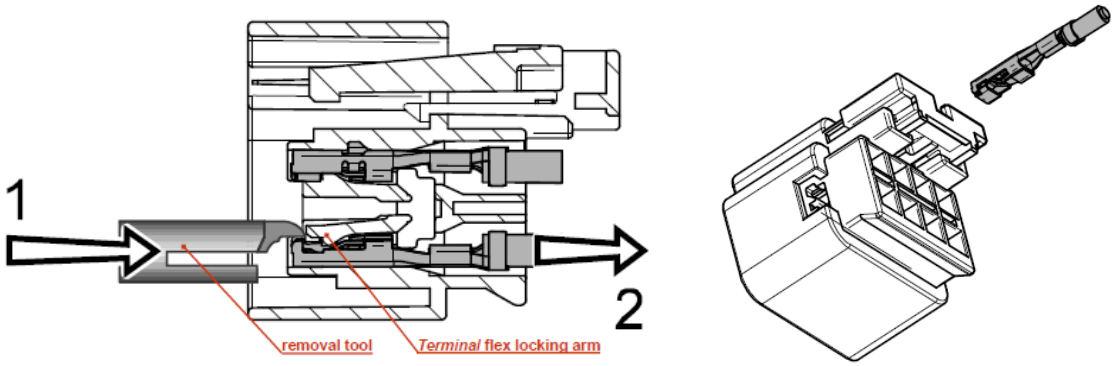

Figure 18 - Terminal Removal from Receptacle Housing

Figure 19 - Terminal Unseating Channel and Release

Terminal Crimping

The cable needs to be prepared for insertion and crimping by stripping back the insulation. Place the unstripped wire next to the new terminal and establish a cut-back distance that will result in a wire “end-of-core” of 0.50 mm ± 0.25 mm [0.188” ± 0.063”].

Lay the back of the terminal core wings on the appropriate tool anvil. Be sure the core wings are pointed towards the crimp nest. Figure 20 shows the terminal installed in the tool.

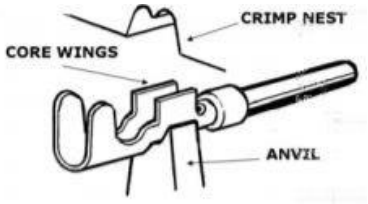

Figure 20 - Terminal Installed in Crimper Jaws

Place the stripped portion of the cable into the terminal such that the correct end-of-core exposure is established. Crimp the core wings. Reposition the terminal in the appropriate tool anvil. Be sure the insulation wings are pointing towards the forming jaws. Crimp the insulation wings. Figure 21 shows a typical terminal crimp.

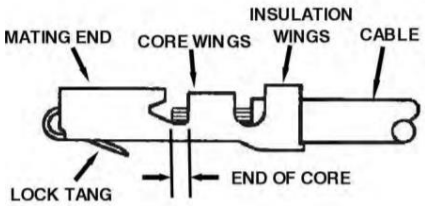

Figure 21 - Typical Terminal Crimp

The crimp can be used this way or soldered to the wire for a better connection. Avoid solder on interface or box areas as this may interfere with terminal installation or how the male terminal connects to the female.

This completes the terminal crimping operation.

Connector Reassembly

The first step in reassembly is to install the SLC until it is correctly closed in the pre-position windows. Figure 22 shows the properly positioned SLC. This should be completed prior to installing any of the terminals.

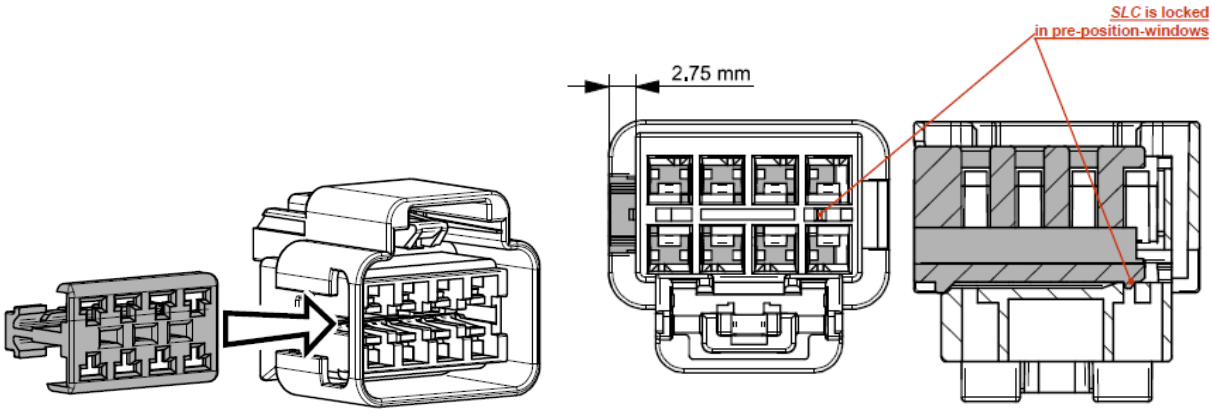

Figure 22 - Properly Pre-positioned SLC

If any of the wires and terminals from the original OE harness are in good condition, they should be reused to reduce the number of required splices, which will result in a cleaner and more reliable repair. If connector housing replacement is needed, the wires should be transferred to the new housing one at a time. Once completed the pinout should be compared to Table 1. It is extremely important to maintain the correct pinout. Figure 23 shows the terminal installation process.

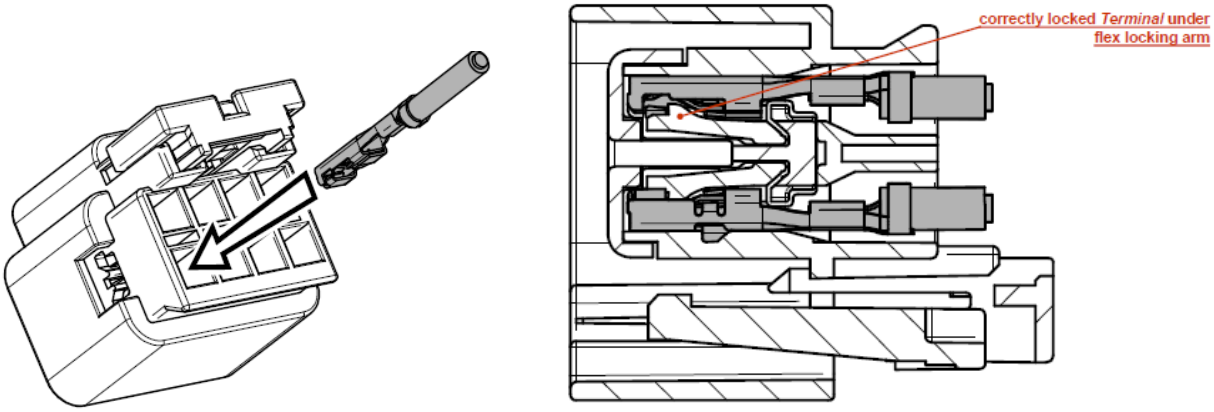

Figure 23 - Installation of Terminals in the Receptacle Housing

At this point the additional wire/terminal assembly should be installed in Position-L. This extra ground wire can be spliced into the existing BK-BU ground wire, or it can be left as a separate ground that can be grounded to a suitable location under the passenger seat. If this second option is utilized, the new ground wire should use a closed eye crimp terminal sized to match the screw at the grounding location.

Once all the wire/terminal crimp assemblies have been properly installed, the SLC needs to be moved to, and locked in, the final end-position. Figure 24 shows the correct final installation of the SLC.

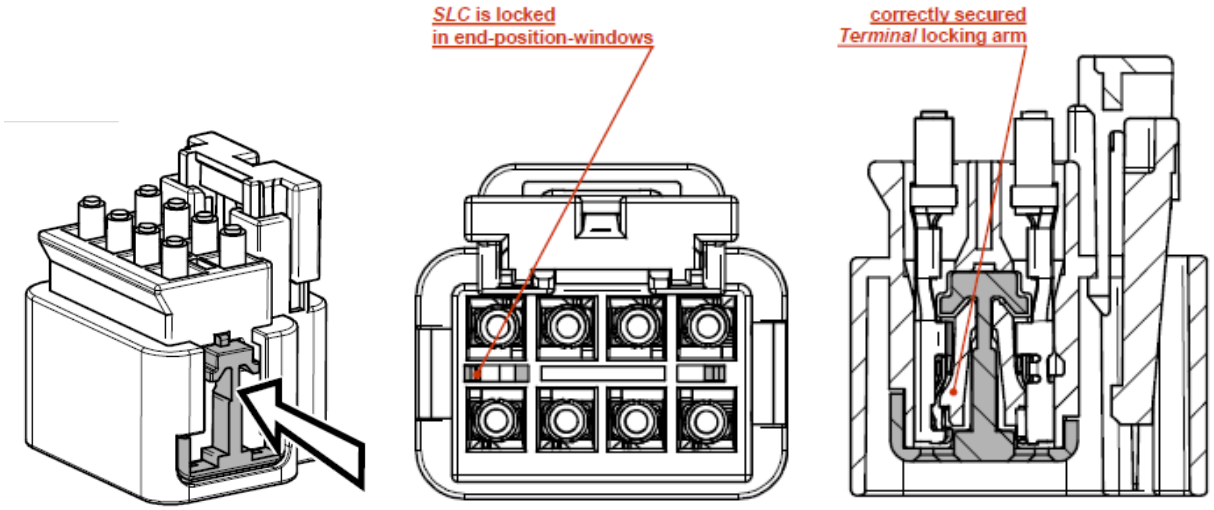

Figure 24 - Final End-position for the SLC

This completes the reassembly of the connector.

Final Installation

If not already installed, reinstall the SCME module under the passenger seat. Install the extra ground wire, if equipped, and not already completed. Install the three electrical connectors in their corresponding locations on the SCME module. Reconnect the positive battery terminal to the battery positive (+) post.

This completes the installation process.

Testing

Test the newly installed SCME for proper operation of the front seat heaters.

I recommend checking for DTCs after completing the testing. Any time the battery is disconnected from the vehicle random DTCs can be broadcast. These should be cleared to prevent any further confusion during future troubleshooting processes.

This ends the operation.

Acknowledgements

- https://www.f150forum.com/f118/heated-cooling-seat-fix-upgrade-preventative-fix-440863/ thread by Musclford
- Ford 2016 F-150 Workshop Manual
- Ford 2016 F-150 Electrical Schematic Manual
- Delphi 8 – 16-way Connector Family for GT 280 Terminal System, Unsealed, Assembly / Disassembly Manual, ADI-15336369-15336370-15336373
- Aptiv Connection Systems E-Catalog, https://ecat.aptiv.com/
- Sargent Quality Tools Automotive Terminal Repair Instruction Manual