



Z-CON™ USERS MANUAL & INSTALLATION GUIDE

DRAFT



ELECTRONIC FLEET MANAGEMENT

www.zonarsystems.com

DRAFT

Z-Con™ Hardware Installation Tips For Professional Installers

Zonar's equipment will provide years of reliable service if properly installed and maintained. Zonar equipment is typically installed in heavy vehicle applications and is often subject to extreme temperatures, dust, dirt, vibration, and shock. Proper installation is the critical first step to equipment longevity and optimal performance.

This guide is meant to be a general guideline for the professional installer and technician. While we attempt to point out the most common installation questions and issues; common sense, good housekeeping procedures, attention to detail, safety adherence, and technical competence of the professional installer is critical for a successful installation.

Please refer to your specific vehicle manufacturer guidelines for the installation of electrical components and wiring.

A professional team of Zonar support technicians and engineers are available to answer your installation questions. Contact Zonar at 1-877-843-3847 or by email at customercare@zonarsystems.com.

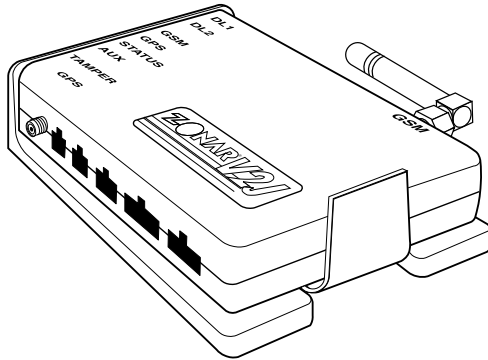
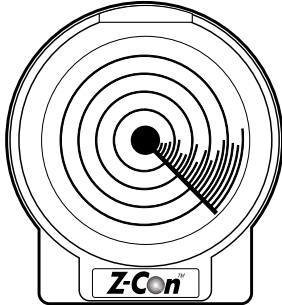
Thank you,



Andre J Horochiwsky
Technical Training Manager – Zonar Systems

As Zonar is continuously improving the Product, Zonar may make changes to the Product at any time which may not be reflected in this document.

DRAFT



Z-Con • V2JE™ /TRUCK SIDE BOARD

Introduction	2
System Overview	4
V2JE/Truck Board Hardware	5
Basic Workflow	6
General Guidelines	6
V2JE Mounting Plate	7
Wiring Guidelines	8
V2JE Pin Configuration	8
Cables	9
Antenna Installation	11
Non-Typical System Installation	12
Truck Install Application & Tool	13
GPS System Check	14
System Checklist	15
System Specifications	16
Installation Example	17
System Installation	18
Troubleshooting	19-20
Truck Windshield Configurations	21-22
Non-Typical System Installation	23
Warranty & Notices - FCC Compliance	24
Notes	25

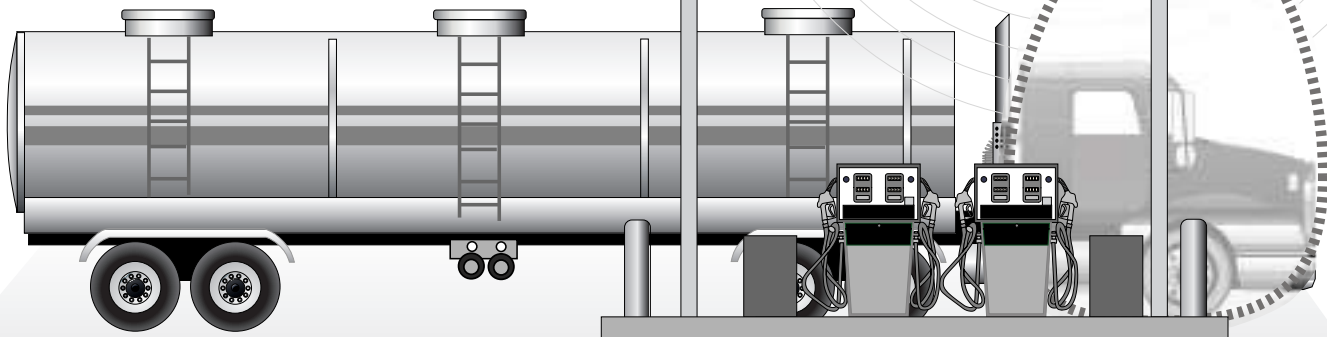
© 2011 Zonar Systems. All Rights Reserved. Products and services protected by one or more patents:

REV: 09/15/11

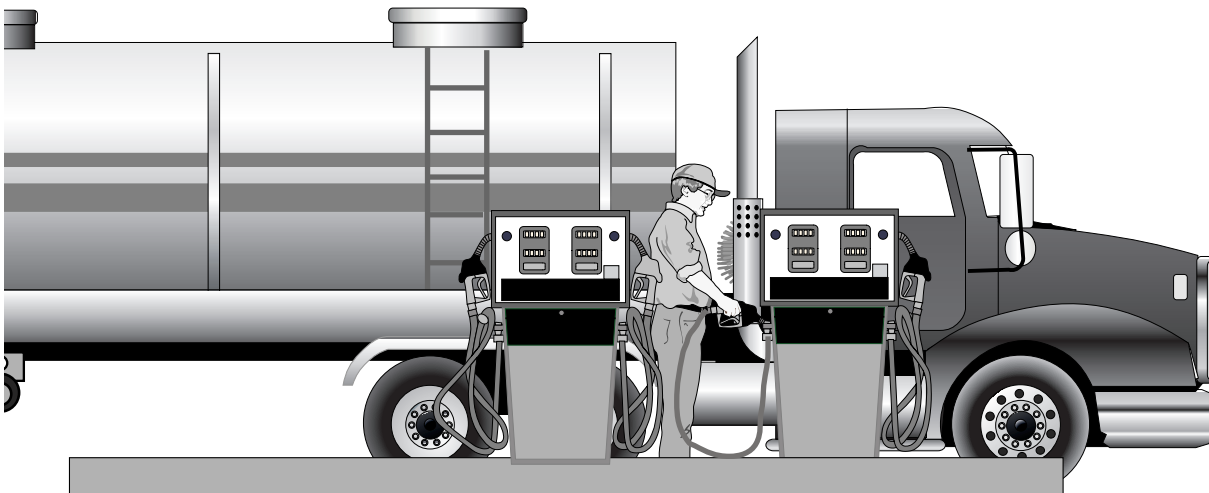
ZONAR®

INSPECT • TRACK • KNOW

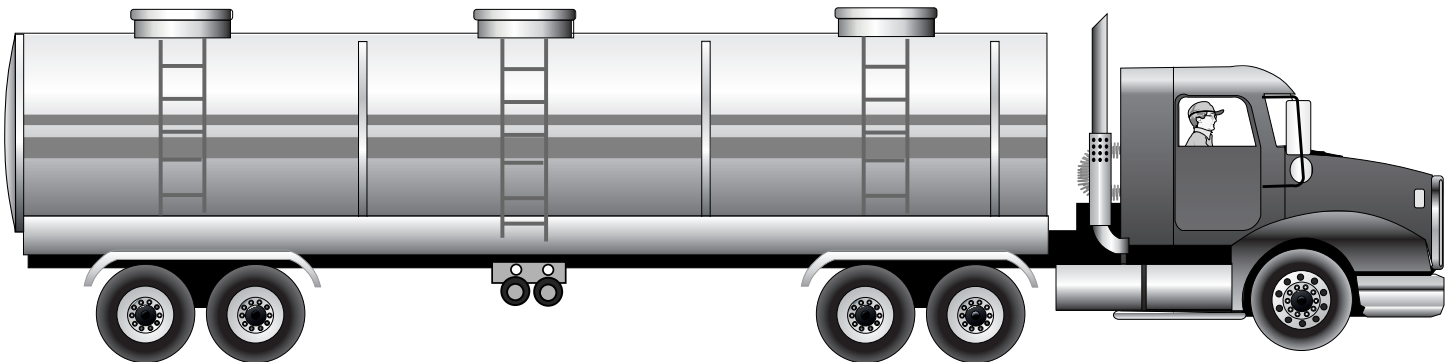
DRAFT



- 1** Z-Con detects the truck via ultrasonic sensors and activates the radio in the fuel canopy and infrared transmitter.



- 2** The truck's VIN is validated indicating the truck is authorized to begin fueling.



- 3** After fueling has completed, the truck leaves the pump area and the secure connection is broken - ensuring that only the authorized truck is fueled.



INSPECT • TRACK • KNOW

DRAFT

Basic Workflow

- 1) Unpack all equipment and verify shipment (see page 7).
- 2) Layout system (see page 7)
- 3) Install and inter-connect system.
 - A) V2JE device (see page 7).
 - B) Electrical/JBus data link (see pages 8-10 and page 16).
 - C) Antenna(s) (see page 12).
 - D) Truck board windshield mount and truck board (see page 11)
- 4) Operational checkout V2JE device (see page 14).
- 5) Provision Truck Board (see page 13).



INSPECT • TRACK • KNOW

DRAFT

Layout

- 1) Cellular/GSM antennas must be located a minimum of 8" from any person.
- 2) Mount all equipment in the interior of the vehicle. External mounted GPS antenna is the only component installed externally.
- 3) Do not install Zonar equipment below windows and doors which open to the vehicles exterior to prevent water damage.
- 4) Lay all components out prior to installation to check for proper cable length and interference issues.
- 5) Avoid mounting equipment in difficult to access areas. Avoid mounting in areas which do not allow for direct diagnostic LED viewing.
- 6) Avoid mounting equipment in dirty, dusty, or damp areas (e.g. near floors and entrance ways).
- 7) Avoid mounting Zonar Equipment, antennas and wiring near other radio equipment (e.g., two-way radios), PA equipment and high energy electrical sources (e.g., cables, relays, amplifiers, etc.)

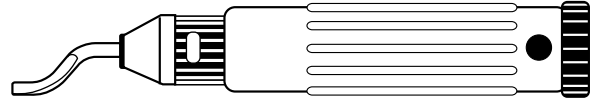


Electrical

- 1) **Consult the vehicles manufacturer for specific installation guidelines. (HIGHLY RECOMMENDED for Multiplex electrical systems)**
- 2) All power leads (V2JE-Power Cable) must be connected to the vehicles protected circuitry (e.g. fuse panel, circuit breaker panel, protected circuits). Never electrically connect Zonar equipment to unprotected circuits.
- 3) It is also required that all power leads (V2JE-Power Cable) be protected with a 3 to 5 amp fuse and inline fuse holder (included) for optimal system protection.

Drill Holes

- 1) Capture all drill chips during drilling operations. Do not allow drill chips to fall onto electrical equipment, furnishings, heating ducts, etc. Magnets, sticky tape, vacuums, physical barriers, etc. may all be used to accomplish this task.
- 2) Deburr all drill holes on both sides of drilled surface. Example deburr tool:



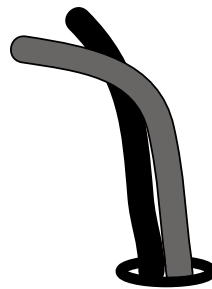
- 3) All drill holes must have a rubber grommet or similar anti-chaffing system installed to protect cable assemblies (e.g. plastic conduit).
- 4) Seal all penetration drill holes which may pass rain water (e.g. GPS antenna cable).

Cable Management

- 1) Strain relieve and support all cable installations.
- 2) Avoid sharp bends and tight radius installations of cables.
- 3) Avoid moving components (e.g. doors, steering shafts, handles, fans, etc.).
- 4) Provide an adequate "Service Loop" i.e. "cable slack" to allow for servicing of equipment.
- 5) Avoid routing cables thru doors, windows, and other pinch points.
- 6) Avoid routing cables in high personnel traffic areas.
- 7) Avoid routing antenna cables near radio and PA equipment.

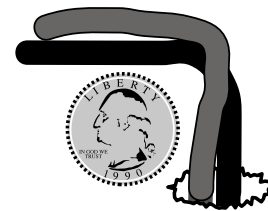
CORRECT

- Bend radius adequate
- Hole has grommet



INCORRECT

- Bend radius too tight
- Hole has sharp edges
- Hole has no grommet

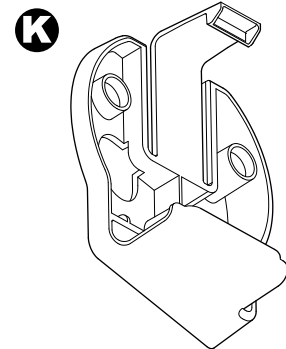
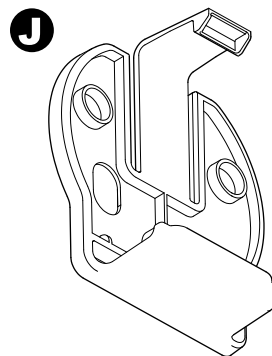
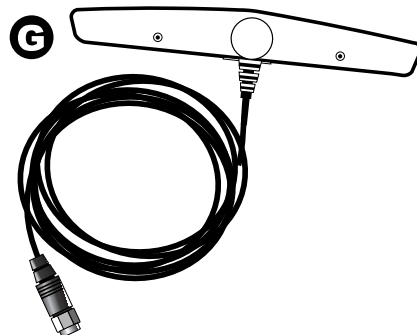
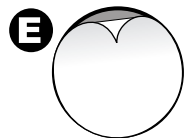
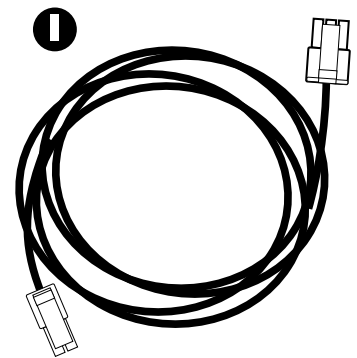
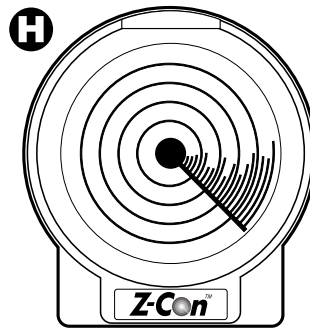
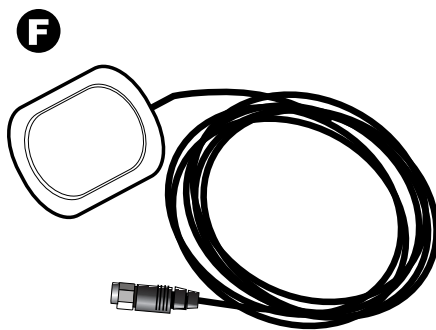
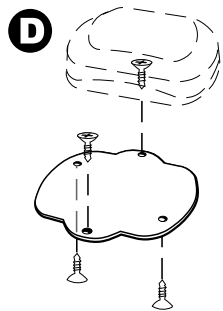
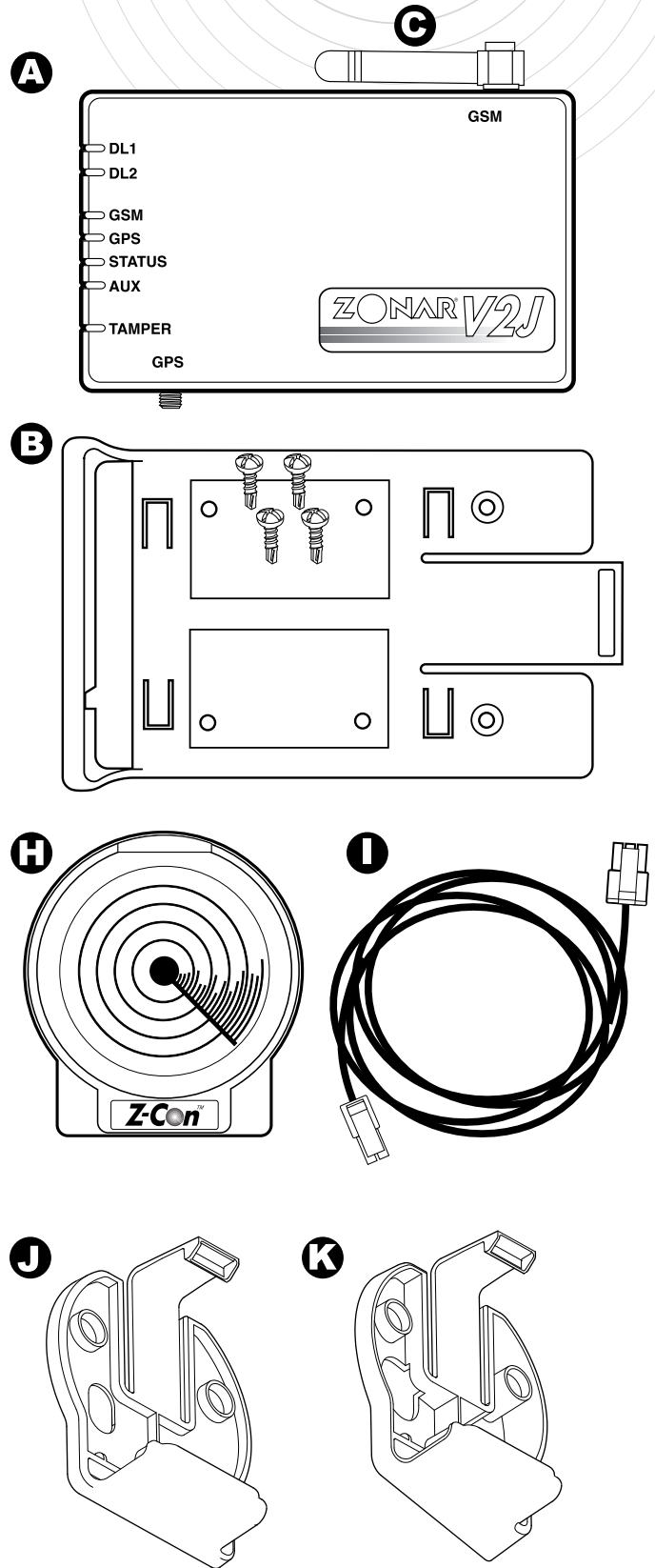


DRAFT

Component Identification

- A. V2JE
- B. V2JE Mounting Plate and Mounting Screws (provided)
- C. Stubby GSM (cellular) Antenna
- D. GPS Antenna Aluminum Mount Plate and Screws (optional - used for non-magnetic exterior rooftop GPS Antenna installs)
- E. 3M Double Sided Adhesive (used for non-metallic interior roof attachment) supplied
- F. GPS Antenna
- G. MiniWing style GSM Antenna (optional)
- H. Truckboard Part No. 80510
- I. Truckboard Cable - 13 ft. - Part No.80765
- J. Standard Back Part No. 80911
- K. Angled Back Part No. 80912

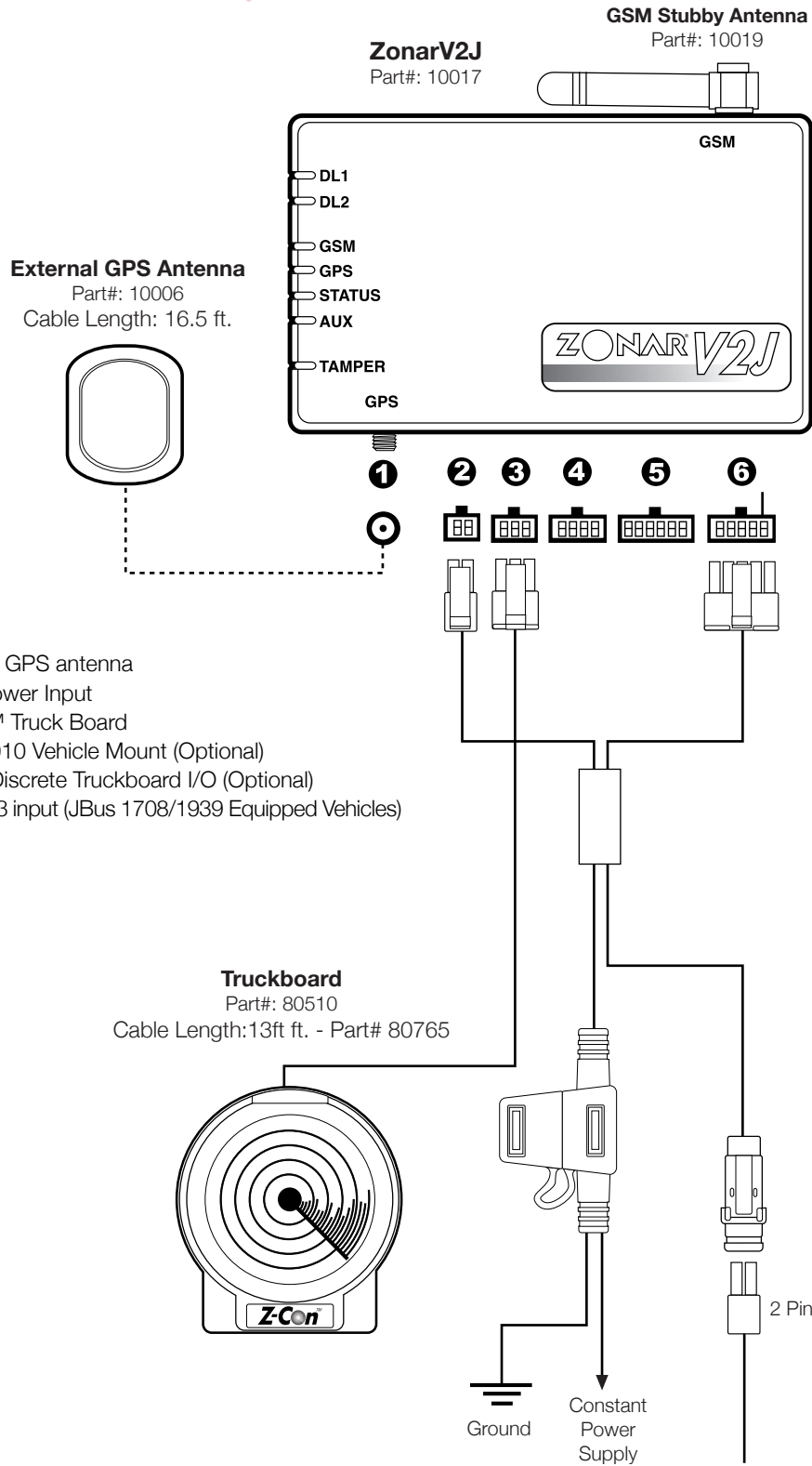
Note: See page 11 for detailed information on GPS and GSM (cellular) antenna requirements and recommendations.





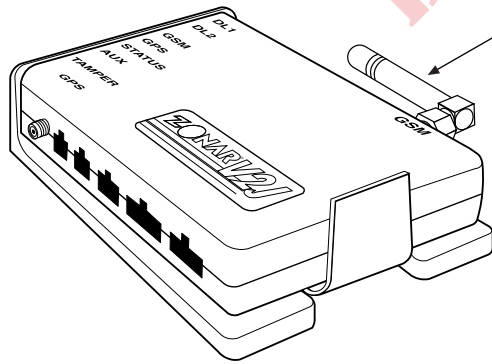
INSPECT • TRACK • KNOW

DRAFT



1. External GPS antenna
2. 4 Pin Power Input
3. Z-Con™ Truck Board
4. 8 Pin 2010 Vehicle Mount (Optional)
5. 12 Pin Discrete Truckboard I/O (Optional)
6. 10 Pin J3 input (JBus 1708/1939 Equipped Vehicles)

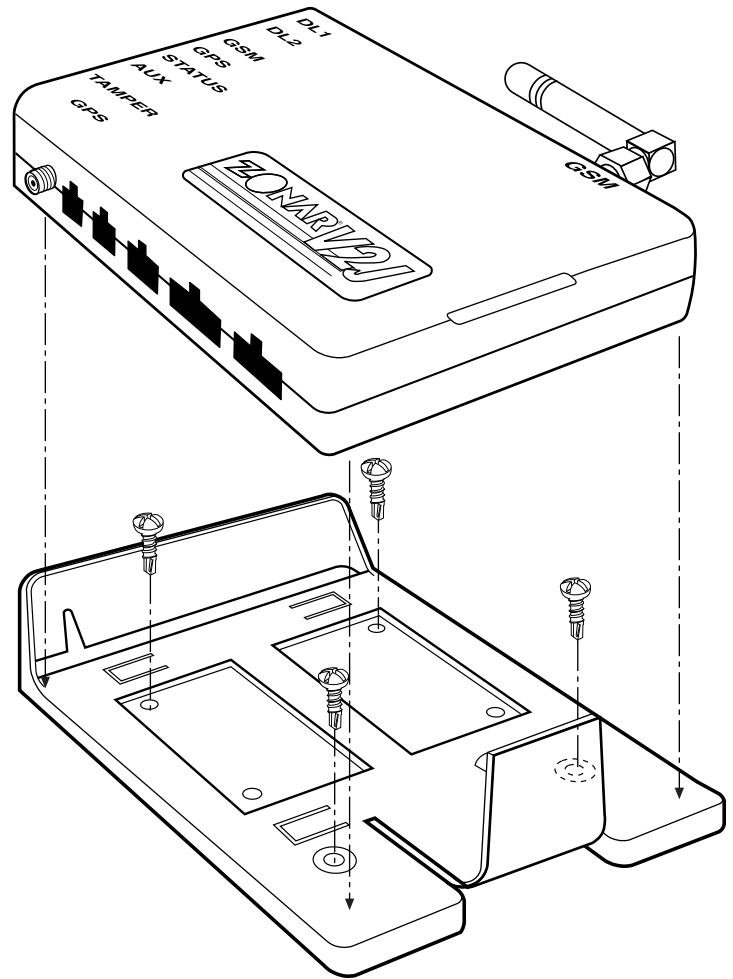
DRAFT



CAUTION: The mini-GSM antenna is factory torqued, do not rotate antenna!!

V2JE Mounting Plate & Unit

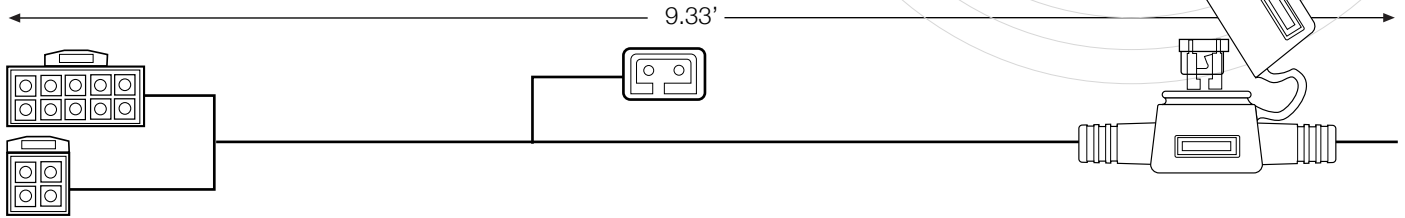
- 1) Follow all General Guidelines as specified on page 6.
- 2) Mount onto interior flat surface large enough to accommodate footprint.
- 3) Do not install below windows or doors which open to the vehicles exterior to prevent water damage.
- 4) Avoid mounting equipment in difficult to access areas. Avoid mounting in areas which do not allow for direct diagnostic LED viewing.
- 5) Avoid mounting Zonar Equipment, antennas and wiring near other radio equipment (e.g., two-way radios), PA equipment and high energy electrical sources (e.g., cables, relays, amplifiers, etc.).
- 6) Avoid mounting equipment in dirty, dusty, or damp areas (e.g. near floors and entrance ways).



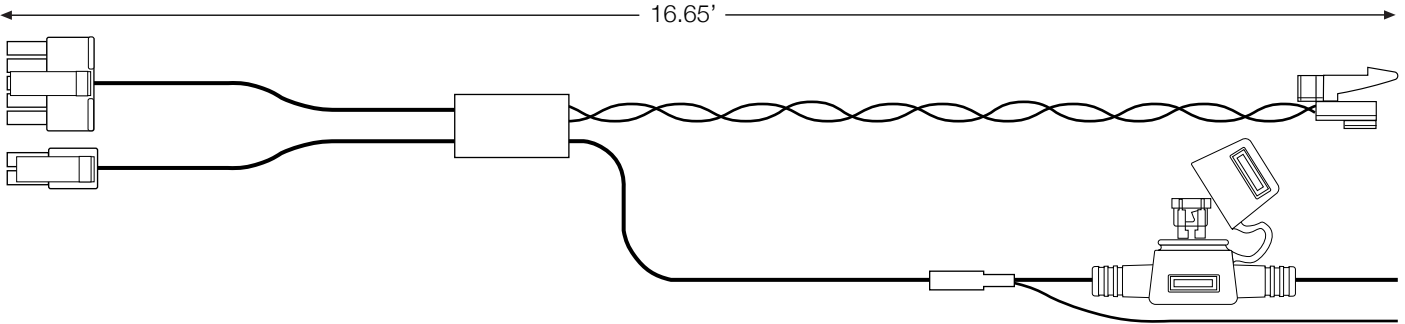
DRAFT

See Page 21-22 for Vehicle Specific Requirements

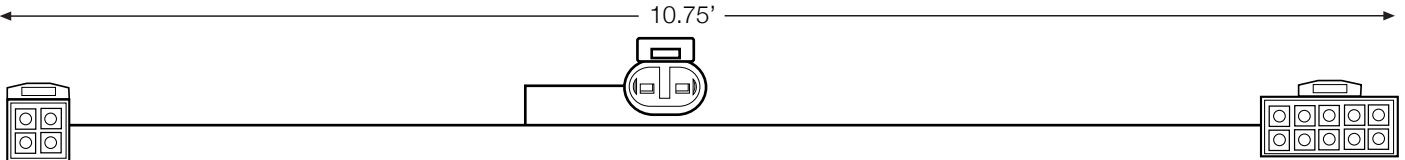
PIN 80441 - V2J WW J1939 TO RETRO ADAPTER



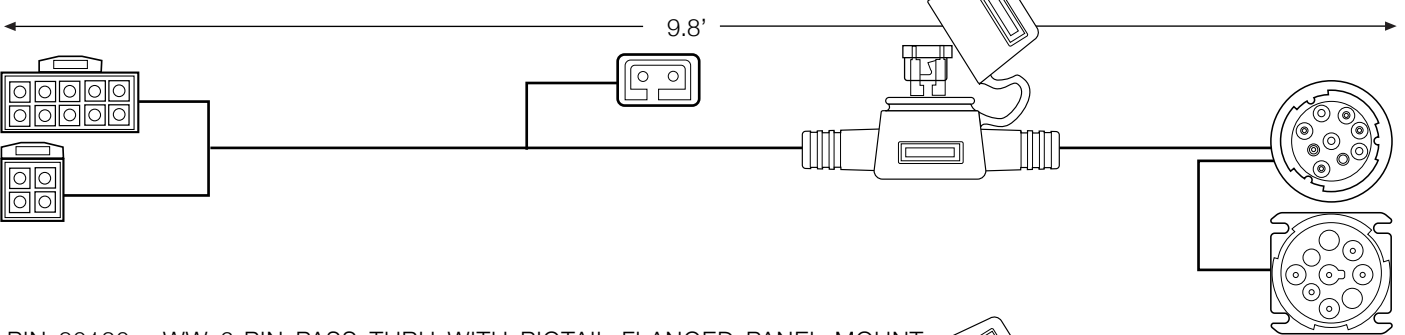
PIN 80444 - V2J WW J1708 2-PIN DELPHI



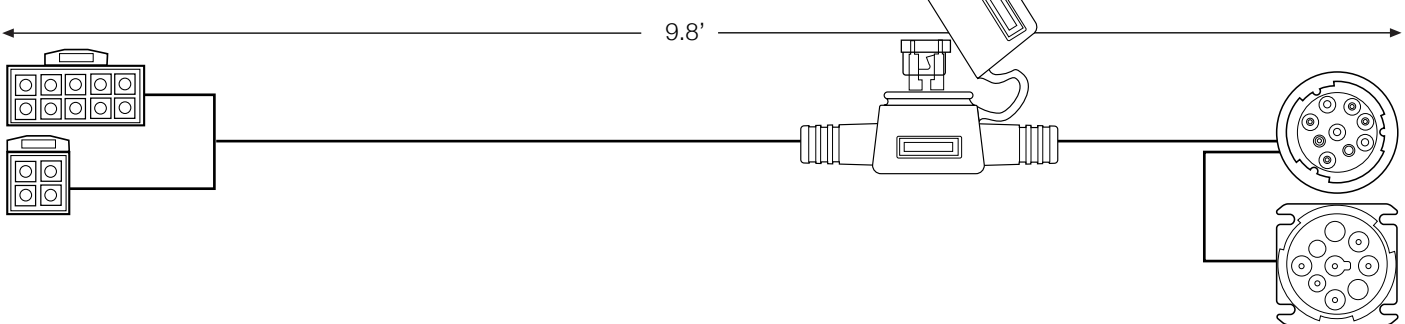
PIN 80339 - J1939 - 15 UNIVERSAL NODER AMP ss



PIN 80183 - WW 9-PIN PASS THRU WITH PIGTAIL FLANGED PANEL MOUNT



PIN 80130 - WW 6-PIN PASS THRU WITH PIGTAIL FLANGED PANEL MOUNT



Wiring Guidelines for non-terminated wire ends

CONSTANT POWER:

The authorized method for power termination on the Zonar V2JE system is the use of Add-a-Circuit fuse taps. Whenever possible, use fuse taps for power termination. If, due to the particular make/model/year of the vehicle being installed, fuse taps cannot be used then the poke and weave method of termination can be utilized. All wiring terminations MUST be fused regardless of Add-a-Circuit or poke and weave.

When installing Add-a-Circuit fuse taps, ensure that the fuse tap seats fully in the correct location. If another fuse, a relay, or any other object in the fuse panel prevents the fuse tap from seating fully, relocate the fuse tap. It is not permissible for the fuse tap to rub or make contact with other items in the fuse panel. In addition, you must be able to re-secure the fuse panel cover or door once the fuse tap is installed. Whenever possible, use an empty location in the fuse panel that does not have an existing fuse. If it is not possible to use an empty location, ensure that the existing fuse is placed in the correct location on the fuse tap.

See Fig. 11-1

Whenever it is not possible to utilize Add-a-Circuit fuse taps then the poke and weave method must be used.

- A. First locate the proper wire where the poke and weave method is to be installed. Strip 3/4" to 1" of insulation from the wire in the vehicle to be installed. Spread the wire strands apart as shown. See Fig. 11-2
- B. Strip 1" to 1 1/2" of insulation from the wire in the fused link to be installed. See Fig. 11-3
- C. Insert the wire from the fused link into the spread wire in the vehicle. Wrap around the wire several times. See Fig. 11-4
- D. Cover the exposed wires with several wraps of electrical tape or mastic. Place one wire tie over the electric tape over the exact location where the wires are 'wrapped' together. Place another wire tie 1" to 2" from the first wire tie, to secure the two wires together and as stress relief. See Fig. 11-5

GROUND:

Normally affixed to the vehicle chassis with a high quality solderless ring lug. Ensure good crimp by giving the finished joint a slight tug. See Fig 11-6

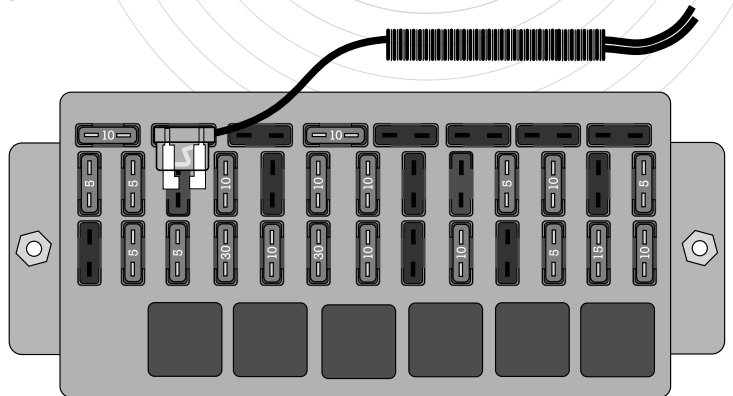
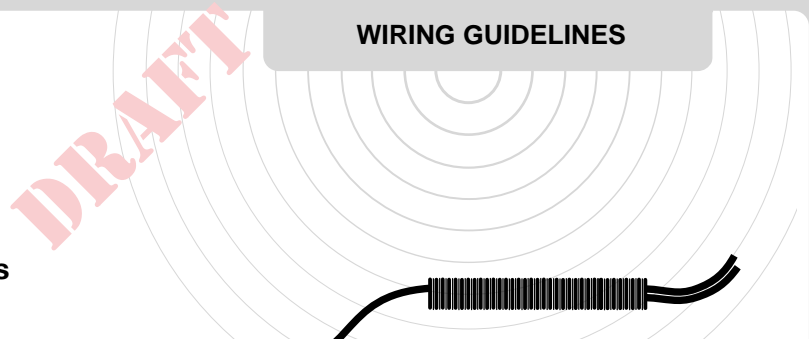


Fig. 11-1

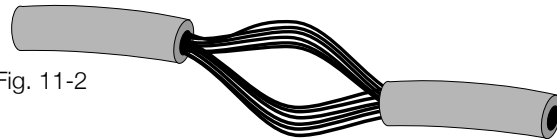


Fig. 11-2

CAUTION: Only "LitteFuse" (www.littlefuse.com) Add-A-Circuit taps are authorized for use with Zonar Equipment.

**Full size: (ATO) P/N FHA200
Mini version: P/N FHM200**

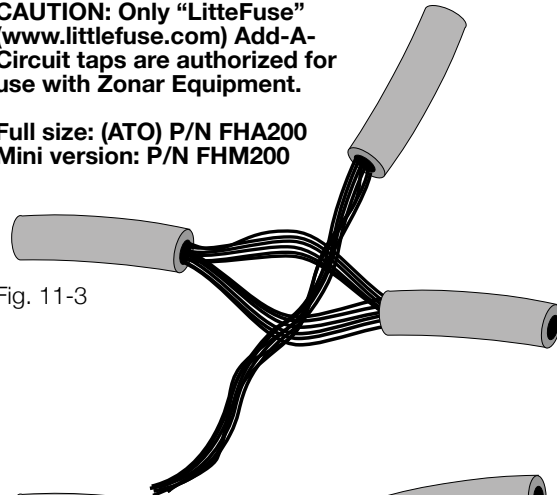


Fig. 11-3

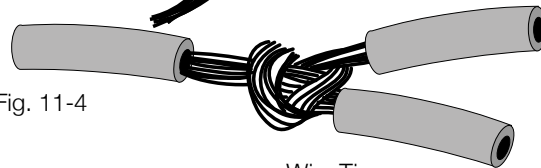


Fig. 11-4

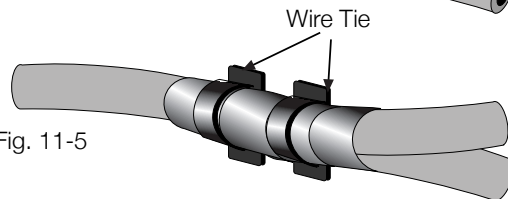


Fig. 11-5

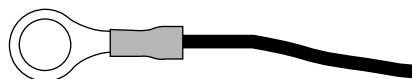
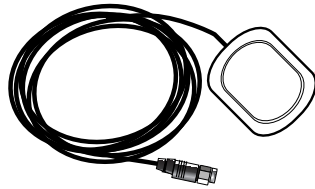


Fig. 11-6



INSPECT • TRACK • KNOW

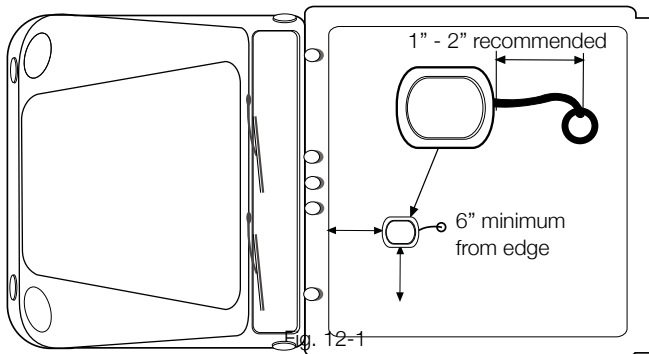
External GPS Antenna



- 1) Follow all General Guidelines as specified on page 6.
- 2) May be magnetically mounted or mounted via optional aluminum plate and screw for non-magnetic surfaces (see page 7).
- 3) Interior cab mount - non-metallic roof only
- 4) Suggested installation point - centerline of vehicle roof, minimize cable run to prevent wind and truck wash damage.
- 5) Ensure a clear antenna view of the open sky.
- 6) Maintain a minimum of 6 inches from any rooftop edge or ledge (see Fig. 12-1).
- 7) Drill, Deburr, grommet, weather seal, cable thru hole as required. Drill hole size - 1/2" (.500"); grommet size - 3/8" (.375").

Note: For optimal system performance Zonar recommends rooftop mounting with a clear view of the sky.

External Rooftop Mount - Preferred



Interior Cab Mount - Non-Metallic Roof Only

- 1) Clean and dry the surface before placing. To obtain optimum adhesion, the surface must be clean and dry. The best surface cleaning solvent is an isopropyl alcohol/water mixture (rubbing alcohol).
- 2) Remove the backing from the peel-and-stick (see fig. 12-2). Press and hold mounting position for 10 seconds to assure good adhesion.

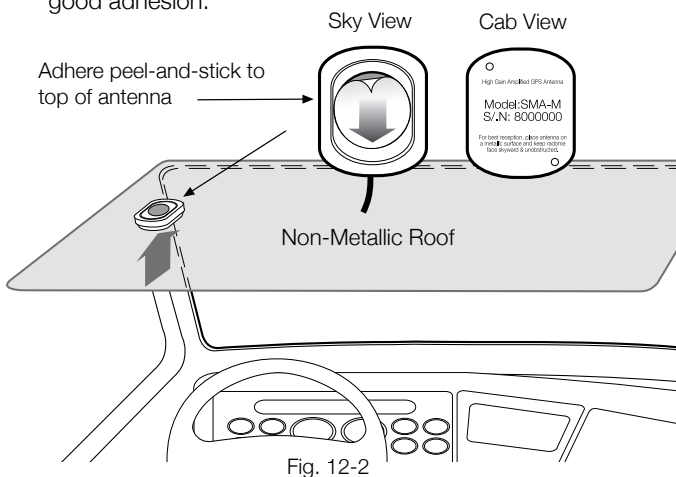
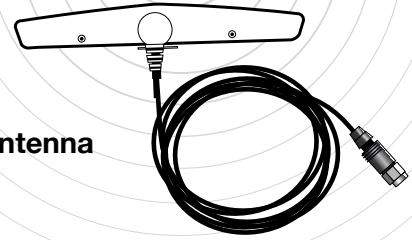


Fig. 12-2

External GSM Antenna (Optional)



- 1) The attached GSM (cellular) "stubby" antenna is quite robust and works well in a wide variety of applications. Generally external GSM (cellular) antennas are only required if the unit is enclosed behind a metallic panel or in a metallic box. To check the quality of the cellular connection, turn on the engine and the GSM LED should be a solid (non-blinking) green within 2 minutes).
- 2) Follow all General Guidelines as specified on page 6.
- 3) Cellular/GSM antennas must be located a minimum of 8 " from any person.
- 4) Mount on unobstructed interior glass surface (e.g. windshield corner or stationary side window) with a clear view of open sky.
- 5) Do not install on metallic surfaces, or in metallic enclosures.
- 6) Do not block drivers view or mirrors.
- 7) Verify placement acceptability with state DOT/law enforcement prior to installation.
- 8) Positioning - Vertical (Optimum), Horizontal (Alternate) (see Fig. 12-3).
- 9) Clean and dry the surface before placing the mounting plate. To obtain optimum adhesion, the surface must be clean and dry. The best surface cleaning solvent is an isopropyl alcohol/water mixture. (rubbing alcohol)
- 10) Remove the backing from the peel and stick (see Fig.12-4). Press and hold mounting position for 10 seconds to assure good adhesion.

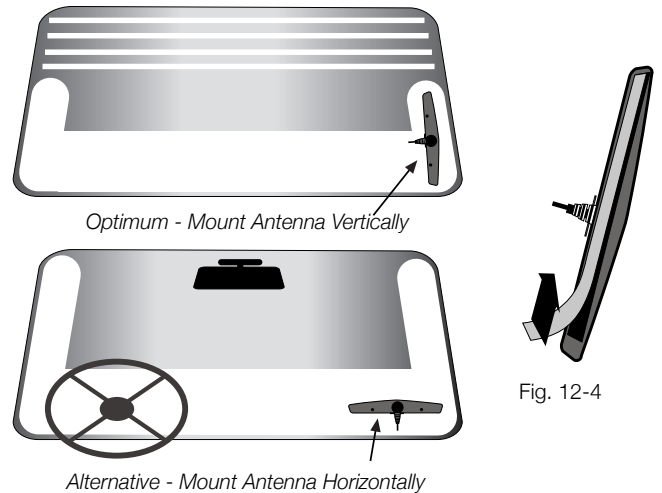
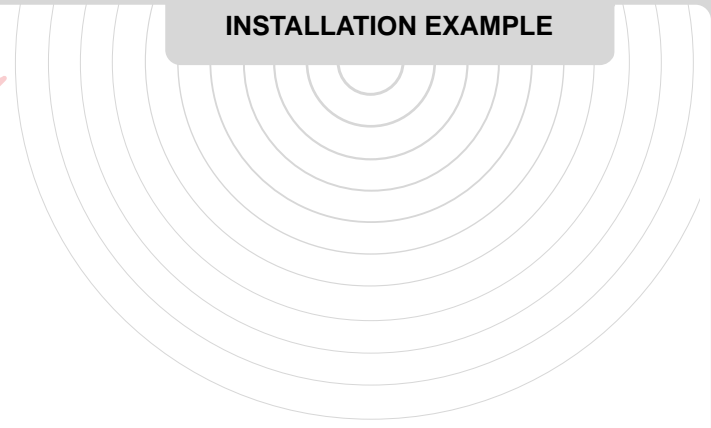


Fig. 12-4

Fig. 12-3

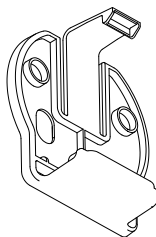
DRAFT



Truck Board Bracket and Truck Board Installation

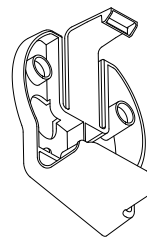
- 1) Follow all general guidelines as specified on page 6.
- 2) Locate proper mounting location. See vehicle specific information table on pages 21-22.
- 3) Clean and dry windshield surface. To obtain optimum adhesion the windshield surface must be clean and dry. The best surface cleaning solvent is an isopropyl alcohol/water mixture (rubbing alcohol).
- 4) Remove the backing from the peel-and-stick (see Fig. 13-1 or 13-2). Press and hold mounting position for 10 seconds to assure good adhesion.
- 5) Complete cable routing and connect Truck Board to V2JE unit.

One Piece Windshield



Standard Back

Split Windshield



Angled Back

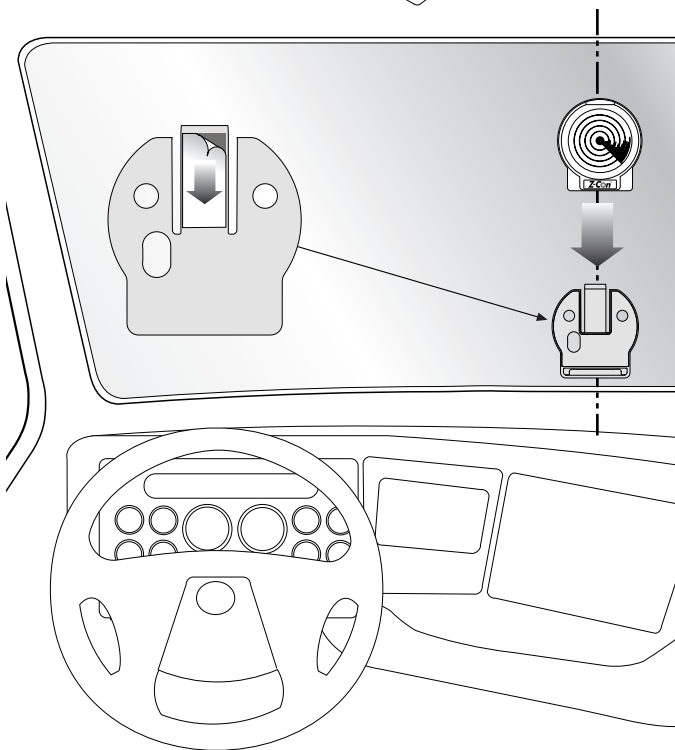


Fig. 13-1

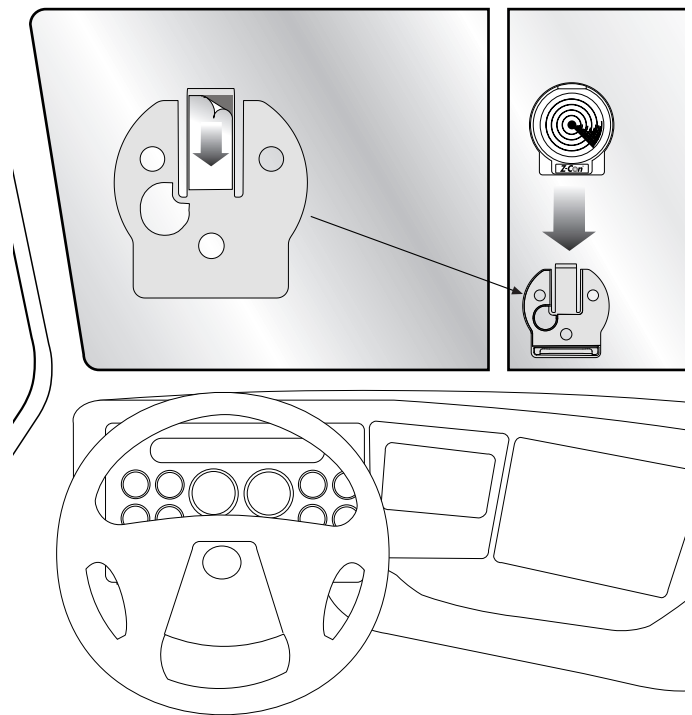


Fig. 13-2



INSPECT • TRACK • KNOW

DRAFT

Customer:	Yard:	Date:	Asset #:
Installer:	Location:	GPS ID:	
Vehicle Odometer Value:	Vehicle I.D. (e.g., Vin, Plate#, Make, Model, Year)		
Vehicle Hour Meter value (if monitoring engine hours)			

System Check	Value	Notes
General Layout		
General condition - components level, even, straight, etc?		
System layout conforms to your established standard?		
Clearance check - Vehicle Mount to 2010 Hand Held?		
Drilling and Cutting		
All drill holes grommeted (or otherwise protected), deburred, sealed (weather penetrations only)		
All chips captured?		
Vehicle Mount vacuumed and visually verified to be free of drill chips or other debris?		
Cable Management		
All cables properly ran (tight radius, interference, strain relieved, supported, service looped)?		
Electrical		
System hookup complies to your established standard?		
Verify crimp integrity?		
Verify fuse holder and fuse installation?		
GPS/J3 System checkout		
GPS/J3 LED light check? (engine on/engine off)		
Verify GPS position uploaded to GTC website?		
Verify power On/Off event		
Truck Board System		
Truck Board properly provisioned?		
Post Job		
Key accounted for?		
Vehicle secure?		
Lights, electrical off?		
All debris, refuse, chips removed?		

INSTALLER SIGNATURE

Date

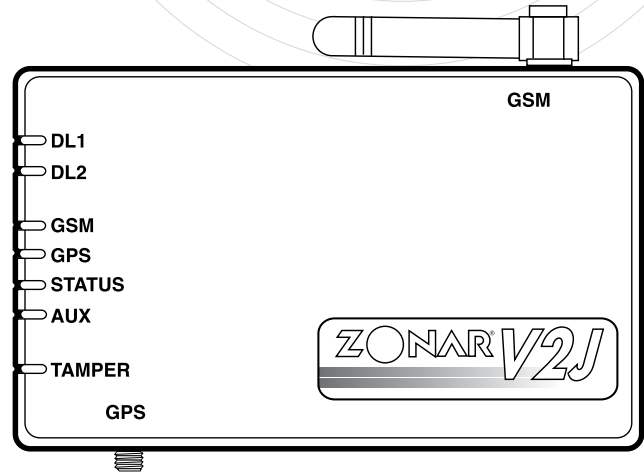


INSPECT • TRACK • KNOW

System Check: Minimum Requirements - GPS

- 1) At a minimum, the installer must perform a "System Check" to verify proper installation.
- 2) This procedure covers the minimum requirements for a system installer. If at all possible a full and complete checkout using Zonar's Ground Traffic Control™ website should be performed. Not all installers will have access to this area, check with a Zonar Customer Service representative if in doubt.
- 3) Turn Key On/Engine running, within 2 minutes:
 - A) GPS Green LED: LED should be solid within 2 minutes or less. Blinking indicates acquiring satellites, Solid indicates satellite acquired. GPS antenna must have a clear view to sky. Do not proceed further until GPS LED is solid
 - B) GSM cellular Green LED: LED should be solid within 2 minutes. If blinking, ensure GSM antenna is secure, has a clear view to the sky and area has cellular coverage.
 - C) STATUS Green LED: Solid
V 2J Model if blinking or off
 - i. Call Zonar
 - D) DL1: Single green blink 1 x per second if J1708/J1587 data is present
 - E) DL2: Single green blink 1 x per second if J1939 data is present
 - F) AUX Red LED: Off (Solid or blinking in the event of system failure)
 - G) TAMPER: Off when unit mounted properly in mounting plate. Solid "On" when not mounted in mounting plate.
- 4) Turn Key Off, within 2 minutes:
 - A) DL1: Disregard
 - B) DL2: Disregard
 - C) GSM Green LED: Disregard
 - D) GPS Green LED: Disregard
 - E) STATUS Green LED: Blinking (Solid may indicate a problem, check white lead. Call your Zonar Customer Service Representative if in doubt)
 - F) AUX: Off (Solid or blinking in the event of system failure)

Note: A proper and complete system/LED functional check requires the engine to be running

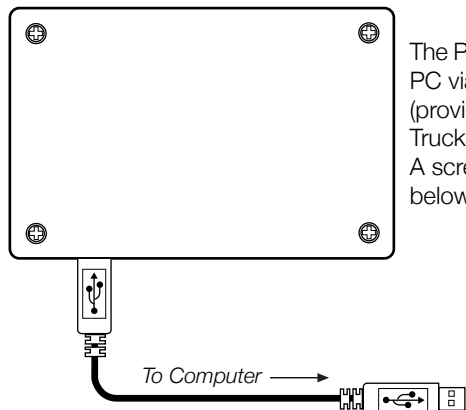


DRAFT

Truck Install App

These tools are for the purpose of ensuring that truck boards installed in trucks are properly receiving data from the V2J, and to send information back to Zonar's servers.

The Truck Install/Pump Validation tool is a PCBA with custom firmware installed on it, along with a standard Zonar radio board, an IR receiver, and an IR transmitter LED.



The PCBA connects to any PC via a USB cable (provided) with the Z-Con Truck Install App installed. A screen shot is shown below.



Installing the tool

When you first plug in the Truck Install tool, you may need to run through the automated Windows "Found New Hardware" setup. Click Next through the dialogs, and the tool should install normally on your machine.

Thereafter, every time you plug a tool into your machine that hasn't been plugged in before, you won't need to reinstall the drivers, but you will need to wait for Windows to identify the tool before its

COM port can be selected in the app's dropdown. When a systray message pops up that says "Your hardware is installed and ready to use", or something similar, then you can select the tool's COM port.

If the Truck Install app is running when you plug in a new tool, you'll need to refresh the COM port list. Do this by unchecking and rechecking the checkbox next to "Showing active ports" at the bottom of the app. It may take a moment where it says "Scanning COM ports..." first.

Standard use and procedure

- 1) Connect the truck board to the V2J in the truck. Verify it has power, and the V2J has a GSM connection.
- 2) Start the truck.
- 3) Connect the Truck Install tool to your PC via the USB, and start the Truck Install app.
- 4) Set the active COM port to the proper port.
- 5) Point the truck board's IR transmitter at the Truck Install tool's IR receiver. Click Request ZID. This will cause the truck board to send its ZID to the Truck Install tool over IR.
- 6) Once the truck board's green LED stops flashing, click Get Current Values. This will fill the fields with info gained from the truck board over radio.
- 7) Verify that the Engine Hours and Total Fuel are accurate, and that there are no faults.
- 8) Make any necessary changes to the Odometer and VIN fields, fill in Fuel Capacity and DEF Capacity, and click Submit. This will store the values in non-volatile memory in the V2J.
- 9) Turn off the truck. The V2J's status light will begin to double-blink as it sends the new data to the servers. It will single blink when it's done.

In short, the process is Start truck -> Request ZID -> Get Current Values -> change values -> Submit -> turn off truck.

Troubleshooting

If the green LED on the truck board does not flash when 'Request ZID' is pressed:

- 1) The Truck Install tool might not be receiving power.
 - Solution: Check the connections of the USB cable between the tool and your PC. If problem persists, use a new cable.
- 2) The wrong COM port may be selected on the Truck Install app.
 - Solution: Select the right COM port for the tool. Try closing and reopening the app.

If clicking 'Get Current Values' causes the output to return with "No data received from the truck board" or "Bad data received from the truck board.", then there are a few possible issues.

- 1) The return message over radio was corrupt.
 - Solution: Bring the Truck Install tool and the truck board closer together, and click 'Get Current Values' again.
- 2) The ZID wasn't fully retrieved, or was corrupted.
 - Solution: Point the truck board's IR LED directly at the recessed hole on the left side of the Truck Install tool (as seen in the picture above). Click 'Request ZID' again. Do not click 'Get Current Values' until the Truck LED stops flashing.



INSPECT • TRACK • KNOW

DRAFT

Important Notice

It is the Owner's sole responsibility to install and use the Zonar products in a manner that will not cause accidents, personal injury or property damage. For the purposes of this notice, "Owner", "you" and "your" means the party (including any person authorized by that party to use and/or install the Product) that has either: (a) purchased the Product; or (b) leased the Product from Zonar Systems, Inc or its related companies. The Owner of this product is solely responsible for observing safe driving practices. The choice, location, and installation of all components of the Product is critical. If installation is not correct, the Product may not perform at its designed potential or specifications. If in doubt, consult your vehicle's manufacturer.

System Specifications

V2JE™

- Operating Temp -20C to +70C
- DC Input range, 8.0Vdc to 30.0Vdc

GPS Receiver

- WAAS Capable
- Very high sensitivity receiver
- Rapid acquisition of satellites
- GPS signal acquisition, tracking and navigation
- On board GPS data storage

GSM/GPRS Transceiver

- Quad Band 850/1900 900/1800

Approved Antennas

- San Jose SM-19 - GPS
- MiniWing GSM 850/1900
- SPK Electronics Co. GSM 850/1900



INSPECT • TRACK • KNOW

V2JE Troubleshooting

Issue	Possible Cause	Remedy	Notes
GSM, GPS, and Status LED solid with engine running	Normal condition	Normal condition	
No LED lights	Non-issue, unit may be sleeping	Start engine and ensure LEDs illuminate	
	Vehicle Master Kill switch/ battery disconnected switch set to "Kill" (if equipped)	Switch Master Kill switch to "Live" to supply power to vehicle	
	Vehicles electrical system malfunction	Check for dead battery, loose or corroded terminals, bad crimps or solder joints, etc.	
	Blown or missing fuse in Jbus cable	Replace fuse.	
	Vehicle uses Multiplex wiring system and has put circuit to sleep	Rewire unit, outside of Multiplex wiring circuit	
	Vehicles Jbus port miswired system does not always supply constant power (direct connect Jbus cable) or constant power lead (Backbone style Jbus cable) is not connected to a constant power supply	Check voltages at Jbus connector or constant lead terminal. Contact Zonar for a document on the vehicles Jbus electrical values	
	Equipment or cable malfunction	Test with known good vehicle, equipment, or cable	
All LEDs go out when the engine is turned off	Jbus port miswired (direct connect Jbus cable) or constant power lead (backbone style Jbus cable) is not connected to a constant power supply	Check voltages at Jbus connector or constant lead terminal	
GSM/Cellular LED blinking with engine running	Non-issue, unit is connecting to cellular tower	After turning engine on, give the unit up to 3 minutes to connector to cellular tower	
	Poor cellular coverage area, local cell tower not operating correctly	Move vehicle to an area with good cellular coverage	
	Cellular (stubby) antenna loose or disconnected	Tighten cellular antenna	Do not over-torque - damage may result
	SIM not activated	Call Zonar with GPS serial number and ask to check for SIM activation	



INSPECT • TRACK • KNOW

V2JE Troubleshooting Continued

Issue	Possible Cause	Remedy	Notes
GPS LED blinking with engine running	Non-issue, unit is gathering satellite information	After turning engine on, give the unit up to 3 minutes to obtain satellite information	If the GPS LED does not get a solid LED with engine running, GSM and Status LED will not behave correctly
	Vehicle is located indoors, under structures, or under heavy brush	Move vehicle to an area where the GPS antenna will have a clear view of the sky	
	GPS antenna was not with a clear view of the open sky	Remount GPS antenna provide it a clear view to the open sky	
	GPS antenna mis-match	V2J units have an internal GPS antenna, and are typically mounted on the dashboard with a clear view of the sky. V2JE units use external GPS antennas that are mounted on the vehicles roof with a clear view of the sky	Never connect an external GPS antenna to a V2J . Conversely, ensure an external GPS antenna with a clear view to the sky is used with V2JE models
Status LED - blinking or off - engine running	V2J is not detecting engine RPM from ECM	Call Zonar	
Status LED - Solid -	Equipment or cable malfunction	Call Zonar	
AUX/Alert LED solid or blinking 3 minutes after engine start	Internal issue	Call Zonar for a replacement unit	Also see "All LEDs flashing"
DL1 and/or DL2 are not blinking green with engine running	Jbus cable not properly connected or faulty	Check Jbus cable connections. Replace with known good cable	The DL1 and/or the DL2 must blink green with the engine running for the system to work correctly
	Vehicles Jbus port mis-wired or faulty	Verify pinout and electrical values from manufacturers specifications	
All LEDs flashing	The unit may be booting, or receiving a Firmware update	For a normal boot, give the unit up to 3 minutes to establish solid LEDs for GSM, GPS, and Status. For a Firmware update, give the unit up to 25 minutes to receive and install the Firmware	



INSPECT • TRACK • KNOW

DRAFT

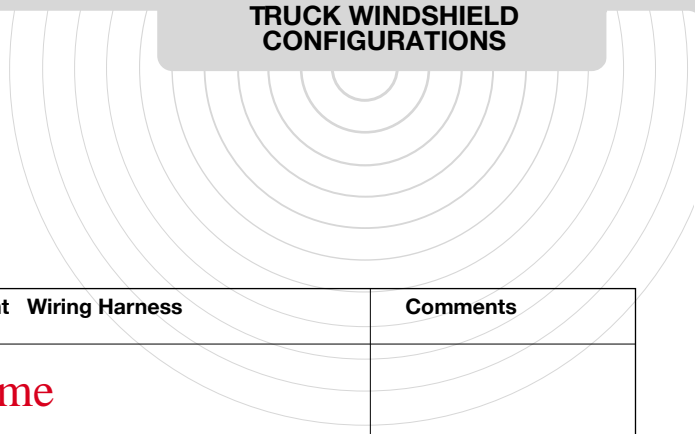
Troubleshooting

Issue	Possible Cause	Remedy	Notes
Status LED - Blinking or off - engine running	V2J is not detecting engine RPM from ECM	Check white lead (Switched Power). It must have 8- Call Zonar	
Status LED - Solid - Engine off	Switched power is connected to an incorrect power source	When engine off White-Switched power lead must have 0 volts	Be sure to check engine off, key position ACC. White-Switched power lead must read 0 VDC in this state
AUX/Alert LED solid or blinking 3 minutes after engine start	Internal issue	Contact Zonar for a replacement unit	
All LEDs flashing	The unit may be booting, or receiving a Firmware update	For normal boot, give the unit up to 3 minutes to establish solid LEDs for GSM, GPS, and Status. For a Firmware update, give the unit up to 25 minutes to receive and install the Firmware	
DL1 (Jbus 1708) and/or DL2 (Jbus 1939) are blinking Green at 1X per second	This is normal with the engine running. Blinking Green indicates that Jbus data is available from the ECM. The DL1 and/or the DL2 must blink green with the engine running for the system to work correctly	None	Normal Operation
DL1 (Jbus 1708) and DL2 (Jbus 1939) are both off (Other LEDs appear to be functioning normally)	Engine not running	Start Engine	
	Jbus Cable not connected	Connect Jbus Cable	
	Jbus Cable faulty	Test with known good cable	
	Vehicles Jbus connector miswired	Verify pinout and electrical values from manufactures specifications	
DL1 (Jbus 1708) and/or DL2 (Jbus 1939) are Red at 1X per second	Normal Boot Sequence	None	Normal Operation



INSPECT • TRACK • KNOW

DRAFT



Mack

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
Pinnacle (highway) (single pane) Titan (heavy haul) (split windshield) Granite (construction) (split windshield) CH (split windshield)						
Info To Come						

Freightliner

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
Century	2007	70deg	2" from center	32"	1998-2003 80130 2004-current 80183	
Coronado		70deg	2" from center	32"	2001-current 80183	
Columbia		70deg	2" from center	32"	2001-2003 80130 2004-current 80183	
FL series	1999	77deg	42"	28"	1996-2002 80130 2003-current 80183	
Legacy	1999	75deg	41"	29"		
Classic	2000	77deg	2" from center	29"	windshield angled 4 deg to right	
Cascadia	Info To Come					
M2	Info To Come					

Peterbilt

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
330					2007-2011 80183	
335					2007-2009 80441 & 80339	
340					2007-2009 80183	
365					2008-2009 80441 & 80339	
367					2008-2009 80441 & 80339	
378, 379	2003	66deg	27" or tight against center		2007-2009 80441 & 80339	windshield angled 14 deg to right
375, 357, 377, 385					2007-current 80441 & 80339	
384					2009-2010 80441 & 80339	
386					2007-current 80441 & 80082	
387					2007-2009 80441 & 80339	
388					2008-2009 80441 & 80082	
389					2007-2009 80441 & 80339	
587						



INSPECT • TRACK • KNOW

DRAFT

Kenworth

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
T600	1999	71deg	31"	27"	2006-current 80441 & 80339	
T800 split wrap-around	2007	68deg	Tight against center	18"	1997-2005 80444 2006-current 80441 & 80339	
T800 split flat	2000	68deg	tight against center	18"	1997-2005 80444 2006-current 80441 & 80339	windshield is angled 7 deg to starboard
T800 One Piece	2009	66deg	measure from right	13"	1997-2005 80444 2006-current 80441 & 80339	
T2000	1999	62deg	42"	32"		
W900					1997-2005 80444 2006-current 80441 & 80339	

International

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
4700	1999	72deg	37"	29"	1995-1998 80130 1999-2009 80183	
4300	2004	64deg	47"	26"	1995-1998 80130 1999-2009 80183	
8600	2007	66deg	44"	30"	1995-1998 80130 1999-2009 80183	
9000 split flat	1992	85deg	36"	31" or tight against center	1995-1998 80130 1999-2009 80183	windshield angled 7 deg to right
9400	2006	69deg	41"	33"	1995-1998 80130 1999-2009 80183	
ProStar	2011	65deg	45"	27"	2007-current 80183	
LoneStar	2009- 2011				2009-2011 80183 should be similar to ProStar	

Sterling

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
Class 8	2002	63deg	41"	27"		

Volvo

Model	Year	Vertical Angle	Distance from left	Distance from right	Wiring Harness	Comments
VNL670, VHD, VT	2006	72deg	43"	31"	2000-current 80441 & 800282	

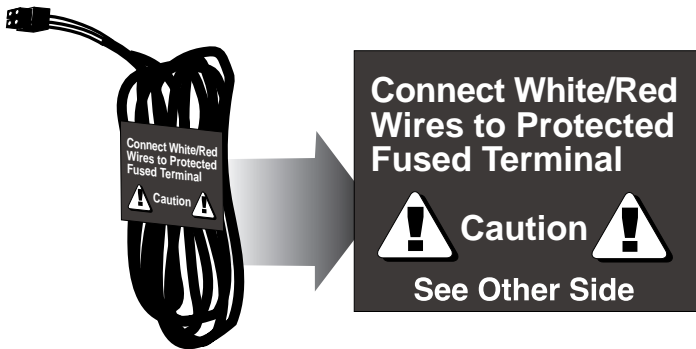


INSPECT • TRACK • KNOW

DRAFT

GPS 4 Pin Power Cable

Note: Do not follow the instructions on this page unless so instructed by a Zonar representative



- 1) Only used during checkout "Status" LED does not illuminate solid green when engine is running
- 2) Follow all General Guidelines as specified on page 6.
- 3) All power leads must be connected to the vehicles protected circuitry (e.g. fuse panel, circuit breaker panel, protected circuits). Never electrically connect Zonar equipment to unprotected circuits. (e.g. directly to battery)
- 4) It is also required that all power leads (Red and White leads) be protected with a 3 to 5 amp fuse and inline fuse holder (included) for optimal system protection.
- 5) Electrical fuses should be installed as close as possible to the source of power
- 5) Power Bundle wiring – 4 Pin, 3 wires
 - A) Red – Constant DC (+8 VDC - +30 VDC), dependent on system type)
 - B) Black – Ground must be less than 1 ohm (measure from 4 Pin connector to chassis attachment point)
 - C) White - Switched Power



The White wire must be connected to a power source that is active only when the engine is running or the system will not track idle time properly

- 1) Engine running (+8 VDC to +30 VDC)
- 2) Engine NOT running (0 VDC)
- 3) Engine not running (key position ACC or Accessory Mode (0 VDC)

Please contact the vehicle manufacturer for any specific electrical questions



INSPECT • TRACK • KNOW

DRAFT

Limited Warranty

LIMITED WARRANTY: Zonar® warrants that the Hardware provided under Zonar's Subscription Agreement is free from material defects in workmanship for a period of one year for hardware purchased by customer. THIS LIMITED WARRANTY IS MADE TO CUSTOMER ONLY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. Zonar EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WHICH MAY ARISE FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR USAGE OF TRADE

CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND ZONAR'S ENTIRE OBLIGATION UNDER THESE LIMITED WARRANTIES for defective equipment is the repair and replacement of the equipment free of charge by Zonar. Zonar shall not be liable to Customer or any third party for any general, special, punitive, incidental, indirect or consequential damages, or any lost profits or business, arising out of Zonar's Subscription Agreement.



FCC Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada (IC). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.



Warning: (Part 15.21)

Changes or modifications not expressly approved by Zonar Systems could void the user's authority to operate the equipment.



Caution: RF Exposure (OET Bulletin 65)

To comply with FCC RF exposure requirements for mobile transmitting devices, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm (8 Inches) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Use only supplied and approved antenna's. Use of unauthorized antenna's or modifications could impair signal quality, void your warranty and/or result in violation of FCC regulations.



Industry Canada Compliance Statements

"This device has been designed to operate with an antenna having a maximum gain of [5] dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is [50] ohms."

"To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent is isotropically radiated power (EIRP) is not more than that required for successful communication."

"The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website, www.hc-sc.gc.ca/rpb"

