Trapeze™
Here for the journey

Ranger v4.3 Installation Guide

Trade Secret | January 2018

trapezegroup.com

Contents

1 Safety and Aftermarket Equipment

WARNING

Failure to install the equipment as recommended could cause or contribute to an accident and result in damage to property or persons.

The use of aftermarket equipment in motor vehicles can compromise a vehicle's safety-related design characteristics, including but not limited to the following examples:

- Airbags - Obstruction of airbag deployment
- Passenger compartment - Ergonomic problems, physical obstacles
- Trunk/gas tank protection - Trunk-mounted equipment to exacerbate tank vulnerability in a rear collision

⚠ This product must be installed by qualified installation personnel only. The installer must be trained in industry best practices for aftermarket vehicle installations.

The training would include but not be limited to the methods described in the following sections.

1.1 Installing Cables

The appropriate methods for installing cables such that:

- The operation of the vehicle is not interfered with.
- The installation process does not damage or interfere with other vehicle components and/or systems. Wiring is kept clear of sharp objects, sources of heat and any other hazard that could damage the cable or wire.
- Wiring is secured such that it does not cause damage to the equipment itself and other equipment or interfere with the operation of other systems and devices.
- Wiring through bulkheads is performed such that wiring does not chafe, and a seal is maintained between compartments.
- Appropriate and industry standard fasteners, splices, connectors and ties are used for the vehicle environment.
- Appropriate slack is in place to prevent straining of the wire, cable or connectors.
- Any other issue that could affect the integrity of the wiring or the safe operation of the vehicle is addressed appropriately.
- All wires connected to power sources are fused at the power source.

WARNING

This product is to be installed by qualified installation personnel only.

Incorrect installation may result in **fire** or contribute to an **accident**.

1.2 Mounting Equipment

The appropriate methods for mounting equipment in vehicles must be applied such that: The safe operation of the vehicle is not interfered with.

- The equipment is attached to the vehicle as securely as possible to minimize the risk of the equipment

breaking free in a collision.

- The installed device does not interfere with the deployment of air bags.
- The installed device does not obscure displays or interfere with the ability of the driver to operate other vehicle systems and components.
- The installation process does not damage other vehicle systems or components. Compartments remain sealed against the elements.

1.3 Use and Operation of Required Tools

To ensure the correct use and operation of the required tools.

- The installer must have the ability to read, understand and follow the instructions in the installation manual.
- The installer must be equipped with the correct tools for performing each installation operation.

The customer must ensure that the installation of all equipment provided for this project is safe, used for its intended purpose, and is in continual accordance with all applicable codes, rules, regulations and guidelines provided by motor vehicle and equipment manufacturers, as well as any state, local or jurisdictional bodies.

2 Introduction

Trapeze Ranger v4 is a Windows CE fixed-mount computer used for various systems such as two-way wireless communication, electronic dispatching, and in-vehicle navigation.

This Ranger Installation guide includes directions for successfully installing and interfacing a Ranger into a vehicle. Some wiring and installation procedures may be different for each customer and should be discussed prior to installation. If you need information not covered in this guide, please contact your Customer Care representative.

3 Before You Begin

1. Carefully read the Installation Guide before installing this product. If anything is unclear, please contact your Customer Care representative for support.
2. Ensure that the NEGATIVE battery connection is disconnected before beginning work.

> ⚠ Some components may lose short-term memory, that is, engine or transmission adaptive parameters, and radio presets after a protracted time without battery power.

3. Ranger device should be serviced by qualified, trained personnel only. Attempting to remove the cover or disassemble the device could expose you to dangerous high voltage points.
4. Do not attempt to install or operate a damaged device. If the unit has been exposed to excessive amounts of water; shows evidence of physical damage; or is not operating properly; unplug it from the power source and contact qualified service personnel.
5. Use of thread-locking compounds such as Loctite may cause serious damage to plastic enclosures. Many thread-locking compounds are not compatible with thermoplastics and can lead to stress cracking. This will require the unit to be returned to replace the ABS enclosures.

3.1 Care and Cleaning of the Touch Panel

- Do not use high-pressure air, water or steam to clean the surface of the touch panel. The action may cause the touch panel to malfunction.
- Clean the touch panel surface with a dry soft cloth; only alcohol or ammonia-based cleaners can be used with caution when necessary.
- Always dampen the cloth and clean the panel. Do not spray the cleaning agent on the panel itself.
- The touch panel is sensitive to long-term water exposure and any excess moisture should be wiped off. Do not apply adhesive materials to the surface of the touch panel. This can cause permanent damage. This restriction includes stickers, tape and static screen protectors.

> ⚠ The use of aftermarket screen protectors is not recommended and may void the warranty of the touch panel.

4 Ranger Overview

The following graphic shows the various components of the front part of the Ranger shell:

5 Parts List

Please verify that you have everything that you need to complete the Ranger installation.

⚠ Not all parts are provided.

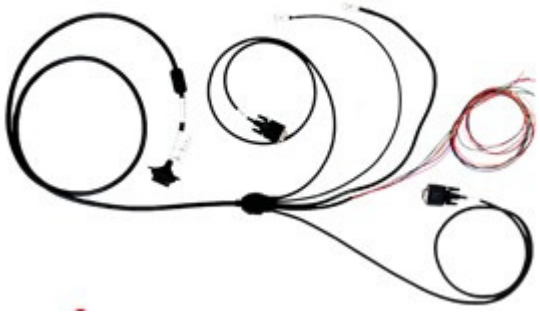
5.1 Supplied

Ranger device

Ranger Mount

Different types of mounts are available.

Ranger Octopus Cable



Ranger PowerPigtail

In-line Cable Fuse

In-line cable fuse holder - Two holders and fuses are supplied. The 3 Amp fuse is for power and 2 Amp fuse is for ignition input.

5.2 Not Supplied

- Zip Ties
- Glued Heat Shrink
- Tools as Required
- Grommets
- Loom Fasteners

6 Mounting Locations

6.1 Placement

- Ensure that the driver's view of the road is not obstructed.
- Ensure that the equipment is not in the path of any active airbags.
- Ensure that the driver still has access to all controls on the dashboard.
- Ensure that the driver has a clear view of the terminal from the seated driving position.
- Ensure that the terminal is within easy reach of the driver from the seated driving position.
- Ensure that the mounting location is a solid surface. Locations that allow even small amounts of initial movement will loosen the placement of the device over time.
- Before drilling any holes or using screws, check for vehicle wiring under the carpet or behind the instrument panel which could be pinched, cut or otherwise damaged.
- If mounting through the floor, put body sealer over the underbody projections. Stamped acorn nuts, filled with sealer, are available at most body shops for this purpose. This keeps moisture out of the carpet and insulation and forestalls rust in this area.
- If mounting under the instrument panel, be sure that there is no interference with the proper operation of the foot controls.
- Inquire if the vehicle is cleaned with a high pressure water wand. If so, ensure that all equipment is installed somewhere that protects them from this type of cleaning.

6.2 Examples of Suitable Mounting Locations

Ranger Installed in an Orion II Bus

Ranger Installed in a Ford E-Series Cutaway

Ranger Installed in a Chevrolet 3500 Series Cutaway

7 Installing the Ranger Cable Cover

The Ranger unit is shipped with the cable cover installed, which can be removed with a 2mm hex bit. If the cable cover needs to be reinstalled at some point, do so according to the steps described in the following procedure.

7.1 Torque Settings

There are a number of items that may need to be installed to a specific torque level. This includes the Power Cable Cover Plate, Cable Cover, SD Cover, and antennas. Over and under torquing can lead to product damage and/or failure. Trapeze recommends using a calibrated torque screwdriver for tightening all screws and a Huber Suhner SMA torque wrench (74Z-0-0-21) for tightening the Antenna cable.

To install the Ranger Cable Cover, the following items are used:

- Ranger Cable Cover
- 6mm hex head screw (Quantity 2) 2mm hex head screw (Quantity 2) Hex bit, for 2mm hex head screws
- 5/16” wrench (torque wrench preferred

⚠ These items are included in your shipment of Ranger equipment except for the hex bit and 5/16" wrench.

Back view of the Ranger device	Cable Cover of the Ranger device
	

7.2 Cable Cover

To install the Ranger Cable Cover:

1. Connect the Ranger power cable to the power input. Use 2mm screws as shown in the following graphic to fasten the Power Cable Cover Plate. This requires a 2mm Hex bit. Apply torque to the main cable cover screws

to 80 - 90 oz-inches (55 - 65 N-cm).

2. Align the Cable Cover with the Ranger unit.

If there are external cables connected to the Ranger unit, thread the cables through the holes in the Cable Cover. The cables must be threaded in such a way that they are not pinched by the Cable Cover when fastened to the Ranger. If an optional Wi-Fi antenna is provided, apply torque to the R-SMA connector to 140 oz-inches (100 N-cm).

3. Secure the Cable Cover to the Ranger unit with the screws provided. This requires 6mm and 2mm hex head screws (2 of each). Apply torque to the mounting ball and RF cable cover screws to 80 - 90 oz-inches (55 - 65 N-cm).

7.3 SD Cover

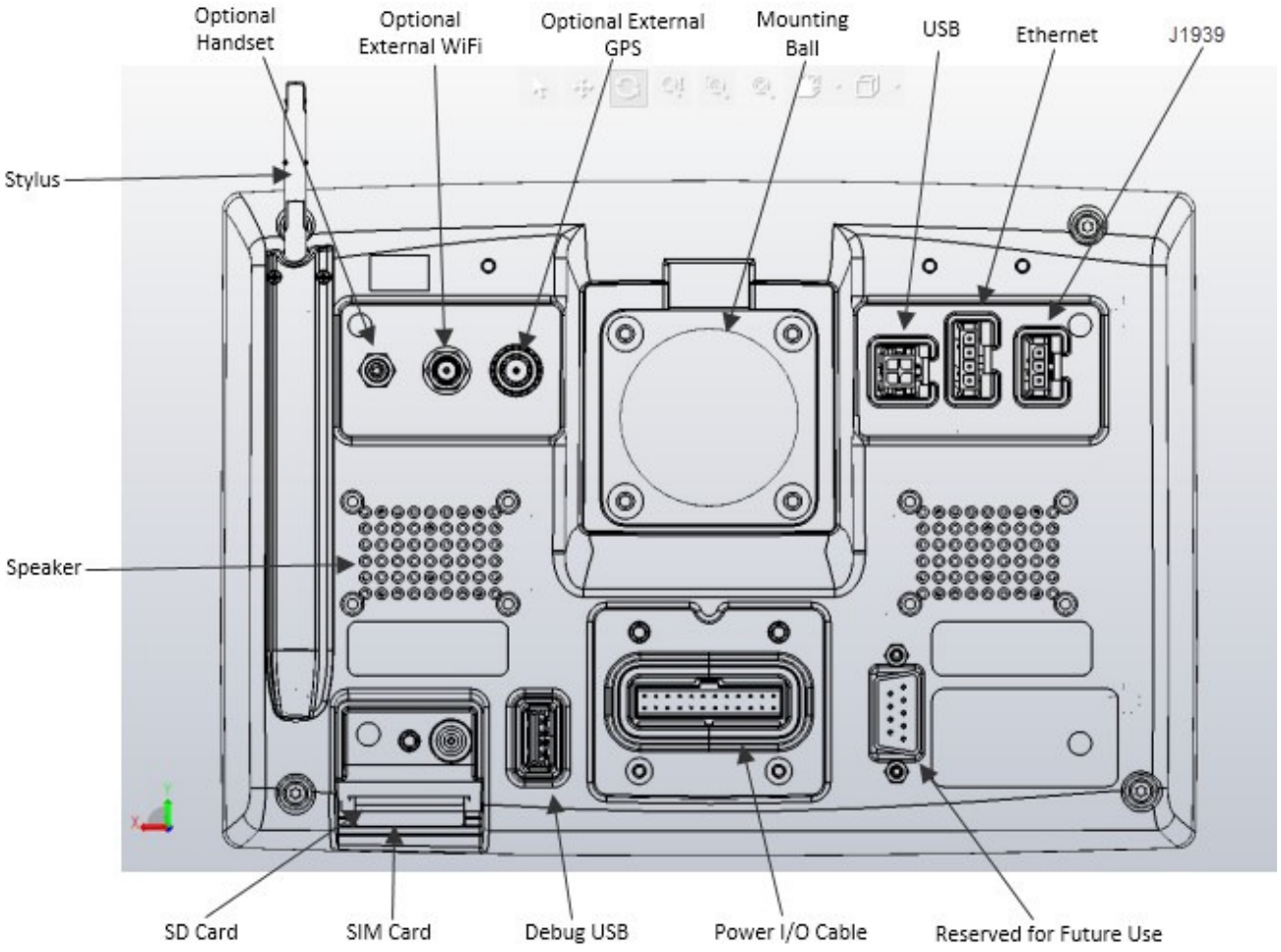
The Ranger will be shipped with the SD Cover installed. It can be removed and reinstalled, for example, to install a SIM card.

To install the SD Cover:

- Secure the SD Cover to the Ranger unit. Apply torque to the 2mm hex screw to 80 - 90 oz-inches (55 - 65 N-cm).

8 Wiring Ranger Unit

The following graphic shows the back view of the Ranger unit:



9 Ranger Configurations and Optional Parts

Ranger has several optional configurations that are implemented during the assembly of the unit at the factory. The full list of these options are explained in the following sections.

The Ranger part number label on the back of the unit can be interpreted to give configuration details for that particular unit. The following graphic shows an example of a label:

9.1 Numbering Structure

The following list explains the different characters of the part number label to determine what options are included with any specific Ranger. (This numbering format is subject to change.)

Numbering is in the format “RANGER 4.3 123456–7” (Example: “RANGER 4.3 T4050X–1”)

Number	Description
1st Number	T = Trapeze Logo A = Asset Works Logo B = No Logo
2nd Number	4 = 4 GB SD Card (All units)
3rd Number	0 = No External RF or Handset Connectors 1 = External M5 for Handset 6 = External R–SMA for WIFI and QMA for GPS 7 = External R–SMA for WIFI, QMA for GPS and M5 for Handset
4th Number	0 = No cell modem (No SIM Card Required) 1 = Verizon EVDO Modem (No SIM Card Required) 2 = Sprint EVDO Modem (No SIM Card Required) 3 = USCC EVDO Modem (No SIM Card Required) 4, 5, or 6 = SIERRA MC8790V HSPA Modem (SIM Card Required) 7 = OPTION NV GTM661W HSPA Plus Modem (SIM Card Required) 8= Sprint EVDO Modem without Bluetooth (No SIM Card Required)

5th Number	0 = Without Taxi Seal and card reader 1 = With Taxi Seal without card reader 2 = Without Taxi Seal with card reader 3 = With Taxi Seal and card reader
6th Number	X = Standard Ignition input for Key Switch Detection (Default) Blank = Alternator Charge Voltage Detection
7th Number	0 = Main Cable Terminated with 24 Pin Molex connector 1 = Main Cable with Multiple Terminations (Octopus) 2 = No Installation Cables

9.2 Logo Options (1st Number)

The logo is silkscreened onto the lower corner of the front enclosure.

9.3 Internal SD Card Option (2nd Number)

A 4GB card is always installed with the Ranger unit. (This may change at a later date.)

9.4 Handset, GPS, Wi-Fi Options (3rd Number)

Look at the back of the unit to check which connectors are available for the handset, GPS, and Wi-Fi options.

Even though these connectors are there, this does not necessarily mean they need to be used. The Ranger unit can be used as a hands-free speaker phone when equipped with a voice capable modem hence the handset connector should never be required. The connector, however, may be available on some units. If you require a handset, contact your Customer Care representative.

There are many types of GPS and Wi-Fi antennas available such as mag mount and window mount. Choosing one to fit the needs of a particular installation should be done with the help of a Customer Care representative.

9.5 Modem Option (4th Number)

If an HSPA modem is selected, a SIM card must be installed into the unit as shown in the following graphic.

The card should click into place when installed correctly. It can be ejected by pushing it inwards until a click is heard, and then can be removed.

If an EVDO modem is selected, no SIM card is required.

9.6 Taxi Seal and Card Reader (5th Number)

A taxi seal is only required if the unit needs to function as a taxi meter. The card reader can read magnetic or contact type cards. Specifications: ISO 7811 Magnetic card reader/ISO 7816 Smart Card Reader (combined into the same enclosure).

9.7 Ignition Sense Option (6th Number)

Before the Ranger unit is assembled, the ignition input option is set with internal jumpers.

If the Standard Ignition input option is selected, the ignition sense threshold is set to 1.6V and the ignition sense line should be connected to an appropriate point on the vehicle as described in the section on Connection Points.

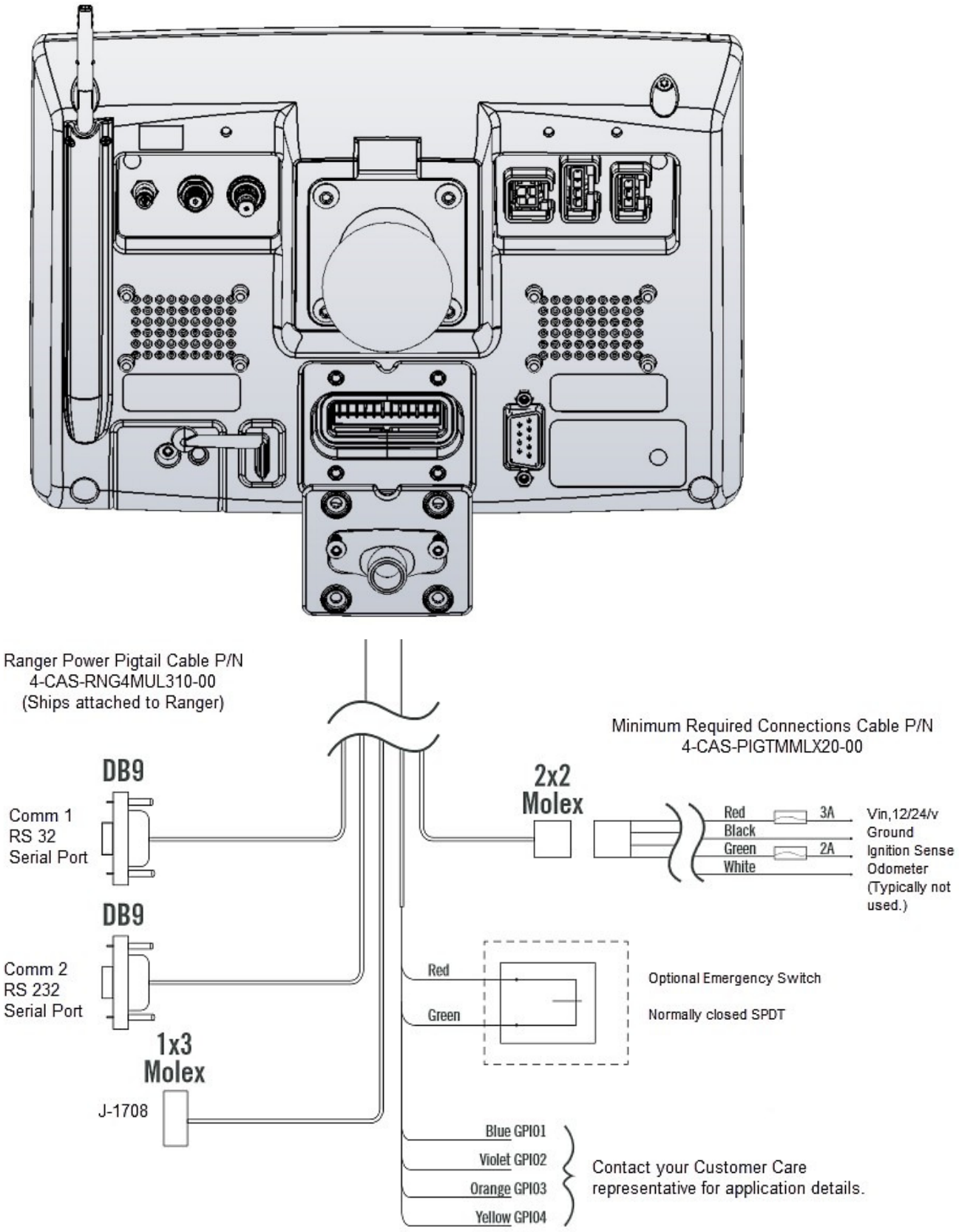
If the Alternator Charge Voltage Detection option is selected, the ignition sense threshold is set to 12.9V, and the ignition sense line on the main cable should be connected to the battery voltage.

Care should be exercised in selecting this option. In some cases, the vehicle battery charging system is not strong enough to maintain sufficient voltage on the battery for the Ranger unit to detect. This is often the case with highly customized vehicles that contain aftermarket items that consume significant power such as heaters, AC units, and wheelchair lifts.

9.8 Main Cable Option (7th Number)

Customers can choose whether they want the “Octopus” cable, which has connections terminated to appropriate connectors, or the 24pin Molex option where a secondary cable connects to it and provides an interface to the appropriate points on the vehicle. Typically, customers order the 24pin Molex option if they are upgrading from Ranger 1 or 2 to Ranger 4.

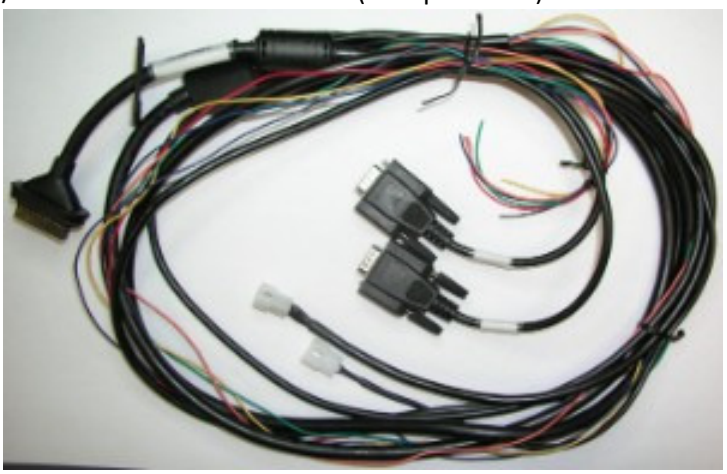
The following graphic illustrates how the octopus cable is attached to the back of the Ranger unit:



9.9 Part Numbers

The part numbers for the main cable that can be ordered are:

- P/N: 4–CAS–RNG4MUL310–00 (Octopus cable)



- P/N: 4–CAS–CGRDMMLX18–31 (24pin Molex)

- P/N: 4–CAS–PIGTMMLX20–00

A power pigtail cable is used with the octopus cable, and provides power, ground, ignition, and odometer inputs to the Ranger unit.

9.10 Adaptor Cables

Earlier versions of Ranger v4 (anything earlier than v4.3) used M8 connectors for the USB, Ethernet, and J1939 on the back of the Ranger unit. In the event that a Ranger v4.3 is being used in place of an earlier version of Ranger v4, an adaptor cable can be used. It will allow cables that have already been run inside the vehicle to connect to the new Ranger unit.

- Ranger v4.3 USB Adaptor Cable P/N: TBD
- Ranger v4.3 Ethernet Adaptor Cable P/N: TBD

- Ranger v4.3 J1939 Adaptor Cable P/N: 75T1446

9.11 Additional Cable Parts

USB, Ethernet, and J1939 connectors are always present on the back of the Ranger unit. However, connecting to these ports is optional and may or may not be required in a particular installation.

The cables to connect to these ports can be ordered from your Customer Care representative as required.

The part numbers that you can order are:

- USB Cable - P/N: 4–CAS–RNG4USBDGL–10

- Ethernet Cable - P/N: 4–CAS–RNG4ETHDGL–10

- J1939 Cable - P/N: 4–CAS–DB15RNG427–51

10 Connection Points

10.1 Splicing

T-Taps are not a suitable form of splicing into existing cabling. All splices must be soldered. Adhesive-lined heat shrink must be applied for protection.

10.2 Power

Power connections should be made directly to the battery and fused as close to the battery as possible. Avoid using a cigarette lighter or “Power Point” receptacles as power sources. Trapeze does not recommend wiring power directly to a vehicle kill switch because the Ranger unit will not power down correctly. Appropriate fuses are provided with the installation equipment.

Typically, powering the Ranger unit directly from the battery ensures that voltage drops are kept to a minimum. If it is necessary to power the Ranger unit from an existing circuit, avoid using circuits that are used to power high current accessories such as AC units, heaters, or wheel chair lifts.

10.3 Ground Point

The ground point should be that point where the (-) terminal from the battery is connected to the body. Typically, this connection to the battery is a 6 or 8 AWG black wire connected to the wheelhouse or radiator support.

Do not fuse the ground lead. If the ground-side fuse were to open, the entire supply current is conducted by an alternate current return path, which may cause the feed line to overheat possibly resulting in damage.

10.4 Vehicle Speed Sensor for Odometer Pulses (Optional)

Most installations use the Ranger GPS receiver for mileage tracking, however, in some cases, a wired odometer connection may be required. Many vehicles have a Vehicle Speed Sensor (VSS) point that provides a pulse train from the transmission. Vehicles that do not have a VSS point with adequate signal characteristics require the installation of a transducer. It is the responsibility of the *installer and customer* to locate a VSS point or determine the appropriate location for a transducer. Your Customer Care representative may be able to assist in locating a suitable VSS point. He/She can also provide information on the type of signal that is required for accurate odometer tracking.

10.5 Emergency Switch (Optional)

The emergency switch is usually installed somewhere that would allow for covert operation. This location needs to be chosen by the customer prior to the start of installation. A switch can be provided if required. It is sometimes possible to use an existing switch already on the vehicle. Contact a Customer Care representative to discuss your specific requirements.

10.6 Switched Ignition Signal

It is important to utilize an unused ignition point. Connecting to an ignition point that is currently being used to switch other devices can cause improper operation of those devices.

The ignition sense input can be configured in two ways: standard ignition detection or alternator charge voltage detection. Interpret the part numbering label to determine how the unit is configured. If it is configured to use the alternator charge voltage detection option, connect the ignition sense line to the battery, otherwise, use an ignition signal from the vehicle. See Ranger Configurations and Optional Parts for more information.

If the Ranger installation requires using an ignition point on the vehicle (i.e., standard ignition detection method), there are usually two options available to connect to an ignition sense line: auxiliary electrical panel or a fuse panel. If neither of these options are possible, then contact your Customer Care representative to discuss

alternative ignition options.

It is highly preferable to find an ignition source that goes high only when the engine is actually on. If this source cannot be found, an ignition source that goes high only when the ignition is in the ON position is the next recommended source.

10.6.1 Auxiliary Electrical Panel (Preferred)

Many bus manufacturers include an auxiliary electrical panel for interfacing peripheral devices. The following graphic is an example of an auxiliary electrical panel in a Ford van:

Typically, one of these terminals is a switched ignition point. A ring terminal should be used when connecting to this type of ignition interface point. Ask the local maintenance personnel if you need assistance to find this panel.

10.6.2 Fuse Panel

An unused ignition activated position in the fuse panel is another option. This installation requires an Add-A-Circuit fuse holder as shown in the following graphic:

⚠ It is not acceptable to use a “fuse sleeve”.

11 Cabling

11.1 Routing

1. Use caution when routing wires between the passenger and engine compartments to avoid chafing or pinching the wires. Use grommets over any exposed sharp edges and strain reliefs to keep wires in place. Seal all holes to prevent moisture intrusion.
2. Route and secure all wiring under the hood away from mechanical hazards such as exhaust manifolds and moving parts.
3. Avoid running power leads in parallel with vehicle wiring over long distances.
4. If cabling is routed under the instrument panel, be sure that there is no interference with the proper operation of the foot controls.

11.2 Strain Relief

Ensure that there is no strain exerted on cable connectors where they enter the unit. Avoid placing the unit in a position where the cable connectors entering the back of the unit are under pressure or strain of any kind.

Ensure the power cable is fully inserted before replacing the cable cover. In the event of undue stress or strain on installed cables and connectors, permanent damage may occur that can weaken the connections. This may result in intermittent or complete loss of communication and or power. Always include strain relief every 2-3 feet on long cable runs.

As the Ranger unit can be tilted and rotated freely by the driver/user, cabling should be installed such that moving/adjusting the position of the unit does not exert any significant stress on the cables.

11.3 Labeling

It is important to always label cabling at connection points. This practice and using cables with consistent coloring will make maintenance easier.

11.4 Wire Types

The following are the minimum specifications for the hook-up wire that should be used during the installation process:

- Ranger Power and Ground
  300V, 105°C PVC, 18AWG stranded
- Ignition
  300V, 105°C PVC, 22AWG stranded
- Odometer Interface
  300V, 105°C PVC, 22AWG stranded
- Ranger Inputs (example: Emergency Input)
  300V, 105°C PVC, 22AWG stranded

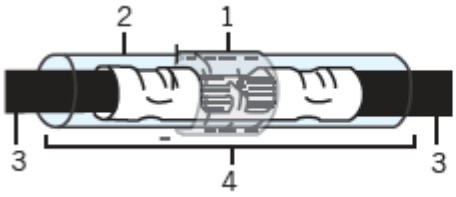
11.5 Electrical Measurements

Always ensure that there is adequate voltage at the point where Ranger is being powered. Compare this voltage to the voltage at the battery. The two voltages should be almost the same or a different power point should be chosen closer to the battery.

11.6 Connection Types

11.6.1 Acceptable Connection Types

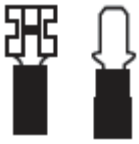
- Ring Terminals: 
- Butt splices with self-contained solder and shrink tubing:



1. Solder Sleeve
2. Crimp Splice (shown crimped)
3. Wire
4. Shrink Tubing

- Soldered connections with shrink tubing

11.6.2 Unacceptable Connection Types

- T-Taps: 
- Spade terminals: 
- Marrettes: 
- Blade connectors: 
- Standard butt splices: 

12 Antennas

12.1 Internal Antennas

Ranger v4 contains celullar, Wi-Fi, Bluetooth, and GPS antennas.

Cellular, Wi-Fi, and Bluetooth antennas are capable of transmitting. Ranger units should be installed and operated with a minimum distance of 20 cm (8”) between the radiator and the operator or any passengers.

The orientation and mounting location of Ranger v4 can have an effect on antenna performance. To optimize GPS performance, mount the Ranger vertically with a clear view of the sky.

12.2 External Antennas

If desired, external Wi-Fi and/or GPS antennas can be used with Ranger v4.

Specific antenna selection depends on the individual system setup. Contact your Customer Care representative for assistance in selecting an appropriate antenna.

To comply with FCC and Industry Canada rules, an external Wi-Fi antenna must be a monopole type with gain of no greater than 5dBi.

Use short lengths of low loss cabling whenever possible. Wi-Fi performance is especially susceptible to cable losses.

Some important features to consider are:

- Compact construction
- Durability
- Weatherproofing
- Temperature stability
- Mode of Installation

Ground plane style antennas are ideally mounted on the center of a metal vehicle roof. Glass mount antennas should be mounted away from metal objects.

When using an adhesive antenna, it is extremely important to make sure that the surface of the mounting location has been thoroughly cleaned. Use isopropyl alcohol to clean the surface just before securing the adhesive pad.

12.3 Cable Routing

The bend radius of the antenna coaxial cable depends on the type used. Apply bend radius per the antenna manufacturer's recommendations.

Avoid routing the antenna cable in parallel with the vehicle wiring over long distances.

12.3.1 Connectors

- R–SMA - The reverse SMA connector is used for Wi-Fi and requires a 1N-M torque wrench to be properly secured.
- QMA - The QMA connector is used for GPS and is a snap-on version of the SMA connector.

13 Ranger Specifications

13.1 General Description

Trapeze Ranger v4 is a water-resistant1,2 WinCE device that is equipped with color Touchscreen display, Compact Flash, smart card/magnetic card readers and USB host/device port. Application software can be custom-designed making it adaptable to a wide variety of applications. It has an optional internal wireless modem for HSPA or EVDO networks. An internal GPS allows Ranger to be used for vehicle navigation, Automatic Vehicle Location (AVL) and/or Computer Aided Dispatch systems for fleet applications.

13.2 Standard Features

- Acceleration sensor
- Internal 50 Channel GPS
- Bluetooth 2.1 (optional on some variations)
- WIFI 802.11 b/g/n
- 2 RS–232 Com Ports
- J1939
- J1708
- 10/100 Ethernet
- 2 USB Device Ports[3]
- Ignition detect input
- Emergency switch input
- Built in Odometer Signal Conditioner
- 4 Digital Input / Open Drain Output with software selectable pull-up or pull-down
- 6.5” TFT Color Display with Touchscreen with LED Backlight
- 6 Button Capacitive Touch Keypad with LED Backlight
- Integrated 3 Watt Stereo Speakers
- Integrated Microphone
- External SD Card Socket
- Internal 4G SD card memory
- Tactile Wear Resistant Coating

13.3 Optional Features

- Taximeter
- ISO 7811 Magnetic card reader/ISO 7816 Smart Card Reader (combined module)
- Internal Wireless Data Modems with integrated antennas
- Handset and/or Handsfree Voice calling

13.4 Compliance and Testing

- FCC Class B Part 15
- UL60950-1:2003 R7.06
- CAN/CSA-C22.2 No. 60950-1-03
- ISO 7637-1 Load Dump Transient
- MIL STD 810F: General Vibration
- MIL STD 810F: Shock
- IP54: Environmental, Dust and Water exposure[4]

13.5 Specifications

- Supply Voltage

Typical	12 V
Min	6 V
Max	32 V

- Current Consumption

Input Voltage (V)	**Current Draw (mA)**		
	Standby	Idle[5]	Typical[6]
9	68	360	965
13.8	50	250	645
24	39	160	405
30	19	110	260

Maximum[7] 3.0 A

- Operating Temperature
  Min -30° C Max 65° C
- Storage Temperature
  Min -30° C Max 70° C

> ⚠ Operation at temperatures outside these ranges is not recommended.

- Size
  8.25" x 2.0" x5.7”
  210mm x 57mm x 146mm
- Weight
  2.0 lbs / 0.9 kg
- 5% - 95% relative humidity non-condensing

13.5.1 Footnotes

1. Ranger unit is designed to be splash-resistant. It is not designed to be immersed in water.
2. Ranger unit may not be water-resistant when some of the options are specified.
3. USB 2.0 High Speed; one port is for maintenance only.
4. Unit is IP54 rated for water without Mag swipe, Taximeter Options, or DSP modem.
5. When display is off, the unit is idle without modem options.
6. Unit Idle with full backlight with GPS, Wi-Fi and Bluetooth. No modem options.
7. This is an absolute maximum that includes an installed modem and all peripheral devices. Actual current draw depends on system design.

> ⚠ Trapeze reserves the right to change circuitry and specifications without notice at any time. Please ensure that you have the most recent version of this document.
> Only use Trapeze approved cables for installation purposes. Refer to cable section of the Hardware Installation

14 Appendix A: Conformity

14.1 FCC Class B Part 15

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Important: Changes or modifications to this product not expressly authorized by Trapeze could void the EMC and wireless compliance and negate your authority to operate the product.

14.2 Industry Canada Statement

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including ... interference that may cause undesired operation of the device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage.
2. l'utilisateur de l'appareil doit accepter tout brouillage ra dioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

UL60950-1:2003 R7.06, CAN/CSA-C22.2 No. 60950-1-03 SAFETY OF INFORMATION TECHNOLOGY EQUIPMENT

ISO 7637-1 Load Dump Transient

Designed for ISO 7637-1 Load Dump Transient

MIL STD 810F: General Vibration

Tested to MIL-STD-810F Vibration Test Method 514.5 Procedure I: General Vibration, Category 20 Ground Vehicles.

4.1. Highway Vehicle Endurance Testing

Each axis was exposed to 1 hour of vibration according to Figure 514.5C-1 U.S. Highway Truck Vibration Exposure Levels. This is an accelerated fatigue test meant to test the unit's life cycle. The unit was functionally tested before and after the test.

MIL STD 810F: Shock Test

Tested to MIL-STD-810F Shock Test Method 516.5 Procedure I: Functional Shock. Functional Shock was performed on the vertical, transverse, and longitudinal axes with a pulse of 40gs. The tests were performed to ensure the unit stays intact during vehicle operation.

IEC 60529 - IP54

Tested to IEC 60529 IP54 for protection against ingress of water with harmful effects splashing. Excludes units equipped with a magnetic card reader or taximeter.

15 Appendix B: RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and the nearest human body.

16 Appendix C: Approvals

Ranger 4 CDMA/EVDO

FCC ID: RZ3RAN45728

IC ID: 2234A-RAN45728

Approvals: FCC, IC, Voice/Data Network Certifications

Ranger 4 EVDO A – No Bluetooth

FCC ID: RZ3RAN45728A

Approvals: FCC, Voice/Data Network Certifications

Ranger 4 GSM/HSPA

FCC ID RZ3RAN48790

IC ID 2234A-RAN48790

Approvals: FCC, IC, PTCRB, Voice/Data Network Certifications

Ranger 4 GSM/HSPA+

FCC ID RZ3RAN4661

IC ID 2234A-RAN4661

Approvals: FCC, IC, PTCRB, Voice/Data Network Certifications

Ranger 4 Wi-Fi/Bluetooth only - No Cellular Modem

FCC ID RZ3RAN49110

IC ID 2234A-RAN49110

Approvals: FCC, IC