

DETAILED SPECIFICATIONS FOR TOFTE FIRE & RESCUE EMS VEHICLE

TOFTE, MINNESOTA

1 CHASSIS

1.01 OEM CHASSIS

- 2027 Ford F-350 XLT, Crew Cab 4 x 4, meeting all the specifications of Section 1.01
(Note: Chassis is subject to model year changes)
 - Ambulance Prep Package **(47A)**
 - 3 year/36,000 mile Bumper-to-Bumper warranty
 - Dual rear wheels

1.01.01X SPECIFIC RATINGS

- Drive – 4 x 4
- G.V.W.R. – 14,000 lb
- Front Axle – 5,990 lb
- Rear Axle – 10,300 lb
- Wheelbase – 179"
- Cab to Axle – 60"
- Rear Differential – 4.30 ratio, limited slip narrow track rear axle

1.01.02 POWER TRAIN

- Engine
 - 7.3L V8 Gas DEVCT NA PFI **(99N)**
 - Engine block heater
 - Oil Minder System
- Engine Cooling System
 - Heavy duty, closed-air, free-liquid state type
 - Coolant recovery system
 - 50/50 solution Permanent type antifreeze to –34 degrees F
- Transmission
 - TorqShift 10-speed automatic transmission with selectable drive modes (Normal, Eco, Slippery Roads, Tow/Haul)
 - External oil cooler in chassis grille area
 - Electronic Shift on the Fly

- Exhaust System
 - System complies with Federal Motor Carrier Safety Regulations, Part 393.83
 - Suspended using three hangers, excluding manifold attachment
 - Discharge at right rear side of module
 - Tailpipe shall not terminate within twelve inches of the vertical axis of the fuel tank filler opening.

1.01.03 STEERING

- Power-assisted
- Manual Tilt and telescoping steering wheel/column

1.01.04 SHOCK ABSORBERS/STABILIZER BARS

- Heavy-duty shock absorbers front and rear
- OEM front and rear stabilizer bars

1.01.05 BRAKES

- Heavy duty power-assisted four wheel ABS; front and rear disc
- Trailer Brake Controller

1.01.06X TIRES AND WHEELS

- Two OEM LT 225/70R/19.5G All-Purpose on Front and All Traction on Rear (TGM)
- Six OEM 19.5" steel wheels
- Spare tire and wheel shipped loose
- OEM jack and tire changing tools
- OEM Wheel Simulators (945)

1.01.07 ELECTRICAL

- Alternators – OEM dual rated at 410 Amps total
- Batteries – OEM Dual 750CCA 68AH/Group 65 AGM
- Stationary Elevated Idle Control

1.01.08 INSTRUMENT PANEL AND CONTROLS

- Gauges
 - Speedometer
 - Tachometer
 - Engine Coolant Temperature
 - Transmission Fluid Temperature
 - Fuel Level
 - Indicator lights
 - Odometer/Trip Odometer
- Cruise Control, with steering mounted controls
- Audio – OEM AM/FM with MP3
- SYNC 4 - 8" touchscreen in center stack
- 4.2" LCD Productivity Screen in IP Cluster with compass display
- Ford Pass® Connect 5G Wi-Fi Modem
- Ford Co-Pilot 360
 - Audible Lane Departure Alert
 - Pre-collision Assist with Automatic Emergency Braking
- Rearview Camera and Prep Kit (872)

1.01.09

CAB EXTERIOR

- Trim Level – XLT
- Bumper – Chrome
- Grille – Bright chrome
- Tow Hooks – Two front
- Mud Flaps – Two front
- Horn – OEM dual electric
- Windows – Solar tinted
- Windshield wipers – Two-speed electric, washer and intermittent speed control
- Mirrors
 - Two black manually telescoping trailer tow
 - Power, heated glass, upper portion
 - Turn indicators and clearance lights on outside edge
 - Lower portion convex
- Lights
 - Headlamps – Auto On/off, Quad-beam halogen
 - Roof clearance light
 - Daytime running lamps
 - Halogen fog lamps
- Fuel – OEM 40 gallon tank

1.01.10

CAB INTERIOR

- Trim Level – XLT
- Seats – OEM
 - Cloth 40/20/40
 - Combination lap and shoulder harness
 - Side door armrest
- Flooring – Black vinyl
- Climate control – OEM
 - Heavy duty, fresh air, high capacity heater/defroster
 - Dehumidifying air conditioning system
- Airbags
 - Driver and right-front passenger front
 - Front-seat side
 - Safety canopy system with roll-fold side curtain airbags
- Other
 - Dome light, with dual map lights
 - Auxiliary Power Point
 - Interior hood release
 - Power door locks & windows
 - Remote keyless entry w/AntiTheft

1.01.11

COLORS

- Exterior – Oxford White **(Z1)**
- Interior – Medium Dark Slate

1.02 CHASSIS MODIFICATIONS

The following modifications will be made to the chassis by vendor

1.02.04 EXHAUST HEAT SHIELDS

Heat shields shall be installed beneath the module floor in all areas where exhaust system components are within 10" of the floor.

1.02.05X RUNNING BOARDS

Running boards made of bright aluminum diamond plate with Grip Strut inserts embedded in the step surfaces for a Ford F-350 Crew cab shall be securely mounted on both sides of the chassis with OEM fasteners.

1.02.08 RECOVERY EYES

Two rear recovery eyes, rated at 10,000 lb per pair, shall be installed in 6.75"W x 6.75"H x 4.375"D recessed pockets. Eyes shall be 1.8125"D, bolted to frame. These eyes shall not be used for towing or lifting of emergency vehicle.

1.02.09 MUD FLAPS

Mud flaps with the "NORTH STAR" logo shall be installed behind rear wheels.

1.02.10 TIRES AND WHEELS

The six OEM tires/wheels shall be removed from the vehicle and tires dismounted. Both sides of each wheel shall be sand blasted and gloss black powder coated before tires are remounted, balanced, and re-installed on the vehicle (Section 3.04.01 related).

1.02.11 AIR HORN

A Buell #1063 air horn shall be added to the chassis. The horn shall be mounted in the aftermarket bumper. The compressor shall be mounted in Compartment #1. An air tank shall be installed between the frame rails aft of the fuel tank. A disable switch shall be located adjacent to the compressor for ease of maintenance. Air horn shall be controlled by a driver's foot switch and a switch labeled "AIR HORN" in the driver's console (Section 6.09 related). Air horn activation switches shall be ignition interlocked.

1.02.18B AFTERMARKET BUMPER/GRILLE GUARD

A Fab Fours Elite with full grille guard aftermarket bumper/grille guard combo with OEM fog light cutouts and in a black powder coat finish shall be installed on the front of the chassis.

(Note: Bumper/grille is subject to change based on chassis model year changes)

1.02.33 TRAILER HITCH/PLUG

A Class V, 2.5" receiver trailer hitch with 20,000-lb total rating and 2,700-lb tongue weight capacity shall be mounted below the rear bumper with 5/8" grade 8 bolts. A 2.5"-to-2" adapter sleeve and 5/8" hitch pin shall be shipped loose to allow use of either 2" or 2.5" accessories (Section 8.01 related). The trailer plug electrical connection shall be a single receptacle that accommodates two standard trailer plugs: One 5 pin flat plug and one RV-style round, seven-pin connection consisting of six flat contacts around one central round pin.

1.02.60**CAB CONDUIT**

A 5.5" cab conduit shall be installed between the cab and module located behind the driver's seat. The switch harness shall be routed through the conduit.

1.03**MODULE-TO-CHASSIS MOUNTING SYSTEM****1.03.01****MODULE MOUNTING SYSTEM**

The module shall be bolted to the chassis frame in no fewer than twelve locations. Each mounting location shall include a hard rubber isolation pad between the chassis frame and the module lateral. The rearmost lateral(s) shall be connected to the frame extensions with 5/8" grade 8 bolts. All remaining laterals shall be connected with vertical 3/4" grade B7 eye bolts fastened to the frame rails with horizontal 3/4" grade 8 hex bolts. All bolts shall be secured with locking nuts.

2 **MODULAR CONSTRUCTION**

All material utilized shall be of the correct type, alloy, and thickness to withstand the intended usage and provide protection against cracking, corrosion, or metal fatigue. All materials utilized shall be of open stock origin, commonly available through local sources, for rapid and economical repair or modification of the body. Any use of proprietary parts or materials in the construction of the body is unacceptable, due to potential delays or difficulties in future repairs or service. NO EXCEPTIONS TO BE TAKEN IN THIS AREA. This specification has been designed and written to fill specific needs of this agency. Where brand name, make, or model of equipment has been specified, no exceptions shall be allowed.

The module shall have a transferable lifetime structural warranty.

2.01

MATERIAL

EXTRUSIONS	SIZE	ALLOY
Structural Tubing	1" x 2" x 0.125" sq	6063-T52
Structural Tubing	2" x 2" x 0.125" sq	6063-T52
Cross Members	3" x 3" x 0.375"	6061-T6
Cross Members	1.5" x 3" x 0.25"	6061-T6
FORMED SHEETING	SIZE	ALLOY
Skin/Roof/Compartments/Subfloors/Doors	0.125"	5052-H32
Diamond Plate	0.125"/0.08"	3003-H22
Stainless Steel	16 ga., 20 ga	304 # 4B

2.02

MODULE DIMENSIONS

Overall Vehicle Dimensions (Specifications are listed as minimums.)

Length	23 '	6 "	282.00 "
Width (excluding mirrors)	7 '	10 "	94.00 "
Height (Approximate)	6 '	10.50 "	82.50 "

Exterior Module Dimensions (Specifications are listed as minimums.)

Length	9 '	6 "	114.00 "
Width	7 '	10 "	94.00 "
Height	5 '	4.75 "	64.75 "

2.03X

STRUCTURAL FRAMING

Side wall and rear wall construction shall consist of 2" x 2" x 0.125" aluminum square tubing extensions welded together with a maximum of 14" centers. 1" x 2" x 0.125" aluminum tubing may be utilized in addition to 2" x 2" tubing to accommodate custom compartment sizes. The bottom of the wall structure shall be sealed with a welded 2" x 2" tube, a 2" x 2" angle, or a 0.125" plate depending upon location. The wall structure shall be capped with a 2" x 4" x 0.125" header upon which a 2" x 2" x 0.125" roof structure is welded. This process provides a unitized roll cage structure for greater occupant safety. The front wall structure shall be constructed of formed aluminum channels to allow ample space for wiring raceways, heater hoses, and A/C hoses.

2.04 FOUNDATION SYSTEM

The foundation system shall consist of a 0.125" aluminum sheet subfloor with foundation members securely welded under the subfloor. Transverse members (laterals) shall consist of 3" x 3" x 0.375" structural angles. 0.25" x 1.5" aluminum stringers shall span longitudinally between the laterals.

2.05 MODULE SEAMS

All body and compartment seams at or below floor level shall be full-seam-welded. The entire perimeter of the subfloor shall be completely sealed with a caulking material, creating a watertight seam.

2.06 EXTERIOR SKIN

A Norton NORBOND closed-cell, polyurethane foam tape with high-performance acrylic adhesive shall be utilized full length on all front and rear wall and roof frame members. A polyurethane adhesive sealant shall be applied to the edges of framing members that are bonded with NORBOND tape. An advanced two-part methacrylate structural adhesive shall be used to bond all side wall tubes to the exterior skin and door frames.

The module shall be constructed utilizing full-size sheet construction to minimize body seams. There shall be no corner or mid-body seams.

2.07X MODULE ROOF

The roof shall be comprised of a single sheet with a continuously welded seam to the side wall. The roof shall be supported by positive contact between sidewall framing and roof framing. In order to avoid the possibility of paint and/or weld cracking, no extrusions shall be used in the exterior construction of the roof or corners of the module.

MODULE EXTERIOR COMPARTMENTS

All compartments shall be constructed from formed 0.125" aluminum, securely welded to the subfloor and structural framing. A baffled drain hole shall be provided in all exterior compartment bottoms that extend below the floor line. All exterior adjustable shelves shall be mounted on heavy-duty aluminum track, which is securely welded to compartment interiors. Each shelf shall support at least 300 lb of equipment.

COMPARTMENT #1 – Transverse Storage

Interior Dimensions – 28.75"W x 52"H x 88.5"D

Doorway Dimensions – 25"W x 48"H

Location – Streetside, forward

Shelving – Three adjustable full depth shelf (shared with Compartment #7)

Door(s) – Single

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- Compartment shall be transverse, sharing storage with Compartment #7.
- A vent with MERV 8 polyester filter media and hex-punched stainless steel cover shall be installed in the lower back wall, forward for ventilation. Aft wall of compartment shall have a precision punched panel, to ventilate Compartment #2.
- Four 120 VAC GFCI duplex receptacles shall be installed on the forward wall evenly spaced (Section 6.21 related).
- The 120 VAC power box shall be installed in the aft wall (Section 6.21 related)

COMPARTMENT #2

Interior Dimensions – 45.25"W x 26.5"H x 22"D

Doorway Dimensions – 42"W x 23"H

Location – Streetside, above the wheel well

Shelving – One adjustable

Door(s) – Double

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- Forward and aft walls of compartment shall have precision punched panels for ventilation.
- Three vertical aluminum tracks shall be installed on the back wall with a painted aluminum plate for *customer-supplied-and-installed* equipment.
- A closeout shall be installed on the forward wall, for the 120 VAC power box facing into Compartment #1 (Section 6.21 related).
- A closeout shall be installed on the floor of the compartment, for access to the shoreline connection (Section 6.21 related).

COMPARTMENT #3

Interior Dimensions – 28.75"W x 52"H x 22"D

Doorway Dimensions – 25.5"W x 48.5"H

Location – Streetside, aft

Shelving – Two adjustable shelves

Door(s) – Single

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- A 10A prewire for *customer-supplied-and-installed* portable flashlight charging base shall be installed, aft (Section 6.45 related), with a 24" service loop.
- A vent with MERV 8 polyester filter media and hex-punched stainless steel cover shall be installed on the lower back wall, aft for ventilation.
- Three vertical aluminum tracks shall be installed on the back wall, with a painted aluminum plate for *customer-supplied-and-installed* equipment. Two full-height vertical tracks shall be installed each on the forward and aft walls.
- One 120 VAC GFCI duplex receptacle shall be mounted on the aft wall, below the shelf, 4" above the floor of the compartment (Section 6.21 related).

COMPARTMENT #4

Interior Dimensions – 43"W x 41"H x 78.75"D

Doorway Dimensions – 49.75"W x 41"H

Location – Rear, center

Shelving – One half depth adjustable shelf with 3" lip

Door(s) – Dual side-hinged

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- Forward wall of compartment shall be punched for ventilation.

COMPARTMENT #5

Interior Dimensions – 28.75"W x 52"H x 22"D

Doorway Dimensions – 25.5"W x 48.5"H

Location – Curbside, aft

Shelving – Two adjustable shelves

Door(s) – Single, aft hinged

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- A 10A prewire with a 24" service loop for a *customer-supplied-and-installed* portable flashlight charging base shall be installed (Section 6.45 related).
- A vent with MERV 8 polyester filter media and hex-punched stainless-steel cover shall be installed in the lower back wall, aft for ventilation.
- Three vertical aluminum tracks shall be installed on the back wall, with a painted aluminum plate for *customer-supplied-and-installed* equipment. Two full-height vertical tracks shall be installed each on the forward and aft walls.
- One 120 VAC GFCI duplex receptacle shall be mounted on the aft wall, below the shelf, 4" above the floor of the compartment (Section 6.21 related).

COMPARTMENT #6

Interior Dimensions – 43.25"W x 26.5"H x 22"D

Doorway Dimensions – 42"W x 23"H

Location – Streetside, above the wheel well

Shelving – Two adjustable

Door(s) – Single

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- Aft wall shall have a precision punched panel for ventilation.
- Three vertical aluminum tracks shall be installed on the back wall with a painted aluminum plate for *customer-supplied-and-installed* equipment.

COMPARTMENT #7 – Transverse Storage

Interior Dimensions – 28.75"W x 52"H x 88.5"D

Doorway Dimensions – 25"W x 48.5"H

Location – Streetside, forward

Shelving – Three adjustable full depth shelf (shared with Compartment #1)

Door(s) – Single, aft hinged

Light(s) – One LED strip light (Section 6.26 related)

Additional Instructions –

- A Samlex 1200-watt inverter shall be installed in the lower portion (Section 6.31 related).
- Compartment shall be transverse, sharing storage with Compartment #1 on the streetside of the vehicle.
- A vent with MERV 8 polyester filter media and hex-punched stainless steel cover shall be installed in the lower back wall, forward for ventilation.

2.09

MODULE DOORS

The doors shall be box-pan-formed with a total thickness of 2".

2.09.01

DOOR FRAMES AND SEALS

Each door frame shall have a flange for the installation of an air cell hollow core 360-degree compression door seal. This seal creates watertight, dust-free compartment integrity. Door seal shall be knock-on type. Door frames shall be bonded to the adjacent tubes such that no exterior flange is required.

2.09.02X

DOOR HINGES

Compartment doors shall have full-length, piano-type, 2.5"W stainless steel hinges, positioned with 0.25" rivets at each end. The hinges shall be attached with #12 x 0.75" stainless steel truss head screws spaced 4" apart, sealed with Sikaflex. All curbside and streetside side-hinged single doors shall be hinged on the **aft** sides and rear compartment doors shall be hinged on the outboard sides.

2.09.03X DOOR LATCHES

Exterior door handles shall be semi-flush, chrome-plated Eberhard E Grabber #21100. All exterior doors shall have rotary latches and striker posts that meet FMVSS 206 requirements. Striker posts shall be adjustable and be secured with a nut from behind the door frame. The striker washer shall not be removed. Doors greater than 45" tall shall have double rotary latches activated by stainless steel rods. Once final adjustments have been made, threads shall have Loctite or equivalent applied. All double-door compartments shall have an exterior E Grabber handle and rotary latches on each door. Doors shall latch to doorframe-mounted striker posts only and not to one another. All locks shall be keyed J236.

2.09.04X COMPARTMENT DOOR CONTROL

A spring-dampened gas shock capable of holding the door open at approximately a 90-degree angle on any road surface shall be installed at the top of each Compartment door.

2.09.07 COMPARTMENT DOOR SKINS

Each compartment door skin shall be made of 0.080" bright aluminum diamond plate, shall be removable, and have a latch service opening with a 2.25" x 4.5" black rubber plug for lubrication and service. Door skins shall be secured with #8 pan head screws and Sikaflex. Red/white 1.5" conspicuity tape shall be installed on the outboard vertical edge of each door.

A bracket and quick-release strap with footman loops shall be installed on Compartment #5 on the doorskin for a *customer-supplied-and-installed* Stryker powered stair chair (Section 4.27 related).

2.09.10 THRESHOLDS

All compartment door frames shall have full-width-formed stainless steel threshold plates to protect the lower edge of frame.

2.14 WHEEL WELL LINERS

Wheel well liners made of formed aluminum shall be installed in the module wheel well openings.

2.15 ELECTROLYSIS PREVENTION

All external materials and fasteners shall be selected to prevent electrolysis and corrosion due to dissimilar materials and exposure to the elements. The module shall be painted before any exterior items (hinges, latches, door hold opens, etc.) are installed to provide an isolating film between dissimilar materials. Exterior fasteners used for direct connection to painted aluminum surfaces shall be coated with a corrosion inhibitor.

3 COATINGS AND FINISHES

3.01 MODULE FINISH PREPARATION

The module shall be seam sealed and all imperfections on aluminum surfaces of module shall be sanded smooth. The entire exterior shall be mechanically etched and washed with wax-and-grease-remover to ensure proper primer/sealant adhesion.

3.02 MODULE PRIMER

Module shall be sealed with a two-component, low VOC, direct-to-metal epoxy primer/sealant prior to applying the finish coat of acrylic urethane paint.

3.03 PAINT TYPE

Shall be Sherwin Williams acrylic urethane.

3.04 COLOR SCHEME

Base color: To match Race Red (G4-100871777).

3.04.01 CHASSIS COLOR

Chassis shall be OEM Race Red (PQ).

Six OEM wheels shall be sand blasted and gloss black powder coated.

3.06 COMPARTMENT FINISH

All compartments, shelves, and trays shall be mill-finished aluminum.

3.10 COMPARTMENT LINING

All compartment floors shall be lined with light gray Matéflex floor tile and all shelves with mat.

3.12 SURFACES AND FINISHES

All installed surfaces and finishes shall be impervious to soap, disinfectants, and water, to permit washing and sanitizing.

4 MODULE EXTERIOR

4.01 STEP/BUMPER

The rear bumper shall be a welded construction of 3" x 3" x 0.375" aluminum angle and 1.5" x 0.25" flat bar and shall be covered by 0.125" bright aluminum diamond plate. The entire top shall be non-skid Grip Strut and shall provide a 7" step. Both outermost ends shall be angled to prevent dragging of corners in high angle of departure areas. Diamond plate shall be formed on front and rear edges for channel-type strength. The bumper shall be bolted directly to the chassis frame using high strength Grade 5 bolts. Bumper shall be easily removable and replaceable in case of damage.

4.02 RUB RAILS

Bright finished extruded aluminum rub rails of a double channel design shall be installed along the lower streetside and curbside edges of the module. Rub rails shall be 2.5"H x 0.75"W x 0.125"D, with a 0.5"H red/white conspicuity reflective tape installed in the insert area.

4.03A FENDER RINGS

High grade weather-resistant industrial rubber fender rings with a rounded outer edge shall be installed on the module, following the full contour of the wheel well opening and projecting 2.5" from the module body.

4.05X ROCK GUARD

Bright aluminum diamond plate rock guards shall cover the front module corners, 24" up from bottom of module, 1.5" wrapped around the sides of module, and 15" across the front of the module.

4.06X REAR KICK PANEL

A bright aluminum diamond plate rear kick panel shall extend from the bottom edge of the module up to the bottom of the rear doors, full-width formed and wrapped 1.5" around the sides of the module.

Two recovery eyes in recessed pockets shall be installed in the rear kick panel (Section 1.02.08 related).

4.07 FUEL FILL

A polished cast aluminum fill well shall be installed on the streetside of the module and be properly vented. Fill and vent hoses shall be installed and protected in accordance with the chassis bodybuilder recommendations.

The OEM DEF tank fill is located between the cab and module, streetside.

4.09 FUEL SPLASH GUARD

A stainless-steel fuel splash guard shall be installed below the fuel fill.

4.16 REAR LICENSE PLATE

A recessed license plate holder with dual Whelen #0AC0EDCR LED lights with angled chrome bezels shall be installed below rear doors in the rear kick panel (Section 4.06 related). A hidden unlock switch shall be installed behind the license plate on the rear of the module (Section 6.40 related).

4.27B**STAIR CHAIR STORAGE**

A bracket and quick-release strap with footman loops shall be installed in Compartment #5 on the doorskin for a *customer-supplied-and-installed* Stryker powered stair chair.

4.32**EXTERIOR FIRE SUPPRESSION**

Two ABC 5 lb fire extinguisher with an Amerex #861H SAE-J3043 compliant bracket shall be shipped loose (Section 8.01 related).

4.34**AUTOMOTIVE UNDERCOATING SEAL**

The chassis and module underbodies (excluding the area above the fuel tank, driveline, and exhaust lines, per manufacturer's specifications) shall be sprayed with undercoating for reduced corrosion and added sound deadening.

ELECTRICAL

All added body and chassis electrical equipment shall be served by circuits separate and distinct from the vehicle chassis circuits. All vehicle wiring shall be copper and conform to all SAE J1128 requirements. The wiring shall be colored, numbered, or function coded every 3" for permanent identification and correspond with the vehicle schematics. Solderless, insulated connectors shall be used. Slotted Panduit-style wiring duct shall be used in electrical component module to ensure air circulation throughout power component wiring. The wiring shall be routed in conduit or looms and wiring shall be secured to the underbody or frame with insulated metal cable straps. All power distribution cabling shall be covered with a protective split loom. Where wiring passes over the exhaust, a heat shield shall be installed. The electrical component module shall be equipped with positive locking plugs to provide easy disconnect for remount or repair of body. All wiring devices, switches, outlets, etc., except circuit breakers, shall be rated to carry 125% of the maximum ampere load for which the circuit is protected.

The vehicle electrical system shall be tested and certified to AMD 005 requirements.

6.01X ELECTRICAL LOAD DEVICES

Body electrical wiring shall utilize overload protective devices of the automotive-type circuit breaker. In addition, one single pole, 20-amp circuit breaker shall be provided for future use. The circuit breakers, relays, and other electrical devices shall be included as part of the electronics storage under the rear folding bench in the cab.

6.02 VOLTMETER/AMMETER

A single display voltmeter/ammeter shall be installed on the side of the console, driver's side, which simultaneously displays voltage and alternator current when the ignition is on (Section 6.09 related). Display flashes to indicate low voltage.

6.04 IGNITION CONTROL

Chassis electrical circuits shall be controlled by the ignition switch as provided by the OEM chassis manufacturer. The auxiliary chassis-related functions shall be powered by one InPower #SSC20-100 solid state contactor, triggered by the chassis ignition.

6.05A MODULE POWER

Module power shall be controlled by a driver's console-mounted switch labeled "MODULE DISC." which activates an InPower #SSC42-275 solid state contactor (Section 6.09 related). An ignition interlock shall disconnect module power approximately 3-5 minutes after the vehicle's ignition is turned off. The interlock shall also allow module power to be reactivated independently for approximately 3 minutes by cycling the ignition switch.

6.06 WIRING ACCESS

All compartments shall have removable panels as needed to access wiring harnesses and hoses.

6.07 BACK-UP ALARM

An SAE J994-compliant self-adjusting back-up alarm shall be installed, with a momentary disable switch labeled "BACK-UP DISABLE" in the driver's console (Section 6.09 related). If disabled while in reverse, the back-up alarm shall automatically reset when shifted out of reverse.

6.08**SERVICE LOOP**

A 6" service loop of wire or harness shall be provided at all electrical components, terminals, and connection points.

6.09X**CUSTOM DRIVER'S CONSOLE/MAP BOX**

A custom driver's console made of black-powder-coated formed aluminum shall be installed between the seats. It shall have:

- A cup holder assembly
- Adjustable arm rests
- A map holder
- Two 120VAC GFCI duplex receptacles (exact location to be determined at pre-construction meeting) (Section 6.21 related)
- A Blue Sea fuse block installed inside of the console (Section 6.18 related)
- A black-powder-coated 0.125" aluminum hat section-style cover installed on the rear chassis floor to protect the wiring harness from damage.
- All switch labels shall be laser etched legends with electro-luminescent backlighting.
 - The console wiring harness shall be routed into the console through the bottom, through the hat section tunnel.
- One faceplate with the following layout:

1.	Compt. D/O Light	2.	3.	Blank Space
Module Disc.		Emerg. Master	Back-up Disable	

Air Horn Button	Whelen 295SLSA1 Siren (Section 6.30.09 related)									Air Horn Button
4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Pri. / Sec	Blank	Left Alley	Right Alley	Left Flood	Right Flood	Rear Flood	Front Flood	Spare	Blank	Dual USB

6.10**SWITCHES**

Switches installed in the driver's console and shall be rocker-type and permanently marked by function.

Backlit switch panels shall have laser engraved legends with electro-luminescent backlighting.

6.11**MAP LIGHT**

A map light with a 19" flexible neck shall be shipped loose (Section 8.01 related).

6.12X**DOOR AJAR WARNING LIGHT**

A flashing LED light with an amber lens shall warn the driver of an open module compartment door. The light shall flash only if the ignition is on. Light shall be installed on the driver's console.

6.17X**BASIC EXTERIOR LIGHTING**

Basic lighting shall include headlights, parking lights, directional signal lights, tail and stop lights, license plate light, back-up lights, hazard lights, identification lights, clearance lights, and side marker lights as required by FMVSS 108.

Module identification lights, clearance lights, and side marker lights, unless included on a lightbar, shall be Truck-Lite LED Model 36.

Rear and side reflex reflectors shall be installed in accordance with FMVSS 108 requirements.

Rear stop/tail, turn and back-up lights shall be Truck-Lite Model 45 series LED lights, installed in the rear kick panel, pattern from outboard in: red stop/tail light, amber turn signal, and clear back-up light. Back-up lights shall activate automatically when vehicle is placed in reverse.

6.18X**COMMUNICATIONS EQUIPMENT**

The customer shall be responsible for powering up and tuning of any radio equipment.

Both Battery hot fuse blocks shall be connected to a shared 100amp manual reset breaker.

Item #1

Description: A Blue Sea #5032 fuse block for communication equipment shall be installed

Location: Inside the driver's console

Additional Instructions: Battery hot side of fuse block shall be connected to a shared 100amp. manual reset breaker. Battery hot wire shall be 40amp.; ignition hot wire shall be 30amp

Item #2

Description: A Blue Sea #5026 battery hot fuse block shall be installed

Location: Under rear crew cab seat, centered on the floor of the storage area

Additional Instructions: Fuse block shall be connected to a shared 100 amp. Manual reset breaker. Wiring shall be minimum 60amp

Item #3

Description: A Blue Sea #5028 ignition hot fuse block shall be installed

Location: Under rear crew cab seat centered on the floor of the storage area

Additional Instructions: Wiring shall be minimum 30amp

6.19**ANTENNA MOUNTS AND CABLES**

Two Larsen 27 MHz to 6 GHz NMO universal antenna mounts with RG-58U low loss, dual shield cables with FME male connectors shall be installed on the module roof. Antenna cables shall terminate in the driver's console.

A rain cap shall be installed on each base that does not have an antenna installed.

6.20A**BLOCK HEATER**

The OEM block heater connection shall not be modified.

6.21**120VAC/SHORELINE CIRCUIT BOX**

Utility power shall be furnished from 120VAC shorepower via a Kussmaul 20-amp Super Auto-Eject plug with a red cover located on the **streetside** of the module, forward of rear wheel well and distributed via a formed aluminum 120 VAC power box with an easily removable cover, located on the aft wall of Compartment #1. A custom stainless steel mounting plate and 0.125" thick ABS spacer behind the mounting plate shall be provided to allow the Auto-Eject housing to be rotated 90 degrees to a horizontal orientation in order to fit above the wheel well. Shoreline shall have enough service loop to allow the entire assembly to be removed for service accessibility. A closeout shall be installed on the floor of Compartment #2 for access to the shoreline connection.

Circuit breakers shall be installed for overcurrent protection and circuit isolation:

- • Inverter (20-amp)
- • Receptacles (15-amp)

All exposed receptacles shall be ground fault circuit interrupting (GFCI) and shall have a power on indicating light.

Eight interior 120 VAC GFCI duplex receptacles shall be installed:

- Four in Compartment #1
- One in Compartment #3 on the aft wall, below the shelf, 4" above the floor of the compartment
- One in Compartment #5 on the aft wall, below the shelf, 4" above the floor of the compartment
- Two on the driver's console (exact location to be determined at pre-construction meeting).

6.22**BATTERY GROUNDS**

In addition to OEM chassis grounds, the following ground circuits shall be added to reduce RF interference:

- A minimum 4 ga. ground cable from the power component panel to the chassis frame.
- Two braided ground straps with soldered ends from the module body to the chassis frame.

6.23**BATTERY CHARGER**

A 60-amp battery charger shall be provided as part of the Samlex 1200-watt inverter system (Section 6.31 related).

6.24**BATTERY MODIFICATIONS**

Chassis batteries shall be utilized in existing locations.

6.25X**12VDC POWER SUPPLY**

One Blue Sea switch-insert-style dual USB charging port in the driver's console, wired battery hot.

All 12 VDC power point receptacles, USB charge ports, 12 VDC charging circuits, electric air compressors, and cool cabinets, if present, shall be powered from a 12 VDC auxiliary bus. An InPower LVD21-100-CSPC540 low voltage disconnect switch shall deliver power to the auxiliary bus only when the supply voltage to the vehicle batteries is at or above 13.0 VDC.

6.26X**COMPARTMENT LIGHTING**

LED strip lighting shall be installed in each outside compartment, and shall be activated by the respective compartment door switch. Two lights shall be installed in each compartment.

6.27

EXTERIOR DOOR SWITCHES

Shall be 1/2" mechanical door switches.

6.30X**EMERGENCY WARNING SYSTEMS**

All emergency lighting shall be controlled by the "EMERG. MASTER" switch in the driver's console and activated by the "PRI/SEC" switch on the driver's console (Section 6.09 related).

Primary position shall activate all emergency lights, siren and Opticom.

Secondary position shall activate rear facing emergency lights.

6.30.01X**CAB LIGHTBAR**

A 54" Whelen Liberty II Duo WC #IJ2RRRR LED lightbar with bracket shall be mounted on the cab roof. Pattern curbside to streetside:

Location	Lens Color	Model	Light Color	Type	Light	Flash Pattern	Additional
Curbside	Clear	Corner LED, flasher	Red	LED	Flasher	Signal Alert	Angled aft
	Clear	TIR alley, short	Clear	LED	Alley light	NA	Section 6.30.04 related)
	Clear	Corner LED, flasher	Red	LED	Flasher	Signal Alert	Angled forward
	Clear	Long TIR takedown, 12 LED	Clear	LED	Flood light	NA	Section 6.30.04 related)
	Clear	Long IB Series flasher	Red	LED	Flasher	Signal Alert	Facing forward
	Clear	Short IB series flasher	Red	LED	Steady	NA	
Center							
Streetside	Clear	Short IB series flasher	Red	LED	Flasher	Signal Alert	Facing forward
	Clear	Long IB Series flasher	Red	LED	Flasher	Signal Alert	Facing forward
	Clear	Long TIR takedown, 12 LED	Clear	LED	Flood light	NA	Section 6.30.04 related)
	Clear	Corner LED, flasher	Red	LED	Flasher	Signal Alert	Angled forward
	Clear	TIR alley, short	Clear	LED	Alley light	NA	Section 6.30.04 related)
	Clear	Corner LED flasher	Red	LED	Flasher	Signal Alert	Angled aft

The lightbar flashers shall be controlled by the "EMERG. MASTER" switch on the driver's console (Section 6.09 related).

The flashers shall be activated in Primary position only.

A momentary switch labeled "WHITE LIGHTS DISABLE" shall be installed in the driver's console to disable the white flashers, pressing the switch once shall disable the white lights, cycling the "EMERGENCY MASTER" switch shall reset circuit. The white lights shall also disable in park. The red flashers, white flashers and Opticom shall be activated in Primary position only.

6.30.02 REAR FLASHERS

Four Whelen M7 and one 700 series light heads with chrome flanges shall be installed on the rear of the module, upper, pattern curbside to streetside:

Curbside: #M7R Red Lens Red LED flasher
#M7ZC LED scenelight (Section 6.30.04 related)

Center: #704BTT Red Lens Red LED third brake light (Section 6.17 related)
#M7ZC LED scenelight (Section 6.30.04 related)

Streetside: #M7R Red Lens Red LED flasher

The red flashers shall be controlled by the "EMERGENCY MASTER" switch on the driver's console (Section 6.09 related).

The red flashers shall be activated in Primary or Secondary positions.

6.30.03A FLASHERS

Four Whelen #M7R Red Lens Red LED flashers with chrome flanges shall be installed in the upper corners of the module: two each on the streetside and curbside.

Flashers shall be controlled by the "EMERG. MASTER" switch on driver's console (Section 6.09 related).

The flashers shall be activated in Primary position only.

6.30.04X SCENELIGHTS

Six Whelen #M7ZC LED scenelights with chrome flanges shall be installed, two each on the streetside, curbside, and rear of the module in the upper corners.

The scenelights shall be controlled by the respective switches on the driver's console (Section 6.09 related).

The rear scene lights shall activate when the vehicle is placed in reverse.

The scenelight portion shall be controlled by the "REAR FLOOD" switch on the driver's console (Sections 6.09 and 6.30.03 related), and shall activate when the vehicle is placed in reverse.

Two alley flood lights and two front takedown floodlights shall be included with the Liberty II Duo lightbar (Section 6.30.01 related). The side facing alley lights shall be controlled by the respective "LEFT ALLEY" and "RIGHT ALLEY" switches on the driver's console. The front facing takedown flood lights shall be controlled by the "FRONT FLOOD" switch on the drivers console (Section 6.09 related).

When the Emergency Master switch is on and the white lights are disabled by either being in park or by the disable switch, the "FRONT FLOOD" switch shall still be able to activate the front scene (takedown) light.

6.30.06 INTERSECTION LIGHTS

Four Whelen #WIONSMCR Clear Lens Red Super-LED flashers with chrome housings shall be installed: one on each cab fender and one above each module wheel well.

The red flashers shall be activated in Primary or Secondary positions.

6.30.08X GRILLE LIGHTS

Two #WIONSMCR Clear Lens Red LED flashers shall be installed on the OEM grille.

The flashers shall be activated in Primary position only.

6.30.09X SIREN

A Whelen 295SLSA1, 200-watt siren shall be installed in the driver's console (Section 6.09 related). Standard features shall include Radio Rebroadcast, Public Address, Manual, Wail, Yelp, and Air horn. The siren's hands-free function shall operate through the OEM horn ring circuit when the sirens rotary selector is in the HF position and the "EMERG. MASTER" switch is on and "PRI/SEC" switch is in Primary position.

6.30.10 SIREN SPEAKERS

Two Federal Signal DynaMax #ES100C 100-watt speakers with mounting brackets shall be installed behind the OEM grille in the upper outboard corners.

6.31 INVERTER

A Samlex 1200-watt inverter with a 60-amp battery charger shall be installed with a perforated surround on the floor of Compartment #7. An EVO-RC Plus inverter remote control panel shall be installed in location to be determined at pre-construction meeting. Inverter shall be configured to turn on and off with ignition.

6.40 ELECTRIC DOOR LOCKS

Electric door locks shall be installed on all compartment doors. The door locks for the cab and module shall be interconnected, to allow all doors to be locked/unlocked from the cab. A hidden unlock switch shall be installed behind the license plate on the rear of the module (Section 4.16 related).

6.45 ADDITIONAL LIGHTING

Two 10A. power/ground prewires for *customer-supplied-and-installed* portable spotlight chargers shall be provided in Compartments #3 and 5, terminating in 24" coils, behind the closeout on the aft wall

6.46 AUDIO/VIDEO/RECORDING EQUIPMENT

Description: A Zorg wedge-style surface-mounted back-up camera with a 5 meter cable shall be installed.

Location: Back-up camera in location to be determined at pre-construction meeting, on the exterior of the module

Additional Instructions: Camera shall be plugged in at the end of the chassis frame and shall automatically show on the OEM in-dash screen when the vehicle is placed in reverse.

7.01B**OWNER'S MANUAL**

Shall be provided with the vehicle and shall include the following items:

1. Vendor Contact Information
2. Warranties
3. Service and Operations Manual
4. Electrical Drawings
5. Parts list
6. Specifications and Drawings
7. Certifications
 - a. AMD 005 Low Voltage Electrical System Test
8. Product Manuals
9. Second OEM chassis key

7.03B**LABELS**

The following labels shall be provided:

Label Description	Location
Paint Label	Inside of the electrical cabinet door
FMVSS Certification Label	Adjacent to the chassis OEM stickers, typically on the B pillar (or inside of the electrical cabinet door if there is not room on the B pillar)
Tire and Loading Information Label (for under 10k GVWR only)	
Overall Height and GVWR	Visible to the driver while seated
Shorepower Inlet Rating	Near the shorepower inlet

8.01**LOOSE EQUIPMENT**

The following equipment shall be shipped loose with the vehicle:

1. One 2.5"-to-2" adapter sleeve and 5/8" hitch pin
 2. One map light with a 19" flexible neck
 3. Touch-up paint, one bottle of each:
 - Race Red (G4-100871777)
 - White (G2-33631 Alt 2)
 - Lt Gray (GLV-51748)
 4. One Whelen Howler speaker
- ABC 5 lb fire extinguisher with an Amerex #861H SAE-J3043 compliant bracket

8.02**CUSTOMER SUPPLIED EQUIPMENT**

The customer shall provide the following equipment and have delivered to vendor within 30 days of the preconstruction meeting:

1. Two NMO antenna mounts and cables
2. One MIMO antenna

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