waySmart™ | Maintenance & Troubleshooting

driver safety | fleet management | compliance

inthinc™

Part Number: 785-00013 Rev. A

About this Document:

Document: waySmart™ Maintenance & Troubleshooting Manual
Part Number: 785-00013 Rev. A

Revision History:

Revision	Description	Author	Date
A	New Manual	Scott Vecchiarelli	03-01-2012

Notice of Rights

Trademarks

About the waySmart™ Device

FCC Notification:

This device complies with Part 15 of the FCC Rules. 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.

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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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 of more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the 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.

Industry Canada Notification:

This product meets the applicable Industry Canada technical specifications. This Class B digital apparatus complies with Canadian ICES-003. Changes or modifications to the tiwiPro™ that are not expressly approved by inthinc, inc. could void the user's authority to operate the tiwiPro™.

About inthinc™

inthinc is a global company centered on telematics, fleet solutions and driving safety. Its breakthrough driving safety solutions are designed to safeguard lives, save money and protect the environment. inthinc technology dramatically improves driver behavior and has been documented to reduce accidents by more than 80 percent. For more information please visit www.inthinc.com.

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About this Guide

Installation of the inthinc waySmart system requires great attention to detail, as inthinc has a high-standard for quality workmanship. If the waySmart system is not installed by a trained technician or is not installed correctly, the product may not work as intended.

This guide provides diagnostic and toubleshooting information for the waySmart system. It also serves as a starting point and study guide for the installer trainee, and a reference manual for the certified installer. Information in this document changes frequently, we recommend you consult this manual regularly.

For system support or for assistance with installation of the waySmart product, contact:

24-Hour Technical Support

1-(866)-294-8637 opt. 3

OR

support@inthinc.com

Australia Technical Support

(800)-928-920

Key Acronyms and Terms

Acronym	Term	Description
GAIN	Global Asset Information Network	GAIN is one of the inthinc web portals where administrators can review data relalative to their fleet of vehicles.
DOT	Department of Transportation (United States)	Federal agency that regulates various safety and driving rules (I.e. Hours of Service (HOS).
HOS	Hours of Service	US DOT regulation that limits the amount of time a driver is allowed to operate a commercial vehicle and other guidelines.
HW	Hardware	An abbreviation used for Hardware.
DMM	Driver Management Module	The DMM is an internal component of the waySmart system and manages the aggressive driving aspect of the system.
MCM	Master Control Module	The MCM is the “brains” of the waySmart system. This module controls communication and other aspects of the system.
W3	Witness III Crash Data Recorder	An abbreviation used for the Witness III crash data recorder component of the waySmart system.
HH	Handheld Driver Interface	An abbreviation used for the Handheld driver interface.
TS	Touchscreen Driver Interface	An abbreviation used for the Touchscreen driver interface.
SD	Slim Dash Driver Interface	An abbreviation used for the Slim Dash driver interface.
SB	Seatbelt	An abbreviation used for Seatbelt.
RMA	Return Merchandise Authorization	An acronym that is commonly used when merchandise needs to be returned to the manufacture. A Return Merchandise Authorization is a tracking system that businesses use to track the return and placement of merchandise.
EMU	Emulation	An EMU or Emulation file is a vehicle-specific file that gets programmed on the waySmart system and is the file that allows the waySmart to gather data from the vehicle.
GPIO	General Purpose Input Output	This is a common technical term and in the context of the waySmart system refers to the various general input/output connections on the system.
IMEI	International Mobile Equipment Identity	The IMEI is a serial number associated with various communication components of the waySmart system.

Section 1

Getting Started

IN THIS SECTION:

- **Format USB Drive** 11
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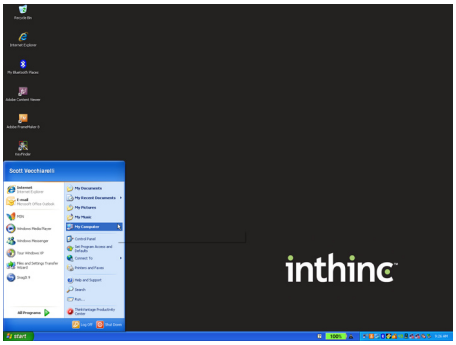
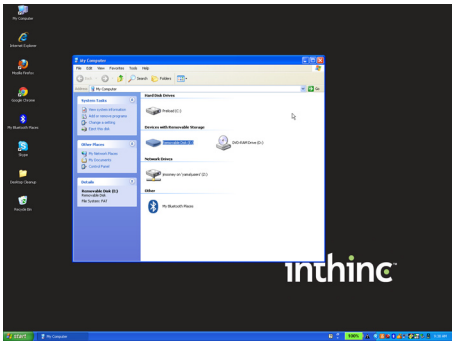
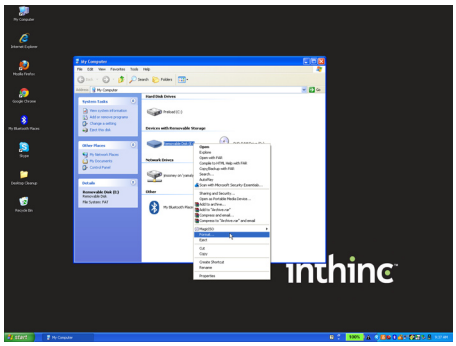
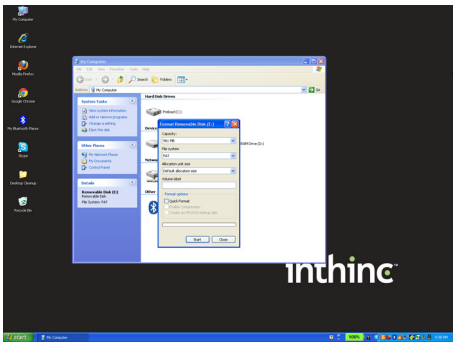
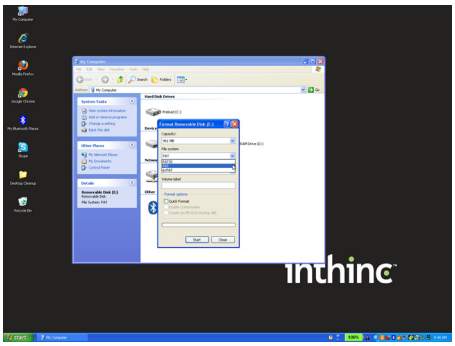
Format USB Drive

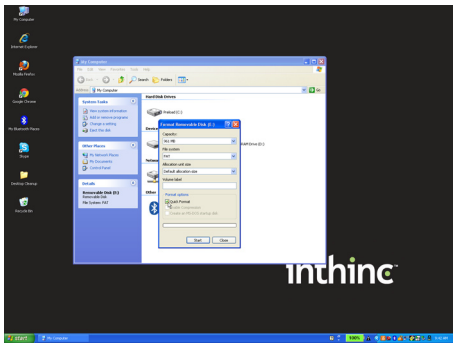
Programming the waySmart system requires the use of a USB Drive, also known as a “Thumbdrive”. The waySmart system requires a specially formatted USB drive, which can be ordred through an inthinc Account Manager. USB Drives purchased from a electronics retailer ususally do not work with the waySmart system due to the way the drive is formatted.

It is extremely important you are using a properly formatted USB drive when programming the waySmart system. Best practice is to verify the USB drive is formatted correctly before attempting to save any files to the drive. This section will provide information on how to verify if the USB Drive if formatted correctly.

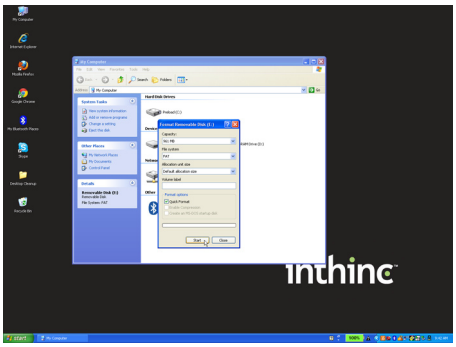
▼ Quick Formatting Instructions:

1. Insert the USB Drive into one of the USB ports on your computer
2. Open “My Computer” from the Windows Start menu
3. Locate the inserted USB Drive
4. Right-click on the USB Drive and select “Format” from the menu options
5. Verify “File System” is set to FAT and not FAT32
6. If the File System is FAT, your USB Drive is configured properly and you can safely remove the USB Drive from your computer. If the File System is any other than FAT, proceed with the instructions below.
7. Set FIle System to FAT
8. In the “Format Options” section, check the box for “Quick Format”
9. Click Start
10. A warning box appears stating that re-formatting the drive will delete all data on the USB Drive, click OK
11. Formatting is now complete. Click Close to exit the formatting window. You can now safely remove the USB Drive from your computer

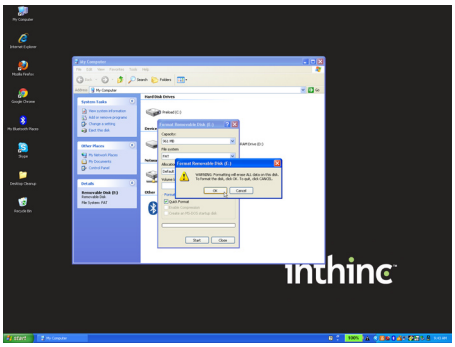
Format USB Drive - Step-by-Step Instructions		
		
❶ Insert the USB Drive into one of the USB ports on your computer	❷ Open “My Computer” from the Windows Start menu	❸ Locate the inserted USB Drive
		
❹ Right-click on the USB Drive and select “Format” from the menu options	❺ Verify the “File System” is set to FAT and not FAT32	❻ If needed, select FAT from the File System menu options



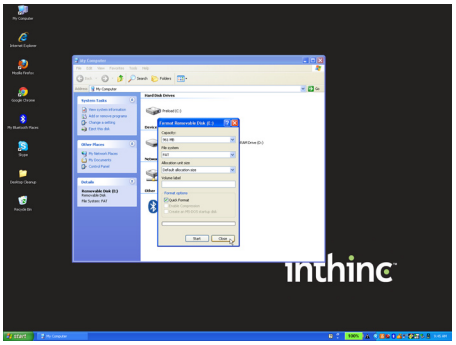
❼ In the “Format Options” section, check the box for “Quick Format”



❽ Click Start



❾ A warning box appears stating that re-formatting the drive will delete all data on the drive, click OK



❿ Formatting is now complete. Click Close to exit the formatting window. You can now safely remove the USB drive from the computer.

USER TIP:

To view a video tutorial on how to Format a USB Drive, visit the following link:
https://link to view video tutorial

For more information about inthinc products or to view video tutorials, visit inthinc university today!
http://training.inthinc.com

SVN Website

inthinc provides field technicians with access to a secure SVN website. The SVN website is customer-specific, meaning there are different URL's to access each customer-specific SVN website. If you do not have access to the customer's SVN site, you can contact inthinc Technical Support for assistance.

The SVN website for each customer is organized into folders each containing customer-specific files. Content available includes:

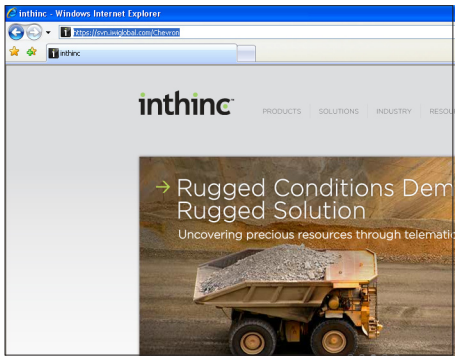
- system firmware files,
- customer zone files,
- customer all-in-one files,
- installation resources and more.

This section will take you though what content is available on the SVN website and how to access and/or download the content. For additional SVN website information or to view video tutorials on using the SVN website, visit *inthinc univeristy* (training.inthinc.com).

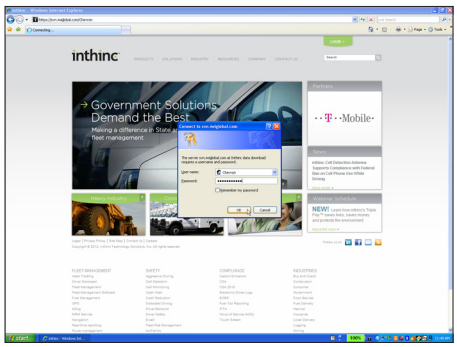
Accessing the SVN Website:

1. Open an internet browser (such as Internet Explorer or Firefox) and navigate to the customer-specific SVN website: https://svn.iwiglobal.com/CustomerName

   Note: The customer name in the URL needs to have a capitalized first letter, for example the URL to access the Chevron SVN website is: https://svn.iwiglobal.com/Chevron

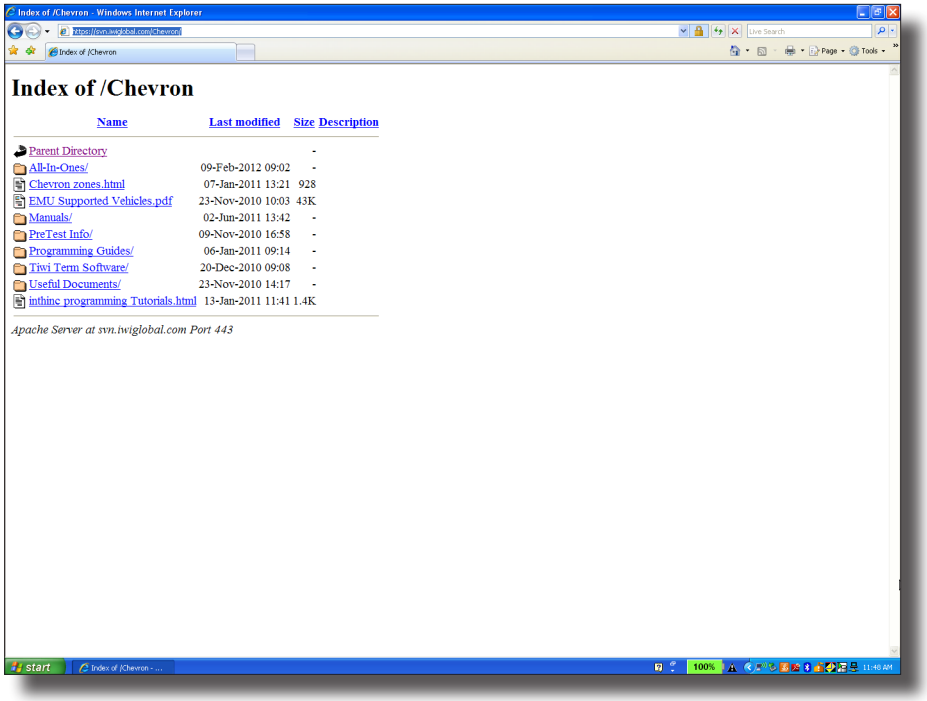


2. Enter the Username and Password to access the secure website. If you do not have the username and password, contact inthinc Technical Support for assistnace.



3. The SVN Home page will display:

Exploring the SVN Website

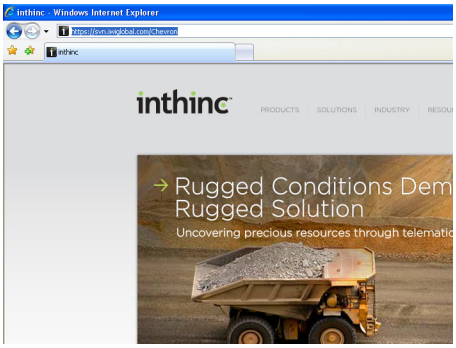
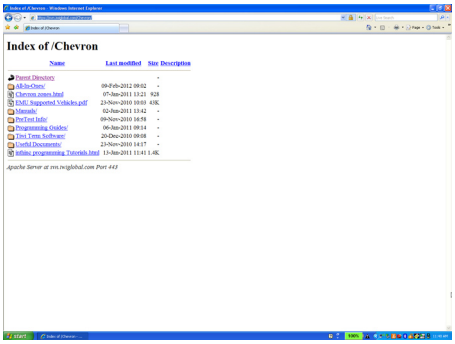
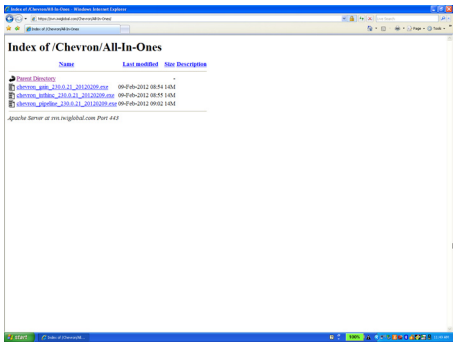
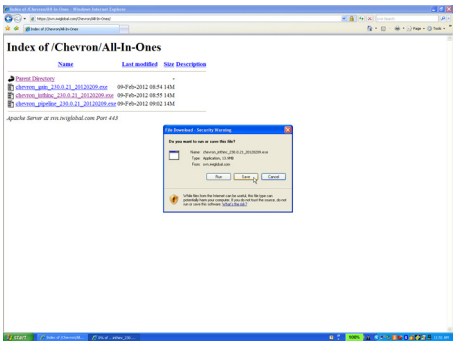
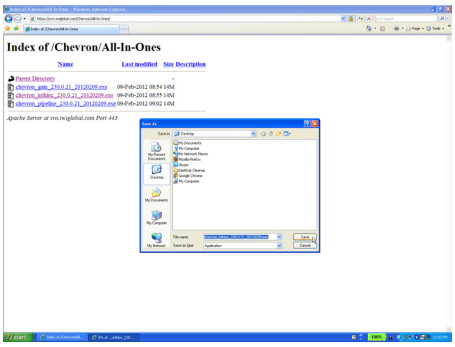


SVN Website Contents	
Content	**Description**
All-In-Ones Folder	This folder contains the various All-in-One files for vehicle programming. There may be several options available based on grography or vehicle type.
Zones.html File	This is the customers Zone file. Use this file when manually programming zones on a waySmart unit.
EMU Supported Vehicles.pdf	This is a reference document that contains a list of vehicles supported by EMU. The EMU code for programming is also available.
Manuals Folder	This folder contains links to various installation and maintenance manuals that can be downloaded. Check this folder often as the manuals are updated regurlarly.
PreTest Info Folder	This folder contains pre-test information for technicians that are completing our certification course.
Programming Guides Folder	This folder contains the most recent Programming Guide for use with the waySmart system.
TiwiTerm Software Folder	This folder contains all of the files needed to use the TiwiTerm software with a waySmart Test Bench.
Useful Documents Folder	This folder contains miscelaneous documents that may be useful when installing or performing maintenance on a waySmart system.

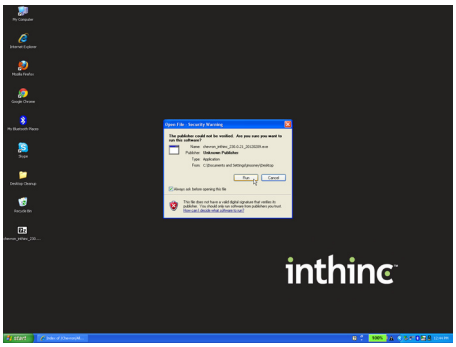
Download an All-in-One File to USB Drive

▼ Quick Download Instructions:

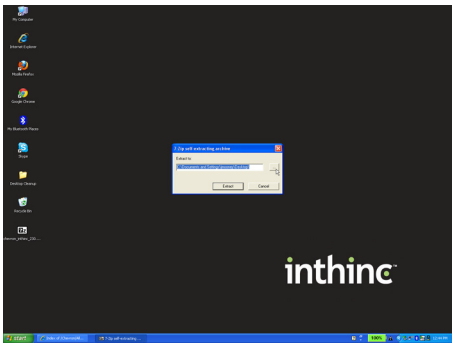
1. Insert a properly formatted USB drive into a USB port on your computer. See “Formatting USB Drive” on page 11 for more information
2. Navigate to the customer-specific SVN website. See “Accessing the SVN Website” on page 13 for more information
3. Click and open the folder titled, “All-in-Ones”
4. Locate the All-in-One file you wish to Save to the USB Drive and click on the File name
5. A prompt appears to “save” the file, click “Save”
6. Select “My Desktop” from the options on the left, and click “Save”
7. After the file has saved to your desktop, locate the file and double-click to open it
8. An Open File security warning will appear, click Run
9. When the prompt appears, click the ellipses icon (...)
10. Expand “My Computer” and select the USB drive that we will be extracting the file to, and then click “OK”
11. Click “Extract”. The files contained in the All-in-One folder are saved on the USB drive
12. All of the files contained in the All-in-One folder are saved on the USB drive. You can now safely remove the USB drive from your computer

Download All-in-One Files to USB Drive - Step-by-Step Instructions		
		
❶ Insert a properly formatted USB drive into a USB port on your computer	❷ Navigate to the customer-specific SVN website	❸ Click and open the folder titled “All-in-Ones”
		
❹ Locate the All-in-One file you want to save to the USB drive and click on the file name	❺ A prompt appears to save the file, click “Save”	❻ Select “My Desktop” from the options on the left and then cilck “Save”

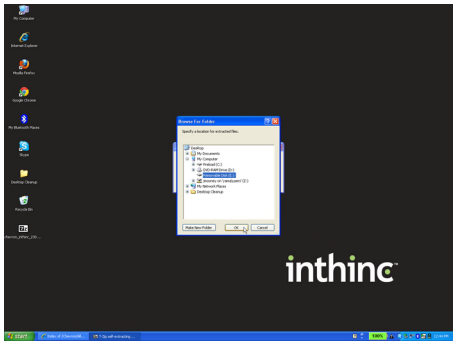
❼ Locate the file on your desktop and double-click to open it



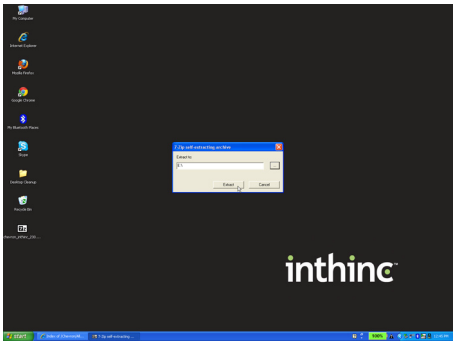
❽ An Open file security warning will appear, click “Run”



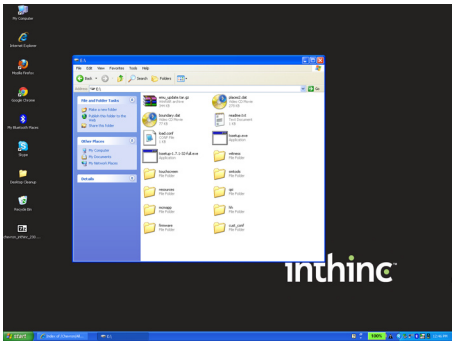
❾ When the prompt appears, click the “ellipses” icon



❿ Expand “My Computer” and select the USB drive that you would like to extract the files to and click “OK”



⓫ Click “Extract”. The files will be saved to the USB drive selected



⓬ If you open the USB Drive folder, you will see all of the files and folders contained within the All-in-One file

USER TIP:

To view a video tutorial on how to Download All-in-One files to a USB Drive, visit the following link:
http://inthinc.na5.acrobat.com/svntutorial

For more information about inthinc products or to view video tutorials, visit inthinc university today!
https://training.inthinc.com/lms

Section 2

waySmart™ System Maintenance

IN THIS SECTION:

- System Maintenance Overview 19
- Updating waySmart Zones 19
- Updating System Firmware 23
- Testing Communication 27

System Maintenance Overview

This section of the manual will focus on topics that we consider general system maintenance. Topics in this section include:

- How to update Zones on a waySmart unit
- How to update System Firmware including:
  - MCM Firmware
  - Witness Firmware
  - Configuration File
  - Emulation (EMU) File
- Verify Communications including:
  - Cellular (GPRS)
  - Satellite
  - WiFi
  - GPS

Updating waySmart Zones

There will be occasions where you may need to manually update Zones on a waySmart unit. When a customer creates a new zone in the inthinc portal, the zone file is sent OTA (over the air) to the waySmart units in the customer's fleet. The unit needs to be powered on and must have cellular (GPRS) connectivity to download the zone file. If the unit is in an area with poor cellular coverage, there is a possibility that the zone file will not be downloaded.

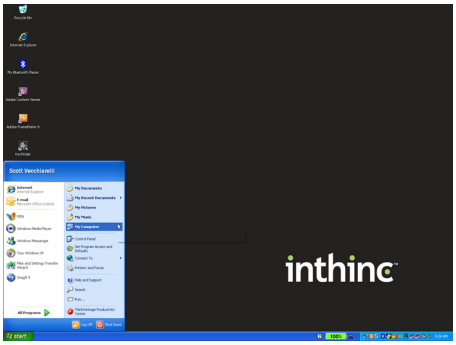
It is in these circumstances that you may need to manually download the zone file to the waySmart unit. The instructions in this section will take you step-by-step through the process of manually downloading the zone file to the waySmart unit.

Download Zones from SVN website:

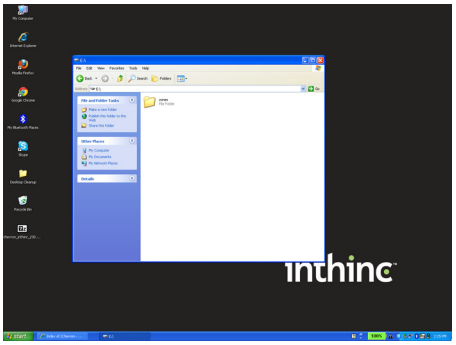
1. Insert an inthinc USB Drive into a USB port on your computer
2. Open "My Computer" from the Windows Start menu and browse to the inserted USB Drive
3. Create a folder on the USB Drive called "zones" (in lower case)
4. Navigate to the company-specific SVN website: https://svn.iwiglobal.com/CompanyName
   See "Accessing the SVN Website" on page 13 for more information
5. Locate and click on the file titled "zones.html". Note: The file may have the customers name in it
6. Click on the applicable Zone link (i.e. All, Light or Heavy)
7. A File download prompt will appear, click "Save"
8. Select "My Computer" from the options on the left, then select the USB drive and click "Open"
9. Select the "zones" folder you created and click "Open"
10. Click "Save". This completes the process of saving a zone file to the USB Drive
11. If you open the USB Drive, you will be able to see the zone file that was saved to the drive
12. You can now safely remove the USB Drive from the computer

Download Zones from SVN Website - Step-by-Step Instructions

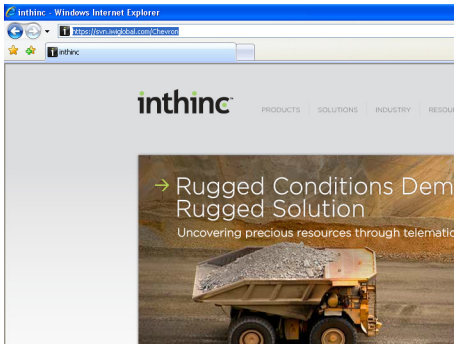
❶ Insert an inthinc USB Drive into a USB port on your computer



❷ Open “My Computer” from the WIndows Start menu and browse to the inserted USB Drive

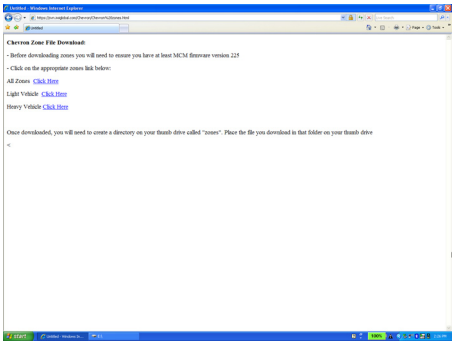


❸ Create a folder on the USB Drive called “zones” (in lower case)

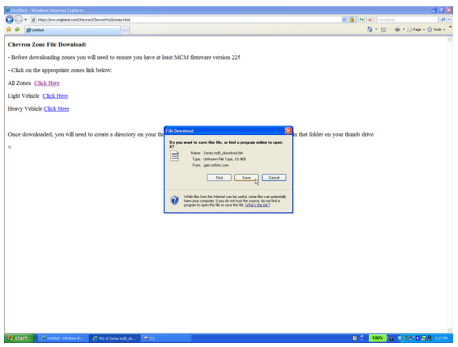


❹ Navigate to the company-specific SVN website

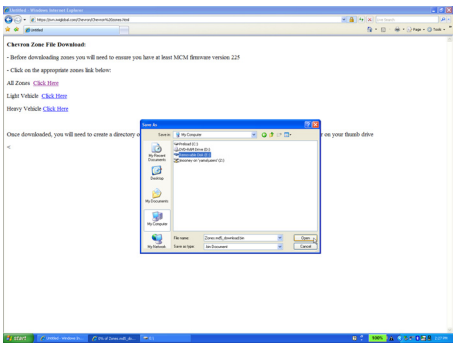
❺ Locate and click on the file titled “zones.html”



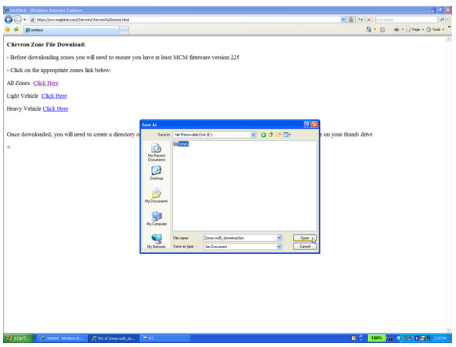
❻ Click on the applicable Zone line (i.e. All, Light or Heavy)



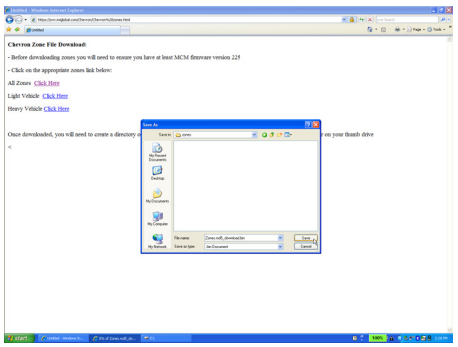
❼ A file download prompt will appear, click “Save”



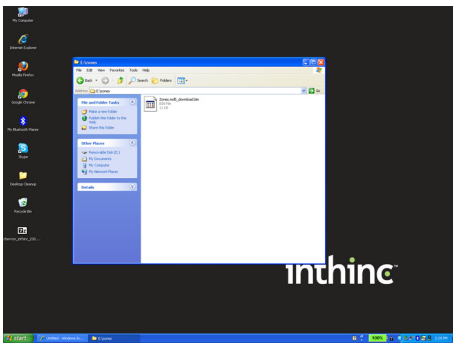
❽ Select “My Computer” from the options on the left, then select the USB drive and click “Open”



❾ Select the zones folder you created, and click “Open”



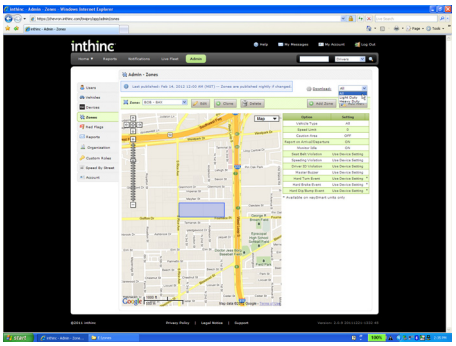
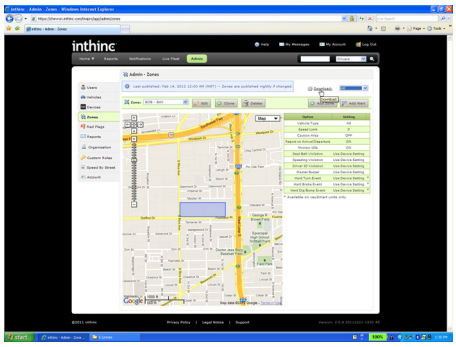
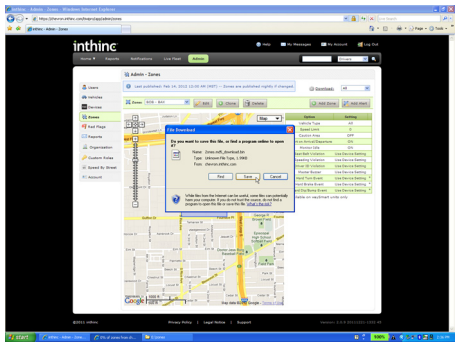
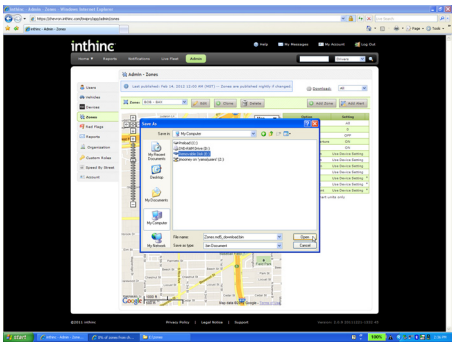
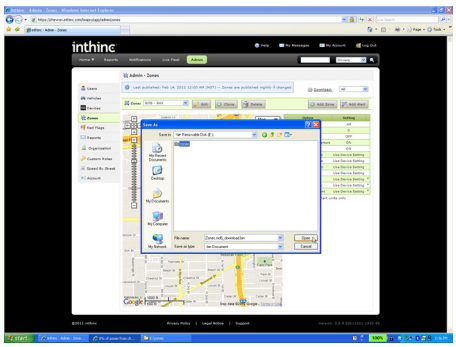
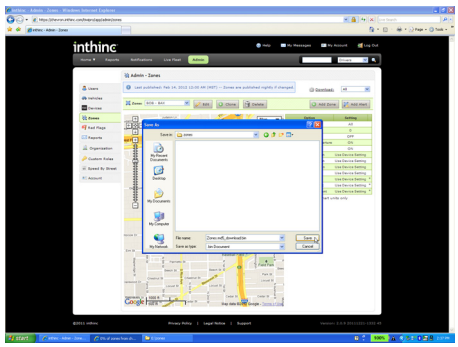
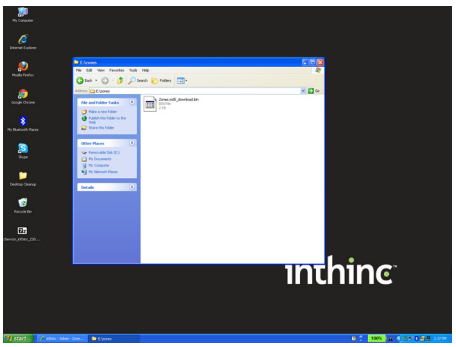
❿ Click “Save”. This completes the process of saving zones to the USB Drive



⓫ If you open the USB Drive, you will be able to see the zone file that was saved to the drive

Download Zones from the inthinc Portal:

1. Navigate to the inthinc portal: https://my.intinc.com
2. Go to Admin > Zones
3. Select the zone type to download from the drop-down menu (i.e. All, Light-Duty, or Heavy-Duty)
4. Click the “Download” link at the top of the page
5. A “Save” prompt will appear, click “Save”
6. Select “My Computer” from the options on the left, then select the USB drive and click “Open”
7. Select the “zones” folder your created and click “Open”
8. Click “Save”. The process of saving zone files to the USB Drive is complete.
9. If you open the USB Drive, you will be able to see the zone file that was saved to the drive.

Download Zones from the inthinc Portal - Step-by-Step Instructions		
		
❶ Navigate to the inthinc portal: https://my.inthinc.com	❷ Go to Admin > Zones	❸ Select the zone type to download from the down-down menu (i.e. All, Light, or Heavy)
		
❹ Click the “Download” link at the top of the page	❺ A “Save” prompt will appear, click “Save”	❻ Select “My Computer” from the options on the left, then select the USB drive and click “Open”
		
❼ Select the “zones” folder you created and click “Open”	❽ Click “Save”. The process of saving zone files to the USB Drive is complete.	❾ If you open the USB Drive, you will be able to see the zone file that was saved to the drive

Updating Zones on a Vehicle

If the vehicle is in an area where there is cellular (GPRS) coverage, zones can be downloaded to the waySmart in the vehicle OTA (over-the-air). In fact, when the customer creates a new zone or modifies an exisiting zone using the inthinc Portal, the new zone file is sent out to all vehicles in the fleet on a nightly basis. If the customer is using the inthinc Portal, there is no manual updating of zones required unless the vehicle is in an area without cell coverage.

In circumstances where you do not have cellular coverage, zones can be manually downloaded to the waySmart in the vehicle using a USB drive. To manually update zones, you must first have downloaded the appropriate zone.html file to a USB drive from either the inthinc Portal or SVN website. Once you have the file properly loaded on the USB drive,.

The instructions below will indicate how to manually update zones on a vehicle using a USB drive and also how to update zones OTA using a Handheld or Touchscreen interface.

STEP	TASK	CODE	EXPECTED RESULT
If NO GPRS Cell Coverage - Manual Update w/ USB Drive			
1	Insert USB Drive into Handheld/USB Dongle (for Touchscreen)	-	USB Drive Inserted
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Enter Commands to download zone file Light-Duty = 367 Heavy-Duty = 781	333 + <Enter> Light or Heavy + <Enter>	5 High Beeps 10 High Beeps - wait for Panic
If GOOD GPRS Cell Coverage - OTA Update			
1	Verify NO USB drive inserted into Handheld or Touchscreen interface	-	-
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Enter Commands to download zone file Light-Duty = 367 Heavy-Duty = 781	333 + <Enter> Light or Heavy + <Enter>	5 High Beeps 10 High Beeps - wait for Panic

Updating System Firmware

System Firmware is a broad topic considering the waySmart system has several components that require their own firmware. To make things siimple, we have created an “All-in-One” file for each customer that contains all of the files necessary to update the firmware on each component. The customer-specific All-in-One file can be downloaded from the customer’s SVN website. Please note, there may be several different All-in-One files to select from, as the customer may have different operating parameters based on geography or vehicle type.

Be sure you know which All-in-One file contains the firmware that should be operating on the waySmart unit prior to making any updates. waySmart system firmware needs to be installed in a particular order; installing firmware out of order may result in a file not getting downloaded properly or the system will not work as intended. Below we will describe each system component and the process for updating its firmware.

Customer-Specific Configuration File

The configuration file is specific to each customer and there may be several configuration files depending on the customer. The config file contains all of the operating parameters of the waySmart system. In other words, how the customer wants the system to work. Items such as speeding buffers and grace periods, HOS functionality, etc. are all part of the configuration file.

STEP	TASK	CODE	EXPECTED RESULT
Download the Current All-in-One File			
1	Ensure you have the latest All-in-One file	-	All-in-One loaded on USB Drive
2	Open Readme.txt on the USB Drive, look at the MCM firmware version #	-	MCM Release:_____
Load the Customer Configuration File			
3	Insert USB Drive into Handheld/Touchscreen USB Dongle with customer-specific All-in-One file loaded	-	-
4	Make sure Seatbelt is buckled if in vehicle	-	-
5	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
6	Run command to load Configuration file	314 + <Enter>	Panic Alarm
7	Reboot using a “Hard Reboot”	50 + <Enter>	10 High Beeps - Screen goes blank

Master Control Module (MCM) Firmware

The MCM is installed in the vehicle, together with a satellite modem and a GPS antenna. It monitors various safety factors. If drivers engage in unsafe behavior (i.e.speeding), the MCM can sound a warning buzzer in the vehicle cab to alert the driver. The MCM also transmits safety violations notifications and accidents to home base. The MCM's satellite technology makes it possible to locate a vehicle at any time, enabling emergency communication between drivers in the field and home base personnel.

STEP	TASK	CODE	EXPECTED RESULT
Verify Current MCM Firmware Version			
1	Login with a valid Driver ID	Enter your Driver ID #	Driver ID will display
2	Compare MCM Firmware version to what was in the Readme.txt file on the USB Drive	Go to About Screen	MCM Release # _____
3	If the MCM Firmware is not up-to-date, proceed with instruction below to update	-	-
Update MCM Firmware			
1	Insert USB Drive into Handheld/Touchscreen USB Dongle with customer-specific All-in-One file loaded	-	USB Drive inserted
2	Enter "Programming Mode"	Programming Code + <Enter>	Programming Tone
3	Run the commands to load the MCM and DMM firmware	333 + <Enter> 365 + <Enter>	5 High Beeps 10 High Beeps
4	Perform a "Soft Reboot"	99 + <Enter>	10 High Beeps - Screen goes blank
5	Check the "About" screen and ensure the MCM firmware was updated	-	About screen shows updated FW version
6	Once the MCM firmware has been updated, after a reboot, the waySmart will automatically check to see if the Witness firmware is up-to-date. If the Witness firmware is not up-to-date, the MCM will immediately start to load the Witness firmware.	-	-

Handheld/Touchscreen Firmware

Both the Handheld and Touchscreen driver interface have firmware that needs to be manually updated periodically. Enter more information about updating the firmware here

STEP	TASK	CODE	EXPECTED RESULT
Update Handheld Firmware			
1	Insert USB Drive into Handheld with customer-specific All-in-One file loaded	-	USB Drive inserted
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Run the commands to load the Handheld firmware	333 + <Enter> 555 + <Enter>	5 High Beeps 10 High Beeps
4	Screen changes to black to begin the flash process	-	HH displays message “LCD Test Screen”
5	Process may take 10-15 minutes to complete	-	Wait for Panic
6	Handheld screen reappears with dialogue prompts. Follow prompts. When complete, the Handheld will automatically re-boot.	Follow Screen Prompts	System will re-boot when complete
7	Check the “About” Screen for Handheld version information	-	About screen shows updated firmware
Update Touchscreen Firmware			
1	Insert USB Drive into Touchscreen (do not use USB Dongle) with customer-specific All-in-One file loaded	-	USB Drive inserted
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Run the commands to load the Touchscreen firmware	333 + <Enter> 555 + <Enter>	5 High Beeps 10 High Beeps
4	Screen changes to black to begin the flash process	-	Touchscreen displays firmware code
5	Process may take 3-5 minutes to complete	-	Touchscreen will automatically re-boot
6	Check the “About” Screen for Touchscreen version information	-	About screen shows updated firmware

Emulation (EMU) File

An emulation file or EMU file is a vehicle-specific file that gets downloaded to the waySmart system. This file controls what data we can collect from the vehicle, such as: Speed, RPM, Idle, Seatbelt, etc. The data we collect varies from vehicle to vehicle, however most vehicle have some level of EMU support.

STEP	TASK	CODE	EXPECTED RESULT
Load EMU Archive			
1	Insert USB Drive (with customer-specific All-in-One file loaded) into the Handheld/ Touchscreen USB Dongle	-	USB Drive inserted
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Load the EMU Archive onto the waySmart	333 + <Enter> 782 + <Enter>	A Panic alarm will sound if successful. An error tone will sound if unsucessful.
4	Wait 1 minute for file to finish (USB Drive will stop flashing), then enter the re-boot code	99 + <Enter>	Device re-boots
Load Vehicle-Specific EMU File			
1	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
2	Load the Vehicle-specific EMU file	155 + <Enter> 785 + <Enter>	2 High Beeps 5 High Beeps
3	Enter the 7-digit vehicle code from the EMU chart. See chart on page 63 or refer to the SVN website fo the latest EMU chart.	(7-digit number) + <Enter>	7 High Beeps - Wait for Panic

Testing Communication & Components

Communication is always tested during initial installation and programming, however there will be instances, perhaps for troubleshooting, where it will be necessary to test the various communication components. There may also be instances where you need to test other various components of the waySmart system, such as the seatbelt or ignition. This section will outline how to test communication and other components of the waySmart system.

STEP	TASK	CODE	EXPECTED RESULT
Testing MCM Communication			
1	Test to ensure the MCM is communicating with the Witness	43 + <Enter>	3 High Beeps
2	Test to ensure the MCM is communicating with the Satellite Modem	56 + <Enter>	2 High Beeps then 5 High Beeps
Testing Satellite Communication			
3	Test to ensure the MCM is communicating with the Satellite Modem	56 + <Enter>	2 High Beeps then 5 High Beeps
4	Test the Satellite signal strength (Error tones = no signal, 10 Beeps = perfect signal)	54 + <Enter>	1 - 10 High Beeps
5	Test SAT Communication. Check GAIN/inthinc Portal for “Location Debug” notification (sent via Satellite)	051 + <Enter>	Wait for Panic Check Portal for notification
Testing Cellular (GPRS) Communication			
6	Test GPRS Communication. Check GAIN/inthinc Portal for “Location Debug” notification (sent via GPRS)	052 + <Enter	Wait for Panic Check Portal for notification
Test Seatbelt			
7	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
8	Buckle the Seatbelt and send command to check seatbelt	42 + <Enter>	3 High Beeps
9	Unbuckle the Seatbelt and send command to check seatbelt	42 + <Enter>	3 Bad Beeps
If the above states are reversed, follow the below steps:			
10	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
11	Enter command to reverse the seatbelt state	45 + <Enter>	2 High Beeps
12	Exit Programming Mode and retest following the steps above	-	-
Test Ignition			
13	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
14	Turn vehicle ignition on and run “ignition check” command	41 + <Enter>	3 High Beeps
15	Turn vehicle ignition off and run “ignition check” command	41 + <Enter>	3 Bad Beeps

Section 3

waySmart™ Diagnostics

IN THIS SECTION:

- Programming Codes 31
- Pre-Installation Test Bench Programming Guide 33
- Post-Installation Test Programming Guide 35
- Pull Event/Trace Data 37

Programming Codes

The waySmart system is highly configurable, much of which can be controlled by various programming codes. This section will outline commonly used programming codes when performing routine system maintenance or troubleshooting a specific issue.

CODE	DESCRIPTION	EXPECTED RESULT	HOW TO USE
Out of Programming Mode			
051	Send Location Event via Satellite	This will force the communication to go through satellite. A Panic will follow a successful test. "Location Debug" notification will show in the Portal.	This command is used to troubleshoot satellite communication.
052	Send Location Event via Cellular (GPRS)	This will force communication to go through GPRS. A Panic will follow a successful test. "Location Debug" notification will show in the Portal.	This command is used to troubleshoot cellular "GPRS" communication.
053	Send Location Event via WiFi	This will force communication to go though WiFi. A Panic will follow a successful test. "Location Debug" notification will show in the Portal.	This command is used to troubleshoot WiFi communication.
41	Diagnose Vehicle On/Off	High Beeps = Vehicle Ignition On Low Beeps = Vehicle Ignition Off	
42	Diagnose Seatbelt State	High Beeps = Seatbelt buckled Low Beeps = Seatbelt unbuckled	
43	Diagnose Witness Descriptor Read	High Beeps = Good Low Beeps = Bad	
44	Diagnose GPS Strings	1 - 10 High Beeps (1 = Poor, 10 = Excellent)	Use this command to test GPS quality. With 5 beeps or greater, you have sufficient signal to get GPS information.
45	Diagnose GPS Lock	2 High Beeps = Good 2 Low Beeps = Bad	Use this command to test GPS lock with the satellite. If you receive high beeps, you have lock with the minimum of 3 GPS satellites in the sky.
51	Enter Low Power Mode	This command will force the waySmart to go into "Low Power Mode". You will receive High Beeps when entering the command. After entering the command, it usually takes 10-15 mins. but can take up to an hour before the system goes into low power mode.	Use this command to force the waySmart system into Low Power Mode
54	Get Satellite Modem Signal Strength (Iridium)	1 - 10 High Beeps (1 = Poor, 10 = Excellent)	Use this command to test the signal strength of the satellite modem. You need at least 5 Beeps to have strong enough signal to send communication through satellite.
56	Get IMEI from Modem	2 High Beeps = Good 2 Low Beeps = Bad	Use this command to verify the satellite is communicating with the waySmart MCM.
59	Flush Queued Messages	Forces the MCM to send all pending messages waiting to be sent over WiFi	Use this command to flush all pending messages
60	Toggle GPS Power	Forces the waySmart to toggle the power to the GPS.	Use this command when not able to acquire GPS lock.
66	Diagnose RF Key state	2 High Beeps = RF Key ON 2 Low Beeps = RF Key OFF	Use this command to test the RF state of the waySmart system.
In Programming Mode			
002xx	Set Orientation without Install event xx = Orientation Code	3 High Beeps	This command sets the orientation of the waySmart without having to do a full Install event.
003xx	Set Orientation with Install event	3 High Beeps	This command sets the orientation of the waySmart and can only be used with an Install event
45	Set Seatbelt state to "in"	2 High Beeps	Use this command to set the seatbelt state to "in". You must have the seatbelt buckled when performing this command.
50	Hard Re-boot	Screen goes blank	This command will delete all temporary information and pending messages and re-boot the system. Use this command with extreme caution.
98	Erase Pending "Install" event	-	Use this command to cancel any pending install events.
99	Soft Re-boot	Screen goes blank	This command will save all temporary information and messages and re-boot the system.

Pre-Installation Test Bench Programming Guide

STEP	TASK	CODE	EXPECTED RESULT
Download the current All-in-One file			
1	Ensure you have the latest “All-in-One” file from the SVN website	-	All-in-One file loaded on USB drive
2	Open “Readme.txt” file on the USB drive and look for the MCM firmware version #	-	MCM Release # _____
Check GAIN/inthinc Portal for Vehicle and Driver ID #			
3	Check Portal to verify there is a Vehicle ID	-	Vehicle is in Portal
4	Check Portal to verify there is a Driver ID	-	Generic Driver in Portal
Load the Customer Configuration File			
5	Insert USB Drive in the Handheld/Touchscreen USB Dongle with customer-specific All-in-One file loaded	-	USB drive inserted
6	Make sure Seatbelt is buckled if in vehicle or key is ON if using test bench	-	-
7	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
8	Run command to load configuration file	314 + <Enter>	Panic Alarm
9	Reboot using a “Hard Reboot”	50 + <Enter>	10 High Beeps - screen goes blank
Testing & Install Event - If following test fail, stop and determine why			
10	Test to ensure the MCM is communicating with the Witness	43 + <Enter>	3 High Beeps
11	Test to ensure the MCM is communicating with the Satellite modem	56 + <Enter>	2 High Beeps, then 5 High Beeps
12	Test the satellite signal strength (Error tones = No signal, 10 Beeps = Excellent signal)	54 + <Enter>	1 - 10 High Beeps
13	Check for GPS lock	Verify on screen	Latitude & Logitude show on screen
Load EMU Archive			
14	Insert USB (with customer-specific All-in-One file loaded) into the Handheld/USB Dongle (for Touchscreen).	-	USB Drive Inserted
15	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
16	Enter code to Load EMU Archive	333 + <Enter> 782 + <Enter>	5 High Beeps 10 High Beeps - Wait for Panic
17	Wait 1 minute for the file to finish, then perform a reboot	99 + <Enter>	Device will reboot
Configure Mileage and Orientation			
18	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
19	Enter the mileage on the vehicle (XXX=Mileage/Km; if mileage is unknown use 100)	18 + XXX + <Enter>	2 High Beeps
20	Enter the mileage/Km again for confirmation	18 + XXX + <Enter>	5 High Beeps
21	Orient the waySmart - See Orientation Chart (X=Orientation #)	003 + X + <Enter>	2 High Beeps
Send Install Event			
22	Install Event - Marry the waySmart to the Vehicle ID in the portal (XXX = Vehicle ID)	19 + XXX + <Enter>	2 High Beeps
23	Install Event - Repeat step 18 for confirmation (May take up to 3 mins. for Panic)	19 + XXX + <Enter>	5 High Beeps - Wait for Panic
Load Vehicle Specific EMU File			
24	Insert USB (with customer-specific All-in-One file loaded) into the Handheld/USB Dongle (for Touchscreen).	-	USB Drive Inserted
25	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
26	Load Vehicle-Specific EMU File	155 + <Enter> 785 + <Enter>	2 High Beeps 5 High Beeps
27	Enter the 7-digit vehicle code (see EMU Chart)	(7 digit code) + <Enter>	7 High Beeps - Wait for Panic
Verification of Install Event			
28	Check GAIN or the inthinc Portal for the “Install Event” notification or contact Technical Support if no access to the portal	-	“Install Event” notification in the portal
Verification of MCM Firmware Version			
29	Login with your valid Driver ID	Enter your Driver ID #	Driver ID will display
30	Compare MCM firmware version against step 2 above	Go to “About” screen	MCM Release # _____

If the MCM Firmware version is not the same as step 2, complete the following steps to load the new MCM firmware from the All-in-One file on the USB drive.			
31	Insert USB Drive into the Handheld/Touchscreen USB Dongle with customer-specific All-in-One file loaded	-	USB Drive inserted
32	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
33	Run the commands to download the MCM and DMM firmware	333 + <Enter> 365 + <Enter>	5 High Beeps 10 High Beeps
34	Perform a “Soft Reboot”	99 + <Enter>	10 High Beeps - Screen goes blank
35	Check the “About” screen to verify the MCM firmware was updated	-	About screen shows updated firmware version
Text Message			
36	Send a Text Message from the Handheld/Touchscreen and check portal for the text message	Send Text Message	Text message displayed in portal
Test Seatbelt			
37	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
38	Ensure Seatbelt is buckled or key is in ON position if using a test bench	42 + <Enter>	3 High Beeps
39	Unbuckle the seatbelt or turn key OFF if using a test bench	42 + <Enter>	3 Bad Beeps
40	If the above states are reversed, Enter “Programming Mode” to correct the state. Buckle and Unbuckle the seatbelt and retest	Programming Code + <Enter> 45 + <Enter>	Programming Tone 2 High Beeps
Test Ignition			
41	Test the vehicle ignition with the vehicle turned on or the key in the ON position if using a test bench	41 + <Enter>	3 High Beeps
42	Turn vehicle ignition off or turn key to OFF position if using test bench - wait 5 seconds for power to drain	41 + <Enter>	3 Bad Beeps
Communication Verification for Zones Download			
43	Verify either on the Handheld “About” screen or in the portal that you have GPRS cell coverage.	052 + <Enter>	Check portal for “Location Debug” notification
Download Zones			
If Good GPRS coverage - remove USB Drive from Handheld/Touchscreen			
44	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
45	Enter commands to load the zones Light-Duty = 367, Heavy-Duty = 781	333 + <Enter> Light or Heavy + <Enter>	5 High Beeps 10 High Beeps - wait for Panic
If No GPRS coverage - Zones need to be manually loaded with USB Drive			
46	With USB inserted into Handheld/Touchscreen, enter “Programming Mode’	Programming Code + <Enter>	Programming Tone
47	Enter commands to load the zones Light-Duty = 367, Heavy-Duty = 781	333 + <Enter> Light or Heavy + <Enter>	5 High Beeps 10 High Beeps - wait for Panic
Shutdown System			
48	Log out your Driver ID	Log out using HH/TS	-
49	Turn Seatbelt Key to the ON position and turn the ignition key to the OFF position - Remove USB Drive safely	Press Remove USB Drive	USB Drive is safe to remove
50	Reboot with tiwiTerm or Soft Reboot. Unplug system cable when screen goes blank	tiwiTerm or 99 + <Enter>	System is powered down safely

Post-Installation Test Programming Guide

STEP	TASK	CODE	EXPECTED RESULT
Login			
1	Login with your Valid Driver ID	Enter your Driver ID #	Driver ID will display
Post Install Configuration			
2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
3	Enter mileage/Km if not entered during pre-install test bench (XXX = Mileage/Km)	18 + XXX + <Enter>	2 High Beeps
4	Enter mileage again for confirmation	18 + XXX + <Enter>	5 High Beeps
5	Set the actual orientation of the waySmart in the vehicle (XX = Orientation - See Orientation Chart)	002 + XX + <Enter>	Wait for Panic
Communication Testing			
6	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
7	Test SAT communication. Check Portal for “Location Debug” notification via SAT	051 + <Enter>	Wait for Panic
8	If you have GPRS coverage, test GPRS communication. Check Portal for “Location Debug” notification sent via GPRS	052 + <Enter>	Wait for Panic
Load Vehicle-Specific EMU File (if not previously completed on the test bench)			
9	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
10	Enter the 7-digit vehicle EMU code (see EMU Chart)	155 + <Enter> 785 + <Enter> (7-digit Vehicle Code) + <Enter>	2 High Beeps 5 High Beeps 7 High Beeps -wait for Panic
11	IMPORTANT! Only one of the next two sections will be performed	-	-
EMU Supported Seatbelt			
12	When a vehicle specific EMU file supports the seatbelt, it is required to send the command to “Disable GPIO” or a hardwired seatbelt sensor	-	-
13	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
14	Enter the commands to disable the GPIO seatbelt sensor	333 + <Enter> 897 + <Enter>	5 High Beeps 10 High Beeps
15	Now go to Step 20	-	-
Hardwired Seatbelt			
16	When the External Seatbelt Sensor is installed, it is a requirement to send the command to Disable the seatbelt portion of the EMU	-	-
17	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
18	Enter the commands to disable the Seatbelt portion of the EMU	333 + <Enter> 899 + <Enter>	5 High Beeps 10 High Beeps
19	Now go to Step 20	-	-
Test Seatbelt			
20	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
21	Buckle the seatbelt and send command to check seatbelt	42 + <Enter>	3 High Beeps
22	Unbuckle the seatbelt and send command to check seatbelt	42 + <Enter>	3 Bad Beeps
23	If the above states are reversed, go into “Programming Mode” to correct the state.	Programming Code + <Enter> 45 + <Enter>	Programming Tone 2 High Beeps
If EMU Seatbelt Fails - External Seatbelt Sensor must be Installed			
24	When tested the Seatbelt is not supported by EMU - a hardwired seatbelt sensor must be installed and correctly programmed. You must now “enable” the GPIO for a seatbelt sensor	Programming Code + <Enter> 333 + <Enter> 896 + <Enter>	Programming Tone 5 High Beeps 10 High Beeps
25	Test Seatbelt again to make sure it is working properly	-	-
Test Ignition			
26	Exit “Programming Mode”	0 + <Enter>	Exit Programming Tone
27	Turn ignition ON and run ignition check command	41 + <Enter>	3 High Beeps
28	Turn ignition OFF and run ignition check command	41 + <Enter>	3 Bad Beeps

Perform Test Drive			
29	Test drive the vehicle as per the Installation Checklist	See Checklist	-
Post Test Drive Wrap Up			
30	Logout so your Driver ID is not logged in	Use HH/TS to Logout	Logged out with your Driver ID
31	Login with the Generic Vehicle ID	Use HH/TS to Login	Logged in with Driver ID
32	Check GAIN/inthinc Portal to ensure all notifications have successfully been recorded	Check Portal	-
Disable PDA - Only perform these next steps if your company is in a pilot phase			
33	Disable all audio from Handheld/Touchscreen unit during “pilot” phase	-	-
34	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
35	Send commands to disable PDA and Auto Detect	333 + <Enter> 425 + <Enter> 758 + <Enter>	 5 High Beeps 10 High Beeps
36	Reboot the unit and make sure the HH/TS remain in “System is Loading” status	99 + <Enter>	10 High Beeps - screen goes blank, then to “System is Loading”

Pull Event/Trace Data

Follow the below step-by-step instructions to pull witness trace and/or event data/history:

STEP	TASK	CODE	EXPECTED RESULT
1	Insert a properly formatted USB drive into the Handheld/Touchscreen USB dongle	-	USB Drive inserted into HH/TS
2	Enter "Programming Mode"	Programming Code + <Enter>	Programming Tone
3	Enter the following commands (Opt Folder)	155 + <Enter> 582 + <Enter> 1 + <Enter>	? ? Wait for Panic
4	Enter the following commands (Map Folder)	155 + <Enter> 582 + <Enter> 2 + <Enter>	? ? Wait for Panic
5	Enter the following commands (evenhist.htm on the root of the thumb drive)	155 + <Enter> 582 + <Enter> 0 + <Enter>	? ? Wait for Panic
6	Enter the following commands (Crash_Data)	155 + <Enter> 582 + <Enter> 4 + <Enter>	? ? Wait for Panic
7	Enter the following commands to safely remove USB Drive (Critical)	333 + <Enter> 583 + <Enter>	
8	Check the thumb drive, you should have 1 folder (named after the MCM of the unit) and the evenhist.htm on the root. In the MCM folder you should find two more folders named opt and maps, in the opt folder you should have a folder named crash_data.		
9	Place the eventhist.htm in the MCM folder right click the folder and "send to" compressed (zipped) folder. This will create a zipped folder. Please make sure you do not use a different format such as zipx because engineering is unable to view this type of file.		
10	If the eventhist.htm (Event History file) or the other files are missing this would be due to the following: • The thumb drive was formatted in the incorrect file system, the correct one is FAT. • The internal thumb drive has not mounted and there are 'No Internal Thumbdrive' notifications on the portal. • The thumb drive is not mounting to the display or slim dash, if it is a hand held the cable length could be the issue. • After the commands there was not enough time given for the writing of the data to the thumb drive. (Wait a few seconds after each panic alarm before proceeding to the next command.)		

Section 4

waySmart™ Troubleshooting

IN THIS SECTION:

- Troubleshooting Quick Reference 41
- System Troubleshooting 43
- Communication Troubleshooting 45
- Driver Interface Troubleshooting 49
- Vehicle Troubleshooting 53
- Seatbelt Troubleshooting 57

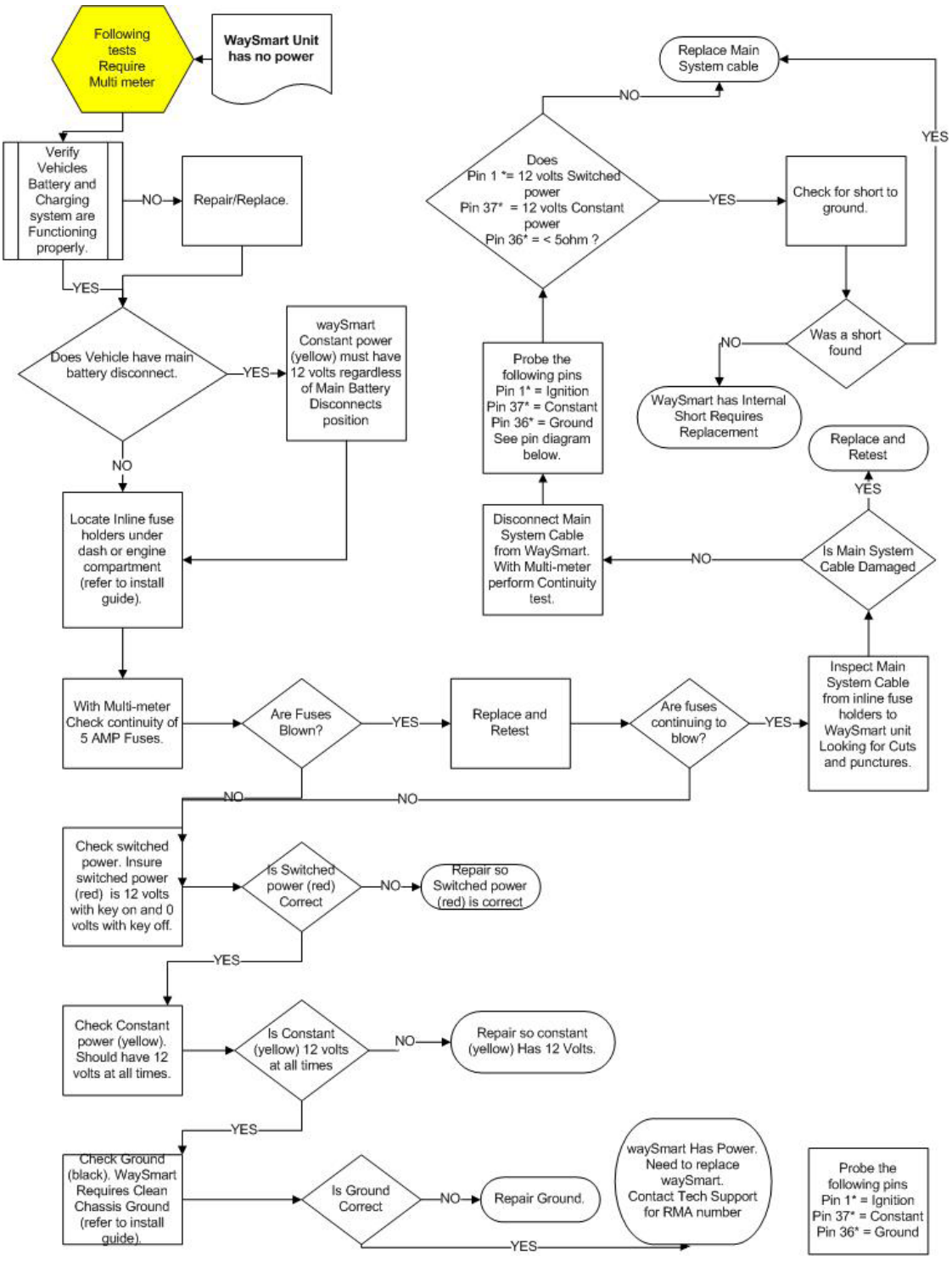
Troubleshooting Quick Reference

Category	Problem	Overview	Page
waySmart System	*waySmart Unit has No Power*	There are several considerations to make when diagnosing a waySmart unit that will not power up. It may have to do with how the unit is installed to the vehicle's electrical system or ground. It may also have to do with a faulty cable or waySmart unit.	43
Communication	*waySmart Unit Not Communicating (Non-Comm)*	Each waySmart is equipped with an internal time clock which helps the MCM determine when to send RF communication messages. If the timestamp if incorrect, the waySmart will stop sending messages and become, "Non-Comm," and is not communicating. This problem can only be diagnosed and fixed using tiwi Term on a Test Bench.	45
	Witness Not Communicating with MCM	When testing communication by sending a "43" command, you recieve bad tones from the waySmart. This indicates the witness component is not communicating with the waySmart MCM.	45
	No GPS Signal	The waySmart system gets GPS information from a Tri-Band antenna that is mounted on the exterior of a vehicle. If the vehicle does not acquire sufficient GPS information, there will be no trip "breadcrumbing" in the web portal.	46
	No Satellite Comminication	When testing communication by sending a "56" command to test communication between the satellite and the MCM the test fails. Or when you are testing the satellite signal strength, the test fails.	47
	No Cellular (GPRS) Communication	If the waySmart system does not have GPRS communication, the system will have limited functionality and ability to send notifications to the web portal.	48
Driver Interface	*Handheld Displays "LCD Test Screen" Indefinitely*	During a firmware update, the Handheld unit gets stuck in a loop and displays the text, "LCD Test Screen". The Handheld will not recover from this state.	49
	Handheld Displays "System is Loading" Indefinitely	There are several scenarios that can cause a Handheld to get stuck in "System Loading", which will require different paths to resolve.	49
	Touchscreen Displays "System is Loading" Indefinitely	There are several scenarios that can cause a Touchscreen to get stuck in "System Loading", which will require different paths to resolve.	51
Vehicle	*Vehicle Low/Dead Battery*	The waySmart draws power from a 12V vehicle power source. After the vehicle ignition is turned off, the waySmart is designed to go into "low power mode" after a predetermined amount of time. It is possible that the unit does not go into low power mode, which may cause excessive drain on the vehicle battery.	53
Seatbelt	*False Seatbelt Alarms w/ External Seatbelt Sensor Installed*	A common driver complaint is that they recieve erronous seatbelt violations when their seatbelt is buckled.	57
	EMU File - Seatbelt Related Problems	The waySmart system supports seatbelt in one of two different methods, (1) Vehicle-specific EMU file supports seatbelt usage or (2) An external Seatbelt Sensor is installed on the seatbelt buckle and latch. The main cause of the problem above, in most cases, is that the system is not configured properly to support the type of seatbelt solution that is being used. The seatbelt solution that is utilized (hardwired or EMU supported) dictates how you will need to configure the waySmart system. The instructions below will provide instrcutions on how to configure the waySmart system for an External Seatbelt Sensor or EMU Seatbelt support.	58

waySmart System Troubleshooting

waySmart Unit has No Power

waySmart Unit has No Power	
Symptom	waySmart Unit will not power on with a working Handheld or Touchscreen interface
Overview	There are several considerations to make when diagnosing a waySmart unit that will not power up. It may have to do with how the unit is installed to the vehicle's electrical system or ground. It may also have to do with a faulty cable or waySmart unit.
How to Diagnose	• Use the Flow Chart below to help identify and resolve the problem. If the problem persists, contact inthinc Technical Support



Communication Troubleshooting

waySmart Non-Comm (Not Communicating)

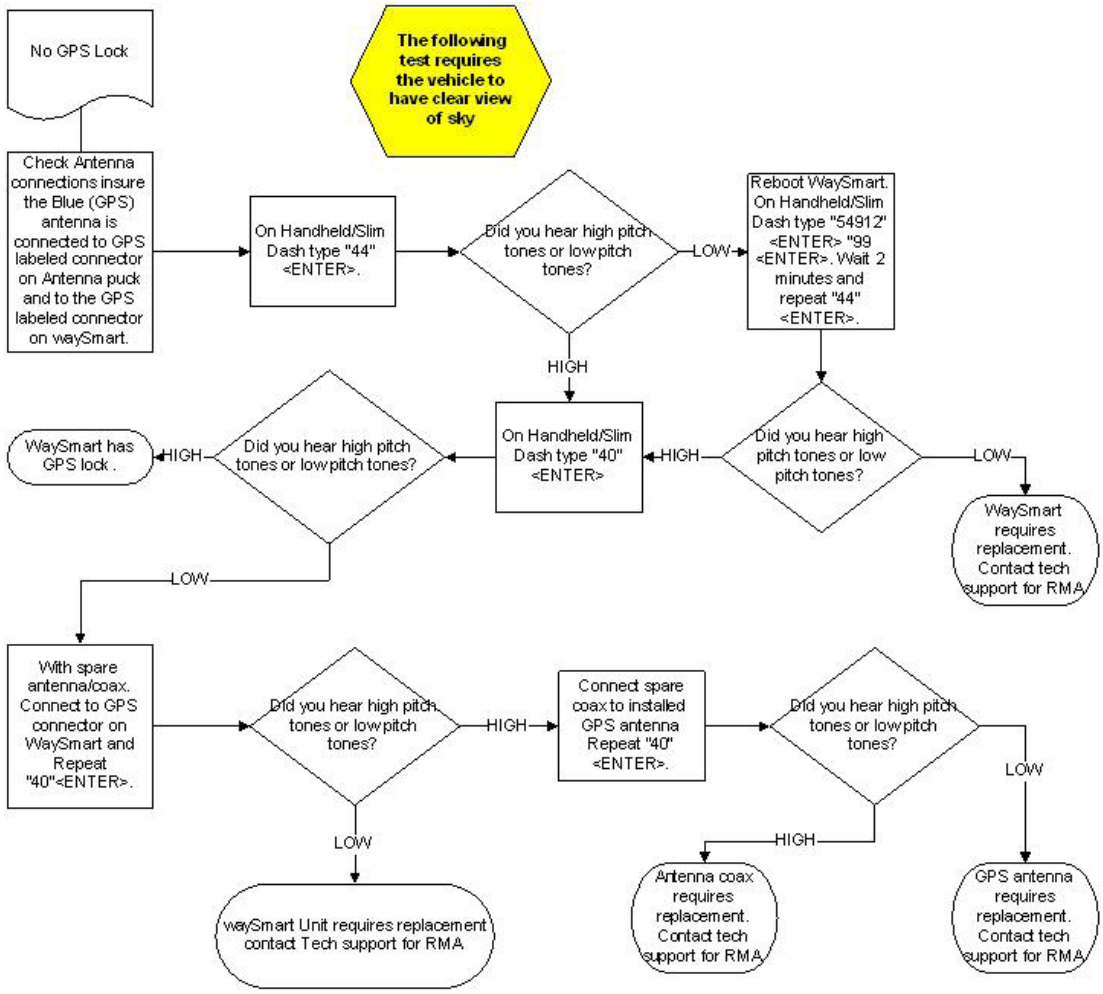
waySmart Non-Comm (Not Communicating)		
Symptom	waySmart is not sending notifications (i.e. Install Event) to the web portal (GAIN or inthinc Portal)	
Overview	Each waySmart is equipped with an internal time clock which helps the MCM determine when to send RF communication messages. If the timestamp if incorrect, the waySmart will stop sending messages and become, "Non-Comm," and is not communicating. This problem can only be diagnosed and fixed using tiwi Term on a Test Bench.	
How to Diagnose	• Disconnect the GPS Coax connection and click the "Reboot" button on tiwi Term • When the system resumes, type: date <enter> • If the date shows different than today's date, the waySmart will not communicate or send notifications to the web portal (i.e. Install Event)	
How to Fix	Step	Action
	1	The waySmart needs to be updated with specific software, titled "mcm7test" - which can be found on the SVN website within the tiwi Term folder
	2	Download and save the above file to an inthinc issued USB Drive
	3	After file has been loaded on USB Drive, remove the USB drive from the computer and insert into the HH/TS
	4	A new button will need to be configured on tiwi Term. Right-click a button on the left-side of the tiwi Term screen and label the button, "Time-stampfix"
	5	In the bottom dialog box, type the command: "/dash_usb/mcm7test rtc"
	6	On tiwi Term, click the button you just created titled, "Timestampfix"
	7	The USB drive will being to flash and data will begin to populate the tiwi Term screen
	8	Look for the timestamp to change a few times, followed by a command line that states, (MPASS(3times))
	9	The USB drive will stop flashing and the download is complete
	10	Reboot the waySmart using tiwi Term, and remove the USB Drive

Witness Not Communicating with MCM

Witness Not Communicating with MCM		
Symptom	When testing communication, the witness fails to communicate with the MCM	
Overview	When testing communication by sending a "43" command, you recieve bad tones from the waySmart. This indicates the witness component is not communicating with the waySmart MCM.	
How to Diagnose	• You receive an unsuccessful "Install Event" - in which case the witness tested okay prior to sending the install event and fails when retested after the failed Install Event • Prior to sending the Install Event the testing between the witness and MCM fails (43 command) • Excessive "Witness Heartbeat Violation" notifications in the web portal	
How to Fix	Step	Action
	1	Most witness issues can be corrected by updating the MCM firmware to version 225.11.7 or later and making sure the DMM updates to 128
	2	Insert USB Drive, with customer-specific All-in-One file loaded, into Handheld/Touchscreen USB Dongle. Follow instructions on page 24 to update MCM Firmware
	If that does not correct the issue, try the following:	
	3	Disconnect the System Cable from the waySmart unit
	4	Remove the waySmart internal battery and leave disconnected for 1 minute
	5	Reconnect the waySmart System Cable
	6	Re-install the waySmart internal battery
	7	Re-test the witness communication by sending a 43 command. See Testing on page 33 for more information
	If you cannot remove the waySmart internal battery, try the following:	
	8	Let the waySmart system sit for 24 hours without power
	9	Disconnect the waySmart System Cable from the unit
	10	Re-test the witness communication by sending a 43 command. See Testing on page 33 for more information
	If the above steps do not resolve the problem, contact inthinc Technical Support	

▶ No GPS Signal

No GPS Signal		
Symptom	• GPS lattitude and logitude coordinates are not displaying on the Handheld or Touchscreen interface	
Overview	The waySmart system gets GPS information from a Tri-Band antenna that is mounted on the exterior of a vehicle. If the vehicle does not acquire sufficient GPS information, there will be no trip "breadcrumbing" in the web portal.	
How to Diagnose	• No GPS lattitude and longitude coordinates display on the Handheld or Touchscreen interface	
How to Fix	Step	Action
	1	Verify vehicle has clear line-of-sight to the GPS satellites in the sky. If the vehicle is indoors, the GPS signal may not be sufficient.
	2	Verify all of the cables and connections from the Tri-Band antenna and waySmart unit
	3	Use the Flow Chart below to help identify and resolve the problem. If the problem persists, contact inthinc Technical Support

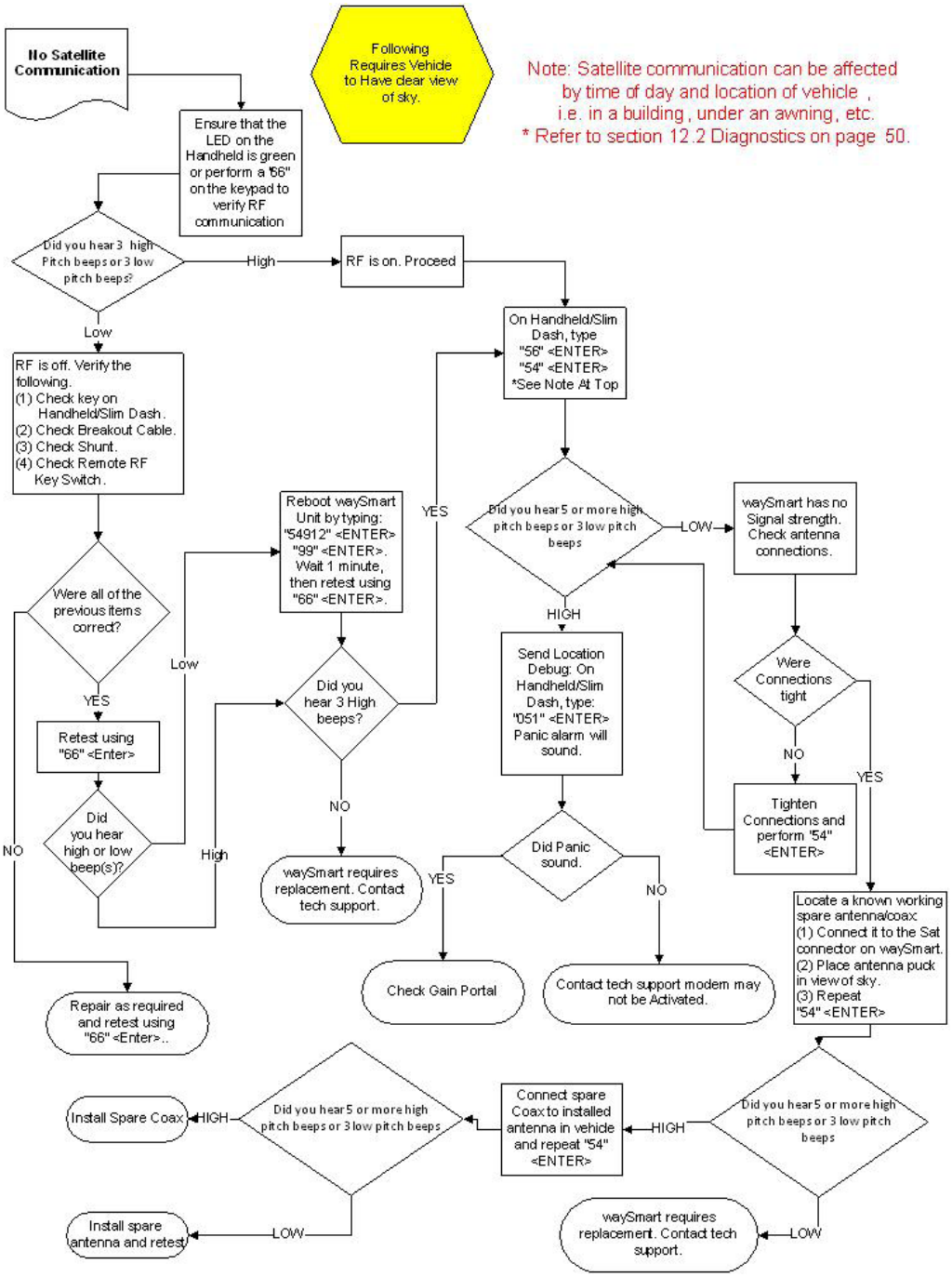


WARNING:

GPS Signal may not be sufficient if the vehicle is indoors. The Tri-Band antenna needs a clear line-of-sight to the GPS satellites in orbit to acquire and lock GPS signal. GPS may also be affected by other environmental factors such as: Mountainous terrain, Heavy Tree Canopy (forested areas), and in rare instances even rain.

▶ No Satellite Communication

No Satellite Communication		
Symptom	When testing communication, communication with the satellite fails	
Overview	When testing communication by sending a "56" command to test communication between the satellite and the MCM the test fails. Or when you are testing the satellite signal strength, the test fails.	
How to Diagnose	• You receive bad tones when testing the communication between the satellite modem and the MCM (56 command) • You have insufficient signal when testing satellite communication signal stength (54 command)	
How to Fix	Step	Action
	1	Follow the Satellite Communication Flow Chart below to diagnose and fix problem
	2	If the problem persists, contact inthinc Technical Support



No Cellular (GPRS) Communication

No GPRS Cellular Communication		
Symptom	• When testing communication, and sending a “Location Debug” notification, the notification does not appear in the portal • No GPRS information is displaying on the “About Screen”	
Overview	If the waySmart system does not have GPRS communication, the system will have limited functionality and ability to send notifications to the web portal.	
How to Diagnose	• No GPRS Modem information on the Handheld or Touchscreen “About” screen • When testing communication by sending a “Location Debug” command, there is no notification in the web portal (52 command) • No green LED indicator light on the GPRS modem	
How to Fix	Step	Action
	1	Check all cables and connections
	2	Verify the green LED indicator light on the GPRS modem is solid green
	3	Re-install the customer-specific configuration file on the waySmart unit
	4	Complete a new Install Event
	5	Re-test communication by sending a “052” command from the Handheld or Touchscreen. Check the web portal for “Location Debug” notification
	6	If the above steps do not correct the problem, contact inthinc Technical Support

Driver Interface Troubleshooting

Handheld Displays “LCD Test Screen” Indefinitely

Handheld Displays “LCD Test Screen” Indefinitely				
Symptom	Handheld unit displays “LCD Test Screen” on the screen indefinitely			
Overview	During a firmware update, the Handheld unit gets stuck in a loop and displays the text, “LCD Test Screen”. The Handheld will not recover from this state.			
How to Diagnose	• When attempting to update the Handheld firmware, the screen displays “LCD Test Screen” and does not recover			
How to Fix	Step	Action		
	1	Disconnect the non-working Handheld from the System Cable (Red roll-lock connection)		
	2	Connect a working Handheld unit to the waySmart System Cable		
	3	From the Handheld keypad, peform the following keypad commands:		
		Action	Code	Expected Result
	4	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	5	Perform the commands to load new Handheld firmware	333 + <Enter> 555 + <Enter>	
	6	Immediately after the 555 command has been sent, disconnect the working Handheld		
	7	Reconnect the non-working Handheld, with the USB Drive still inserted into the USB port		
	8	USB Drive LED will start to flash and the Handheld firmware will begin to load		
	9	Wait approximately 10-15 minutes for the Handheld to download the new firmware. Wait for Panic.		
	10	If the problem persists, contact inthinc Technical Support		

Handheld Unit Displays “System is Loading” Indefinitely

Handheld Unit Displays “System is Loading” Indefinitely		
Symptom	Handheld unit displays “System is Loading” on the screen indefinitely	
Overview	There are several scenarios that can cause a Handheld to get stuck in “System Loading”, which will require different paths to resolve.	
How to Diagnose	• Initial system boot up (performed on Test Bench) - Stuck in “System Loading” • Initial system boot up okay - Upon re-boot after loading the customer-specific configuration file, system gets stuck in “System Loading” • “System Loading” issue happens intermittently, lasting a few minutes or a few hours • System is in “silent” mode for a customer (auto-detect and PDA module purposely disabled for a period of time) **Note**: You will be limited on what can be done to resolve the issue if you do not have a TEST BENCH WITH CONSOLE CABLE OR JUST A CONSOLE CABLE. Remember the “Console Cable” allows you to connect a laptop computer to the waySmart. Most repair instructions will require a minimum of the console cable and a laptop computer.	
Probable Causes	• **PDA is Disabled** - The PDA Module comtrols the Handheld interface. When PDA is disabled the HH screen will display “System is Loading”. This means that the waySmart will continue to operate as normal, but will not communicate with the HH interface. This is usually the case when customers are in a “pilot” or “calibration” phase and do not want in-cab coaching or driver interaction with the interface. • **Auto Detect is Disabled** - Auto Detect is a feature that allows the waySmart system to automatically detect the presence and type of driver interface being used (Handheld or Touchscreen).	
General Troubleshooting		
PDA is Disabled	Step	Action
	1	To “Enable” PDA - from GAIN, send the forward commands: “Enable Auto Detect” (command 757) and “Enable PDA Module” (command 424)
	2	Monitor the Command History page in GAIN to ensure that the sent commands are “success”
	3	Once a “success” is received in GAIN for each of the commands sent, the waySmart unit needs to be power-cycled. From GAIN, send the forward command, “Power Cycle”. The HH or TS unit should power up. Verify the unit no longer displays “System is Loading” Note: If PDA module is disabled before “Install Event” confirmation, or the process does not work, a computer with access to tiwi Term and a console cable will be required to manually enable the PDA and Auto Detect settings.

Auto Detect is Disabled	Step	Action		
	1	Disconnect the HH/TS and connect a Slimdash or QSI interface and using the keypad, complete the following commands:		
		Action	Code	Expected Result
	2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	3	Send the following commands:	333 + <Enter> 757 + <Enter>	
	4	Perform a Soft Reboot	99 + <Enter>	
	5	Disconnect the Slimdash or QSI unit and connect the Handheld or Touchscreen before the system complete the reboot cycle. Note: If you do not have access to a Slimdash or QSI unit, you will need access to a computer with tiwi Term software and a console cable to manually enable “Auto Detect”.		

Issue-Specific Troubleshooting	
Issue: *System Loading issue happens during initial system boot up (performed on Test Bench)*	
Assumption:	Known functional Test Bench, initial boot up is performed on the Test Bench
Resolution:	Look in tiwi Term and you will probably find one or all of the following disabled: iwi handheld, auto detect, PDA module. Enable these and reboot the system.
Issue: *System Loading issue happens during initial system boot up (performed in the vehicle)*	
Quick Test:	Bypass the breakout cable and connect the handheld directly to the system cable. If the handheld works properly, replace the breakout cable. If not successful, you can remove the waySmart 820 unit and connect it to a test bench. Power up the system, if the system works normally, you either have a bad system cable or handheld unit. Swap the test bench handheld with the one from the vehicle, if the handheld is still in system loading, replace the handheld. If the handheld powered up normally, double check all system cable connections are good in the vehicle, if they are then replace the system cable.
If NO Test Bench:	Use a console cable and complete quick test from the vehicle. If you do not have a console cable, refer to *Probable Causes* section for possible resolution.
Issue: *System Loading issue happens upon reboot after loading a configuration file*	
Assumption:	System booted up normally on the test bench, or in the vehicle
Resolution:	Reload the All in One file. It is possible that either the config file did not load properly, the information contained in it is incorrect or the thumb drive may be corrupt. If you have a test bench or console cable go into tiwi terminal, then check that iwi handheld, auto detect, PDA enabled settings are enabled. If they are all enabled, reboot the system with tiwi terminal and reload the customer config file.
Issue: *System Loading issue happens intermittently, lasting several minutes to several hours*	
Resolution:	This issue is related to firmware, update the unit to the latest version of firmware
Issue: *System Loading issue happens when unit is in “Silent Mode”*	
Resolution:	Handheld units are commonly put in “Pilot Mode” or “Stealth Mode” so that a driver cannot interact with the system while baseline data is being gathered, the duration is usually 30 to 60 days. When vehicles are ready to “go live” a Forward Command is sent to the vehicle to enable *Auto detect* and *PDA module*. There could be several reasons that caused the commands to be unsuccessful. Commands will either need to be resent or you will to use tiwi terminal to enable *Auto detect* and *PDA module*.

Touchscreen Unit Displays “System is Loading” Indefinitely

Touchscreen Unit Displays “System is Loading” Indefinitely				
Symptom	Touchscreen unit displays “System is Loading” on the screen indefinitely			
Overview	There are several scenarios that can cause a Touchscreen to get stuck in “System Loading”, which will require different paths to resolve.			
How to Diagnose	• Initial system boot up (performed on Test Bench) - Stuck in “System Loading” • Initial system boot up okay - Upon re-boot after loading the customer-specific configuration file, system gets stuck in “System Loading” • “System Loading” issue happens intermittently, lasting a few minutes or a few hours • System is in “silent” mode for a customer (auto-detect and PDA module purposely disabled for a period of time) Note: You will be limited on what can be done to resolve the issue if you do not have a TEST BENCH WITH CONSOLE CABLE OR JUST A CONSOLE CABLE. Remember the “Console Cable” allows you to connect a laptop computer to the waySmart. Most repair instructions will require a minimum of the console cable and a laptop computer.			
Probable Causes	• **PDA is Disabled** - The PDA Module comtrols the Touchscreen interface. When PDA is disabled the TS screen will display “System is Loading”. This means that the waySmart will continue to operate as normal, but will not communicate with the TS interface. This is usually the case when customers are in a “pilot” or “calibration” phase and do not want in-cab coaching or driver interaction with the interface. • **IWI Handheld is Enabled** - Occasionaly the waySmart will default to IWI Handheld Enabled during the boot process. The Handheld and Touchscreen are similar type interfaces, however only one device can work at a time. If the IWI Handheld is “enabled” while using a Touchscreen, the TS will display “System is Loading”.			
General Troubleshooting				
PDA is Disabled	Step	Action	Code	Expected Result
	Enable PDA with a Slimdash Unit:			
	1	Connect the SlimDash unit with the waySmart System Cable	-	SlimDash connected
	2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	3	Perform the following commands:	333 + <Enter> 424 + <Enter>	
	4	Perform a Soft Reboot	99 + <Enter>	
	Enable PDA using tiwi Term Software:			
	1	Click the “Config Setup” button and type “10” and hit Enter		
	2	Look for the ID number next to “PDA Module” (i.e. 133)		
	3	Type “11” (modify settings by ID) and hit Enter, then type “133” (PDA module) and hit Enter		
	4	Type “1” (enable PDA module) and hit Enter		
	5	Type “Y” (yes to confirm) and hit Enter		
	6	Click the “Quit” button to exit “config setup”		
	7	Click the “Reboot” button		
	Enable PDA using GAIN web portal:			
	1	Go to the “Send Command” tab when looking at a Vehicle or when in the “Vehicle” tab under Asset Management		
	2	Scroll down in the Forward Command menu and send the command: “Enable PDA Module”		
	3	Monitor GAIN for “success” in the Command History tab (may take a while)		
	4	The unit needs to be power-cycled, send the command “Power Cycle”		
IWI Handheld is Enabled	Disable IWI Handheld using tiwi Term Software:			
	1	Click the “Config Setup” button and type “10” and hit Enter		
	2	Look for the ID number next to “IWI Handheld” (i.e. 193)		
	3	Type “11” (Modify Settings by ID) and hit Enter, then type “193” (IWI Handheld)		
	4	Type “0” (Disable IWI Handheld) and hit Enter		
	5	Type “Y” (yes to confirm) and hit Enter		
	6	Click the “Quit” button to exit Config setup		
	7	Click the “Reboot” button		

Vehicle Troubleshooting

Vehicle Low/Dead Battery

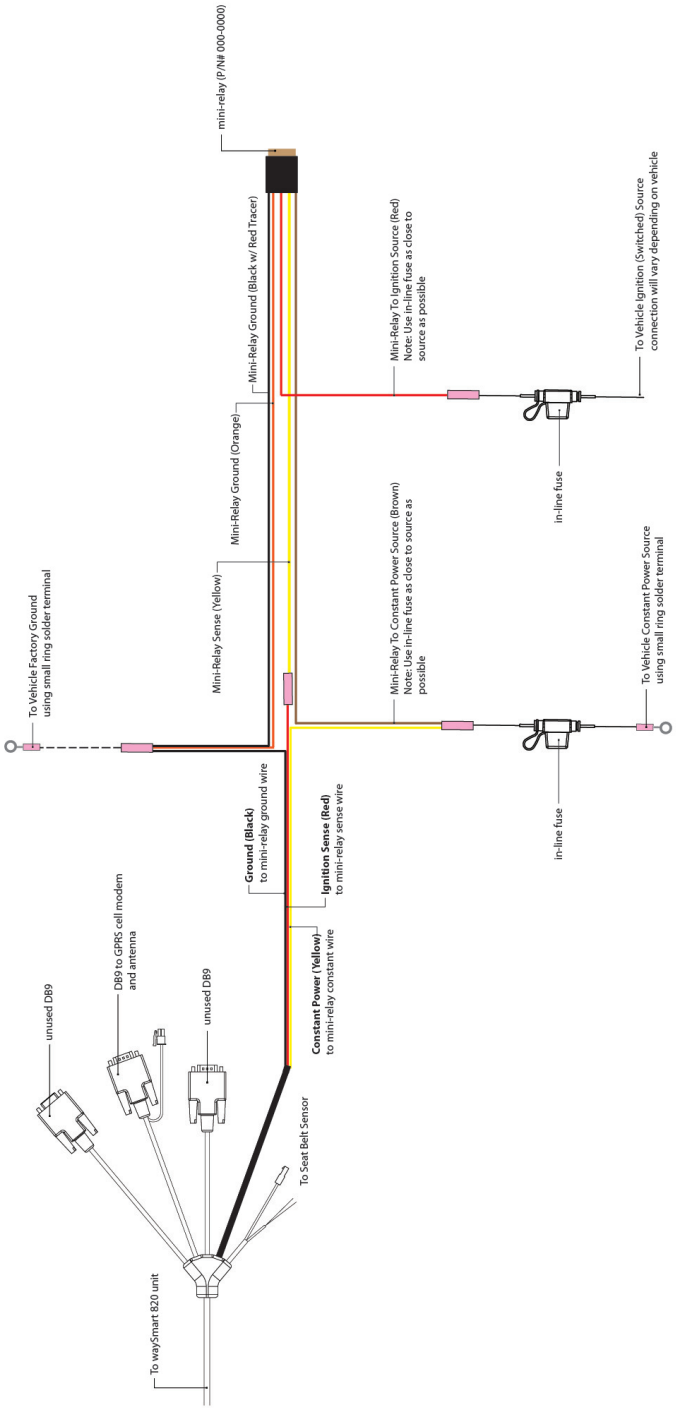
Vehicle Low/Dead Battery				
Symptom	Vehicle has a low or dead battery			
Overview	The waySmart draws power from a 12V vehicle power source. After the vehicle ignition is turned off, the waySmart is designed to go into “low power mode” after a predetermined amount of time. It is possible that the unit does not go into low power mode, which may cause excessive drain on the vehicle battery.			

Things to Consider	• Has problem started since a new install, RMA, or other service work?
	• What kind of service work was performed on the vehicle? (i.e. electrical work, etc.)
	• Is a Relay being used?
	• Verify all connections have been soldered in accordance with the waySmart Installation Manual
	• Check the condition of the battery (Refer to Installation/Maintenance Checklist for Static/Dynamic voltage)
	• How corroded are the battery terminals?
	• What is the Static battery voltage? Is the voltage 12.5 or less?
	• What is the Dynamic voltage of the Charging System?
	  • To perform a Dynamic voltage test, attach a multi-meter to each battery terminal and start the vehicle. Verify the voltage increase. Did the voltage increase to at least 12.9V (13-14V is normal)?
	  • If you do not see a significant voltage increase, then the charging system may be suspect. The battery may also need to be replaced. **Note**: Even with a poor charging system, the waySmart may still have a problem and will require further testing.
	• Are there other vehicle components that are contributing to the problem? (i.e. Cell phone charger, radio equipment, etc.)			

How to Diagnose	• Check the Ignition On/Off state. In some cases this state gets reversed and needs to be corrected. • Check waySmart System Power Connections (Constant, Switched Ignition, Ground) - this tends to be the leading cause of dead batteries. In most cases the switched ignition wire has 12v power with the ignition off, when it should have zero (0) volts with the ignition off. • Verify waySmart unit is going into “Low Power Mode”. If the unit does not go into Low Power Mode, the system will draw power from the vehicle indefinetely, which may cause excessive battery drain when the vehicle is turned off.			
General Troubleshooting				
Check Vehicle Ignition State	Step	Action	Code	Expected Result
	1	Turn the vehicle on and access the keypad screen on the HH/TS	-	-
	2	Send the command to check ignition state	41 + <Enter>	2 High Beeps
	3	Turn the vehicle off and send the command to check the ignition state	41 + <Enter>	2 Low Beeps
	4	If you are getting high beeps with the vehicle on and off, or low beeps with the vehicle on and off, follow the steps below to program the ignition state	-	-
	5	Turn the vehicle on, and enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	6	Enter the following command	44 + <Enter>	2 High Beeps
	7	Peform a Soft Reboot	99 + <Enter>	
	8	After the system reboots, go back to step 1 and test the ignition state again	-	-
Portal Diagnosis	Step	Action		
	1	Access GAIN web portal. The following steps will be to verify the waySmart unit is going into Low Power Mode		
	2	Does the waySmart display multiple low power notifications? If YES, update to firmware 225 or later may fix the problem.		
	3	If there are NO low power notifications (unit not going to sleep) refer to the following possibilities: • Incorrect ignition source, or switched power is not a true source (with ignition off you still have 2v or more) • Poor Ground. Must be factory ground location, non-painted, metal chassis ground • Faulty internal ground inside the waySmart. Will need to test waySmart is going into Low Power Mode		

Check waySmart Power Connections	Step	Action		
	1	Is a Relay being used? Verify solder connections are good. See Mini-Relay Wiring diagram on the next page.		
	2	Verify the waySmart constant power wire is connected to a 12v constant power source in the vehicle		
	3	With the ignition off, use a voltmeter to check the switched (ignition) power wire (red wire) to make sure there is zero (0) volts present. Switched power should be connected to a fuse that doesn't supply power when the vehicle ignition is off.		
	4	Check where the unit is being grounded. Must be a factory ground location, non-painted metal chassis ground.		
Verify waySmart goes into Low Power Mode	Step	Action	Code	Expected Result
	1	Verify waySmart is updated with the most recent version of firmware	-	Firmware up to date
	2	Enter the following command to flush queued messages	59 + <Enter>	
	3	Try putting the unit in Low Power Mode. Allow at least 15-70 mins for the unit to go into low power mode	51 + <Enter>	Wait for Panic
	4	If the unit does not go into low power mode, follow the steps below to conduct an Amp Draw Test	-	-
	Amp Draw Test			
	1	Remove the waySmart main power fuse and attach amp meter in its place (set amp meter probes in the in-line fuse holder)	-	-
	2	Start the vehicle	-	-
	3	With the waySmart powered up, you will see between 600ma - 1.5 amps, depending on the model	-	-
	4	Perform a Hard Reboot	50 + <Enter>	10 High Beeps, screen goes blank
	5	Once the unit has rebooted, turn off the vehicle	-	-
	6	Enter the following command to go into low power mode	51 + <Enter>	Wait for Panic
	7	In approximately 15-70 mins, the unit should be asleep, with 25ma or less showing on your amp meter	-	-
	8	If the unit does not go into low power mode, follow the steps below to conduct a Manual Ground Test	-	-
	Manual Ground Test			
	1	Leave the amp meter attached to the main power in-line fuse holder	-	-
	2	Remove the switched power fuse and place a jump lead, off of the waySmart side of the in-line fuse holder, to the negative battery terminal	-	-
	3	Perform a Hard Reboot	50 + <Enter>	10 High Beeps, screen goes blank
	4	After reboot, enter the following command to go into low power mode	51 + <Enter>	Wait for Panic
	5	If the unit goes to sleep in 15-70 mins, verified with amp meter, waySmart has a problem. Verify power connections.	-	-
	6	If problem persists, contact intinc Technical Support for assistance	-	-

Mini-Relay Wiring Diagram



Mini-Relay Wiring Diagram Legend

Connect This...	To This...	Using This...
Mini-Relay Orange and Black wires	Splice with waySmart Black ground wire using small solder connector, then connect to a factory ground.	Small ring solder terminal
Mini-Relay Red wire	To Vehicle (Switched) Ignition Source. Use in-line fuse as close to ignition source as possible.	Small solder link connector
Mini-Relay Yellow wire	Splice with waySmart Red Switched Ignition wire	Small solder link connector
Mini-Relay Brown wire	Splice with waySmart Yellow (constant power) wire using a small solder link connector. Connect to vehicle constant power source. Use in-line fuse as close to power source as possible.	Small ring solder terminal

Seatbelt Troubleshooting

▶ False Seatbelt Alarms w/ External Seatbelt Sensor Installed

False Seatbelt Alarms w/ External Seatbelt Sensor Installed			
Symptom	Seatbelt violation audio plays in-cab when the seatbelt is buckled		
Overview	A common driver complaint is that they recieve erronous seatbelt violations when their seatbelt is buckled.		
How to Diagnose	• Drive the vehicle with the seatbelt buckled. Did you receive any erronous seatbelt violations? • Is the external seatbelt sensor magent still present and installed in a north/south position? • Did excessive heat being applied to SB heat shrink damage or melt the sensor wires? • Is the external seatbelt reed sensor switch present and installed in the correct position? • Has the external seatbelt sensor been wired correctly? • Have any of the wires been damaged or cut by seat movement?		
How to Fix	Step	Problem	Solution
	1	Seatbelt sensor magnet has fallen off or is not installed in a North/South position.	All magnets are now black teflon coated with white paint on the east/west surfaces, the white surfaces will never be glued down on the seatbelt tongue.
	2	Excessive heat being applied to Seatbelt heat shrink resulting in melted wiring or damage to the seatbelt reed switch	Do not over heat when appling heat shrink
	3	Seatbelt Reed Sensor Switch not glued in correct position	Seatbelt Reed Sensor Switch needs to be glued in a vertical position on the seatbelt buckle.
	4	Seatbelt Sensor improperly wired	Refer to the wiring diagram inside the Seatbelt kit or the waySmart Installation Manual
	5	Seatbelt sensor improperly routed and has been cut by seat movement	Reroute seatbelt wires. Thoroughly test the seat movement prior to completion of install.
	6	Seatbelt sensor magnet being glued to the molded plastic on the seatbelt tongue and the magnet is falling off	Magnets are required to be glued on surfaces that are metal and have been sanded, cleaned with alcohol, and glued with our special bonding agent. In some cases you may need to remove plastic so the seatbelt magnet can be glued to a metal surface.
	7	There have been occasions where a correctly installed magnet will come off the buckle. In most cases this is because the magnet will stick to the door jam, and when the driver closes the door, the magnet breaks off.	You can use 2" Gorilla tape to wrap the magnet and prevent this from happening.
	8	If the above is not applicable or does not resolve the issue	Verify the waySmart system is configured properly for the type of seatbelt support that is being used (hardwired or EMU supported)

EMU File - Seatbelt Related Problems

EMU File - Seatbelt Related Problems				
Symptom	During the first 30 seconds of driving the vehicle, the waySmart plays constant or intermittent seatbelt alarms with the seatbelt buckled.			
Overview	The waySmart system supports seatbelt in one of two different methods, (1) Vehicle-specific EMU file supports seatbelt usage or (2) An external Seatbelt Sensor is installed on the seatbelt buckle and latch. The main cause of the problem above, in most cases, is that the system is not configured properly to support the type of seatbelt solution that is being used. The seatbelt solution that is utilized (hardwired or EMU supported) dictates how you will need to configure the waySmart system. The instructions below will provide instrcutions on how to configure the waySmart system for an External Seatbelt Sensor or EMU Seatbelt support.			
How to Diagnose	• If an External Seatbelt Sensor is installed, verify the installation and presence of both the magnet and reed sensor switch. See the waySmart Installation manual for installation and wiring instructions • If an External Seatbelt sensor is being used, has the Seatbelt portion of the EMU file been disabled? • If Seatbelt is supported by EMU file, has the Seatbelt GPIO been disabled? • If a new EMU file was installed that supports Seatbelt, when an external seatbelt sensor was being used, has the waySmart system been reconfigured for the new type of seatbelt support? • If an External Seatbelt Sensor was installed because of intermittent or no seatbelt support via EMU file, has the waySmart system been reconfigured for the new type of seatbelt support?			
General Troubleshooting				
External (Hardwired) Seatbelt Sensor	Step	Action	Code	Expected Result
	1	If an External Seatbelt Sensor is being used, the Seatbelt portion of the EMU file needs to be disabled	-	Disable Seatbelt portion of EMU file
	2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	3	Enter the commands to disable seatbelt portion of EMU file	333 + <Enter> 899 + <Enter>	
	4	This prevents the waySmart from trying to detect SB support through the EMU file, when seatbelt support does not currently exist.	-	-
Seatbelt is Supported by EMU File	Step	Action	Code	Expected Result
	1	If Seatbelt usage is supported by EMU file, the Seatbelt GPIO needs to be disabled	-	Disable Seatbelt GPIO
	2	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	3	Enter the commands to disable seatbelt GPIO	333 + <Enter> 897 + <Enter>	
	4	This prevents the waySmart from tyring to detect a seatbelt sensor, when the seatbelt sensor does not exist.	-	-
Adding an EMU File to a Vehicle with External Seatbelt Sensor Installed	Step	Action	Code	Expected Result
	1	When a vehicle did not have EMU support for seatbelt during initial installation and EMU support is developed later, the waySmart system needs to be reconfigured for the new type of support	-	Reconfigure waySmart for EMU Support
	2	Remove the hardwired seatbelt sensor hardware	-	Remove old hardware
	3	Enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	4	Enter the following commands to enable SB portion of EMU file	333 + <Enter> 898 + <Enter>	
	5	Enter the following commands to disable GPIO	333 + <Enter> 897 + <Enter>	
	6	This will enable support from the EMU without conflits from the GPIO	-	-
Adding External Seatbelt Sensor because EMU Support is Intermittent or Not Available	Step	Action	Code	Expected Result
	1	When a vehicle had EMU support at time of installation, and has intermittent seatbelt support, an External Seatbelt Sensor must be installed. For more information on how to install the sensor, see the waySmart Installation Manual	-	Install External Seatbelt Sensor
	2	After hardware has been installed, enter “Programming Mode”	Programming Code + <Enter>	Programming Tone
	3	Enter the following commands to Enable the GPIO for the hardwired seatbelt sensor	333 + <Enter> 896 + <Enter>	
	4	Enter the following commands to Disable the SB portion of the EMU file	333 + <Enter> 899 + <Enter>	
	5	This will enable the External Seatbelt Sensor without conflicts from EMU	-	-

Section 5

Manual Reference

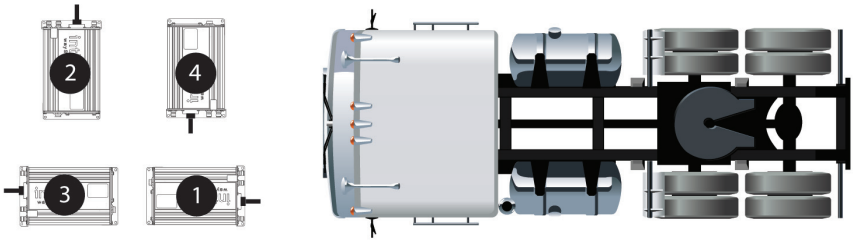
IN THIS SECTION:

- waySmart Orientation Diagram 61
- EMU Support Chart 63
- waySmart Unit Installation Locations by Vehicle Type 65
- waySmart Power Locations by Vehicle Type 67

waySmart™ Orientation Diagram

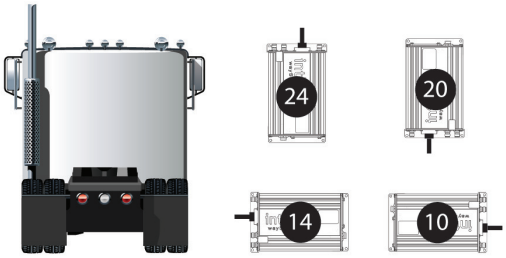
Installing on Floor of Cab (Most Popular)

View: Looking from top down



Installing on Back of Seat

View: Looking to the front of the vehicle



Installing on Back Wall of Cab

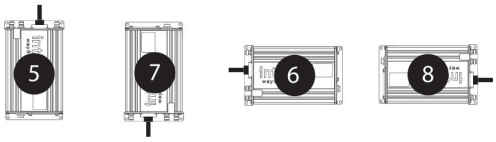
View: Looking to the rear of the vehicle

Installing on Left-Side of Seat

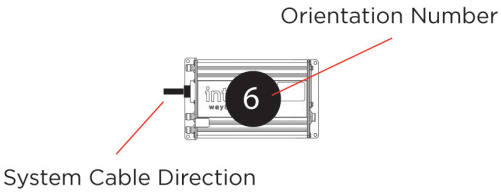
Installing on Right-Side of Seat

Installing on Ceiling of Cab (Rare)

View: Looking up to ceiling in driver seat



Legend:



EMU Support Chart

Legend		
Standard Adapter Cable	840-00053	
SWC	840-00052	
Deutsch 6-Pin Connector	840-00029	
Deutsch 9-Pin Connector	840-00030	
Seatbelt Support		✔

GENERAL MOTORS

EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
114-29-YY	Chevrolet	Impalla		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
114-14-YY	Chevrolet/GMC	Colorado/Canyon	✔	✔	✔	✔	✔	✔	✔	✔	✔								
114-38-YY	Chevrolet	Malibu	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
114-73-YY	Chevrolet/GMC	Silverado/Sierra (Diesel)	✔	✔	✔	✔	✔	✔											
114-79-YY	Chevrolet/GMC	Silverado/Sierra (Gas)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
114-66-YY	Chevrolet/GMC	Traverse/Acadia		✔	✔	✔	✔	✔											
114-66-YY	Chevrolet/GMC	Tahoe/Yukon/Suburban		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
114-26-YY	Chevrolet/GMC	Express/Savanah	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
130-55-YY	Chevrolet/GMC	Equinox/Terrain		✔	✔														
114-68-YY	Chevrolet	Trailblazer (2002-2009)				✔	✔	✔	✔	✔	✔	✔	✔						
130-08-YY	GMC	Envoy (1998-2009)				✔	✔	✔	✔	✔	✔	✔	✔						
114-30-YY	GMC	Kodiak																	

FORD MOTOR CO.

EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
126-05-YY	Ford	Crown Victoria			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
126-17-YY	Ford	Expedition	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
126-14-YY	Ford	Escape	✔	✔	✔	✔	✔	✔	✔	✔									
126-19-YY	Ford	Explorer		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔						
126-40-YY	Ford	Focus			✔	✔	✔	✔	✔	✔	✔	✔	✔						
126-43-YY	Ford	Fusion	✔	✔	✔	✔	✔	✔	✔	✔									
126-51-YY	Ford	Taurus			✔	✔	✔	✔	✔	✔									
126-22-YY	Ford	F-150 E Series	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔							
126-26-YY	Ford	F-250/350/450/550 (Diesel)	✔	✔	✔	✔	✔	✔											
126-17-YY	Ford	F-250/350/450/550 (Gas)	✔	✔	✔	✔	✔	✔											
126-36-YY	Ford	F-650																	
126-37-YY	Ford	F-750																	

CHRYSLER CORP.

EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
120-13-YY	Dodge	Caravan	✔	✔	✔	✔	✔	✔											
120-12-YY	Dodge	Durango		✔	✔	✔	✔	✔	✔	✔	✔								
120-09-YY	Dodge	Dakota		✔	✔	✔	✔	✔	✔										
140-03-YY	Jeep	Grand Cherokee		✔	✔	✔	✔	✔	✔	✔									
140-04-YY	Jeep	Liberty		✔	✔	✔	✔	✔	✔										
120-21-YY	Dodge	RAM 1500 (Gas)		✔	✔	✔	✔	✔	✔										
120-24-YY	Dodge	RAM 2500 (Diesel)	✔	✔	✔	✔	✔	✔	✔										

MITSUBISHI

EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
160-07-YY	Mitsubishi	Montero SUV/Truck (Diesel)																	
160-03-YY	Mitsubishi	Endeavor SUV/Truck (Gas)		✔															

NISSAN																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
164-06-YY	Nissan	Frontier (Gas)					✔	✔	✔										
164-14-YY	Nissan	Pickup (Diesel)		✔	✔	✔	✔	✔	✔										
TOYOTA																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
187-30-YY	Toyota	Prada		✔	✔	✔	✔	✔	✔										
187-20-YY	Toyota	Tacoma (Gas)				✔	✔	✔	✔										
187-25-YY	Toyota	Tundra (Gas)		✔	✔	✔	✔	✔	✔										
187-08-YY	Toyota	International Landcruiser																	
187-30-YY	Toyota	Hilux (No MPG at this time)																	
KENWORTH																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
142-08-YY	Kenworth	All Models																	
PETERBILT																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
169-04-YY	Peterbilt	All Models																	
HEAVY TRUCK																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
149-00-YY	All Other	All Models																	
UNKNOWN EMU																			
EMU Code (YY = Year)	Make	Model	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
132-03-96	All	Use this if NO EMU support																	

waySmart Unit Installation Locations by Vehicle Type

GENERAL MOTORS				
Year	Make	Model	waySmart Mount Location	Orientation
All	Chevroloet	Impalla		
All	Chevrolet/GMC	Colorado/Canyon		
All	Chevrolet	Malibu		
All	Chevrolet/GMC	Silverado/Sierra (Diesel)		
All	Chevrolet/GMC	Silverado/Sierra (Gas)		
All	Chevrolet/GMC	Traverse/Acadia		
All	Chevrolet/GMC	Tahoe/Yukon/Suburban		
All	Chevrolet/GMC	Express/Savanah		
All	Chevrolet/GMC	Equinox/Terrain		
2002-2009	Chevrolet	Trailblazer		
1998-2009	GMC	Envoy		
All	GMC	Kodiak		
FORD MOTOR COMPANY				
Year	Make	Model	waySmart Mount Location	Orientation
All	Ford	Crown Victoria		
All	Ford	Expedition		
All	Ford	Escape		
All	Ford	Explorer		
All	Ford	Focus		
All	Ford	Fusion		
All	Ford	Taurus		
All	Ford	F-150 E Series		
All	Ford	F-250/350/450/550 (Diesel)		
All	Ford	F-250/350/450/550 (Gas)		
All	Ford	F-650		
All	Ford	F-750		
CHRYSLER CORP.				
Year	Make	Model	waySmart Mount Location	Orientation
All	Dodge	Caravan		
All	Dodge	Durango		
All	Dodge	Dakota		
All	Jeep	Grand Cherokee		
All	Jeep	Liberty		
All	Dodge	RAM 1500 (Gas)		
All	Dodge	RAM 2500 (Diesel)		
MITSUBISHI				
Year	Make	Model	waySmart Mount Location	Orientation
All	Mitsubishi	Montero SUV/Truck (Diesel)		
All	Mitsubishi	Endeavor SUV/Truck (Gas)		
NISSAN				
Year	Make	Model	waySmart Mount Location	Orientation
All	Nissan	Frontier (Gas)		
All	Nissan	Pickup (Diesel)		
TOYOTA				
Year	Make	Model	waySmart Mount Location	Orientation
All	Toyota	Prada		
All	Toyota	Tacoma (Gas)		
All	Toyota	Tundra (Gas)		
All	Toyota	International Landcruiser		
All	Toyota	Hilux		

waySmart Power Locations by Vehicle Type

GENERAL MOTORS					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Chevroloet	Impalla			
All	Chevrolet/GMC	Colorado/Canyon			
All	Chevrolet	Malibu			
All	Chevrolet/GMC	Silverado/Sierra (Diesel)			
All	Chevrolet/GMC	Silverado/Sierra (Gas)			
All	Chevrolet/GMC	Traverse/Acadia			
All	Chevrolet/GMC	Tahoe/Yukon/Suburban			
All	Chevrolet/GMC	Express/Savanah			
All	Chevrolet/GMC	Equinox/Terrain			
2002-2009	Chevrolet	Trailblazer			
1998-2009	GMC	Envoy			
All	GMC	Kodiak			
FORD MOTOR COMPANY					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Ford	Crown Victoria			
All	Ford	Expedition			
All	Ford	Escape			
All	Ford	Explorer			
All	Ford	Focus			
All	Ford	Fusion			
All	Ford	Taurus			
All	Ford	F-150 E Series			
All	Ford	F-250/350/450/550 (Diesel)			
All	Ford	F-250/350/450/550 (Gas)			
All	Ford	F-650			
All	Ford	F-750			
CHRYSLER CORP.					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Dodge	Caravan			
All	Dodge	Durango			
All	Dodge	Dakota			
All	Jeep	Grand Cherokee			
All	Jeep	Liberty			
All	Dodge	RAM 1500 (Gas)			
All	Dodge	RAM 2500 (Diesel)			
MITSUBISHI					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Mitsubishi	Montero SUV/Truck (Diesel)			
All	Mitsubishi	Endeavor SUV/Truck (Gas)			
NISSAN					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Nissan	Frontier (Gas)			
All	Nissan	Pickup (Diesel)			
TOYOTA					
Year	Make	Model	Constant 12V Power	Switched (Ignition) Power	Ground
All	Toyota	Prada			
All	Toyota	Tacoma (Gas)			
All	Toyota	Tundra (Gas)			
All	Toyota	International Landcruiser			
All	Toyota	Hilux			

Section 6

Manual Index

IN THIS SECTION:

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