



BBCV NEA AFTERMARKET INSTALLATION GUIDELINES 2/01/2022



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PURPOSE:

The purpose of this document is to provide an electrical installation guide for the aftermarket designer and installer which will be applicable to a Blue Bird Vehicle with the NEA (New Electrical Architecture). This document will provide useful information when making electrical modifications and/or additions of components/systems that require battery, ignition, driver switches, and J1939 communication.



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This guideline will address the following:

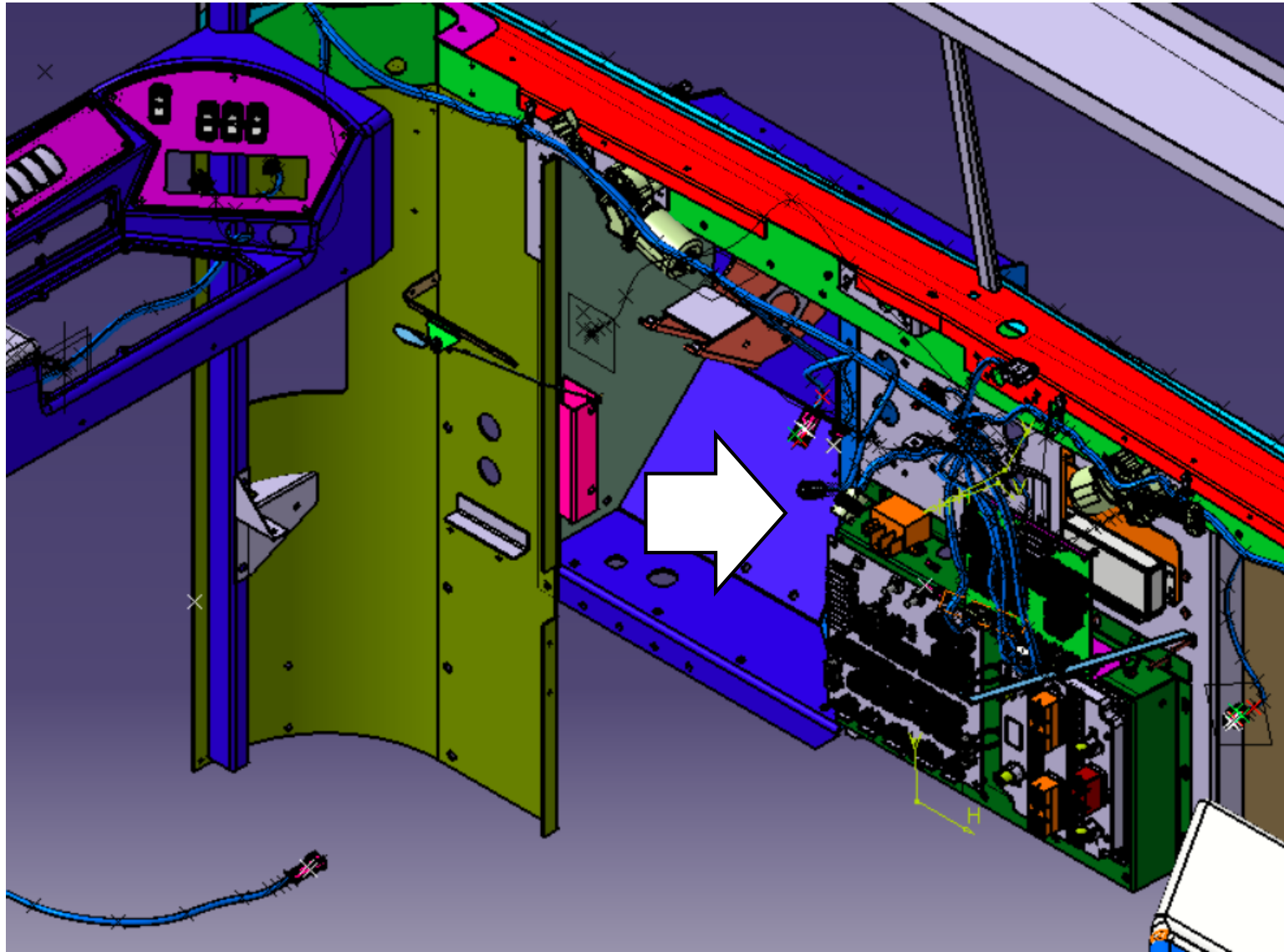
- 1. Utilizing the spare Battery 4 position fuse block (standard wiring).**
- 2. Utilizing the spare Ignition 4 position fuse block (standard wiring).**
- 3. Main Power and Ground Studs that are available to connect to.**
- 4. Driver switch module guidelines and switch additions.**
- 5. Available locations to tap into the Vehicle J1939 data link.**
- 6. Provided J1939 Message List (Note: this list is always evolving).**



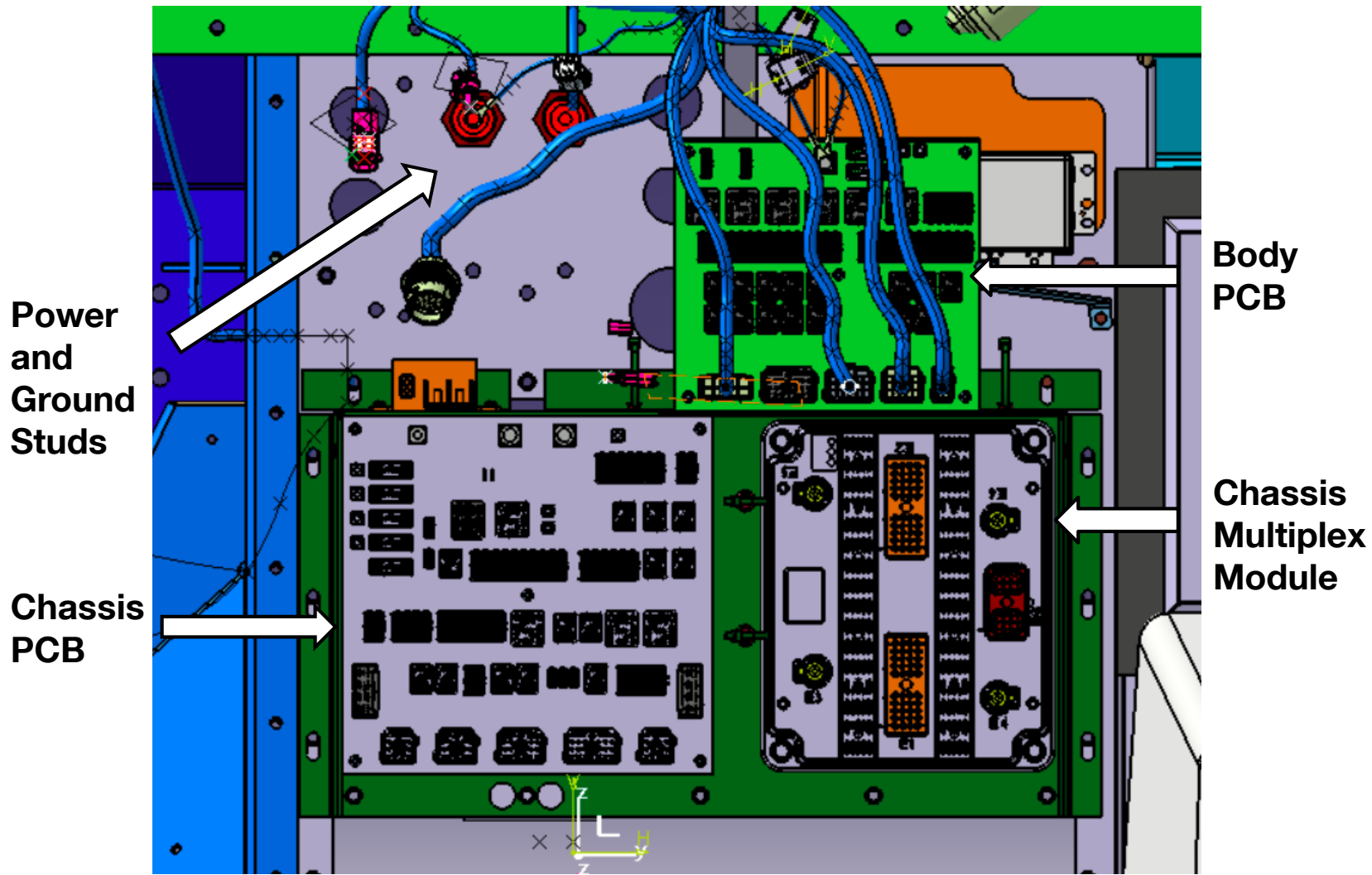
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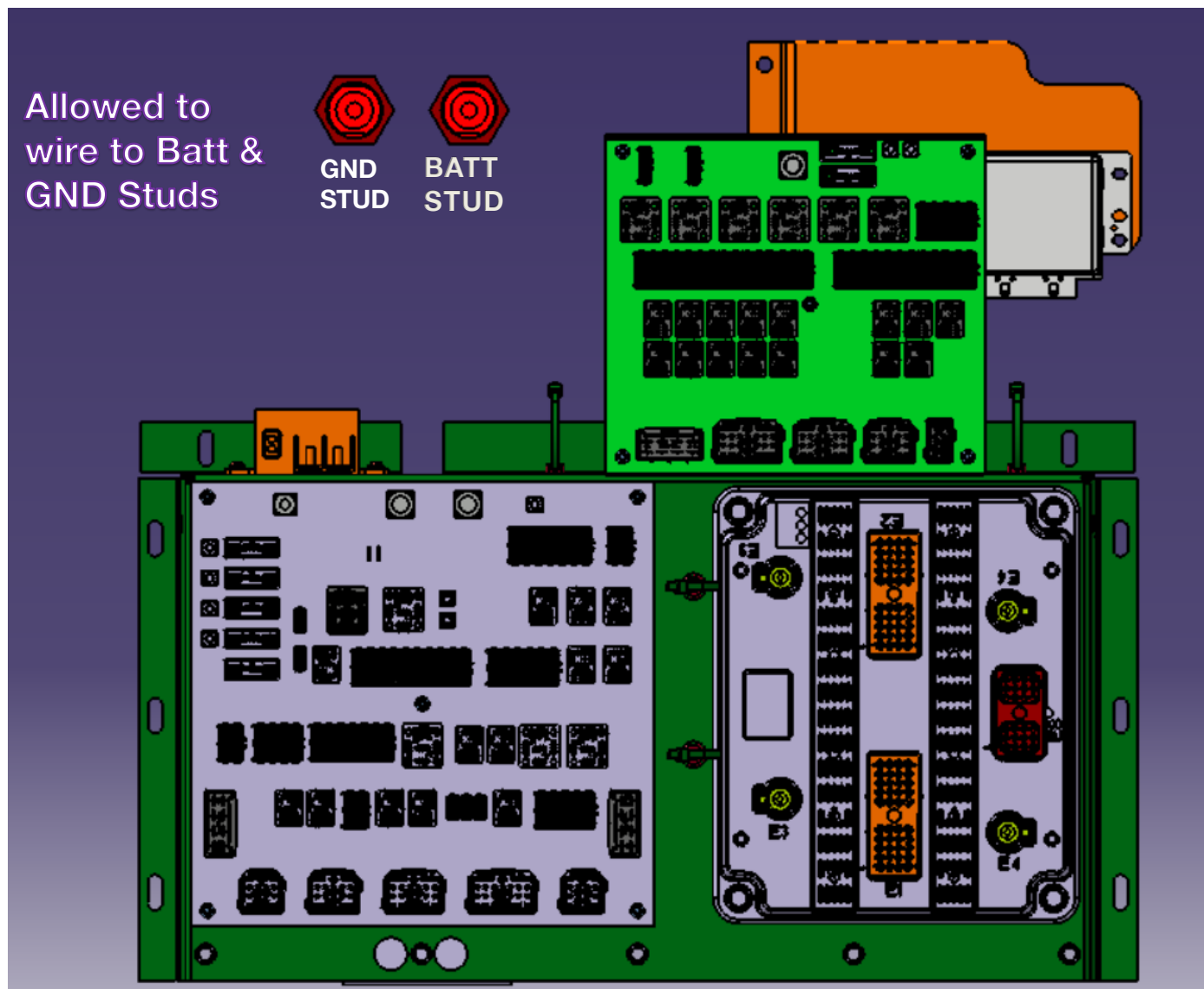
NEA Power Distribution Unit



NEA Power Distribution Unit – Front View



NEA Power Distribution Unit – Batt & GND studs



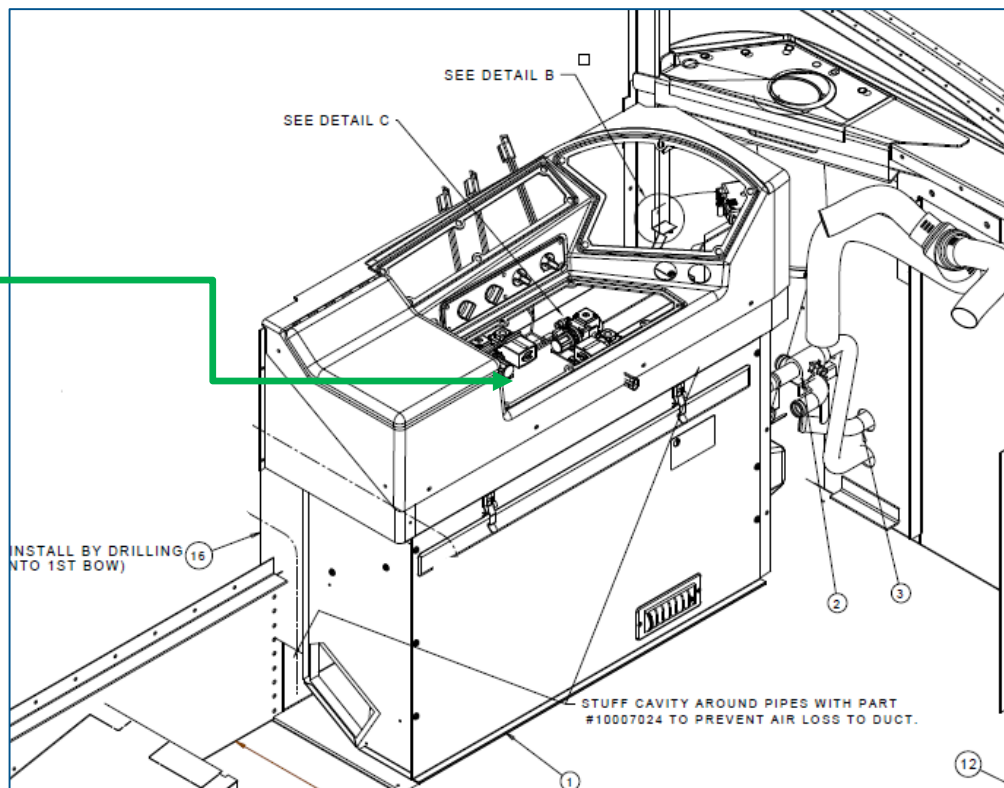
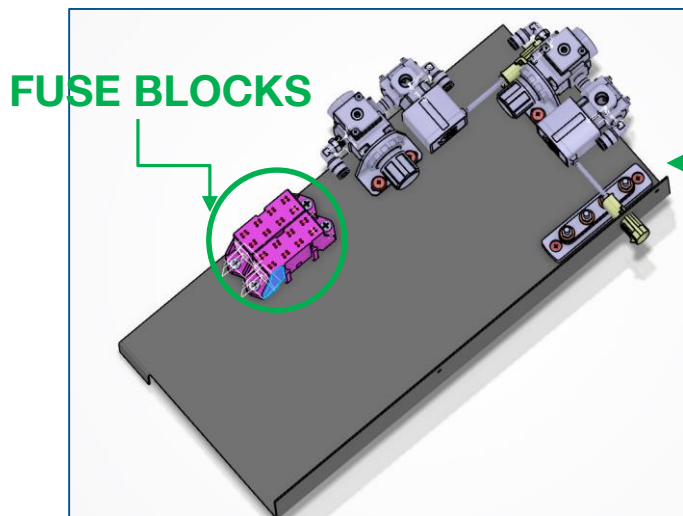


- ❖ The aftermarket installer can wire to the Power Distribution Unit power and ground studs (located just above the chassis Printed Circuit Board and to the left of the Body Printed Circuit Board).
- ❖ They can also wire to the battery box power stud (mounted on the side of the battery box) for high amperage needs.
- ❖ When wiring to power studs, the installer must protect the wiring with the correct size fuse or circuit breaker and locate the protective device as close to the power stud(s) as possible. Proper routing and securing of wiring must be adhered to.
- ❖ Any existing nut(s) that have been temporarily removed to add wiring must be reinstalled and properly torqued as specified on the electrical installation diagrams structured to the vehicle.

NEA - Additional Battery & Ignition Fuse Blocks



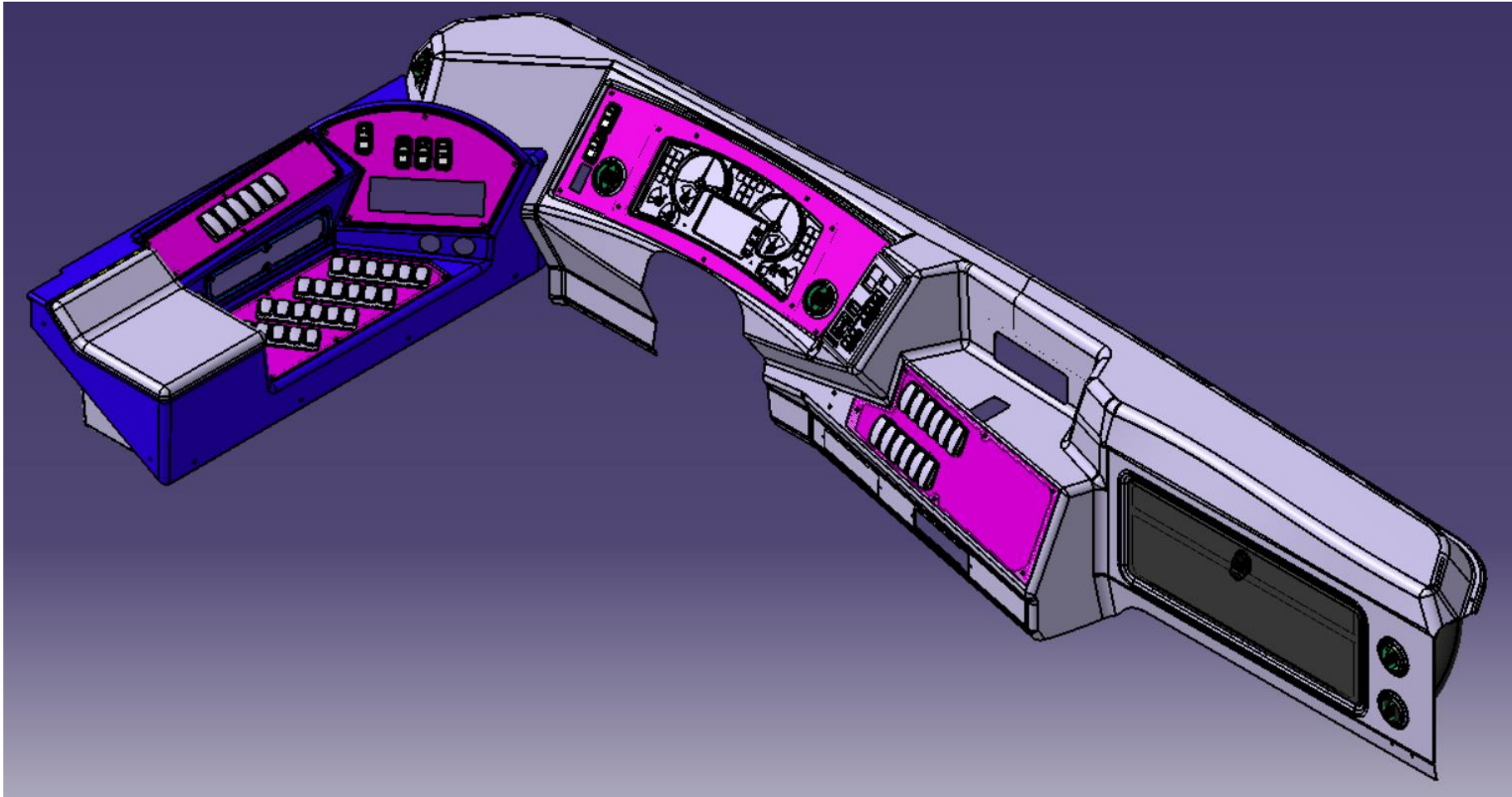
Spare Battery and Ignition Fuse Blocks are installed on the Crossing Arm and Stop Arm assembly located just under the left hand switch panel and are standard.





- ❖ **There are 4 positions for ATO fuses to be installed in the Battery Fuse Block. A total of 60 amps of Battery Power is available on all buses. (Only exception is the Electric Vehicle in which a maximum of 30 amps is allowed). So a quantity of 4 15 amp fuses could be installed, or 3 20 amp fuses. Wires are connected and coiled up and secured for aftermarket installation use.**
- ❖ **There are 4 positions for ATO fuses to be installed in the Ignition Fuse Block. A total of 60 amps of Ignition Power is available on all buses. (Only exception is the Electric Vehicle in which a maximum of 30 amps is allowed). So a quantity of 4 15 amp fuses could be installed, or 3 20 amp fuses. Wires are connected and coiled up and secured for aftermarket installation use.**
- ❖ **See wiring diagram D0036714 for details.**

NEA Switch Panels

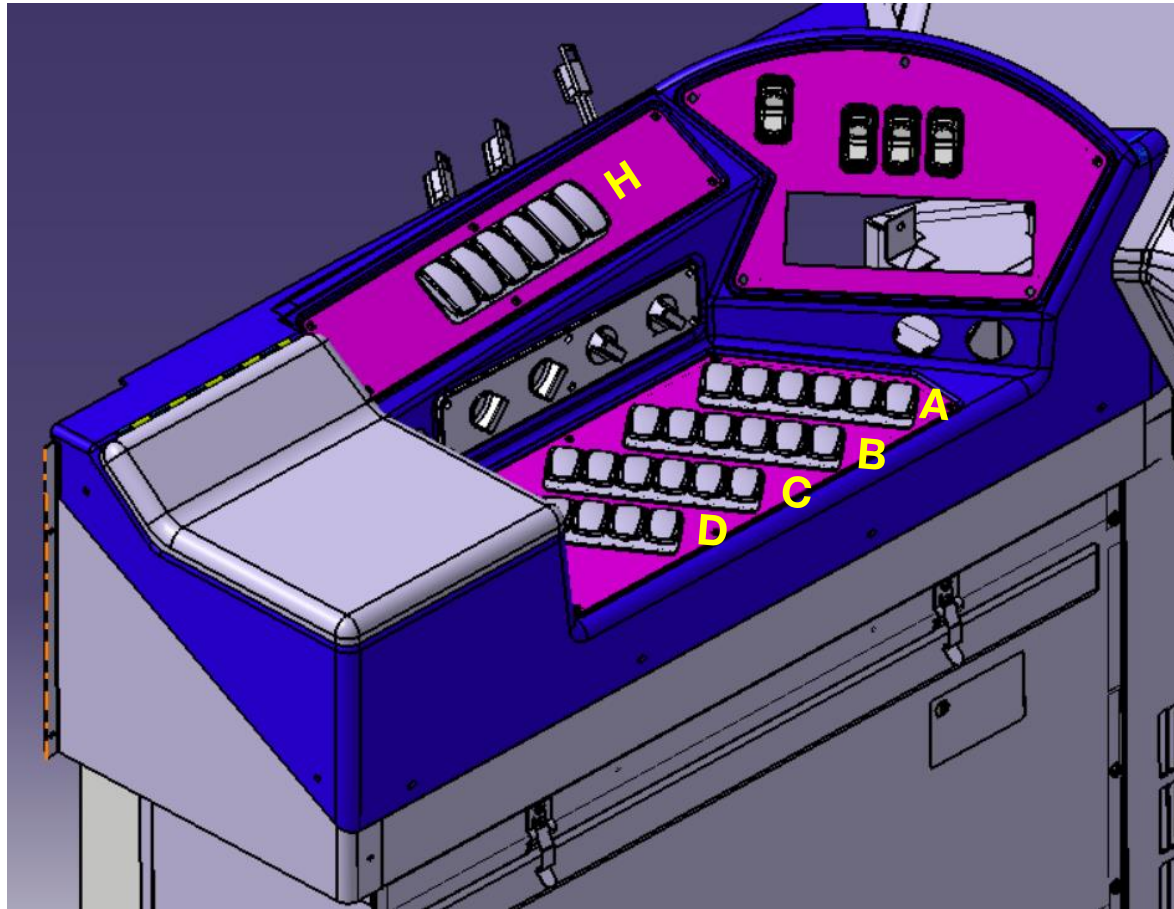


NEA Switch Panels – Driver's Left Side



J1939 DRIVER SWITCH BASE MODULE (SBM) LOCATIONS

SBM – A
SBM – B
SBM – C
SBM – D
SBM – H



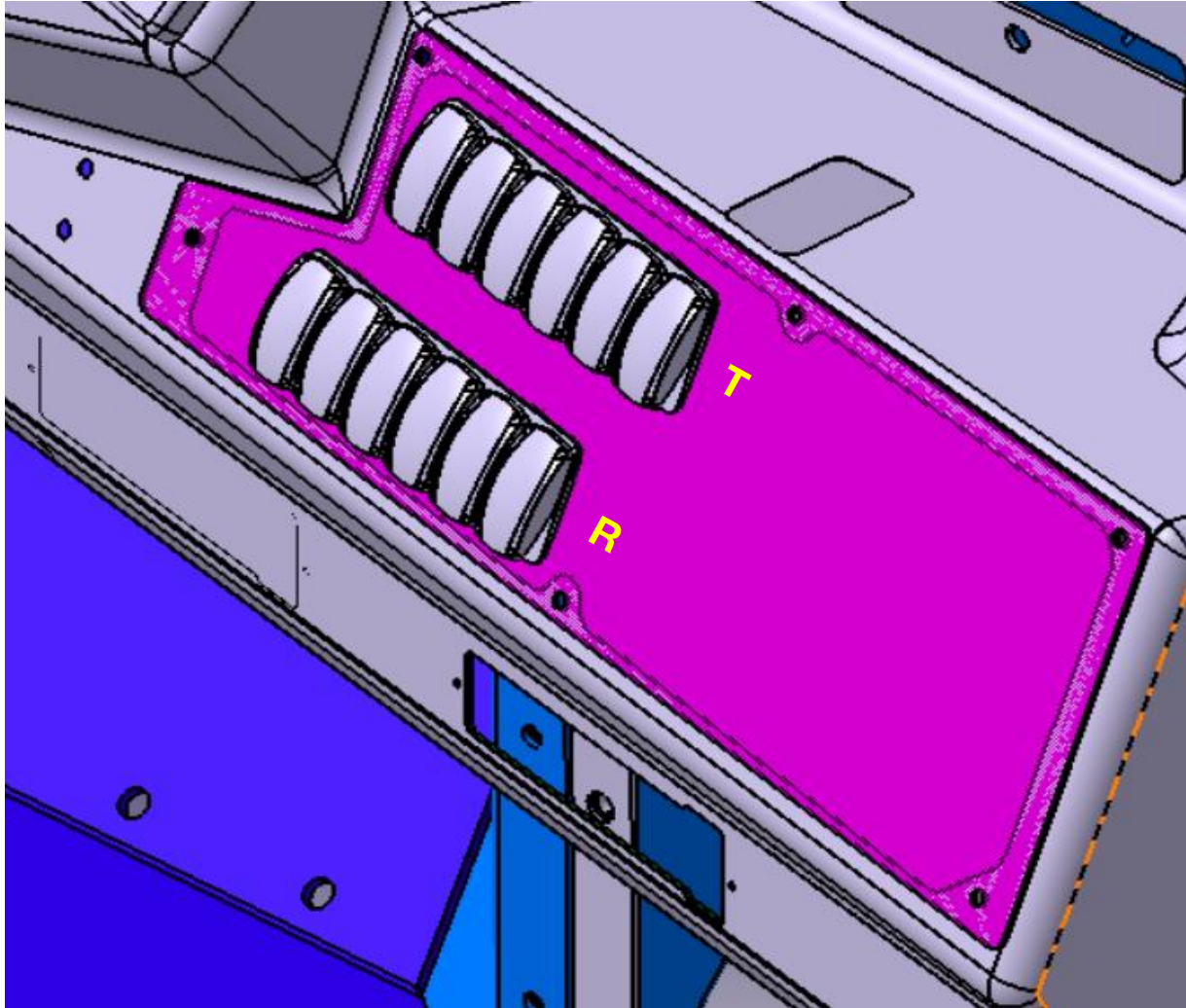
NEA Switch Panels – Driver's Right Side



J1939 DRIVER SWITCH BASE MODULE (SBM) LOCATIONS

SBM – R

SBM – T

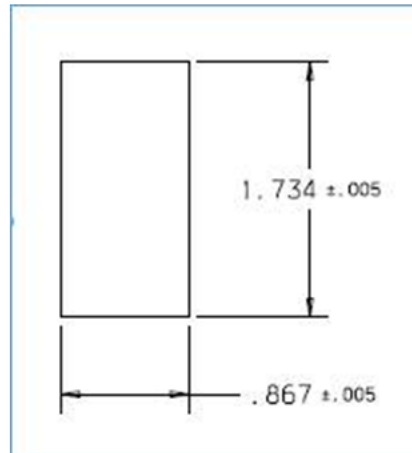




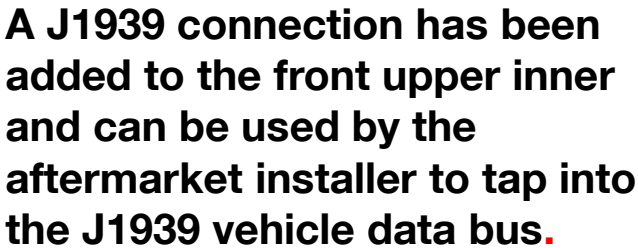
- ❖ **The Driver Switch Base Modules are a gang of 6 switches (or blank positions) and are J1939 components. All communication of switch status, illumination, and lamp control is accomplished through the J1939 data link.**
- ❖ **These switch modules are complicated components and should not be modified or tampered with.**
- ❖ **It is not allowed to move a rocker from one switch bank location to any other. Software would not be compatible.**
- ❖ **It is not allowed to remove a blank from a switch module and add in a new rocker. Software would not be compatible.**
- ❖ **Aftermarket installers will need to add their own discrete switches. These can be added to unoccupied switch locations on the radio or instrument panels. If all switch locations are occupied, additional locations can be added using the following as a cutout template.**



- ❖ Example switch panel 1.734" x 0.867" rectangular cutout. Before cutting remove panel to avoid damaging electrical circuits.



- ❖ When wiring discrete switches, the installer must protect the wiring with the correct size fuse or circuit breaker. Proper routing and securing of wiring must be adhered to.
- ❖ Any existing nut(s) that have been temporarily removed to add wiring must be reinstalled and properly torqued as specified on the electrical installation diagrams structured to the vehicle.



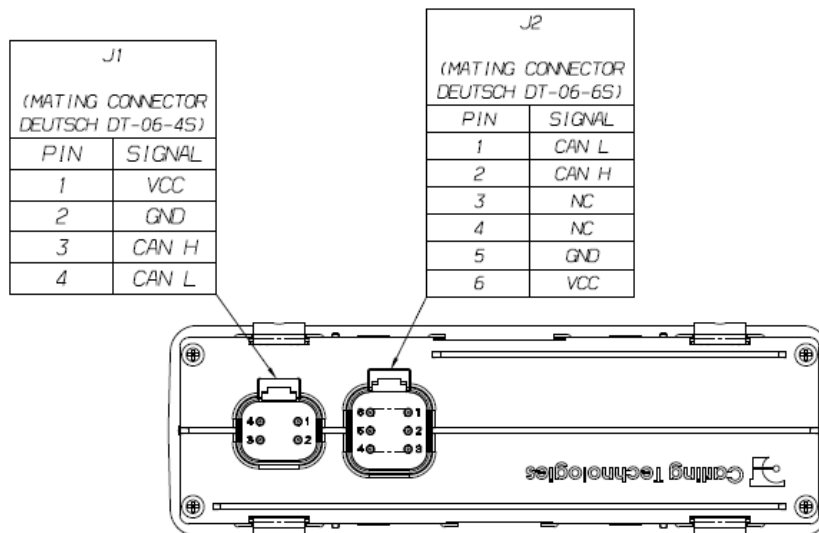
NEA - J1939 Tap Off in the Front Dash Left & Right side options.



On the driver's left hand side, at least one of the new switch modules will have an empty 4 pin connector location available to allow the aftermarket to tap into the J1939 on pins J1-3 and J1-4. Mating connector information is provided below.

NOTE: IT IS NOT PERMITTED TO TAP INTO POWER AND GROUND PINS, J1-1 & J1-2.

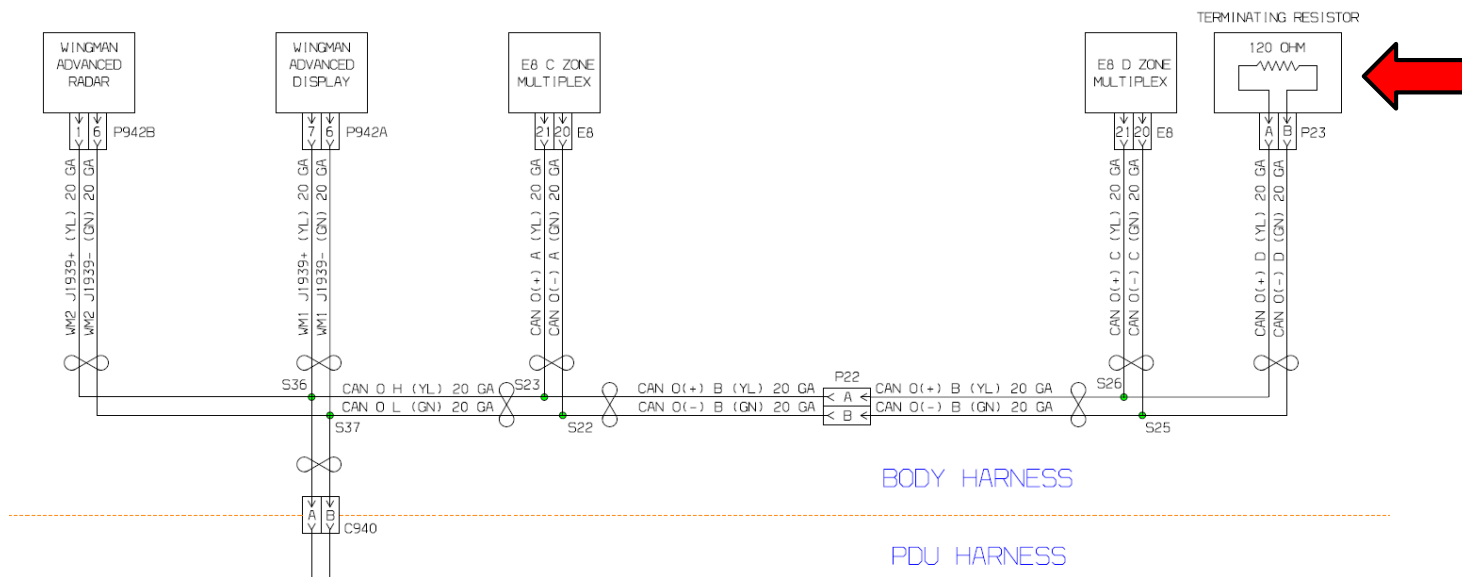
Depending on the bus configuration, there could be a switch module installed on the driver's right hand side, in which an empty 4 pin connector location is also available.



NEA - J1939 Tap Off – Rear of the bus



The aftermarket installer could remove the Terminating Resistor at the D-Zone access rear of the bus (P23 below) and extend the J1939 backbone to wherever they want to install their component that connects to the J1939 and then reconnect the terminating resistor.





- ❖ **J1939 Guidelines:**
- ❖ **The aftermarket installer should not splice into the J1939 data link at all. Blue Bird has provided easy locations and methods to tap into it.**
- ❖ **The J1939 architecture is such that there is a backbone and stubs that go to each ECU or device that will communicate on the J1939 data link. The maximum length of any ECU that taps into the J1939 backbone is 1.67 meters (applicable to 500Kbps backbones) and must be adhered to.**

NEA - J1939 List of Messages



- ❖ Blue Bird can provide an updated list of all the J1939 information that will be transmitted from its New Multiplex and Instrument Cluster System.
- ❖ The J1939 signals listed in Appendix A at the end of this document should be available but J1939 test equipment, such as Vector, should be used to gather the latest DBC files on a particular Blue Bird vehicle. (The DBC file is an ASCII based translation file used to apply identifying names, scaling, offsets, and defining information of data transmitted within a CAN frame).
- ❖ Blue Bird Component Source Addresses (SA) are shown in the chart below (in decimal):
- ❖ Note: Switch Base Module Source Addresses (SA) are overwritten by the A-Zone to the below values when installed on the bus.

Blue Bird Components	SA (decimal)
Instrument Cluster	23
Chassis Multiplex Module, A-Zone (by PDU)	33
Body Multiplex Module, C-Zone (Front)	242
Body Multiplex Module, D-Zone (Rear)	244
Switch Base Module, A	146
Switch Base Module, B	147
Switch Base Module, C	148
Switch Base Module, D	149
Switch Base Module, H	151
Switch Base Module, R	152
Switch Base Module, T	153

NEA – APPENDIX A - J1939 List of Messages



<u>J1939 Signal Name</u>	<u>PGN</u>	<u>SA</u>
PTI_Door_Switch_Signal	65303	33
D_Zone_Buzzer	65303	33
RH_Backup_Light	65303	33
LH_Backup_Light	65303	33
PTI_Arming_Signal	65302	33
RH_Directional_Lights	65302	33
LH_Directional_Lights	65302	33
PTI_Brake_Signal	65302	33
RH_4_Inch_Tail_Light	65302	33
LH_4_Inch_Tail_Light	65302	33
RH_4_Inch_Stop_Light	65302	33
LH_4_Inch_Stop_Light	65302	33
RH_7_Inch_Tail_Light	65302	33
Rear_RH_Amber_Warning_Light	65302	33
Rear_LH_Red_Warning_Light	65302	33
Rear_LH_Amber_Warning_Light	65302	33
LH_7_Inch_Tail_Light	65302	33
RH_7_Inch_Stop_Light	65302	33
LH_7_Inch_Stop_Light	65302	33
Rear_Stop_Arm	65302	33
Marker_Light	65302	33
LH_Side_Directional_Lights	65302	33
Strobe_Light	65302	33
LH_Pushout_Window_Sw	65300	244
Rear_Emrncy_Exit_Vandal_Lock_Sw	65300	244

NEA – APPENDIX A - J1939 List of Messages



<u>J1939 Signal Name</u>	<u>PGN</u>	<u>SA</u>
Rear_Emergency_Exit_Latch_Sw	65300	244
LH_Emergency_Door_Vandal_Lock_Sw	65300	244
LH_Emergency_Door_Latch_Sw	65300	244
Child_Check_Reset_Sw	65300	244
Roof_Hatch_Vandal_Lock_Sw	65300	244
Roof_Hatch_Unlatched_Sw	65300	244
StrobeMomentary_Bottom	65500	242
StrobeMomentary_Top	65500	242
StrobeLightSwitch	65500	242
BrakeInterlockSwitch	65500	242
PTI_Dome_Lights	65500	242
PTI_Alarm	65500	242
Exterior_Light_Check_Sw	65500	242
LH_Entrance_Door_Opened_Sw	65500	242
Exit_Door_Open_Sw	65500	242
Lift_Door_Vandal_Lock_Sw	65500	242
Lift_Door_Lights_Rocker_Sw	65500	242
Lift_Door_Latch_Sw	65500	242
Lift_Door_Hinge_Sw_NO	65500	242
Lift_Door_Hinge_Sw_NC	65500	242
Overhead_Locking_Storage_Compt	65500	242
Entrance_Door_Closed_VL_Sw	65500	242
Keyed_Exterior_Ent_Door_Sw_Open	65500	242
Keyed_Exterior_Ent_Door_Sw_Close	65500	242
RH_PushOut_Window_Sw	65500	242

NEA – APPENDIX A - J1939 List of Messages



<u>J1939 Signal Name</u>	<u>PGN</u>	<u>SA</u>
RH_Emergency_Exit_Latch_Sw	65500	242
RH_Emergency_Exit_Vandal_Lock_Sw	65500	242
Emer_Compt_Lock_Sw_BuzzUpperFr	65500	242
Entrance_Door_Opened_Sw	65500	242
Camera_System_Door_Open_Trigger	65504	33
Wheelchair_Lift_Enable	65504	33
PTI_Check_Bus_Indicator	65504	33
Camera_System_Reverse_Trigger	65504	33
Mirror_Heat_Relay	65503	33
Driver_Dome_Light	65503	33
Entrance_Door_Open	65503	33
Entrance_Door_Close	65503	33
C_Zone_Buzzer	65503	33
Exit_Door_Open	65503	33
Exit_Door_Closed	65503	33
Front_RH_Red_Warning_Light	65503	33
Front_RH_Amber_Warning_Light	65503	33
Front>Loading_Lights_Relay	65503	33
PTI_Accessory_Power	65503	33
Front_LH_Red_Warning_Light	65503	33
Front_LH_Amber_Warning_Light	65503	33
PTI_Armed_Indicator	65503	33
Marker_Light	65503	33
RH_Side_Directional_Lights	65503	33
wiper_switch_3_logic_data	65526	33

NEA – APPENDIX A - J1939 List of Messages



J1939 Signal Name	PGN	SA
wiper_switch_2_logic_data	65526	33
wiper_switch_1_logic_data	65526	33
wiper_park_rh_data	65526	33
wiper_park_lh_data	65526	33
windsheild_wiper_pump_data	65526	33
w_l_start_foot_switch	65526	33
turn_switch_right	65526	33
turn_switch_left_data	65526	33
start_swch_data	65526	33
srvce_brk_lamp_swch_data	65526	33
seat_belt_swch_data	65526	33
reverse_signal_data	65527	33
park_brk_swch_data	65526	33
neutral_hrd_wird_data	65526	33
hrrlc_brk_flr_lght_data	65526	33
horn_button_data	65526	33
high_beam_swch_data	65526	33
headlamp_swch_bit_2_data	65526	33
headlamp_swch_bit_1_data	65526	33
fuel_door_opn_swch_data	65526	33
frnt_htr_dfrst_fan_spd_swch_data	65527	33
elec_stab_cntrl_data	65526	33
accessory_switch_data	65526	33
BrakeInterlockOverrideSwitch	65526	33
Brake_Interlock_Request	65527	33
Fast_Idle	65526	33

NEA – APPENDIX A - J1939 List of Messages



<u>J1939 Signal Name</u>	<u>PGN</u>	<u>SA</u>
Hydraulic_Brake_Fail_Light	65280	33
Brake_Interlock_Alarm	65280	33
Brake_interlock_set	65280	33
Total Vehicle Distance (High Resolution)	65217	23