

TransTech

a TCI Company



Electrical Troubleshooting & Diagnosis

Friday, July 28, 2023

Introductions

Welcome to TransTech Bus, a division of Transportation Collaborative Inc., we are an American manufacturer of industry-leading conventional and environmentally-friendly electric Type-A school buses. Established in 2007, the company produces Type-A1 & Type-A2 School Buses and various models of Commercial Buses, all built on cutaway vehicle chassis. TransTech Bus headquarters and production are located in a 70,000-square-foot (6,500 m²) facility located in Warwick, New York, United States.

Your guide and instructor for this presentation will be;

- ◎ Daniel Carlock
 - Electrical Supervisor @ TransTech Bus
 - dcarlock@transtechbus.com
 - (845) 988-2333

Facility Tour



Best Diagnosis Tools

⦿ Power Probe

After connecting the Power Probe III clips to the vehicle's battery, a technician can determine at a glance, the voltage level and the polarity of a circuit without running for a volt meter or reconnecting hookup clips from one battery pole to the other. The power switch allows you to conduct a positive or negative battery current to the tip for activating and testing the function of electrical components without wasting time with jumper leads. And yes, the Power Probe III is short circuit protected. It tests for bad ground contacts instantly without performing voltage drop tests and locates short circuits without wasting precious fuses. It tests for continuity with the assistance of its auxiliary ground lead. Also, with a flip of the power switch, you will know instantly that your Power Probe III is functioning without running to the battery as you would otherwise have to do with simple test lights.



⦿ Wire Strippers

A small, hand-held device used to strip the electrical insulation from electric wires.

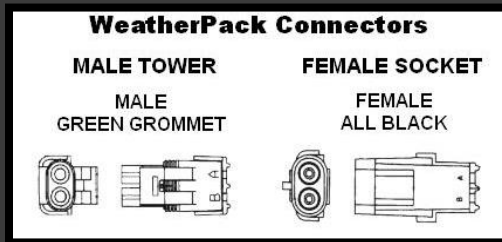
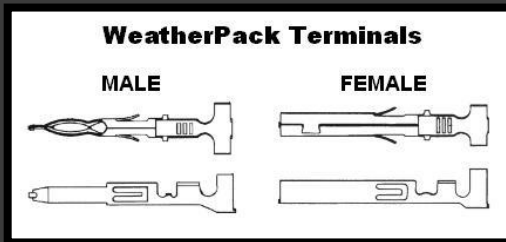


Approved Connectors

- Faston Quick Disconnect Connector



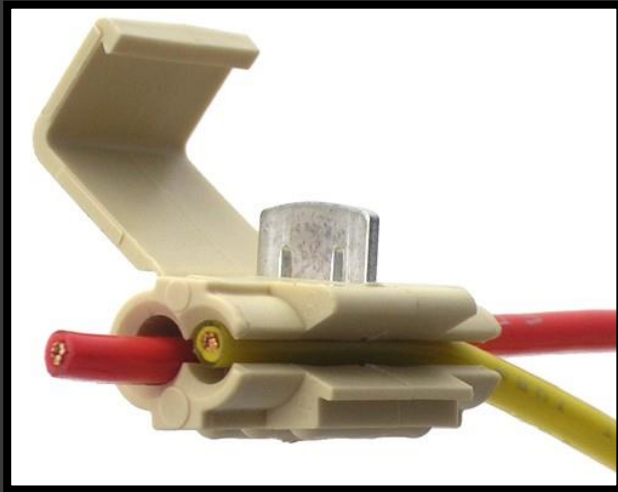
- WeatherPack Connectors



- Molex Pins & Sockets



Prohibited Connectors



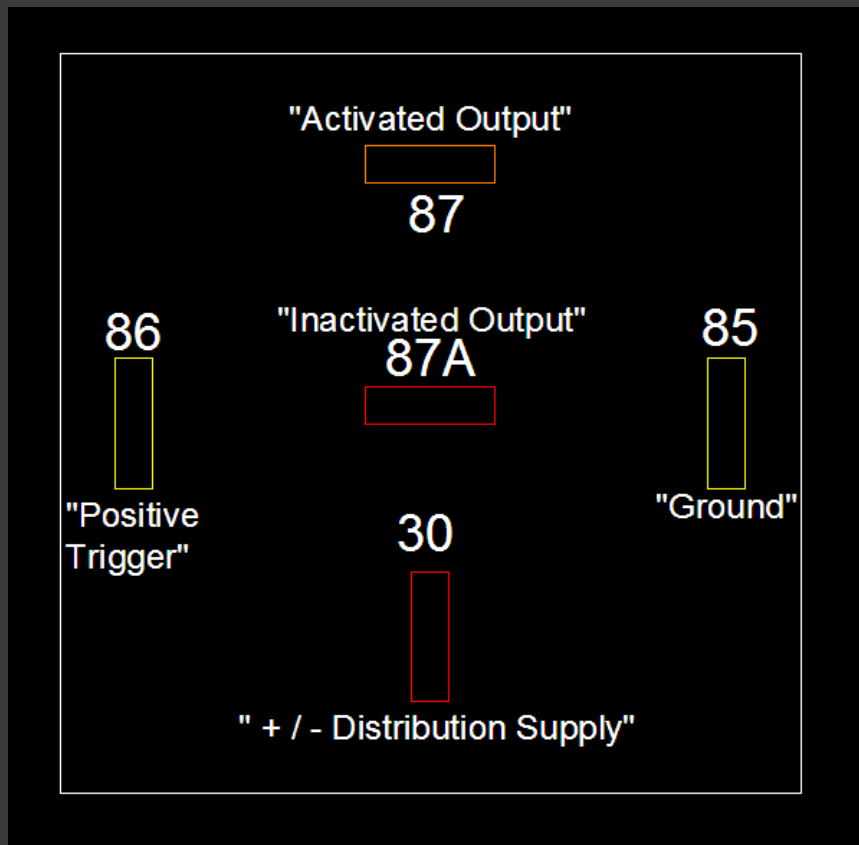
ScotchLok
Connectors



Butt
Connectors



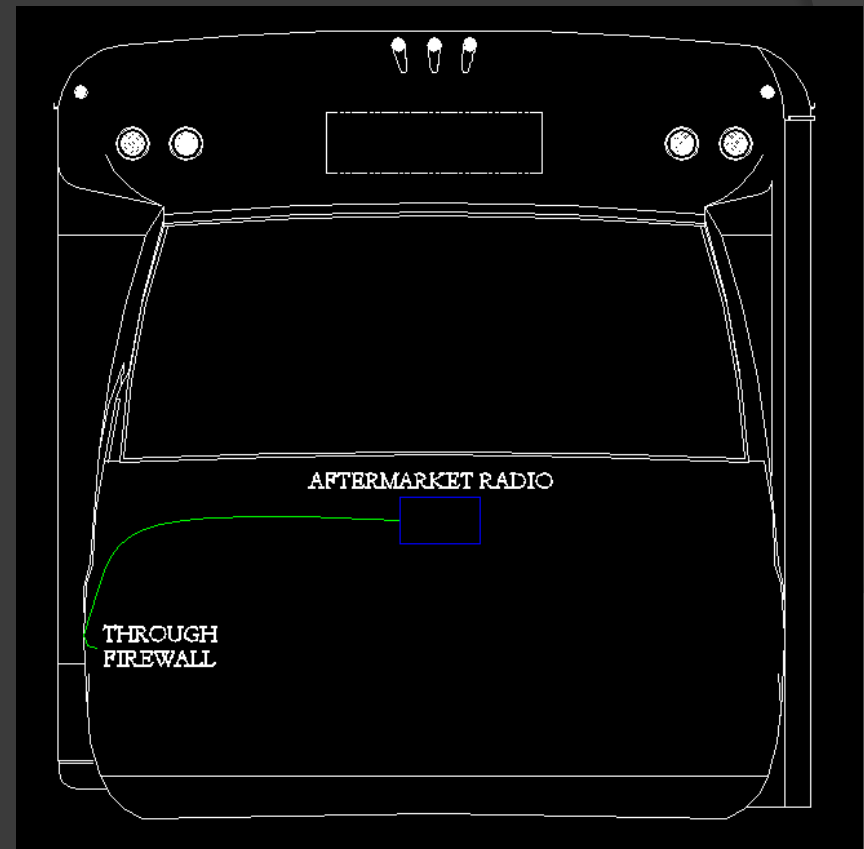
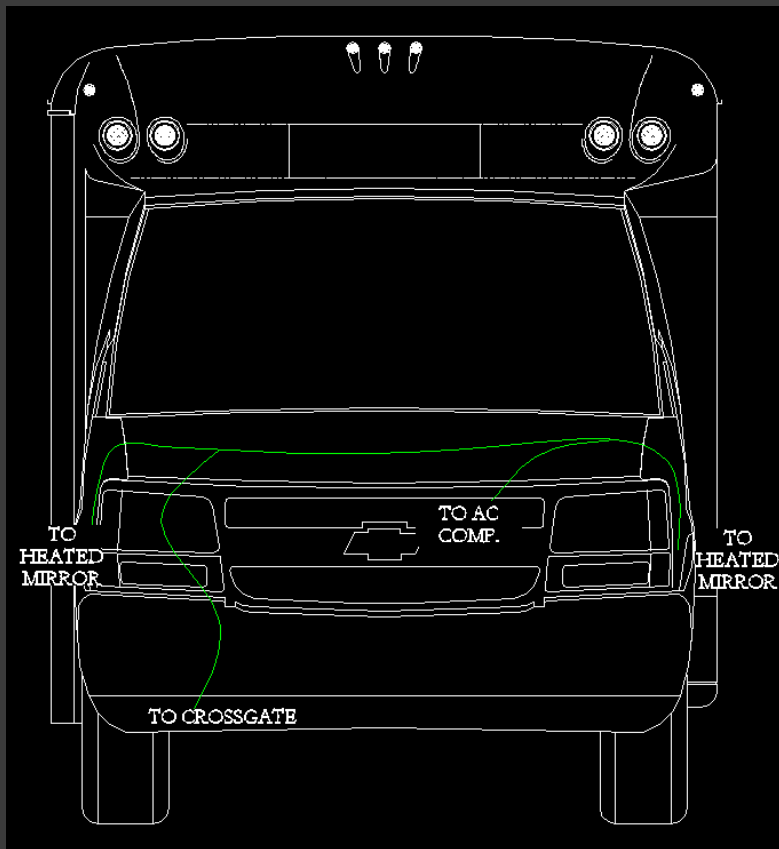
Relay Theory



- A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

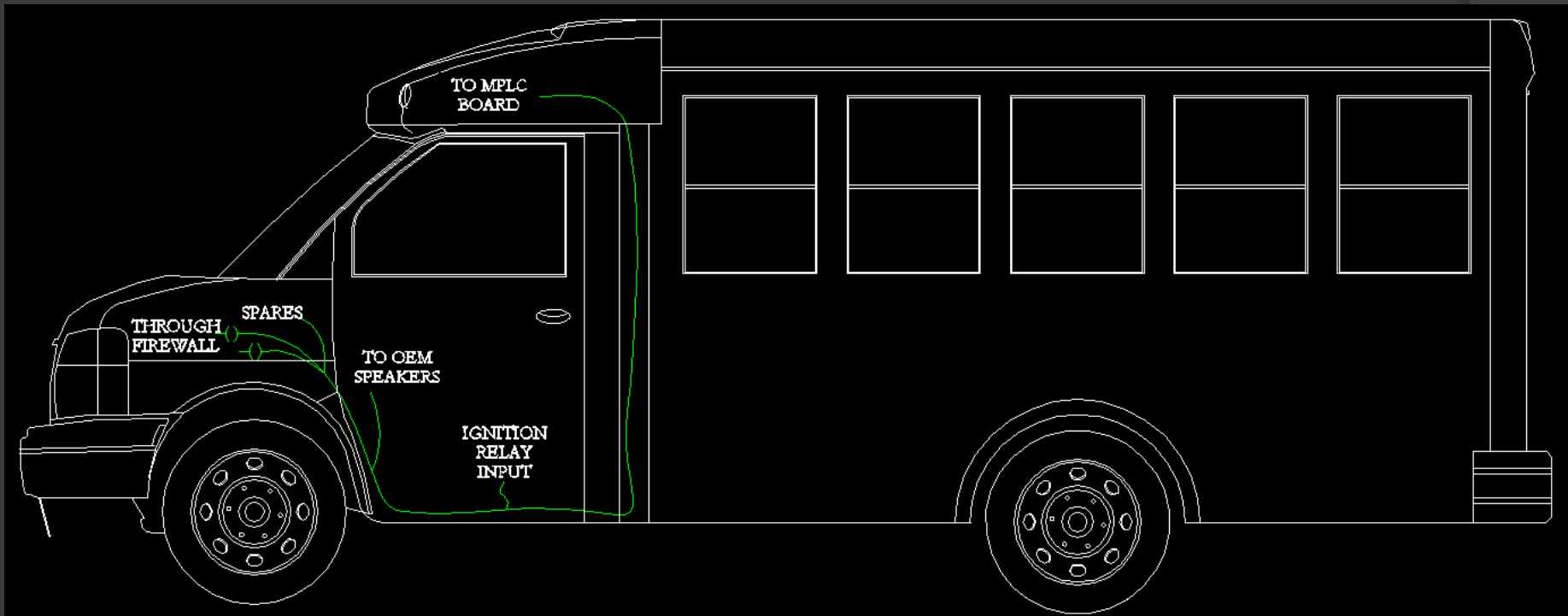
Harness Routing Overview

- Dash Harness



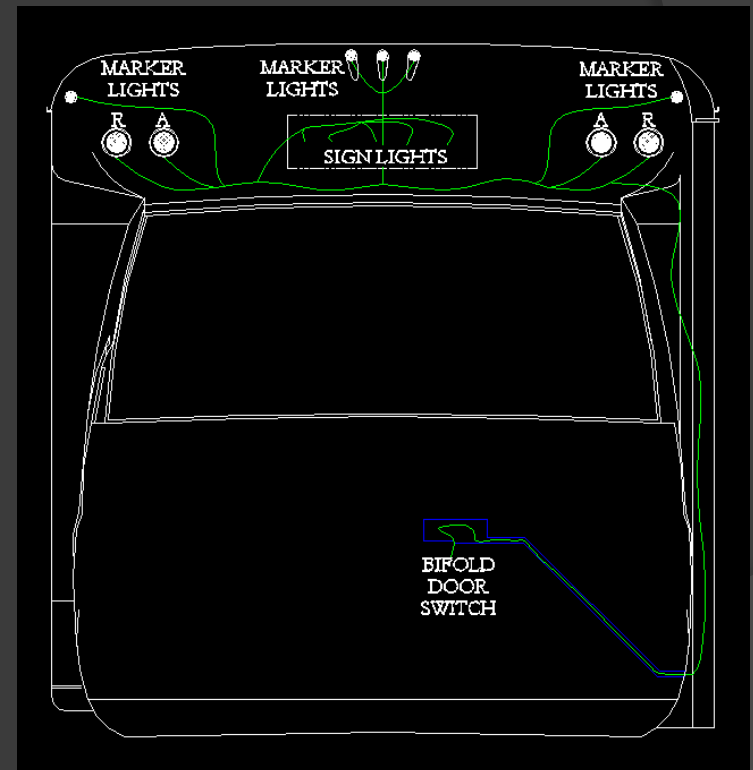
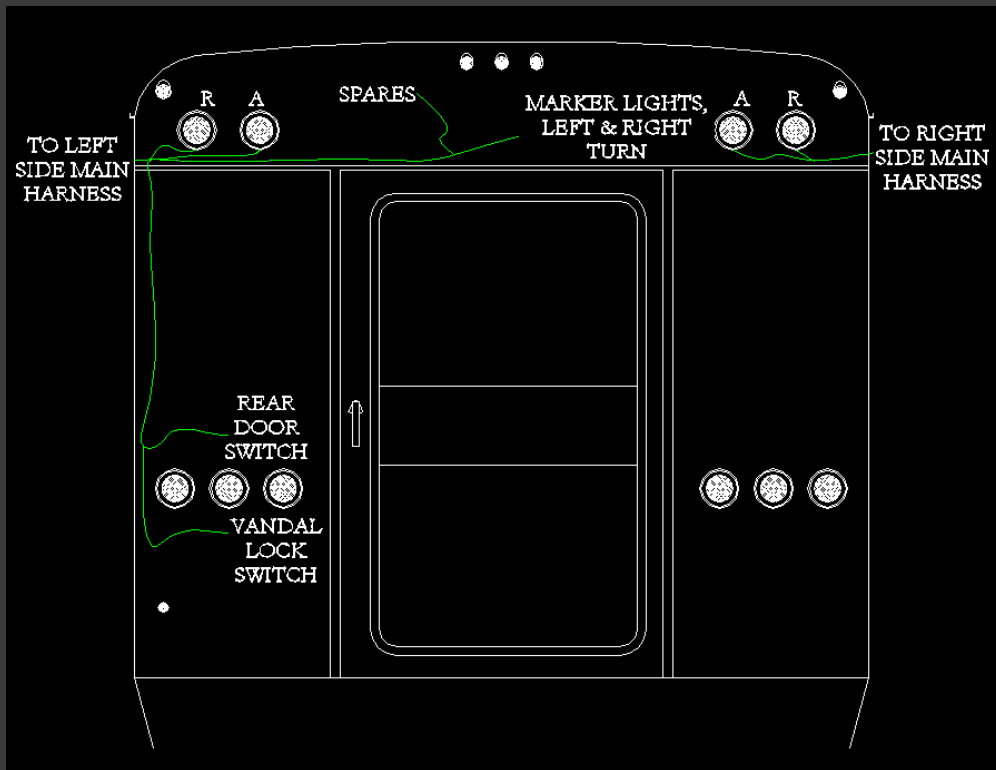
Harness Routing Overview

- Dash Harness continued...



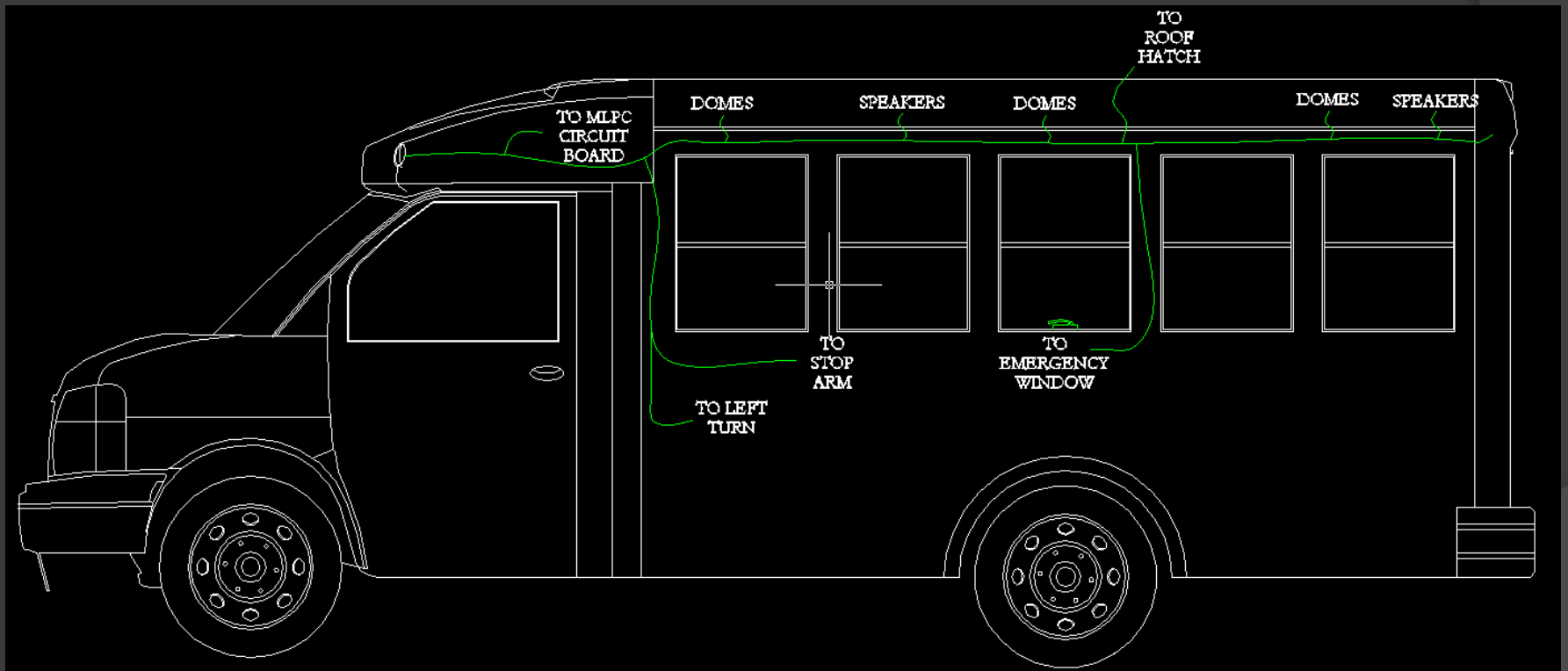
Harness Routing Overview

- Main Harness



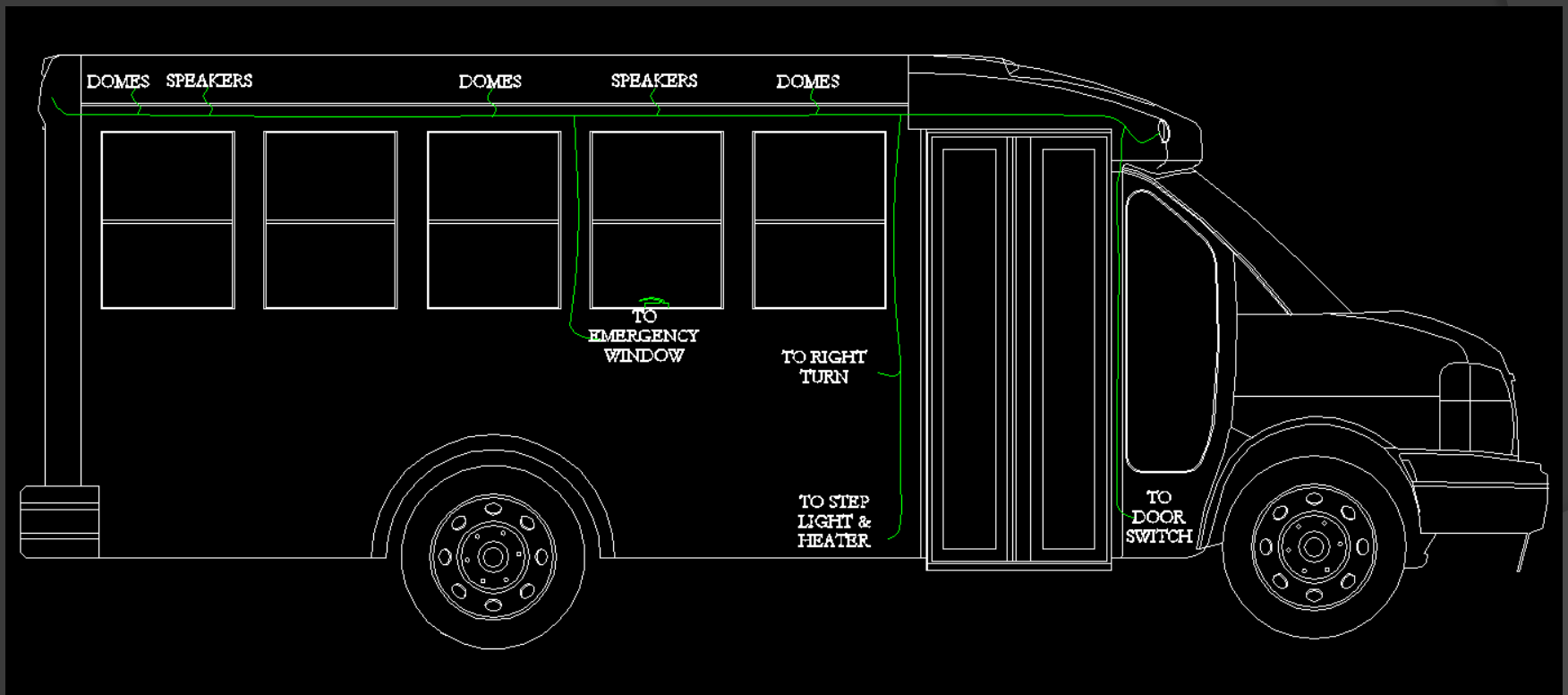
Harness Routing Overview

- Main Harness continued...



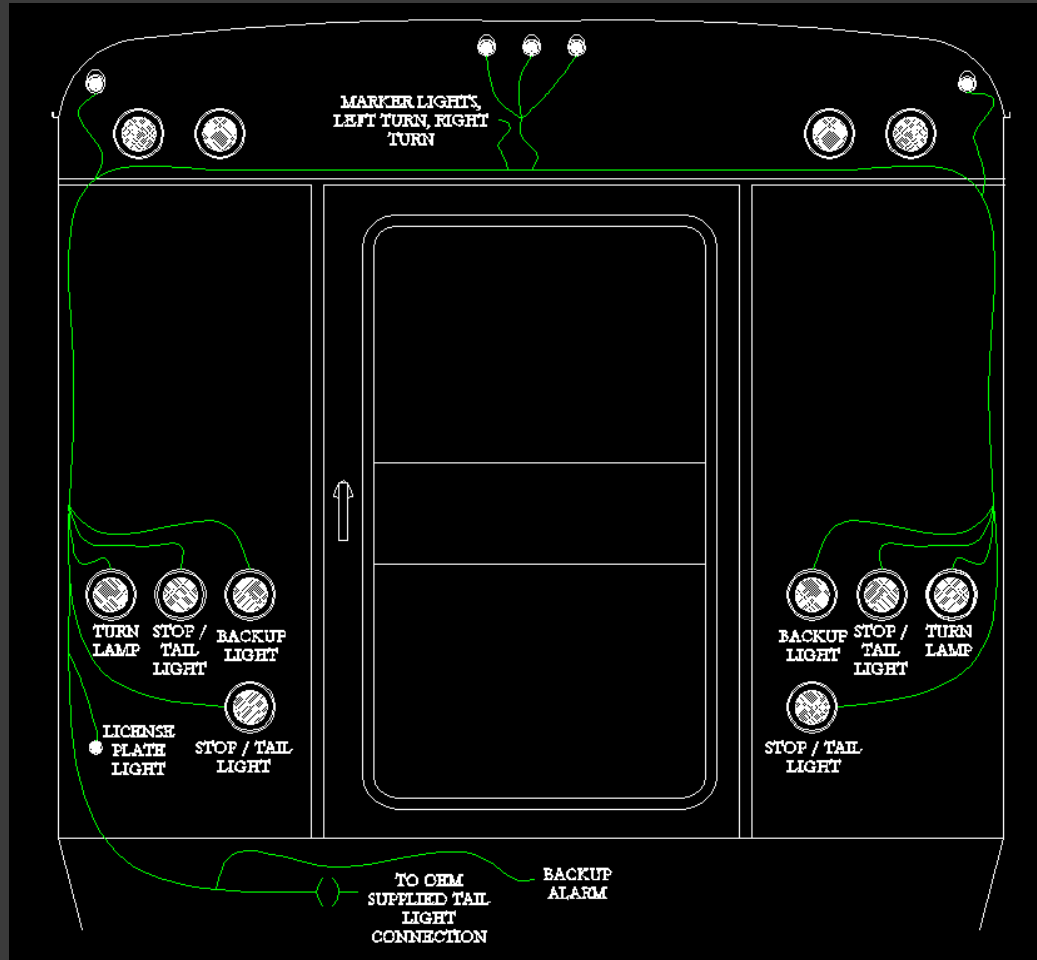
Harness Routing Overview

- Main Harness continued...

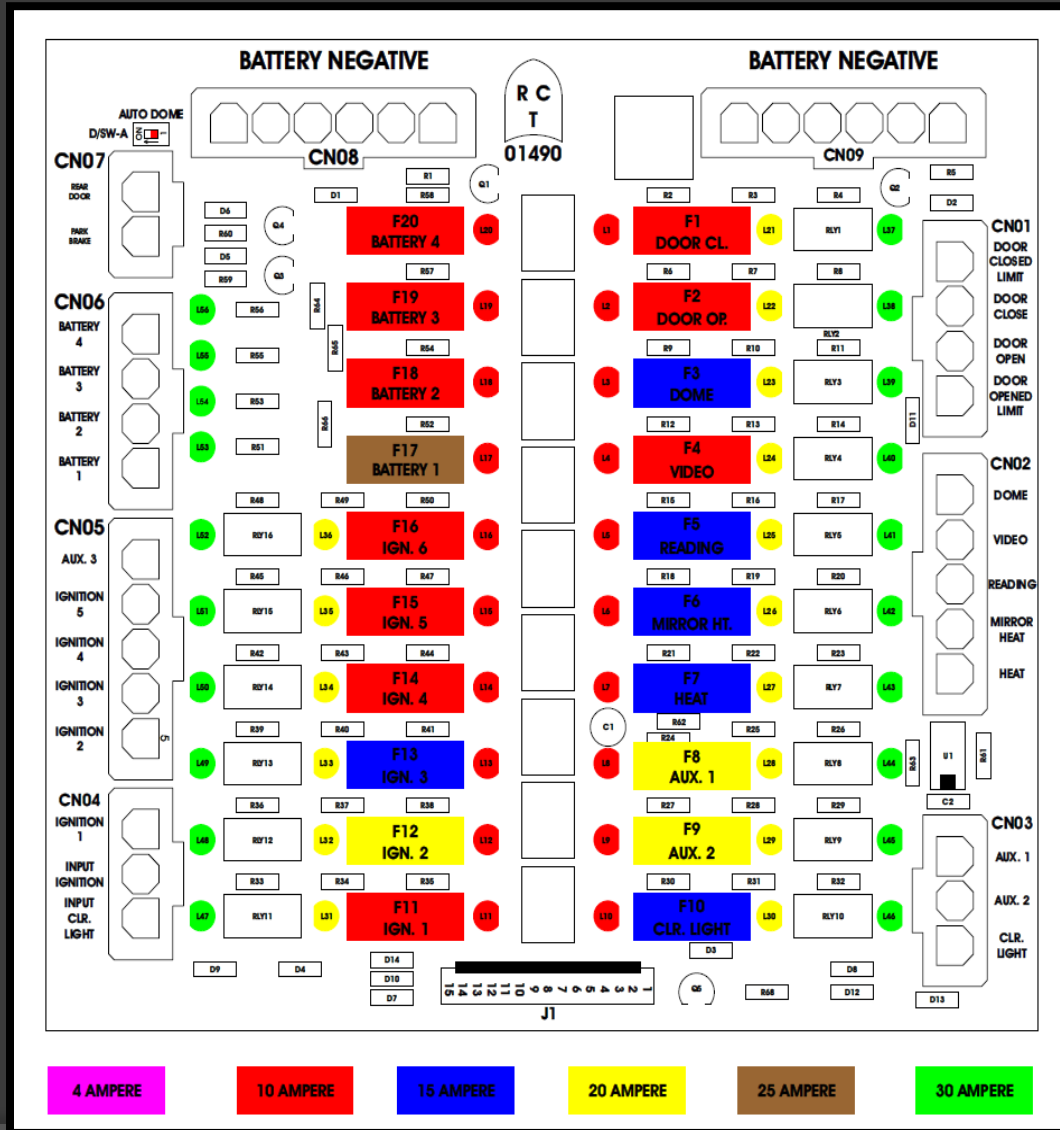


Harness Routing Overview

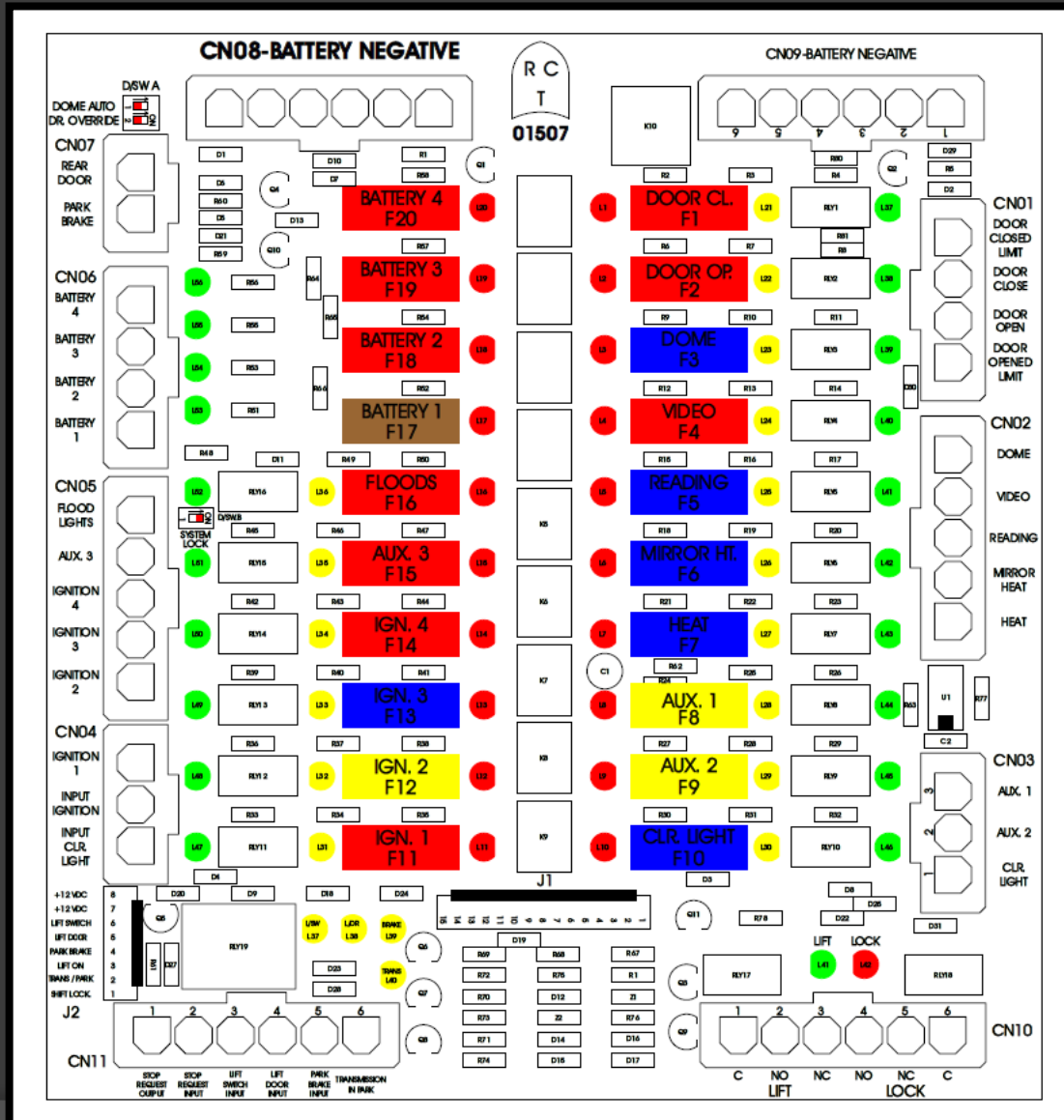
- Tail Harness



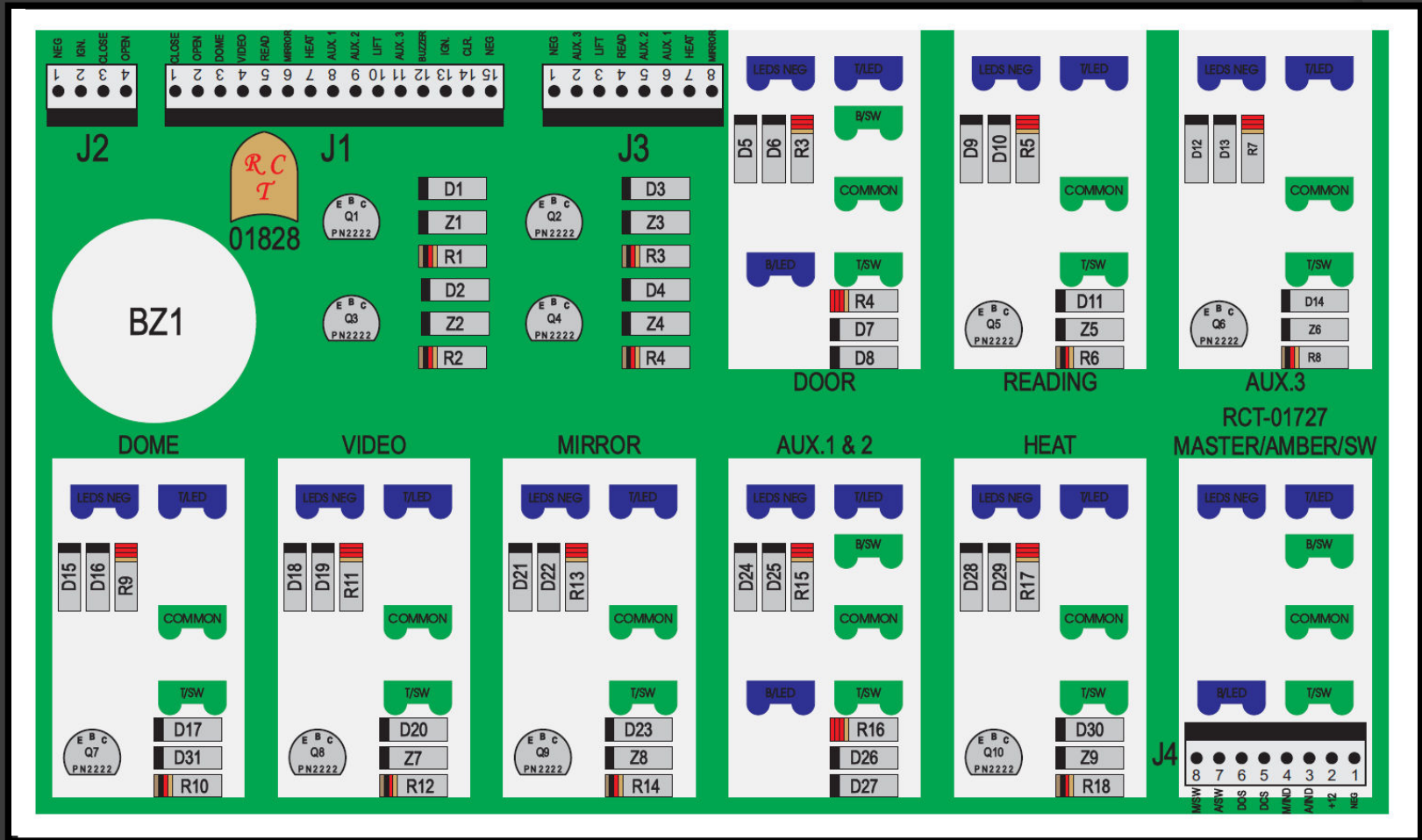
1490 MicroLine Power Center Board



1507 MicroLine Power Center Board

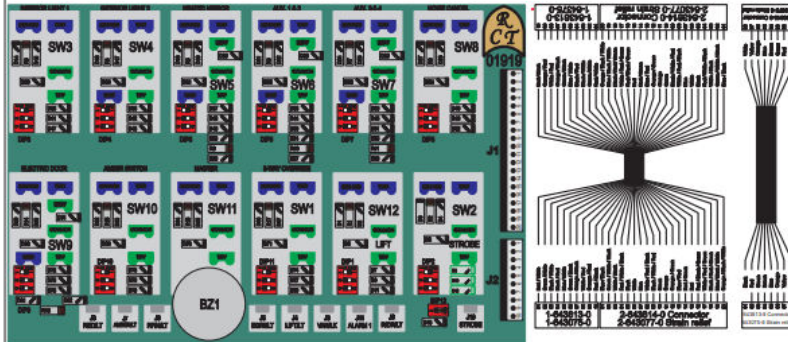
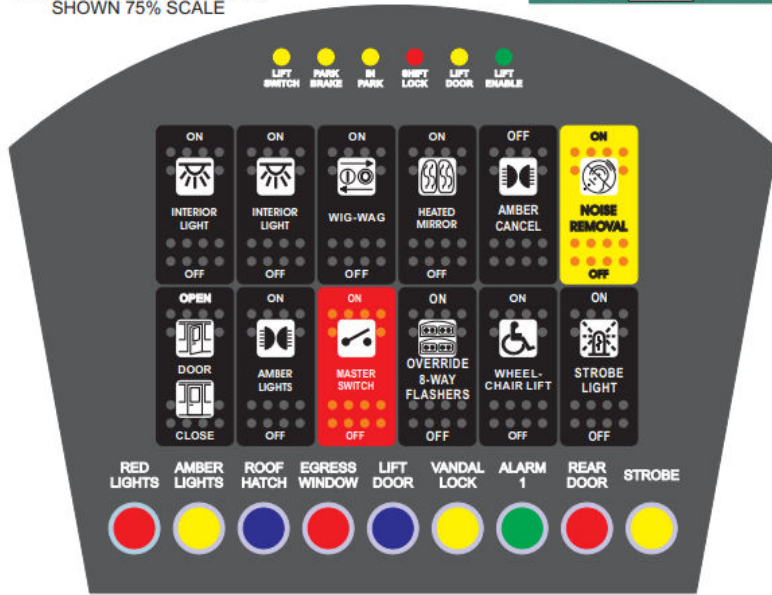


1828 Control Center Board



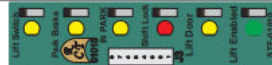
2015 Circuit Board

DASH SWITCH PANEL (9.5 X 7.65)
 SWITCH PCB-STF-01919 (6.2 X 4.2)
 ADA PCB-STF-01010 (.8 X 3.3)
 SHOWN 75% SCALE



Switch loads may be operated by; Ignition, DIP 1; Ignition with Master Switch, DIP 2; (or) Battery, DIP 3.

DAT-01352-00XX0 DAT-01348
 (XX = FEET OF CABLE) -00XX0



CN17 Alarm Inputs to ground. Operation dip switch selectable; Ignition, Master Switch or Battery. Alarm 1 Roof Hatch Rear Door Egress Window Lift Door Vandal Lock.

CN16 Engine Start only with R/DOOR input.

CN15 Battery 1 thru 5 Output. Cross Arm Output

CN14 Lift Flood Output Rear Door Light Output Ignition 6 thru 8 Output.

CN13 Ignition 2 Output "OFF" w / SW09 DIP Switch 9, override. Ignition 3 thru 5

CN12 Horn Input and Horn Output.

CN11 Clearance Output Clearance Input and Ignition Input.

CN10 Ignition 1 Output "OFF" w / SW09 DIP SW8, override. Fan Low output.

CN18 Brake Light Input to Amber Light. Input to Red Indicator. Input to Strobe Indicator. Provides Negative output, SW01

CN19-CN20-CN21-CN22 Battery Negative 24 each total.

RCT-MOLEX-00016 MATING HARNESS CONNECTOR KIT

Cn01 Door Outputs with Door Limits.

DIP SWITCH 10 Inhibits "DOOR OPEN" without vehicle "IN PARK".

CN02 Outputs from switch panel.

Cn03 Input and Outputs for Dual Stop Arm.

CN04 Outputs from switch panel.

CN05 Outputs from switch panel.

CN06 Fan High Output. Fan Medium Output Input J3, pin 1&2.

DIP7 Battery Enabled; Interior Lights, Switch 5

10 second Timer On Switch 4. Interior 2 Light On Switch 3. Interior 1 Light On Switch 2 Door Light On Switch 1.

CN09 Opens 4 Negative returns, SW09

DIP SWITCH 10 Removes Low-Medium-High Fan with "Noise Cancel Switch"

CN08 Park Brake Input and Transmission Input

CN07 Lift Interlock Output and Shift Lock Output.

CONTROLS SHOWN 50% OF ACTUAL SIZE: RCT-02015 9 x 16 INCHES

1490 CONTROL BOARD

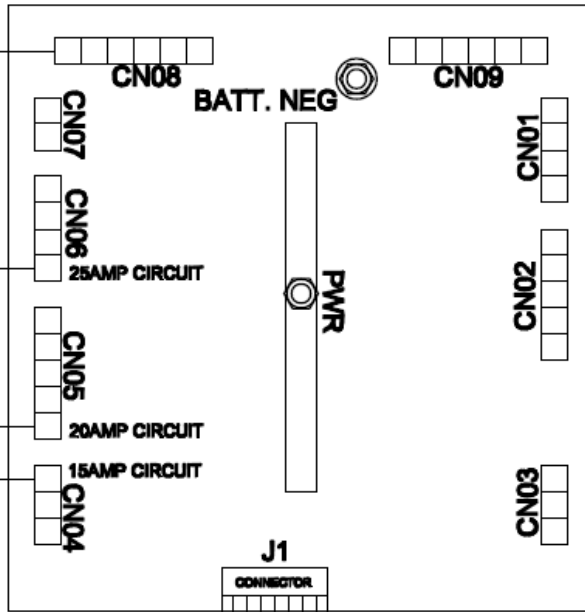
GROUND TO ADDED
RELAYS & 8-WAY
FLASHER ON BACK
SIDE OF CONTROL
BOARD

BATTERY #1:
ELECTRIC DOOR
MAIN POWER FEED

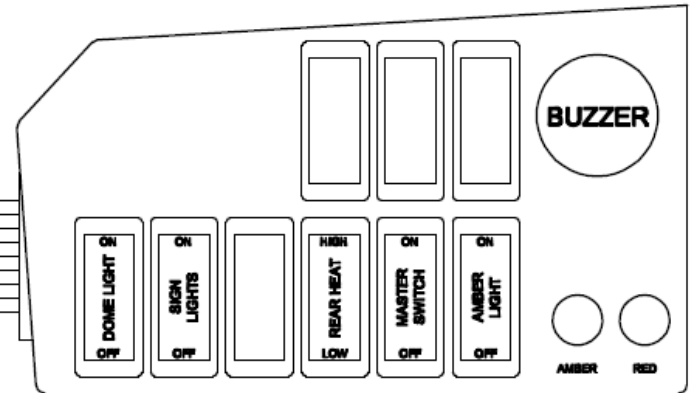
IGNITION #2:
AIR CONDITIONING

IGNITION #1:
POWER FOR ADDED
RELAYS ON BACK
SIDE OF CONTROL
BOARD

(IGNITION #1 ALSO PROVIDES
IGNITION POWER TO SWITCH
PANEL VIA DATA CABLE)



DATA CABLE
CONNECTOR



DRIVER SWITCH CONTROL PANEL

NOTE:

SWITCH LOCATIONS MAY VARY DUE TO
VEHICLE OPTIONS

1507 CONTROL BOARD

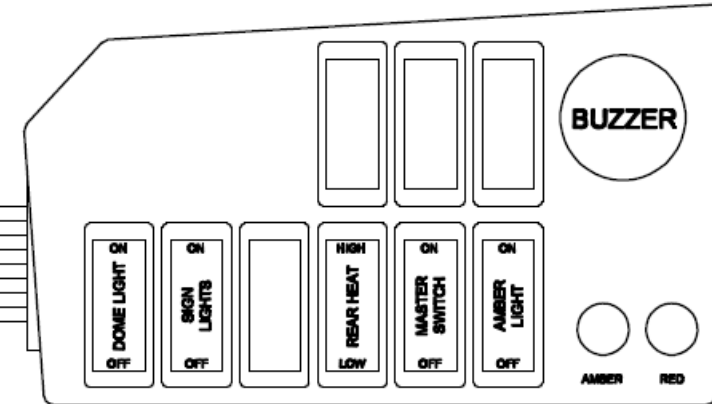
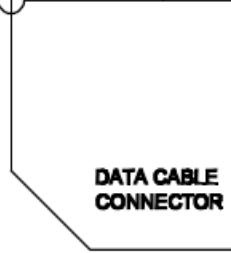
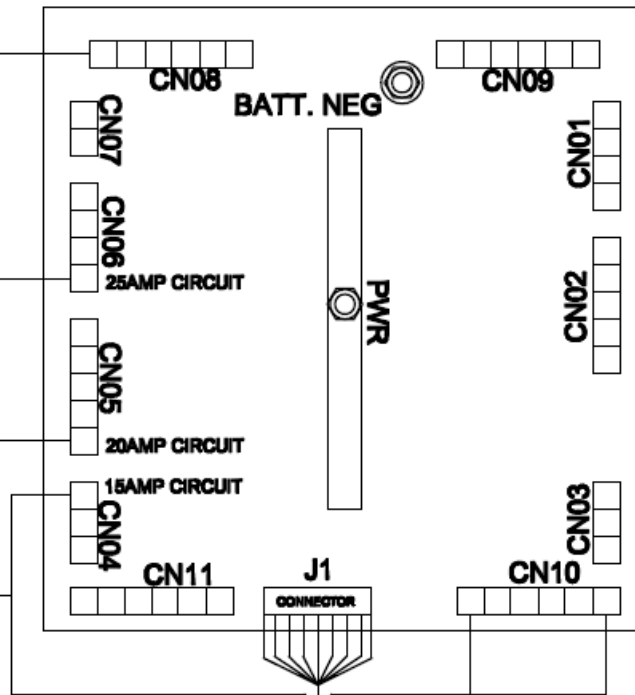
GROUND TO ADDED
RELAYS & 8-WAY
FLASHER ON BACK
SIDE OF CONTROL
BOARD

BATTERY #1:
ELECTRIC DOOR
MAIN POWER FEED

IGNITION #2:
ACT & CARRIER
AC IGNITION

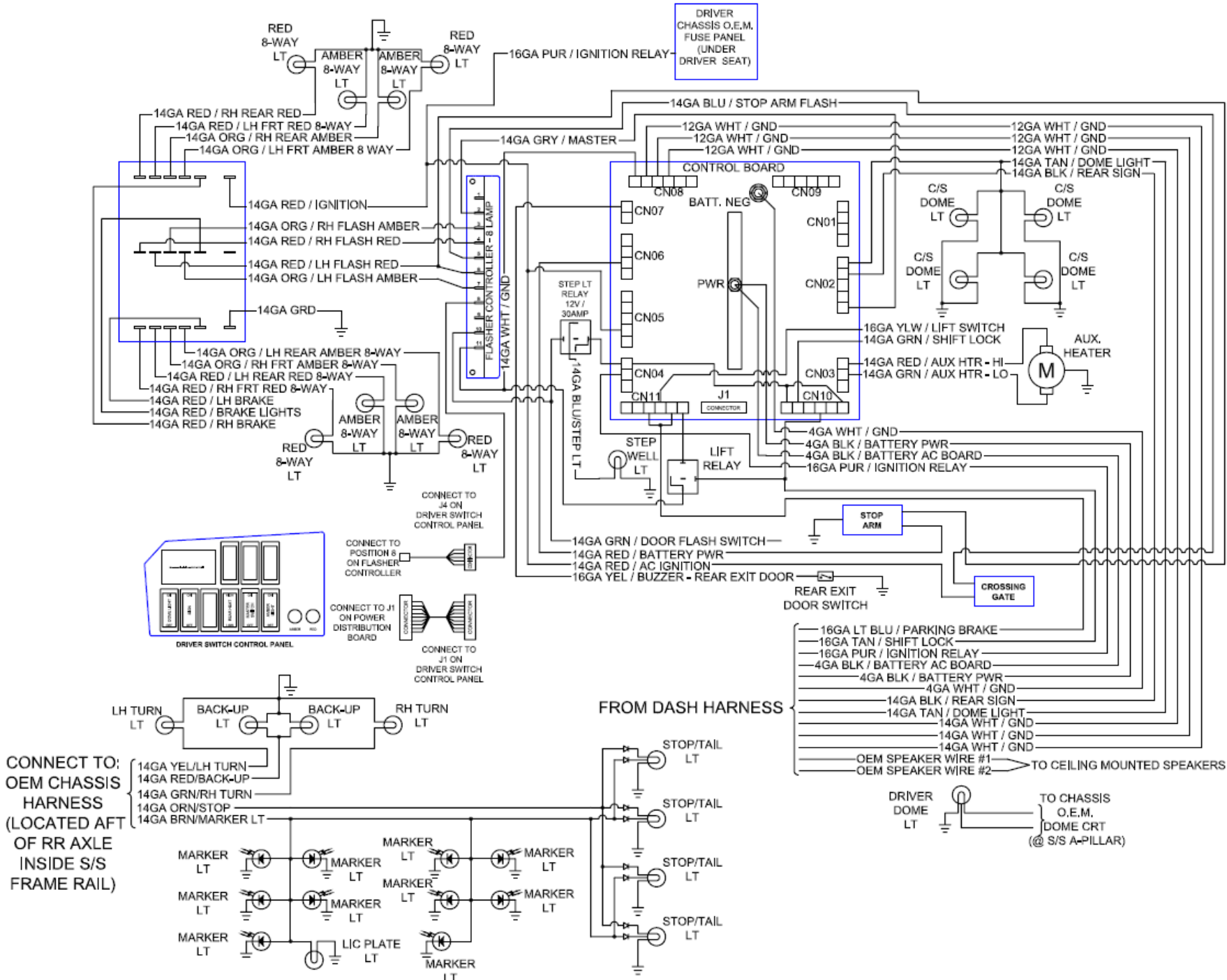
IGNITION #1:
POWER FOR ADDED
RELAYS ON BACK
SIDE OF CONTROL
BOARD & LIFT (CN10)

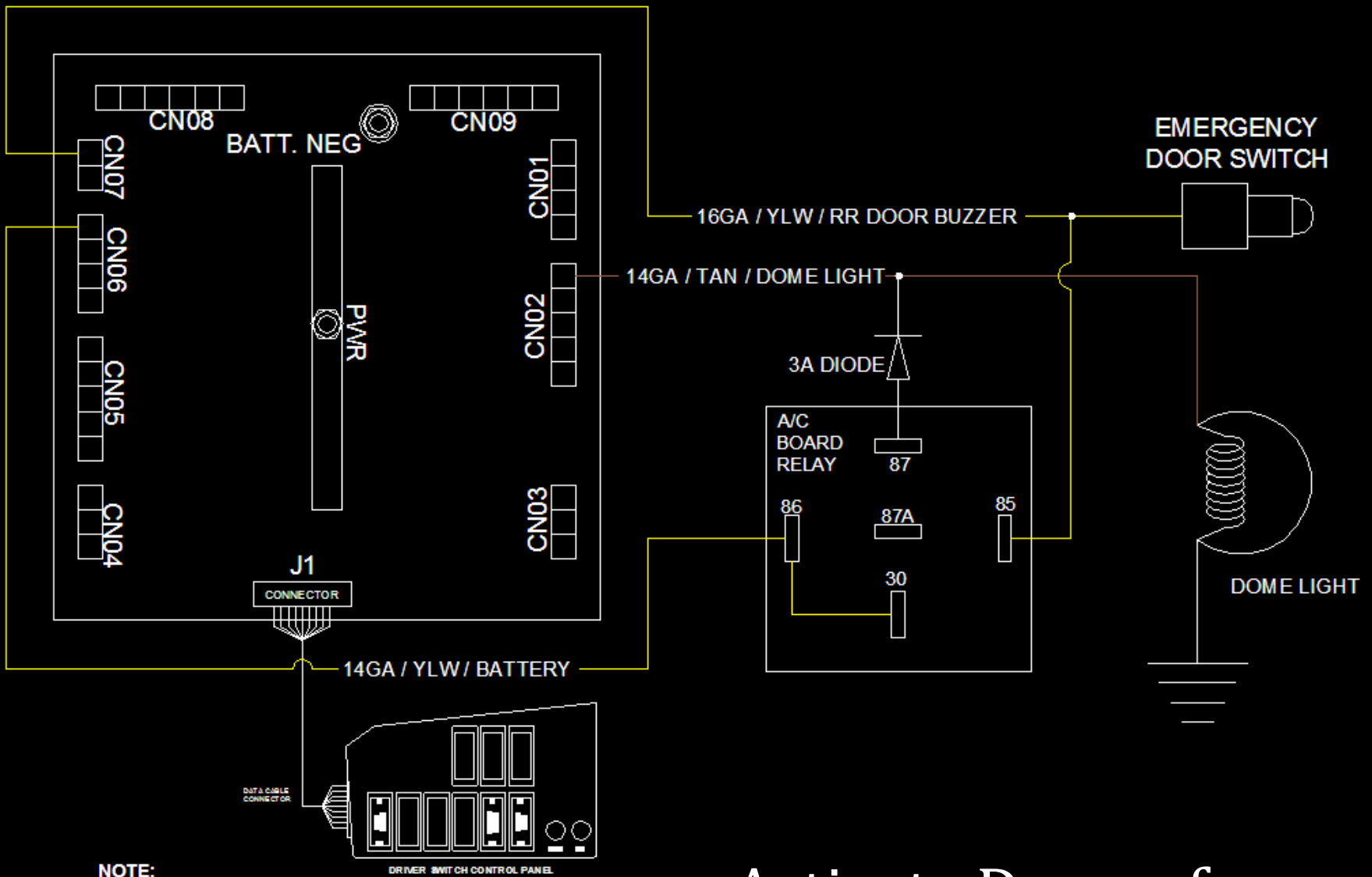
(IGNITION #1 ALSO PROVIDES
IGNITION POWER TO SWITCH
PANEL VIA DATA CABLE)



DRIVER SWITCH CONTROL PANEL

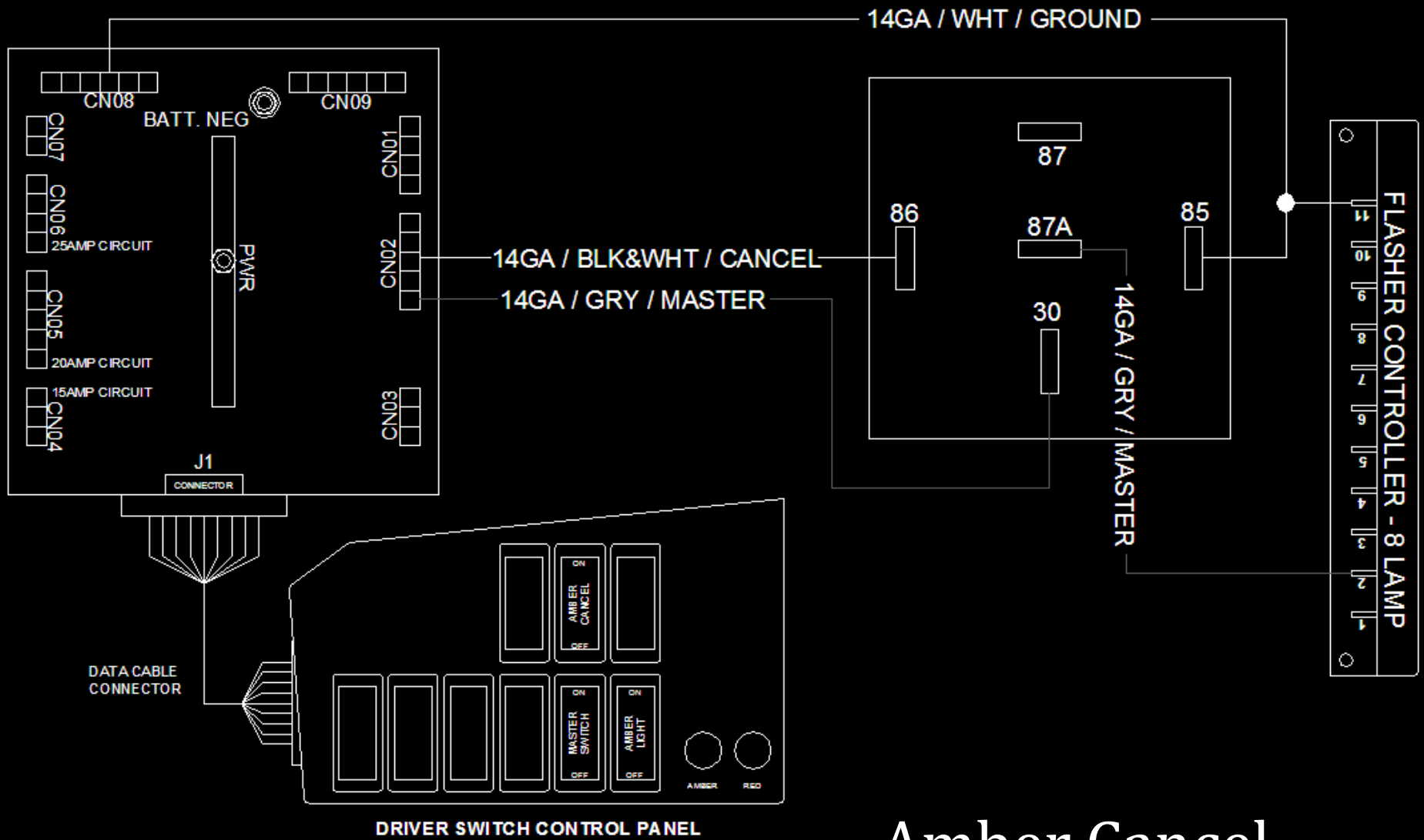
NOTE:
ROCKER SWITCH LOCATIONS MAY
VARY DUE TO VEHICLE OPTIONS



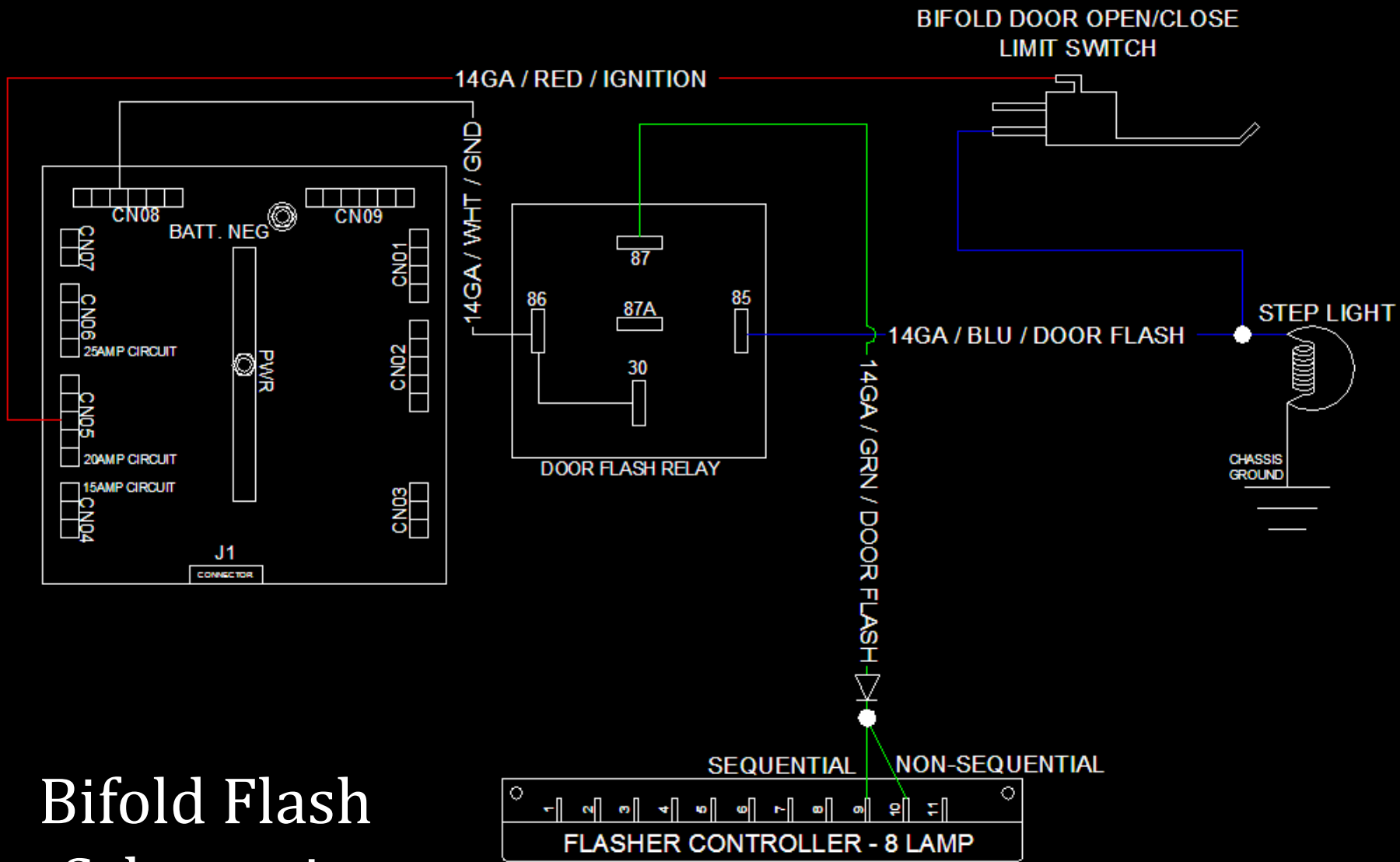


NOTE:
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VARY DUE TO VEHICLE OPTIONS

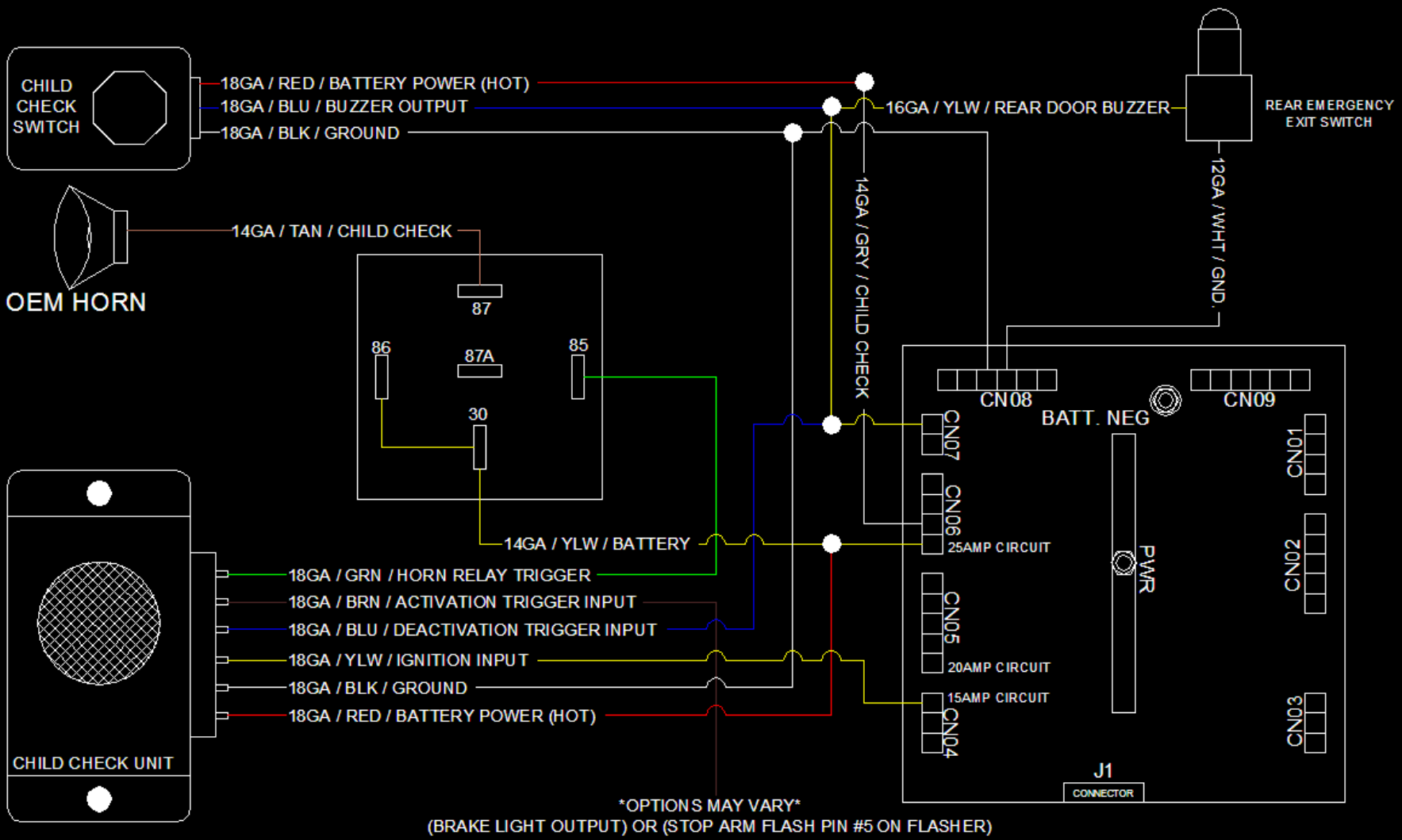
Activate Domes from Emergency Exit



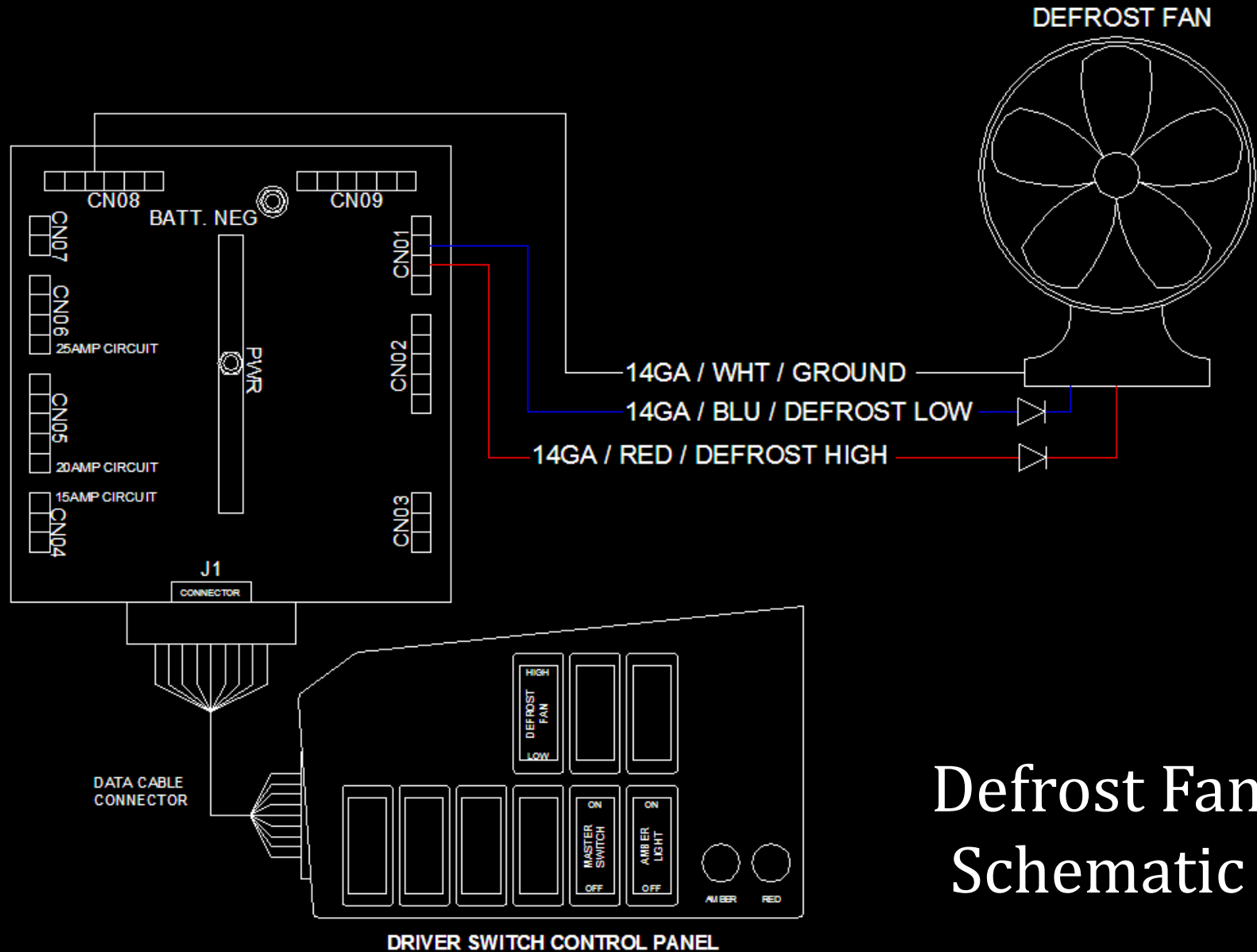
Amber Cancel Schematic



Bifold Flash Schematic

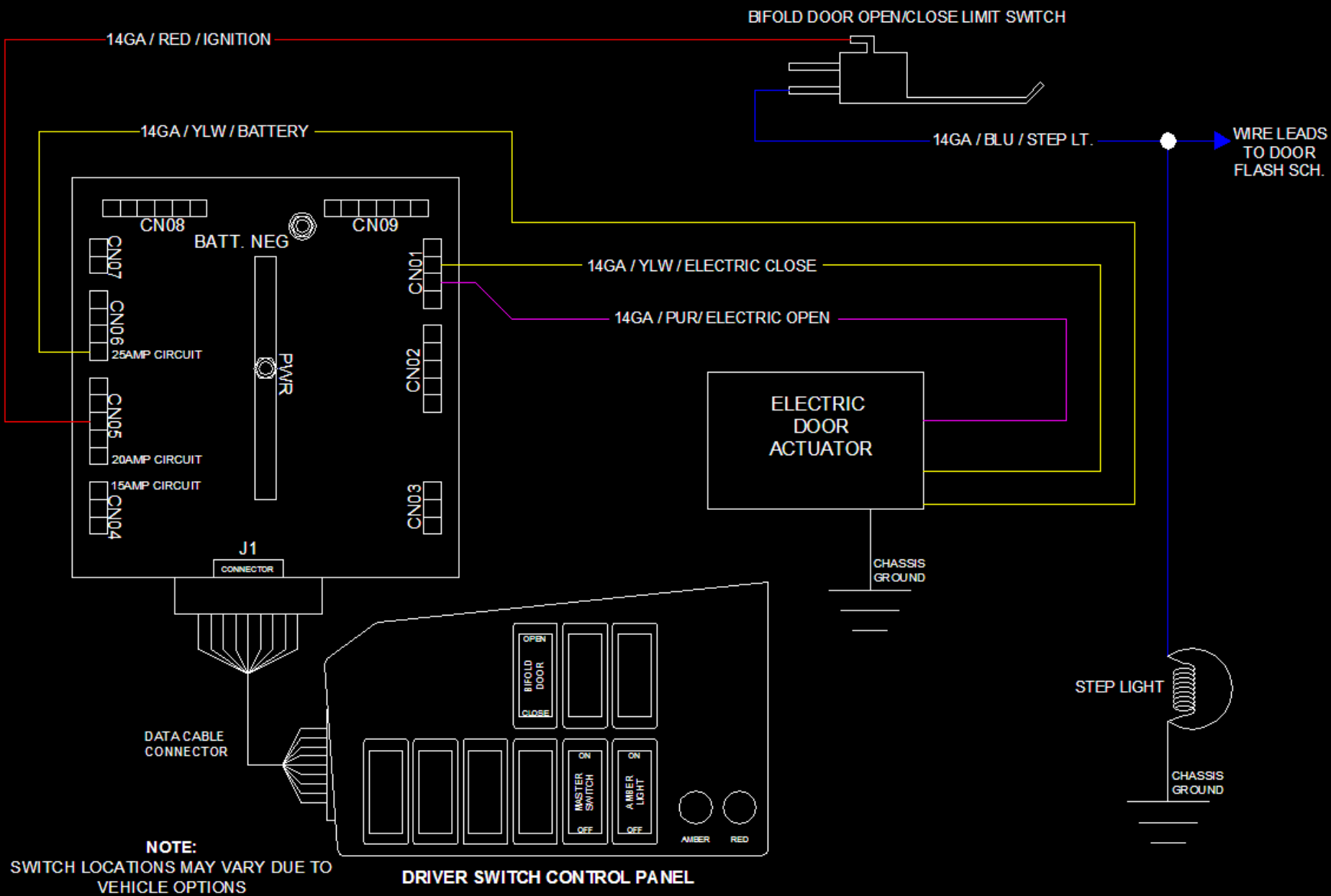


Child Check Schematic



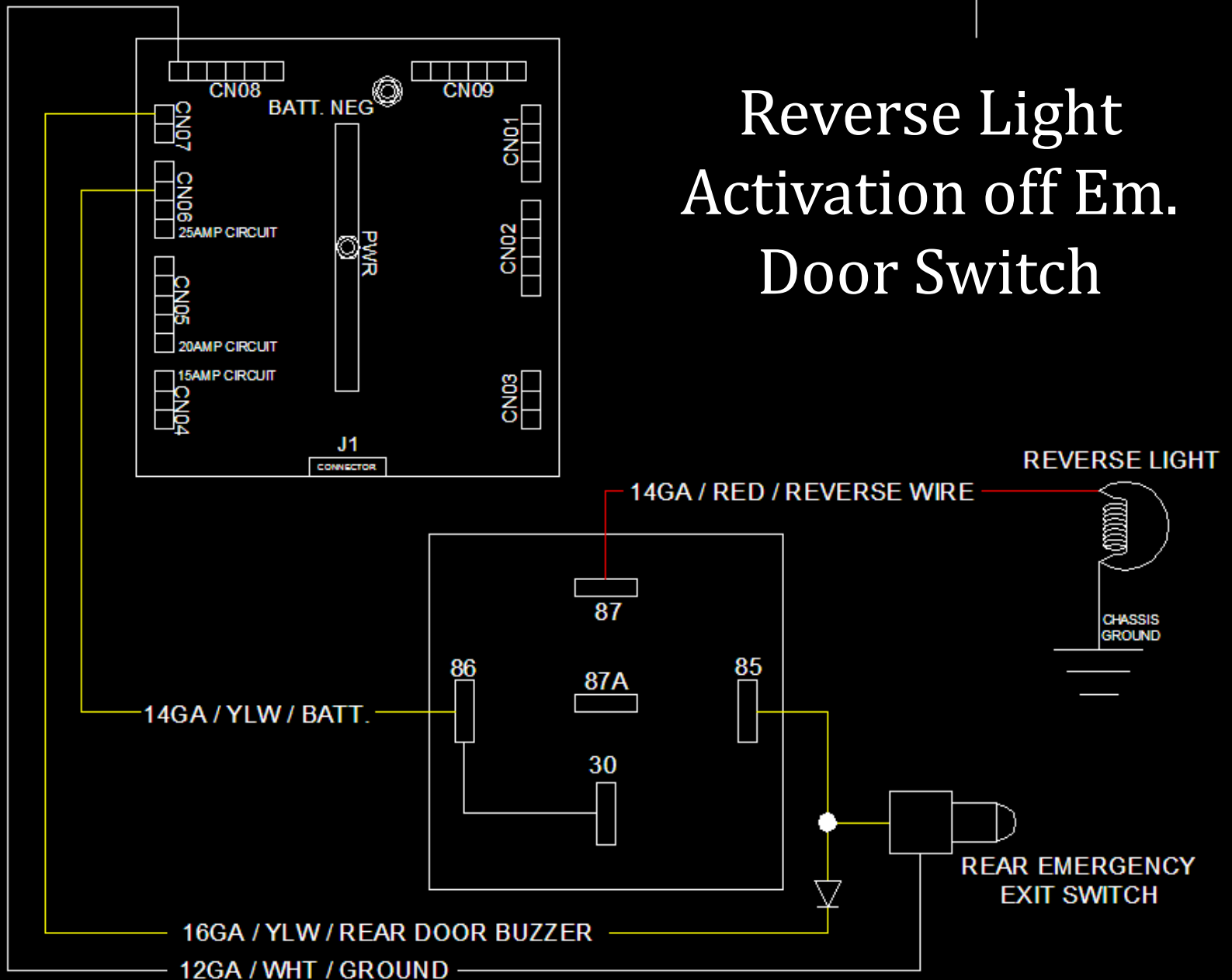
Defrost Fan Schematic

NOTE:
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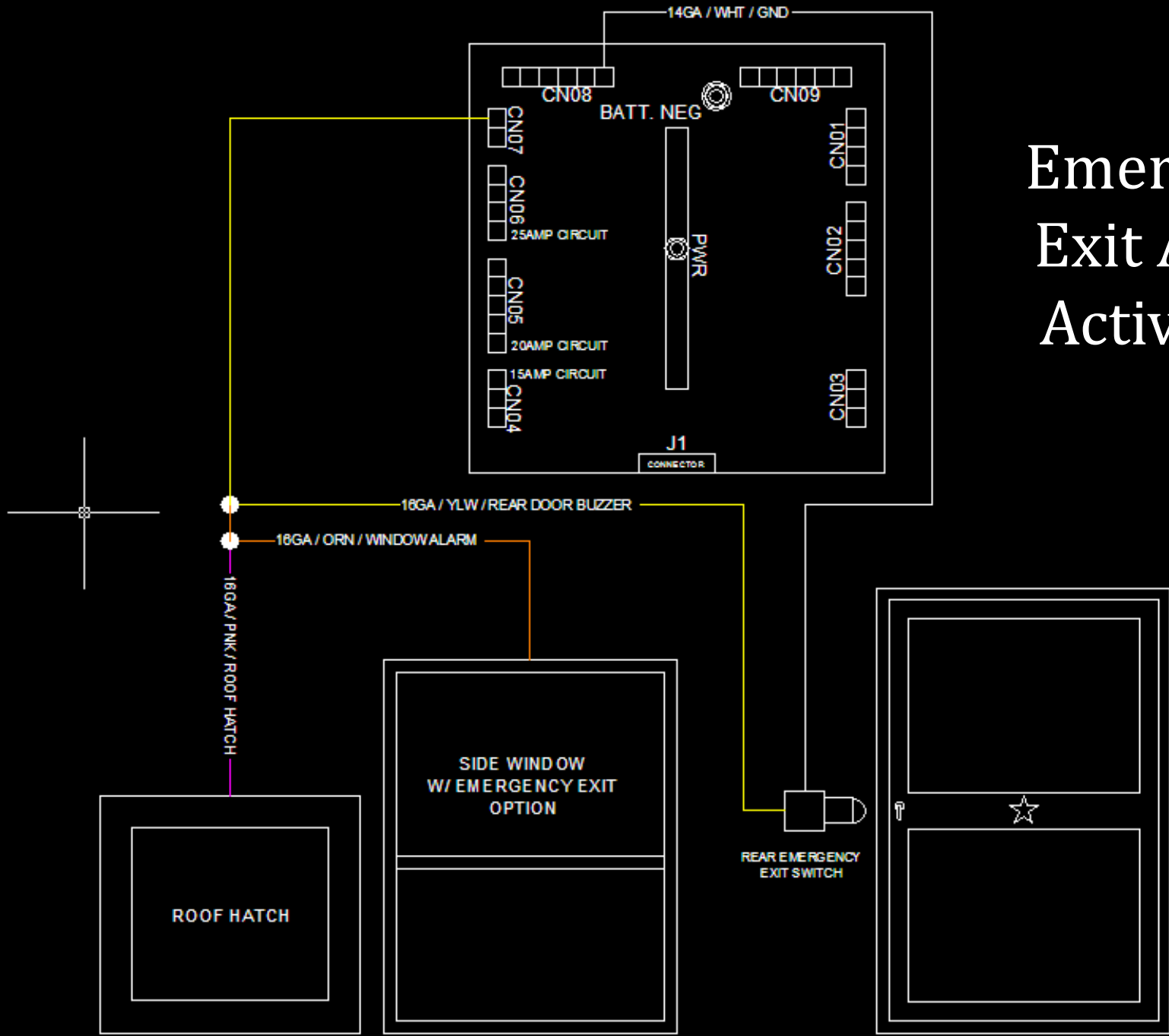


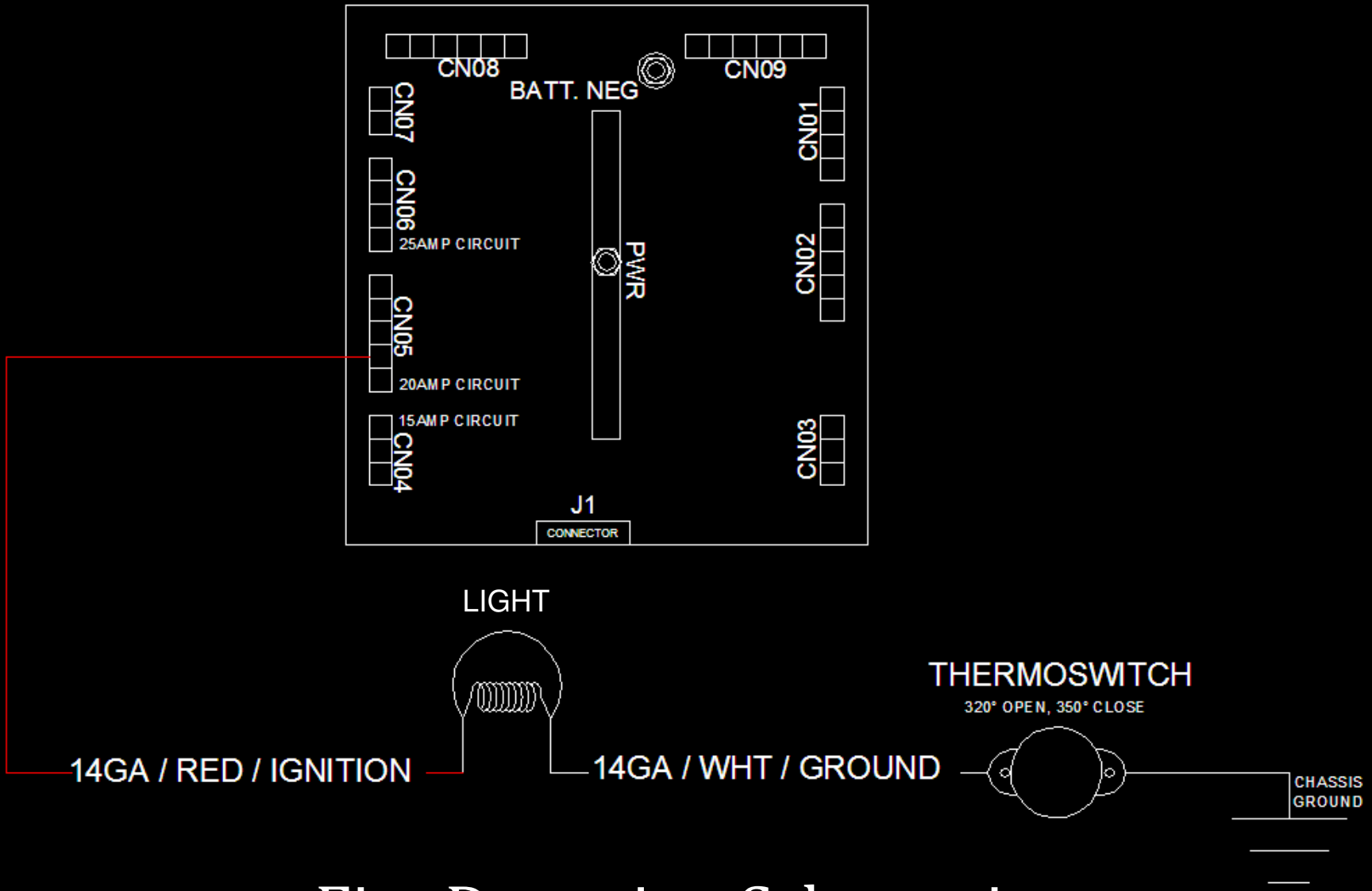
Electric Door Flash Schematic

Reverse Light Activation off Em. Door Switch

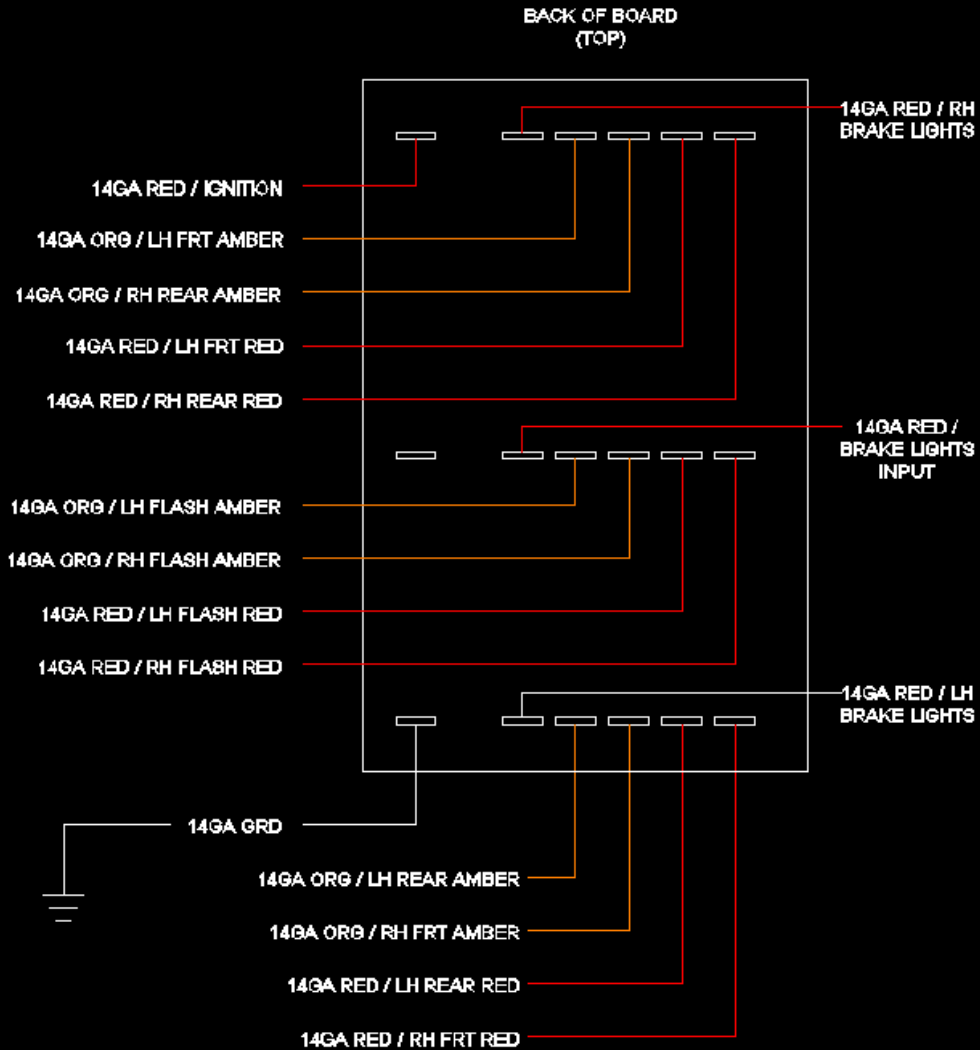
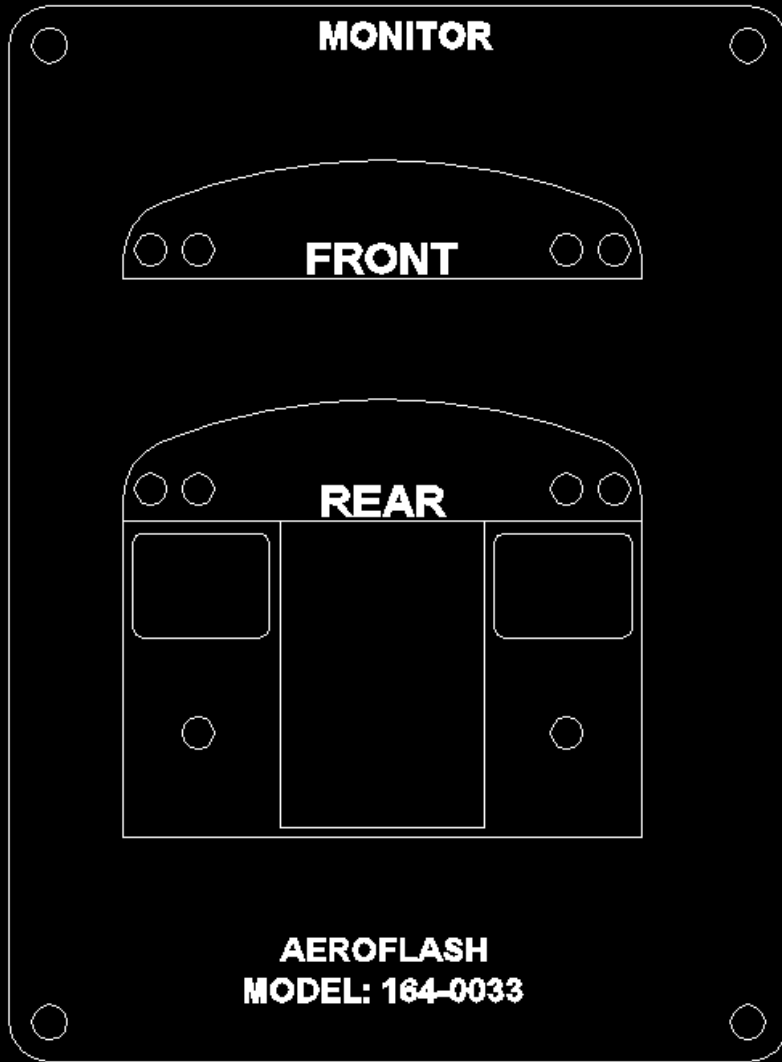


Emergency Exit Alarm Activation

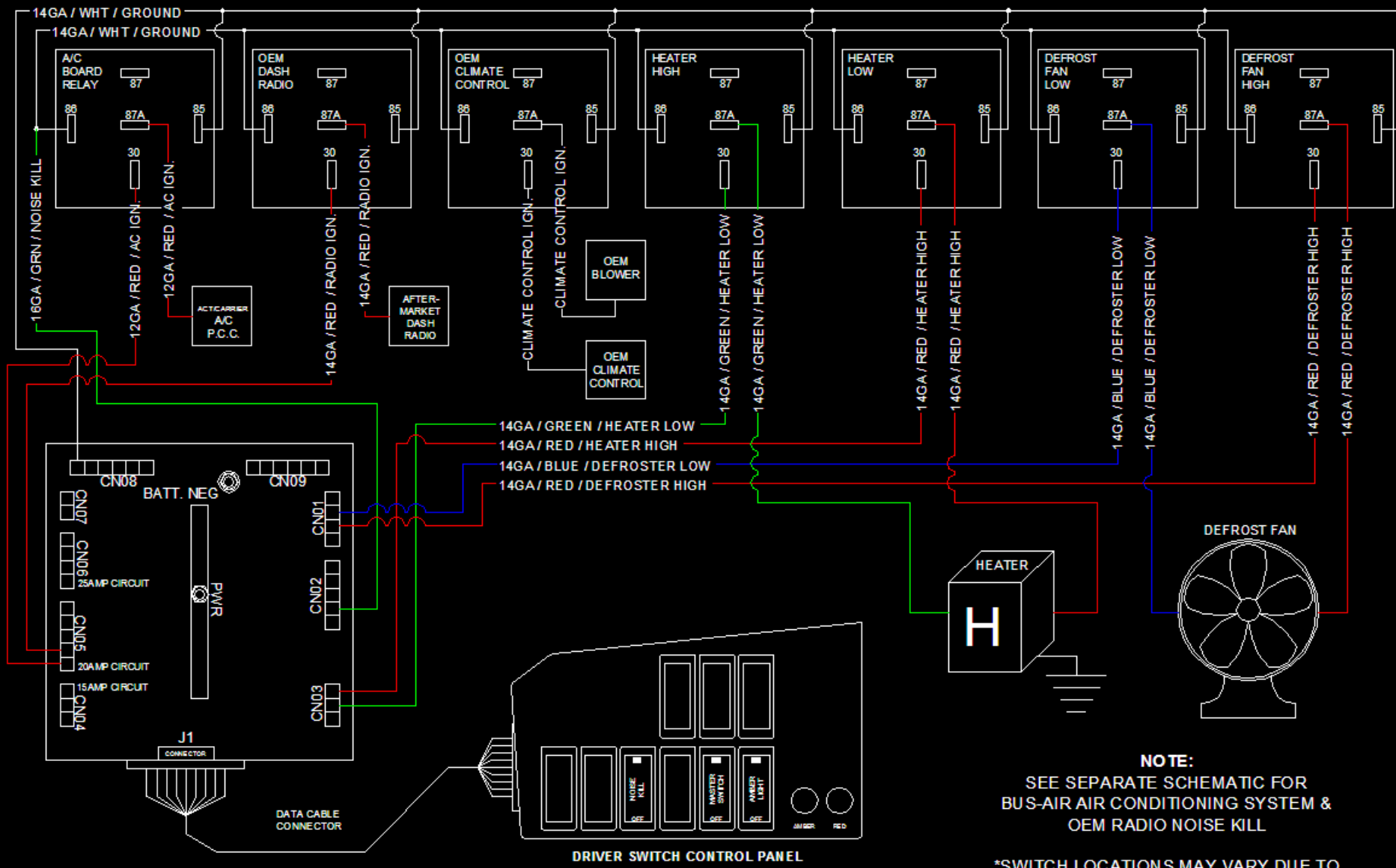




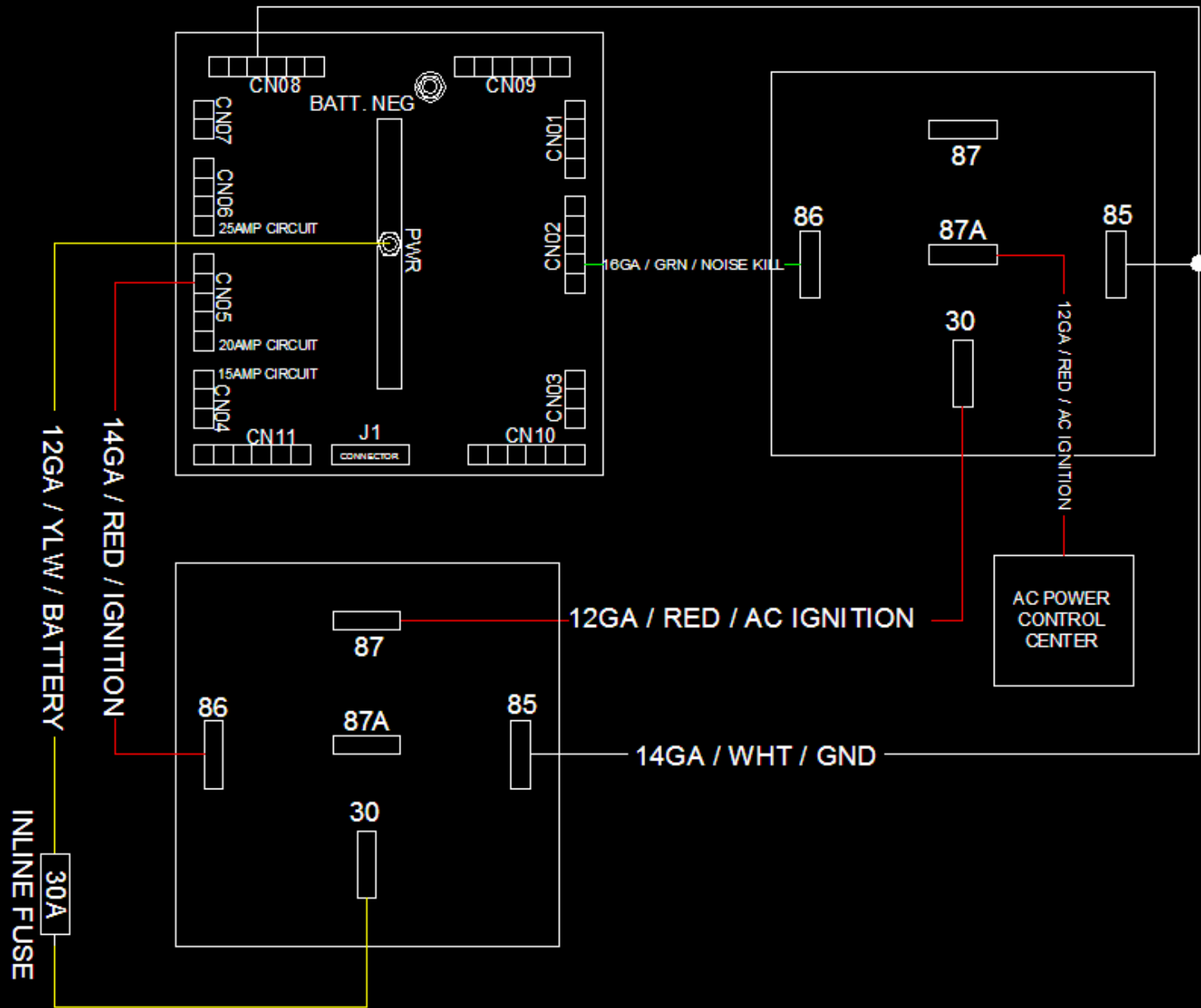
Fire Detection Schematic



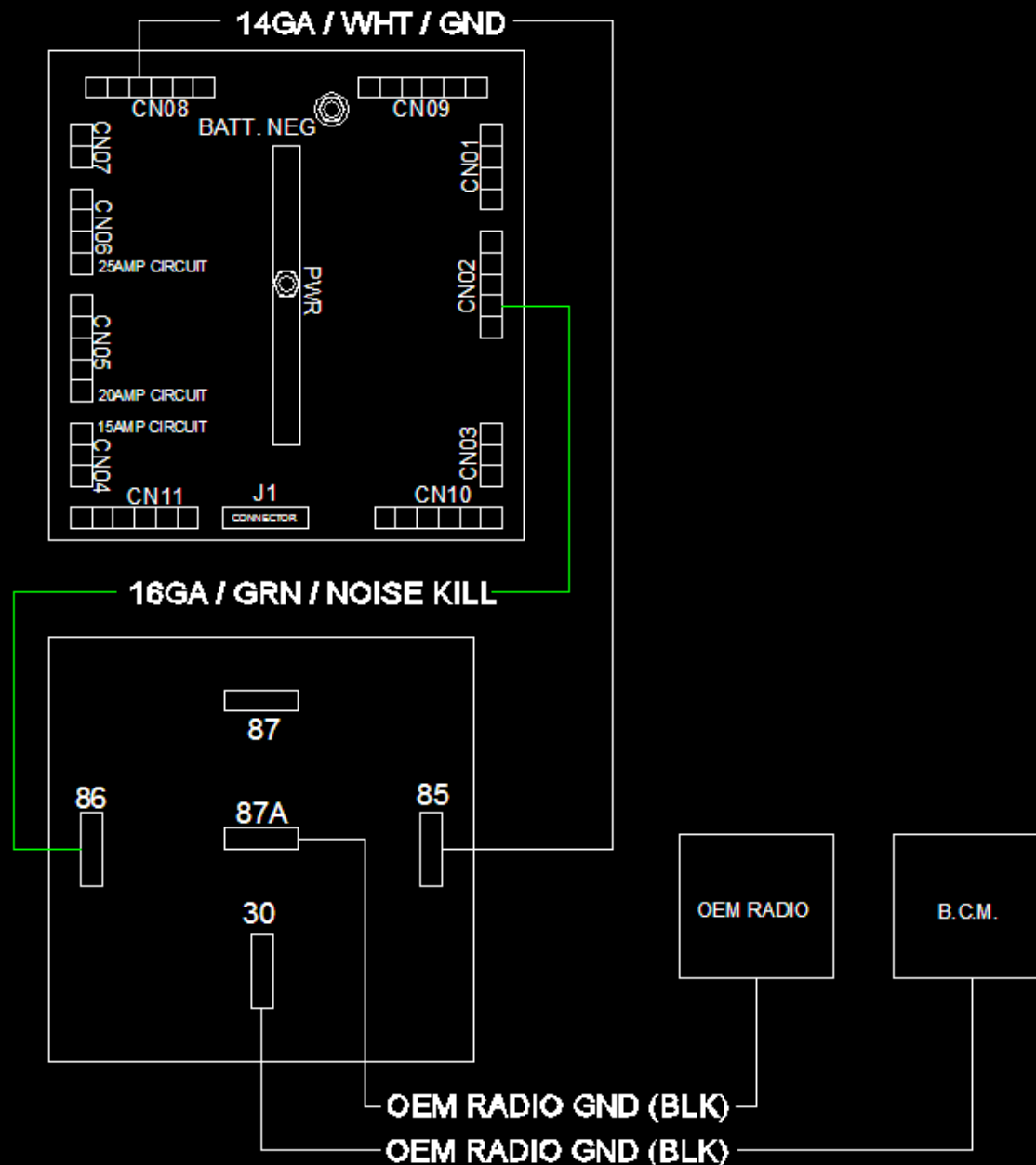
Bus Monitor Schematic



Noise Kill Schematic



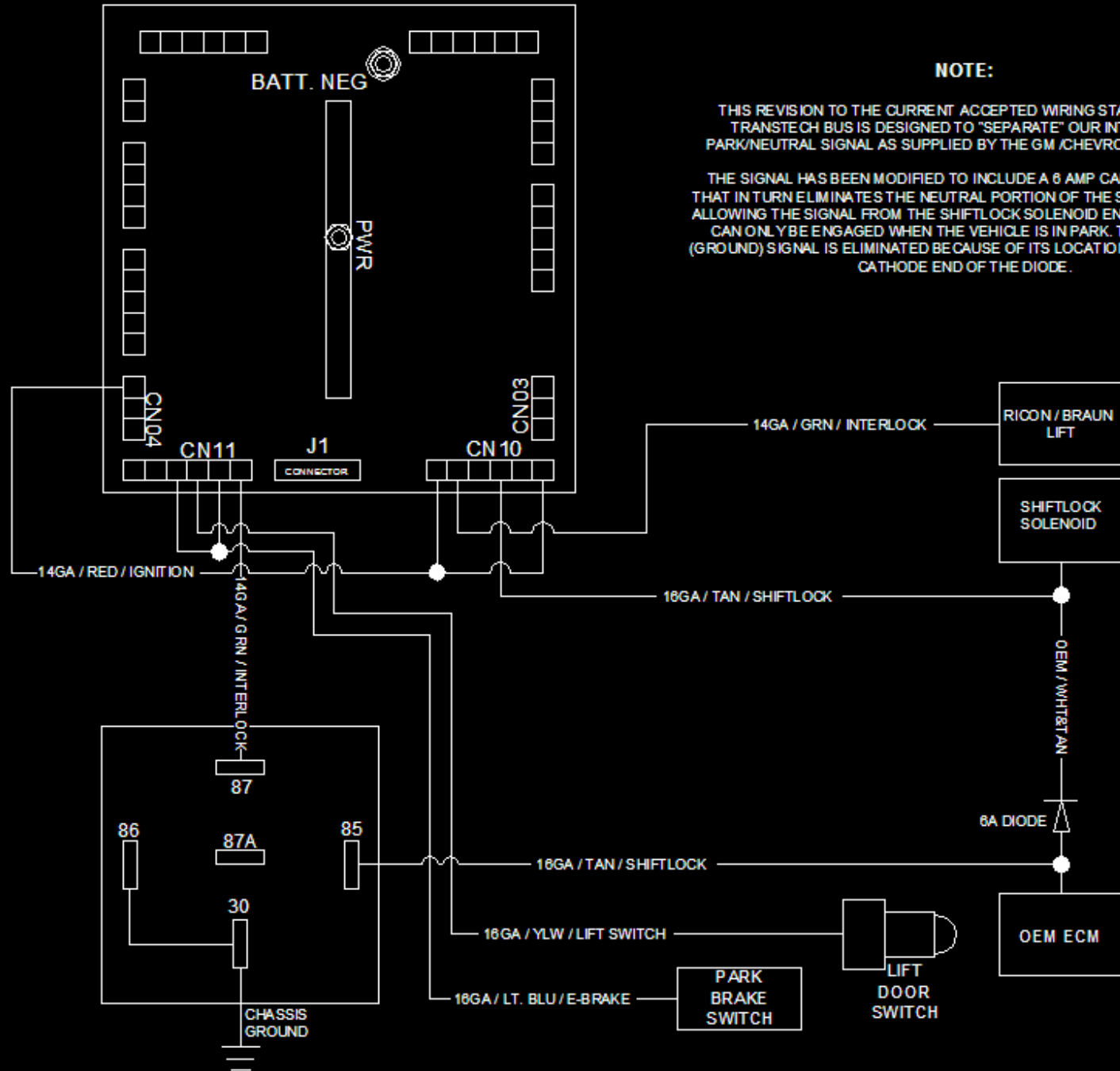
Noise Kill Schematic – BusAir Addendum



Noise Kill Schematic – OEM Radio Addendum

Chevrolet ShiftLock Schematic

1507 CONTROL BOARD

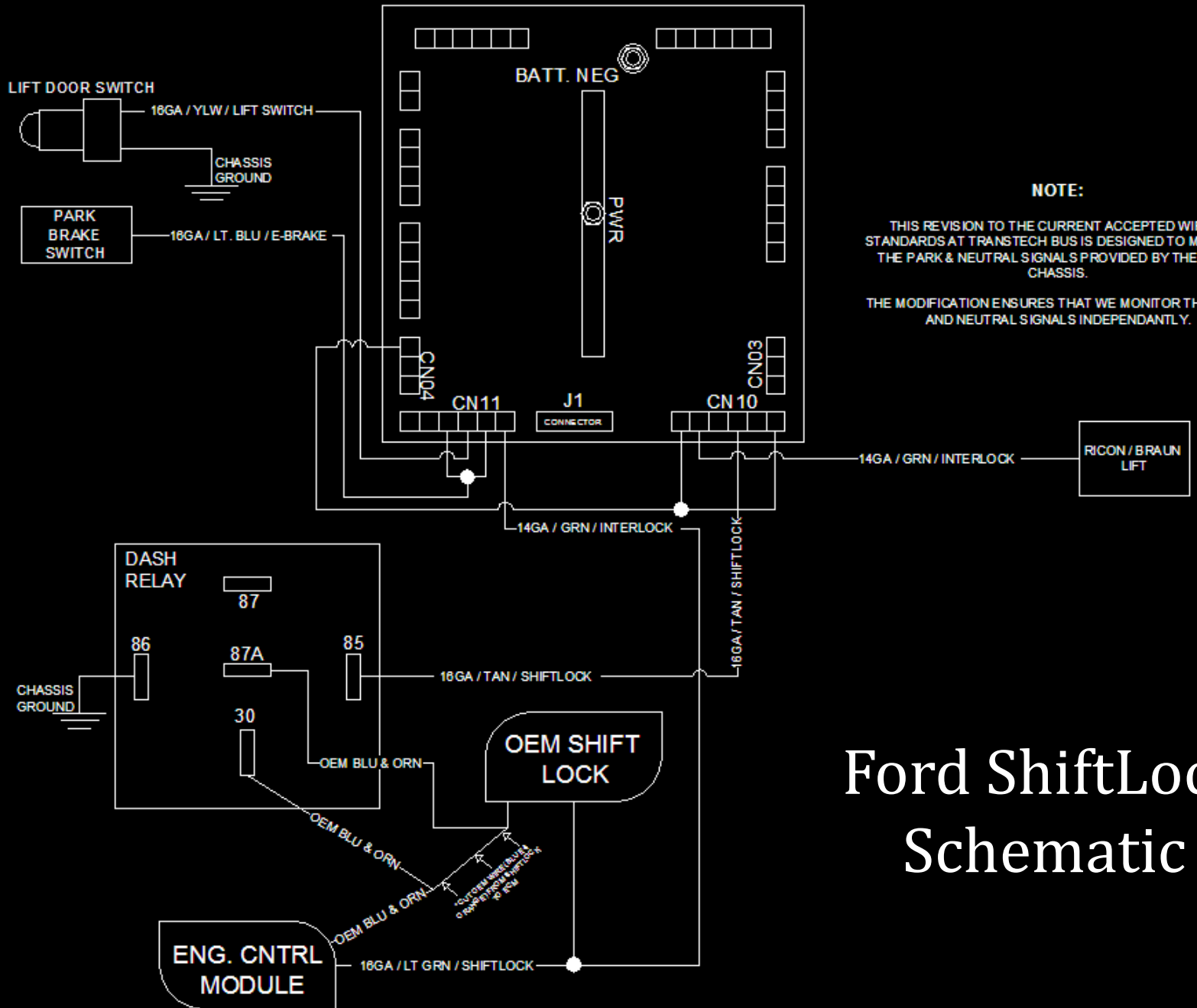


NOTE:

THIS REVISION TO THE CURRENT ACCEPTED WIRING STANDARDS AT TRANSTECH BUS IS DESIGNED TO "SEPARATE" OUR INTEGRATED PARK/NEUTRAL SIGNAL AS SUPPLIED BY THE GM /CHEVROLET CHASSIS.

THE SIGNAL HAS BEEN MODIFIED TO INCLUDE A 6 AMP CAPACITY DIODE THAT IN TURN ELIMINATES THE NEUTRAL PORTION OF THE SIGNAL BY ONLY ALLOWING THE SIGNAL FROM THE SHIFTLOCK SOLENOID ENGAGING, WHICH CAN ONLY BE ENGAGED WHEN THE VEHICLE IS IN PARK. THE NEUTRAL (GROUND) SIGNAL IS ELIMINATED BECAUSE OF ITS LOCATION TOWARDS THE CATHODE END OF THE DIODE.

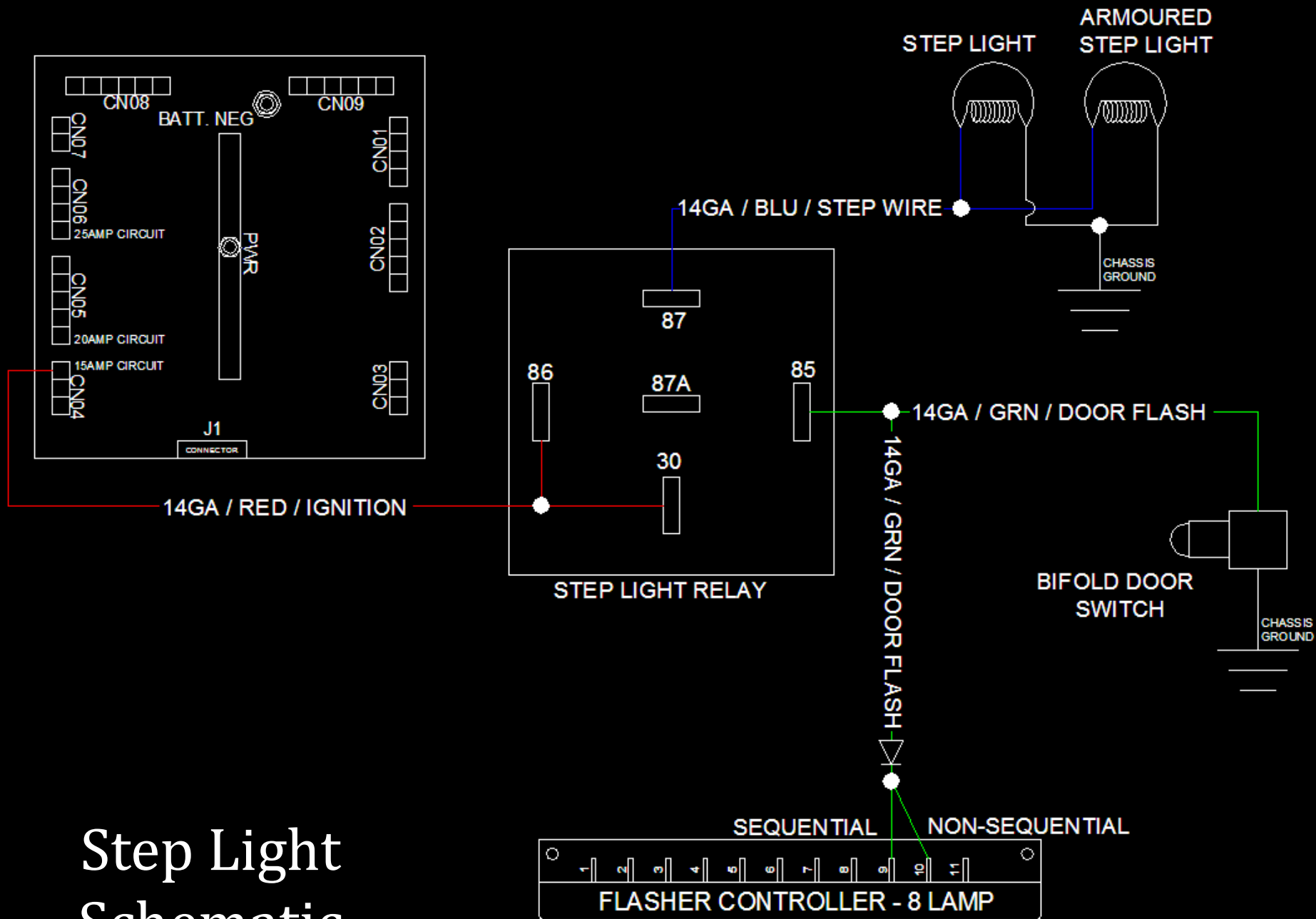
1507 CONTROL BOARD



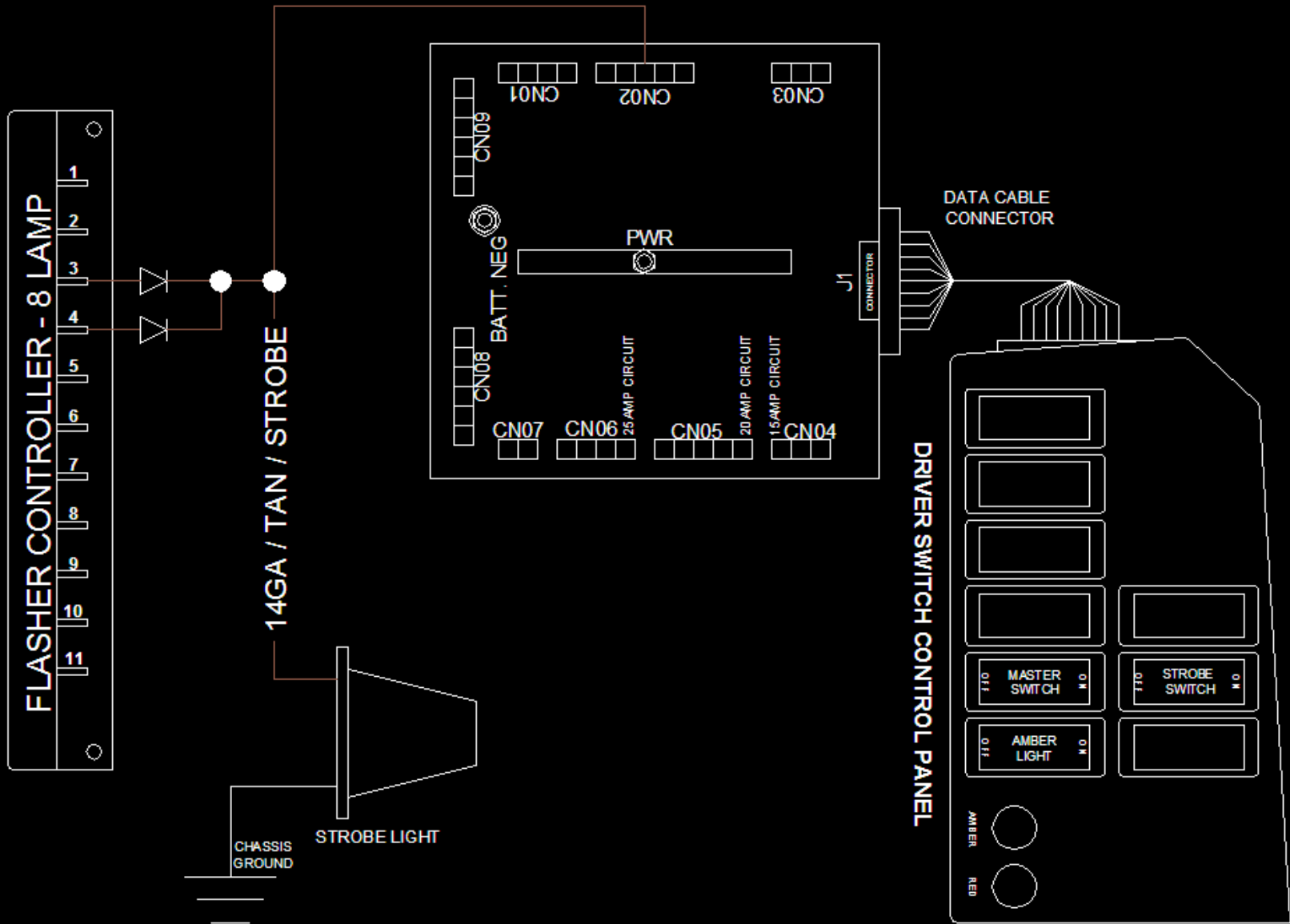
NOTE:

THIS REVISION TO THE CURRENT ACCEPTED WIRING STANDARDS AT TRANSTECH BUS IS DESIGNED TO MONITOR THE PARK & NEUTRAL SIGNALS PROVIDED BY THE FORD CHASSIS. THE MODIFICATION ENSURES THAT WE MONITOR THE PARK AND NEUTRAL SIGNALS INDEPENDANTLY.

Ford ShiftLock Schematic

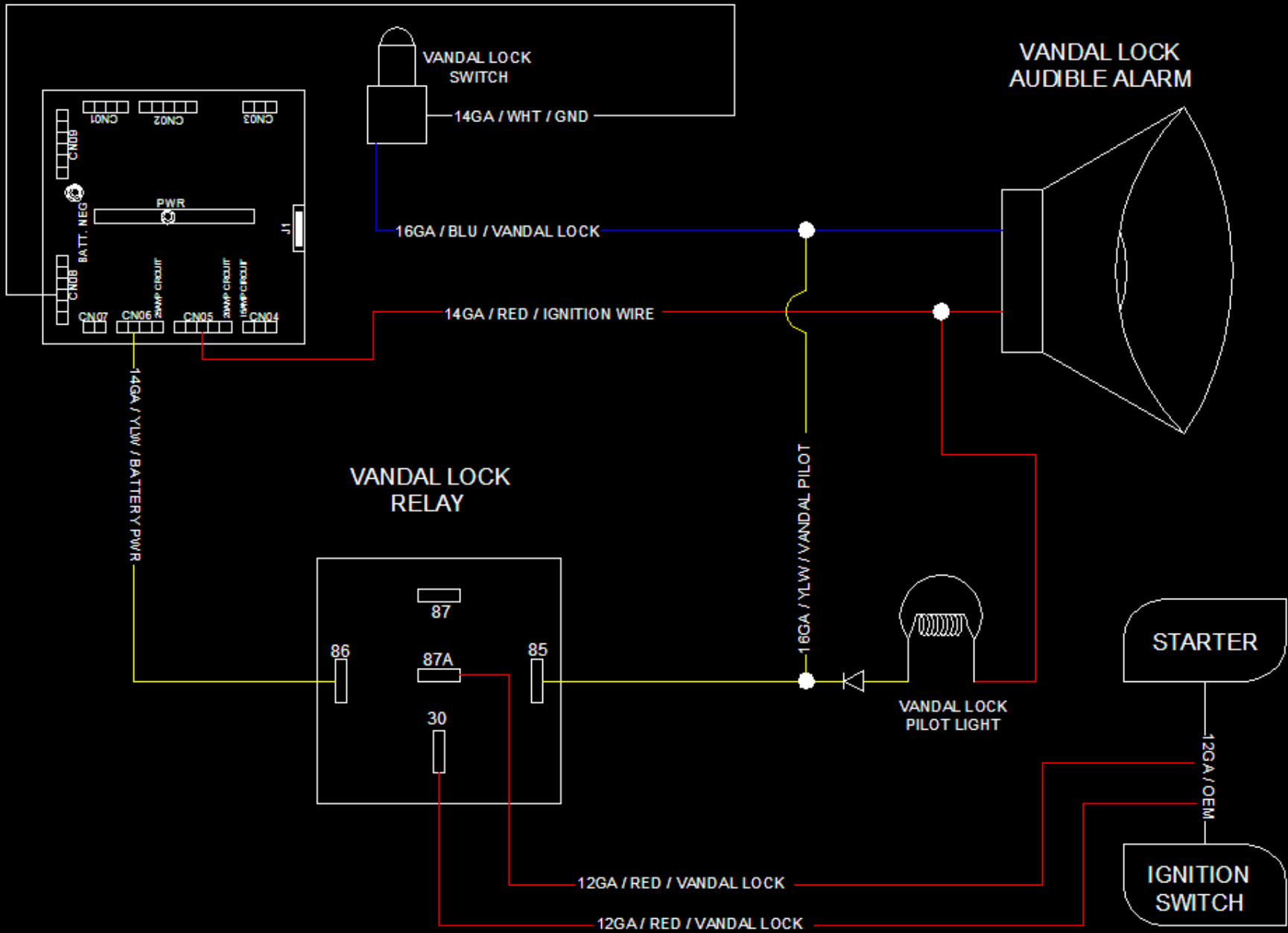


Step Light Schematic

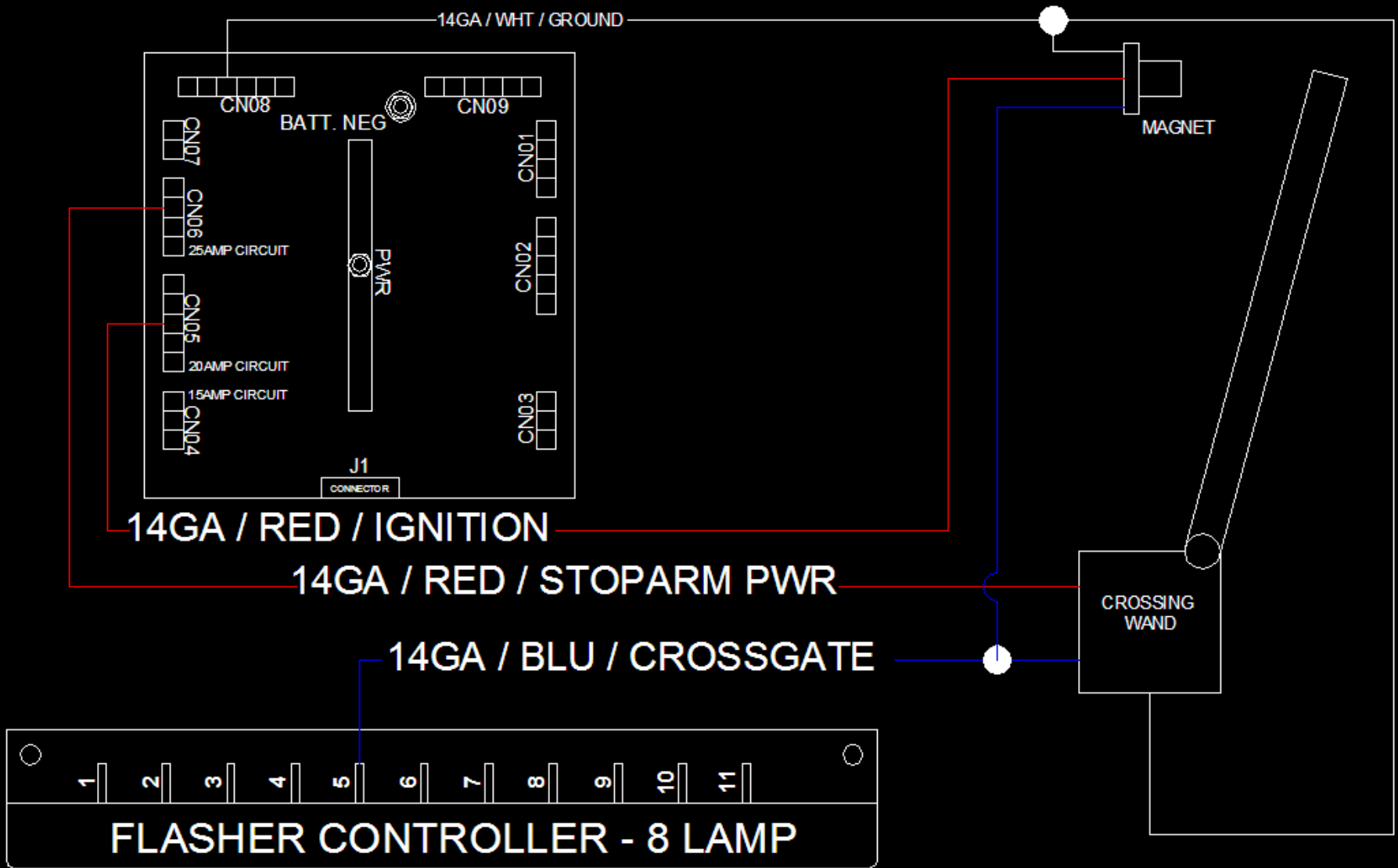


NOTE:
ROCKER SWITCH LOCATIONS MAY
VARY DUE TO VEHICLE OPTIONS

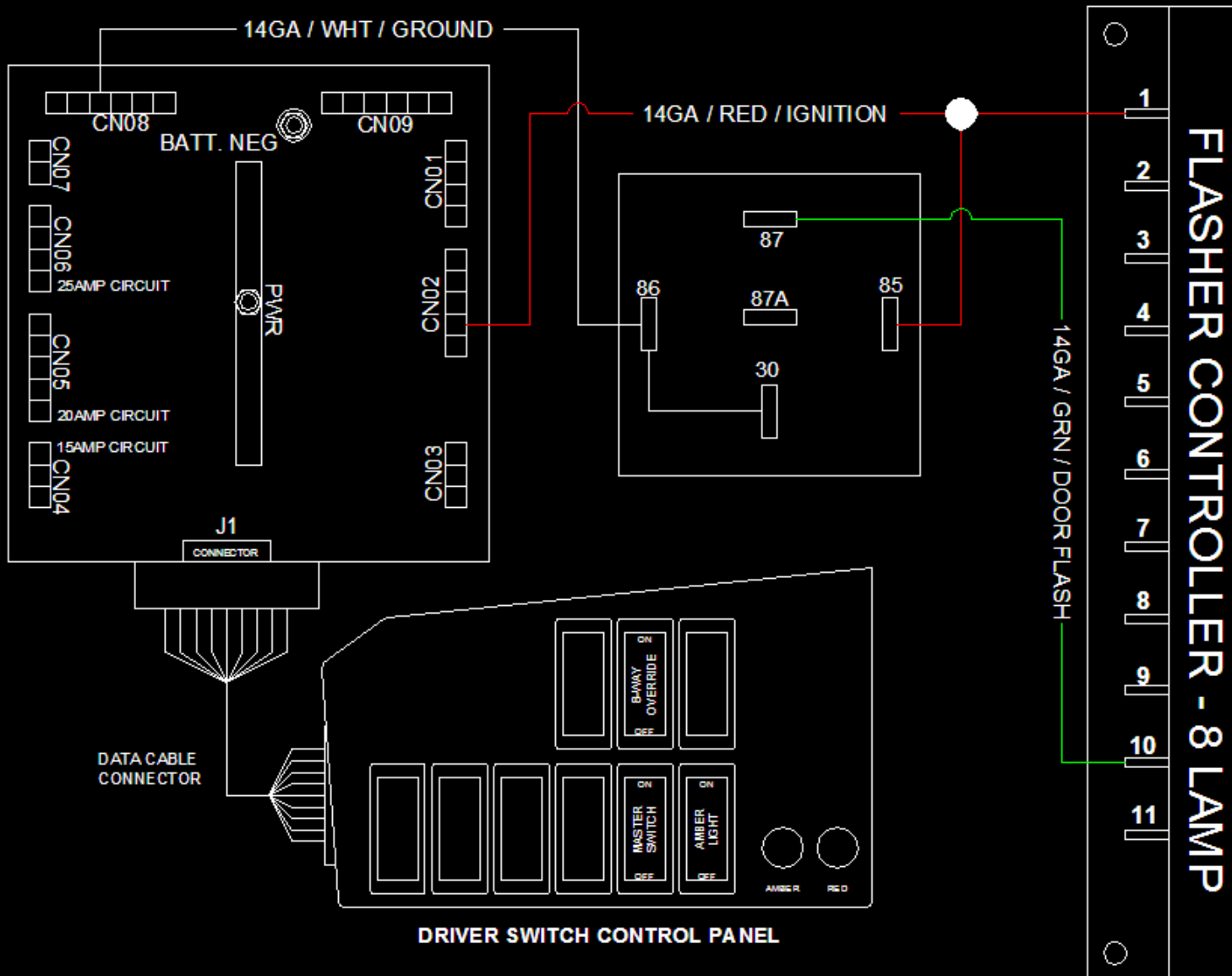
Strobe & Switch Activation Schematic



Vandal Lock Schematic



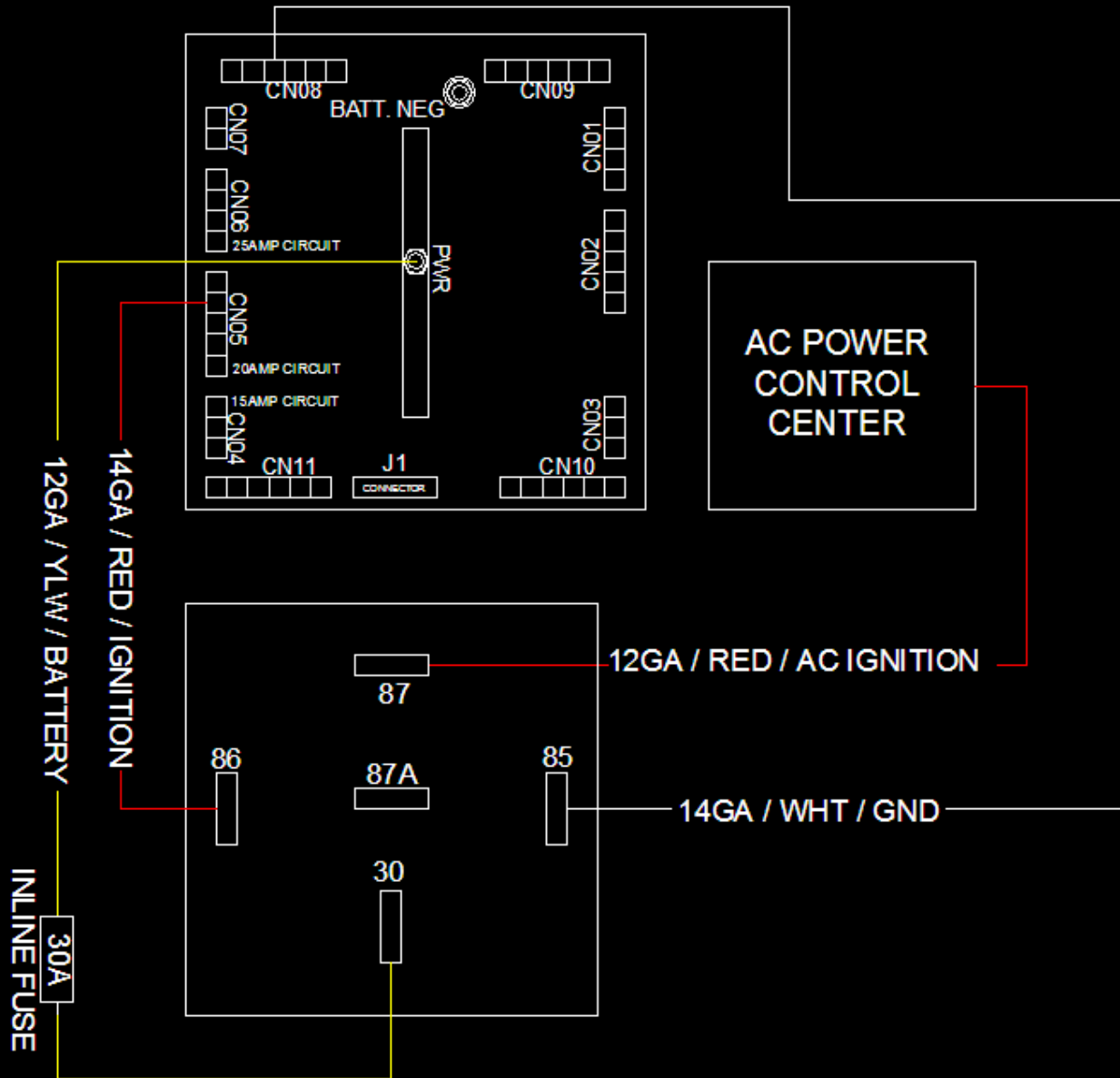
Crossing Wand Schematic



NOTE:
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VARY DUE TO VEHICLE OPTIONS

8-Way Activation Schematic

NOTE:
NEW AC POWER CIRCUIT AS PER BUS-AIR MANUFACTURING
REQUEST. WE HAVE PROVIDED A 30AMP RELAY CIRCUIT FOR
AC IGNITION POWER.

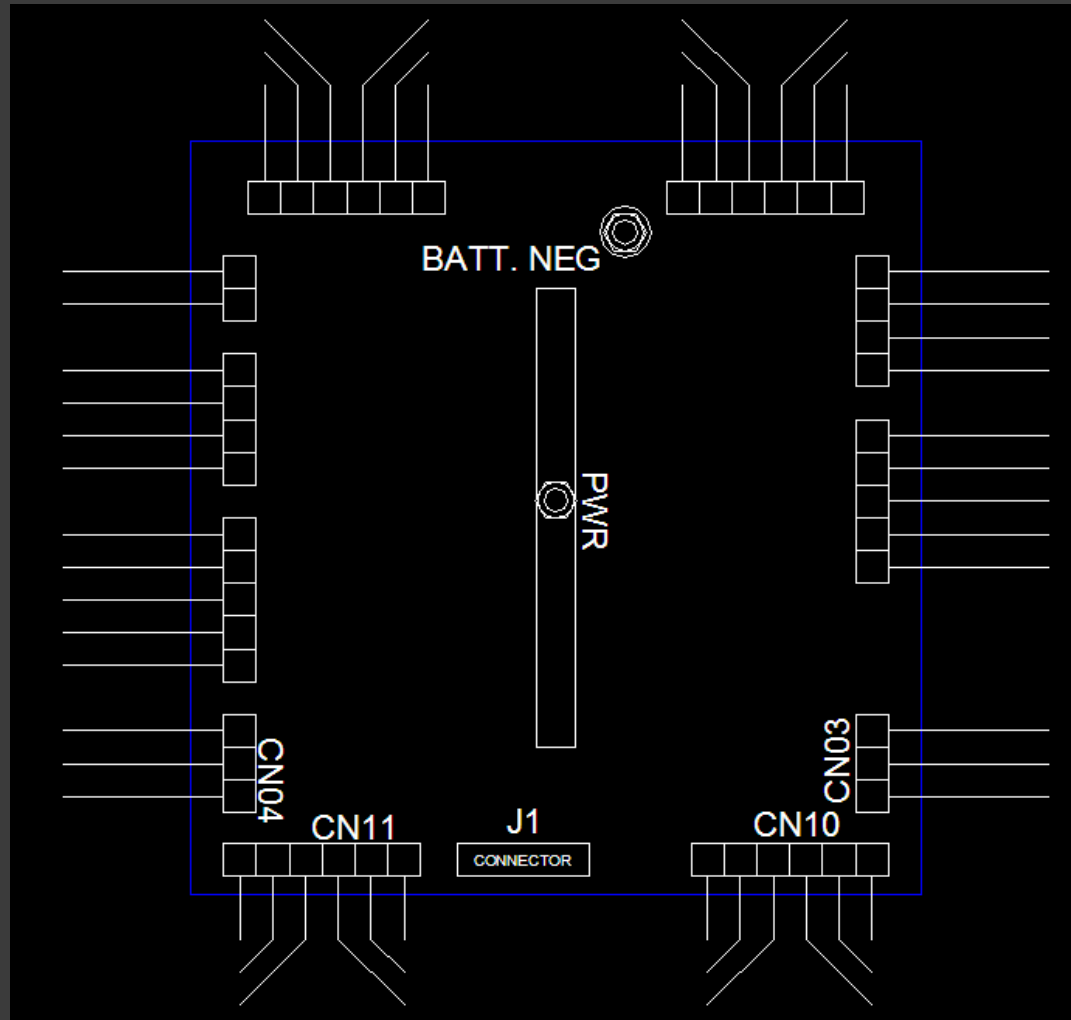


Bus-Air Draft Schematic

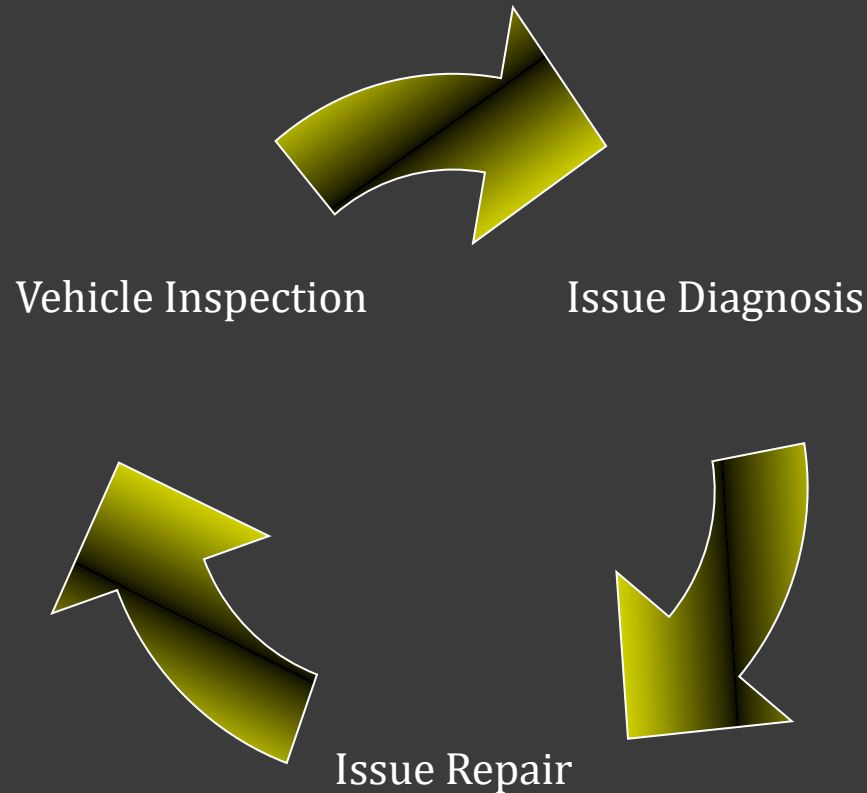
Questions and/or Comments?



Board Assembly Exercise



Diagnosis & Repair Exercise



Questions and/or Comments?



End of Lesson...



...Comments & Questions?