BLUE BIRD

BBCV NEA AFTERMARKET INSTALLATION GUIDELINES

7/10/2024
Rev. C

Subtitle

Purpose

- 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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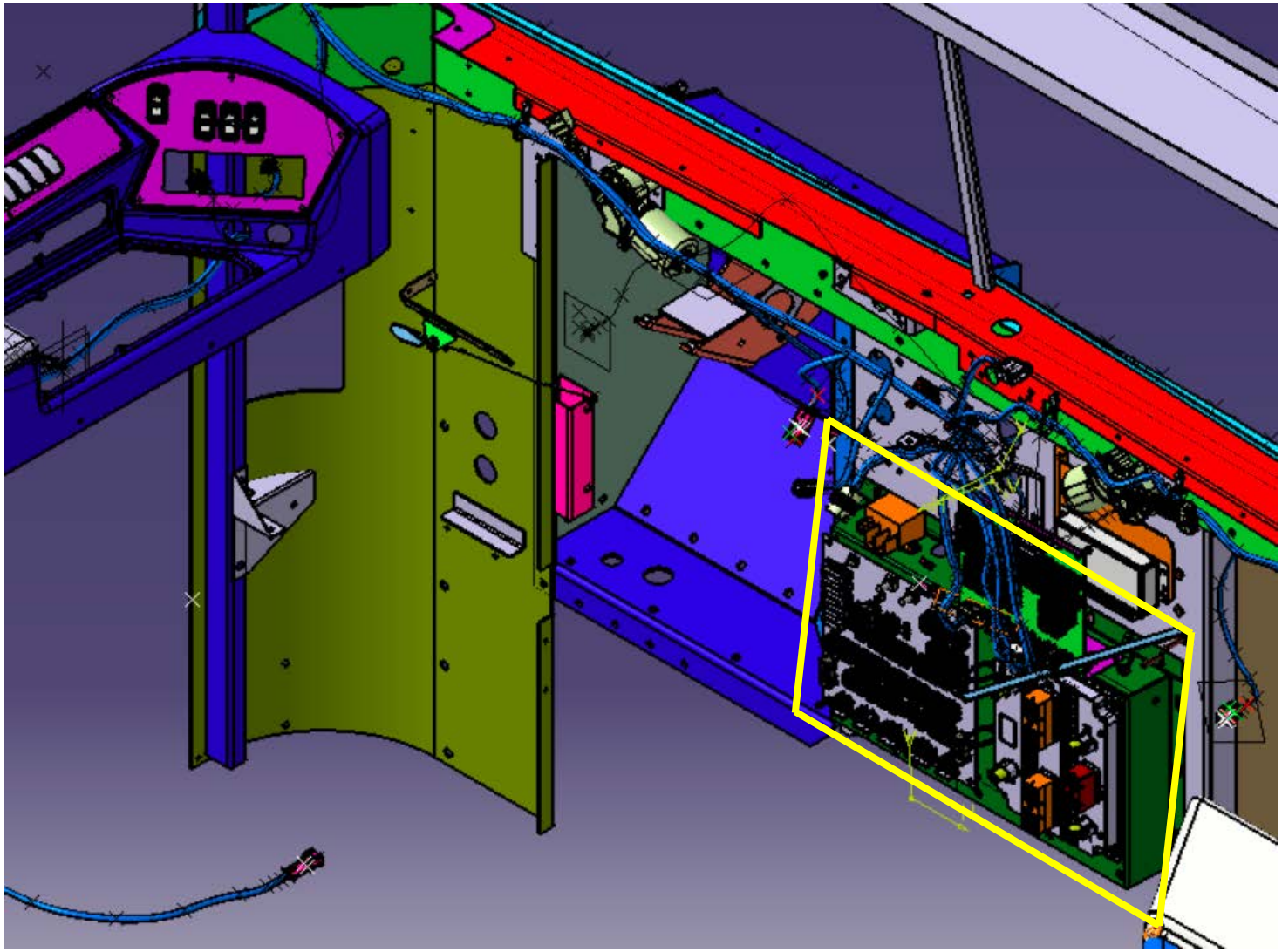
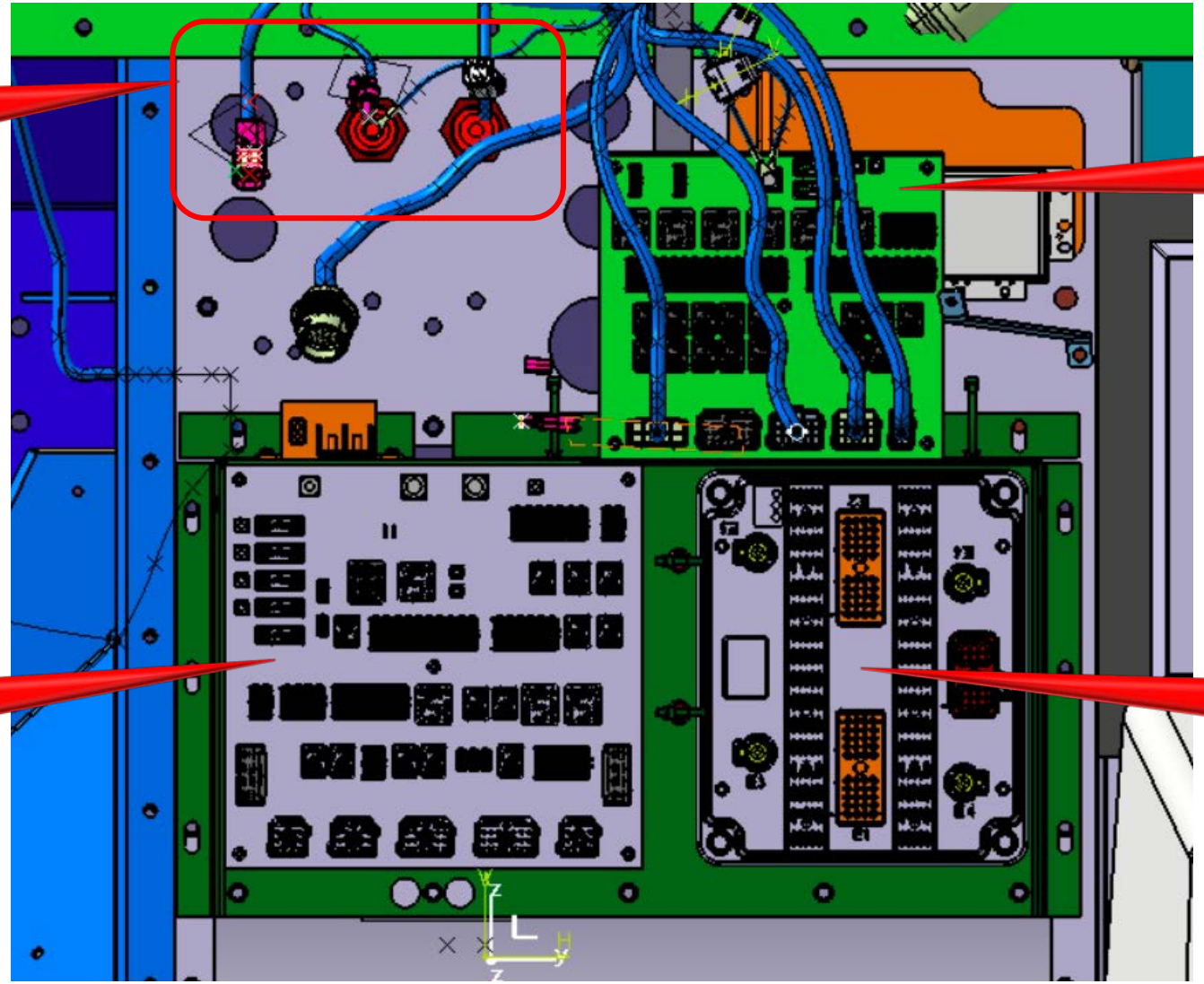
NEA Power Distribution Unit/PDU

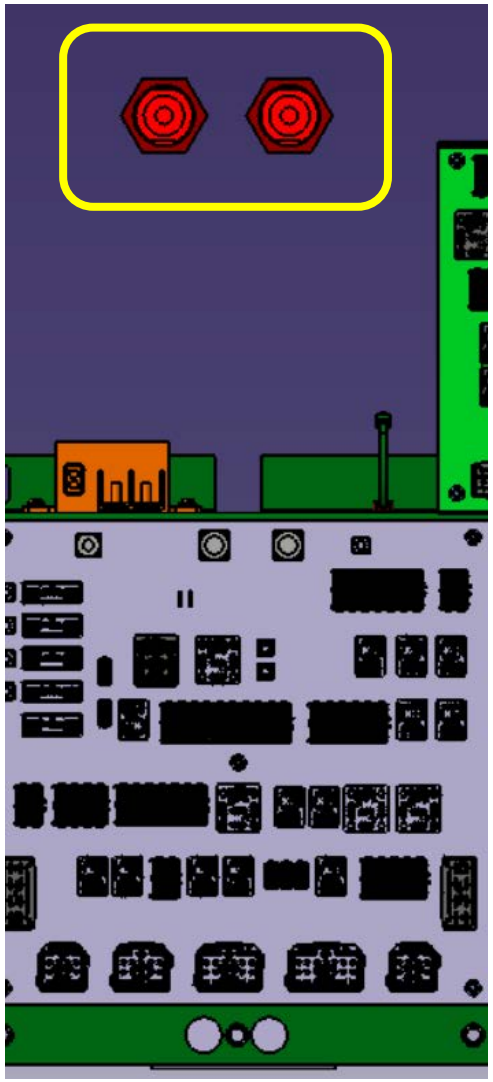


NEA PDU- Front View



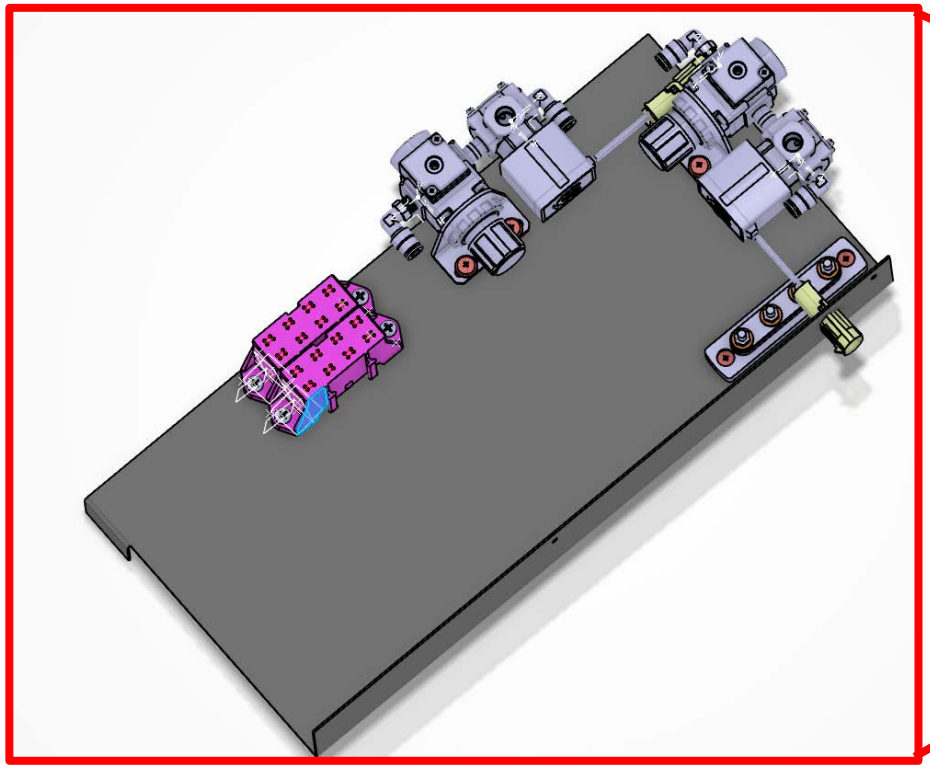
NEA PDU- Power/Ground connections

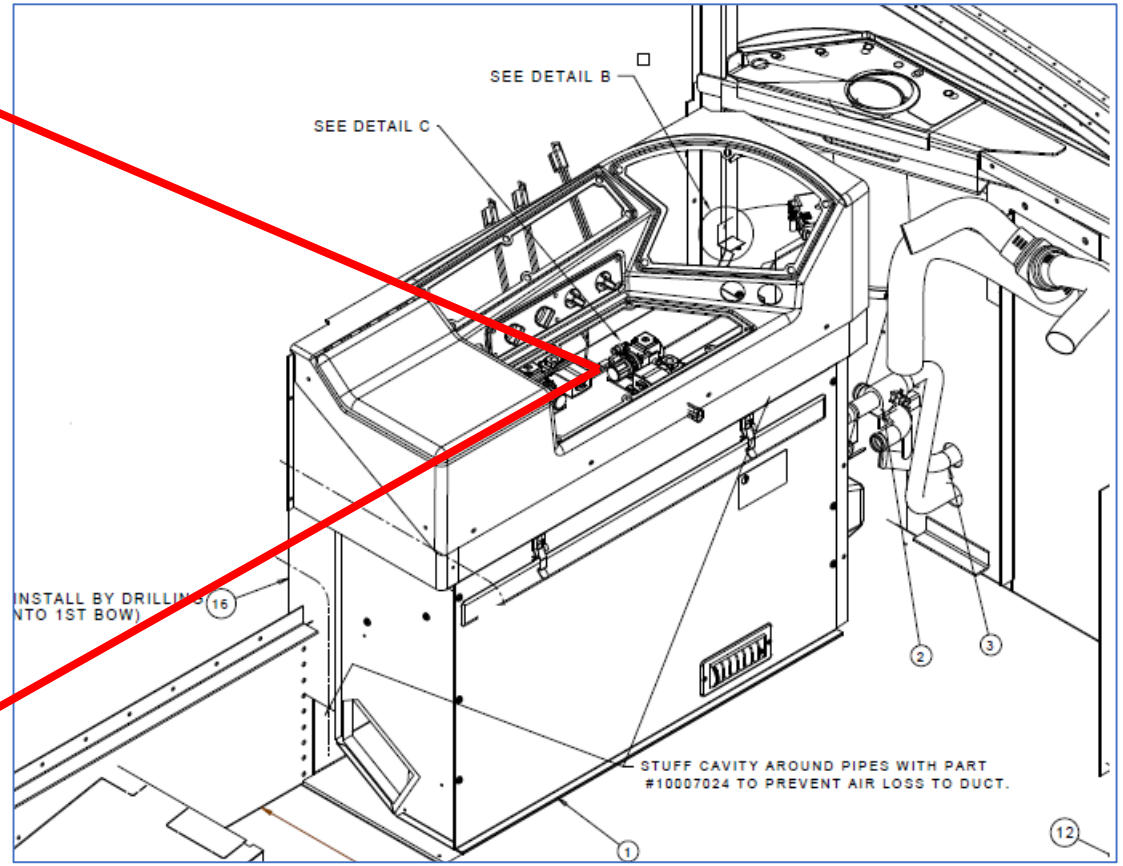
- The aftermarket installer can wire to the Power Distribution Unit power and ground studs (located just above the chassis Printed Circuit Board and to the left of the Body Printed Circuit Board).
- They can also wire to the battery box power stud (mounted on the side of the battery box) for high amperage 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.**



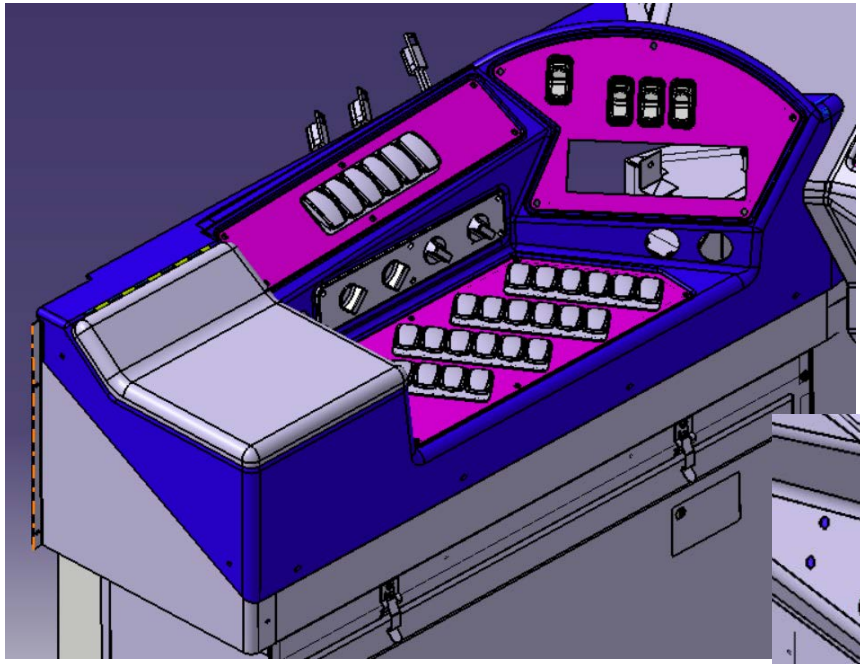


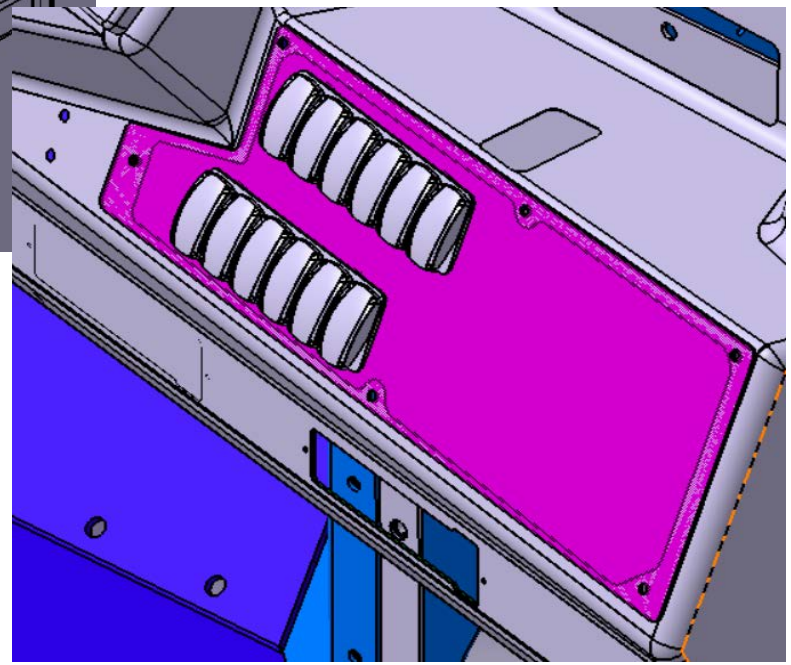
NEA - Additional Battery & Ignition Fuse Blocks

- There are 4 positions for ATO fuses to be installed in the AUX Battery Fuse Block.
- A total of 4, 15 amp B+ leads are coiled and secured for A/M use.
  - EV units will only have two
- A total of 4, 15 amp IGN leads are coiled and secured for A/M use.
  - EV units will only have two
- See wiring diagram D0036714 for details

NEA - Switch Panels and Switch Modules

- 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.

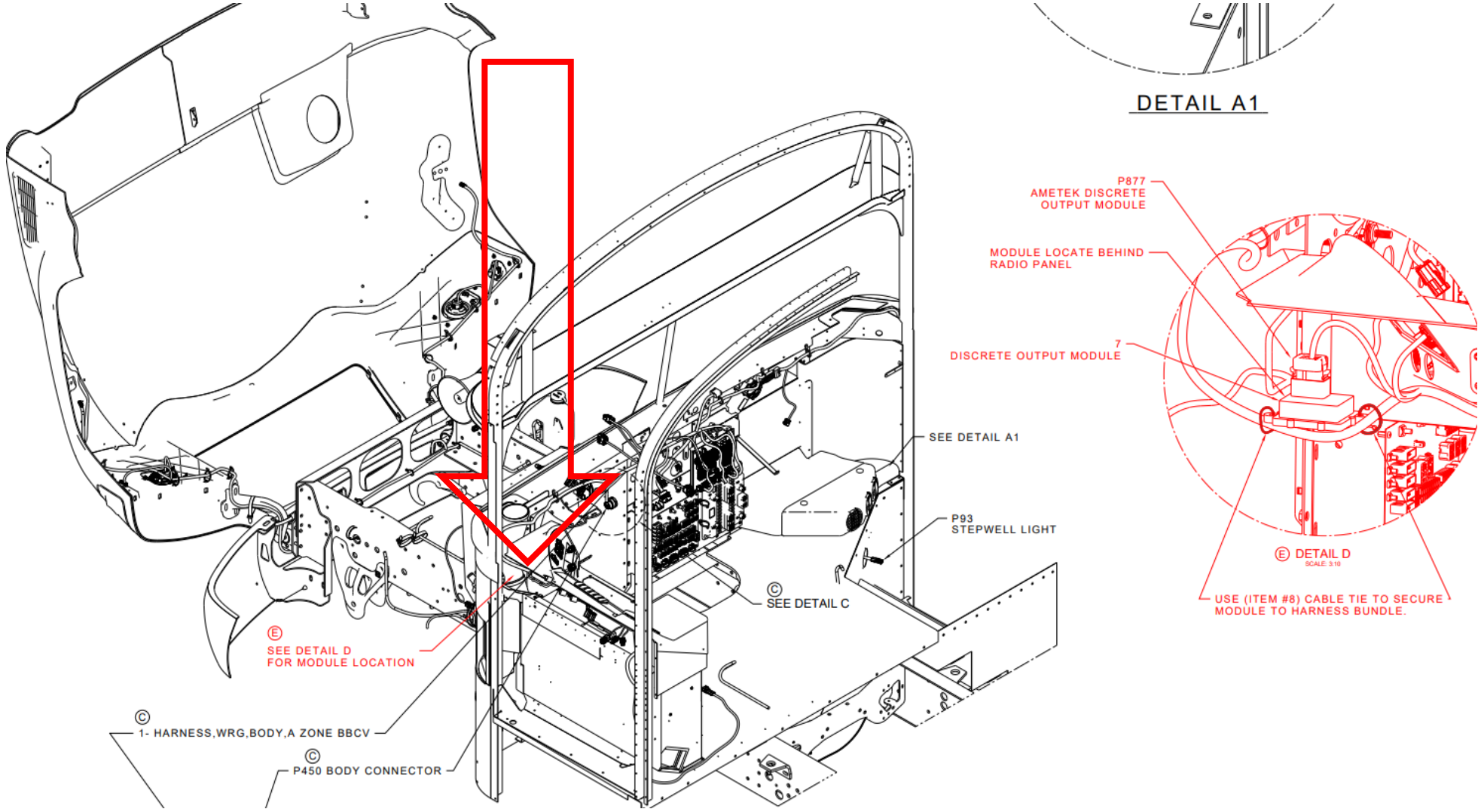




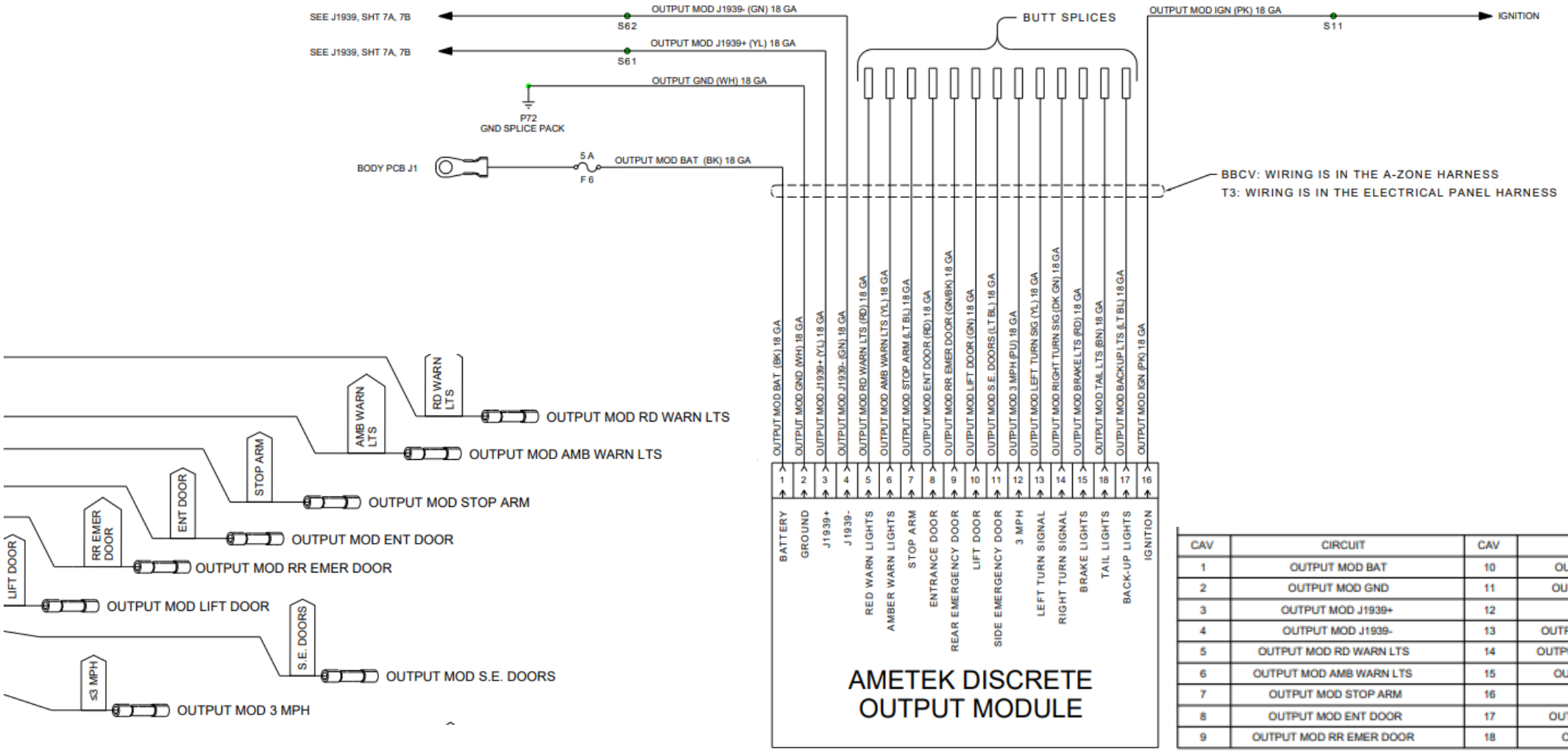
NEA Discrete Module

- The Blue Bird Discrete module is a device that is parallels to the J1939 network and listen for CAN signals to change. In response to signal change, the DM will drive individual wires high for aftermarket equipment.
  - IE camera systems, telematics, etc.
- Each output is labeled & current limited to 160mA. Total load on the module is to not exceed 1.40A.
  - If current is exceeded, the module will reset at the next key cycle.
- Kit p/n is 10083750
  - Module alone is p/n 10079706
  - Harness alone is p/n 10079722
- Module interfaces to CAN network by connecting to the last switch bank module in the chain.
- Module Battery, Ignition and ground sources are available at the spare battery and ignition fuse blocks located under the left armrest.

NEA Discrete Module location



NEA Discrete Module harness



CAV	CIRCUIT	CAV	CIRCUIT
1	OUTPUT MOD BAT	10	OUTPUT MOD LIFT DOOR
2	OUTPUT MOD GND	11	OUTPUT MOD S.E. DOORS
3	OUTPUT MOD J1939+	12	OUTPUT MOD 3 MPH
4	OUTPUT MOD J1939-	13	OUTPUT MOD LEFT TURN SIG
5	OUTPUT MOD RD WARN LTS	14	OUTPUT MOD RIGHT TURN SIG
6	OUTPUT MOD AMB WARN LTS	15	OUTPUT MOD BRAKE LTS
7	OUTPUT MOD STOP ARM	16	OUTPUT MOD IGN
8	OUTPUT MOD ENT DOOR	17	OUTPUT MOD BACKUP LTS
9	OUTPUT MOD RR EMER DOOR	18	OUTPUT MOD TAIL LTS

NEA – Internet Connected Devices

- **Cummins 2024 (or greater) Emissions Cyber Security Requirements**
  - **[33536] Internet connected devices installed on the vehicle must be connected through a secure gateway device before connecting to either the Engine ECM or other communication network.**
  - **[33537] Internet connected devices with cellular connection shall support 4G LTE or Newer standards. Devices with 802.11 (Wi-Fi) shall support 802.11i WPA2 or newer protocol.**
  - **The risk of a cyber security attack is increased when 3rd party internet connected devices have direct access to the Engine control Module (ECM). The secure gateway will limit the exposure.**
- **Secure Gateway Installation Notes**
  - **The installation and specification of the secure gateway device is the responsibility of the installer of the internet connected device.**
  - **The Installer shall identify a supplier and specify the J1939 gateway message requirements.**
  - **The Ametek VIS CAN I/O Expander Module has successfully been used on OEM applications. However, the installer can use the supplier of their choosing for the development of the required gateway device.**