

# ZOLL®

## Road Safety RS-4000 System Overview and Installation



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# THIS DOCUMENT

## PURPOSE

The purpose of this document is to provide the reader all the necessary information for the installation, configuration, activation and testing of the ZOLL Road Safety RS-4000 devices. In addition to instructional information, this document will also provide the forms necessary to accurately document the individual installations for future reference.

## INTENDED AUDIENCE

The mechanical tasks detailed in this document should only be performed by an experienced and certified professional vehicle technician. This document is NOT intended to be an instructional manual on vehicle mechanics/modification.

As detailed in the next section, the ZOLL Online configuration information covered in this document is just as important to successful implementation as the proper physical installation of the devices. The system will not work if either one of these tasks are not completed or completed incorrectly. The ZOLL Online section (Appendix F) of this document can be completed by either the professional vehicle technicians, the agencies Road Safety Administrators or any combination of the two.

## ZOLL Online’s Road Safety & the RS-4000’s

For the RS-4000 devices to function correctly, two tasks must be completed:

1. The devices **must** be physically installed in the vehicles following the guidelines in this document.
2. Road Safety settings **must** be configured using the web based, ZOLL Online Road Safety application.

***Failure to complete 1 & 2 for every unit will result in a non-functional vehicle(s).***

ZOLL Online’s Road Safety application is the back end interface tool for managing and configuring the RS-4000 devices. In the final section of this document (Appendix F), you will find all of the details necessary for using ZOLL Online to properly prepare the vehicles and devices for a successful installation.

**IMPORTANT:** Prior to beginning the installation of any RS-4000 unit, ensure the vehicle and device have been properly configured in the agency’s ZOLL Online Road Safety system.

## USING THIS DOCUMENT

As with most modern documentation used today, this RS-4000 Installation and Overview is available in an Adobe PDF format which makes it easy to view on—and print from—most devices. It also makes it very easy to distribute to others via printed copies, e-mail, jump drives or internet file sharing sites.

We recognize that in a real-world, working garage environment it’s most likely installers will work off of a printed version of this document and reference it as needed. However, to achieve the full benefit of this PDF, it is best viewed from a desktop/laptop computer with an internet connection. Utilizing an internet connected computer provides the additional benefit of quick access to related video content and the latest information/documentation available on the Road Safety system. Clicking on PDF icons (located throughout the document) will display PDFs in a new browser window from which you can read, print or save to your computer, and the video button will open up a viewing dialog box and play video content.



## ZOLL ONLINE EARNING COURSE

A large section of this document is dedicated to the ZOLL Online configuration of the RS-4000 units. Although this section does include all of the necessary information needed to setup the devices and make them operable, addition details and training on the full scope of the Road Safety product is available at no additional charge. Requests for enrollment in this course can be made by emailing [trainingservices@zoll.com](mailto:trainingservices@zoll.com).

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## PURPOSE

This guide provides an overview of the components of the RS-4000 system, suggestions on component location, mounting recommendations, configuration, testing, and a suggested installation work flow.

## BEFORE YOU START

A typical ambulance installation takes approximately 8-12 hours. Supervisor vehicles, fire apparatus, and other non-standard vehicles may take longer due to their size and complexity. Due to the degree of disassembly needed to perform the installation, the vehicle will not be able to be placed in service until the installation is completed.

## WHAT TO EXPECT

Are you and your agency ready for the Road Safety Installation? How do you even know if you're ready? We've put together a comprehensive video to help to ensure both the agency and the installer have all the knowledge they need when it comes being properly prepared. Click the video content button to be taken directly to view the video.



## WIRING PRACTICES

You must make all the connections with solder or standard crimp connectors. Solder is preferred for all connections where practical, ScotchLok wire taps (or similar) are not to be used. All ground connections should be to their own chassis ground point, do not splice into a ground wire on another system.

## SAFETY PRECAUTIONS

Make sure to always follow vehicle manufacturer and up-fitter safety procedures and specifications on disassembly and reassembly of vehicle components such as torque specs, airbag disconnect, and testing of electrical system components. Personal injury hazards such as needle sticks and biological hazards may be present and the installers should be aware of the procedures to avoid injury.

**Oxygen Cylinders** - Prior to starting the in-vehicle installation of the RS-4000 device, all oxygen cylinders should be removed (by agency staff members) from the vehicle. Working on electrical components in close proximity to oxygen cylinders can greatly increase the risk of an explosion resulting in severe injury or death.

## BUILD SHEET

**ZOLL does not have access to all year/make/model vehicles and some research by the installers will likely be required.** Input/output and connection information including vehicle wire colors and common connection points can be obtained (when available) by calling ZOLL Road Safety Support at 1-800-663-3911 option 9. When completing Build Sheets (page 42, Form 3) you must have the year, make, model, & engine size for accurate documentation. Other vehicle information may be required on a case by case basis.

## FIRMWARE

"Firmware" is permanent software that lives on and works with the Road Safety device. Basically it's responsible for communicating with the vehicle, the speaker, the device itself and the Road Safety software. Occasionally, behind the scenes, ZOLL pushes out updated firmware to the Road Safety devices. Once this "push" is complete the very next time the ignition of the vehicle is turned off, the new firmware will be automatically installed onto the device.

Although it's very unlikely that anyone will even notice that this update is occurring a failure is possible if power to the device is disconnected while it's performing this installation. If this situation occurs a notification message will be displayed on the LCD of the device and ZOLL support should be contacted for assistance.



## PARTS INVENTORY

Use the *ZOLL-Hardware Identification + Inventory Sheet* (pages 6 - 8) to inventory the ZOLL provided hardware. To order additional or replacement parts, such as Driver ID tags, Call ZOLL support for additional information: 1-800-663-3911 option 9.

## SUPPLIES NEEDED

- Cable ties
- Heat shrink tubing - 1/16"-1/2", various sizes
- Electrical tape - Scotch super 33+ recommended
- JB Kwik epoxy - or equivalent product
- Lead free solder
- 16-18 gauge Butt splices.
- Wire loom – ¼" and ½"
- RTV Silicone - if installing roof mount antenna

## RECOMMENDED TOOLS

- Drill (with screwdriver bits, 1/2" & 1" step-bits, and 5/16" nut driver)
- Utility knife
- Inline wire strippers
- Wire cutters
- Crimping tool.
- Digital Multi-meter
- 1/4" + 3/8" ratchets and extensions or equivalent
- Electric soldering gun
- 3/8" drive deep socket assortment (10-18mm +21mm)
- Electric heat gun
- 1/4" drive standard & metric assortments (3/16"-7/8" and 5mm-12mm)
- Torx bits or Torx screwdriver kit
- Combination wrench assortment (1/4"-7/8" & 5mm-15mm)
- Fish rods/tape or metal coat hanger for wire fishing
- Level
- Laptop with Wi-Fi
- 4 Port switch with two Ethernet cables

## RS-4000 OVERVIEW

The ZOLL 4000 is an on-board driver modification and data acquisition system that monitors and reports vehicle speed, vehicle RPM, 16 additional user definable digital single ended inputs and 6 differential inputs. There are 2 digital outputs. The digital outputs may be programmed to turn on vehicle components or other devices when a user defined parameter has been met or the on-board computer receives a user generated command from ZOLL Online.

The on-board computer internal memory configuration includes 32 GB data memory and 1 Gb RAM, 2 USB 2.0 ports, 2 Ethernet and 1 RS232 data port, as well as 1 802.11 b/g/n Wi-Fi capability.

The system identifies and databases activities by vehicle. Optional driver identification allows the system to also record and store activities by driver. The system administrator may set parameters to activate an audible alarm if the vehicle is operated without a valid driver identification logged onto the system.



## EMBEDDED COMPUTER

### SYSTEM:

- Intel® Atom™ CPU n455 1.66 MHz
- 32 Bit Bus.
- Windows Embedded Standard Operating System.
- 1.0 Gb RAM Memory
- 32 Gb SATA Hard Drive

### COMMUNICATIONS:

- 2x USB 2.0 Ports
- 2x RJ45, Gigabit Ethernet Ports
- 1x DB9 (Male), RS-232

### VIDEO:

- 1x HD15 (Female), VGA

### WI-FI:

- 802.11 b/g/n
- 150 Mb/s

### USER INTERFACE

- 2 Line x 16 Characters Lighted LCD Display.
- Membrane Switch Pad with Up, Down, Left, Right and Enter Arrows.

## CONTROLLER AREA NETWORK BUSES (CAN)

Two CAN (OBD-II, J-1939) busses are available. One CAN bus is used for communications with the vehicles OBDII system. The other is a proprietary ZOLL CAN bus.

## VCAN:

HD15 (Male), Vehicle CAN

## ZCAN: ZOLL CAN

DB9 (Female), ZOLL CAN

## VEHICLE DYNAMICS

A GPS receiver and accelerometer are incorporated to measure vehicle movement and safe operation.

### GPS:

- Continuous Multiple Satellite WAAS Enabled Receiver
- Minimum Receiver Sensitivity -185dbW
- Acquisition time: 1s all data known; 38s ephemeris unknown; 45s no data; <2s Reacquisition.
- < 15 Meters Accuracy with GPS Standard Positioning Service, Velocity .1 knot RMS.
- < 3 Meters Accuracy with DGPS (WAAS)
- 999 knot, 3g Dynamics

### ACCELEROMETER:

- 3 Axis
- $\pm 1.5g, \pm 3g, \pm 6g, \pm 12g$

## INPUTS/ OUTPUTS

### DIGITAL I/O

The RS-4000 incorporates 16 single ended digital Inputs, 6 differential digital Inputs, 1 analog input, and 2 digital outputs.

### SINGLE ENDED INPUTS:

16 single ended inputs are available referencing 0 VDC common.

- Input Voltage for Logic 1: 8-18VDC: Absolute Maximum: 40 Volts.
- Maximum Input Voltage for Logic 0: 0.75 VDC.
- Maximum Input Voltage for Logic 1: 5.0 VDC.

### DIFFERENTIAL INPUTS:

6 optically isolated differential inputs are available that allow inputs from a floating common. The input is on when the difference between the two inputs is greater than 1.5 Volts and off when they are less than 1 Volt.

- Voltage Differential: 5-18VDC, Absolute Maximum: 24 Volts.
- Maximum Differential Input Voltage for Logic 0: 0.75 VDC.
- Minimum Differential Input Voltage for Logic 1: 5.0 VDC.

### HIGH SPEED INPUTS:

2 high speed digital inputs are used to measure Vehicle Speed and Engine RPM.

- Input Voltage for Logic 1: 8-18VDC: Absolute Maximum: 40 VDC.
- Maximum Differential Input Voltage for Logic 0: 0.75 VDC.
- Minimum Differential Input Voltage for Logic 1: 5.0 VDC.

**DIGITAL OUTPUTS:**

2 optically isolated digital (switched vehicle voltage) outputs available that use a 0 VDC common.

- Maximum Current: 1 Amp

**AUDIO:**

2 audio connections are incorporated. The output is used to give the driver audible warnings. The input (microphone) is not currently used, but may be incorporated in future enhancements.

- 1x Audio Out
- 1x Audio In

**MISCELLANEOUS:**

- Operating Power (Ignition On): ..... 8-18 VDC @ 25 Watts Maximum
- Standby Power (Ignition Off): ..... 8-18 VDC @ 0.18 Watts Maximum
- Maximum Input Voltage: ..... 18 VDC
- Dimensions: ..... 9.652 x 8.068 x 2.815 in., 204.95 x 245.17 x 71.5mm
- Mass: ..... 4.56 lbs., 2.07 Kg
- Operating Temperature: ..... 14 to 176°F, -10 to 80°C
- Storage Temperature: ..... -40 to 196°F, -40 to 90°C
- Shock Operating: ..... 30g Peak Acceleration, 11(±1ms) Pulse Width
- Shock Not Operating: ..... 30g Peak Acceleration, 11(±1ms) Pulse Width
- Vibration: ..... Tested 5g @ 1-500Hz per IEC 68-2-6

**RS-4000 & DIGITAL ALLY INTEGRATION**

The Digital Ally video recording system (DVM-250/250+) is an in-vehicle audio/video recording system that can be tightly integrated with the Road Safety system. Tying the two systems together will provide Road Safety the ability to trigger recordings based upon the violations it detects.

If possible, the installation of the DVM-250/250+ camera(s) should be done simultaneously with the RS-4000 installations. Running cables and making connections for both devices is obviously easier and more efficient if preformed at the same time rather than bringing the vehicles in for service twice for similar work.





The **Digital Ally system is an optional add-on to the Road Safety system**. If it is being installed in conjunction with the Road Safety, please see Appendix E for additional information on its setup and configuration.

**NOTE:** A detailed set of installation/integration instructions can be found in [APPENDIX E](#) of this document.

## HARDWARE IDENTIFICATION AND INVENTORY SHEET

**IMPORTANT:** Upon delivery of the RS-400 equipment, the shipment should be inspected for completeness and condition. Any shortage or damage should be documented and immediately reported to the ZOLL support team at 1-800-663-3911 or [support@zoll.com](mailto:support@zoll.com)








 <p><b>RS-3211-R Driver ID Receptacle</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-3212-6 Driver ID Tags (Base System Package of 6)</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-3910 Seatbelt Sensor</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-4000 Main Road Safety In-Vehicle Device</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-4101 Power/Audio Harness</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-4102 Digital I/O Pigtail</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-4103 Standard Digital Harness</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-4107 OBDII Adapter Cable</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-4111 Fuse Kit</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-4120 12 Ft Ethernet Cable</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

 <p>RS-0202 WiFi Antenna</p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>		 <p>RS-4203 GPS Antenna</p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p>RS-4301 Speaker</p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>		 <p>RS-4902 Unsafe Reverse Spotter Switch Kit</p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>



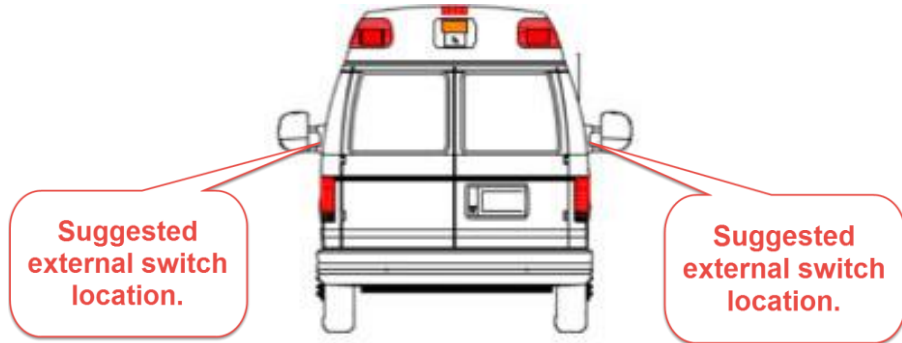
Additional optional items listed on the following page.

OPTIONAL ITEMS THAT CAN BE PURCHASED FROM ZOLL BY THE AGENCY

 <p><b>RS-2213 Driver ID Programmer Kit</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-3212-25 Driver ID Tags (Package of 25)</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-3144 Sprinter Harness</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-4105 Standard I/O Harness</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-4106 Mercedes Sprinter DLC Extension</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <p><b>RS-DVM250B Digital Ally 250 - 2 Camera Event Data Recorder Bundle</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p><b>RS-DVM250PB Digital Ally 250+ 3 Camera Event Data Recorder Bundle</b></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>		

## COMPONENT LOCATIONS AND CONNECTIVITY OVERVIEW

**NOTE:** See Appendix A at the end of this document for a one-page version of the component locations and system overview diagram.



### RS-4902 – SPOTTER SWITCHES:

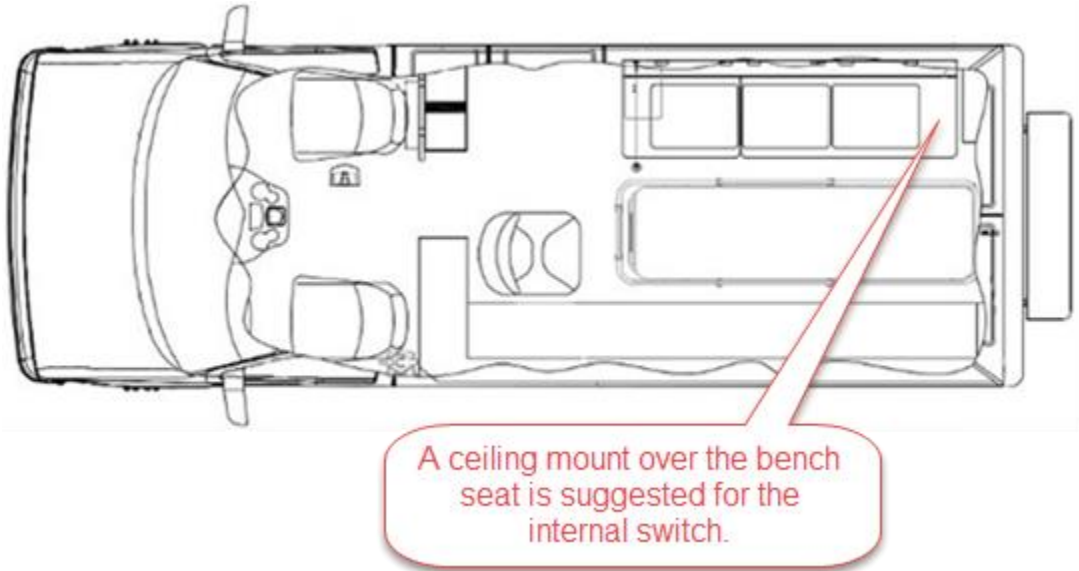
When pressed by the vehicle spotter or ground guide, a tone alerts the driver that it is safe to back up the vehicle.

One switch mounted on the rear overhead panel with a clear sight line out the rear window, and one switch mounted outside the vehicle near the left or right taillight assembly depending on agency policy.

**NOTE:** Switches should be placed in similar positions on all vehicles in the fleet to assist the crew.

Typical wire harness routing is through the center overhead or outboard exterior light voids.

Connects to: RS-4000 On-Board Computer via the Standard Digital Harness. See Appendix C for wiring assignments.

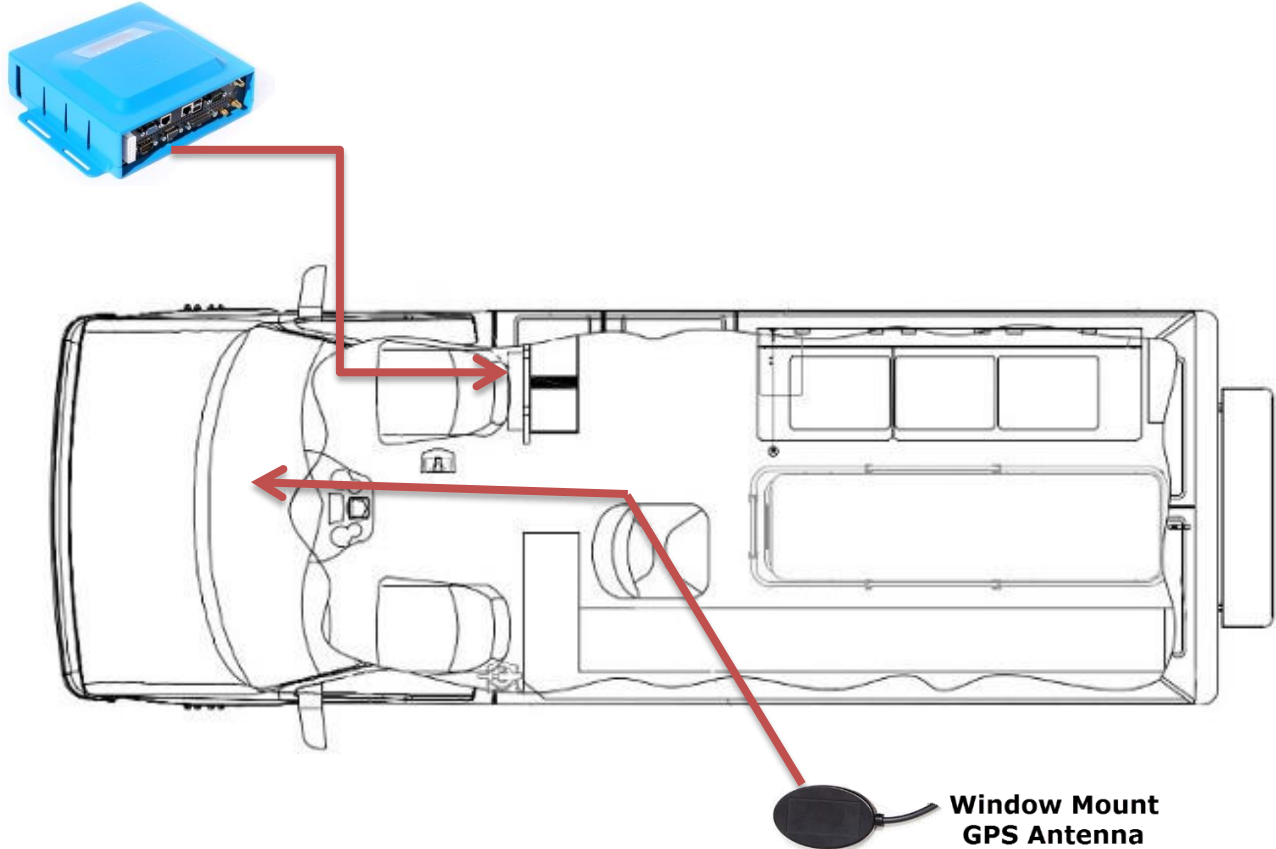




## RS-4000 - ON-BOARD COMPUTER

Records and stores event information. The on-board computer is the main control unit for inputs, outputs, and driver communication.

- Bulkhead mounting. The unit may be mounted in any of 24 three dimensional positions. See Appendix B for positions and their associated Orientation Index Number.
- Acceptable Mounting Location- In the equipment cabinet if there is enough clearance and the harness will reach, somewhere behind one of the seats or directly on the bulkhead. The location must be within the OEM imposed length limit for the OBDII/CAN cable of 16 feet (4.87 meters).
- \*Extensions to the cable are not recommended or supported by ZOLL. DO NOT modify the cable



## RS-4202 – WINDOW MOUNT GPS ANTENNA

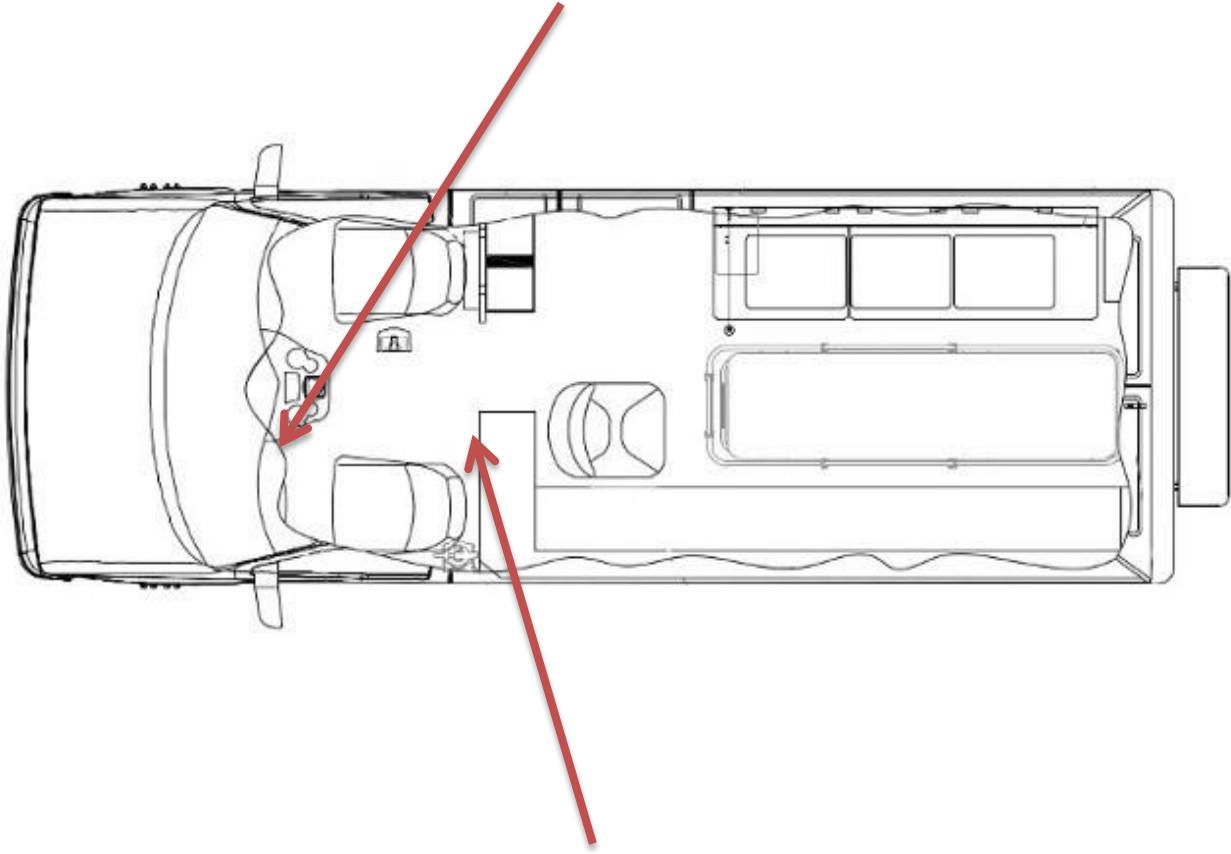
Determine the installation location of the antenna on the windshield or dashboard. Keep in mind that the GPS antenna cannot "see" through metal. Unobstructed line of sight is required. The GPS antenna should not be placed near any physical obstruction like the "A" pillar, rearview mirror, or a 2-way communication antenna. Always install the antenna as high on the glass as possible if mounting on the windshield. Do not mount the antenna to a metallic surface.

- **NOTE:** Do not place the antenna where it may interfere with the driver's vision. Some states prohibit mounting anything on the windshield that may obstruct the driver's vision.

## RS-3211-1 - DRIVER ID RECEPTACLE

Used to read assigned Driver ID tags that associate a driver to the vehicle for reporting purposes.

- Typical Mounting Location - Driver's side dash in close proximity to the ignition switch.
- **NOTE:** The panel should not be greater than 3/16" (4.76mm) thick and have sufficient room behind it to fit without interference. A 13/16" hole is required.
- Connects to: RS-4000 On-Board Computer via the Standard Digital harness.



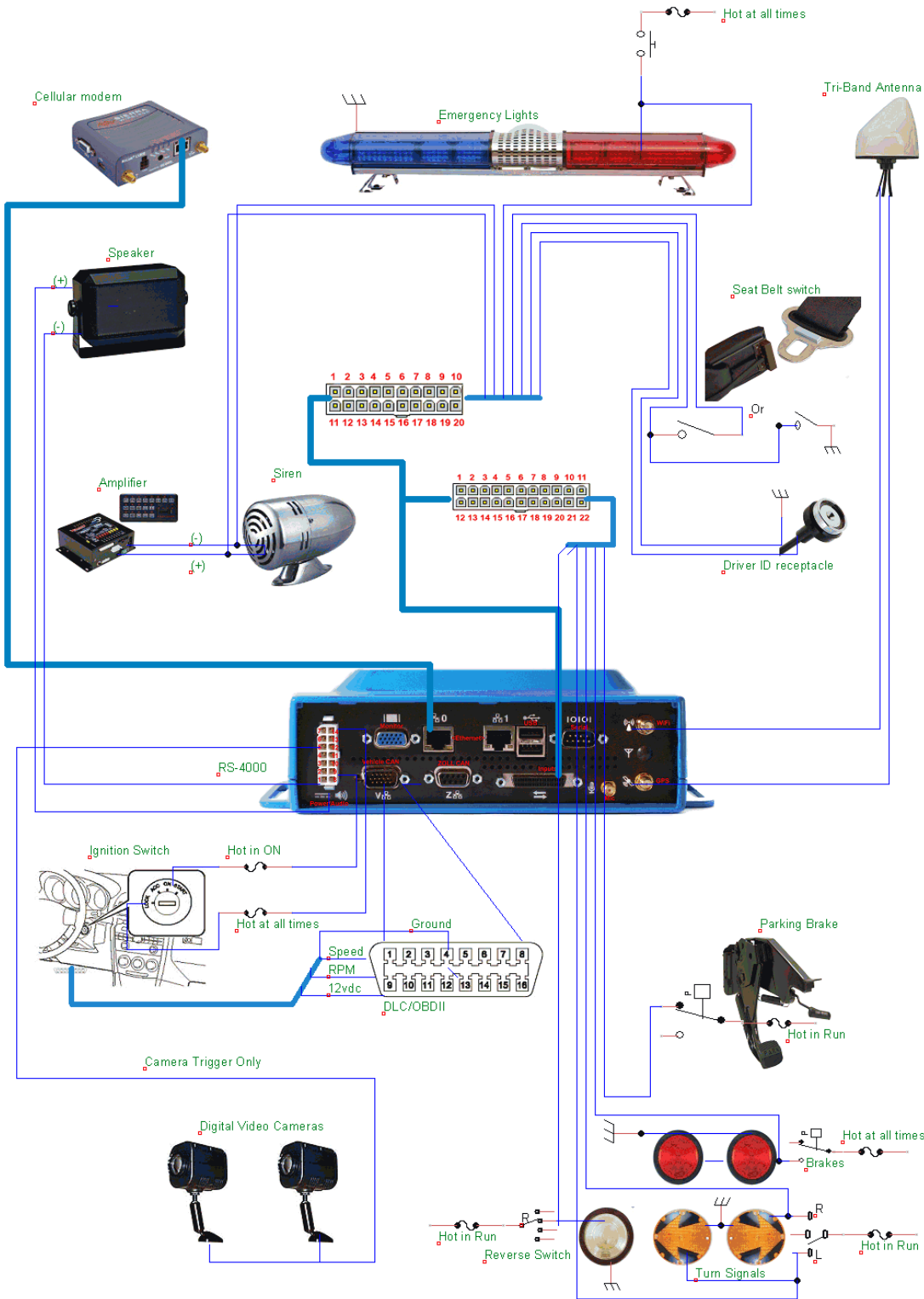
## RS-4301 - AUDIO SPEAKER

Source of audible feedback including warning and violation tones.

- Typical Mounting Location- Driver's side headliner or bulkhead.
- **NOTE:** Mounting the speaker in other locations further from the driver creates the need for higher volume settings.
- Connects to: RS-4000 On-Board Computer via the Power/Audio harness.

## CONNECTIVITY OVERVIEW

See Appendix C for wiring assignments.



## ZOLL ONLINE PREREQUISITES

As noted early on in this document the physical installation of the RS-4000 device and the proper configuration of ZOLL Online are equally important. With this being the case, although it is possible to begin the physical installation of the RS-4000 prior to completing the ZOLL Online setup/configuration, there is a **HARD STOP** that should be observed prior to completing the installation.

**If the vehicle being installed has not been completely setup in ZOLL Online the install SHOULD NOT proceed past STEP 17: CONNECTING DIGITAL OUTPUTS.**

Each agency must have a tenant account configured in ZOLL Online. Customers using multiple ZOLL Online applications will use the tenant already in use for their other products. It is not the responsibility of the vehicle installer to build and configure the customer's ZOLL Online tenant account but the active account name must be determined as the RS-4000 serial numbers are pre-configured into that tenant. If the customer does not know the tenant name, call ZOLL Support at 1-800-663-3911 option 9 to have Road Safety support assist in determining the tenant name.

Administrative access to ZOLL Online **MUST** be granted to the installer or the customer with appropriate account privileges (administrative) must be available to assist in the ZOLL Online configuration portion of the Road Safety installation.

**NOTE:** A detailed set of instructions on the ZOLL Online setup and configuration can be found in [APPENDIX D](#) of this document.

## HARDWARE INSTALLATION

Two installers can perform the installation efficiently by following the below work flow/

### STEP 1: VEHICLE INSPECTION

Complete a thorough interior and exterior inspection of the vehicle with the customer using the Vehicle Inspection Diagram (Form 1) and the ZOLL Road Safety Vehicle Inspection Form (Form 2). Before starting the installation, identify and document any damage or inoperable systems, and notify the responsible party. You can find forms 1 and 2 in the back of this document.

ROAD SAFETY  
**ZOLL**

Customer: \_\_\_\_\_ Date: \_\_\_\_\_

Vehicle: \_\_\_\_\_ Year: \_\_\_\_\_ Make: \_\_\_\_\_ Model: \_\_\_\_\_

**Damage Key**

B-Bent	C-Cracked	D- Dent
DR-Dirty	L-Loose	M- Missing
R-Ripped	S-Scratch	ST-Stained

Notes: \_\_\_\_\_

**ZOLL** Road Safety  
Vehicle Inspection Form

Customer: \_\_\_\_\_ Vehicle #: \_\_\_\_\_ Year: \_\_\_\_\_ Make: \_\_\_\_\_  
 Model: \_\_\_\_\_ VIN: \_\_\_\_\_ Starting Mileage: \_\_\_\_\_ Date: \_\_\_\_\_

Pre-Installation Inspection		Installation Inspection	
Area Inspected (See Vehicle Diagram)	Damage yes/no	Describe Damage or Condition	Damage yes/no
Exterior Front	<input type="checkbox"/>		<input type="checkbox"/>
Exterior Drivers Side	<input type="checkbox"/>		<input type="checkbox"/>
Exterior Rear/Roof	<input type="checkbox"/>		<input type="checkbox"/>
Exterior Passenger	<input type="checkbox"/>		<input type="checkbox"/>
Seats/Belts	<input type="checkbox"/>		<input type="checkbox"/>
Dash/Door Panels	<input type="checkbox"/>		<input type="checkbox"/>
Headliner	<input type="checkbox"/>		<input type="checkbox"/>
Flooring	<input type="checkbox"/>		<input type="checkbox"/>
*Other	<input type="checkbox"/>		<input type="checkbox"/>
Vehicle Systems	Normal yes/no	Describe Abnormal Operation or Condition	Normal yes/no
Interior OEM Lights	<input type="checkbox"/>		<input type="checkbox"/>
Horn/OEM Radio	<input type="checkbox"/>		<input type="checkbox"/>
Emg. Lights/Siren	<input type="checkbox"/>		<input type="checkbox"/>
Emg. Radios/P.A.	<input type="checkbox"/>		<input type="checkbox"/>
Vehicle Starts	<input type="checkbox"/>		<input type="checkbox"/>
Warning Lts OFF	<input type="checkbox"/>		<input type="checkbox"/>
Head Lights	<input type="checkbox"/>		<input type="checkbox"/>
Turn Sig/Flashers	<input type="checkbox"/>		<input type="checkbox"/>
Brake/Rev. Lights	<input type="checkbox"/>		<input type="checkbox"/>
*Other	<input type="checkbox"/>		<input type="checkbox"/>

ZOLL Inspector (Signature) \_\_\_\_\_ ZOLL Inspector (Signature) \_\_\_\_\_  
 Customer (Signature) \_\_\_\_\_ Customer (Signature) \_\_\_\_\_

Notes/Comments: \_\_\_\_\_



## STEP 2: IDENTIFY COMPONENT INSTALLATION LOCATIONS

Identify vehicle connection points and plan the wire harness routing. Remove access panels as needed. Keep in mind the length of the harnesses when planning the mounting locations.

## STEP 3: MOUNT THE RS-4000 ON-BOARD COMPUTER IN THE VEHICLE

Mounting the On-Board Computer on a bulkhead or in the equipment cabinet within the 16 foot (4.87 meters) OBDII harness length is preferred to help protect the On-Board Computer from potential tampering and accidental spills. If mounting in the equipment cabinet or on the bulkhead is not possible, mounting it under the driver's or passenger seat is an acceptable alternative if space allows. \*Do not mount the RS-4000 on a door or other moveable surface.

**NOTE:** Avoid locations where tampering, excessive heat, moisture, or electromagnetic fields could interfere with or damage the unit. **The OEM imposed length limit for the OBDII/CAN cable is 16 feet (4.87 meters).** Extensions to the cable are not recommended or supported by ZOLL. **DO NOT modify this cable.**

1. If you are going to mount the On-Board Computer under a seat, ZOLL recommends that you remove it for easier access, and verify adequate clearance.  
Ensure that you disconnect all wiring from the seat per the manufacturer's recommendations before removing from it from the vehicle.  
  
Ensure that you have clearance on the connector side to allow you to connect the wire harnesses and associated cabling. Trial fit the RS-4000 On-Board Computer in its location prior to drilling.

**NOTE:** Prior to drilling through the floor or other mounting surface, check for clearance below, above, or behind to ensure nothing will be damaged by drilling or by the mounting screws in all seat positions.

2. Secure but do not fully tighten the unit until you have checked to see if it is level and square.
3. Once square and level, tighten, but do not over-tighten the four mounting screws as the mounting tabs may break. Use appropriately sized flat washers to help prevent breaking the tabs. Tighten only enough to prevent the box from moving.

## STEP 4: PREPARE HARNESES FOR LOOMING AND APPROPRIATE ROUTING

Locate and identify the connection points for the seatbelt, brakes, reverse, parking brake, turn signals, lights and siren, and camera controller (if used). Prepare the wire harnesses by adding protective loom and routing to the connection points on the driver's side dash and to other areas of the vehicle. See **Appendix C** and Form 3 Build Sheet for wiring assignments and possible connection locations.

Make sure the wires do not interfere with moving parts, contact sharp edges and are long enough to reach the wire connection point without stress.

**NOTE:** Unused wires may be cut off to approximately 12-18" (30-45cm) and taped off individually for future use and to facilitate an orderly build of the remaining wires into one harness.

### RS-4101 Power/Audio Harness



**NOTE:** Locations for battery power, ground, ignition, and speaker connections made to this harness vary by vehicle. Refer to your Sample Install Form (Form 3) or applicable OEM schematic diagram.

**Typical Routing** -Separate the speaker wires which will route aft to above and behind the driver's seat.

See **Page 42** and Form 3 Build Sheet for wiring assignments.



## RS-4103 Standard I/O Harness



**NOTE:** You may have received a newer version of these harnesses where all the input wiring is located on one harness. In this case the expansion harness will not be used and does not need to be connected. The harness can be given to the customer to store for future use if required.

**Typical Routing** – Wiring for the brake and parking brake digital inputs may route with the Power/Driver ID, and the Speed /RPM OBDII/CAN Harness wiring. The input for seatbelt will usually route behind the driver’s seat to wiring in the door trim panel area, or to the seatbelt buckle area if the RS-3910 seat belt sensor is used as required by certain vehicles.

See **Page 42** and Form 3 Build Sheet for wiring assignments.

**NOTE:** Locations for accessories connecting to the digital channels vary by device. Refer to your Build Sheet (Form 3) or applicable OEM schematic diagram or instructions. The digital inputs monitor the presence or absence of voltage and should be connected at a point in the circuit that goes from low to high voltage when turned on and off. This “Polarity” should be noted for use in configuring ZOLL Online.



## RS-4107 OBDII Adapter



**NOTE:** The vehicle Speed and RPM signals are obtained through the OBDII/CAN connection.

1. Locate and identify the vehicles OBDII port (driver's side dash) and unbolt the connector.
2. Mount the connector end of the ZOLL OBDII Harness in its place and connect the vehicle's port to the matching receptacle on the ZOLL OBDII cable. Secure all wiring to prevent interference with vehicle foot controls or any other moving components under the dash.

**Typical Routing** – Connect inline to the vehicle DLC connector. Route the harness through the dash, through center console or floor trim panel to the RS-4000 location. Connect to the V CAN port on the RS-4000. **Do not extend or modify this cable** to exceed the OEM 16' (4.87m) maximum length.

## STEP 5: MOUNT THE RS-4301 AUDIO SPEAKER

The RS-4301 Audio Speaker delivers audible feedback tones to the driver so they can adjust their driving style to remain within agency safe driving guidelines.

**Typical mounting location** - On the driver's side headliner or bulkhead near the driver's head so it may be easily heard.



**NOTE:** Mounting the speaker on the passenger side or near the floor will decrease the effectiveness of the tones to the driver and may increase the likelihood of the unit being tampered with. *(Speaker volume is not adjustable by the driver and must be done through ZOLL Online)*

1. Check for clearance behind the panel for the screws that will secure the speaker.
2. Mark the location for the two mounting holes and the speaker wire access hole.
3. Using a 3/16" drill bit, drill the hole for speaker wire access and for the 2 mounting screws.
4. Pass the speaker wires through the access hole, and using two 8-32 machine screws and nuts, or if the panel is metal #10 self-tapping screws (Included) and securely mount the speaker to the panel.
5. Connect the speaker wires from the RS-401 Power/Audio Harness to the speaker connections. Connect the ribbed wire to (-) and the non-ribbed to (+) on the speaker.

## STEP 6: MOUNT THE RS-3211-1 DRIVER ID RECEPTACLE

The RS-3211-1 Driver ID Receptacle reads driver ID tags that associate a driver to the vehicle for reporting purposes.

**Typical mounting locations** – On the dash in close proximity of the ignition switch. Placement should allow the driver to reach it easily when sitting in the driver's seat.

**NOTE:** The panel should not be greater than 3/16" (4.76mm) thick and have sufficient room behind it for the back end of the receiver and wiring to fit without interference.



**On dash near ignition switch**

Drill a hole through the panel at the chosen location using a 13/16" or 20mm drill bit. See Appendix C and Form 3 Build Sheet for wiring assignments.

1. Feed the wires into the hole and through the mounting nut until the receiver is seated fully into the panel.
2. Pass the wires through a 15/16" or 24mm deep socket, position socket onto the nut and hand tighten only.
3. Connect the wires from the receiver to RS-4105 Expansion harness wires.

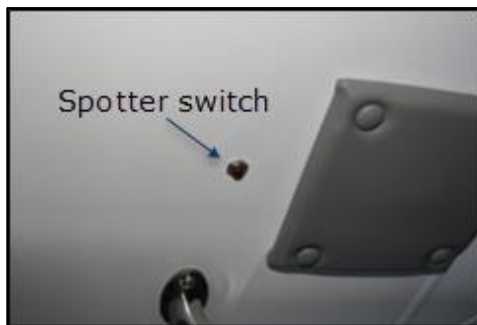
## STEP 7: MOUNT THE SPOTTER SWITCHES (RS-4902 KIT)

**NOTE:** If spotter switches are not going to be installed, connect the spotter wire to the reverse input wire to prevent unwanted spotter violations from occurring.

When pressed by the vehicle spotter, a tone alerts the driver that it is safe to back up the vehicle.

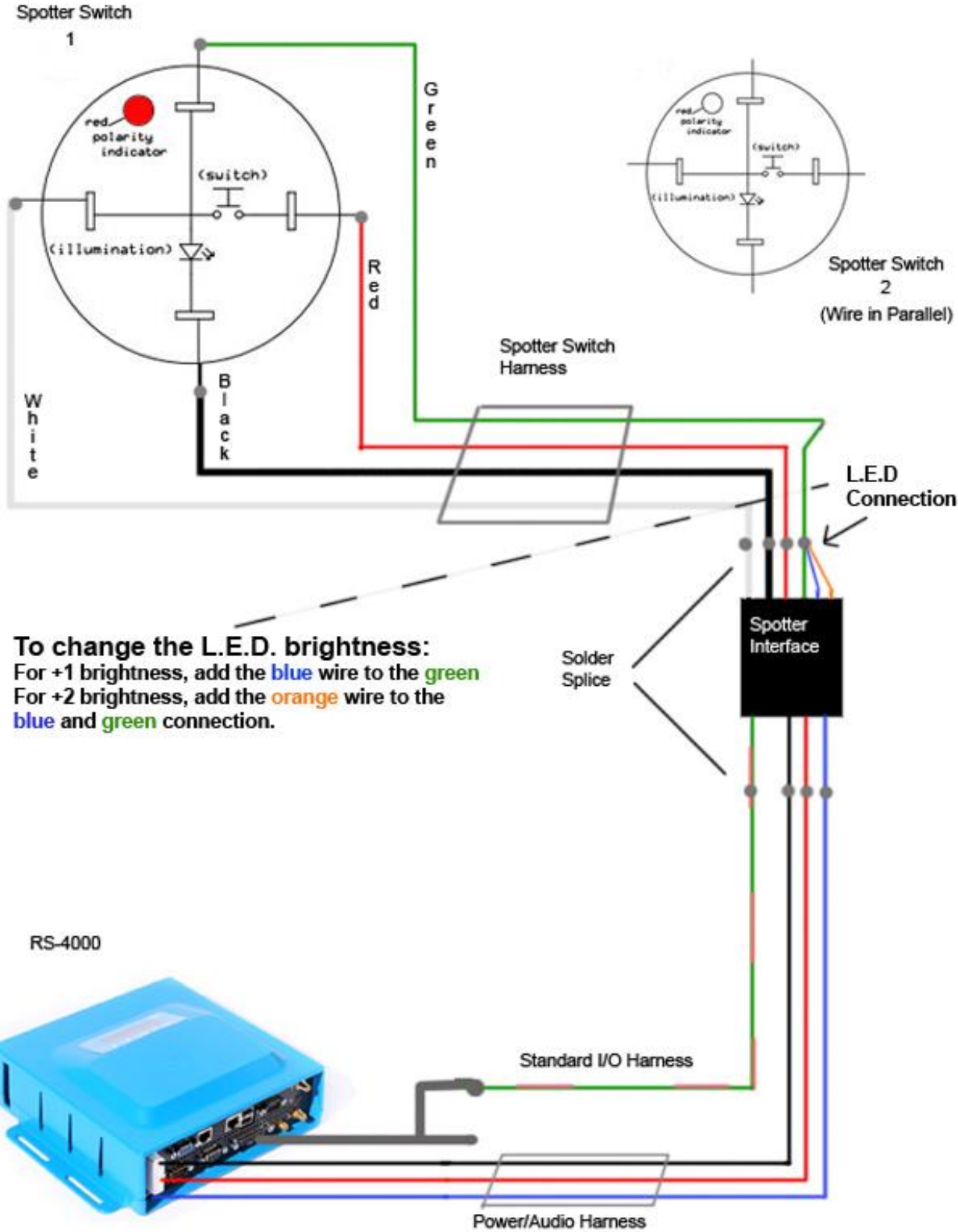
**Typical mounting locations** - One switch mounted to the overhead panel near the rear doors allowing a clear sight line out the rear window, and one switch mounted on the outside of the vehicle on the left or right rear corner per customer's preference.

Typical routing for the switch wiring is from the RS-4000 On-Board Computer out of the forward cab through the overhead panel of the patient compartment to the interior switch location. Continue routing to the rear door header, across to the corner on the driver or passenger side, then down to the exterior switch location.



1. Remove one of the interior light assemblies or access panels nearest the desired interior switch location in the patient compartment overhead to check for clearance prior to drilling the 5/8" diameter hole for the interior switch and to make the wiring connections.
2. After making connections to the switch, insert the switch into the hole and tighten the nut to hold the switch in place.
3. Remove the tail light assembly to check for clearance prior to drilling the 5/8" diameter hole and to make wiring connections to the exterior switch. \*Note: The switch mounts from the outside.
4. Some installations of the exterior switch leave very little room between the switch contacts and the metal body. Applying RTV Silicone to cover the switch contacts will help prevent them from contacting the body and causing a short circuit. Electrical tape alone may not be sufficient due to excessive vibration.

**NOTE:** Effort should be made to have the switches placed in the same relative position throughout the entire fleet of similar vehicle types to assist the crew in locating them.



Spotter Switch Connectivity

## STEP 8: CONNECTING THE SEATBELT INPUT

RS-3910- Seatbelt Sensor is used in vehicles when their seatbelt monitoring circuit does not provide a useable signal to the RS-4000 On-Board Computer.

1. If you are using the vehicle's factory wiring: go to step 7-3
2. If you are using the RS-3910 Seatbelt Sensor: go to step 7-4
3. Locate and access the driver's seat belt wiring. Location varies by vehicle; refer to your Build Sheet (Form 3) and Appendix C.
4. The switch should be installed on the seatbelt latch assembly using two part epoxy (JB Weld-Quick). This part remains stationary and is usually secured to the floor or seat.
5. The actuator magnet is installed on the buckle itself using two part epoxy (JB Weld Quick). Both devices are installed facing the occupant of the seat.



6. When the seatbelt is fastened, the magnet should be no further than 1in (25mm) from the switch. It may be closer than 1" (25mm) but make sure the devices do not interfere with the locking or releasing of the seatbelt assembly.



7. After the JB Weld Quick epoxy has begun to narden the switch assembly may be covered with neat shrink tubing that surrounds the switch and latch assembly protecting it from damage.
8. See Appendix C and Form 3 Build Sheet for wiring assignments.

## STEP 9: MOUNT THE RS-4202 WINDOW MOUNT GPS ANTENNA

The GPS antenna allows for the acquisition and communication of the vehicles physical location to the RS-4000 and eventually the ZOLL Online system.

1. Determine the installation location of the antenna on the windshield or dashboard. Keep in mind that the GPS antenna cannot "see" through metal. Unobstructed line of sight is required. The GPS antenna should not be placed near any physical obstruction like the "A" pillar, rearview mirror, or a 2-way communication antenna. Always install the antenna as high on the glass as possible if mounting on the windshield. Do not mount the antenna to a metallic surface.

**NOTE:** RF Reception is prone to electromagnetic interference when mounted in the interior of the vehicle. Do not place the antenna on the dashboard or rear deck if:

- A wired windshield defroster exists
- A metallic window tint is installed
- The window is any type of solar reflective composite
- A windshield mounted radio antenna is already in place

**CAUTION** - Do not place the antenna where it may interfere with the driver's vision. Some states prohibit mounting anything on the windshield that may obstruct the driver's vision.

2. Test fit the antenna on the selected area prior to mounting the antenna using the adhesive foam tape. Ensure there is sufficient length to route the antenna lead to the RS-4000. Make sure that the mounting surface is clean and free of debris and any imbedded obstructions such as antenna wires, defroster wires, heavy tinting, etc. An alcohol wipe may be used on the mounting surface to remove any dirt or oils which may prevent proper adhesion of the adhesive foam tape.

**CAUTION** - The adhesive tape is very strong and will bond instantly on the mounting surface. Once the antenna is placed on the surface, it cannot be moved easily without damage.

3. Remove the release liner and carefully position the adhesive foam tape to the antenna. Place the antenna on the mounting surface and apply even pressure to allow the foam tape to conform to the windshield curvature or dashboard. 50% of the bond strength is achieved after 20 minutes. Avoid contact with the antenna for a minimum of 20 minutes after initial installation.





### STEP 10: CONNECTING TURN SIGNAL INPUTS

Locate the White/Brown wire in the input harness used for monitoring the left turn input. Locate the White/Yellow wire in the input harness used for monitoring the right turn input. Determine your location for making these connections in the vehicle. Typically they can be found on the BCM, or under the driver's side dash in the steering column wiring. If provided, refer to your build sheet for a suggested location. Always verify and test the function of the wire before making permanent connections.

Once located, test and verify the connection points provide the required voltage, note the polarity, and annotate your build sheet with the location and color of the wires used for use later in ZOLL Online. Route the White/Brown and White/Yellow wires safely using wire loom if needed to their connection points and solder splice the connections. Tape the splice and secure the wiring.

### STEP 11: CONNECTING THE REVERSE INPUT

Locate the Green/Black wire in the input harness used for monitoring the reverse input. Determine your location for making this connection in the vehicle. Typically it may be found on the BCM, or under the driver's side dash in the steering column wiring. If provided, refer to your build sheet for a suggested location.

Once located, test and verify the connection point provides the required voltage, note the polarity, and annotate your build sheet with the location and color of the wire used for use later in ZOLL Online. Route the Green/Black wire safely using wire loom if needed to its connection point and solder splice the connection. Tape the splice and secure the wiring.

### STEP 12: CONNECTING THE PARKING BRAKE INPUT

Locate the Green/Tan wire in the input harness used for monitoring the reverse input. Determine your location for making this connection in the vehicle. Typically it may be found on the BCM, or under the driver's side dash behind the parking brake assembly itself. If provided, refer to your build sheet for a suggested location.

Once located, test and verify the connection point provides the required voltage, note the polarity, and annotate your build sheet with the location and color of the wire used for use later in ZOLL Online. Route the Green/Tan wire safely using wire loom if needed to its connection point and solder splice the connection. Tape the splice and secure the wiring.

### STEP 13: CONNECTING EMERGENCY LIGHTS INPUT

Locate the Green/Grey wire in the input harness used for monitoring the emergency light input. Determine your location for making this connection in the vehicle. Typically it may be found on the lights control panel, electrical cabinet, or at the light itself. Do not connect to L.E.D. or strobe lights as the voltage may exceed the RS-4000's voltage input rating. If provided, refer to your build sheet for a suggested location.

Once located, test and verify the connection point provides the required voltage, note the polarity, and annotate your build sheet with the location and color of the wire used for use later in ZOLL Online. Route the Green/Grey wire safely using wire loom if needed to its connection point and solder splice the connection. Tape the splice and secure the wiring.

### STEP 14: CONNECTING SIREN INPUTS

Locate the Brown/Yellow wire in the input harness used for monitoring the siren (+) input. Locate the Grey/Yellow wire in the input harness used for monitoring the siren (-) turn input. Determine your location for making these



connections in the vehicle. Typically they can be found on the amplifier and are labeled speaker output +,-. If provided, refer to your build sheet for a suggested location.

Once located, test and verify the connection points, note the polarity, and annotate your build sheet with the location and color of the wires used for use later in ZOLL Online. Route the Brown/Yellow and Grey/Yellow wires safely using wire loom if needed to their connection points and solder splice the connections. Tape the splice and secure the wiring.

## STEP 15: CONNECTING THE POWER AND GROUND INPUTS

The RS-4000 requires two +12vdc power sources, one connected to a constant +12vdc source, and one ignition switched +12vdc source. Both must be fuse protected with a 5amp fuse at the point of connection to protect the vehicle wiring should a short develop.

Locate the solid Red wire in the power/audio harness used for the +12vdc constant input. Locate the solid Blue wire in the power harness used for the ignition switched +12vdc input. Determine your location for making these connections in the vehicle. Typically they can be found under the steering column in the ignition switch area. If provided, refer to your build sheet for a suggested location.

Once located, test and verify the connection points, note the polarity, and annotate your build sheet with the location and color of the wires used. Route the Red and Blue wires safely using wire loom if needed to their connection points and Inline splice a fuse holder on the end of the Red and the Blue wire before solder splicing the connections. Tape the splices and secure the wiring.

**Caution:** Do not connect any Road Safety ground connections to any existing vehicle connections. The exception would be a connection to a ground lug or ground bus.

## STEP 16: CONNECTING THE CHASSIS GROUNDS

Locate the solid Black wires in the input and power harnesses. These are used for providing the system grounds. Do not splice into other circuit grounds, find a suitable location, connect the ends of the black wires together, crimp a terminal lug on to them, and using a self-tapping screw and star washer, connect to the vehicle chassis. Typically this can be done in close proximity to the RS-4000 mounting location, or under either the passenger or driver's seat. If provided, refer to your build sheet for a suggested location. Route the Black wires safely using wire loom if needed.

**Caution:** Do not connect any Road Safety ground connections to any existing vehicle connections. The exception would be a connection to a ground lug or ground bus.

## STEP 17: CONNECTING DIGITAL OUTPUTS

Locate the solid Yellow wire in the input harness used for output one. Locate the solid Orange wire in the input harness used for output 2. Determine which output will be used for your device and determine a path to its location in the vehicle. Follow the manufacturer's recommendations for connecting to the device. See [APPEEDIX E](#) for information on connecting a Digital Ally camera system.

Once run and connected, annotate your build sheet with the location and color of the wires used for use later in ZOLL Online. Route the Yellow and Orange wires safely using wire loom if needed to their connection points and solder splice the connections, or as recommended by the manufacturer. Tape the splice and secure the wiring.

**NOTE:** Digital Outputs are optional. Generally they're only necessary if another third party device (such as Digital Ally cameras) require them.

## STEP 18: CONNECTING A CELLULAR MODEM OR WI-FI

The preferred method of connectivity for the RS-4000 is via an Ethernet cable to your vehicle's on-board cellular modem. The RS-4000 may also be configured to download via Wi-Fi when in range of your Wi-Fi access point, such as in the vehicle parking area or service area. Wi-Fi connectivity limits the real time functionality of the system and data will only be available for viewing in ZOLL Online upon completion of a download while the vehicle is connected to the access point.

### ETHERNET CONNECTION

To connect the RS-4000 to the vehicle's cellular modem, route an Ethernet cable from the RS-4000's Ethernet port "0" to an available Ethernet port on the cellular modem.

### WI-FI CONNECTION

To configure the RS-4000 to download via Wi-Fi, there are two methods that can be used. The preferred method is through the UIB as it is done from the screen and input keys on the RS-4000 itself.

#### Configuration via the UIB:

To enter the UIB menu:

Vehicle ignition to **ON** Wait until **VERSION** shows in display



1. Push and hold the **RIGHT ARROW**
2. Push and hold the **UP ARROW**
3. Release the **RIGHT ARROW**
4. Push and hold the **ENTER BUTTON**
5. Release the **UP ARROW**
6. Release the **ENTER BUTTON**

**Main Menu** is displayed

Menu Options:

- |                                 |                                     |                               |
|---------------------------------|-------------------------------------|-------------------------------|
| <b>Option 1</b> – Wi-Fi Connect | <b>Option 5</b> - Firmware Download | <b>Option 9</b> -Serial #     |
| <b>Option 2</b> – Select VID    | <b>Option 6</b> - Software Download | <b>Option 10</b> -Diagnostics |
| <b>Option 3</b> – Save Config   | <b>Option 7</b> - SxS Viewing       | <b>Option 11</b> -Calibration |
| <b>Option 4</b> – Set Defaults  | <b>Option 8</b> - Event Viewer      | <b>Option 12</b> - Exit       |

7. Select **Option 1 Wi-Fi Connect** from the main menu.
8. Using the up and down arrows, scroll through the available SSIDs until the network you wish to connect to is shown.
9. Press **ENTER** to select that network.
10. Using the arrow keys, enter the password. (symbols, numbers, and upper/lowercase letters are available, just continue to scroll in one direction or the other until the appropriate letter, number, or symbol is displayed, press ENTER to select)
11. Save your changes:
  - a. From **MAIN MENU** press **DOWN ARROW** to Option **3 - SAVE CONFIGURATION**

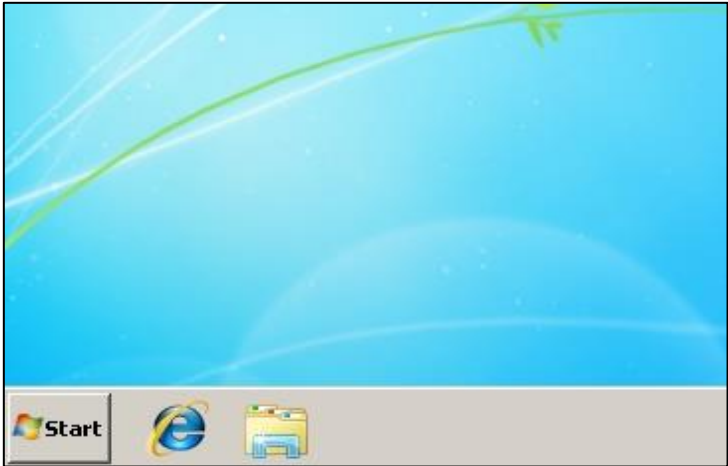


- b. Press **ENTER**, then **ENTER** again. **CONFIG SAVING** is displayed
- c. Press ENTER, then UP ARROW to EXIT, option 12, Press ENTER
- d. When Version is displayed, power the vehicle off.

**To configure using a monitor, mouse, and keyboard:**

1. Place the vehicle within range of your Wi-Fi access point, where you will normally plan to have the downloads take place.
2. Connect a USB keyboard, a USB mouse, and a VGA monitor to the two USB ports and the VGA connector on the back of the RS-4000. If the vehicle has been shut down for more than 90 seconds, restart the vehicle to bring the RS-4000 out of hibernation. A Windows desktop should be present or will appear after the RS-4000 boots up.

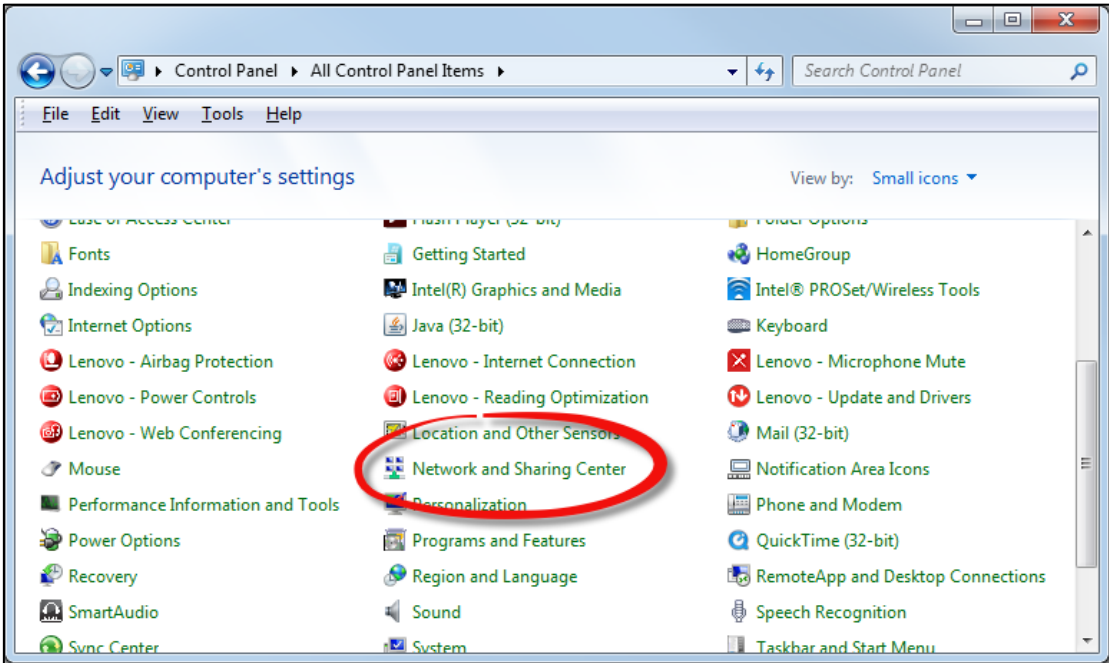
3. Click the **START** button in the lower right corner of the screen.



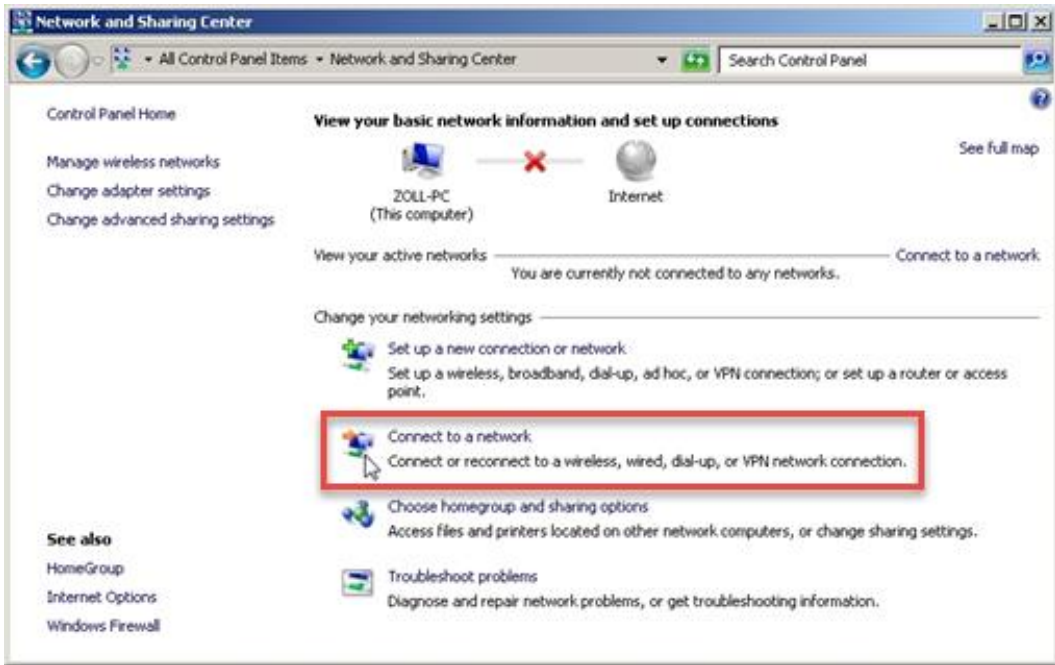
4. Click on **CONTROL PANEL**



5. Click on **NETWORK AND SHARING CENTER**



6. Click on **CONNECT TO A NETWORK**



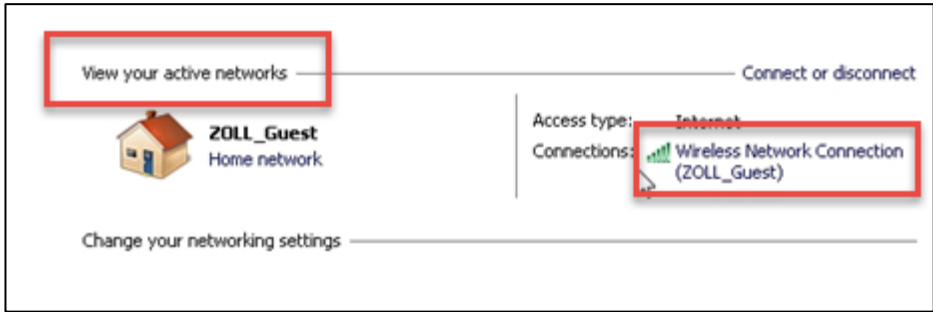
- 7. Find the name of your access point and select it. Note the SSID on your SAMPLE INSTALLATION FORM for future reference.



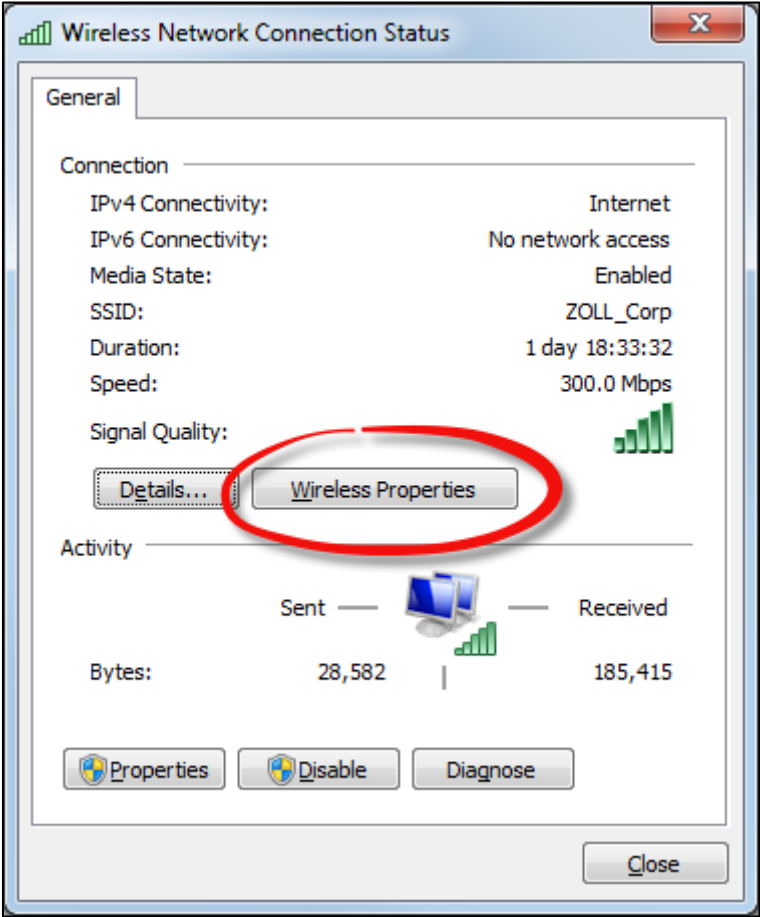
- 8. Enter the network security key for the selected network, and then click OK.



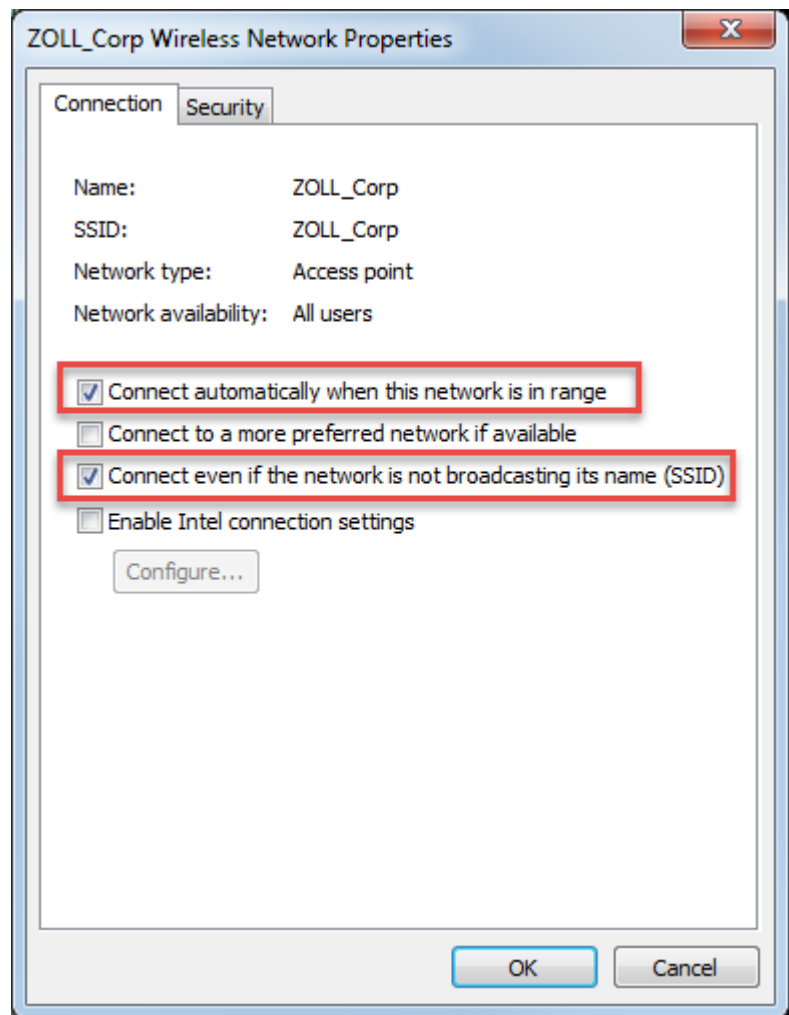
- 9. From the **NETWORK AND SHARING CENTER** screen, click on your connection in the **VIEW YOUR ACTIVE NETWORK** portion of the screen.



10. Click on the **WIRELESS PROPERTIES** button.



11. If not already checked, check the **CONNECT AUTOMATICALLY WHEN THIS NETWORK IS IN RANGE** box, and the **CONNECT EVEN IF THE NETWORK IS NOT BROADCASTING ITS NAME (SSID)**. Then click OK.
12. Test your connectivity by opening Internet Explorer and navigating to a web page such as <http://www.zolldata.com/>
13. If your settings are correct the ZOLL Data webpage or whatever web page you entered should be displayed in the browser.
14. If you cannot display a web page, recheck your settings.
15. Once successful, close all open windows on the R-S4000 desktop, disconnect the monitor, keyboard, and mouse. Connectivity setup is complete.





## STEP 19: COMPLETING THE INSTALLATION

Before you can put the RS-4000 On-Board Computer into service, it will first need to have all inputs tested using the Diagnostic Viewer.

### CONNECTING THE DIAGNOSTIC VIEWER

The diagnostic viewer will be used to check the status of the RS-4000 installation and verify input events are recording normally.

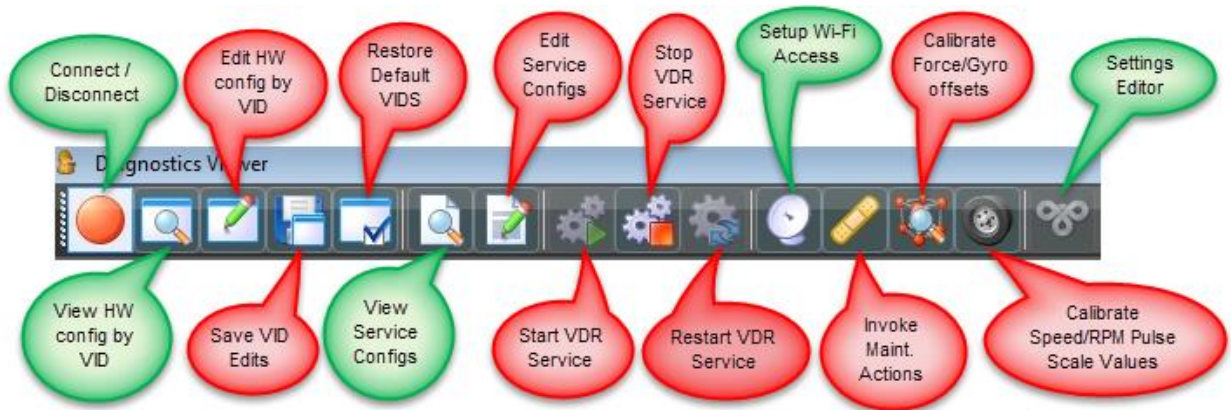
The laptop you are using must be on the same subnet as the RS-4000 for the viewer to connect to the RS-4000. The vehicle should be in one of the following conditions:

- If the cellular modem broadcasts an SSID, obtain the password and connect to it.
- If the RS-4000 is connected to a cellular modem without an SSID and the modem has more than one Ethernet port, connect your laptop to the open Ethernet port.
- If the RS-4000 is connected to a cellular modem without an SSID and there is only one Ethernet port, connect the Ethernet cable from that port to a port on a switch, connect via Ethernet the RS-4000 to the switch, and lastly connect your laptop via Ethernet to the switch.
- If the RS-4000 has to connect to the station's Wi-Fi, you will have to configure the RS-4000 to connect to the Wi-Fi first using option 1 on the UIB menu, and then connect your laptop to the same Wi-Fi access point.

### DIAGNOSTIC VIEWER MENU OPTIONS

Options in **GREEN** below can be used with little or no harm to the system.

Options in **RED** should only be used when directed by ZOLL Support.

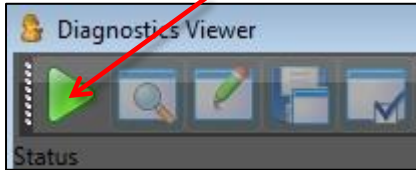


**NOTE:** The RS-4000 must maintain internet connectivity to receive the settings and configuration data from ZOLL Online during testing.

## TESTING

With the vehicle running, open the Diagnostic Viewer and connect to the RS-4000. As you should be on the same subnet, the diagnostic viewer should auto connect. If multiple vehicles are online, select the I.P. address of the vehicle you wish to view.

1. Click the CONNECT/DISCONNECT icon from the menu bar.



2. Once connected check the status of the following (top to bottom):
  - a. Version matches version displayed on the RS-4000 screen.
  - b. Settings Downloaded
  - c. Settings Applied
  - d. GPS Available
  - e. Send Cache Size
  - f. DAQ Port Status
  - g. Send to Server
  - h. ZOLL Online Connected
  - i. SxS Port Status
  - j. UIB Port Status
  - k. Tenant Key
  - l. Vehicle Key
  - m. Serial Number **\*must match serial number on the sticker\* contact ZOLL if mismatched.**
  - n. WAN Connectivity
  - o. WAN Connectivity
  - p. ZOLL RescueNet Road Safety Running

There are four possible statuses: blue, green, yellow and red.



= Reporting Data



= Status Good




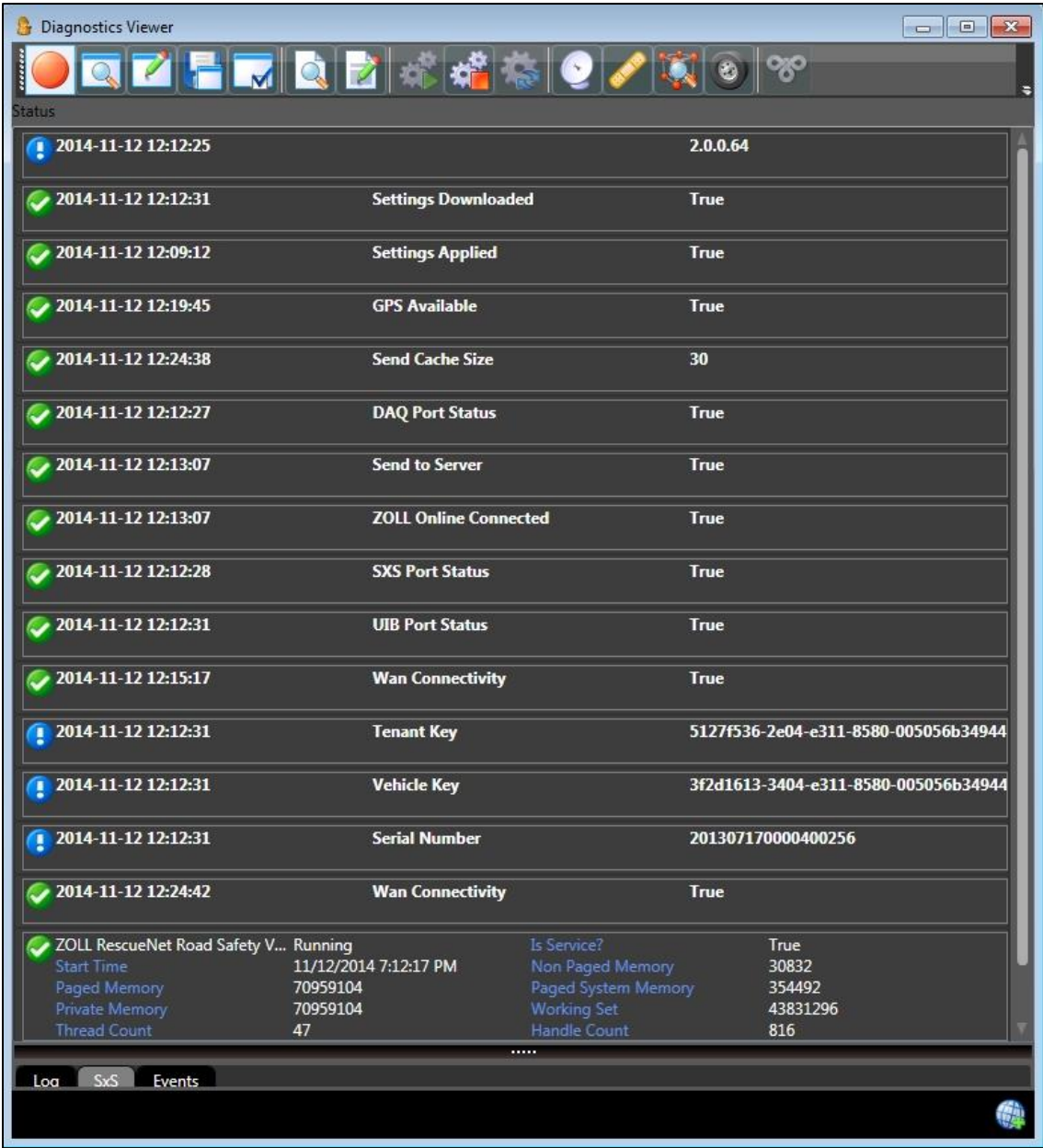
= Attention



= Status bad

**A "Red – Status bad" indicates a problem that will need to be corrected.**

Sample screen shot with all items in the GREEN. Note the items with the  are just versions, keys, or serial numbers and cannot be modified.



Timestamp	Item Name	Value	
2014-11-12 12:12:25		2.0.0.64	
2014-11-12 12:12:31	Settings Downloaded	True	
2014-11-12 12:09:12	Settings Applied	True	
2014-11-12 12:19:45	GPS Available	True	
2014-11-12 12:24:38	Send Cache Size	30	
2014-11-12 12:12:27	DAQ Port Status	True	
2014-11-12 12:13:07	Send to Server	True	
2014-11-12 12:13:07	ZOLL Online Connected	True	
2014-11-12 12:12:28	SXS Port Status	True	
2014-11-12 12:12:31	UIB Port Status	True	
2014-11-12 12:15:17	Wan Connectivity	True	
2014-11-12 12:12:31	Tenant Key	5127f536-2e04-e311-8580-005056b34944	
2014-11-12 12:12:31	Vehicle Key	3f2d1613-3404-e311-8580-005056b34944	
2014-11-12 12:12:31	Serial Number	201307170000400256	
2014-11-12 12:24:42	Wan Connectivity	True	
ZOLL RescueNet Road Safety V... Running			
Start Time	11/12/2014 7:12:17 PM	Is Service?	True
Paged Memory	70959104	Non Paged Memory	30832
Private Memory	70959104	Paged System Memory	354492
Thread Count	47	Working Set	43831296
		Handle Count	816

*\*Screen shot the above and the event tab after cycling through all inputs. And include with the documentation sent to ZOLL. Label the vehicle name on the screen shot.*

3. Once you have checked the statuses are normal, the inputs will need to be verified.
  - a. Click on the EVENT TAB
  - b. Engage each input (Left Turn, Right Turn, Brake, etc.) and note the corresponding ACTIVATE entry when ON, and the corresponding DEACTIVATE when turned OFF.

Timestamp	Message Type	DriverId	Start Odometer	Data
11/14/2014 11:39:48 PM	LeftTurnSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:LEFT TURN SWITCH ACTIVATED EVENT
11/14/2014 11:39:59 PM	LeftTurnSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:LEFT TURN SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:06 PM	RightTurnSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:RIGHT TURN SWITCH ACTIVATED EVENT
11/14/2014 11:40:12 PM	RightTurnSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:RIGHT TURN SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:24 PM	BrakeSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:BRAKE SWITCH ACTIVATED EVENT
11/14/2014 11:40:25 PM	BrakeSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:BRAKE SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:31 PM	SpotterSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:SPOTTER SWITCH ACTIVATED EVENT
11/14/2014 11:40:32 PM	SpotterSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:SPOTTER SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:38 PM	ReverseSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:REVERSE SWITCH ACTIVATED EVENT
11/14/2014 11:40:39 PM	ReverseSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:REVERSE SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:44 PM	EmergencyLightsSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:EMERGENCY LIGHTS SWITCH ACTIVATED EVENT
11/14/2014 11:40:47 PM	EmergencyLightsSwitchDeActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:EMERGENCY LIGHTS SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:48 PM	SeatbeltSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	0	:SEATBELT SWITCH DE-ACTIVATED EVENT
11/14/2014 11:40:49 PM	SeatbeltSwitchActivatedEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	:SEATBELT SWITCH ACTIVATED EVENT
11/14/2014 11:41:09 PM	DriverLogoutEvent	ddd9706d-341f-e411-96e4-005056a84483	0	66000006C9F4F501:Driver Logout
11/14/2014 11:41:09 PM	DriverLoginEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	66000006C9F4F501:Driver Login
11/14/2014 11:41:15 PM	DriverLogoutEvent	ddd9706d-341f-e411-96e4-005056a84483	0	0000000000000000:Driver Logout
11/14/2014 11:41:18 PM	DriverLoginEvent	ddd9706d-341f-e411-96e4-005056a84483	1011.982	66000006C9F4F501:Driver Login

- c. Any inputs that appear reversed should have their polarity checked in ZOLL Online and corrected as needed until you get the appropriate ACTIVATE and DEACTIVATE event to match the actual condition in the EVENT tab.

## CALIBRATION

After verifying through the Diagnostic Viewer that the settings from ZOLL Online have downloaded and been applied, the RS-4000 accelerometer and gyro must be calibrated to prevent erroneous force measurements from being created.

1. Ensure the vehicle is on a flat and level surface.
2. Calibrate the unit using option 11 on the UIB.
3. SAVE CONFIGURATION option 3 before exiting the UIB.

## ZOLL ONLINE SETUP OF THE RS-4000 ON-BOARD COMPUTER

Assigning the RS-4000 serial number to a vehicle and configuration of the RS-4000 through ZOLL Online will normally be completed by ZOLL. For customers self-installing the RS-4000 follow the steps below.

1. Log in to ZOLL Online and configure steps 6-18. This will allow you to set up a **vehicle name, vehicle class, audible tones, orientation index number, and calibration settings.**
2. If you have not yet created your ZOLL Online account perform steps
3. When completed with ZOLL Online, ask an employee of the company for permission to move the vehicle or assist in a short road test to verify assignments are working correctly.

## TEST DRIVE AND FINAL CHECK WITH ZOLL ONLINE

Have the customer test drive the vehicle and ride along with the driver to verify that the appropriate tones are present if used. (Login, Reverse (spotter switch), Seatbelt, Over force, and Over speed if safe to do so.)

If the vehicle was configured to communicate via the vehicle's cellular modem, data will be visible in ZOLL Online REPORTS after uploading is complete.

If the vehicle was configured for Wi-Fi downloads, return the vehicle to the download area so the RS-4000 can connect and begin downloading before checking ZOLL Online REPORTS for data. See [APPENDIX E, Page 72](#).

## REQUIRED DOCUMENTATION

As part of a ZOLL Certified installation, forms 1-4 are required to be completed and submitted to ZOLL Support for inclusion in the account records.

**Form 1, Vehicle Damage Inspection Form** - Document any areas where damage or an unusual condition exists, and should be reflected on form 2, the vehicle inspection form. Bringing these items to the attention of the responsible customer representative before work begins helps protect the installer against potential claims after the install, and may be unknown to the customer's management. Any exception to not completing this form in the presence of the customer must be agreed upon prior to beginning work. Such an agreement may be approved during the pre-deployment scope call, upon arrival at the customer's installation location, or similar, and any documentation of the agreement should be in writing.



**Form 2, Vehicle Inspection Form** - To be used in conjunction with Form 1, the vehicle inspection diagram, both before starting work, and again upon completion. This will help prevent installers spending time attempting to troubleshoot and repair conditions that were pre-existing, and identify vehicle systems that may have been impacted during the install and will need to be corrected before turnover to the customer.



**Form 3, Build Sheet** - is to be used to document wiring locations and specific wires used during the installation. Submission of this form helps ZOLL build a database of known good connections for future use, and for assisting installers in the field in need of connection information.



**Form 4, Post Installation Verification Worksheet** - is to be used before, during, and upon completion of the installation to help prevent the installers from missing any of the critical steps along the way and to show the customer that the vehicle is complete and operating normally. Anything not able to be completed such as road testing the vehicle should be annotated in the notes section describing the reason.



**Form 5, Serial Number Assignment Form** - is used to document installed serial numbers for use in ZOLL Online setup and for archiving after being sent to Road Safety support upon completion.



These five forms will should be completed for each vehicle and shall be returned either by mail, fax, or scanned and emailed to ZOLL Support using one of the following:

**Email:** [support@zoll.com](mailto:support@zoll.com)

**Fax:** 303-801-0001

**USPS:** ZOLL Road Safety, 11802 Ridge Pkwy Suite 400, Broomfield, CO 80021



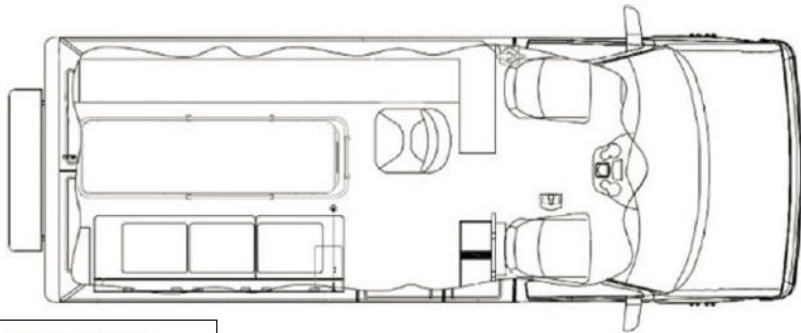
## FORM 1: VEHICLE INSPECTION DIAGRAM

### ZOLL® Road Safety Vehicle Damage Inspection Form

Customer: \_\_\_\_\_ Date: \_\_\_\_\_

Vehicle: \_\_\_\_\_ Year: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_



Damage Key:	
B – Bent	S – Scratch
DR – Dirty	D – Dent
R – Ripped	M – Missing
C – Cracked	ST – Stained
L – Loose	

Notes:



FORM 2: VEHICLE INSPECTION FORM

## ZOLL Road Safety Vehicle Inspection Form

Customer:	Vehicle #:	Year:	Make:
Model:	VIN:	Starting Mileage:	Date:

<b>Pre-Installation Inspection</b>	<b>Post Installation Inspection</b>
------------------------------------	-------------------------------------

Area Inspected (See Vehicle Diagram)	Damage yes/no		Describe Damage or Condition	Damage yes/no	
Exterior Front	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Exterior Drivers Side	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Exterior Rear/Roof	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Exterior Passenger	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Seats/Belts	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Dash/Door Panels	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Headliner	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Flooring	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
*Other	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Vehicle Systems	Normal yes/no		Describe Abnormal Operation or Condition	Normal yes/no	
Interior OEM Lights	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Horn/OEM Radio	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Emg. Lights/Siren	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Emg. Radios/P.A.	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Vehicle Starts	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Warning Lts OFF	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Head Lights	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Turn Sig/Flashers	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
Brake/Rev. Lights	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>
*Other	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>

ZOLL Inspector (Signature)	ZOLL Inspector (Signature)
Customer (Signature)	Customer (Signature)

Notes/Comments:



ZOLL Documentation



FORM 3: BUILD SHEET

## ZOLL® Road Safety RS4000 Build Sheet

Make:	Year:	Model:	Customer:
-------	-------	--------	-----------

Is the vehicle pre-wired?	If yes, are all ports connected correctly?
---------------------------	--

**RS4101 POWER HARNESS CONNECTIONS**

Function	RS Wire Color	Vehicle Wire Color	Connection Location
Power 1	Red		
Power 2	Red/white		To Spotter
Ignition	Blue		
Ground	Black	n/a	Chassis Ground
Speaker Wires	Black	n/a	Connected to Audio Speaker (ribbed=neg)
Driver ID +	Blue/yellow		White or grey (new style) on Driver ID Receiver
Driver ID -	Blue/black		Brown or black (new style) on Driver ID Receiver

**RS4103 STANDARD DIGITAL HARNESS**

Function	Digital Input	RS Wire Color	Vehicle Wire Color	Polarity		Connection Location
				+	-	
Left Turn	7	White/Brown				
Right Turn	8	White/Yellow				
Brakes	9	Green/Red				
Spotter Switches	10	Green/Pink				
Reverse	11	Green/Black				
Parking Brake	12	Green/Tan				
Seatbelt +	20	Brown/Red				
Seatbelt -		Grey/Red				
Siren +	21	Brown/Yellow				
Siren -		Grey/Yellow				
Emerg. Lights	13	Green/Grey				

**SPEED AND RPM LOCATIONS**

OBDII Connection		Connect RS4107 OBDII ADAPTER CABLE to OEM DLC connector for Vehicle SPEED and Engine RPM	
High Speed Digital	Function	Vehicle Wire Color	Connection Location
	Speed (Light Green)		
	RPM (Dark Green)		



## FORM 4: POST INSTALLATION VERIFICATION WORKSHEET

### ZOLL Road Safety Post Installation Verification

Company Name: \_\_\_\_\_

Vehicle: \_\_\_\_\_

Date: \_\_\_\_\_

NOTES:

ZOLL Online Configuration	
ZOLL Online Tenant Name	_____
User Accounts in place?	_____
Devices Available in Tenant?	Yes <input type="radio"/> No <input type="radio"/> Other <input type="radio"/>
ZO Vehicle Name	_____
Added to ZO Group Name?	_____
Device Added to Vehicle?	Yes <input type="radio"/> No <input type="radio"/> Other <input type="radio"/>
Inputs configured?	Yes <input type="radio"/> No <input type="radio"/> Other <input type="radio"/>
Alerts Defined?	Yes <input type="radio"/> No <input type="radio"/> Other <input type="radio"/>

Installation Milestones		
Completed by (initials)	Installer	Customer
Onsite hardware Inventory		
Installation overview with Customer		
Pre-Installation Inspection (form 1&2)		
Hardware Installation completed		
Orientation determined and set in ZO		
Device Calibration performed		
Input Events Verified	Activate	Deactivate
Driver log in	<input type="checkbox"/>	<input type="checkbox"/>
Driver log out	<input type="checkbox"/>	<input type="checkbox"/>
Left Turn	<input type="checkbox"/>	<input type="checkbox"/>
Right Turn	<input type="checkbox"/>	<input type="checkbox"/>
Foot Brake	<input type="checkbox"/>	<input type="checkbox"/>
Spotter	<input type="checkbox"/>	<input type="checkbox"/>
Reverse	<input type="checkbox"/>	<input type="checkbox"/>
Parking brake	<input type="checkbox"/>	<input type="checkbox"/>
Emergency lights	<input type="checkbox"/>	<input type="checkbox"/>
Seatbelt	<input type="checkbox"/>	<input type="checkbox"/>
Siren	<input type="checkbox"/>	<input type="checkbox"/>
Post Installation Inspection Form 2	<input type="checkbox"/>	<input type="checkbox"/>

Alarm Testing and ZOLL		
Online Data Verification	Y	N
Driver Log in Prompt	<input type="checkbox"/>	<input type="checkbox"/>
Driver Log in Tone	<input type="checkbox"/>	<input type="checkbox"/>
Spotter Tone	<input type="checkbox"/>	<input type="checkbox"/>
Spotter Violation	<input type="checkbox"/>	<input type="checkbox"/>
Seatbelt Violation	<input type="checkbox"/>	<input type="checkbox"/>
Over Force Violation	<input type="checkbox"/>	<input type="checkbox"/>
High Over Force	<input type="checkbox"/>	<input type="checkbox"/>
Over Speed – NE	<input type="checkbox"/>	<input type="checkbox"/>
High Over Speed – NE	<input type="checkbox"/>	<input type="checkbox"/>
Over Speed – E	<input type="checkbox"/>	<input type="checkbox"/>
High Over Speed - E	<input type="checkbox"/>	<input type="checkbox"/>
Triggers Tested	<input type="checkbox"/>	<input type="checkbox"/>
Above Data in SAFETY	<input type="checkbox"/>	<input type="checkbox"/>
Above Data in RUN	<input type="checkbox"/>	<input type="checkbox"/>
Run in Daily	<input type="checkbox"/>	<input type="checkbox"/>
Time in Engine Idle	<input type="checkbox"/>	<input type="checkbox"/>
End Mileage:		

Installation Complete:

Installer (print name): \_\_\_\_\_

Signature: \_\_\_\_\_

Customer (print name): \_\_\_\_\_

Signature: \_\_\_\_\_

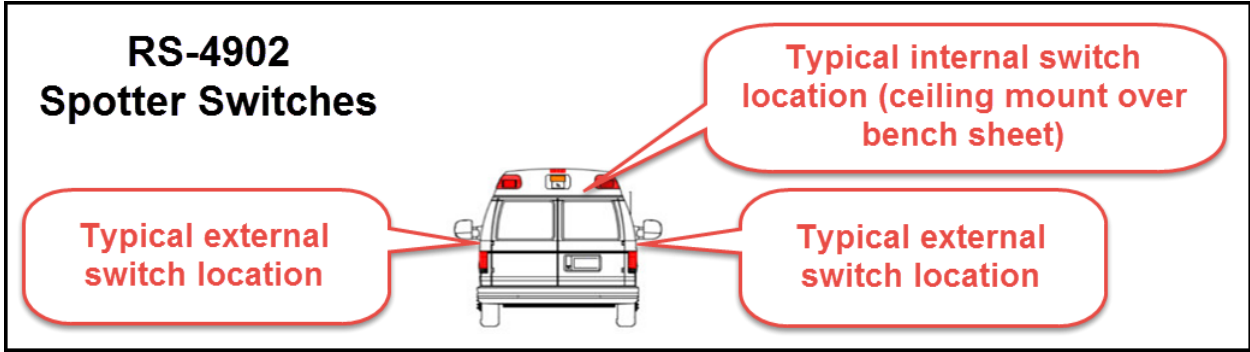


FORM 5: SERIAL NUMBER ASSIGNMENT FORM

ZOLL Road Safety		Customer:			
Serial Number Assignment Form		Implementation:			
Vehicle Number	Installed Serial Number	Date	Removed Serial Number	Date	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
<b>Notes / Comments</b>					
Return shipping method:					
Tracking numbers:					



## APPENDIX A: PRINTABLE COMPONENT LOCATIONS DIAGRAM



### RS-4902 Spotter Switches

Typical internal switch location (ceiling mount over bench sheet)

Typical external switch location

Typical external switch location

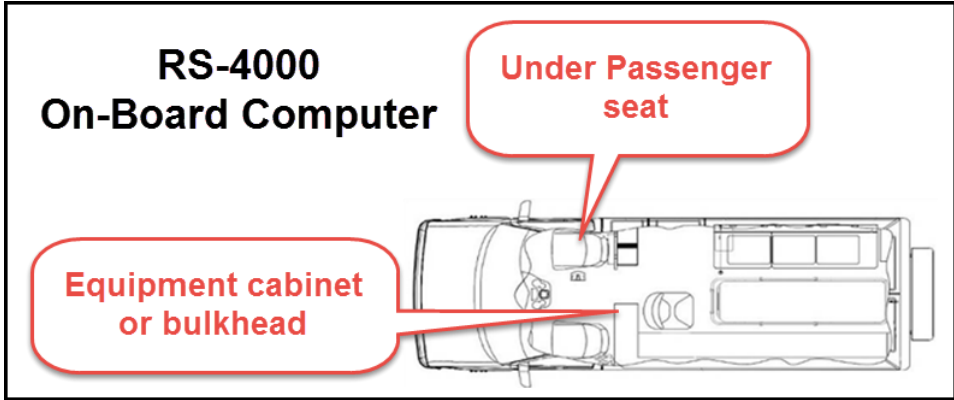
**RS-4902 - Spotter Switches:** When pressed, a tone alerts the driver that it is safe to back up the vehicle.

**Typical Mounting Location:** One switch mounted on the rear overhead panel with a clear sight line out the rear window, and one switch mounted outside the vehicle near the left or right taillight assembly depending on agency policy.

**NOTE:** Place all switches in similar positions on all fleet vehicles to assist the crew.

Typical wire harness routing is through the center overhead or outboard exterior light voids.

**Connects to:** RS-4001 On-Board Computer via **Digital I/O harness.**



### RS-4000 On-Board Computer

Under Passenger seat

Equipment cabinet or bulkhead

**RS-4000 On-Board Computer:** Records and stores vehicle event information. It is the main control unit for inputs, outputs, and communication.

**Preferred Mounting Location:** Equipment cabinet or bulkhead to help reduce tampering and other damage.

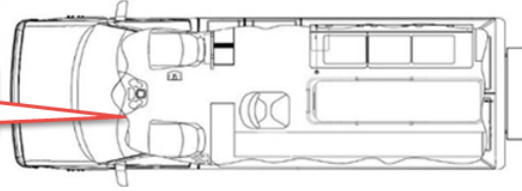
**Acceptable Mounting Location:** Under passenger seat. This area is more susceptible to damage by tampering and environmental hazards.

**NOTE:** Location should be within 16 feet of the driver's side dashboard. There is an OEM limit of 16 feet for the OBDII/CAN Harness.



## RS-3211 Driver ID Receptacle

Close to the  
ignition switch



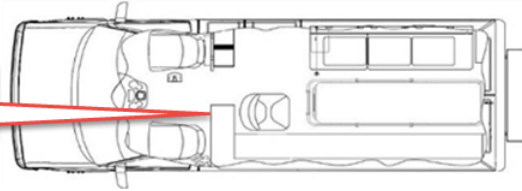
**RS-3211-1 Driver ID Receptacle:** Used to read assigned Driver ID tags that associate a driver to the vehicle for reporting purposes.

**Typical Mounting Location-** Driver's side dash in close proximity to the ignition switch.

**NOTE:** The panel should not be greater than 3/16" thick and have sufficient room behind it to fit without interference. **Connects to:** On-Board Computer Plug 16 Pin 1 and 9.

## RS-4301 Audio Speaker

Headliner or  
Bulkhead



**RS-4301 Audio Speaker:** Source of audible feedback including warning and violation tones.

**Typical Mounting Location-** Driver's side headliner or bulkhead.

**NOTE:** Mounting the speaker in other locations further from the driver greatly reduces effectiveness as its volume is limited. **Connects to:** On-Board Computer via Power/Audio Harness.



## APPENDIX B: ORIENTATION INDEX





The RS-4000 On-Board Computer can be mounted in any of 24 unique positions. When configuring the unit in ZOLL Online, refer to the chart below and images following to determine the appropriate **Orientation Index Number** to use for your installation. When mounting the unit, ensure it is level, (perpendicular or vertical) and either parallel or square to the centerline of the vehicle.

Orientation Index	Engraved ZOLL Logo Facing	Connectors Facing
1	Up	Front
2	Up	Rear
3	Up	Left
4	Up	Right
5	Down	Front
6	Down	Rear
7	Down	Left
8	Down	Right
9	Front	Up
10	Front	Down
11	Front	Left
12	Front	Right
13	Rear	Up
14	Rear	Down
15	Rear	Left
16	Rear	Right
17	Left	Up
18	Left	Down
19	Left	Front
20	Left	Rear
21	Right	Up
22	Right	Down
23	Right	Front
24	Right	Rear



## ORIENTATION INDEX 1-4

The On-Board Computer's mounting tabs are on the bottom, and parallel to the floor, ZOLL logo and screen facing up. The ambulance is shown as a reference to how the RS-4000 would be mounted inside the vehicle.

<p><b>Orientation 1</b> (default) - ZOLL logo UP, connectors facing FRONT.</p>  A blue rectangular device is shown next to a toy ambulance. The device's top surface is facing up, displaying the ZOLL logo and a screen. The front edge of the device has several vertical slots for connectors.	<p><b>Orientation 2</b> - ZOLL logo UP, connectors facing REAR.</p>  A blue rectangular device is shown next to a toy ambulance. The device's top surface is facing up, displaying the ZOLL logo and a screen. The rear edge of the device has several vertical slots for connectors.
<p><b>Orientation 3</b> - ZOLL logo UP, connectors facing LEFT.</p>  A blue rectangular device is shown next to a toy ambulance. The device's top surface is facing up, displaying the ZOLL logo and a screen. The left side of the device has several vertical slots for connectors.	<p><b>Orientation 4</b> - ZOLL logo UP, connectors facing RIGHT.</p>  A blue rectangular device is shown next to a toy ambulance. The device's top surface is facing up, displaying the ZOLL logo and a screen. The right side of the device has several vertical slots for connectors.



## ORIENTATION INDEX 5-8

The On-Board Computer's mounting tabs are on top, and parallel to the floor, ZOLL logo and screen facing down (mounted under a shelf).

**Orientation 5** - ZOLL logo DOWN, connectors facing FRONT.



**Orientation 6** - ZOLL logo DOWN, connectors facing REAR.



**Orientation 7** - ZOLL logo DOWN, connectors facing LEFT.



**Orientation 8** - ZOLL logo DOWN, connectors facing RIGHT.





## ORIENTATION INDEX 9-12

The On-Board Computer is mounted vertically, perpendicular to the floor, ZOLL logo and screen facing forward (wall mounted).

**Orientation 9** - ZOLL logo FRONT, connectors facing UP.



**Orientation 10** - ZOLL logo FRONT, connectors facing DOWN.



**Orientation 11** - ZOLL logo FRONT, connectors facing LEFT.



**Orientation 12** - ZOLL logo FRONT, connectors facing RIGHT.



## ORIENTATION INDEX 13-16

The On-Board Computer is mounted vertically, perpendicular to the floor, ZOLL logo and screen facing rearward (wall mounted).

**Orientation 13** - ZOLL logo facing REAR., connectors facing UP.



**Orientation 14** - ZOLL logo facing REAR., connectors facing DOWN.



**Orientation 15** - ZOLL logo facing REAR., connectors facing LEFT.



**Orientation 16** - ZOLL logo facing REAR., connectors facing RIGHT.



## ORIENTATION INDEX 17-20

The On-Board Computer is mounted vertically, perpendicular to the floor, ZOLL logo and screen facing left (right wall mounted).

**Orientation 17** - ZOLL logo facing LEFT, connectors facing UP.



**Orientation 18** - ZOLL logo facing LEFT, connectors facing DOWN.



**Orientation 19** - ZOLL logo facing LEFT, connectors facing FRONT.





**Orientation 20** - ZOLL logo facing LEFT, connectors facing REAR.



## ORIENTATION INDEX 21-24

The On-Board Computer is mounted vertically, perpendicular to the floor, ZOLL logo and screen facing right (left wall mounted).

<p><b>Orientation 21</b> - ZOLL logo facing RIGHT, connectors facing UP.</p>  A blue rectangular ZOLL On-Board Computer is shown vertically. A small red and white toy truck with the ZOLL logo is placed to its left for scale. The top edge of the device is open, showing connectors.	<p><b>Orientation 22</b> - ZOLL logo facing RIGHT, connectors facing DOWN.</p>  A blue rectangular ZOLL On-Board Computer is shown vertically. A small red and white toy truck with the ZOLL logo is placed to its left for scale. The bottom edge of the device is open, showing connectors.
<p><b>Orientation 23</b> - ZOLL logo facing RIGHT, connectors facing FRONT.</p>  A blue rectangular ZOLL On-Board Computer is shown vertically. A small red and white toy truck with the ZOLL logo is placed to its left for scale. The front edge of the device is open, showing connectors.	<p><b>Orientation 24</b> - ZOLL logo facing RIGHT, connectors facing REAR.</p>  A blue rectangular ZOLL On-Board Computer is shown vertically. A small red and white toy truck with the ZOLL logo is placed to its left for scale. The back edge of the device is open, showing connectors.



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## APPENDIX C: WIRING ASSIGNMENTS

(Inputs start with #7, 1-6 not used at this time)

RS-4105 Expansion Harness Input #	Vehicle Input	Road Safety Harness	Wire	Color	Common Vehicle Location for connection - See Form 3
20	Seatbelt -	Gray/Red			Connect to Blue ignition wire at RS-4000
20	Seatbelt +	Brn/Red			Vehicle seat belt wiring / RS switch
21	Siren 1 +	Gray/Yel			Speaker - at Siren Amp
21	Siren 1 -	Brn/Yel			Speaker + at Siren Amp
7	Left Turn	Wht/Brn			Steering Column / BCM
8	Right Turn	Wht/Yel			Steering Column / BCM
9	Brakes	Grn/Red			Brake Light Switch / BCM
10	Spotter Switch	Grn/Pink			OBC to Rear of Vehicle
11	Reverse	Grn/Blk			Various - Back Up Light circuit
12	Parking Brake	Grn/Tan			Parking Brake Switch / BCM
13	Emerg. Lights	Grn/Gray			Switched side of Pri/Sec Circuit
14	Neutral if used	Grn/Vio			Varies per vehicle
15	Starter *if used	Grn/Brn			Ignition Switch
	Driver ID -	Blu/Blk			<b>Brown</b> Driver ID wire
	Driver ID +	Blu/Yel			<b>White</b> Driver ID wire
	Digi-Ground	Black			Connect to chassis ground
	Digi-Ground	Black			Connect to chassis ground
RS-4101 Power Audio Harness		RS Harness	Wire	Color	Common Vehicle Location
Power 1 +12vdc		Red			Under Steering Column -12v In
Power 2 +12vdc		Red/Wht			12v Out of RS-4000 to Spotter SW Module
Ignition +12vdc		Blue			Ign. Sw - 12V Ign On only
Ground		Black			Connect to chassis ground
Ground		Black			Connect to chassis ground
Speaker "+"		Black			Speaker "+" to RS Audio Speaker
Speaker "-"	Ribbed	Black			Speaker "-" to RS Audio Speaker
Digital Output 1		Yellow			To Device Controller
Digital Output 2		Orange			To Device Controller

## APPENDIX D: HIGH SPEED DIGITAL INPUT INSTALLATION & SETUP

### PURPOSE

This document describes the process of installing an RS4000 system using high speed digital inputs and calibration using the Diagnostic Viewer Utility for your Road Safety 4000 system.

### HIGH SPEED DIGITAL INPUT INTERFACE

The Road Safety system can acquire vehicle speed and engine RPM by measuring the frequency of digital pulses which are typically generated by the vehicle computer or by sensors in the engine if a direct link with the vehicle computer network is not available or not supported. The system uses scale values that vary with each vehicle model and allows these frequencies to be converted directly into a speed or RPM value.

### ENGINE RPM SCALE VALUES

The scale value for engine RPM is typically related to the number of pulses per revolution, which is related to the number of engine cylinders. This number is multiplied by 1000 to provide higher precision options for calibration. For example, the expected scale value for a 10-cylinder Ford E-Series is 10,000. As another example, a late model International Terrastar with a V8 turbodiesel engine uses an expected scale value of 24,000.

### VEHICLE SPEED SCALE VALUES

A vehicle typically has a rated value for pulses per mile on the signal that the RS4000 reads for speed. For example, in most Fords, this value is 8,000 pulses per mile. In a late model International Terrastar, this value is 29,500 pulses per mile. This value is used directly as the scale value for vehicle speed.

### CALIBRATING SPEED AND RPM SCALE VALUES

For a variety of reasons (including inevitable differences between a vehicle's actual speed and its reported speedometer value as well as slight unit-to-unit variations in the RS4000's frequency measuring capabilities), the expected scale values used for speed or RPM will often not produce the most accurate possible speed or RPM readings. And for these reasons, each vehicle/RS4000 combination must be individually calibrated during installation for the highest accuracy in reporting speed and RPM.

The calibration process is done using the Diagnostic Viewer Utility to tell the RS4000 the actual current speed or RPM value as read by the installer from the vehicle's speed or RPM gauges. The RS4000 uses the provided speed/RPM value along with the currently measured frequency value on the corresponding high speed digital input to calculate the appropriate scale value.

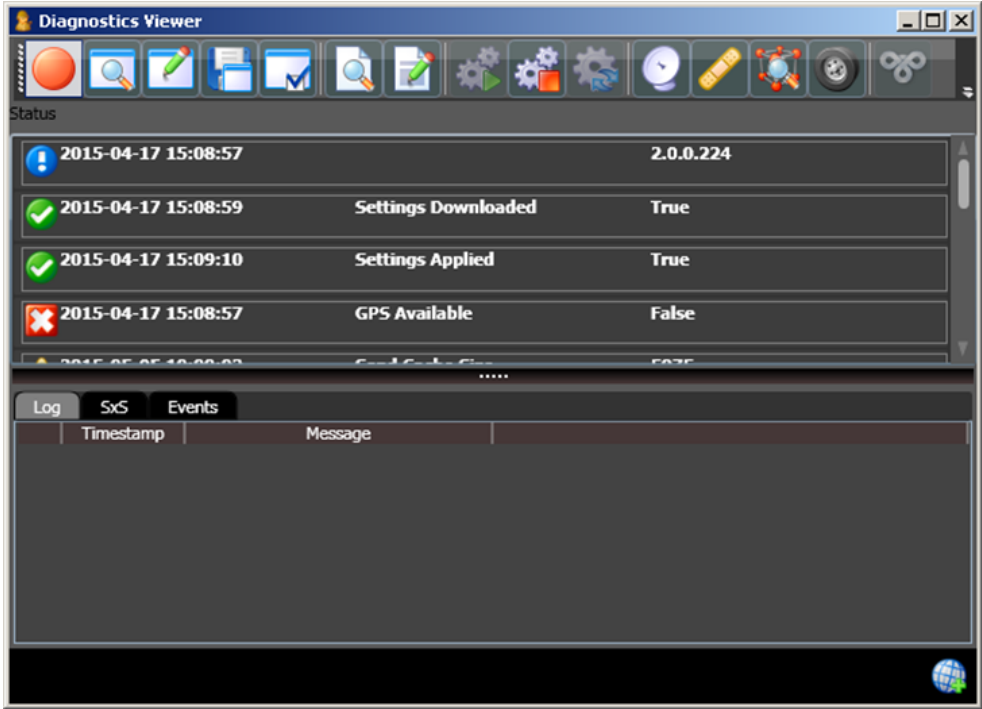
Use the following steps to calibrate the Diagnostic Viewer Utility:

#### 1. Starting the Diagnostic Viewer

Begin by opening the Diagnostic Viewer Utility and connecting it to the target RS4000 unit.

- Press the green triangle Start button at the top left corner of the window if the computer running the Diagnostic Viewer Utility and the RS4000 unit are connected to the same network.
- If the Diagnostic Viewer Utility is being run locally on the RS4000 unit, you must change the settings to disable Auto Discovery and to set the host value to 127.0.0.1 before pressing the Start button.

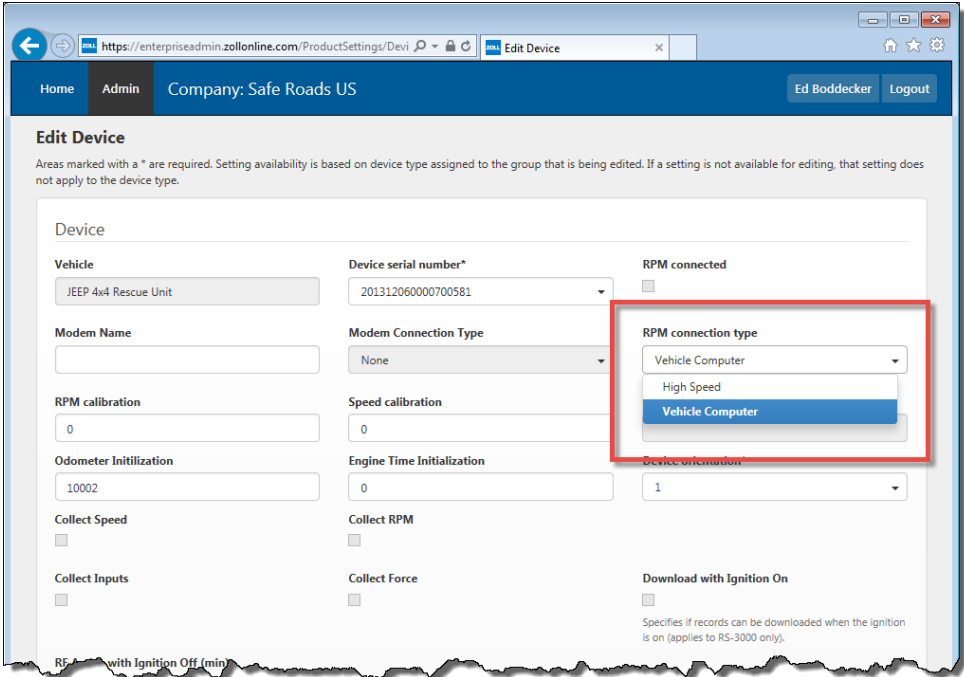
The following screenshot shows the main screen of the Diagnostic Viewer Utility after it has been connected to the target RS4000 unit.



## 2. Setting Configuration Options

You can set Configuration options for High Speed RPM Connection Type by using ZOLL Online.

In ZOLL Online, go to: **Administration>Road Safety>Road Safety Configurations>Devices>** and then click on the vehicle you're working with and make sure that the **RPM Connection Type** is set to **High Speed** and complete the **Add/Edit Device** screen.

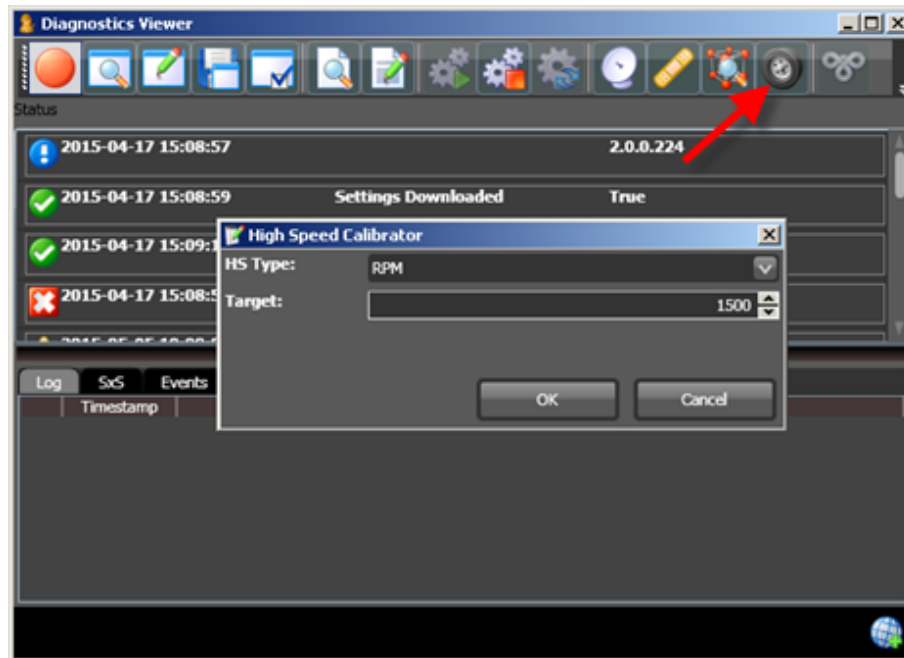




After the RS4000 has been configured for high speed inputs on ZOLL Online, the RS4000 may generate violation tones until speed and RPM have been calibrated.

### 3. Calibrating RPM

In the Diagnostics Viewer application, Open the High Speed Calibration window by clicking the wheel icon. Choose **RPM** from the HS Type dropdown menu and set the desired target RPM value.



With the vehicle in park, the vehicle operator should press the accelerator pedal to increase the engine RPM value until the RPM gauge reports the target RPM value. While the vehicle operator holds the RPM steady at the target value for several seconds, the Diagnostic Viewer operator will click the **OK** button to begin the calibration process.

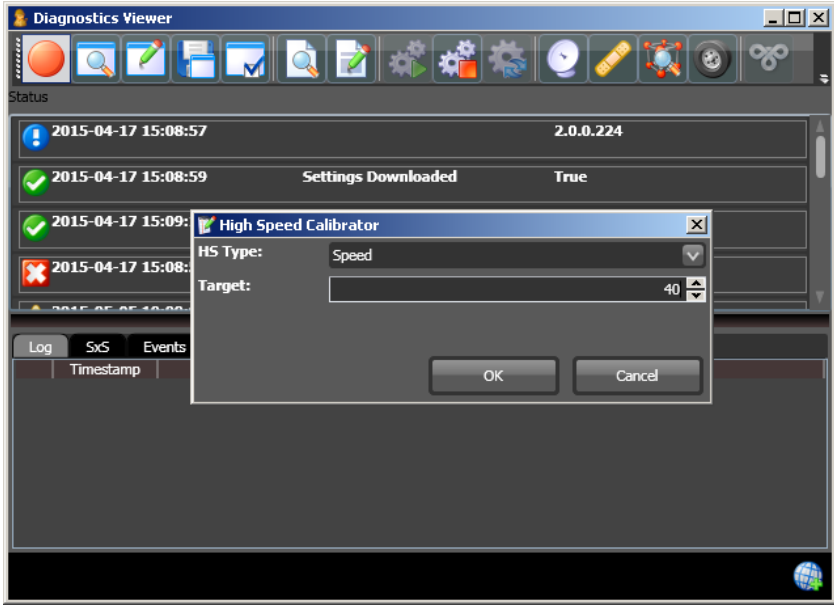
Note that the best RPM calibration results are typically achieved with a target RPM value in the range of 1500-2000RPM.

### 4. Calibrating Speed

Again open the High Speed Calibrator window by clicking on the wheel icon in the Diagnostics Viewer.

- First, choose **Speed** from the **HS Type** dropdown list. Set the **Target** value to the desired speed value. The units for the specified speed value must be the same as the active units for the RS4000. So if the RS4000 is configured to report in miles, specify a target speed in miles per hour, and if the RS4000 is configured to report in kilometers, specify a target speed in kilometers per hour. See the figure below for an example screenshot.
- Once the target speed has been specified and the driver has reached the target speed as indicated by the vehicle speedometer, the driver must hold the speed as steady as possible for several seconds. You can click the Diagnostic Viewer operator **OK** button to begin the calibration process which should complete within 2-3 seconds. This process will also close the calibration window.

Note that the best speed calibration results are typically achieved with a target speed in the range of 40-50mph.

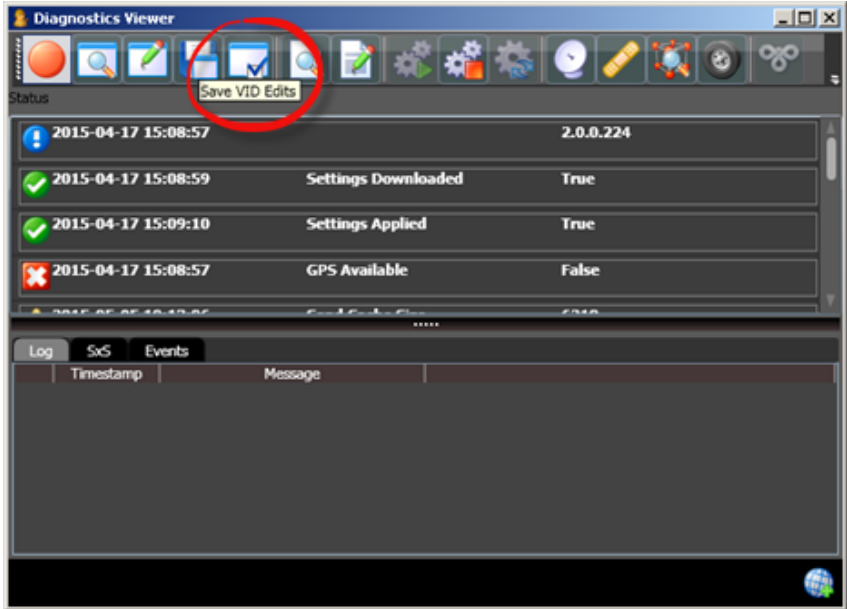


**5. Testing Calibration Results**

At this point, both speed and RPM are calibrated and the vehicle should be taken on a test drive to confirm that the RS4000 is detecting speed and RPM values correctly. The vehicle operator and Diagnostic Viewer operator can make sure speed and RPM match between the vehicle and RS4000 by comparing values on the vehicle speedometer to values displayed in Diagnostic Viewer’s SxS tab. Note that Diagnostic Viewer always displays speed values in kilometers per hour so the SxS values should be compared against the metric speedometer readings, if available.

**6. Saving Calibration Results**

Once the calibration results have been tested and found to be acceptable, the settings must be saved. Save the settings by clicking the fourth icon from the left on the Diagnostic Viewer toolbar. See the figure below for an example screenshot.



## APPENDIX E: ZOLL ONLINE'S ROAD SAFETY APPLICATION

As mentioned at the very beginning of this document, ZOLL Online plays a very important role in the Road Safety System. ZOLL Online houses the Road Safety application, which is used to not only configure and manage the onboard RS-4000 devices, but the entire Road Safety system.

Here you'll be provided step by step detailed instructions on the addition and configuration of RS-4000 devices to the system. **THIS ADDITION/CONFIGURATION SHOULD BE PERFORMED PRIOR TO THE COMPLETION OF THE IN-VEHICLE INSTALLATION OF THE DEVICE.**

### 1. SUPPORTED BROWSERS

ZOLL Online supports the most current versions of the following browsers:

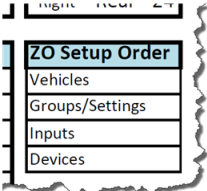
- Google Chrome (Most recent version)
- Internet Explorer (v11)
- Apple Safari (iOS only, most recent version)

On a side note. . .

On the surface this may look like a lot of complex technical work. But it's really no. It boils down to the four steps as shown on the "RS-4000 Cheat Sheet".

Setup your:

- Vehicles
- Groups / Settings
- Inputs
- Devices



Once you've completed these steps a few times, you'll most likely only need the cheat sheet, if that.

### 2. LOG INTO ZOLL ONLINE

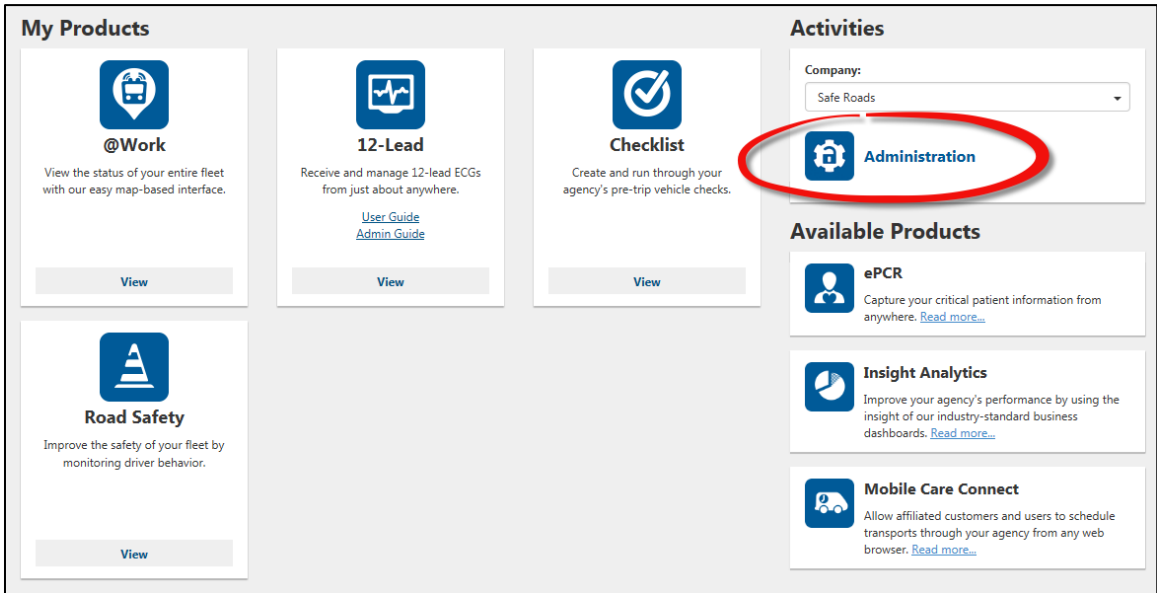
The required steps for configuration can be accomplished by either the individual performing the actual installation or an agency staff member. Regardless of who will be handling this setup, the user will need both ZOLL Online login credentials and also administrative access to the Road Safety application. Log in to [www.zollonline.com](http://www.zollonline.com) to get started.



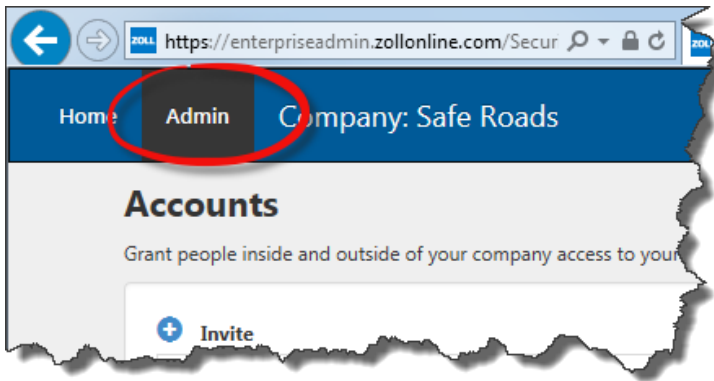
**NOTE:** The ZOLL Online Road Safety instructions found here cover only a subset of the product's features. Complete product documentation can be found at [www.zolldata.com](http://www.zolldata.com).

### 3. MAIN SCREEN-HOME PAGE

All of the tasks that need to be accomplished in the Road Safety application are accessed via the “Administration” section.

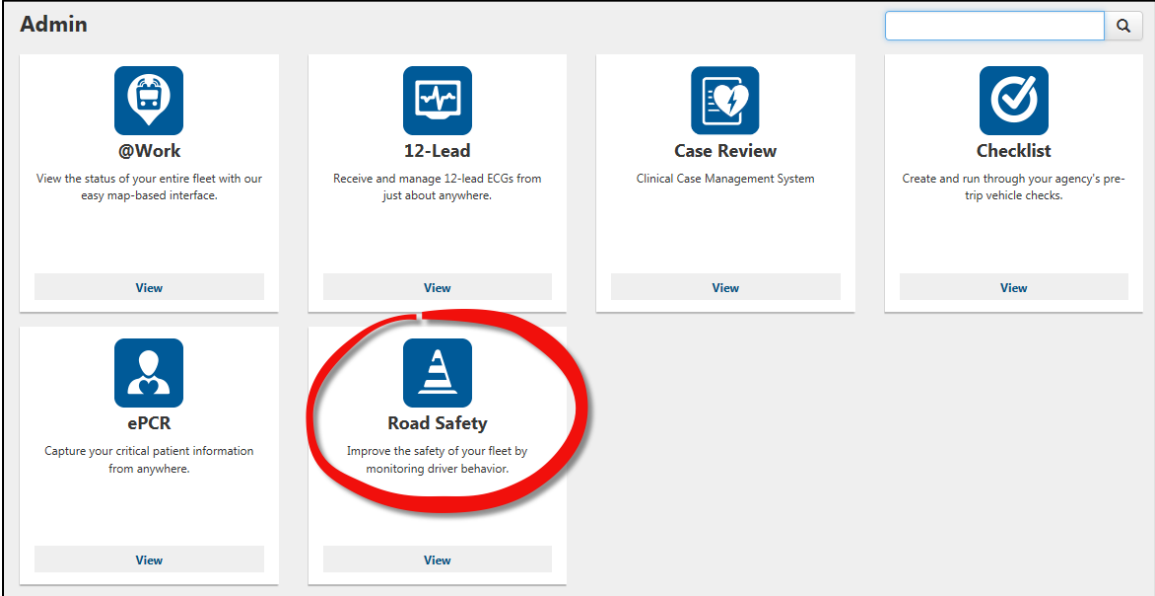


As seen in the screen shot above, the initial page to which you’re taken once logged into ZOLL Online is the “My Products” page. You can see the “Administration” link has been circled. It should also be noted that the “Administration” section can be accessed from most places in ZOLL Online by simply clicking on “Admin” near the top left hand side of the screen as shown below.



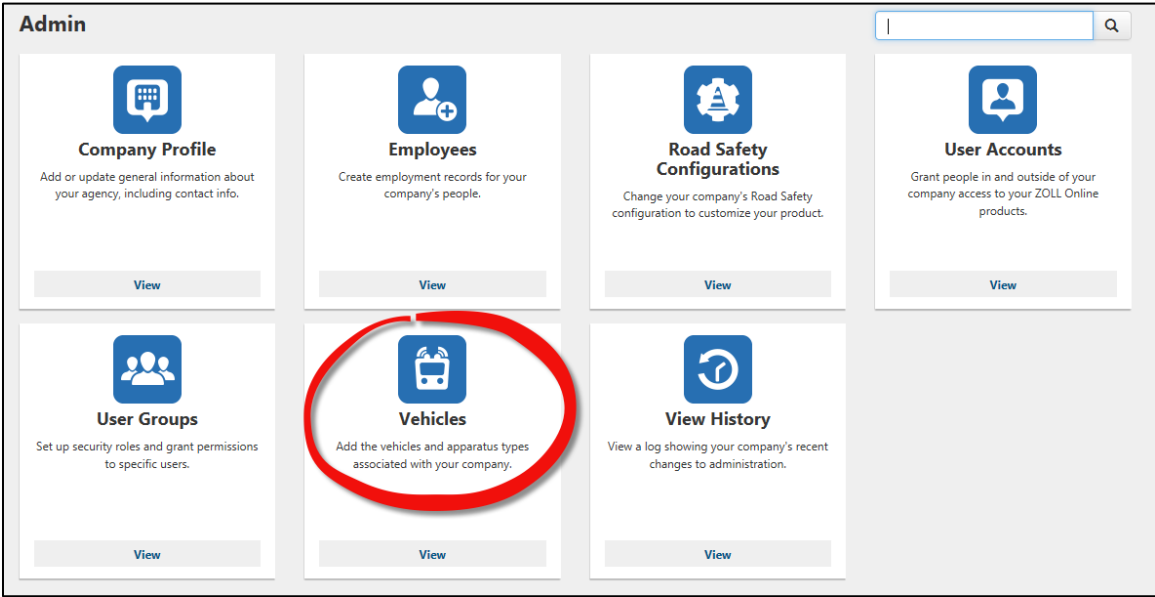
## 4. PRODUCT ADMINISTRATION SCREEN

After clicking on “Administration” or “Admin” you’re taken to the screen where you can select the product you wish to administer. The selections here will vary based upon which ZOLL products the agency uses. Obviously, you’ll want to select “Road Safety”.



## 5. ROAD SAFETY ADMINISTRATION SCREEN

This is where our setup begins. A logical setup begins with adding vehicles. Click “Vehicles”.

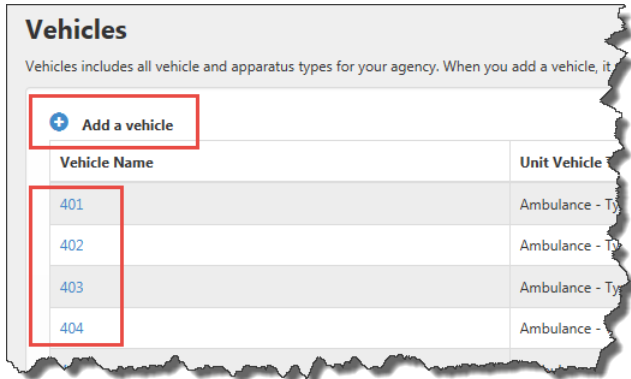


## 6. VEHICLE SCREEN



The next step will be to add vehicles. From the admin section you'll click on the vehicles icon.

Vehicles include all vehicle and apparatus types for your agency. When you add a vehicle, it will be available for selection in all of your ZOLL Online applications.



Once you've entered the Vehicles section you can either edit the vehicles that already exist by clicking on their "Vehicle Name" or click the "Add a vehicle" plus button to create a vehicle.

**NOTE:** Information entered here will also be available in the other ZOLL Online product screens, as will vehicles entered in another ZOLL Online product will be available here. If all the information is correct, no further changes will need to be made.

**Add a vehicle**  
Areas marked with a \* are required.

Vehicle

Vehicle name\*

Usage type\*

License plate number

License plate expiration

Color

Vehicle type\*

VIN

License plate state

DOT number

Odometer

Description

Manufacturer

Chassis make

Transmission type

Year

Chassis model

Engine

Items marked with an \* are required, enter other information as needed.

Click "SAVE" when done and you will be returned to the list of vehicles.

Next, starting with "Vehicle Group Settings" we'll configure our Road Safety settings. Press the "Admin" button from the top of the screen.

## 7. ROAD SAFETY CONFIGURATIONS SCREEN – VEHICLE GROUP SETTINGS



Groups create a classification of similar vehicle types that will allow you to apply the same device settings, alarms and more to all vehicles within the group. Vehicles within a group should be similar in body style, size, weight, and mission. It's also **very IMPORTANT that the vehicles include in a group have identical input configurations**. Group settings and input assignments are assigned to the group and are applied to all vehicles within the group.

To begin our look at the group setup, from the Admin page click on “Road Safety” and then “Road Safety Configurations”. Here you can see all of the different sections that can be configured to customize the Road Safety application for the agency. To configure the group settings for the vehicle, click on “Vehicle Group Settings”.

As with most of the ZOLL Online configuration sections, when you first enter the section you can either modify existing entries by clicking on their name or add new items by clicking on the plus (+) icon. Once you're in the area where you're adding or modifying entries, you'll see that the top section allows you to add the name of your group, device type to be installed and the vehicles to be included in the group.

**Add Vehicle Group Setting**

Areas marked with a \* are required. Setting availability is based on device type assigned to the group that is being edited. If a setting is not available for editing, that setting does not apply to the device type.

Group name\*  Device type  Add vehicle

Alarm Volumes

Violation volume  Warning volume

The percentage of the volume for violations; 100% being the highest volume and 0% being turned off. Range: 0 - 100 % Value: 0 %

The percentage of the volume for warnings; 100% being the highest volume and 0% being turned off. Range: 0 - 100 % Value: 0 %

MC4, MC5  
 406  
 MC4  
 MC5  
 MC6  
 MC7

As mentioned earlier, Items marked with an \* are required.



Starting with the Alarm Volumes, the following pages will cover all of the individual settings that will be applied to each of the vehicles contained in the group being created or modified.

The remaining fields on the Vehicle Group Settings page allow for the customization of alarm notifications for the driver, set warning ranges and more.

**Section Settings:**

**NOTE:** Based upon our experience with the system and consultations with our clients, typical values are being provided where applicable. These are not recommendations or suggestions. These settings need to be tailored to the agency's policies and procedures.

### Alarm Volumes

<p><b>Violation volume</b> <span style="border: 1px solid red; padding: 2px;">50%</span></p>  <p>The percentage of the volume for violations; 100% being the highest volume and 0% being turned off. <b>Range: 0 - 100 % Value: 40 %</b></p>	<p><b>Warning volume</b> <span style="border: 1px solid red; padding: 2px;">50%</span></p>  <p>The percentage of the volume for warnings; 100% being the highest volume and 0% being turned off. <b>Range: 0 - 100 % Value: 50 %</b></p>
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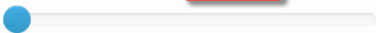
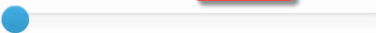
### Units of Measure

**Speed units of measure\***



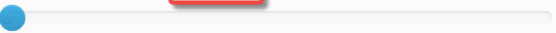
Miles Per Hour (MPH) Dependent on location

The units of measure that you want to use for measuring speed. All speed limits and speed related settings will be set in this unit of measure.

### Driver

<p><b>Log in time (seconds)</b> <span style="border: 1px solid red; padding: 2px;">10 Sec.</span></p>  <p>Amount of time, in seconds, before a full alarm. <b>Range: 0 - 300 seconds Value: 10 seconds</b></p>	<p><b>Log off time (seconds)</b> <span style="border: 1px solid red; padding: 2px;">5 Sec.</span></p>  <p>Amount of time, in seconds, after the vehicle has been turned off in which a driver is logged off of the system. <b>Range: 0 - 300 seconds Value: 5 seconds</b></p>
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### Safety warning ranges

<p><b>Safe reverse action time (seconds)</b> <span style="border: 1px solid red; padding: 2px;">60 Sec.</span></p>  <p>The amount of time allowed for a vehicle to be in reverse after a valid spotter switch activation. <b>Range: 0 - 360 seconds Value: 60 seconds</b></p>	<p><b>Spotter valid time (seconds)</b> <span style="border: 1px solid red; padding: 2px;">10 Sec.</span></p>  <p>The amount of time that a spotter switch activation is valid prior to shifting into reverse. This parameter also sets the duration, after the vehicle is shifted into reverse, during which the spotter switch button must be pressed to avoid a spotter violation. <b>Range: 0 - 360 seconds Value: 10 seconds</b></p>
<p><b>Seatbelt off distance</b> <span style="border: 1px solid red; padding: 2px;">.1 Miles</span></p>  <p>The allowed distance to operate without a seatbelt before a violation is recorded. <b>Range: 0 - 5 miles Value: 0.1 miles</b></p>	



## Speed warning ranges

### Over speed, non-emergency operating mode



Indicates the speed at which the over speed grace period starts while driving in a non-emergency mode.

Range: 0 - 200 MPH Value: 66 MPH

### High over speed, non-emergency mode



Indicates the speed at which the driver will immediately receive a violation for high over speed.

Range: 0 - 200 MPH Value: 71 MPH

### Over speed grace period



The amount of time in seconds that the driver is allowed to be above the speed limit.

Range: 0 - 100 seconds Value: 10 seconds

### Over speed, emergency operating mode



Indicates the speed at which the over speed grace period starts while driving in an emergency mode.

Range: 0 - 200 MPH Value: 76 MPH

### High over speed, emergency operating mode

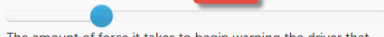


Indicates the speed at which the driver will immediately receive a violation for high over speed.

Range: 0 - 200 MPH Value: 81 MPH

## Forces

### Activate over force warning



The amount of force it takes to begin warning the driver that they are approaching an over force situation. 100 indicates the need for high forces while 0 indicates lower forces are needed.

Range: 0 - 100 Value: 25

### Over force



The amount of forces required for the driver to receive a violation for being in an over force condition. 100 indicates the need for high forces while 0 indicates lower forces are needed.

Range: 0 - 100 Value: 35

### Extreme over force



The amount of forces required for the driver to receive a violation for being in an extreme over force condition. 100 indicates the need for high forces while 0 indicates lower forces are needed.

Range: 0 - 100 Value: 45

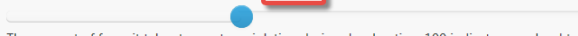
### Hard acceleration



The amount of force it takes to create a violation during acceleration. 100 indicates very hard to set a violation and 0 indicates easy to create a violation.

Range: 0 - 100 ft/s/s Value: 35 ft/s/s

### Hard deceleration



The amount of force it takes to create a violation during deceleration. 100 indicates very hard to set a violation and 0 indicates easy to create a violation.

Range: 0 - 100 ft/s/s Value: 40 ft/s/s

## RPM warning ranges

### Over RPMs, moving



The RPM at which the driver is alerted that they are over the allowed RPM.

Range: 0 - 8000 RPMs Value: 5000 RPMs

### Engine Idle Grace Period



Grace period before idle time is recorded. (Engine on, Vehicle not moving)

Range: 0 - 9999 seconds Value: 3600 seconds

RPM values will obviously vary greatly based upon different factors and discussed with the agency.

Following the section where all of the values are defined there is an additional GPS Data Destinations section.

GPS Data destinations ^

GPS destination one

GPS destination one

The IP address of where you wish GPS data to be delivered to. The IP Address must be entered in standard notation 000.000.000.000, domain names are not currently supported.

GPS destination one port

The UDP port that GPS data for the corresponding IP Address will use to deliver the GPS data on. The value for this port setting is a value between 0 and 65535.

GPS destination interval one

The interval (seconds) to send the GPS feed to the destination.

GPS destination min-distance one

The minimum distance (meters) required to send a GPS feed to the destination. Zero ignores the distance.

GPS destination two

GPS destination two

GPS destination two port

This section allows for the entry of up to four different GPS Destinations. If configured here in Road Safety the GPS information acquired from the RS-4000 will be sent to the destinations from ZOLL Online. If this setup is requested by the agency they will be required to provide the installer values for the four fields shown in the image.

**VERY IMPORTANT:**

Once you've configured all of the settings for Vehicle Group, **don't forget to save.**

The RPM at which the driver is alerted that they are over the allowed RPM.  
Range: 0 - 8000 RPMs Value: 5000 RPMs

The amount of time at which the driver is alerted that they are over the allowed RPM.  
Range: 0 - 360 seconds Value: 0 seconds

Engine Idle Grace Period

Grace period before idle time is recorded. (Engine on, Vehicle not moving)  
Range: 0 - 9999 seconds Value: 3600 seconds

GPS Data destinations v

Save Cancel

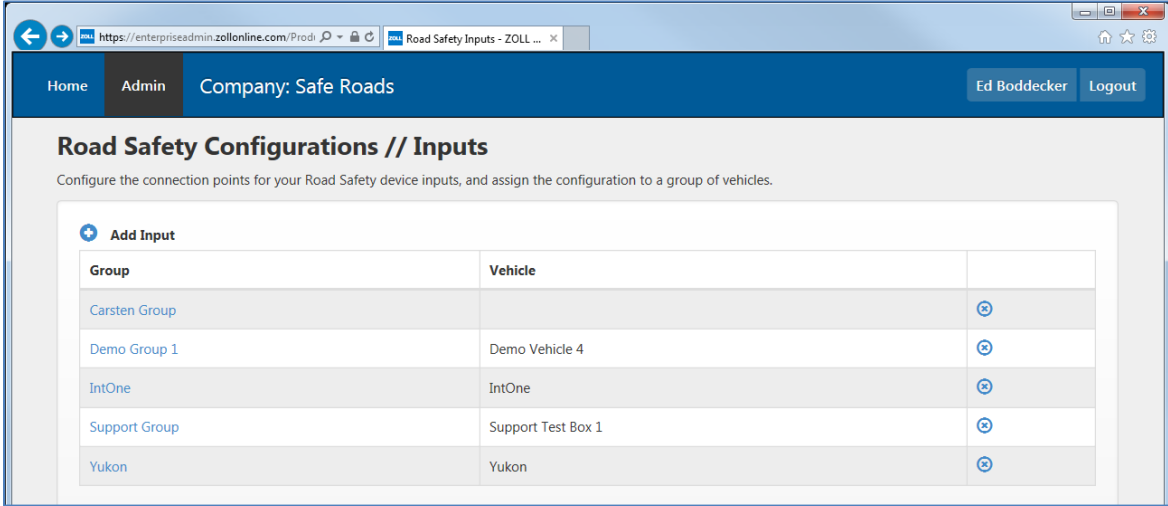
Click "SAVE" when finished to return to the Vehicle Group Settings screen, then click [Back to Road Safety](#) to return to the Road Safety Configuration screen. Configure Inputs next.

## 8. ROAD SAFETY CONFIGURATIONS SCREEN - INPUTS

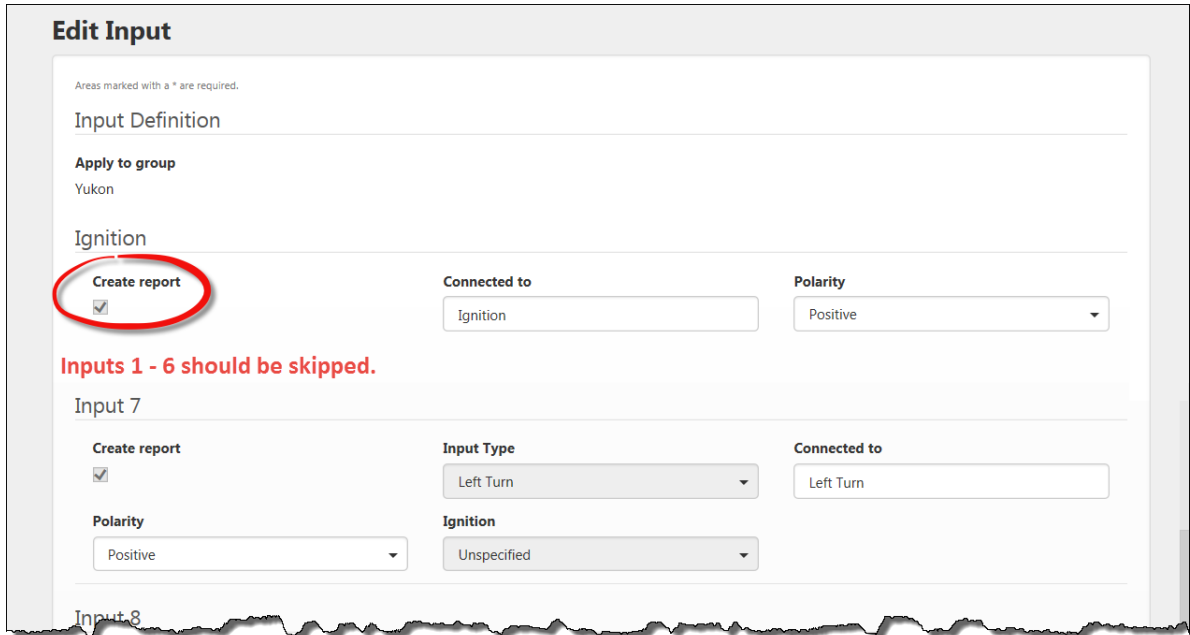


Here you will configure the connection points for your Road Safety device inputs, and assign them to a Group of vehicles (previously defined).

Click the vehicle group your vehicle is assigned to (or add a new set of inputs).



Put a check in the **Create Report** box. The inputs must be assigned as follows:



**Input 8**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> Right Turn	<b>Connected to</b> Right Turn
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Input 9**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> Brake	<b>Connected to</b> Brake
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Input 10**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> Spotter	<b>Connected to</b> Spotter
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Input 11**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> Reverse	<b>Connected to</b> Reverse
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Input 12**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> Parking Brake	<b>Connected to</b> Parking Brake
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Input 13**

<b>Create report</b> <input checked="" type="checkbox"/>	<b>Input Type</b> EmergencyLights	<b>Connected to</b> Emergency Lights
<b>Polarity</b> Positive	<b>Ignition</b> Unspecified	

**Inputs 14 - 19 should be skipped.**  
**Inputs 20 & 21 should be completed.**

Finish with items 20 and 21 Driver's Seatbelt and Siren.

The screenshot shows a configuration window with two sections: 'Input 20' and 'Input 21'. Each section has a 'Create report' checkbox (checked), an 'Input Type' dropdown, a 'Connected to' text field, a 'Polarity' dropdown, and an 'Ignition' dropdown. For Input 20, 'Input Type' is 'Seatbelt', 'Connected to' is 'Seatbelt', 'Polarity' is 'Negative', and 'Ignition' is 'Unspecified'. For Input 21, 'Input Type' is 'Siren 1', 'Connected to' is 'Siren', 'Polarity' is 'Positive', and 'Ignition' is 'Unspecified'. At the bottom are 'Save' and 'Cancel' buttons.

Summary of Inputs configurations:

<u>Input #:</u>	<u>Input Type:</u>	<u>Connected to:</u>
1 – 5	Skipped -----	-----
7	Left Turn	Left Turn
8	Right Turn	Right Turn
9	Brake	Brake
10	Spotter	Spotter
11	Reverse	Reverse
12	Parking Brake	Parking Brake
13	EmergencyLights	Emergency Lights
14 – 19	Skipped -----	-----
20	Seatbelt	Seatbelt
21	Siren 1	Siren

Click "SAVE" when finished to return to the Input screen, then click [Back to Road Safety](#) to return to the Road Safety Configuration screen. Configure Devices next.

## 9. ROAD SAFETY CONFIGURATIONS SCREEN - DEVICES



This is where you will assign a Road Safety device to a specific vehicle and define some configuration settings specific to that vehicle. Select the vehicle you are working on to open the EDIT DEVICE screen.

1. Click on the “Device serial number” drop down field **(1)** in the DEVICE SERIAL NUMBER window and select the serial number that is being installed in the vehicle. **\*This must match the serial number on the RS-4000.**
2. In the RPM Connector Type” field **(2)** specify either “Vehicle Computer” or “High Speed Digital” based upon how the information is being sent to the device.
3. If available, complete the Odometer and Engine Time Initialization fields **(3)**.
4. In the “Device Orientation” field **(4)** enter the orientation of the device installed in the vehicle based upon the something found in Appendix A.
5. Click SAVE at the bottom of the page when complete.

**Edit Device**

Areas marked with a \* are required. Setting availability is based on device type assigned to the group that is being edited. If a setting is not available for editing, that setting does not apply to the device type.

<b>Device</b>		
<b>Vehicle</b> Vehicle 3	<b>Device serial number*</b> <b>(1)</b> 901307170000400165	<b>RPM connected</b> <input type="checkbox"/>
<b>Modem Name</b> 	<b>Modem Connection Type</b> None	<b>RPM connection type</b> <b>(2)</b> Vehicle Computer
<b>RPM calibration</b> 0	<b>Speed calibration</b> 0	<b>Odometer calibration</b> 
<b>Odometer Initialization</b> <b>(3)</b> 0	<b>Engine Time Initialization</b> <b>(3)</b> 0	<b>Device orientation*</b> <b>(4)</b> 1
<b>Collect Speed</b> <input type="checkbox"/>	<b>Collect RPM</b> <input type="checkbox"/>	
<b>Collect Inputs</b> <input type="checkbox"/>	<b>Collect Force</b> <input type="checkbox"/>	

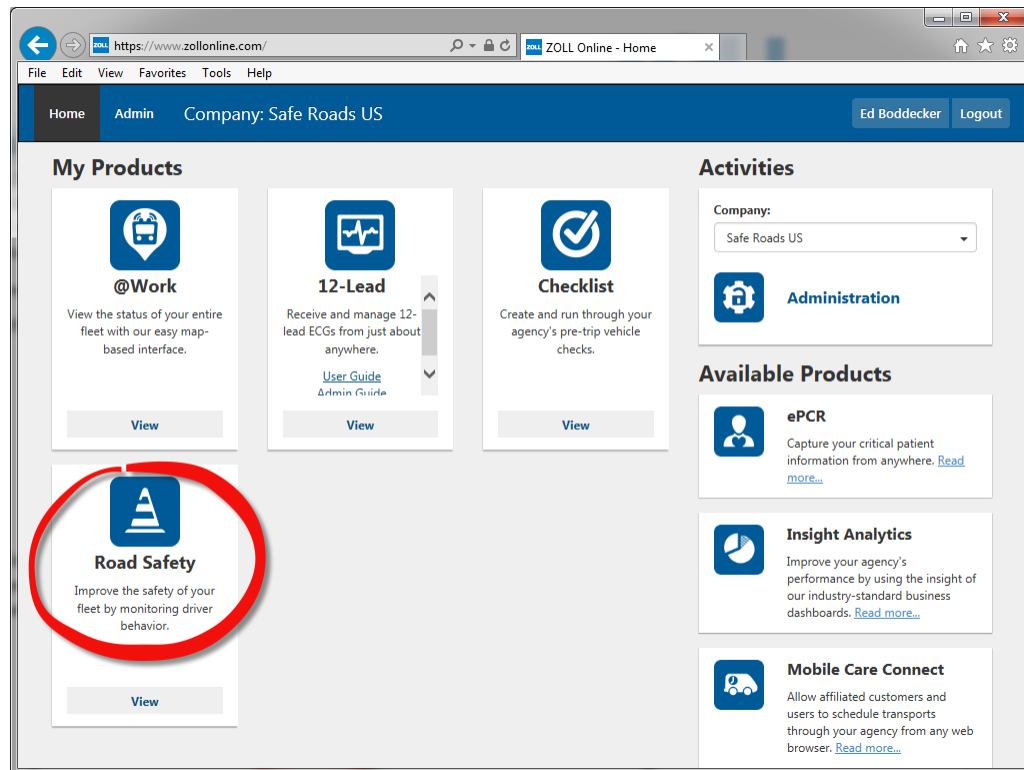
Once all Devices have been properly configured, click [Back to Road Safety](#) to return to the Customize Road Safety screen. Configure Inputs next.

## 10. VEHICLE INSTALLATION VERIFICATION

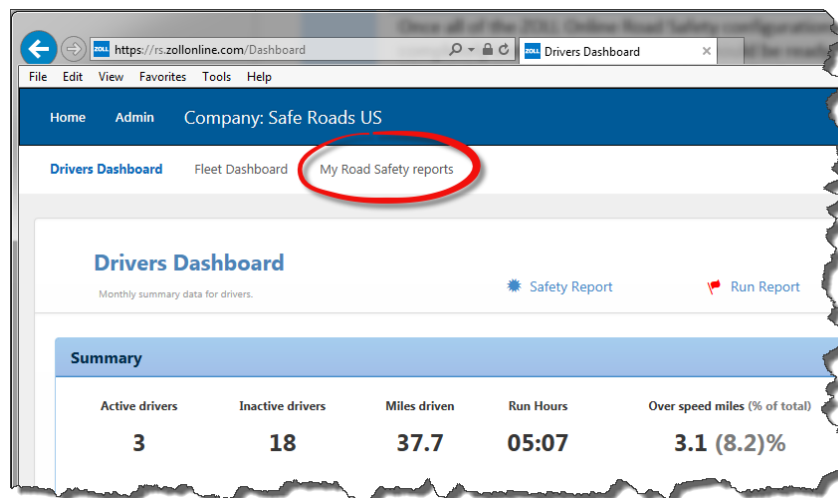
Once all of the ZOLL Online Road Safety configurations have been set and the RS-4000 devices has been completely installed and calibrated, it should be ready to go live with the customer. Using the “Reports” section of ZOLL Online’s Road Safety can provide one final system test to ensure the functionality of the vehicle(s). Seeing report’s populated with data from each vehicle is a good indication that the system is up and functioning properly.

Follow these steps to test a vehicle:

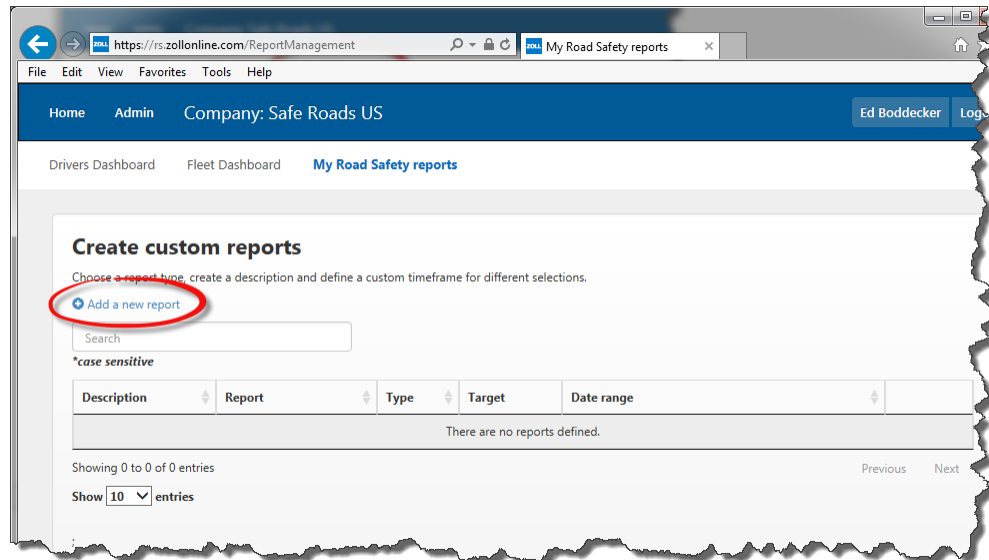
1. From the ZOLL Online “Home” (My Products) page, simply click on the “Road Safety” icon:



2. The “Drivers Dashboard” will display. Generally this section will be used by the management personnel of the agency to review the data collected by the system. For Installation Technicians it can be used to check the status of the vehicles that have been installed. From here, click the “My Road Safety reports” link.

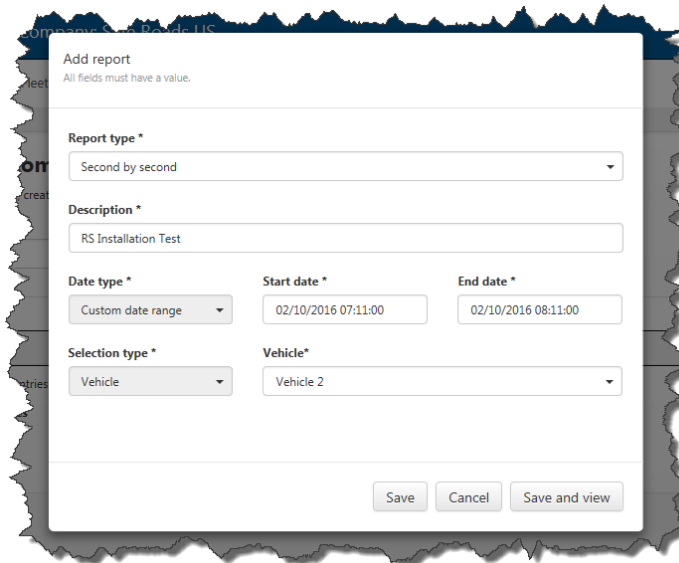


- If this is a new installation and this is the first time you're accessing this area, it's likely the screen will look like this:



If this is the case you'll want to click the "Add a new report" link.

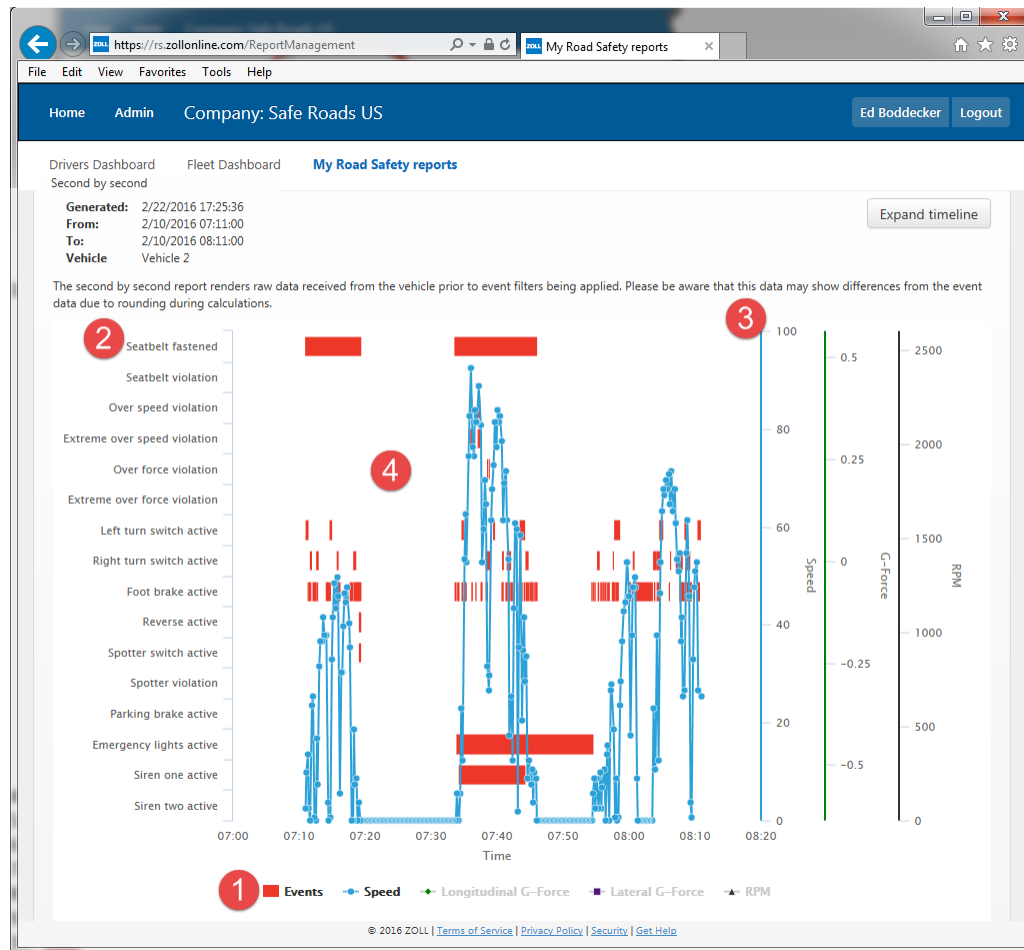
- Next the "Add report" dialog box appears:



- Here you'll define your test report using the following criteria:
  - Type** – The report type should be "Second by second" to see the exact data being sent to the system.
  - Description** – Something like "RS Installation Test" will work fine. This report can be removed after the installation is complete.
  - Start Date & End Date** – The range being set can only be a maximum of one hour. Set a timeframe that covers a period you know the vehicle was being driven and should have been sending data.
  - Vehicle** – Select the vehicle of which you wish to check the status.
  - Data type & Selection type** – These fields are inactive for this type of report.
- Once the values have been entered, press the "Save and view" button.



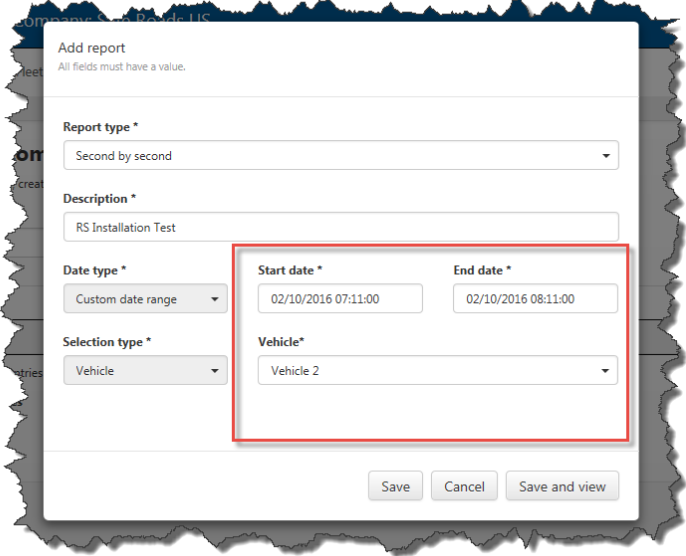
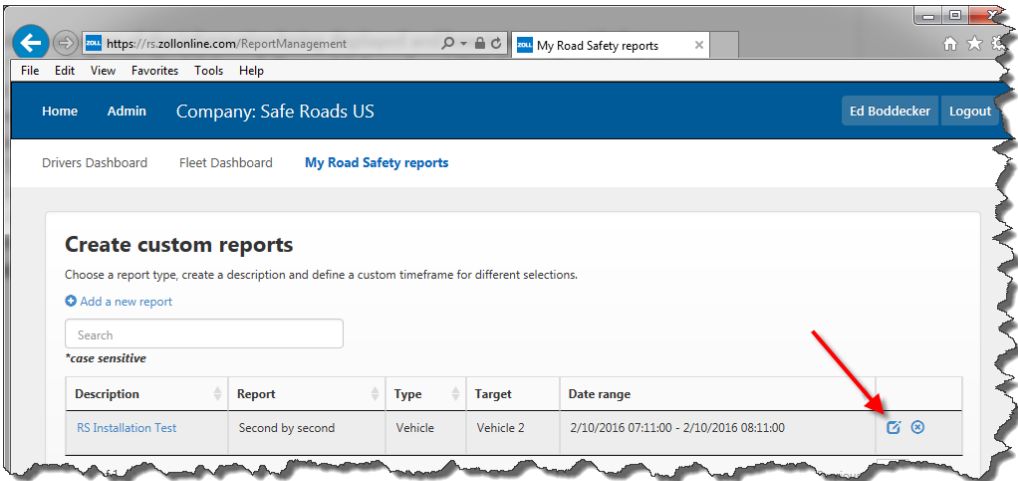
- If after polling the data, the ZOLL Online Road Safety system displays a report similar to the image below, you can feel very confident that the vehicle's RS-4000 is communicating successfully with the Road Safety system.



Here's a quick rundown on some of the information being displayed and how to interact with the report:

- "Events", "Speed", "Longitudinal G-Force", "Lateral G-Force" and "RPM" are all toggles that can be clicked to enable or disable their display on the report. In our example, only "Event" (Red Blocks) and Speed (Blue Line) are being displayed.
- This is a list of the "Events". In our example we can see that the seatbelts were disengaged from around 7:10 – 7:20 and once again from 7:35 – 7:45.
- The vertical bars provide a rough estimate of the Speed, G-Force and RPM.
- The report are itself is also interactive. Hovering over one of the blocks or points will provide on-screen details of that exact point in time. The viewer can also hold down their left mouse button while dragging to zoom into a specific time.

- 6. After adding in the “RS Installation Test” report the installer can simply edit this report for the next vehicle they wish to test. From the “My Reports” list they would simply click the edit button and change the vehicle they wish to view and reset the time period as needed:



This testing procedure should be performed for all vehicles to ensure their installation has been successfully completed.

## APPENDIX F: DIGITAL ALLY / RS-4000 TRIGGER CONNECTION AND SETUP

### WHAT IS DIGITAL ALLY

Digital Ally Inc. is a manufacture of in-vehicle audio/video recording devices. Recordings are triggered by both the Digital Ally devices themselves and the ZOLL RS-4000. The RS-4000 can be tightly integrated with both the DVM-250 (two camera system) and the DVM-250+ (three camera system).

In this section of the document you'll be provided with detailed instructions on both the installation of the DVM-250/250+ devices and the steps necessary to integrate them with the RS-4000 devices.

### DVM-250/250+ INSTALLATION

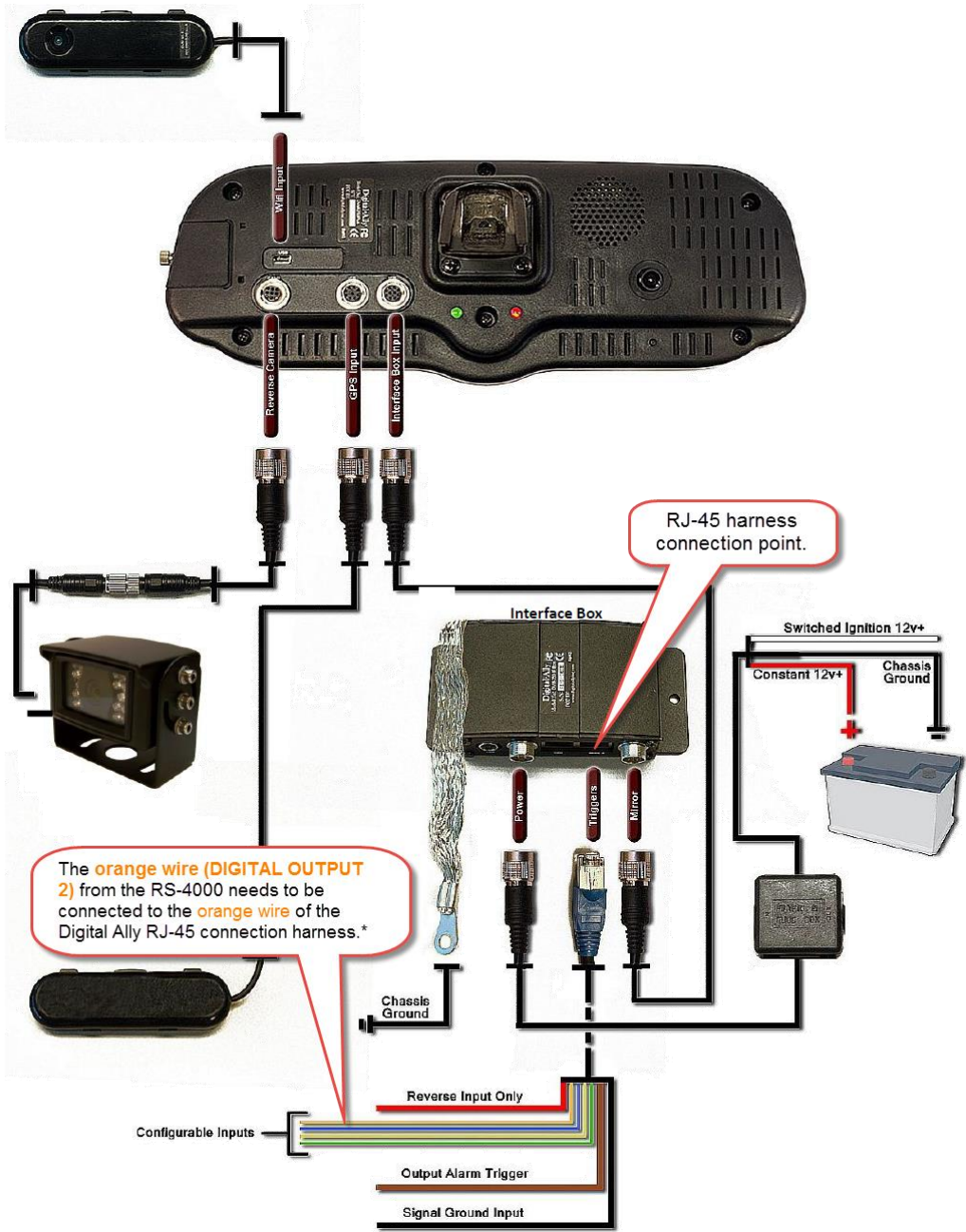
1. If possible the installation of the DVM-250/250+ should be done simultaneously with the RS-4000's. Running cables and making connections for both devices is obviously easier and more efficient if it can all be done at the same time rather than bringing the vehicle in for service twice for similar work.
2. The details of the physical installation of the DVM-250/250+ can be found in Digital Ally's Installation Guide which is available by clicking the PDF Button.



3. Once the DVM-250/250+ has been installed, locate the RJ-45 harness with the orange wire on the Digital Ally Interface box.
4. Connect the Orange wire (digital output 2) from the RS-4000 harness to the orange wire on the Digital Ally RJ-45 Interface Harness.

**NOTE:** Although these instructions describe using the RS-4000 digital output 2 (which is commonly used), digital output 1 may also be used.

## DVM-250/250+ Basic Wiring Diagram



\* If the Digital Ally orange input wire (Sensor 2) is already in use, any of the other available input wires can be used. Using a wire/sensor other than Orange #2 will require a slight modification to the sensor setup process described below..

RJ45Pin#	Sensor Number	Wire Color
1	Sensor #1	RED
2	Sensor #2	ORANGE
3	Sensor #3	BLUE
4	Sensor #4	YELLOW
5	Sensor #5	WHITE
6	Sensor #6	GREEN
7	Output #1	BROWN
8	GND	BLACK

## DVM-250/250+ CONFIGURATION MANAGER / CAMERA SETUP

Prior to being able test or utilize the DVM-250/250+ system, the devices must be configured using Digital Ally’s “Configuration Manager” software. Just as some setup work in ZOLL Online needs to be completed before the RS-4000 will function, the same holds true for the Digital Ally system. DVM-250/250+ configurations must be setup using the Configuration Manager software for the device to properly function. This section of the document will guide the Installer through a basic setup of the Configuration Manager leading to the creation of a fully operational, integrated, Road Safety / Digital Ally system.

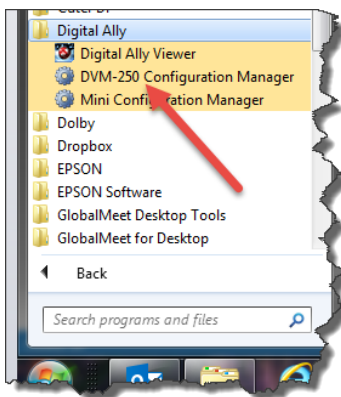
**NOTE:** The instructions provided here for the DVM-250/250+ Configuration Manager are only a sub-set of the full documentation available from Digital Ally. Please obtain the latest version of the full documentation from their website for additional information on these and other configuration settings in the software.

### CONFIGURATION MANAGER INSTALLATION

1. Download the latest version of the “DVM-250 Configuration Manager” from Digital Ally. Visit <http://www.digitalallyinc.com> and click on the “customer portal” button at the top right portion of the page.
2. Sign up for an account if you have not already.
3. Once logged in, you will be able to download the latest software and documentation.
4. After downloading the ZIP file, unzip the file and run the “**ViewerSetup.exe**” and it will guide you through the installation.
5. For assistance with setting up a Digital Ally account or any questions about accessing or downloading content from their customer portal, please contact **Digital Ally support 800-440-4947**.

### LAUNCHING THE CONFIGURATION MANAGER & THE FILE TAB

1. From your desktop or Start / All Programs / Digital Ally, run the “DMV-250 Configuration Manager”.



- Once the application loads you're placed in the "File" page as seen here.



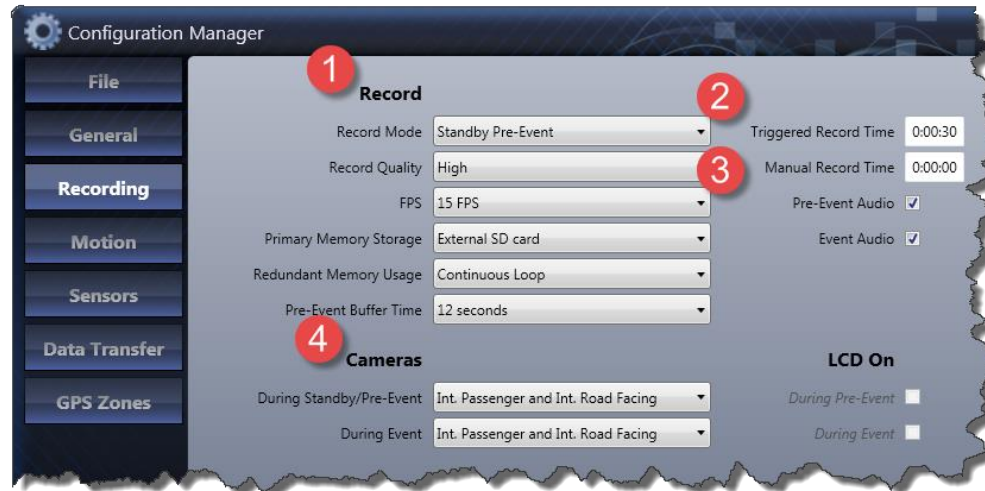
- The first action to take is to press the appropriate link where it says "Load factory default configuration for". Once loaded, a confirmation dialog box will pop up which can be acknowledged and closed by just pressing "OK".

## THE GENERAL TAB



- Location** - Set the appropriate time zone and desired date format using the drop down.
- Display** – Generally the defaults for these settings work fine.
- Power** –
  - Ignition Shutdown Time** - Select a desired time frame for the ignition shutdown timer. This setting determines how long the camera will stay active before going into standby mode after the ignition is switched off.
  - Days in LPS** – This field allow for the setting of the number of days the camera will stay in standby mode before it's completely powering down. **Please change this setting to a value of at least 1.**

## THE RECORDING TAB



The suggested values outlined in this document will setup the camera to record triggered event clips onto the external SD card and record a continuous loop onto the internal camera memory. Depending upon quality settings, the camera loop can record for weeks before overwriting previous data.

1. **1 – Record** – The values displayed in the above image are the suggested initial settings for the devices.
2. **2 – Triggered Record Time** – Sets the amount of time **after** an event that will be recorded. Adjust this value as needed. Remember that the **actual event video will have a combined length of the Pre-Event Buffer Time and the Triggered Record Time**. If the Pre-Event Buffer (from the Record section) is set at 12 seconds and the Triggered Record Time is 0:00:30, then the resulting event clip will be 42 seconds, with 12 of those seconds occurring before the event and 30 seconds after the event.
3. **3 – Manual Record Time** - Determines the time that will be recorded if the red manual record button is pressed on the front of the camera. If this value is left at 0:00:00, the camera will record indefinitely until the manual button is once again pressed.
4. **4 – Cameras** – The default values displayed are the suggested initial settings for the devices.



## MOTION TAB

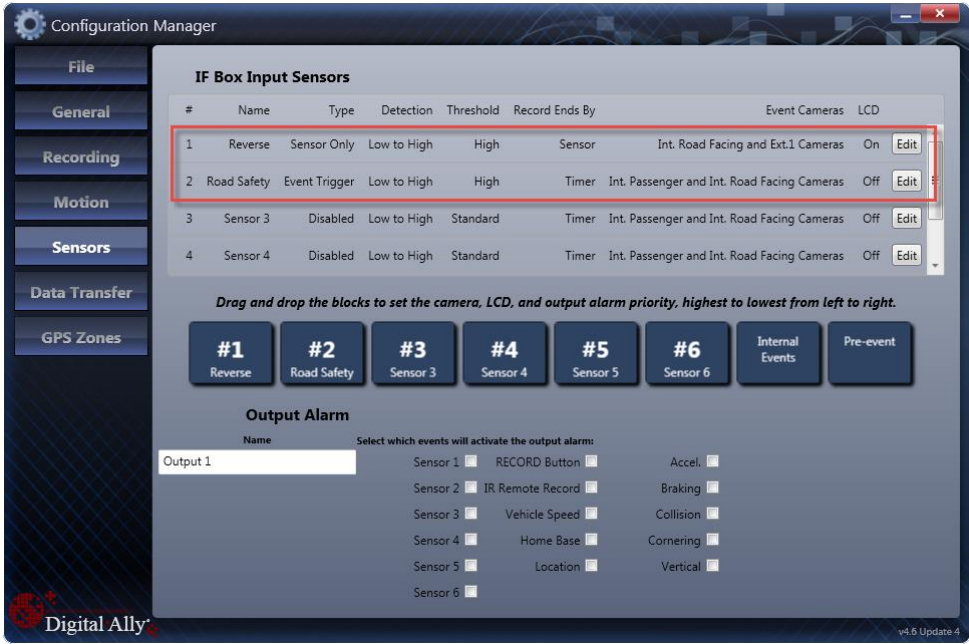


This tab allows for the configuration of the trigger levels that will initiate the start of a video recording.

1. **Accelerometer** - Both the RS-4000 and the Digital Ally devices can trigger a recording based upon vehicle movement. In addition to triggering a recording based upon vehicle movement, the Digital Ally system can also trigger a recording based upon the movement (or tampering) of the camera itself. Using the suggested settings displayed in the image above will utilize the accelerometer functionality of both devices.
2. **Vehicle Speed** – This value should be set based upon the highest vehicle speed acceptable under the agencies safety policy.



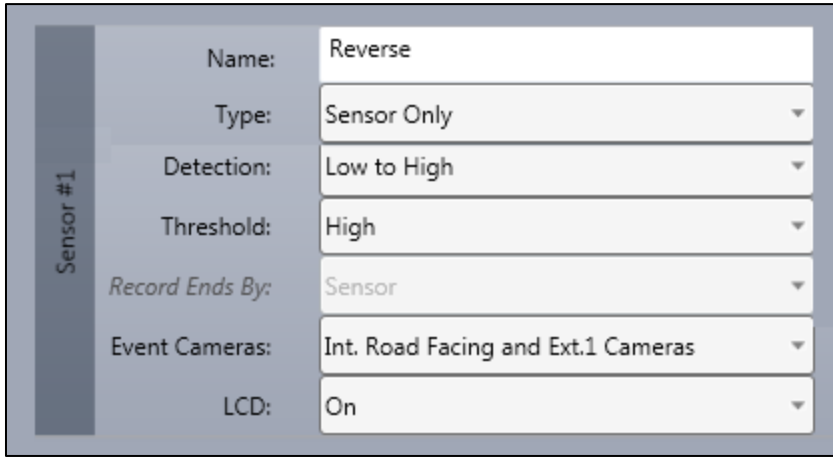
## SENSORS



Proper configuration of the Sensors tab is vitally important to the integration of the two systems. Carefully follow the sensor setup instructions below. *(Until they've been configured following the procedure below, the sensor will be named "Sensor 1" and "Sensor 2").*

**Sensor #1** - This sensor is reserved by Digital Ally for a vehicle reverse or backup sensor. **This sensor MUST always be setup to sense a vehicle reverse input and MUST be configured as follows:**

1. Click "Edit" button for Sensor 1.
2. Configured the drop-down fields as follows:



3. Click the "Done" button (where the edit button was) and this will save the configurations for this sensor.

**Sensor #2** - This sensor is linked to the **ORANGE** Digital Ally input wire. The **ORANGE** digital output wire from Road Safety is to be connected to this input. **To allow the RS-4000 to trigger the recording on the DVM250/DVM250+ this sensor MUST always be setup as follows:**

1. Click "Edit" button for Sensor 2.
2. Configured the drop-down fields as follows:

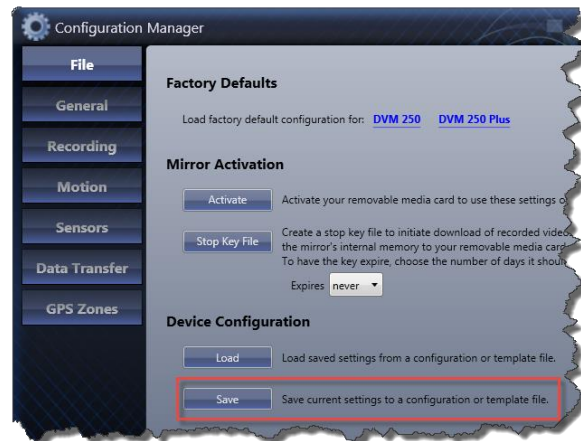
Sensor #2	Name:	Road Safety
	Type:	Event Trigger ▼
	Detection:	Low to High ▼
	Threshold:	High ▼
	Record Ends By:	Timer ▼
	Event Cameras:	Int. Passenger and Int. Road Facing Camer ▼
	LCD:	Off ▼

3. Click the "Done" button (where the edit button was) and this will save the configurations for this sensor.

## DISTRIBUTING THE CONFIGURATIONS

Once the setup of the configurations have been completed the final steps are to save them and then apply them to the DVM-250/250+ devices.

1. Return to the **File** tab and under Device configuration, press the **Save** button. **DO NOT change the name of the configuration file. The filename must remain "deviceconfig" (there is no file extension).**
2. Remove the External SD card from the DVM-250/250+ camera.
3. Load the SD card onto your computer.
4. If any video clips are on the card they must be moved off of the SD card prior to loading the "deviceconfig" file to the SD card. It's suggested that you create a folder on the computer to house these files. The SD card must be blank prior to proceeding to the next step.
5. Copy the deviceconfig file that you just created from your computer onto the blank SD card.
6. **With the ignition off and no events recording**, insert the SD card back into the DVM250+ camera.
7. Turn on the vehicle's ignition and allow the camera to completely start up. Once the camera has completely finished its ignition start-up sequence, the configuration will be loaded into the cameras memory. **DO NOT remove the deviceconfig file from the SD card.**



The camera should now be setup to receive triggers from the RS-4000 device.

## ACCESSING RECORDED VIDEO FILES

Triggered events will be stored on the camera's external SD card. Remove the card and place it into a computer with the Digital Ally Viewer software to view the triggered event videos.

To access the internal continuously looped video, you will need to connect the camera to a computer via the USB connection on the back of the camera. The camera's storage will be accessible as a removable storage device. The Digital Ally Viewer software should be used to access the video.

For assistance setting up a wireless connection between your DVM-250/250+ camera and a secure storage computer or any other camera related support issues or questions, please contact Digital Ally at

**Phone:**           **800-440-4947**

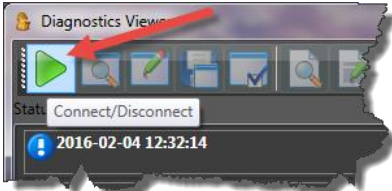
**Email:**           **[support@digitalallyinc.com](mailto:support@digitalallyinc.com)**

## PREPARING THE RS-4000 OUTPUT 2

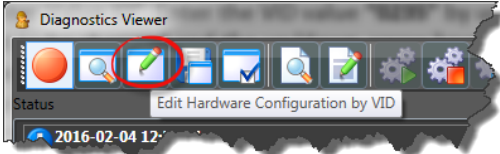
The RS-4000 energizes the orange output wire with 12 vdc for .5 to 1 second when a configured threshold has been exceeded. The ZOLL Road Safety Diagnostics viewer is used to configure the RS-4000 device to send this output for each of the violations detected by the device.

## CONFIGURING THE RS-4000 DIGITAL OUTPUT 2 TO SEND TRIGGERS

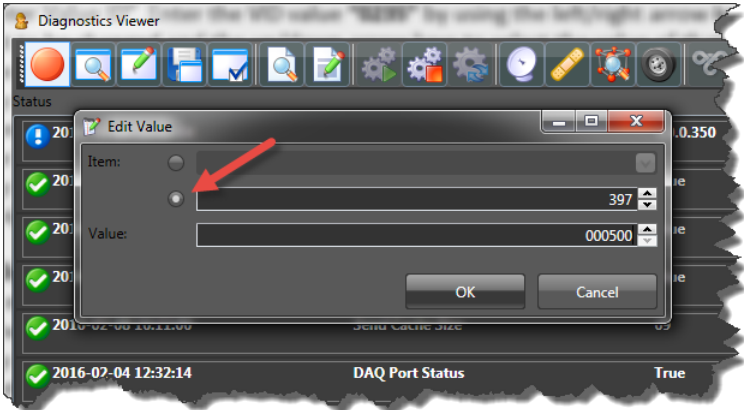
1. Run the diagnostic viewer on the RS-4000 using one of these two methods:
  - a. **Direct Connection** – This method requires a direct connection of a monitor, mouse and keyboard to the RS-4000. Details on this method can be found on [page 28](#).
  - b. **Wirelessly** – This method can be used if both the RS-4000 and a desktop/laptop computer are on the same network subnet. The computer being used must have the Diagnostics Viewer software installed. Details on this method can be found on [page 28](#).
2. Press the “Play” button on the far left to connect to the RS-4000



3. Click the third button from the left (Edit Hardware Configuration by VID).

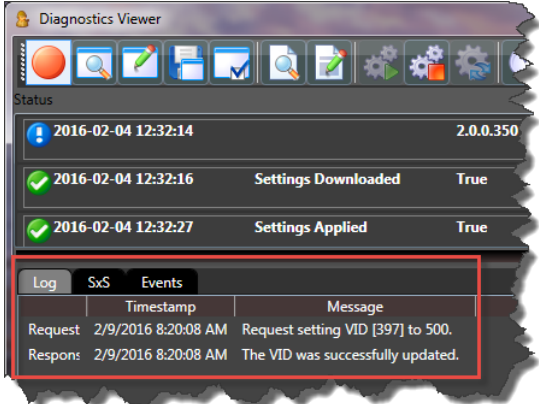


4. The “Edit Value” dialog box displays. Here the second option button should be selected.
5. Enter the value of the VID you wish to update. In our example 397 has been entered. This is the VID for a high RPM.
6. In the value field, 000500 has been entered which will send a half second 12VDC pulse through the RS-4000 Digital OUTPUT 2.



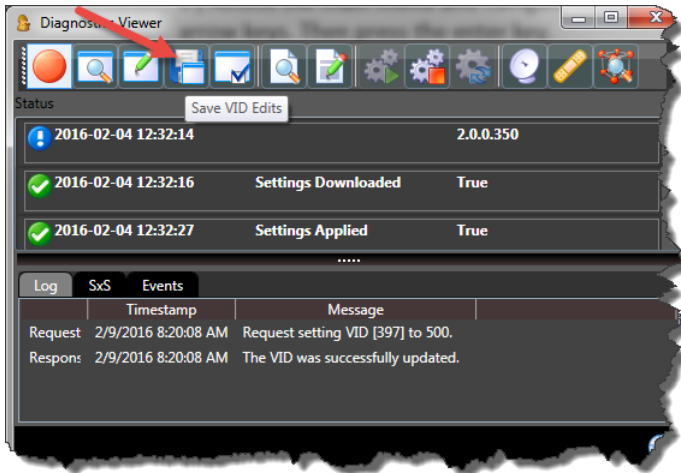
- After clicking “OK”, the dialog box will close and within a few seconds in the log section in the lower portion of the viewer will display a notification advising that the VID was successfully updated with value entered.

There are a total of 25 VID’s that can be configured to trigger the Digital Ally DVM-250/250+ cameras. Which VID’s are configured to do so is at the discretion of the agency. However, **for each of the VID’s that are to be setup as triggers, the process described above must be completed for each.** The list below details each of the VID’s that used to send the 12VDC pulse using Road Safety’s Digital OUTPUT 2.



VID	Type	VID	Type
397	RPM	113	Centripetal Acceleration
235	Spotter	106	Centripetal Acceleration
229	Seatbelt	134	Longitudinal Forward Go Acceleration
011	Overspeed (Emergent)	127	Longitudinal Forward Go Acceleration
017	Extreme Overspeed (Emergent)	155	Longitudinal Forward Stop Acceleration
030	Overspeed (Non-Emergent)	148	Longitudinal Forward Stop Acceleration
024	Extreme Overspeed (Non-Emergent)	176	Longitudinal Reverse Go Acceleration
050	Coordinated Turn	169	Longitudinal Reverse Go Acceleration
043	Coordinated Turn	197	Longitudinal Reverse Stop Acceleration
071	Turn Factor One	190	Longitudinal Reverse Stop Acceleration
064	Turn Factor One	218	Two-Dimensional Acceleration
092	Turn Factor Two	211	Two-Dimensional Acceleration
085	Turn Factor Two		

**IMPORTANT:** Once VID’s are set using the steps above, they MUST be saved to the RS-4000 prior to exiting the Diagnostics viewer. To save, simply press the fourth button from the left on the button bar.



**Not saving prior to exiting will require the re-entry of all values.**

## TESTING THE RS-4000, DIGITAL ALLY DVM-250/250+ INTEGRATION

After everything has been installed and configured, the system test is a very simple process that generally takes less than one minute.

### TESTING PREREQUISITES

Prior to testing the integration the following conditions **MUST** be true:

- Road Safety ZOLL Online configurations for the RS-4000 being tested must be completed
- RS-4000 must be installed and tested
- RS-4000 VID's to trigger the DVM-250/250+ camera must be saved to the RS-4000 being tested
- Configurations for the DVM-250/250+ must be saved to the camera being tested
- The RS-4000 Digital OUTPUT 2 orange wire must be connected to the orange wire of the DVM-250/250+ RJ45 wire harness

### TEST PROCEDURE

1. Ignition switch must be activated.
2. Wait for the DVM-250/250+ to boot up, the green LED will be solid when it's complete.
3. **Manual Record Test** –
  - a. Press the RED RECORD button on the front of the mirror.
  - b. **SUCCESSFUL TEST?** The red status indicator will blink indicating its recording.
  - c. After ten seconds, press the record button again to stop the recording.
4. **Triggered Record Test** –
  - a. Engage the brakes, place the vehicle in reverse.
  - b. The backup tone will begin to sound. At this point the "Spotter" timer has begun.
  - c. After 20 seconds\* the Road Safety speaker will sound indicating a "Spotter Violation" has occurred because the spotter switch has not been depressed.
  - d. **SUCCESSFUL TEST?** – At the same time the alarm tone begins the RS-4000 should\*\* send a trigger to DVM-250/250+ to begin recording because a violation has occurred. The red recording light on the mirror will be the indication of a successful test.

\* The Spotter Switch violation time is a configurable value in ZOLL Online. 20 seconds is a suggested amount of time but it may be different based upon the agency.

\*\* VID 235(spotter violation) must be configured to send the 12VDC pulse out the RS-4000 Digital OUTPUT 2.

## RS-4000 / DIGITAL ALLY TROUBLE SHOOTING SUMMARY

This following excerpt is taken directly from the troubleshooting section of the Digital Ally installation guide.

### Basic Troubleshooting

Symptom	Resolution
System will not power up.	<ul style="list-style-type: none"> <li>Verify the power cable connector is connected to the back of the DVM.</li> <li>Check the power cable fuses located in the in-line fuse housing on the power cable.</li> <li>Verify there are no breaks, pinches, or cuts in the wiring or cable harness.</li> <li>Check the wiring and voltage levels to the vehicle power and ignition switch wiring.</li> </ul>
All LEDs are flashing rapidly in unison	<ul style="list-style-type: none"> <li>DVM is configured to use an external SD card and the SD card is missing.</li> <li>The external SD card does not have enough free available storage for uploading the events from internal memory. Replace the external SD card with a blank SD card.</li> </ul>
Yellow LED on Solid	<ul style="list-style-type: none"> <li>Memory is full. Upload event files from the DVM or replace the external memory storage device.</li> </ul>
DVM powers up but doesn't record	<ul style="list-style-type: none"> <li>Check the LED status indicators and clear accordingly</li> <li>Reset the system.</li> </ul>
DVM powers up and goes directly to an event record (Red LED Flashes)	<p>An event record has been triggered from either an internal sensor or from an IF Box:</p> <ul style="list-style-type: none"> <li>Disconnect the Sensor Cable RJ45 connector from the IF Box and reset the DVM. If the problem doesn't re-occur, check the wiring from the vehicle to the sensor cable.</li> <li>Check the DVM configuration parameter values for all internal sensors and/or IF Box sensors.</li> </ul>
Backup Camera not visible on the LCD when the vehicle is in Reverse gear	<ul style="list-style-type: none"> <li>Verify the DVM is powered ON and operational.                             <p><i>Note: Backup camera operation will only occur when vehicle ignition is on and running.</i></p> </li> <li>Verify the reverse gear wiring is connected to the Red wire of the RJ45 sensor cable.</li> <li>Verify the Reverse Gear signal voltages.</li> <li>Verify there are no breaks, pinches, or cuts in any of the wiring or cable harnesses for the backup camera, IF Box, reverse gear wiring, vehicle power and ignition wiring.</li> <li>Verify the IF Box is connected to the DVM.</li> <li>Verify the camera cable connector is connected to the back of the DVM.</li> <li>Verify the camera cable from the DVM is connected to the connector on the hard-wired harness from the camera.</li> <li>Verify the DVM sensor inputs are configured correctly through the <i>Configuration Manager</i> software. Refer to the Administrator Guide for additional details for configuring the DVM.</li> </ul>
Backup Camera is visible when the vehicle is in Park	<ul style="list-style-type: none"> <li>The default operation for the IF Box reverse gear signal is from High to Low (+12vdc to 0vdc). If the reverse gear signal that is connected has +12VDC when in reverse, the DVM will need to be re-configured. Refer to the Administrator Guide for additional details for configuring the DVM.</li> </ul>
Backup Camera video is garbled or not intelligible	<ul style="list-style-type: none"> <li>Verify backup camera, cabling, and connectors.</li> <li>IF Box may be defective</li> </ul>
DVM is unresponsive	<ul style="list-style-type: none"> <li>Verify the cables and cable connections.</li> <li>Verify vehicle power.</li> <li>Press the reset button.</li> </ul>
False Triggering of Event Recordings	<ul style="list-style-type: none"> <li>Determine which trigger is causing the false trigger by viewing the event recording.</li> <li>The unit can be reconfigured to default settings and enable each trigger to determine which one is causing the false trigger.</li> <li>If the Accelerometer is causing false triggering, verify the mirror is in the normal rearview mirror orientation.</li> </ul>

For additional assistance contact:

ZOLL Support – 1-800-663-3911 / [support@zoll.com](mailto:support@zoll.com)

Digital Ally – 1-800-440-4947 / [support@digitalallyinc.com](mailto:support@digitalallyinc.com)



