# Truck Component *Order Sheet* Breakdown for Cybersecurity Matrix

The first level are categories that match truck order sheets and they are the 'anchor' to what the fleets will understand when creating their RFP/RFQs. The next level are the individual *components* to which we will apply security requirements.

Each component may or may not be present on a particular truck being spec'd for quote. Furthermore, each component being spec'd may be implemented by a portion of a device, one whole device or multiple devices provided by the OEM. Because of this order-centric view (for the benefit of the fleets), OEMs receiving RFPs may view duplication of requirements in questionnaires.

Each component below has been assigned to a ‘class’ of cybersecurity requirements 0-5. The classes are generally defined as captured in the table below. Each assignment of a component to a class was determined by performing a risk analysis of modern truck topologies in cooperation with OEMs and fleets. The OEMs shared enough detail to form estimates of attack likelihood and the fleets shared enough information to form estimates of attack impact, which yielded risk estimates for each component. For more detail on this process, please see the *Component Class Assignment* workbook sheet *Simplified Risk Analysis and Classification.*

|  |  |  |
| --- | --- | --- |
| Class | Devices | Heuristic |
| 0 Telematics | Engine Telematics (J1939 SA 249),  OEM Telematics (aka Telematics GateWay (TGW) / Off Vehicle Gateway / Communications Unit / Communications Telematics (CTP-FB)) (J1939 SA 249, 251),  Brake Telematics,  Transmission Telematics,  Exterior Camera Telematics,  Interior Camera Telematics | Components of a telematics system or truck modules that otherwise connect to cellular, satellite or other Wide Area Networks (WANs), or the internet |
| 1 Multi Segment with Wireless | Antilock Brake System (ABS) (J1939 SA 11),  Brakes - System Controller (J1939 SA 11),  Tire Pressure Controller (aka Tire Pressure Monitoring System (TPMS)) (J1939 SA 51),  Wheel End Monitoring,  Propulsion Battery Charger (J1939 SA 73),  Brakes - Drive axle #1 (J1939 SA 13),  Brakes - Drive Axle #2 (J1939 SA 14),  Vehicle Navigation (J1939 SA 84),  Radio (aka Head Unit / Infotainment) (J1939 SA 76, 84) | Truck modules that may or may not be intended to perform gateway functions (transport, translate, transform, filter or encapsulate data) and has at least one wireless interface |
| 2 Vehicle Gateway | Onboard Diagnostics Connector Gateway (aka Gateway (CGW)) (J1939 SA 39, 17, 44, 49, 50, 77),  3rd Party Equipment Gateway (J1939 SA 249),  Telematics Interface Gateway | Truck modules intended to perform gateway functions (transport, translate, transform, filter or encapsulate data) between two or more vehicle network segments |
| 3 Multi Segment with Untrusted Wired Connection | Tractor/Trailer Bridge #2 (J1939 SA 138, 39),  Thermal Management System Controller (J1939 SA 49),  Parking Brake Controller (J1939 SA 80),  Traction Control (J1939 SA 138, 39),  Water Pump Controller (J1939 SA 57),  Steering Input Unit (aka Steering Angle Sensor (SAS)),  On Board Diagnostic Unit (aka OEM Factory & Service tool) (J1939 SA 250),  Low-Voltage Disconnect (J1939 SA 49),  Fifth Wheel Smart System (J1939 SA 138, 39),  ADAS Lane Keep (aka LCS Side Sensor (blind spot only) / Lane Warning / Lane Departure Warning System / Bendix Fusion / Exterior Camera for Lane Departune Warning / Driver Assistance Camera (MPC)) (J1939 SA 232, 19),  Tractor-Trailer Bridge #1 (J1939 SA 32),  Engine #1 (aka Motor Control Module (MCM) / Engine Management System (EMS) / Engine Control Module (ECM)) (J1939 SA 00, 01),  Fan Drive Controller (aka Fan Hub) (J1939 SA 78),  Powertrain Control Module (aka Common Powertrain Controller Module (CPC)) (J1939 SA 90),  Transmission #1 (aka Transmission Control Module (TCM)) (J1939 SA 03),  Body-to-Vehicle Interface Control (aka VECU - Vehicle ECU) (J1939 SA 33),  Ignition Control Module #2 (J1939 SA 57),  Cab Controller - Primary (aka SAM CAB) (J1939 SA 49),  Cab Controller - Secondary (J1939 SA 50),  Starter System (J1939 SA 00, 03),  Fuel Heater, In-Tank (J1939 SA 72),  Differential Lock Controller (J1939 SA 138, 72, 39 ),  Suspension - Drive Axle #1 (J1939 SA 138, 72, 39),  Suspension - Drive Axle #2 (J1939 SA 22),  Cruise Control (J1939 SA 17),  Forward Road Image Processor (J1939 SA 232),  Object Detection Display (aka Active Safety Components / Bendix Fusion (Display)),  Ammeter (J1939 SA 23, 39),  On-Board Data Logger (J1939 SA 251),  Instrument Cluster #1 (aka Gauges) (J1939 SA 23),  ADAS Adaptive Cruise Control (aka Bendix Fusion) (J1939 SA 42),  Predictive Cruise Control (aka E-Horizon / Intelligent Predictive Powertrain Control (IPPC)) (J1939 SA 75),  Lighting - Operator Controls (J1939 SA 71) |  |
| 4 Multi Segment | Oil Sensor (J1939 SA 00),  Retarder - Engine (J1939 SA 15),  Radiator (aka Radiator Fan Control) (J1939 SA 78, 00, 255),  Oil Pan Heater (J1939 SA 00),  Electronic Clutch Actuator (J1939 SA 03),  Steering Controller (aka Front Axle Steering (FAS) / VDS / MCS) (J1939 SA 19),  Lift Axle (J1939 SA 138, 71),  Engine Injection Control Module (J1939 SA 00),  Fuel Actuator (J1939 SA 15),  Throttle (J1939 SA 0),  Headway Controller (J1939 SA 42),  Ignition Control Module #1 (J1939 SA 52),  Chassis Controller #2 (J1939 SA 72),  Transmission Display - Primary (J1939 SA 59),  Trip Recorder (J1939 SA 24),  Engine Display,  Axle - Drive #1 (J1939 SA 09),  Axle - Drive #2 (J1939 SA 10),  Mirrors (J1939 SA 40),  Switch Field (aka Additional Switches / Modular Switch Field (MSF)) (J1939 SA 138) | Truck modules that are not intended to be Vehicle Gateways but nonetheless are connected to two or more vehicle network segments |
| Class 5 | Power TakeOff (Front or Secondary) (J1939 SA 07),  Idle Control System (J1939 SA 68),  Pneumatic - System Controller (J1939 SA 48),  Power TakeOff (PTO) Switches (J1939 SA 07),  Engine Cylinder Pressure Monitoring System,  Aftertreatment #1 system gas intake (J1939 SA 81),  Aftertreatment #2 system gas intake (J1939 SA 86),  Diesel Particulate Filter Controller (aka Aftertreatment Control Module (ACM) / Exhaust Emission Controller) (J1939 SA 211),  Engine Exhaust Backpressure (J1939 SA 34),  Retarder - Driveline (J1939 SA 16),  Power TakeOff - (Main or Rear) (J1939 SA 07),  Retarder, Exhaust, Engine #1,  Retarder, Exhaust, Engine #2 | Truck modules found to have a 'high' overall fleet risk |
| Class 6 | Suspension - Steer Axle (aka Electronically Controlled Suspension (ECS) / Electronically Controlled Air Suspension (ECAS)) (J1939 SA 20),  Suspension - System Controller #1 (J1939 SA 47),  Automated Driving (L0-L2) (aka Bendix FLR and FLC (Forward looking Camera / Radar)),  Engine Valve Controller (J1939 SA 0),  Clutch/Converter Unit (J1939 SA 78),  Transmission #2 (aka Auxiliary Transmission) (J1939 SA 16),  Collision Avoidance (J1939 SA 42),  Body Controller (aka Key-Lock Options),  Shift Console - Primary (aka Gearshift ECU) (J1939 SA 05),  Safety Restraint System (SRS) (J1939 SA 83),  Vehicle Dynamic Stability Controller (J1939 SA 62),  Pyrometer,  Adaptive Front Lighting System (J1939 SA 71) | Truck modules found to have a 'medium' overall fleet risk |
| Class 7 | Electric Propulsion Control Unit #1,  Retarder Display (J1939 SA 23),  Shift Console - Secondary (J1939 SA 06),  Transmission Display - Secondary (J1939 SA 60),  Chassis Controller #1 (aka SAM Chassis) (J1939 SA 71),  Passenger-Operator Climate Control #1 (aka LECM (Living Environment Control Module) / HVAC / HVAC FCU) (J1939 SA 25),  Battery Pack Monitor #1 (J1939 SA 243),  Slope Sensor (aka Hill Start Assist),  Aftertreatment #2 system gas outlet (J1939 SA 87),  Axle - Steering (J1939 SA 08),  Steering Column Unit (aka Turn Signal Control),  Steering Wheel Switches (J1939 SA 77),  Auxiliary Valve Control or Engine Air System Valve Control (J1939 SA 34),  Body Controller #2,  Passenger-Operator Climate Control #2 (aka HVAC #2 / HVAC ACU),  Aftertreatment #1 system gas outlet (aka NoX Sensors ) (J1939 SA 82),  Catalyst Fluid Sensor (aka DEF Quality Sensor) (J1939 SA 211),  Seat Control #1,  Turbocharger (J1939 SA 02),  Turbocharger Compressor Bypass (J1939 SA 02),  Turbocharger Wastegate (J1939 SA 02),  Air Intake System (J1939 SA 70),  Filtration Control,  Door Controller (J1939 SA 236),  Door Controller #1 (J1939 SA 237),  Engine Exhaust Gas Recirculation (J1939 SA 70),  Cab Display #1,  Alternator/Electrical Charging System,  Battery Charger,  Personnel Detection Device (aka Pedestrian Detection),  Door Controller #2,  Door Controller #3,  Door Controller #4,  Roadway Information,  Vehicle Security (J1939 SA 29) | Truck modules found to have a 'low' overall fleet risk |

The component names are taken from J1939 (specifically J1939DA\_201910 ‘Global Source Addresses', 'Global NAME Functions', and 'IG Specific NAME Function' for IG0 and IG1) whenever possible. Exceptions to this are collected in Appendix A.

ENGINE

|  |  |  |
| --- | --- | --- |
| **Component Reference Name** | **Cybersecurity Requirements Class** | **Class Assignment Rationale** |
| Engine Telematics (J1939 SA 249) | **0** | telematics device |
| Engine #1 (aka Motor Control Module (MCM) / Engine Management System (EMS) / Engine Control Module (ECM)) (J1939 SA 00, 01) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Engine Cylinder Pressure Monitoring System | **5** | 'high' overall fleet risk |
| Engine #2 | **None Specified** | no responses / not common component |

ENGINE EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Propulsion Battery Charger (J1939 SA 73) | **1** | has a CCS/ISO 15118 interface which is accessible wirelessly and connects to J1939 |
| Thermal Management System Controller (J1939 SA 49) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Water Pump Controller (J1939 SA 57) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Low-Voltage Disconnect (J1939 SA 49) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Fan Drive Controller (aka Fan Hub) (J1939 SA 78) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Powertrain Control Module (aka Common Powertrain Controller Module (CPC)) (J1939 SA 90) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Ignition Control Module #2 (J1939 SA 57) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Starter System (J1939 SA 00, 03) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Fuel Heater, In-Tank (J1939 SA 72) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Oil Sensor (J1939 SA 00) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Retarder - Engine (J1939 SA 15) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Radiator (aka Radiator Fan Control) (J1939 SA 78, 00, 255) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Oil Pan Heater (J1939 SA 00) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Engine Injection Control Module (J1939 SA 00) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Ignition Control Module #1 (J1939 SA 52) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Idle Control System (J1939 SA 68) | **5** | 'high' overall fleet risk |
| Aftertreatment #1 system gas intake (J1939 SA 81) | **5** | 'high' overall fleet risk |
| Aftertreatment #2 system gas intake (J1939 SA 86) | **5** | 'high' overall fleet risk |
| Diesel Particulate Filter Controller (aka Aftertreatment Control Module (ACM) / Exhaust Emission Controller) (J1939 SA 211) | **5** | 'high' overall fleet risk |
| Engine Exhaust Backpressure (J1939 SA 34) | **5** | 'high' overall fleet risk |
| Retarder, Exhaust, Engine #1 | **5** | 'high' overall fleet risk |
| Retarder, Exhaust, Engine #2 | **5** | 'high' overall fleet risk |
| Engine Valve Controller (J1939 SA 0) | **6** | 'medium' overall fleet risk |
| Battery Pack Monitor #1 (J1939 SA 243) | **7** | 'low' overall fleet risk |
| Aftertreatment #2 system gas outlet (J1939 SA 87) | **7** | 'low' overall fleet risk |
| Aftertreatment #1 system gas outlet (aka NoX Sensors ) (J1939 SA 82) | **7** | 'low' overall fleet risk |
| Catalyst Fluid Sensor (aka DEF Quality Sensor) (J1939 SA 211) | **7** | 'low' overall fleet risk |
| Turbocharger (J1939 SA 02) | **7** | 'low' overall fleet risk |
| Turbocharger Compressor Bypass (J1939 SA 02) | **7** | 'low' overall fleet risk |
| Turbocharger Wastegate (J1939 SA 02) | **7** | 'low' overall fleet risk |
| Air Intake System (J1939 SA 70) | **7** | 'low' overall fleet risk |
| Filtration Control | **7** | 'low' overall fleet risk |
| Engine Exhaust Gas Recirculation (J1939 SA 70) | **7** | 'low' overall fleet risk |
| Alternator/Electrical Charging System | **7** | 'low' overall fleet risk |
| Battery Charger | **7** | 'low' overall fleet risk |
| Exhaust Emission Controller (J1939 SA 61) | **None Specified** | no responses / not common component |
| Air Compressor | **None Specified** | no responses / not common component |

TRANSMISSION

|  |  |  |
| --- | --- | --- |
| Transmission Telematics | **0** | telematics device |
| Transmission #1 (aka Transmission Control Module (TCM)) (J1939 SA 03) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Electronic Clutch Actuator (J1939 SA 03) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Power TakeOff (Front or Secondary) (J1939 SA 07) | **5** | 'high' overall fleet risk |
| Retarder - Driveline (J1939 SA 16) | **5** | 'high' overall fleet risk |
| Power TakeOff - (Main or Rear) (J1939 SA 07) | **5** | 'high' overall fleet risk |
| Clutch/Converter Unit (J1939 SA 78) | **6** | 'medium' overall fleet risk |
| Transmission #2 (aka Auxiliary Transmission) (J1939 SA 16) | **6** | 'medium' overall fleet risk |

FRONT AXLE & EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Steering Input Unit (aka Steering Angle Sensor (SAS)) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Steering Controller (aka Front Axle Steering (FAS) / VDS / MCS) (J1939 SA 19) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Suspension - Steer Axle (aka Electronically Controlled Suspension (ECS) / Electronically Controlled Air Suspension (ECAS)) (J1939 SA 20) | **6** | 'medium' overall fleet risk |
| Suspension - System Controller #1 (J1939 SA 47) | **6** | 'medium' overall fleet risk |
| Axle - Steering (J1939 SA 08) | **7** | 'low' overall fleet risk |
| Brakes - Steer Axle (J1939 SA 13) | **None Specified** | no responses / not common component |
| Suspension - System Controller #2 (J1939 SA 64) | **None Specified** | no responses / not common component |

REAR AXLE & EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Antilock Brake System (ABS) (J1939 SA 11) | **1** | has J2497 interface (in NA) which is accessible wirelessly |
| Brakes - Drive axle #1 (J1939 SA 13) | **1** | has J2497 interface (in NA) which is accessible wirelessly |
| Brakes - Drive Axle #2 (J1939 SA 14) | **1** | has J2497 interface (in NA) which is accessible wirelessly |
| Traction Control (J1939 SA 138, 39) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Differential Lock Controller (J1939 SA 138, 72, 39 ) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Axle - Drive #1 (J1939 SA 09) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Axle - Drive #2 (J1939 SA 10) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Electric Propulsion Control Unit #1 | **7** | 'low' overall fleet risk |
| Electric Propulsion Control Unit #2 | **None Specified** | no responses / not common component |
| Electric Propulsion Control Unit #4 | **None Specified** | no responses / not common component |
| Endurance Braking System | **None Specified** | no responses / not common component |

ADDITIONAL AXLES

|  |  |  |
| --- | --- | --- |
| Lift Axle (J1939 SA 138, 71) | **4** | medium' scope change risk (connected to two or more vehicle networks) |

REAR SUSPENSION

|  |  |  |
| --- | --- | --- |
| Suspension - Drive Axle #1 (J1939 SA 138, 72, 39) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Suspension - Drive Axle #2 (J1939 SA 22) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Vehicle Dynamic Stability Controller (J1939 SA 62) | **6** | 'medium' overall fleet risk |

TRAILER CONNECTIONS

|  |  |  |
| --- | --- | --- |
| Tractor/Trailer Bridge #2 (J1939 SA 138, 39) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Tractor-Trailer Bridge #1 (J1939 SA 32) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |

TIRES & WHEELS

|  |  |  |
| --- | --- | --- |
| Tire Pressure Controller (aka Tire Pressure Monitoring System (TPMS)) (J1939 SA 51) | **1** | has a wireless interface and connects to J1939 |
| Wheel End Monitoring | **1** | has a wireless interface and connects to J1939 |

FRAME & EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Fifth Wheel Smart System (J1939 SA 138, 39) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| ADAS Lane Keep (aka LCS Side Sensor (blind spot only) / Lane Warning / Lane Departure Warning System / Bendix Fusion / Exterior Camera for Lane Departune Warning / Driver Assistance Camera (MPC)) (J1939 SA 232, 19) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Body-to-Vehicle Interface Control (aka VECU - Vehicle ECU) (J1939 SA 33) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Forward Road Image Processor (J1939 SA 232) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Automated Driving (L0-L2) (aka Bendix FLR and FLC (Forward looking Camera / Radar)) | **6** | 'medium' overall fleet risk |
| Collision Avoidance (J1939 SA 42) | **6** | 'medium' overall fleet risk |
| Slope Sensor (aka Hill Start Assist) | **7** | 'low' overall fleet risk |
| Personnel Detection Device (aka Pedestrian Detection) | **7** | 'low' overall fleet risk |
| Aerodynamic Control (J1939 SA 27) | **None Specified** | no responses / not common component |
| Electrical System (J1939 SA 30) | **None Specified** | no responses / not common component |
| Hitch Control (J1939 SA 35) | **None Specified** | no responses / not common component |
| Power Systems Manager (J1939 SA 91) | **None Specified** | no responses / not common component |

FUEL TANK & EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Fuel Actuator (J1939 SA 15) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Fuel System (J1939 SA 18) | **None Specified** | no responses / not common component |

CAB EXTERIOR

|  |  |  |
| --- | --- | --- |
| Exterior Camera Telematics | **0** | telematics device |
| Mirrors (J1939 SA 40) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Body Controller (aka Key-Lock Options) | **6** | 'medium' overall fleet risk |
| Body Controller #2 | **7** | 'low' overall fleet risk |
| Door Controller (J1939 SA 236) | **7** | 'low' overall fleet risk |
| Door Controller #1 (J1939 SA 237) | **7** | 'low' overall fleet risk |
| Door Controller #2 | **7** | 'low' overall fleet risk |
| Door Controller #3 | **7** | 'low' overall fleet risk |
| Door Controller #4 | **7** | 'low' overall fleet risk |
| Roadway Information | **7** | 'low' overall fleet risk |
| Vehicle Security (J1939 SA 29) | **7** | 'low' overall fleet risk |
| Forensic Exterior Cameras (J1939 SA 232) | **None Specified** | no responses / not common component |

CAB INTERIOR

|  |  |  |
| --- | --- | --- |
| Interior Camera Telematics | **0** | telematics device |
| Vehicle Navigation (J1939 SA 84) | **1** | has a wireless interface and connects to J1939 |
| Radio (aka Head Unit / Infotainment) (J1939 SA 76, 84) | **1** | likely to have wireless interfaces and a J1939 interface |
| Cab Controller - Primary (aka SAM CAB) (J1939 SA 49) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Cab Controller - Secondary (J1939 SA 50) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Cruise Control (J1939 SA 17) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Object Detection Display (aka Active Safety Components / Bendix Fusion (Display)) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Lighting - Operator Controls (J1939 SA 71) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Throttle (J1939 SA 0) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Transmission Display - Primary (J1939 SA 59) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Trip Recorder (J1939 SA 24) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Switch Field (aka Additional Switches / Modular Switch Field (MSF)) (J1939 SA 138) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Power TakeOff (PTO) Switches (J1939 SA 07) | **5** | 'high' overall fleet risk |
| Shift Console - Primary (aka Gearshift ECU) (J1939 SA 05) | **6** | 'medium' overall fleet risk |
| Safety Restraint System (SRS) (J1939 SA 83) | **6** | 'medium' overall fleet risk |
| Retarder Display (J1939 SA 23) | **7** | 'low' overall fleet risk |
| Shift Console - Secondary (J1939 SA 06) | **7** | 'low' overall fleet risk |
| Transmission Display - Secondary (J1939 SA 60) | **7** | 'low' overall fleet risk |
| Passenger-Operator Climate Control #1 (aka LECM (Living Environment Control Module) / HVAC / HVAC FCU) (J1939 SA 25) | **7** | 'low' overall fleet risk |
| Steering Column Unit (aka Turn Signal Control) | **7** | 'low' overall fleet risk |
| Steering Wheel Switches (J1939 SA 77) | **7** | 'low' overall fleet risk |
| Passenger-Operator Climate Control #2 (aka HVAC #2 / HVAC ACU) | **7** | 'low' overall fleet risk |
| Seat Control #1 | **7** | 'low' overall fleet risk |
| Cab Display #1 | **7** | 'low' overall fleet risk |
| Cab Display #2 | **None Specified** | no responses / not common component |
| Driver Impairment Device (J1939 SA 94) | **None Specified** | no responses / not common component |
| On-board axle group display | **None Specified** | no responses / not common component |
| On-board axle group scale | **None Specified** | no responses / not common component |
| Safety Restraint System #2 (aka Seat SRS) | **None Specified** | no responses / not common component |
| Seat Control #2 | **None Specified** | no responses / not common component |
| Tachograph | **None Specified** | no responses / not common component |
| User Interface System | **None Specified** | no responses / not common component |
| Virtual Terminal | **None Specified** | no responses / not common component |
| Interior Cameras | **None Specified** | no responses / not common component |

INSTRUMENTS & CONTROLS

|  |  |  |
| --- | --- | --- |
| Ammeter (J1939 SA 23, 39) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Instrument Cluster #1 (aka Gauges) (J1939 SA 23) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| ADAS Adaptive Cruise Control (aka Bendix Fusion) (J1939 SA 42) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Headway Controller (J1939 SA 42) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Engine Display | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Pyrometer | **6** | 'medium' overall fleet risk |
| Instrument Cluster #2 (aka Auxiliary Gauges) | **None Specified** | no responses / not common component |

INFORMATION & COMMUNICATION SYSTEMS

|  |  |  |
| --- | --- | --- |
| OEM Telematics (aka Telematics GateWay (TGW) / Off Vehicle Gateway / Communications Unit / Communications Telematics (CTP-FB)) (J1939 SA 249, 251) | **0** | telematics device |
| Onboard Diagnostics Connector Gateway (aka Gateway (CGW)) (J1939 SA 39, 17, 44, 49, 50, 77) | **2** | gateway device |
| 3rd Party Equipment Gateway (J1939 SA 249) | **2** | gateway device |
| Telematics Interface Gateway | **2** | gateway device |
| On Board Diagnostic Unit (aka OEM Factory & Service tool) (J1939 SA 250) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| On-Board Data Logger (J1939 SA 251) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Predictive Cruise Control (aka E-Horizon / Intelligent Predictive Powertrain Control (IPPC)) (J1939 SA 75) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Information System Controller #1 | **None Specified** | no responses / not common component |
| On Board Diagnostic Unit #2 | **None Specified** | no responses / not common component |

LIGHTS & SIGNALS

|  |  |  |
| --- | --- | --- |
| Chassis Controller #2 (J1939 SA 72) | **4** | medium' scope change risk (connected to two or more vehicle networks) |
| Adaptive Front Lighting System (J1939 SA 71) | **6** | 'medium' overall fleet risk |
| Chassis Controller #1 (aka SAM Chassis) (J1939 SA 71) | **7** | 'low' overall fleet risk |

AIR EQUIPMENT

|  |  |  |
| --- | --- | --- |
| Brake Telematics | **0** | telematics device |
| Brakes - System Controller (J1939 SA 11) | **1** | has J2497 interface (in NA) which is accessible wirelessly |
| Parking Brake Controller (J1939 SA 80) | **3** | high' scope change risk (assumes NGTTI with no J2497) and untrusted wired connection |
| Pneumatic - System Controller (J1939 SA 48) | **5** | 'high' overall fleet risk |
| Auxiliary Valve Control or Engine Air System Valve Control (J1939 SA 34) | **7** | 'low' overall fleet risk |
| Brake Stroke Alert | **None Specified** | no responses / not common component |

# Appendix A: J1939 Source Address Controller Application (CA) Deviations

## Duplicate J1939 CA

The following were determined to be duplicates of other J1939 CAs and were omitted.

|  |  |  |
| --- | --- | --- |
| Name in Origin | Origin | (optional) Duplicate Of? |
| Body-to-Vehicle Interface Control | IG Names IG0, IG1 | Body-to-Vehicle Interface Control |
| Brake Telematics | Truck Matrix Component Breakdown v0 | Brake Telematics |
| Catalyst Fluid Sensor | IG Names IG0, IG1 | Catalyst Fluid Sensor |
| Communications Unit, Cellular | Global SA | OEM Telematics |
| Communications Unit, Radio | Global SA | OEM Telematics |
| Communications Unit, Satellite | Global SA | OEM Telematics |
| Forward Road Image Processing | IG Names IG0, IG1 | Forward Road Image Processor |
| On-board data logger | IG Names IG0, IG1 | On-Board Data Logger |
| Slope Sensor | IG Names IG0, IG1 | Slope Sensor |
| Tachograph | IG Names IG0, IG1 | Tachograph |
| Turbocharger | IG Names IG0, IG1 | Turbocharger |

## No J1939 CA

The following were introduced above in the component breakdown and do not have a corresponding J1939 CA to which we could refer for traceability.

|  |  |  |
| --- | --- | --- |
| Matrix Component Name | Matrix Order Sheet Line | Origin |
| 3rd Party Equipment Gateway | INFORMATION & COMMUNICATION SYSTEMS | Industry Trajectory |
| ADAS Adaptive Cruise Control | INSTRUMENTS & CONTROLS | Example Truck Topology |
| ADAS Lane Keep | FRAME & EQUIPMENT | Example Truck Topology |
| Brake Telematics | AIR EQUIPMENT | Industry Trajectory |
| Electronic Clutch Actuator | TRANSMISSION | Example Truck Topology |
| Engine Display | INSTRUMENTS & CONTROLS | Example Truck Topology |
| Engine Telematics | ENGINE | Industry Trajectory |
| Exterior Camera Telematics | CAB EXTERIOR | Industry Trajectory |
| Exterior Cameras | CAB EXTERIOR | Example Truck Topology |
| Interior Camera Telematics | CAB INTERIOR | Industry Trajectory |
| Interior Cameras | CAB INTERIOR | Example Truck Topology |
| OEM Telematics | INFORMATION & COMMUNICATION SYSTEMS | Industry Trajectory |
| Onboard Diagnostics Connector Gateway | INFORMATION & COMMUNICATION SYSTEMS | Industry Trajectory |
| Switch Field | CAB INTERIOR | Example Truck Topology |
| Telematics Interface Gateway | INFORMATION & COMMUNICATION SYSTEMS | Industry Trajectory |
| Transmission Telematics | TRANSMISSION | Industry Trajectory |
| Wheel End Monitoring | TIRES & WHEELS | Example Truck Topology |

## Out of Scope J1939 CA

The following were determined to not be applicable to the intended scope of the Truck Cybersecurity Requirements Matrix.

|  |  |
| --- | --- |
| Name in Origin | Origin |
| Articulation Turntable Control | IG1 SA |
| Articulation Turntable Control | IG Names IG0, IG1 |
| Atmospheric Sensor | Global SA |
| Auxiliary Heater #1 | Global SA |
| Auxiliary Heater #2 | Global SA |
| Auxiliary Power Unit (APU) #1 | IG1 SA |
| Battery Pack Monitor #2 / APU #4 | IG1 SA |
| Battery Pack Monitor #3 / APU #3 | IG1 SA |
| Battery Pack Monitor #4 / APU #2 | IG1 SA |
| File Server / Printer | Global SA |
| Fire Protection System | Global SA |
| GLOBAL (All-Any Node) | Global SA |
| Ground based speed sensor | IG Names IG0, IG1 |
| Humidity sensor | IG Names IG0, IG1 |
| Hydraulic Pump Controller | Global SA |
| Inertial Sensor | IG Names IG0, IG1 |
| Keypad | IG Names IG0, IG1 |
| Management Computer #1 | Global SA |
| Not Available | IG Names IG0, IG1 |
| Not Available | IG Names IG0, IG1 |
| Not Available | IG Names IG0, IG1 |
| Not Available | IG Names IG0, IG1 |
| Not Available | IG Names IG0, IG1 |
| Not Available | IG Names IG0, IG1 |
| Null Address | Global SA |
| Object Detection | IG Names IG0, IG1 |
| Object Detection Sensor | IG Names IG0, IG1 |
| Off Board Diagnostic-Service Tool #1 | Global SA |
| Off Board Diagnostic-Service Tool #2 | Global SA |
| Off-board diagnostic-service tool | IG Names IG0, IG1 |
| On-board bin weighing scale | IG Names IG0, IG1 |
| On-board bin weighing scale display | IG Names IG0, IG1 |
| Other Trailer #1 Devices | IG1 SA |
| Other Trailer #1 Devices | IG1 SA |
| Other Trailer #2 Devices | IG1 SA |
| Other Trailer #2 Devices | IG1 SA |
| Other Trailer #3 Devices | IG1 SA |
| Other Trailer #3 Devices | IG1 SA |
| Other Trailer #4 Devices | IG1 SA |
| Other Trailer #4 Devices | IG1 SA |
| Other Trailer #5 Devices | IG1 SA |
| Other Trailer #5 Devices | IG1 SA |
| PC Keyboard | IG Names IG0, IG1 |
| Ramp Control | Global SA |
| Rear Axle Steering Controller #1 | Global SA |
| Rear Steering Axle Controller #2 | IG1 SA |
| Rear Steering Axle Controller #3 | IG1 SA |
| Reserved | IG Names IG0, IG1 |
| Reserved for Experimental Use | Global SA |
| Reserved for OEM | Global SA |
| thru 127 are reserved for future assignment by SAE | Global SA |
| thru 227 are reserved for future assignment by SAE | IG1 SA |
| thru 247 | Global SA |
| Trailer #1 Brakes (ABS-EBS) | IG1 SA |
| Trailer #1 Bridge | IG1 SA |
| Trailer #1 Cargo | IG1 SA |
| Trailer #1 Chassis-Suspension | IG1 SA |
| Trailer #1 Lighting-electrical | IG1 SA |
| Trailer #1 Reefer | IG1 SA |
| Trailer #2 Brakes (ABS-EBS) | IG1 SA |
| Trailer #2 Bridge | IG1 SA |
| Trailer #2 Cargo | IG1 SA |
| Trailer #2 Chassis-Suspension | IG1 SA |
| Trailer #2 Lighting-electrical | IG1 SA |
| Trailer #2 Reefer | IG1 SA |
| Trailer #3 Brakes (ABS-EBS) | IG1 SA |
| Trailer #3 Bridge | IG1 SA |
| Trailer #3 Cargo | IG1 SA |
| Trailer #3 Chassis-Suspension | IG1 SA |
| Trailer #3 Lighting-electrical | IG1 SA |
| Trailer #3 Reefer | IG1 SA |
| Trailer #4 Brakes (ABS-EBS) | IG1 SA |
| Trailer #4 Bridge | IG1 SA |
| Trailer #4 Cargo | IG1 SA |
| Trailer #4 Chassis-Suspension | IG1 SA |
| Trailer #4 Lighting-electrical | IG1 SA |
| Trailer #4 Reefer | IG1 SA |
| Trailer #5 Brakes (ABS-EBS) | IG1 SA |
| Trailer #5 Bridge | IG1 SA |
| Trailer #5 Cargo | IG1 SA |
| Trailer #5 Chassis-Suspension | IG1 SA |
| Trailer #5 Lighting-electrical | IG1 SA |
| Trailer #5 Reefer | IG1 SA |
| WWH-OBD Tester | IG1 SA |