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ACS Project: 15-2067

Manufacturer: xG Technology, Inc.
Model: CN3100

User Manual



CN3100 Vehicle Modem

Model Number: CN3100-PS-2500-900-1-EXT

Installation and Configuration Guide

July 2015



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Introduction

About this Product

The CN3100 Vehicle Modem is a ruggedized subscriber device. It is waterproof and made to handle wide temperature ranges. While primarily designed for vehicle usage, the device may be used in fixed locations, such as in parks or at outdoor events.

It enables any Internet-ready device to connect to the xMax network, either wirelessly using secure WiFi links or through a wired Ethernet connection.

About this Book

This manual provides basic instructions for installation and configuration of the CN3100 Vehicle Modem. It also describes how to connect to the xMax Network and then connect Internet-enabled wireless devices to the xMax Network.

Before You Begin

IMPORTANT

The CN3100 Vehicle Modem is shipped with the parts needed for installation and operation. Be sure each of these items is included in your product package. If any item is missing, please contact the place of purchase.

Depending upon the requirements of your installation, you may also need to purchase additional components such as fuses and cables. A checklist of typically required parts is shown in the topic



CN3100 Vehicle Modem

**Weatherproof
Ethernet Kit**



**Weatherproof Power
Connector
with 3 ft. cable**



**xMax Antenna with
Magnetic Mount**



**Magnetic Mount
WiFi Antenna**



**Mounting
Bracket**



Hardware Overview

The CN3100 Vehicle Modem is a self-contained IEEE 802.11b/g access point and xMax modem. It is a full-featured hotspot allowing connection by up to 5 users.

The CN3100 is totally protected against dust and moisture.

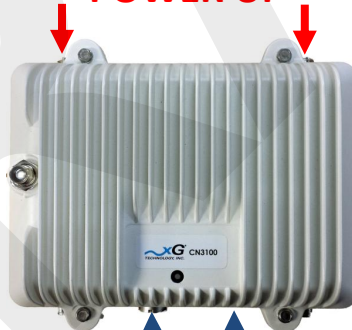
Before Powering the CN3100 Vehicle Modem



Both top Tx RF ports, **MUST** be properly terminated before power is applied to the unit.

Applying power without proper RF port termination might damage the unit and void the product warranty.

**TERMINATE
BEFORE
POWER UP**



POWER

ETHERNET

Connectors

The CN3100 features seven connectors:



- Four external xMax antenna connectors (N-type Jack, Female Socket)
- A connector for an external WiFi antenna (TNC Jack, Female Socket)
- A weatherproof Ethernet connector
- A weatherproof Power connector



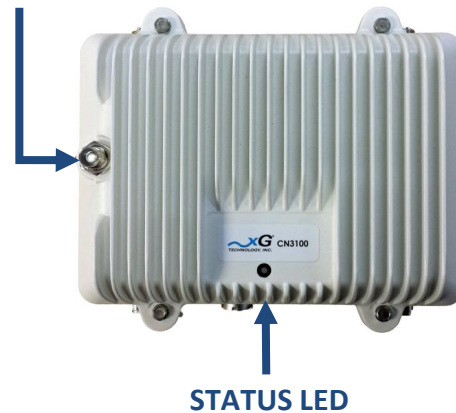
Status LED

The CN3100 Vehicle Modem Status LED indicates power, WiFi and network status and hardware fault conditions.

Under normal operating conditions, the LED glows **GREEN**.

		xMax Network
 GREEN	SOLID	CONNECTED
 RED	SOLID	NOT CONNECTED

WiFi CONNECTOR



Important Safety and Installation Requirements

These notices apply to the CN3100 Vehicle Modem.

- Be sure to read, understand and follow these instructions.
- Heed all warnings.
- Only use accessories and attachments specified by xG Technology.
- Keep a copy of these instructions for future reference.

NOTICE

FCC Part 15 Requirement

The CN3100 Vehicle Modem **MUST** only be installed by a professional installer. It is the responsibility of the installer to adjust the transmit power level to ensure that the output power plus antenna gain does not cause the device to exceed FCC Part 15 output power regulations.

⚠ WARNING

Hazardous situation, which if not avoided, could result in death or serious injury.

- All antennas **MUST** either be located on the exterior of a vehicle or mounted on a pole.
- Every antenna **MUST** be separated from users by more than 25 cm (0.82 ft) at all times.
- Shielded and grounded Ethernet cable **MUST** be used to avoid damage to the CN3100 Modem unit and ensure proper operation.
- Lightning Protection **MUST** be used on all antenna connections and Ethernet tower runs.

FCC Compliance

NOTE

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 or more of the following measures:

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

RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance of 25 cm (0.82 ft) between the radiator and your body. This transmitter **MUST** not be co-located or operating in conjunction with any other antenna or transmitter.



Changes or modifications to this device not expressly approved by xG Technology could void the user's authority to operate the equipment and void the product warranty.

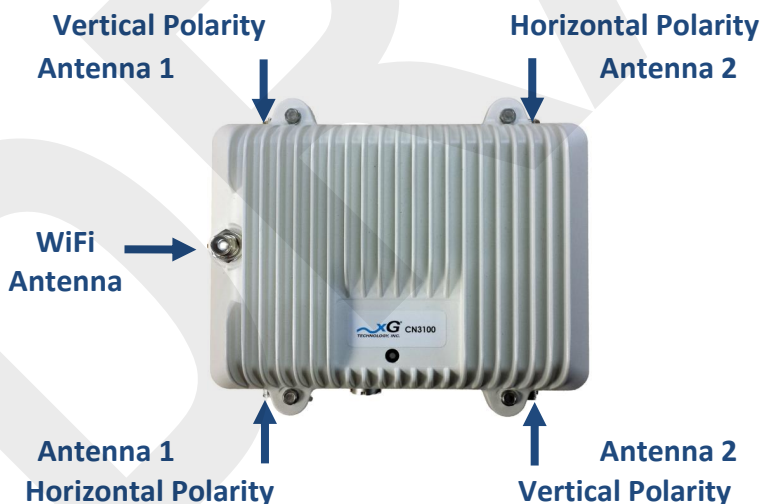
Antenna Considerations

- The CN3100 has four antenna connectors — two Tx/Rx and two Rx-only.
- All connectors are always used.
- The WiFi antenna can be positioned in any convenient location.
- On a vehicle, magnetic-mount or through-hole mount antennas may be used.

FOR OPTIMUM PERFORMANCE

- The CN3100 should be placed as close as possible to the antennas.
- The antenna cable lengths should be as short as possible.
- Use of Low-loss cables (LMR 195/240 or equivalent) is highly recommended.
- When using four antennas
 - The cables from the two Tx/Rx connectors on the CN3100 should be connected to the two antennas on one diagonal.
 - The cables from the two Rx connectors on the CN3100 should be connected to the two antennas on the opposite diagonal.

When using two dual-polarity antennas, connect the cables as shown:



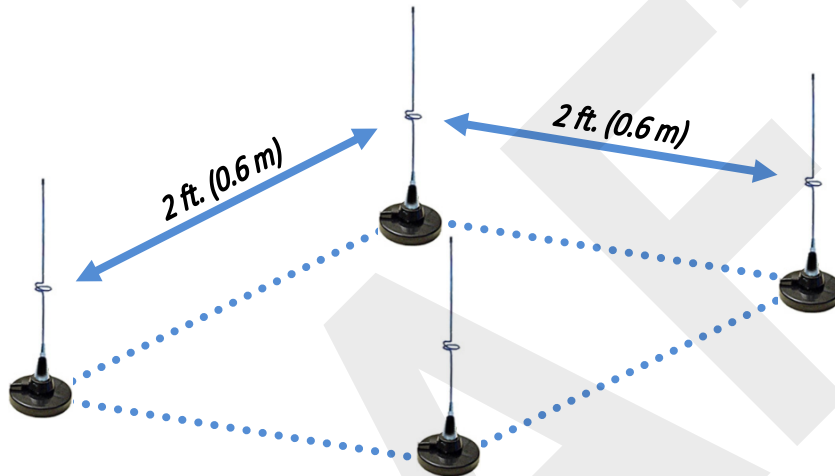
For additional information, please refer to the antenna configuration illustrations in the [Antenna Configurations](#) section on page 11.

Antenna Configurations

The following illustrations show typical antenna configurations. The antennas must be separated by at least 2 feet (0.6 meters) in horizontal and vertical orientation. This is the minimum separation distance required for proper operation.

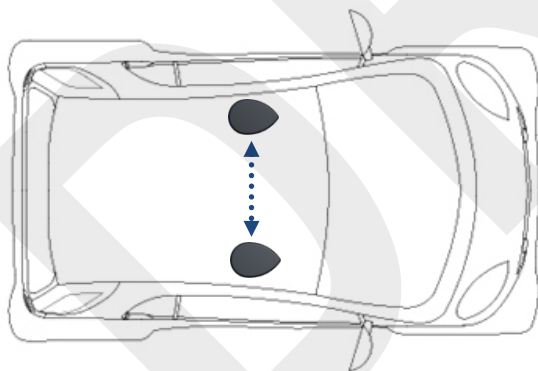
Omni Antenna Configuration

Four antennas are used with an Omni antenna installation. The antennas should be arranged in a square configuration with two feet (2 ft.) separation on each side.

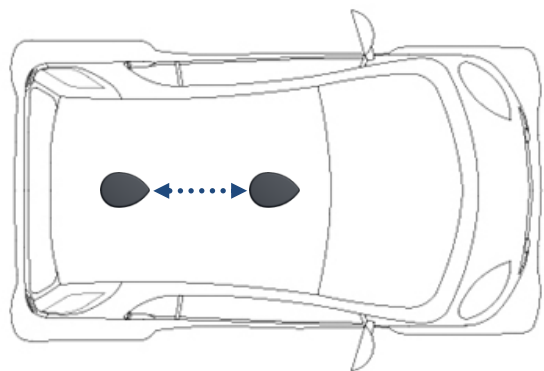


xMax Dual-polarity Vehicle Antenna Configuration

Two antennas are used with an xMax Vehicle Antenna installation. The antennas should be arranged either in line or side-to-side, with two feet (2 ft.) separation between the antennas.

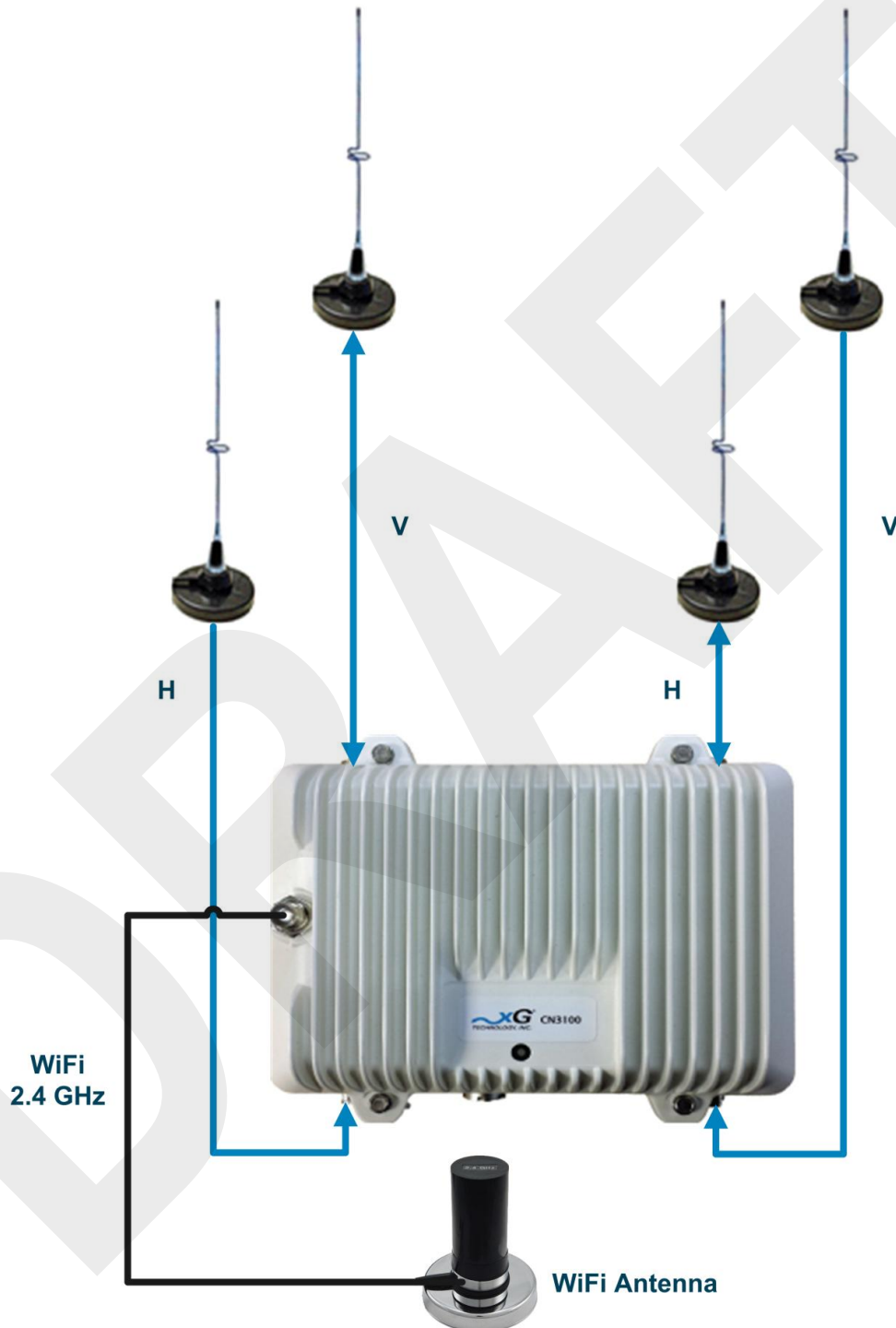


Side-to-Side

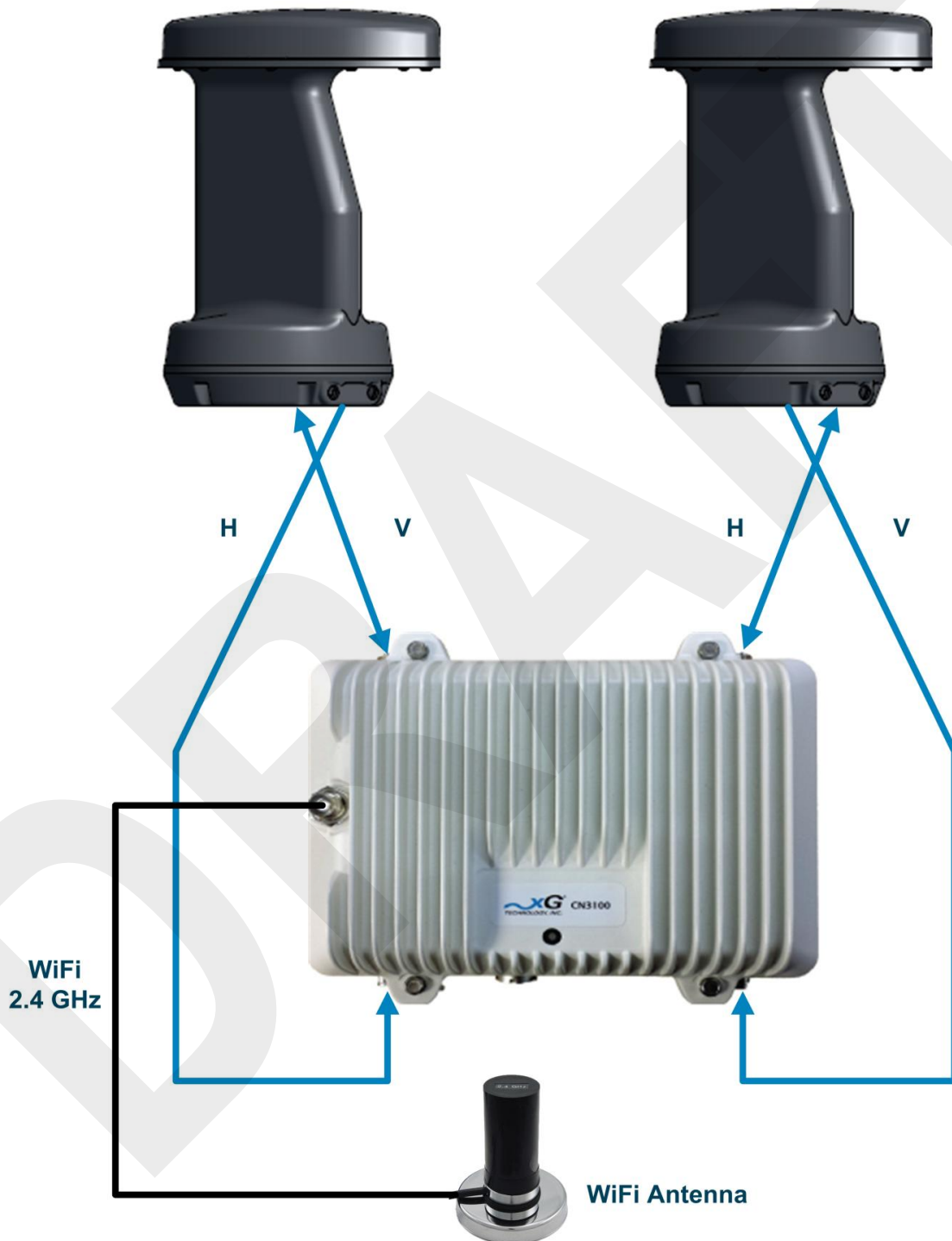


In-line

Omni Antenna Configuration Connections



xMax Dual-polarity Vehicle Antenna Configuration Connections



Configuring the CN3100 Vehicle Modem

This procedure should be completed before installing the CN3100 in a service location.

These steps set up the CN3100 Vehicle Modem for use. After completing these configuration steps, the CN3100 Vehicle Modem will be fully functional and ready for installation and operation.

It will broadcast on the configured channel and enable any authorized Internet-ready device to securely connect to the Internet through the xMax Network.

Devices may also be connected to the xMax network through a wired Ethernet connection to the CN3100. For more information, refer to the topic [Wired Internet Connectivity](#) on page 20.

NOTE

This sequence assumes that the CN3100 device is in factory-default configuration and has not been previously configured.

IMPORTANT: BEFORE YOU CONTINUE

Antennas or dummy loads **MUST** be connected to the two top Tx RF ports.

Both top Tx RF ports **MUST be properly terminated before power is applied to the unit.**



Applying power without proper RF port termination might damage the unit and void the product warranty.

1. Use a laptop or desktop computer to configure the CN3100 Vehicle Modem. Configure the computer network adapter to Internet Protocol Version 4 (TCP/IPv4) for a static IP address and subnet mask.

BEFORE YOU CONTINUE

Be sure to take note of the current settings to restore them after configuration.

2. Use the IP Address as shown below:

Computer Network Adapter Settings	
IP Address:	169.254.90.100
Subnet Mask:	255.255.255.0

3. Using an Ethernet cable, connect the computer to the Ethernet connector on the CN3100.

4. Connect the flying leads on the supplied weatherproof power connector to a 12 to 19 VDC power supply capable of providing 3 amp service.
5. Secure the power plug to the power connector on the CN3100 Vehicle Modem.
The **Status LED** glows **RED** within fifteen seconds after the power source is switched on.

NOTE

The CN3100 startup process takes two to three minutes.

Before continuing, wait until this process completes and the LED glows **GREEN**.

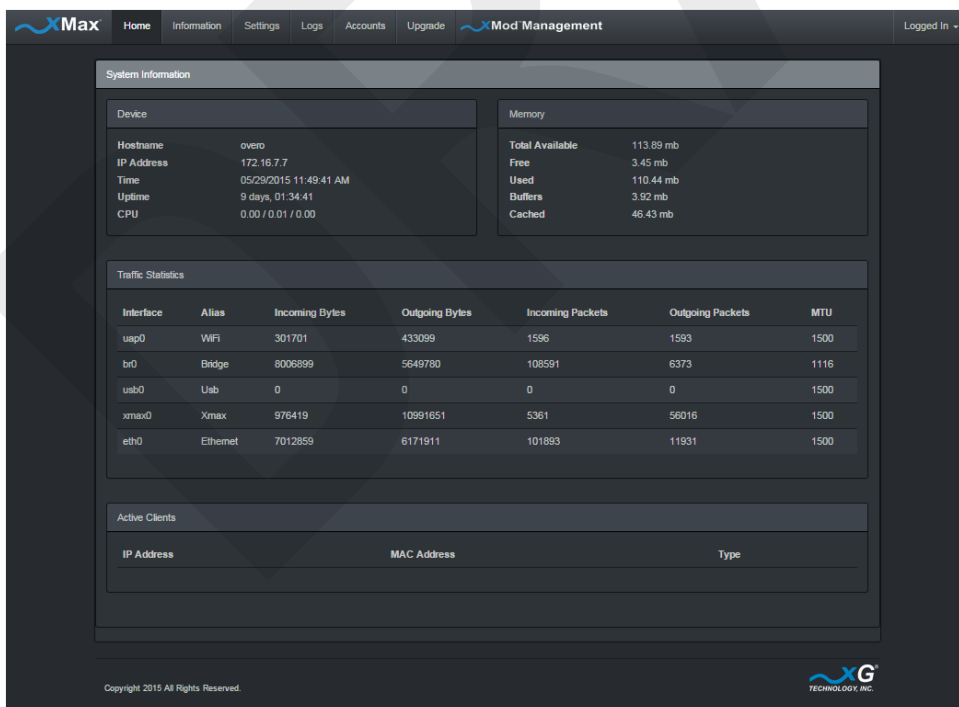
6. On the computer, open a Web browser.
In the browser address line, enter the IP address to open the **CN3100 xVM Management** window:

CN3100 Management	
IP Address:	http://169.254.90.101

7. In the **User name** and **Password** fields enter:

User name:	admin
Password:	admin1 The password is case sensitive.

The **CN3100 xVM Management** window opens to the **Home** view.



The screenshot shows the xMax web interface for the CN3100 xVM Management. The top navigation bar includes links for Home, Information, Settings, Logs, Accounts, Upgrade, and xMod Management. The main content area is divided into three sections:

- System Information:**
 - Device:** Hostname: overo, IP Address: 172.16.7.7, Time: 05/29/2015 11:49:41 AM, Uptime: 9 days, 01:34:41, CPU: 0.00 / 0.01 / 0.00.
 - Memory:** Total Available: 113.89 mb, Free: 3.45 mb, Used: 110.44 mb, Buffers: 3.92 mb, Cached: 46.43 mb.
- Traffic Statistics:** A table showing network interface statistics.
- Active Clients:** A table showing active client connections.

The Traffic Statistics table is as follows:

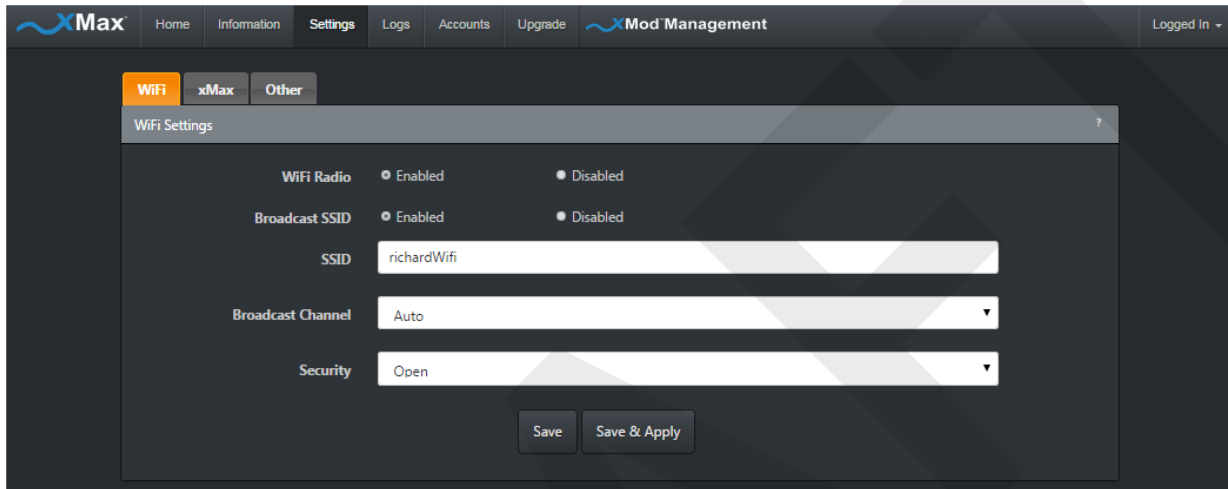
Interface	Alias	Incoming Bytes	Outgoing Bytes	Incoming Packets	Outgoing Packets	MTU
uap0	WiFi	301701	433099	1596	1593	1500
br0	Bridge	8006899	5649780	108591	6373	1116
usb0	Usb	0	0	0	0	1500
xmax0	Xmax	976419	10991651	5361	56016	1500
eth0	Ethernet	7012859	6171911	101893	11931	1500

The Active Clients table has columns for IP Address, MAC Address, and Type, but it is currently empty.

The menu bar is at the top of the window.



8. On the tool bar, click **Settings** to open to the **Settings – WiFi** view.



xG Technology strongly recommends that you change the SSID and WPA security key.

NOTE

Before saving changes, be sure to write down the new SSID, and then keep it in a safe place for future reference:

SSID:	
-------	--

9. In the **SSID** field, enter a unique SSID for the device.

Select a security protocol:

10. Click the down arrow on the right side of the **Security** field to reveal the options menu.
11. Click the desired security protocol. The best, and most secure, level of security is WPA2.

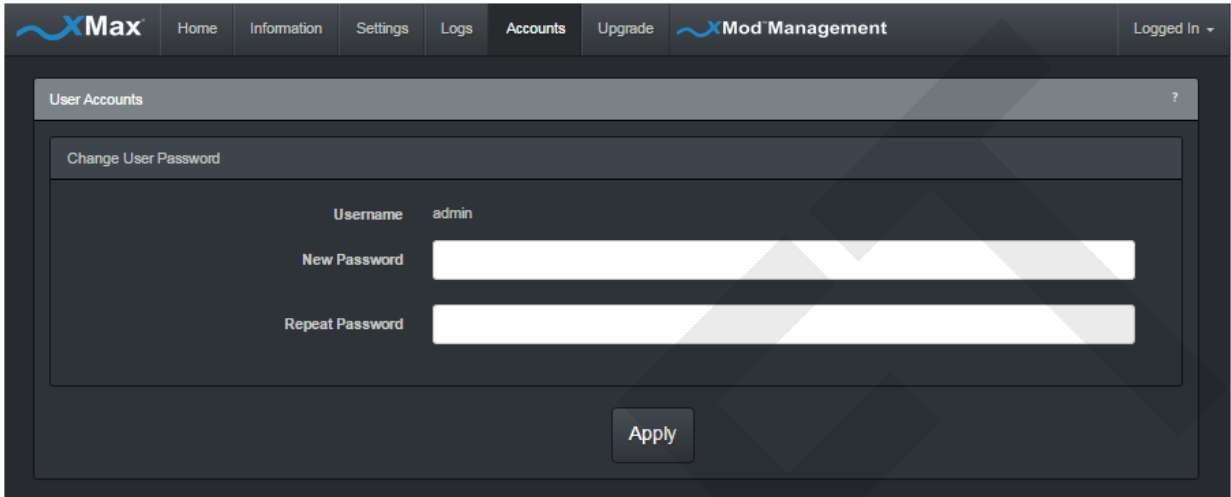
Enter the desired security key/passphrase:

Be sure to write down the new **Shared Key** and then keep it in a safe place for future reference:

Shared Key	
------------	--

After confirming that the settings are written down for future reference, click **Save**.

On the tool bar, click **Accounts** to open the **User Accounts** view.



The **Change User Password** section, displays the current **Username**.

xG Technology strongly recommends that you change the default Account Password.

IMPORTANT

Before clicking **Apply**, be sure to write down the new password, and then keep it in a safe place for future reference.

- The password length must be a minimum of 6 characters.
- The password is case sensitive, and may contain any alphanumeric or special character.

Note the New Password:

12. Enter the selected password in the **New Password** field, and then again enter the password in the **Repeat Password** field. Finally, click **Apply**.

The system displays the message:

Saving Settings! Please wait while the server saves your settings,** and then followed by **Settings saved! Server has successfully saved your settings.

NOTE

This completes the minimum setup. For additional information on the many features of the **CN3100 xVM Management** tool, please refer to the topic **CN3100 Vehicle Modem Management Tool** starting on page 21.

13. To complete the setup, log out of the **CN3100 xVM Management**. On the right side of tool bar click **Logged In** to reveal the options menu, and then click **Log Out**.

14. Be sure to restore the computer network adapter to its previous settings.

Installation

Assemble Your Parts and Tools

NOTE

xG Technology recommends that the CN3100 Vehicle Modem be configured on a bench before installing the device in the field. See [Configuring the CN3100 Vehicle Modem](#) on page 14.

This checklist may be of assistance in assembling the parts needed to complete the installation.

CN3100 Vehicle Modem Parts Checklist	
SUPPLIED BY xG Technology	OBTAIN FROM YOUR PART SUPPLIER
<input type="checkbox"/> 1 CN3100 with Wall Mount Bracket	<input type="checkbox"/> 1 Ethernet Cable (for configuration)
<input type="checkbox"/> 1 Weatherproof Ethernet Kit	<input type="checkbox"/> 1 In-line Fuse Holder (Littelfuse FHA010 or equivalent)
<input type="checkbox"/> 1 Weatherproof Power Connector with 3 ft. cable	<input type="checkbox"/> 1 Fuse (10 Amp ATO®)
<input type="checkbox"/> 2 Magnetic Mount xMax Antennas	
<input type="checkbox"/> 1 Magnetic Mount WiFi Antenna	
<input type="checkbox"/> Alternative CN3100 mounting solution (as ordered)	

Installation Procedure

These steps outline the basic tasks required to complete a successful installation. Your specific steps will depend upon the requirements of your system design.

1. Select an appropriate location to mount the CN3100 Vehicle Modem and secure it in place with an appropriate mounting bracket.
2. Position the Magnetic Mount xMax Antennas on the roof of the vehicle as shown in the topic [Antenna Configurations](#) on page 11. For optimum performance, the antennas should be arranged with a separation of two feet (2 ft.) between the antennas.
3. Position the Magnetic Mount WiFi Antenna on the roof of the vehicle in any convenient location.
4. Route the cables to the CN3100 unit location, and then connect the cables from the antennas to the CN3100 unit.

IMPORTANT

Ensure that the correct antenna cable is attached to correct CN3100 connector, as shown in the diagrams in the topic [Antenna Configurations](#) starting on page 11.

5. Connect the flying leads of the supplied weatherproof power plug cable to a in-line fuse holder fitted with a 10 Amp fuse.
6. Connect the fuse holder cable to a 12 to 19 VDC power source capable of providing 3 amp service.
7. Secure the power plug to the power connector on the CN3100 Vehicle Modem.

Within 15 seconds after the power source is applied, the Status LED glows **RED**.

If the CN3100 is within range of an xMax Network, it connects within 2 minutes and the LED glows **GREEN**.

The CN3100 Vehicle Modem is now fully functional and provides IEEE 802.11 wireless connections to wireless devices.

NOTES

- If the **Status LED** remains **RED** after two minutes have elapsed, ensure that the CN3100 is within range of an operating xMax Network.
- If the CN3100 is within range of an operating xMax Network, but not connecting, follow these steps to restart the CN3100:
 - Power off the CN3100.
 - Wait 60 seconds.
 - Power on the CN3100.

Connecting Wireless Devices to the xMax Network

When within range of an operating CN3100 Vehicle Modem, any authorized Internet-ready device is enabled to securely connect to the Internet through the xMax Network.

These steps connect WiFi devices to the xMax Network.

1. Configure a WiFi-enabled device for Internet Protocol Version 4 (TCP/IPv4) and DHCP operation.
2. Enter the SSID and password that was saved in the steps performed in the section [Configuring the CN3100 Vehicle Modem](#) on page 14.

Once connected, the device can be used for any common Internet function.

Wired Internet Connectivity

A properly configured device, such as a PC or laptop computer, can be connected directly to the CN3100 Vehicle Modem for Internet access.

1. Configure the device network interface for DHCP operation.
2. Using the provided Ethernet cable, connect the device to the operating CN3100 Vehicle Modem.

CN3100 Vehicle Modem Management Tool

Overview

Much like a common wireless router, the CN3100 Vehicle Modem requires only minimal configuration for general use. Additional configuration features, however, are available using the **CN3100 Vehicle Modem Management** tool.

The **CN3100 Vehicle Modem** tool provides a means to perform the complex configuration tasks in a visually appealing, Web-based interface. In addition, the tool provides powerful facilities for network monitoring and analysis.

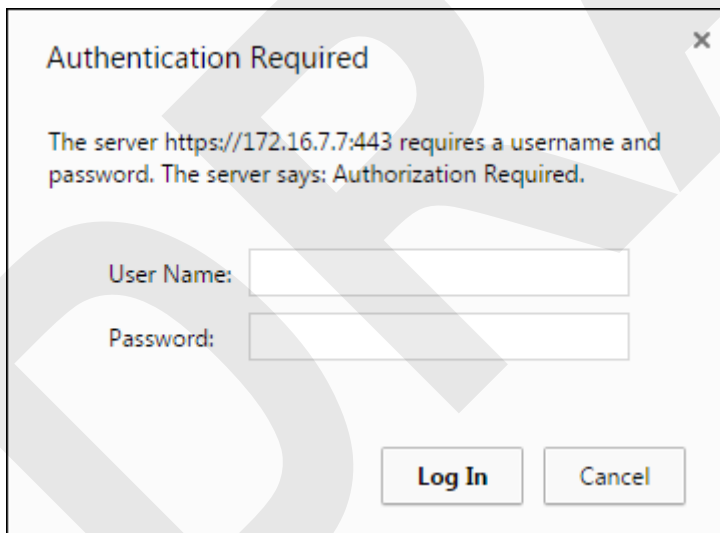
Before You Begin

Ensure that the computer network adapter is configured as described in the topic [Configuring the CN3100 Vehicle Modem](#) on page 14.

1. On the computer, open a Web browser, type the **CN3100 Vehicle Modem** IP address in the address line, and then press **Enter**:

CN3100 Vehicle Modem Management	
IP Address:	http://169.254.90.101

2. The **User Authentication** window displays.



The dialog box titled "Authentication Required" contains the following text: "The server https://172.16.7.7:443 requires a username and password. The server says: Authorization Required." Below this text are two input fields: "User Name:" and "Password:". At the bottom of the dialog are two buttons: "Log In" and "Cancel".

Enter the **User Name** and **Password**, as saved in the topic [Configuring the CN3100 Vehicle Modem](#) on page 14, and then click **Log In**.

The **CN3100 Vehicle Modem** window opens to the **Home** view, as shown.

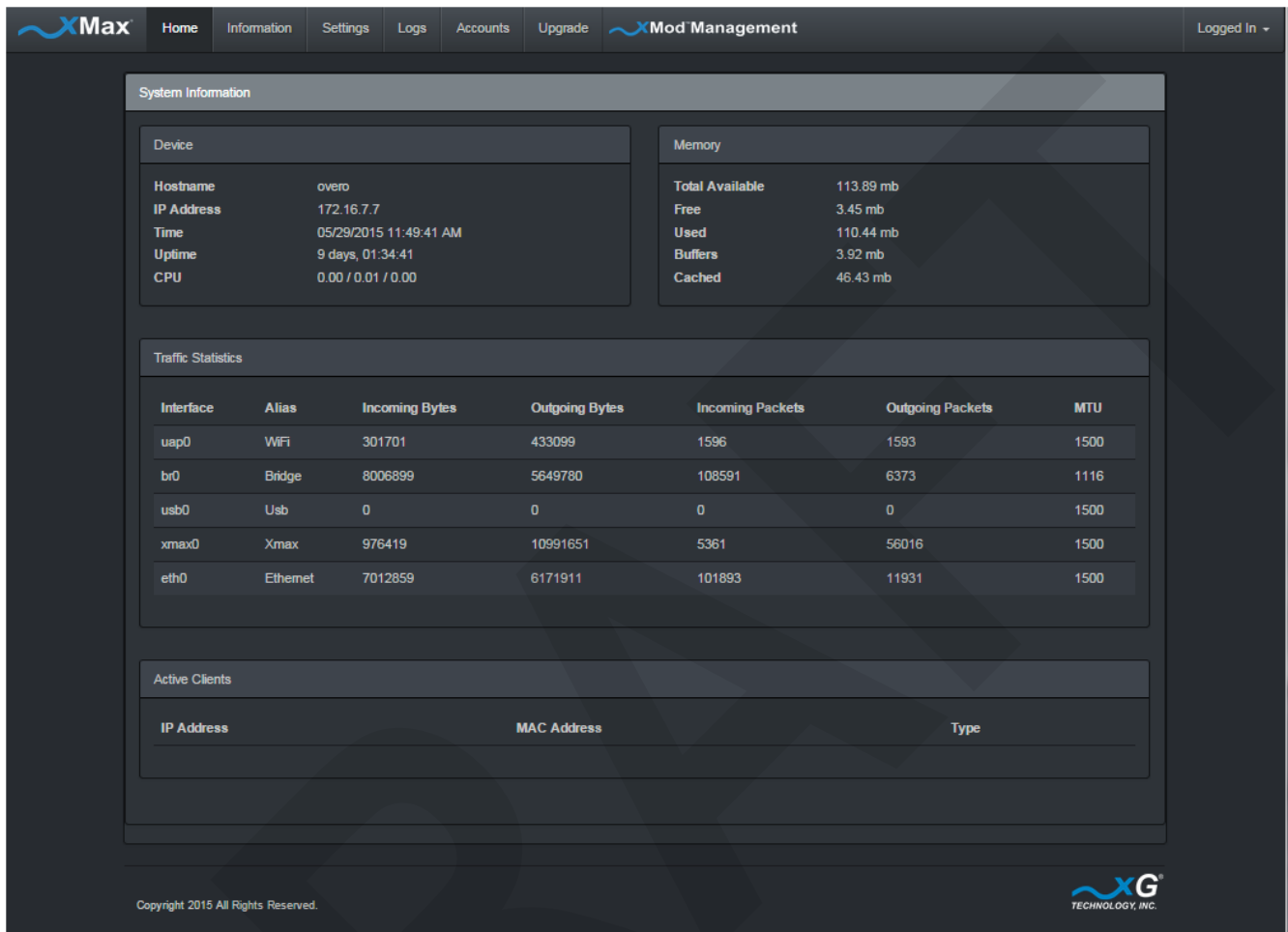


Figure 1: CN3100 Vehicle Modem – Home View

- There are six **CN3100 Vehicle Modem Management** tabs at the top of the window.
- Each of these tabs presents additional **CN3100 Vehicle Modem Management** functions.
- Topics in this section describe the functions of each **CN3100 Vehicle Modem Management** tab.

Content and Functions Chart

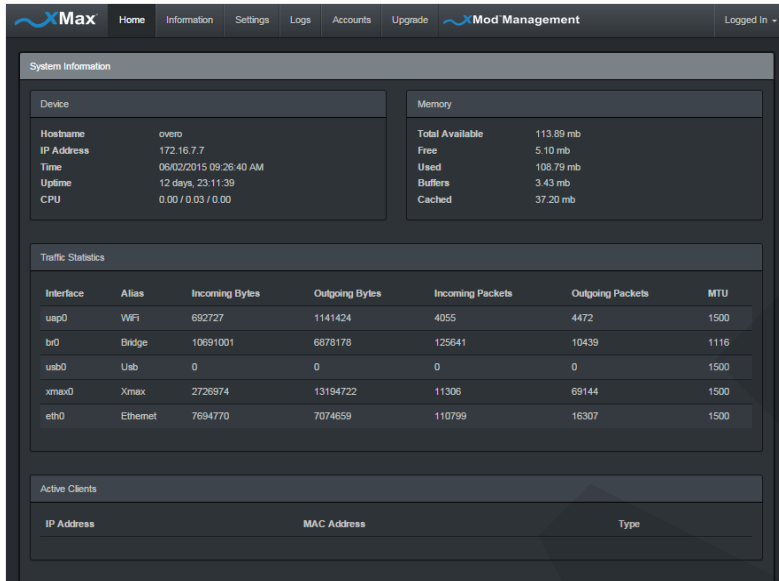
This diagram shows the major functions in each of the **CN3100 Vehicle Modem Management** views. Topics in this guide describe the features and usage information for each **CN3100 Vehicle Modem Management** function. Click one of the six **CN3100 Vehicle Modem Management** tabs, at the top of the window, to display that view.

xMax		Home	Information	Settings	Logs	Accounts	Upgrade	xMod Management		Logged In
VIEW		CONTENT AND FUNCTIONS OVERVIEW								
Toolbar Options	<div><div>Logged In</div><div>Edit admin Account</div><div>Use Dark Theme</div><div>Use Light Theme</div><div>Log Out</div></div>	Click the arrow to the right of the of Logged In status to reveal the options								
		Click Edit Account to display the User Accounts view.								
		Click to select the CN3100 Management Dark Theme or Light Theme .								
		Click to Log Out of CN3100 Vehicle Modem Management .								
Home	The Home view displays a real-time overview of CN3100 system information:									
	System Information									
	Device		Hostname, IP Address, Time, Uptime, CPU							
	Memory		Total Available, Free, Used, Buffers, Cached							
	Traffic Statistics		Interface, Alias, Bytes (In/Out), Packets (In/Out), MTU							
Information	Active Clients		IP Address, MAC Address, Type							
	Device Information		<div><div>Home</div><div>xMax</div><div>WiFi</div><div>Sys-Info</div><div>Tools</div></div>							
	Home		Version, Wireless, Network, Control System Components							
	xMax		WAN Information: Configuration Type, Total Traffic, RF Settings, Wireless							
	WiFi		Status, Packets, Clients							
	System		Device, Memory, Traffic Statistics, Active Clients							
Settings	Tools		Network Tools: Ping, Trace Route, NS Lookup Restart: CN3100 Vehicle Modem							
			<div><div>WiFi</div><div>xMax</div><div>Other</div></div>							
	WiFi		WiFi Radio Enable, Broadcast SSID Enable, SSID, Broadcast Channel, Security							
	xMax Radio		RF Channel, Network ID, Transmit Power, Enable/Disable Other Parameters							
Logs	Other		Date/Time: Set or Sync		<div><div>Sync with Internet</div><div>Sync with Browser</div><div>Sync with NTP</div></div>		RADIUS Secret, System Reboot Enable			
	View		messages, debug, syslog, Dmesg, WdReboot							
Accounts	User Accounts		Change User Password							
Upgrade	Software Upgrade		Display Current Software and xMax Components, Upload File, Swap to Backup							

Figure 2: CN3100 Vehicle Modem Management – Content and Functions Overview

CN3100 Vehicle Modem Management Details

Home View



The screenshot shows the xMax Home View interface. At the top is a navigation bar with links: Home, Information, Settings, Logs, Accounts, Upgrade, and Mod Management. The main content area is titled 'System Information' and contains three sections: Device, Memory, and Traffic Statistics. The Device section shows Hostname (overo), IP Address (172.16.7.7), Time (06/02/2015 09:26:40 AM), Uptime (12 days, 23:11:39), and CPU (0.00 / 0.03 / 0.00). The Memory section shows Total Available (113.89 mb), Free (5.10 mb), Used (108.79 mb), Buffers (3.43 mb), and Cached (37.20 mb). The Traffic Statistics section is a table with columns: Interface, Alias, Incoming Bytes, Outgoing Bytes, Incoming Packets, Outgoing Packets, and MTU. The Active Clients section is a table with columns: IP Address, MAC Address, and Type.

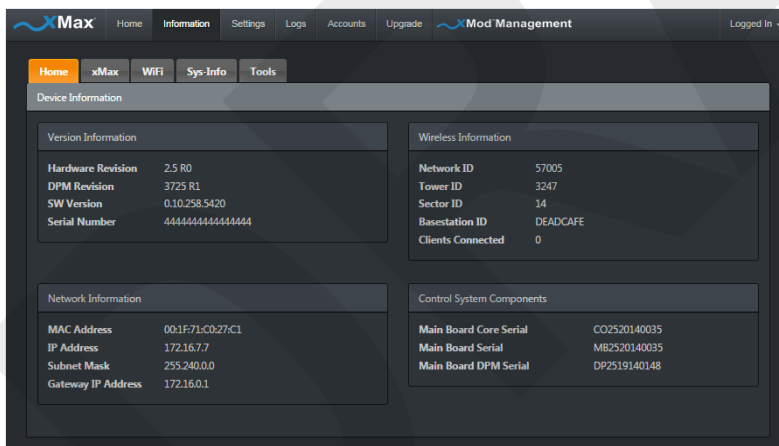
System Information						
Device						
Hostname	overo					
IP Address	172.16.7.7					
Time	06/02/2015 09:26:40 AM					
Uptime	12 days, 23:11:39					
CPU	0.00 / 0.03 / 0.00					
Memory						
Total Available	113.89 mb					
Free	5.10 mb					
Used	108.79 mb					
Buffers	3.43 mb					
Cached	37.20 mb					
Traffic Statistics						
Interface	Alias	Incoming Bytes	Outgoing Bytes	Incoming Packets	Outgoing Packets	MTU
usb0	WiFi	692727	1141424	4055	4472	1500
br0	Bridge	10691001	6878178	125641	10439	1116
usb0	Usb	0	0	0	0	1500
xmax0	Xmax	2726974	13194722	11306	69144	1500
eth0	Ethernet	7694770	7074659	110799	16307	1500
Active Clients						
IP Address	MAC Address	Type				

The **Home** view is the initial page presented.

This page displays real-time **System Information** from the xMCC database for:

- **Devices**
- **Memory**
- **Traffic Statistics**
- **Active Clients**

Information View – Home



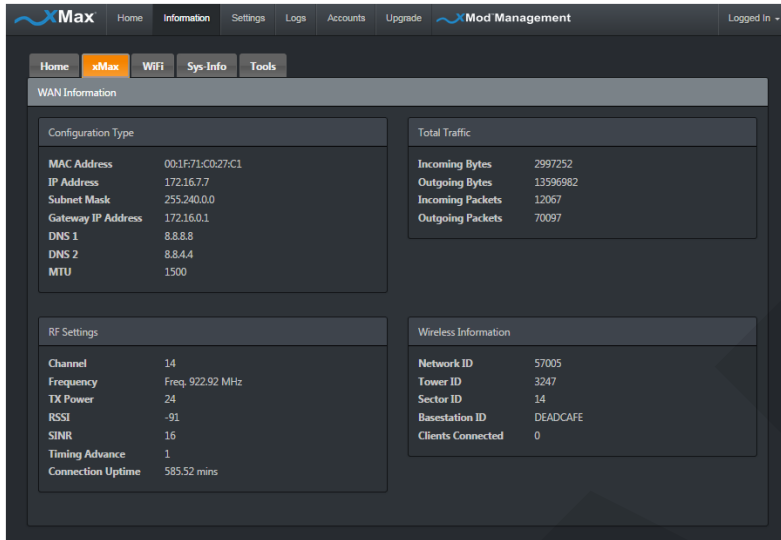
The screenshot shows the xMax Information View – Home interface. At the top is a navigation bar with links: Home, Information, Settings, Logs, Accounts, Upgrade, and Mod Management. The main content area is titled 'Device Information' and contains four sections: Version Information, Wireless Information, Network Information, and Control System Components. The Version Information section shows Hardware Revision (2.5 R0), DPM Revision (3725 R1), SW Version (0.10.258.5420), and Serial Number (4444444444444444). The Wireless Information section shows Network ID (57005), Tower ID (3247), Sector ID (14), Basestation ID (DEADCAFE), and Clients Connected (0). The Network Information section shows MAC Address (00:1F:71:C0:27:C1), IP Address (172.16.7.7), Subnet Mask (255.240.0.0), and Gateway IP Address (172.16.0.1). The Control System Components section shows Main Board Core Serial (C02520140035), Main Board Serial (M82520140035), and Main Board DPM Serial (D92519140148).

Device Information	
Version Information	
Hardware Revision	2.5 R0
DPM Revision	3725 R1
SW Version	0.10.258.5420
Serial Number	4444444444444444
Wireless Information	
Network ID	57005
Tower ID	3247
Sector ID	14
Basestation ID	DEADCAFE
Clients Connected	0
Network Information	
MAC Address	00:1F:71:C0:27:C1
IP Address	172.16.7.7
Subnet Mask	255.240.0.0
Gateway IP Address	172.16.0.1
Control System Components	
Main Board Core Serial	C02520140035
Main Board Serial	M82520140035
Main Board DPM Serial	D92519140148

The **Information – Home** view displays **Device Information**:

- **Version**
- **Wireless**
- **Network**
- **Control System Components**

Information View – xMax



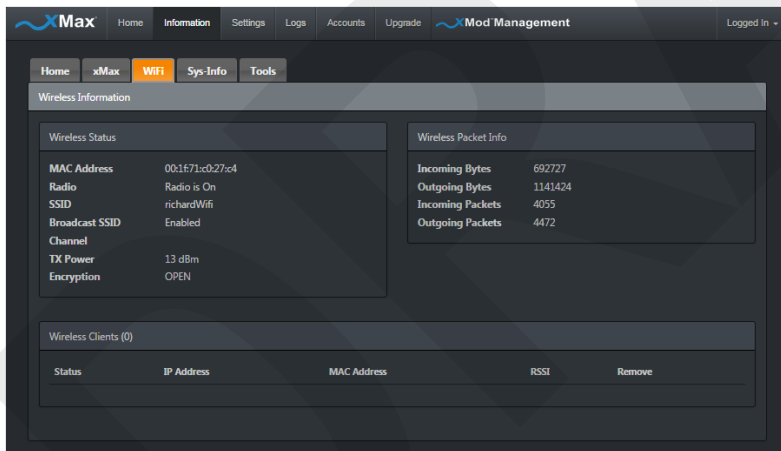
Configuration Type		Total Traffic	
MAC Address	00:1F:71:C0:27:C1	Incoming Bytes	2997252
IP Address	172.16.7.7	Outgoing Bytes	13596982
Subnet Mask	255.240.0.0	Incoming Packets	12067
Gateway IP Address	172.16.0.1	Outgoing Packets	70097
DNS 1	8.8.8.8		
DNS 2	8.8.4.4		
MTU	1500		

RF Settings		Wireless Information	
Channel	14	Network ID	57005
Frequency	Freq. 922.92 MHz	Tower ID	3247
TX Power	24	Sector ID	14
RSSI	-91	Basestation ID	DEADCAFE
SINR	16	Clients Connected	0
Timing Advance	1		
Connection Uptime	58552 mins		

The **Information – xMax** view displays **WAN Information**:

- Configuration Type
- Total Traffic
- RF Settings
- Wireless

Information View – WiFi



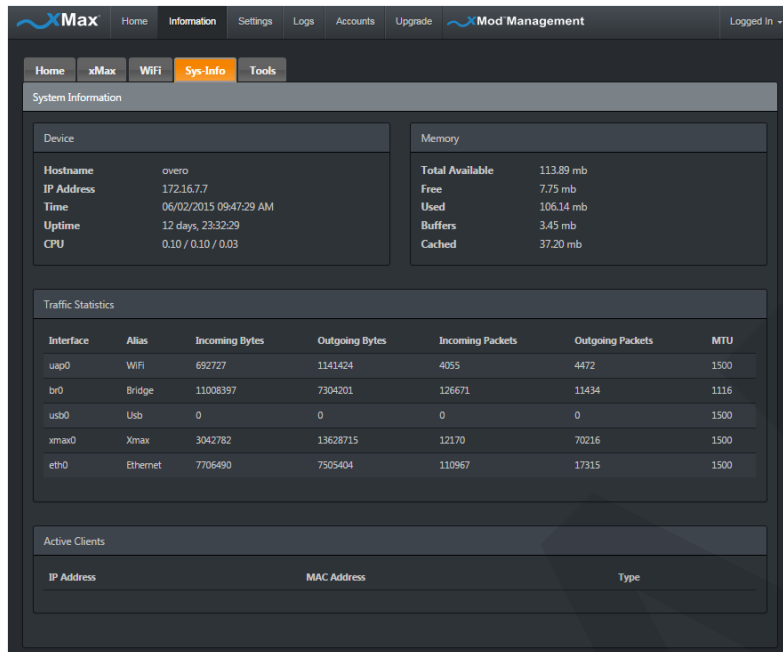
Wireless Status		Wireless Packet Info	
MAC Address	00:1F:71:C0:27:C4	Incoming Bytes	692727
Radio	Radio is On	Outgoing Bytes	1141424
SSID	richardWifi	Incoming Packets	4055
Broadcast SSID	Enabled	Outgoing Packets	4472
Channel			
TX Power	13 dBm		
Encryption	OPEN		

Wireless Clients (0)				
Status	IP Address	MAC Address	RSSI	Remove

The **Information – WiFi** view displays **WAN Information**:

- Wireless Status
- Wireless Packets
- Wireless Clients

Information View – System Information



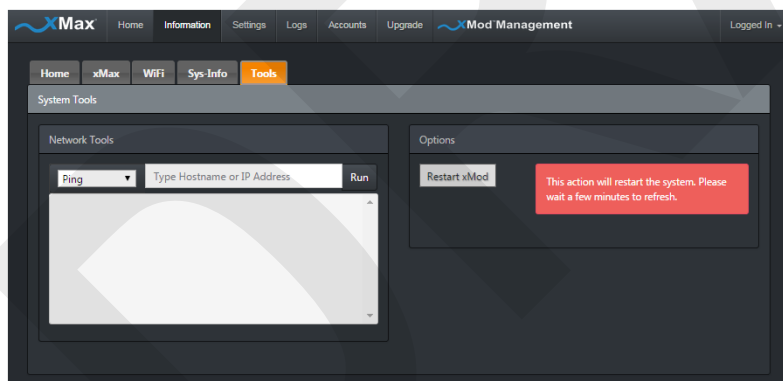
The screenshot shows the 'Sys-Info' tab in the xMax web interface. It displays system information in three main sections: Device, Memory, and Traffic Statistics. The Device section shows hostname, IP address, time, uptime, and CPU usage. The Memory section shows total available, free, used, buffers, and cached memory. The Traffic Statistics section shows a table of network interfaces with their respective statistics.

System Information						
Device						
Hostname	overo					
IP Address	172.16.7.7					
Time	06/02/2015 09:47:29 AM					
Uptime	12 days, 23:32:29					
CPU	0.10 / 0.10 / 0.03					
Memory						
Total Available	113.89 mb					
Free	7.75 mb					
Used	106.14 mb					
Buffers	3.45 mb					
Cached	37.20 mb					
Traffic Statistics						
Interface	Alias	Incoming Bytes	Outgoing Bytes	Incoming Packets	Outgoing Packets	MTU
uap0	WiFi	692727	1141424	4055	4472	1500
br0	Bridge	11008397	7304201	126671	11434	1116
usb0	Usb	0	0	0	0	1500
xmax0	Xmax	3042782	13628715	12170	70216	1500
eth0	Ethernet	7706490	7505404	110967	17315	1500
Active Clients						
IP Address	MAC Address	Type				

The **Information – Sys-Info** view displays **System Information**:

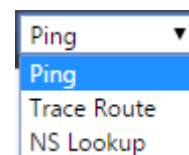
- **Device**
- **Memory**
- **Traffic Statistics**
- **Active Clients**

Information View – Tools



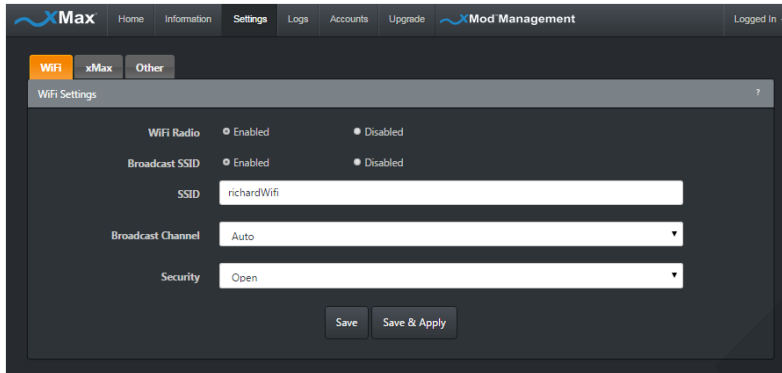
The **Information – Tools** view displays **System Tools**:

- **Network Tools**
Click the down arrow to the right of **Ping** to reveal the other tools:



- **Option: Restart Device**

Settings View – WiFi

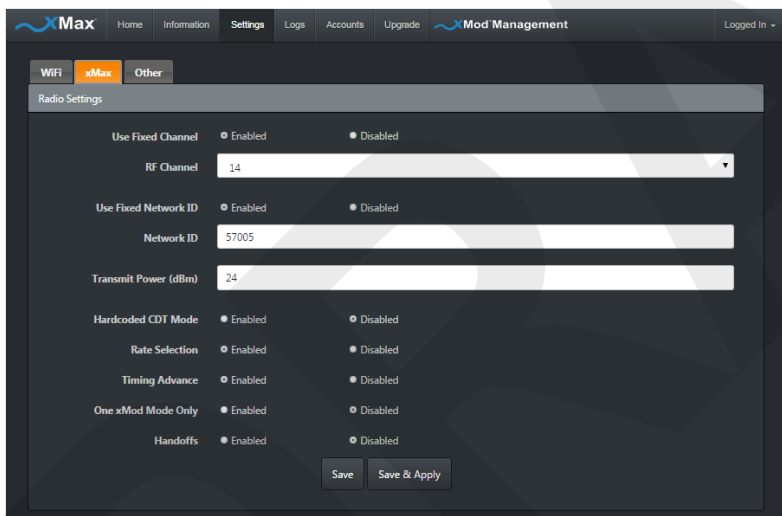


The screenshot shows the xMax web interface with the 'Settings' tab selected. Under the 'WiFi' sub-tab, the 'WiFi Settings' section is visible. It includes radio buttons for 'WiFi Radio' and 'Broadcast SSID', both currently set to 'Enabled'. There is a text input field for 'SSID' containing 'richardWifi', a dropdown menu for 'Broadcast Channel' set to 'Auto', and another dropdown menu for 'Security' set to 'Open'. At the bottom are 'Save' and 'Save & Apply' buttons.

The **Settings – WiFi** view displays **WiFi Settings**:

- WiFi Radio Enable
- Broadcast SSID Enable
- SSID
- Broadcast Channel
- Security

Settings View – xMax

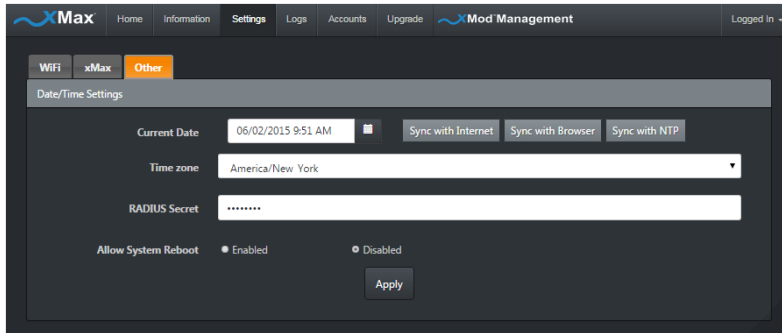


The screenshot shows the xMax web interface with the 'Settings' tab selected. Under the 'xMax' sub-tab, the 'Radio Settings' section is visible. It includes radio buttons for 'Use Fixed Channel' and 'Use Fixed Network ID', both currently set to 'Enabled'. There is a dropdown menu for 'RF Channel' set to '14', a text input field for 'Network ID' containing '57005', and a text input field for 'Transmit Power (dBm)' set to '24'. Below these are several other settings, each with a radio button: 'Hardcoded CDT Mode', 'Rate Selection', 'Timing Advance', 'One xMod Mode Only', and 'Handoffs', all currently set to 'Enabled'. At the bottom are 'Save' and 'Save & Apply' buttons.

The **Settings – xMax** view displays **Radio Settings**:

- RF Channel
- Network ID
- Use Fixed Channel and ID
- Transmit Power
- Enable:
 - Hardcoded CDT Mode
 - Rate Selection
 - Timing Advance
 - One CN3100 Vehicle Modem Mode Only

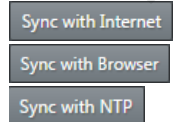
Settings View – Other



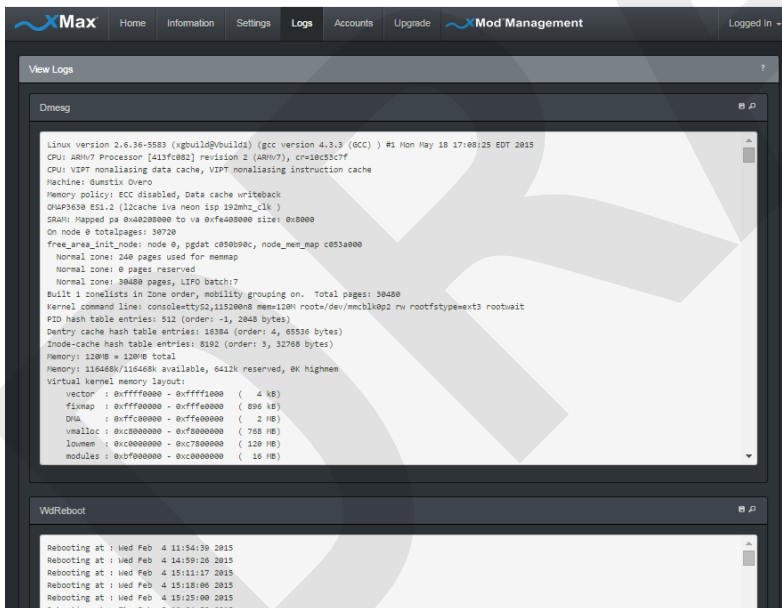
The **Settings – Other** view enables configuration of additional settings:

- **RADIUS Secret**
- **Enable System Reboot**
- **Date/Time Settings:**
 - Manually set date, time, and time zone, or
 - Time/Date Sync Options:

Automatically syncs the date and time with a preset Internet time IP address.
Acquires the date and time from the current local machine and sets it to that device.
Syncs the date and time with a specific NTP server.





Logs View



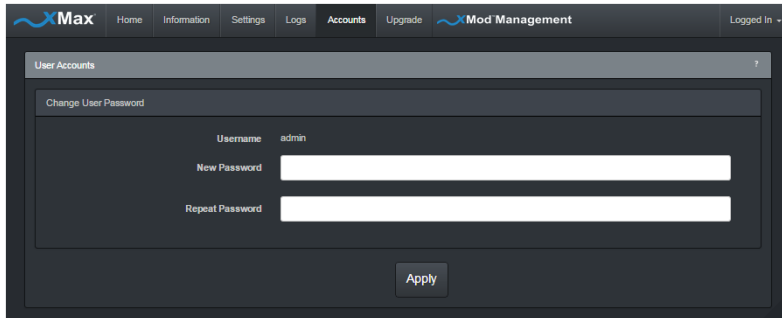
The **Logs** view enables viewing of CN3100 Vehicle Modem logs. Scroll down to view any available log.

messages	Software Events
debug	Debug Events
syslog	All Events
Dmesg	Hardware Events
wdReboot	Reboot Events

Useful icons are available in the upper right corner of each log frame:

	Click to enable filtering of searched information.
	Click to download the Log file in .TXT format.

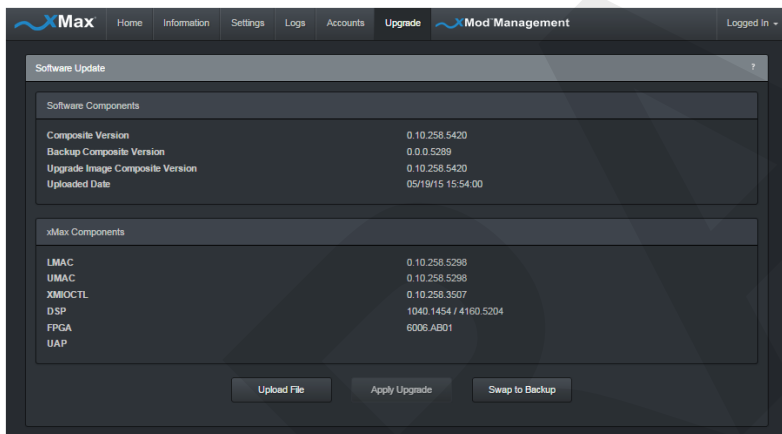
Accounts View



The screenshot shows the 'Accounts' tab in the xMax interface. The 'Change User Password' form is displayed, showing the current username 'admin' and fields for 'New Password' and 'Repeat Password'. An 'Apply' button is at the bottom.

The **Accounts** view enables the currently logged-in user to update the account password.

Upgrade View



The screenshot shows the 'Upgrade' tab in the xMax interface. It displays two tables: 'Software Components' and 'xMax Components'. At the bottom, there are buttons for 'Upload File', 'Apply Upgrade', and 'Swap to Backup'.

Software Components	
Composite Version	0.10.258.5420
Backup Composite Version	0.0.0.5289
Upgrade Image Composite Version	0.10.258.5420
Uploaded Date	05/19/15 15:54:00

xMax Components	
LMAC	0.10.258.5298
UMAC	0.10.258.5298
XMIOCTL	0.10.258.3507
DSP	1040.1454 / 4160.5204
FPGA	6006.AB01
UAP	

The **Upgrade** view displays the software versions for the CN3100 Vehicle Modem components:

- **Software Components**
- **xMax Components**

This view also enables upgrading and rollback of the firmware and software on the CN3100 Vehicle Modem.

Technical Specifications

SYSTEM OVERVIEW	
Frequency Band:	902-928 MHz
Channel Bandwidth:	1.44 MHz
Modulation:	Adaptive BPSK / QPSK / QAM16 / QAM64
Spectral Efficiency:	Up to 4.25 Bits/Hz
PHY Protocol:	Proprietary OFDM, 2x4 MIMO
Max Simultaneous Users per Channel:	200 Users
Mobility:	Up to 100 MPH
Handoff:	Sessions maintained in CN3100 to CN3100 handoffs
Data rate:	Per channel: up to 6 Mbps; Aggregate (16 channels): up to 96 Mbps
RADIO PERFORMANCE	
Tx Power Output	RANGE: Up to 24 dBm in 1 dB steps (BPSK, QPSK, QAM 16/64)
Receiver Sensitivity:	-100 dBm BPSK/-90 dBm QAM64
ANTENNA CONNECTORS	
	Four N-type female (xMax), one TNC-type female (GPS)
POWER	
	PoE++ (Power over Ethernet Plus) Power Supply with Power Cord
	Input: 100-240 VAC, 50-60 Hz; Output: 56 V 0.9 A up to 50 W 100 M
PHYSICAL DESCRIPTION	
Size:	8.5" x 7.5" x 3.5" (21.59 cm x 19.05 cm x 8.89 cm) excluding antenna
Weight:	5 lbs. (2.27 kg), excluding antenna
Interface:	100BASE-T Ethernet
ENVIRONMENTAL	
Operating Temp:	-40° to 122° F (-40° to 50° C)
Water/Dust:	IP67
Humidity:	0-100% condensing
REGULATORY	
EMC:	FCC CFR 47 Part 15 Class B
Vibration and Shock:	MIL-STD 810F Method 514.5 Vibration (constant acceleration), MIL-STD 810F Method 516.5 Shock
MANAGEMENT	
NMS:	xMonitor® Proprietary Event/Fault Manager SNMP Management

Warranty

Limited Warranty

CN3100 Vehicle Modem

xG Technology, Inc. ("xG")
240 South Pineapple Avenue, Suite 701
Sarasota, FL 34236

SCOPE OF THE WARRANTY

Unless a different period is specified for a particular hardware Product, or in a sales agreement between xG and customer, or in the published specification sheet for the hardware Product, xG's hardware Products are generally warranted against defects in workmanship and materials for a period of twelve (12) months from the date of original purchase, provided the Product remains unmodified and is operated under normal and proper conditions. Unless otherwise so provided the warranty period for computer programs in machine-readable form included in a hardware Product, which are essential for the functionality will be coincident with the warranty period of the hardware Product. Software patches, bug fixes or workarounds do not extend the original warranty period. For Software sold by xG and run outside the hardware Product (e.g. xMCC), the warranty term is 90 days from date of original purchase. All accessories (e.g. antennas, cables, power supply, POE) carry a warranty term of 90 days from date of original purchase.

The Limited Warranty extends only to the original purchaser of the Product from xG, or its authorized Resellers, and is not assignable or transferable to any subsequent purchaser or end-user.

xG's warranty applies only to a Product that is manufactured by or for xG Technology and is identified within xG's price book at time of purchase. Any products not covered by xG's warranty, but supplied under the customer's Purchase Order with xG as part of the delivered equipment, are covered under that manufacturer's standard warranty and any warranty claims should be handled directly with that manufacturer.

xG's warranty shall not apply: (i) to any Product subjected to accident, misuse, neglect, alteration, acts of God, improper handling, improper transport, improper storage, improper use or application, improper installation, improper testing or unauthorized repair; (ii) use of parts or accessories not approved or supplied by xG, or failure to perform operator handling and scheduled maintenance instructions supplied by xG or (iii) to cosmetic problems or defects that result from normal wear and tear under ordinary use, and do not affect the performance or use of the Product.

If the Product develops a covered defect within the warranty period, xG will, at its option, either repair or replace the Product found by xG to be defective or not in conformity with material specifications, provided that the Product is returned during the warranty period.

Customer is responsible for shipment to xG (or authorized service provider) and assumes all costs and risks associated with this transportation; return shipment to the Customer will be at xG's expense. Customer shall be responsible for return shipment charges for Product returned where xG determines there is no defect ("No Defect Found"), or for Product returned that xG determines is not eligible for warranty repair. No charge will be made to customer for replacement parts for warranty repairs.

Product that has been repaired or replaced may consist of refurbished equipment that contains used components, some of which have been reprocessed. The used components comply with xG Product performance and reliability specifications. The repair services provided are warranted against defects in workmanship and materials on the repaired component of the product for a period of 30 days from the shipment date of the repaired product, or until the end of the original warranty period, whichever is longer.

xG is not responsible for any damage to or loss of any software programs, data or removable data storage media, or the restoration or reinstallation of any software programs or data other than the software, if any, installed by xG during manufacture of the Product or shipped with Product. xG's sole obligation for software that when properly installed and used does not substantially conform to the published specifications in effect when the software is first shipped by xG, is to use commercially reasonable efforts to correct any reproducible material non conformity (as determined by xG at its sole discretion) by providing Customer with: (a) telephone or e-mail access to report non conformance so that xG can verify reproducibility; (b) a software patch or bug-fix, if available, or a workaround to bypass the issue, if available; and (c) where applicable, replacement of damaged or defective external media, such as a CD-ROM disk, on which the software was originally delivered. xG does not warrant that the use of the software will be uninterrupted, error-free, free of security vulnerabilities, or that the software will meet Customer's particular requirements. Customer's sole and exclusive remedy for breach of this warranty is, at Seller's option, to receive (i) suitably modified software, or part thereof, or (ii) comparable replacement software or part thereof.

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Because it is impossible for xG to know the purposes for which the purchaser acquired this Product or the uses to which this Product will be put, the purchaser assumes full responsibility for the selection of the Product for its installation and use. While every reasonable effort has been made to insure that the purchaser will receive a Product that can be used and enjoyed, xG does not warrant that the functions of the Product will meet the purchaser's requirements or that the operation of the Product will be uninterrupted or error-free. xG is not responsible for problems caused by the interaction of the Product with any other software or hardware.

OBTAINING SERVICE AND SUPPORT UNDER WARRANTY

To obtain warranty service or technical support, please contact the party from whom you purchased the product. If you purchased the product directly from xG, contact your xG Sales Representative or call 754-206-4800. To take advantage of this Limited Warranty Purchasers are required to supply an original point of purchase receipt. Returned Product must be accompanied by the purchaser's sales receipt or comparable substitute proof of sale showing the date of purchase, the serial number of Product, and the sellers' name and address (if purchased through a authorized xG reseller).

EXCLUSIVITY OF THE WARRANTY

This Limited Warranty Policy shall be the sole and exclusive remedy of the purchaser with respect to xG's Products. xG's sole liability on any claim arising out of the sale of the Product or xG's replacement of defective product, whether in contract, warranty, tort, or otherwise shall be limited to the purchase price of the goods that prove defective or nonconforming. In no event shall xG be liable for, and purchaser shall hold xG harmless from, any damages, direct, indirect, or consequential, whether resulting from xG's negligence or otherwise, arising out of, in connection with, or resulting from the goods sold to the Purchaser (including, without limitation, damages, for loss of business profits, business interruption, loss of information, or any other pecuniary loss), and any and all claims, actions, suits, and proceedings which may be instituted in respect to the foregoing, including those made by subsequent owners and users of the goods. In no event shall xG be liable for damages from alleged negligence, breach of warranty, strict liability, incidental or consequential damages, or any other theory, other than the Limited Warranty set forth herein.

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CN3100

Vehicle Modem

Installation and Configuration Guide



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