



VML700 - LTE Vehicular Subscriber Modem (VSM) Installation Guide



VML700 - LTE VSM
Installation Guide

6802987C90

Revision A

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Patents

This product is covered by one or more of the patents listed on the website:
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Warranty

For the complete Motorola hardware product warranty statement, go to:
<http://www.motorola.com/enterprisemobility/warranty>.

Legal Notice

The VML700 OSS legal notice may be found in the root directory of the LTE VSM Software CD (P/N 82013113001).

Revision History

Changes to the original manual are listed below:

Change	Date	Description
A		Initial release

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About This Guide

Introduction

The *VML700 LTE VSM Installation Guide* provides general instructions for installing, setting up, operating, and troubleshooting the VML700.

NOTE The names LTE VSM and VML700 are interchangeable and they are both used in this manual.

Configurations

This guide includes the following configuration:

- F4080A model VML700

Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, VML700 Description](#) provides the product overview.
- [Chapter 2, Installation](#) provides unpacking instructions and all required procedures for installing the VML700.
- [Chapter 3, Configuring and Monitoring the VML700](#) provides the procedures that enable configuring the VML700 for best operation.
- [Chapter 4, Troubleshooting](#) provides details regarding possible malfunctions that may occur after first time installation of the VML700, their probable cause and the recommended corrective actions.
- [Chapter 5, Using the VML700](#) provides general information regarding the use of the VML700.

The following conventions are used in this document:

- *Italics* are used to highlight the following:
 - Chapters and sections in this and related documents
 - Dialog box, window and screen names
 - Drop-down list and list box names
 - Check box and radio button names
- **Bold** text is used to highlight the following:
 - Key names on a keypad
 - Button names on a screen.
- bullets (•) indicate:
 - Action items
 - Lists of alternatives
 - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Documents

- *VML700 LTE VSM Basic Service Manual*, p/n 6802988C02

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility support for your region. Contact information is available at: <http://www.motorola.com/enterprisemobility/contactsupport>.

When contacting Enterprise Mobility support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Motorola responds to calls by e-mail, telephone or fax within the time limits set forth in service agreements.

If your problem cannot be solved by Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and will be given specific directions. Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Enterprise Mobility business product from a Motorola business partner, please contact that business partner for support.

Safety

Before installing/using this product, the installer/operator must be familiar with the RF energy awareness information and operating instructions in the “Product Safety and RF Energy Exposure Booklet” enclosed with the VML700 LTE VSM (Motorola Publication part number 6881095C99) to ensure compliance with Radio Frequency (RF) energy exposure limits.

FCC Interference

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.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This Class A/B digital apparatus complies with Canada ICES-003.

Changes or modifications made to this product, not expressly approved by Motorola, will void the user's authority to operate the equipment, per FCC Rule Part 15.21.

Chapter 1 VML700 Description

The VML700 Unit

The Motorola VML700 - LTE Vehicular Subscriber Modem (VSM) is a high/medium power infrastructure modem. The following model is available:

- F4080A: LTE, EVDO, WiFi and GPS

See [Figure 1-1](#).

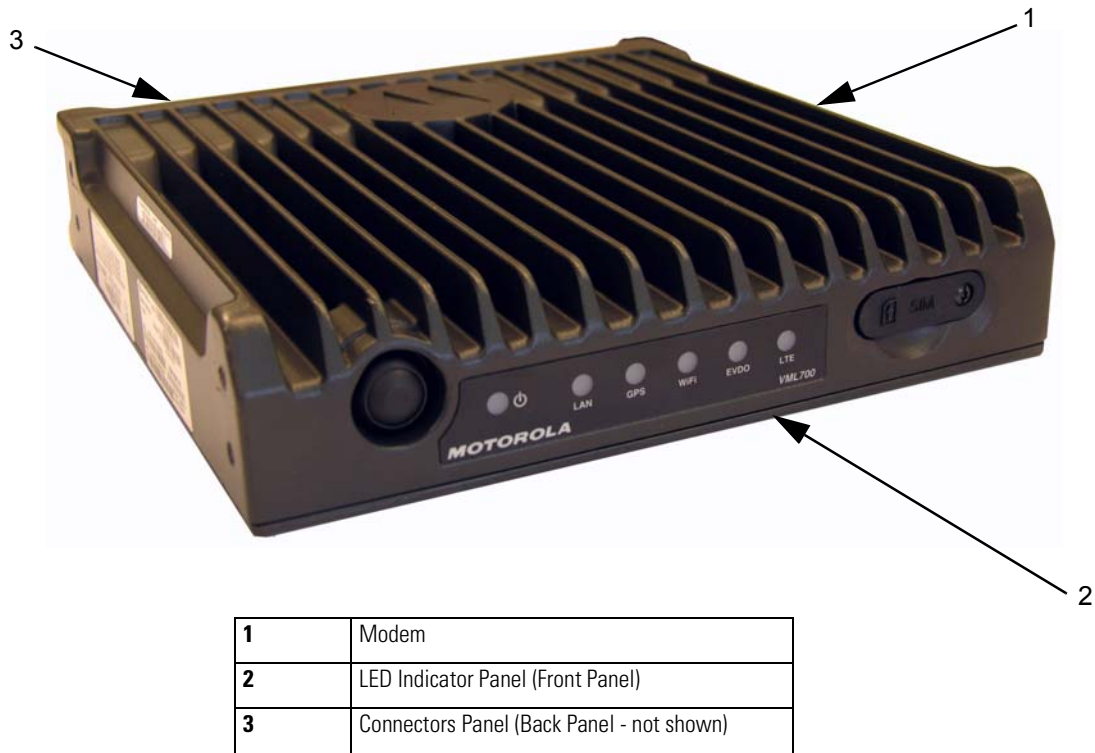


Figure 1-1 VML700 - General View

For detailed specifications of the VML700 unit, see Appendix A: Specifications.

Modem

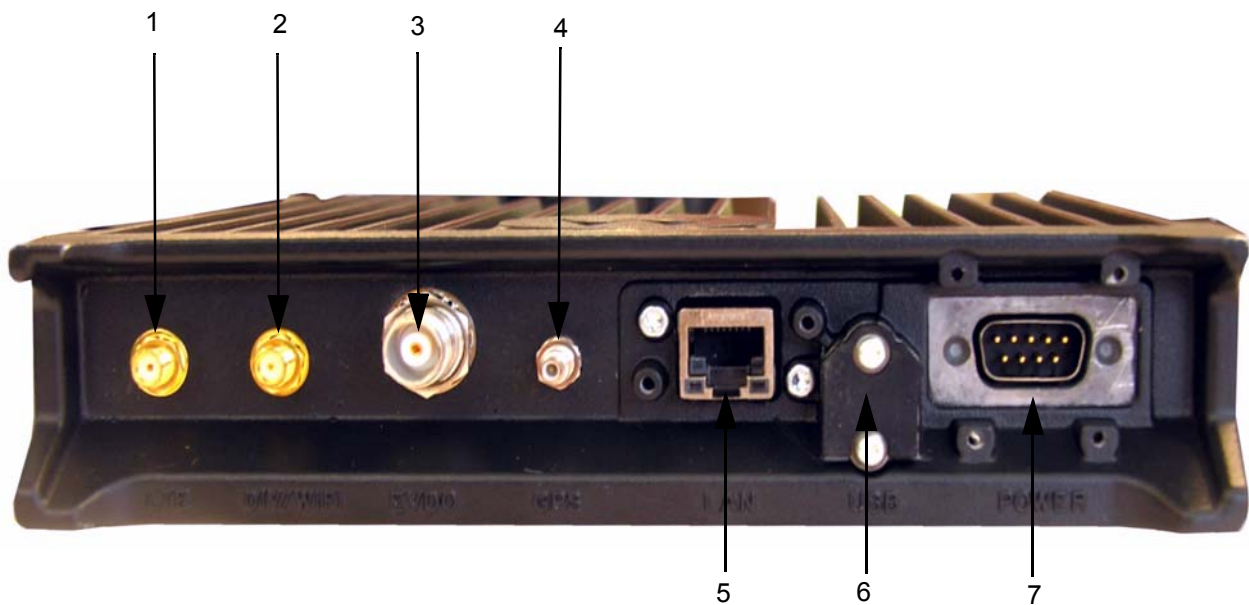
The modem has a Connectors panel (back panel) and a LED Indicator panel with On/Off button (front panel).

Connectors Panel

The VML700 Connectors panel consist of the following (see [Figure 1-2](#)):

- LTE Main Rx/Tx – SMA type connector
- Diversity – LTE secondary Rx/EVDO secondary Rx/WiFi – reverse SMA type connector
- EVDO Main Rx/Tx – TNC type connector
- GPS – SMC type connector
- LAN – Ethernet 10/100 – RJ45 type connector

- USB 2.0 high speed– Micro AB type connector (HW ready)
- Power – 9-pin DTYPE connector

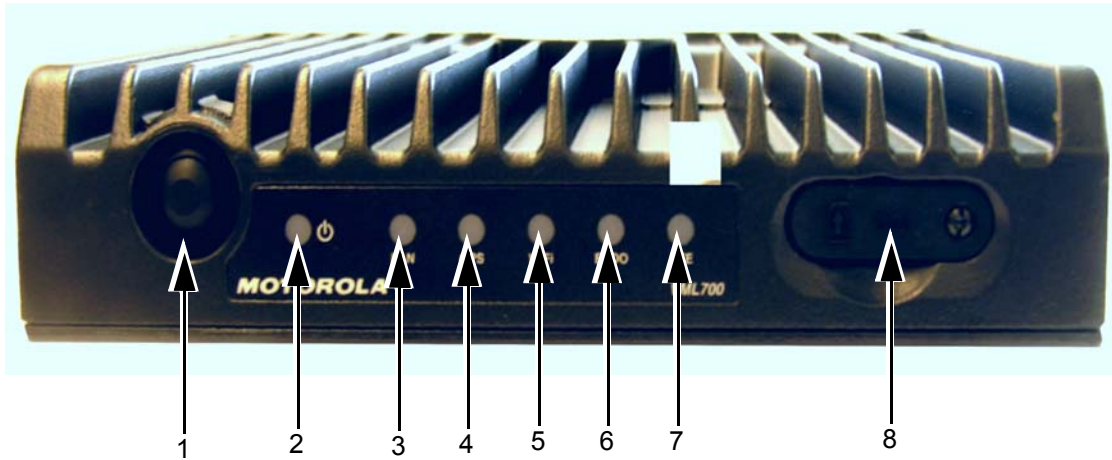


1	RF SMA female type connector (LTE)
	RF SMA reversed female type connector (DIV/WiFi)
	RF TNC female type connector (EVDO)
4	RF SMC female type connector (GPS)
5	LAN/Ethernet communication connector (RJ45)
6	Micro AB type connector (USB 2.0)
7	DC power connector

Figure 1-2 Connectors Panel

LED Indicator Panel with On/Off Button and SIM Card Door

A set of six LEDs is used for diagnostics and testing of the unit (see [Figure 1-3](#)).



1	
2	
3	
4	
5	
6	
7	
8	

Figure 1-3 LED Indicators Panel

LED Indicators Functions

Table 1-1 describes the functions of the LED indicators on the VML700 front panel.

Table 1-1 LED Indicators Functions

LED Name	Power	LAN	LTE	EVDO	WiFi	GPS
LED Status						
OFF	Power off	No link	Off	Off	Off	Off
Solid Green	Power on	Link is on	Connected	Connected	Available	Tracking
Blinking Green	Powering up	TX/RX Activity	Connecting/ Registering	Connecting/ Registering	TX/RX Activity	--
Solid Orange	No Ignition The user turns the power On (power button pressed) but ignition is off.	--	--	--	--	--
Blinking Orange	--	--	Searching for signal	Searching for signal	--	Searching for signal
Solid Red	--	--	Problem/ Overheat	Problem/ Overheat	Problem/ Overheat	Problem
Blinking Red	Standby External power is connected to the system.	--	--	--	--	--
Rapid Blinking Red	Problem		SIM door is open			

Control

The On/Off button is used to turn the VML700 On or Off.

SIM Card

A SIM is required for the operation of the modem.

Chapter 2 Installation

Unpacking and Inspecting the Shipment

Unpack your shipment and check the contents to ensure that you have received all the specified items.

Thoroughly inspect the equipment for shipping damage as soon as possible after delivery. Report any damage you find to your Motorola Customer Service representative immediately.

Safety and General Information

A properly installed VML700 unit minimizes service calls. When mounting the VML700 unit components, consider the following factors:

- The mounting surface must have sufficient strength to support the equipment being mounted and to prevent it from becoming loose over time.
- Do not attach components to any part of the vehicle subjected to excessive vibration.
- Do not mount the VML700 unit on a flat surface where the unit could become partially submersed in water.
- The proposed location of the equipment being mounted or wires/cables attached must not interfere with driver/passenger seating or leg space.
- Select a location such that heat from the unit does not damage any wiring or any other plastic or heat-sensitive parts of the automobile.
- Use the supplied mounting hardware.
- Leave sufficient space around the VML700 unit for air flow and installation.
- Select a location that permits routing the cables as directly as possible.
- Ensure that the cables are not stretched, and not subject to heat from the engine, transmission housing or heating ducts.
- Crimp connectors securely.
- Do not run cables over sharp edges that may cause excessive wear or chaffing of the cable insulation.
- Do not install components in locations where they may cause interference to the operation of the vehicle's controls.

- Only qualified personnel may install communication equipment.
- Ensure secure tightening of cable connectors.

Install this product in a vehicle in accordance with the vehicle manufacturer's guidelines and the instructions detailed in this manual. Use only the Motorola parts specified in this manual.

Check the required mounting locations. It might be necessary to penetrate the bulkhead to reach the battery. Before drilling commences, ensure cable clearance on the opposite side of the bulkhead and do not install the vehicle's Electronic Control Modules (ECM's) on the opposite side of the bulkhead. Protect the cable where it passes through the bulkhead by using a grommet or similar protective measures.



CAUTION Installing the VML700 at the end of the vehicle above the exhaust pipe may cause the VML700 to overheat.



WARNING! VEHICLES EQUIPPED WITH AIR BAGS

An air bag inflates with great force. **DO NOT** place objects, including communications equipment, in the area over the air bag or in the air bag deployment area. If the communication equipment is improperly installed and the air bag inflates, this could cause serious injury.

If necessary, contact the vehicle manufacturer for air bag information specific to the vehicle.



WARNING! Verify that none of the vehicle's systems are affected by use of the unit, e.g. cruise control, ABS breaking, traction control, engine management, direction indicators, lights, etc.



WARNING! Use existing openings through the bulkhead to avoid drilling. If drilling is a must, verify not to damage the Vehicle Electronic Control Modules (ECM's), fuel pipes, brake pipes, and/or cable looms.



WARNING! For vehicles equipped with electronic braking systems, see "ANTI-SKID BRAKING PRECAUTIONS", Motorola publication 68P81109E34.

It is mandatory that modems installed in vehicles fuelled by liquefied petroleum gas conform to the National Fire Protection Association standard NFPA 58, which applies to vehicles with a liquid propane (LP) gas container in the trunk or other sealed off space within the interior of the vehicle. The NFPA 58 requires the following:

- (1) The space in which the LP gas container and its fittings are located must be isolated by a seal from the space containing modem equipment.
- (2) Removable (outside) filling connections shall be used.
- (3) The container space shall be vented to the outside.

Planning is the key to fast, easy and safe installation.



IMPORTANT Take the following points into consideration when selecting a location and planning the installation.

Installation Constraints

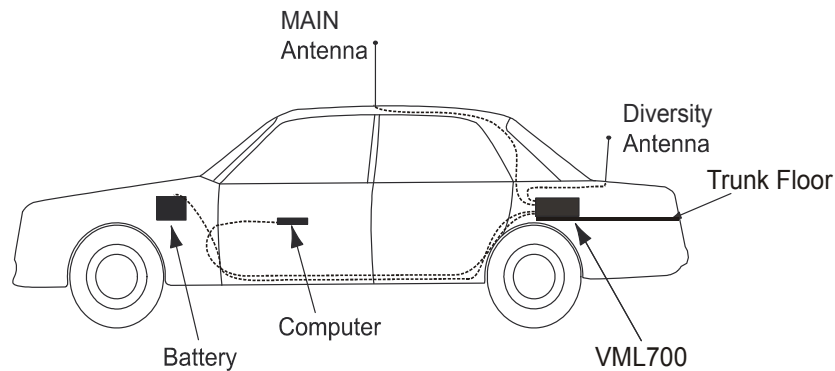
Refer to the Safety Instructions in “Product Safety and RF Energy Exposure Booklet for Mobile Two-Way Radios in Vehicles or as Fixed Site Control” P/N 6881095C99.

The LTE VML700 must be installed in the car’s trunk, on the floor or the side walls (cooling fins facing up, or to the side).



IMPORTANT The VML700 **must not** be installed with the cooling fins facing down. Failure to comply may cause overheat problems and performance degradation.

Figure 2-1 shows a typical VML700 installation in a car.



VML700 - Typical Car Installation

Before beginning the installation process make sure that the space available at the installation site is adequate for the modem and its accessories. Each installation configuration requires a different area for mounting the modem without obstruction.

When choosing a location, ensure easy installation and replacement of the unit.

Figure 2-2 gives the VML700 dimensions.



VML700 - Dimensions

Cables Routing

- Before running a wire or drilling a hole, inspect the vehicle and determine how and where you intend to mount the antenna, modem, and the input/output device.
- Plan wire and cable routing to provide maximum protection from overheating, battery acid, moving parts and sharp edges.
- Keep cables away from ignition circuits to reduce noise pickup in the radio equipment.
- Verify that the cables are of sufficient length. Do not connect two short lengths with a connector; doing so results in signal loss. Refrain from loose excess in the cables, but leave enough slack to allow reconnection if necessary.
- Do not run cables externally or underneath floor mats.
- Do not locate cables where the driver or passengers can kick them or where they can interfere with operation of the driver's foot pedals.
- When routing the cable, refrain from creating sharp bends or kinks.

Drilling Holes

- Where possible, use existing holes in the bulkhead, the trunk wall and the channels above or beneath the doors. Run cables parallel to existing car cables if appropriate.

- If you must drill holes, verify not to damage other wiring, break lines or gas lines.
- When drilling a hole in the roof, take care not to snag the roof liner.
- To prevent rusting after drilling, remove all metal burrs and residue, and completely clean the area to ensure the removal of all steel dust.
- Insert rubber grommets in all drilled holes to protect cables.

Tools and Equipment

- #2 Phillips screwdriver
- Electrical drill and drill bit set
- X-acto knife or equivalent
- Wire stripper
- Long nose pliers
- Small side cutters
- Crimping tool
- Wrench set, including 8 mm for tray to unit attachment
- 3 mm Allen wrench set for unit to tray attachment
- Soldering iron and solder
- Electrical tape

Antennas

Main Antenna

The main antenna is constructed of three antenna types (LTE, EVDO and GPS) on a single mount.

- Kit No. FAF5266A

The antenna is provided with two short flexible coaxial cables (threads) coming out of the antenna bottom side (LTE and EVDO). Two 12ft jumper coaxial cables are also provided in order to connect between these threads and the modem connector. The GPS antenna is provided with 12ft coaxial cable. (see [Figure 2-3](#)).



Figure 2-3 *Main Antenna*

Diversity Antenna

The Diversity antenna is used to enhance the reception capability in poor reception areas. It also enables WiFi reception.

- Kit No. FTN7651A

The Diversity antenna is shown in [Figure 2-4](#)..



Figure 2-4 Diversity Antenna

Cables

The following cables are supplied with the VML700 (see [Figure 2-5](#)).

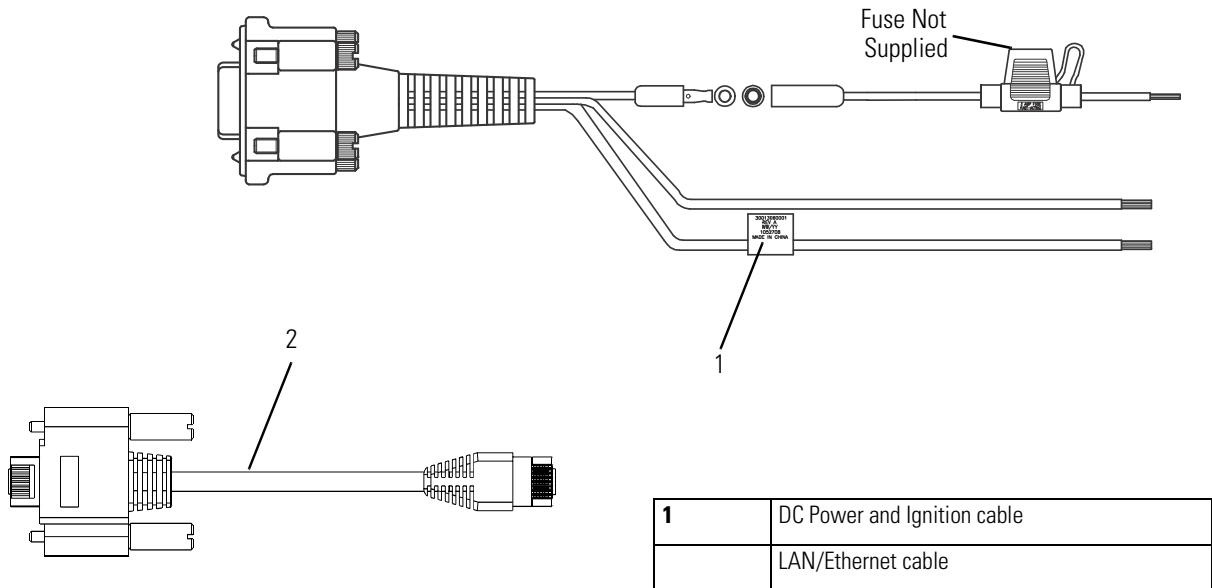


Figure 2-5 Cables

Mounting Brackets

Use the brackets (2 brackets are supplied) for mounting the VML700 securely on a flat surface.

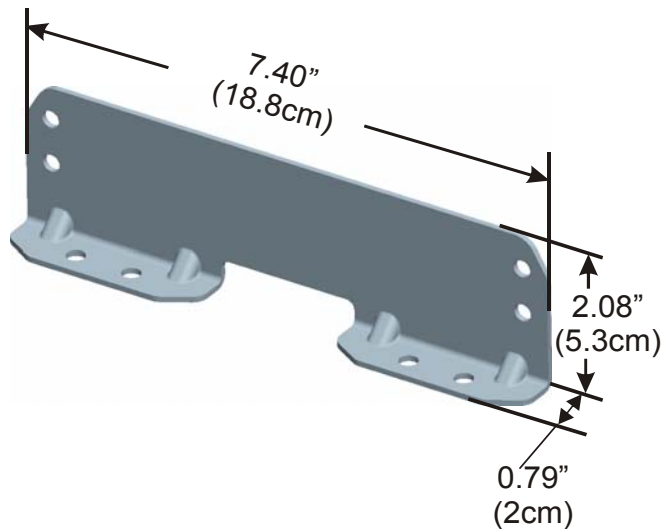


Figure 2-6 Bracket Dimensions

Process 2-1 describes the steps for the modem installation.

Process 2-1 *Modem Installation Process*

1	Ensure adequate space for the installation. (See Planning the Installation on page 2-3)
2	Install the antennas. (See Antennas Mounting on page 2-9).
3	Route the cables. (See Planning the Installation on page 2-3 and Cables Routing and Connection Procedure on page 2-10).
4	Install the brackets and the unit. (See Modem Installation Procedure on page 2-10).
5	Connect the DC Power and Ignition cable. (See DC Power and Ignition Cable Installation on page 2-10).
6	Connect the main antenna cables. (See Main Antenna Cables Installation on page 2-12).
7	Connect the Diversity/WiFi antenna cable. (See Diversity Antenna Cable Installation on page 2-12).
8	Connect the LAN/Ethernet cable. (See LAN/Ethernet Cable Installation on page 2-12).
9	Place caps on unused connector(s). (See Cap Installation on page 2-12).

Process 2-2 gives general instructions for mounting the antennas.

Process 2-2 *How to Mount the Antennas*

1	Mount the antennas in accordance with the instructions provided with each antenna kit and with the Product Safety and RF Energy Exposure Booklet for Mobile Two-Way Radios Installed in Vehicles or as Fixed Site Control Stations (6881095C99) enclosed with the product.
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Special Antennas Installation Considerations

General Antenna Installation Safety Considerations



The main and diversity antennas must be installed in a location that will ensure a distance of at least 8" (20cm) between them and any bystander.

Main Antenna

The main antenna must be installed on the vehicle's roof, preferably in the center of it. For best performance, a minimum distance of 36" (91.44cm) must be kept between this antenna and any other antenna.

Diversity Antenna

It is recommended that the Diversity Antenna will be installed on the vehicle's trunk hood. For best performance, a minimum distance of 36" (91.44cm) must be kept between this antenna and any PSNB antenna.

Modem Installation Procedure

Process 2-3 describes how to install the modem on a flat surface.

Process 2-3 How to Install the Modem on a Flat Surface

- 1 Position the two mounting brackets (1) on both sides of the modem (2) and fasten using 4 screws each. See [Figure 2-7](#).

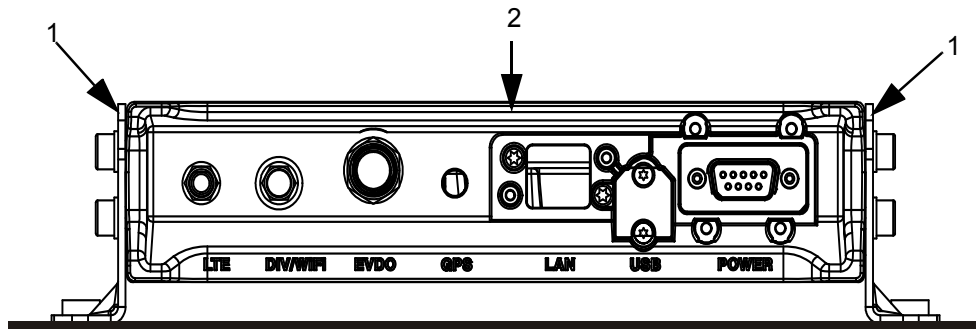


Figure 2-7 Mounting Brackets

- 2 Locate the VML700 with the mounting brackets attached on the dedicated flat surface.
- 3 Centerpunch the marked spots and fix the modem in position using the self-drilling supplied screws.

Cables Routing and Connection Procedure

DC Power and Ignition Cable Installation

The VML700 supports 12 V vehicle batteries, i.e. 13.8 V \pm 20% DC vehicle batteries.

The DC Power cable is equipped with 5-Ampere fuse (slow-blow). Verify that the vehicle electrical system can support current values larger than that.

Connect the fuse in the red wire to the power source using the shortest practical length.

The unit is used with a negative ground system only.



Insert the fuse after making and carefully inspect all connections.

See [Figure 2-8](#) before routing or connecting the DC Power and Ignition cable and use the following process.

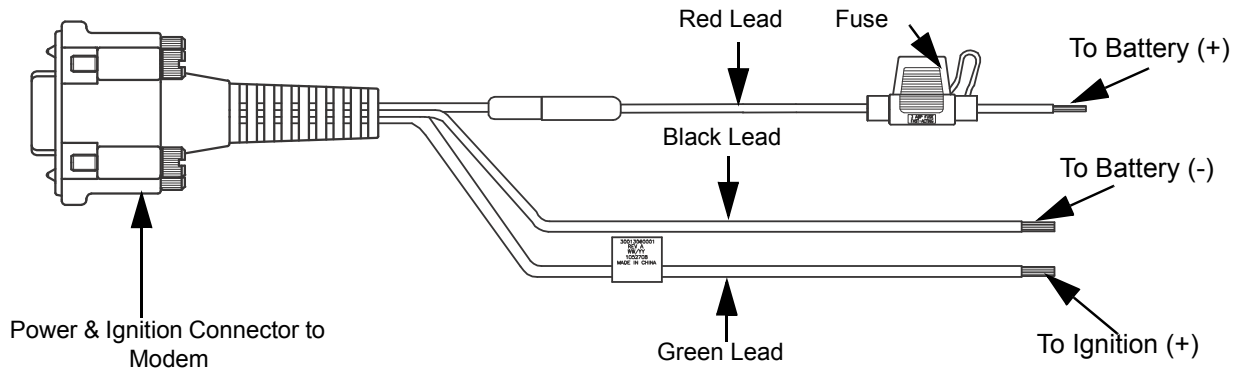


Figure 2-8 DC Power and Ignition Cable Routing Into Engine Compartment


Process 2-4 describes how to install the DC power and ignition cable.

Process 2-4 How to Install the DC Power and Ignition Cable

1	Route the DC Power cable's leads through the bulkhead and into the engine compartment. Use an existing opening or, if necessary, drill a 2 cm (26/32 inch) diameter hole through the bulkhead. Insert a grommet into the hole to prevent damage to the DC Power cable.
2	Cut the black lead to the desired length and connect it to the negative (-) battery terminal.
3	On the engine side of the bulkhead, connect the red (A+) lead to the vehicle's battery as follows: <ol style="list-style-type: none"> a. Cut the long red lead to the desired length. Verify that the fuse holder is at a distance of 20-30 cm away from the connection point, ensuring that it is not close to any hot engine component. b. Mount the fuse holder using the provided mount, and dress wires as necessary. Connect the red lead plug adaptor (on the fuse holder) to the matching receptacle on the red lead of the DC Power cable. c. Remove the fuse from the fuse holder and connect the red lead of the DC Power cable to the positive (+) battery terminal. Cable tie the wire every 4" (10 cm) along its length, do not tie to existing vehicle systems. d. Insert the fuse into the fuse holder.
5	Verify that the cables in the engine compartment do not obstruct any of the vehicle controls or touch hot or moveable parts of the engine.
6	For ignition installation, perform the following steps: <ol style="list-style-type: none"> a. Cut the green lead to the desired length. b. Connect the green lead of the DC Power cable to ignition (+). Cable tie the wire every 4" (10 cm) along its length, do not tie to existing vehicle systems. c. Verify that the voltage is high with ignition on, during cranking and while vehicle is running. When ignition is off, the voltage is low.
7	Connect the DC Power and ignition cable connector to POWER connector on the VML700 Connectors panel. Fasten the connector using the four fastening screws.

Main Antenna Cables Installation

Process 2-5 *How to Install the Main Antenna Cables*

1	 The antenna is provided with two short flexible coaxial cables (threads) coming out of the antenna bottom side (LTE and EVDO). Two 12ft jumper coaxial cables are also provided in order to connect between these threads and the modem connector. The GPS antenna is provided with 12ft coaxial cable. Do not trim these cables after routing them. Form a service loop to any cable excess length. The service loop should have a minimum bend radius of 1" (2.54cm). Use plastic cable ties to secure the cable.
2	Connect the RF cables from the antenna to LTE, EVDO and GPS connectors on the Connectors panel (the order of connection is not important). Do not use pliers or any other metallic tool for tightening. Hand tighten only! Fully tighten the antenna cable connector and verify it is well fastened.

Diversity Antenna Cable Installation

Process 2-6 *How to Install the Diversity Antenna Cable*

1	Connect the RF cable from the antenna to DIV/WiFi connector on the Connectors panel. Do not use pliers or any other metallic tool for tightening. Hand tighten only! Fully tighten the antenna cable connector and verify it is well fastened.
---	--

LAN/Ethernet Cable Installation

Process 2-7 *How to Install the LAN/Ethernet Cable*

1	Connect the LAN/Ethernet cable from the LAN connector on the Connectors panel to the input/output device. Do not use pliers or any other metallic tool for tightening. Hand tighten only!
2	Secure the LAN/Ethernet cable to the vehicle body at a distance of 7.8 ± 1.9 " (20 ± 5 cm) from the VML700.

Cap Installation

Process 2-8 *How to Install Cap(s) on Unused Connector(s)*

1	Screw cap(s) on unused port(s) to protect connector(s).
---	---

Chapter 3 Configuring and Monitoring the VML700

Introduction

The VML700 is basically a plug and play modem and will, most of the time, access the network without any configuration.

Some service providers require special security configuration. Also, there are some basic configuration that may be done after first time installation.

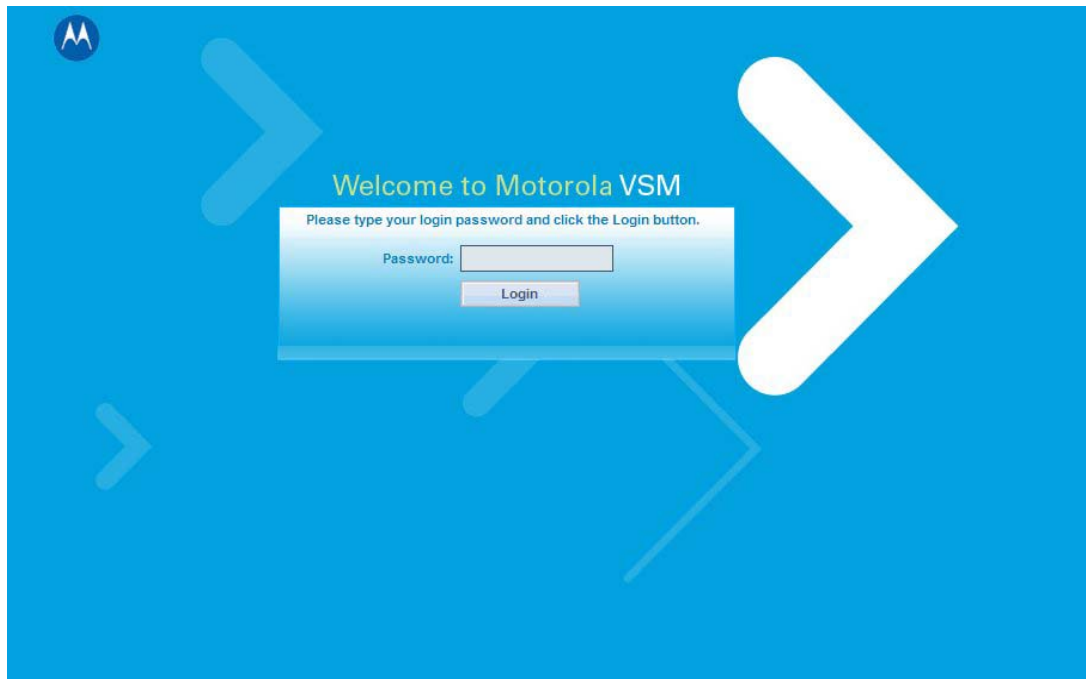
This chapter provides required security configuration procedures and other general configuration procedures that may be done by your system administrator after the modem installation completion.

In addition, this chapter describes some basic VML700 operation indications that appear on your computer and enable you to monitor your VML700 operation.

Prior to Configuration

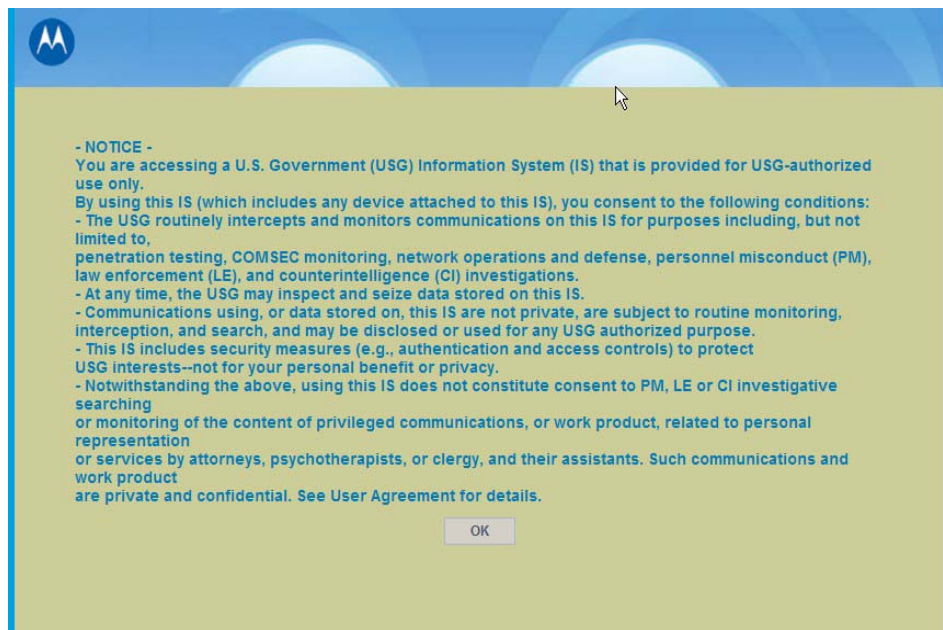
1. Connect a LAN/Ethernet cable between the VML700 and your computer.
2. Turn the VML700 On.
3. Verify your computer is On and open your web browser.
4. In the web address field, enter the VML700 IP address (<http://192.168.15.1>) and press "Enter".

5. The following login window appears.



The default password is "motorola".

6. Enter the password and click the "Login". The following login banner appears after successful login.



This is a default banner. Your service provider may provision your VML700 with a different one.

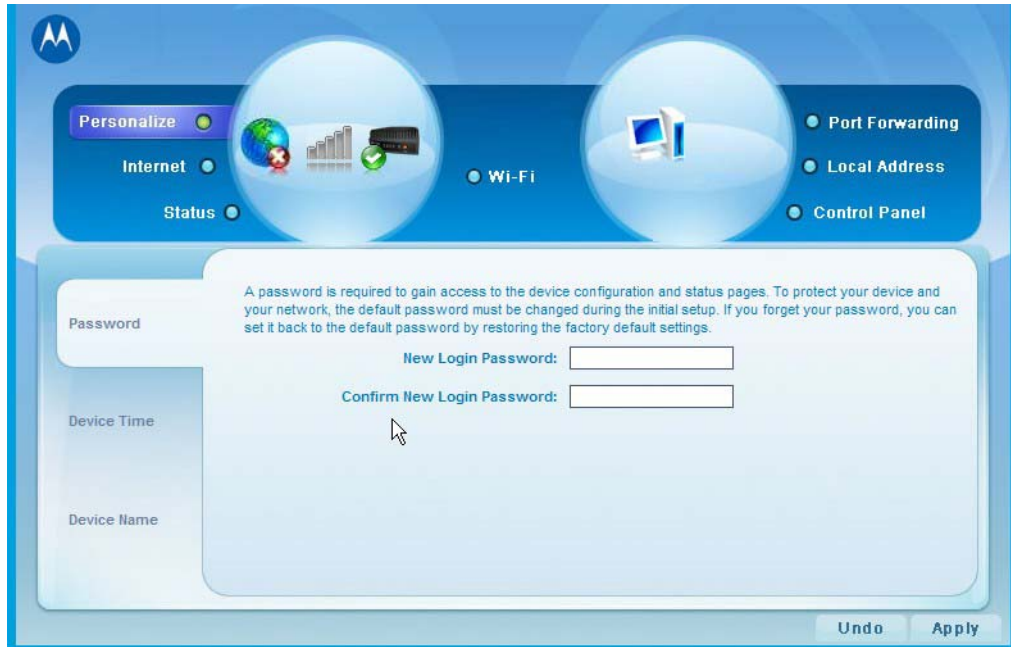
7. Click the "OK" button to enter the configuration wizard.

The Configuration Wizard

After login, the configuration wizard starts.

Changing the Login Password

1. To change your login password, enter “New Login Password” and “Confirm New Login Password”.



The screenshot shows the configuration interface for the VML700 device. The interface is blue and features a navigation bar at the top with icons for Personalize, Internet, Status, Wi-Fi, Port Forwarding, Local Address, and Control Panel. The main content area is titled "Password" and contains a text box with the following text: "A password is required to gain access to the device configuration and status pages. To protect your device and your network, the default password must be changed during the initial setup. If you forget your password, you can set it back to the default password by restoring the factory default settings." Below this text are two input fields: "New Login Password:" and "Confirm New Login Password:". A mouse cursor is pointing at the "Confirm New Login Password:" field. At the bottom right of the interface, there are "Undo" and "Apply" buttons.

2. Click “Apply” for the new password to take affect.

Configuring the LTE VML700 Time Zone

1. The following window appears.

2. Using the pull-down menu, select the required Time Zone.
3. If required, check the “Auto Adjust for Daylight Saving Time” checkbox.

4. When finished, click “Next” to continue to LTE security configuration.

Configuring the VML700 Security

If required by your service provider, you will need to configure your VML700 security settings.

1. The following window appears.

2. Using the pull-down menu, select the required authentication method.

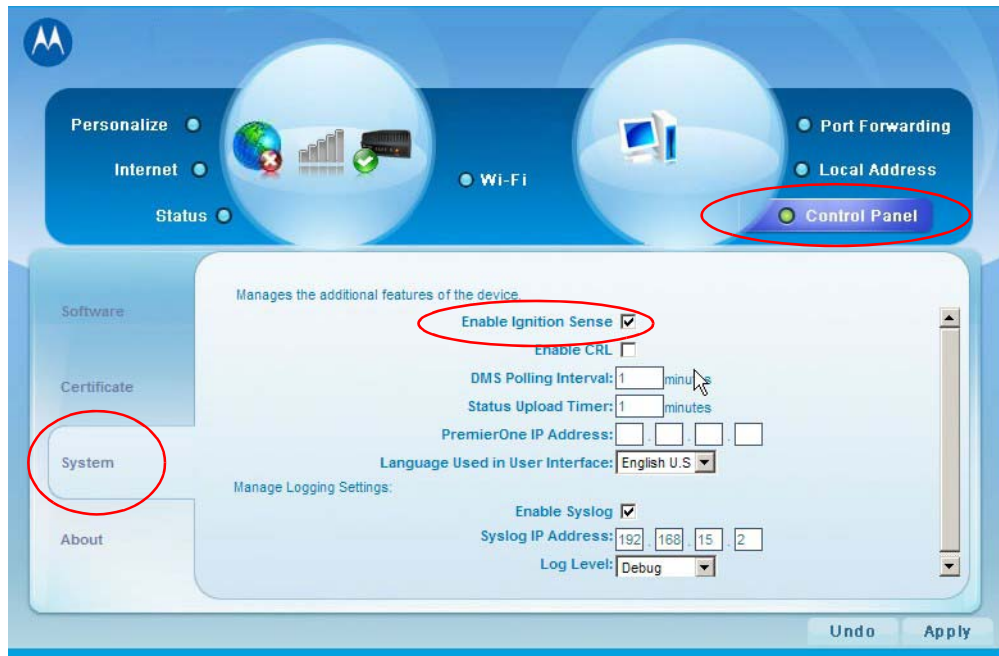
Two Authentication Methods are available (check with your service supplier): EAP-TLS does not require user name and password, and EAP-TTLS/MS-CHAPv2 that require user name and password.

3. If EAP-TTLS/MS-CHAPv2 Authentication Method is selected, the User Name, Password and Password Confirmation fields are enabled.
4. Fill in the required user name and password.
5. When finished, click “Apply”.

Configuring the Ignition Switch

1. Turn the VML700 On by pressing the On/Off button on the LED Indicator Panel to On.

2. Click the “Control Panel” menu item and select the “System” tab. The following window appears.



3. To enable Ignition Sense, check the “Enable Ignition Sense” checkbox.
4. Click the “Apply” button.

Configuring WiFi

1. Click the “WiFi” menu item and select the “General” tab. The following window appears.



2. To enable the WiFi service, check the “Enable Wi-Fi Service” checkbox.

3. Select the Wi-Fi Mode using the drop-down menu.
4. Select the operating mode. The available operating modes are: 802.11b, 108.11g and 108.11b/g.
5. Click the “Apply” button. The following window appears.



6. Enter the Wi-Fi network name (SSID). The default value is “motorola”.
- 7.
8. Select the operating channel. The available values are 1 - 6, or Auto.
9. Click the “Apply” button.

Monitoring the VML700 Operation

Verify that the Status Utility is installed on your computer.




When your VML700 is up and running, a signal strength icon is displayed on the status tray.

This icon displays the following general information:

- Received signal strength (bars).
- Type of connection, indicated by a letter (LTE, EVDO, WiFi).
- A set of 3 colored indicators that are explained in the example below.

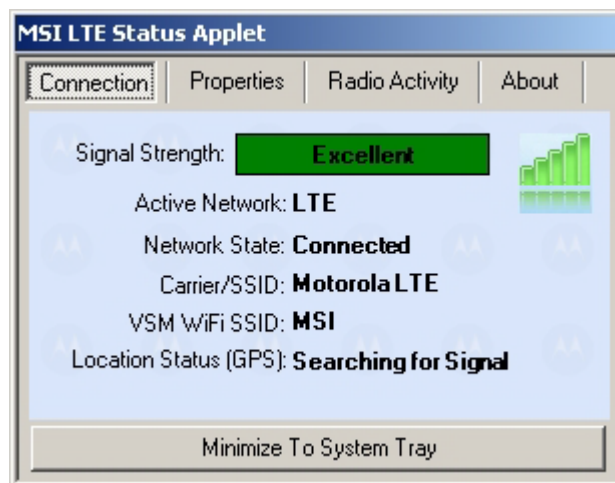
The icons also enables the access into the status utility screens.

1. The following is an example of the icons displayed.

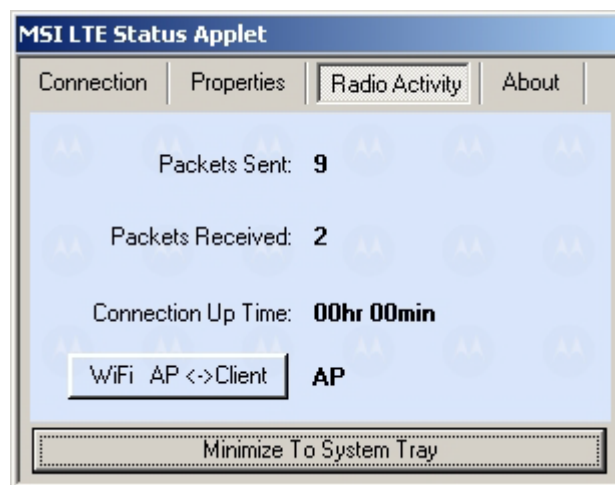
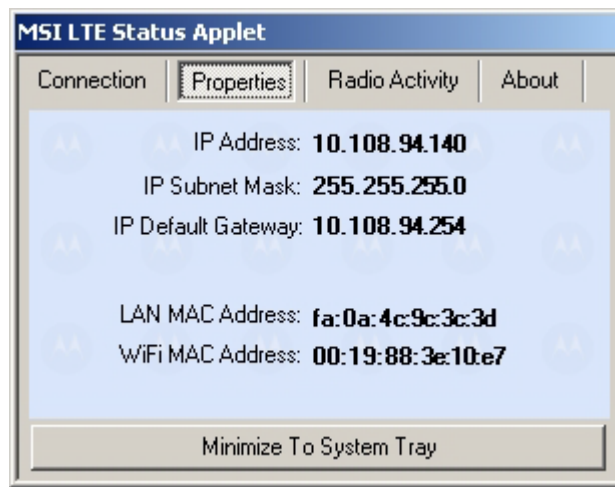
Icon	Description
	<ul style="list-style-type: none"> • E - EVDO active. • Signal strength bars - the more green bars, the better is the reception. • Bottom LEDs - in this example, Orange LED-LTE inactive, Green LED-EVDO connected, Red LED-WiFi is in fault state.
	<p>L - LTE active, all bottom LEDs are green, full reception.</p>
	<p>No connection between the VML700 and the PC.</p>

2. To access the status utility, double click the tray icon.

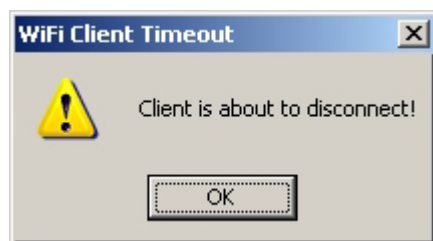
3. The following “Connection” screen is displayed as a default.

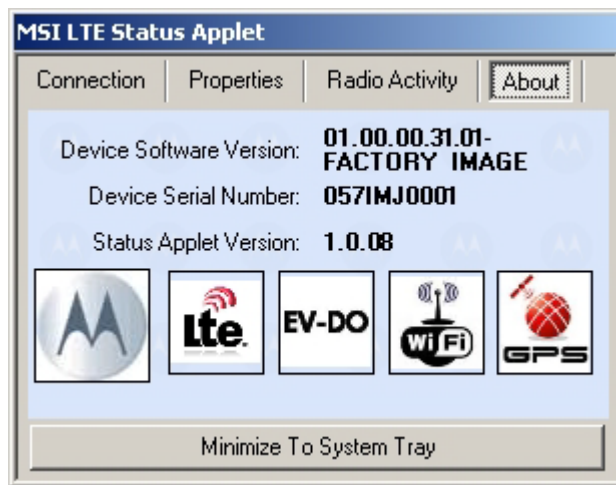


- Click the upper tabs to receive the required system information you need.



- If you are configured as a WiFi Client, the following message appears about 50 seconds before your client status is terminated.





6. To minimize the status utility, click the “Minimize To System Tray” button on bottom of the screen.



Chapter 4 Troubleshooting

Introduction

Motorola has made every effort to ensure that this product is of excellent quality. However, if you experience any problems with the product, please contact your local Motorola representative with product related information.

For complete information on ordering required parts and kits, contact your local customer service representative and refer to *Appendix B, Reference*.

Troubleshooting

This paragraph, gives details regarding possible malfunctions that may occur after first time installation of the VML700, their probable cause and the recommended corrective action.

Malfunction	Probable Cause	Corrective Action
VML700 does not turn On.	1. Power cable is not properly connected.	1. Check the cable connections, connect as required and turn the VML700 On. 2. Verify that the Power LED is solid red (standby mode).
	2. On/Off push button was not properly pressed.	1. Apply power to the modem. 2. Press the On/Off push button for at least 2 sec. 3. Verify that the Power LED is blinking orange in "ignition enabled" mode, or blinking green and then solid green in "ignition disabled" mode.
No LAN/Ethernet connection.	LAN/Ethernet cable is not connected.	Connect the LAN/Ethernet cable (refer to How to Install the LAN/Ethernet Cable on page 2-12) and verify that the LAN LED is green.

No GPS reception.	GPS cable (from Main antenna) is not connected.	<ol style="list-style-type: none"> 1. Connect the GPS cable (refer to How to Install the Main Antenna Cables on page 2-12). 2. Verify that the GPS LED is blinking orange and then changed to solid green.
No WiFi connection.	Div/WiFi cable (from Diversity antenna) is not connected.	<ol style="list-style-type: none"> 1. Connect the Div/WiFi cable (refer to How to Install the Diversity Antenna Cable on page 2-12). 2. Verify that the WiFi LED is blinking/solid green.
No EVDO connection.	EVDO cable (from Main antenna) is not connected.	<ol style="list-style-type: none"> 1. Connect the EVDO cable (refer to How to Install the Main Antenna Cables on page 2-12). 2. Turn the VML700 On. 3. Verify that the EVDO LED is blinking orange/green and then change to solid green.
No LTE connection.	1. SIM is not inserted/damaged.	<ol style="list-style-type: none"> 1. Insert a new SIM. 2. Close the SIM door. 3. Turn the VML700 On. 4. Verify the LTE LED is blinking orange/green and then change to solid green.
	2. LTE cable (from Main antenna) is not connected.	<ol style="list-style-type: none"> 1. Connect the LTE cable (refer to How to Install the Main Antenna Cables on page 2-12). 2. Verify the LTE LED is blinking orange/green and then change to solid green.

Chapter 5 Using the VML700

General

The VML700 modem installed in your vehicle is a plug and play modem and requires no user intervention. The VML700 should be turned on automatically upon your vehicle ignition and operate properly.

If you detect any malfunction in the VML700 operation, refer to [Troubleshooting on page 4-1](#).



Appendix A Specifications

Physical

Dimensions (Modem)	8.07"x7.87"x1.71" (20.5cm x 20cm x 4.35mm \pm 1mm)
Weight (Modem)	6 Pounds (2.5 Kg)

Communication Ports

Amphenol	LAN – Ethernet 10/100 – RJ45 USB 2.0 high speed– Micro AB (HW ready)
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RF Ports

LTE Main Rx/Tx	SMA connector
Diversity – LTE secondary Rx/ EVDO secondary Rx/WiFi	Reverse SMA connector
EVDO Main Rx/Tx	TNC connector
GPS	SMC connector

Power Ports

Power	9-pin D-TYPE
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LEDs

LED Name	Power	LAN	LTE	EVDO	WiFi	GPS
LED Status						
OFF	Power off	No link	Off	Off	Off	Off
Solid Green	Power on	Link is on	Connected	Connected	Available	Tracking
Blinking Green	Powering up	TX/RX Activity	Connecting/ Registering	Connecting/ Registering	TX/RX Activity	--
Solid Orange	No Ignition The user turns the power On (power button pressed) but ignition is off.	--	--	--	--	--
Blinking Orange	--	--	Searching for signal	Searching for signal	--	Searching for signal
Solid Red	--	--	Problem/ Overheat	Problem/ Overheat	Problem/ Overheat	Problem
Blinking Red	Standby External power is connected to the system.	--	--	--	--	--
Rapid Blinking Red	Problem		SIM door is open			

Operating Temperature

Ambient temperature -30°C to +60°C

Power

Input Voltage 11 to 16.60 VDC

RF Power Modes

 LTE Pout = 23.5 dBm
 EVDO Pout = 23.5 dBm
 WiFi Pout = 12.5 dBm

Power Consumption Amplifiers are Class AB.

 Modem Standby ≤ 0.3 A RMS

 Modem Transmit ≤ 1 A RMS

Main Antenna

LTE

Type	Sleeve Dipole
Frequency	746 - 798 MHz
Physical	Texin 285 and Gelay XP4025 UV
Impedance	50 Ohms (nominal)
Polarization	Vertical Linear
Height	17 inches (43cm)
Azimuth pattern	Omni-directional
Elevation beamwidth	60 deg

EVDO

Type	Folded monopole
Frequency	821 - 896MHz, 1850 - 1990MHz
Physical	PCB
Impedance	50 Ohm
Polarization	Linear vertical
Height	65mm
Azimuth pattern	Omni-directional
Elevation beamwidth	800MHz band - 60deg, 1900MHz band 40deg.

GPS

Type	Active patch antenna
Frequency	1575.42 MHz
Impedance	50 Ohms (nominal)
Polarization	Circular RHCP
System Gain (including cable)	11 dB

Diversity Antenna

Type	Wideband folded Monopole
Frequency	746 - 2500 MHz
Physical	Fiberglass UV protected
Impedance	50 Ohms (nominal)
Polarization	Vertical Linear
Height	1.77 inches (4.5Cm)

Azimuth pattern	Omni-directional
Elevation beamwidth	35 deg

RF Characteristics

Frequency	
LTE	746-756 MHz, 777-787 MHz 758-768 MHz, 788-798 MHz
EVDO BC0	824-849 MHz, 869-894 MHz
EVDO BC1	1850-1910 MHz, 1930-1990 MHz
WiFi	2401-2472 MHz
Bandwidth	
LTE	5 MHz 10 MHz
EVDO	1.3 MHz
WiFi	20 MHz (802.11b/g)
Output transmit power	
LTE	23.5 dBm
EVDO	23.5 dBm
WiFi	12.5 dBm
Receiver sensitivity	
LTE	10 MHz -94dBm 5 MHz -97 dBm
EVDO	-105.5 dBm
WiFi (802.11g)	-87 dBm
Frequency Stability	
LTE	+/- 2.5 ppm
EVDO	BC0 +/- 300 Hz BC1 +/- 150 Hz
WiFi	+/- 20 ppm

Appendix B Reference

Replacement Parts

Replace damaged parts with identical replacement parts.

For complete information on ordering required parts and kits, contact your local customer service representative.

Replacement Parts List

Kit/Part Number	Description
Antennas	
FAF5266A	Main Antenna
FTN7651A	Diversity Antenna
Bracket, Screws & Washers	
0312002B14	Mounting Screw, Bracket to Car, 8
03013013001	Mounting Screw, VSM to Bracket, 8
0487779V56	Flat Washer, VSM to Bracket, 8
0487623U12	Spring Washer, VSM to Bracket, 8
07013065001	Bracket, 2
Cables	
3071815Y61	LAN/Ethernet Cable (177"/450 cm)
30013060001	DC Power & Ignition Cable (177"/450 cm)

Kit Replacement Parts List

Kit/Part Number	Description
F4080A	VML700, LTE VSM Modem



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