



YouniVu™ USER MANUAL

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TABLE OF CONTENTS

1	INTRODUCTION.....	5
1.1	Overview of GPS	5
1.2	YouniVu™ Functionality Overview	5
2	YouniVu™ SOLUTION COMPONENTS	6
3	YouniVu™ SOLUTION FEATURES.....	7
4	SAFETY	8
5	HARDWARE INSTALLATION.....	9
5.1	DLD Installation Verification	9
5.2	DRS Installation Verification	9
6	VEHICLE MONITOR SOFTWARE.....	10
6.1	VehicleMonitor Server	10
6.1.1	System Requirements	10
6.1.2	Installation.....	10
6.1.3	Getting Around the Server Application.....	11
6.1.4	Server Page	12
6.1.5	Server Configuration Settings	13
6.1.6	Vehicles Page	14
6.1.7	Groups Page.....	15
6.1.8	Coordinators Page	16
6.1.9	Network-Related Configuration Parameters	18
6.1.10	Server-Related Configuration Parameters	21
6.1.11	Monitoring Connected Coordinators.....	22
6.2	VehicleMonitor Viewer	23
6.2.1	System Requirements	23
6.2.2	Installation.....	23
6.2.3	Getting Around the Viewer Application.....	24
6.2.4	Reports Page	26
7	TECHNICAL SUPPORT	28

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The DLD 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 or more of the following measures:

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

Warning:

The Device has both GPS and Zigbee Antennas build in internally. Thus, the installation of the device shall have a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

1 INTRODUCTION

The YouniVu™ Fleet Management Solution from *Younivate* is a robust GPS-based vehicle tracking solution to monitor the speeding history of vehicles. Based on the short-range ZigBee technology from Texas Instruments, the solution is capable of providing comprehensive speeding reports of your vehicles without any monthly GSM/GPRS and SMS costs to the wireless network operators.

1.1 Overview of GPS

Global Positioning System (GPS) is a satellite-based navigational system. GPS satellites provide signals from space that GPS receivers use to provide three dimensional locations (latitude, longitude, and altitude) plus the time.

1.2 YouniVu™ Functionality Overview

Four stages of the YouniVu™ solution are illustrated in the Figure 1.

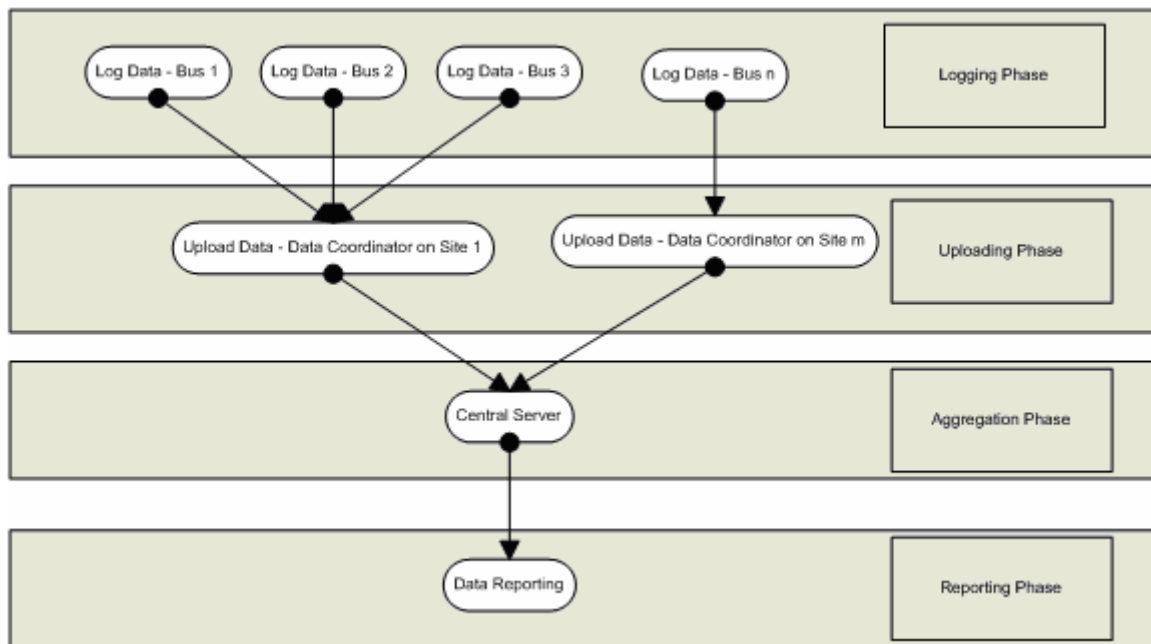


Figure 1: YouniVu™ Functional Stages.

2 YouniVu™ SOLUTION COMPONENTS

Figure 2 illustrates the YouniVu™ solution components.

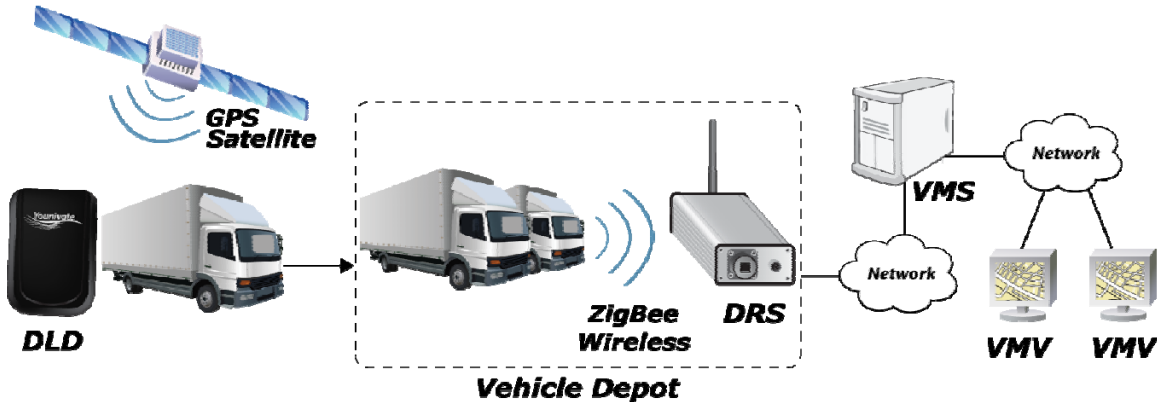


Figure 2: YouniVu™ Solution Components.

- **Data Logging Device (DLD):** The Y5010-A DLD is the tracking device installed in every vehicle intended to be tracked. The DLD has on board a best-of-breed GPS chipset to collect GPS data with utmost accuracy, a ZigBee wireless system on chip solution to communicate with the Data Routing System (DRS) once within the range of the ZigBee network.
- **Data Routing System (DRS):** The DRS system consists of the Y5030-C DRS Box and the PA-UNV-24 Power Supply Box (or any other 24 Volt DC power supply unit). The Y5030-C DRS Box is mounted at a suitable position at the parking station and facing vehicles in the parking. The Y5030-C DRS Box collects the data from the DLDs wirelessly through ZigBee and transfers to the Server via Ethernet. The PA-UNV-24 Power Supply Box (or alternative) is intended for supplying 24 Volt DC supply to the Y5030-C DRS Box.
- **Coverage Extending Device (CED):** The Y5031-C CED is an **optional accessory** for the YouniVu™ Fleet Management System which originally consists of two primary components: Data Logging Device (DLD) and Data Routing System (DRS). A CED is required only when the coverage provided by the DRS is not adequate to cover the parking area, or when the coverage of the DRS is curtailed by obstacles such as buildings or walls in the parking lot.
- **VehicleMonitor Server (VMS):** The Server handles the communication with the DRSs, processes the collected logs, and generates the requested report for the Viewer.
- **VehicleMonitor Viewer (VMV):** The Viewer is where report generation parameters can be specified and the reports, retrieved from the Server, can be viewed. Typically, multiple viewers are used with a single server.

3 YouniVu™ SOLUTION FEATURES

- Totally designed to be off-line to save GSM/GPRS fees
- Best of class GPS sensitivity (-160 dBm) for better connection in bad conditions
- Automatic wireless data collection
- Speeding reports utilizing GIS data
- Remote multi-viewer report access with complete history
- Customizable reports, printed and saved in multiple formats
- Rugged/weather proof hot spots
- Secure wireless interface using private network parameters
- 6 years DLD rolling storage capacity
- Easy and secure DLD installation and upgrade
- GPS satellite record every second for utmost accuracy
- 250 kbps peak data transfer rate (almost 2x GSM/GPRS)
- Data transfer time of less than 1 minute for 8 hours of continuous logging

- ZigBee Wireless Technology:
 - “Line-of-sight” peak coverage area up to 1 km
 - Mesh network (vehicle to vehicle) capability for endless area of coverage
 - Efficient power consumption
 - Noise and interference immunity via FHSS and DSSS technologies
 - Signal collision avoidance via CMA/CA technology

4 SAFETY

It is the User's responsibility to mount the DLD in a secure and safe manner that will not lead to any injury or accidents. Safety rules and guidelines specified in the Vehicle Manual, Governmental Regulations, Organizational Safety Procedures and the YouniVu™ Installation Recommendations manual should be followed.

- The DLD is designed for usage inside the vehicle only, and therefore, it should not be exposed to external atmospheric conditions such as rain or dust.
- Since drilling is involved during installation, all the safety harnesses such as gloves, safety goggles, etc. as required by Organizational Safety Procedures should be followed.
- The mounting of the DLDs should not in anyway affect the safe operation of the air bags or any other safety accessory.
- As specified in the YouniVu™ Installation Recommendations manual, ensure that the fuse is mounted in the Power Supply Wire (wire marked white) and the Ignition Wire before connecting to the terminals of the car battery.

5 HARDWARE INSTALLATION

Step by step instructions on the installation of the DLDs and DRSs are listed out in the Setup and Test Plan for CE & FCC Testing & Verification document. Instructions on installing the VehicleMonitor Server and Viewer Applications and how to generate reports are listed out in subsequent sections of this document.

5.1 DLD Installation Verification

- Verify whether the Red LED is steady ON and the Green LED is blinking three times once the fuse is installed.
- Now switch the vehicle ignition ON and turn it back to OFF, verify the following:
 - Red LED will be reset and will be turned back ON immediately.
 - Green LED will be reset and will blink 3 times.

5.2 DRS Installation Verification

- The IP address of the particular DRS will be listed in the “Connected Coordinators” tab of the Coordinator page YouniVu™ VehicleMonitor Server Application and the status against the particular DRS IP will be shown as “Searching for Devices” once the Window/IP Address is refreshed.

6 VEHICLE MONITOR SOFTWARE

VehicleMonitor, the software solution accompanying YouniVu™, is comprised of two parts: The Server and the Viewer. Among other tasks, the Server handles the communication with the coordinators, processes the collected logs, and generates requested reports for the Viewer. The Viewer is where report generation parameters can be specified and the reports, retrieved from the Server, can be viewed. Typically, multiple viewers are used with a single server.

The following sections describe the Server and the Viewer in detail.

6.1 VehicleMonitor Server

6.1.1 System Requirements

These are the recommended specifications for the machine on which the server is to be setup:

- 2 GHz processor.
- 1 GB RAM.
- 300 GB hard disk.
- Windows XP Professional (with SP2 or later).

6.1.2 Installation

To install the Server, insert the product CD into your computer's CD or DVD drive. The installer should start automatically. If it doesn't, navigate to the root of the product CD and double-click **Setup.exe**. Follow the on-screen instructions to complete the installation.

The setup creates a group in the **Start** menu and a shortcut to the application on the desktop.

The server can be uninstalled as usual from the Add or Remove Programs. Note that the setup doesn't remove all the files upon uninstalling the server (e.g., the database is not removed); such files need to be removed manually. Also, before installing a new version of the Server, the old version must be uninstalled first.

6.1.3 Getting Around the Server Application

The main window of the Server Application basically contains a sidebar that provides links to pages, and a working area where a page is displayed, as depicted in Figure 3.

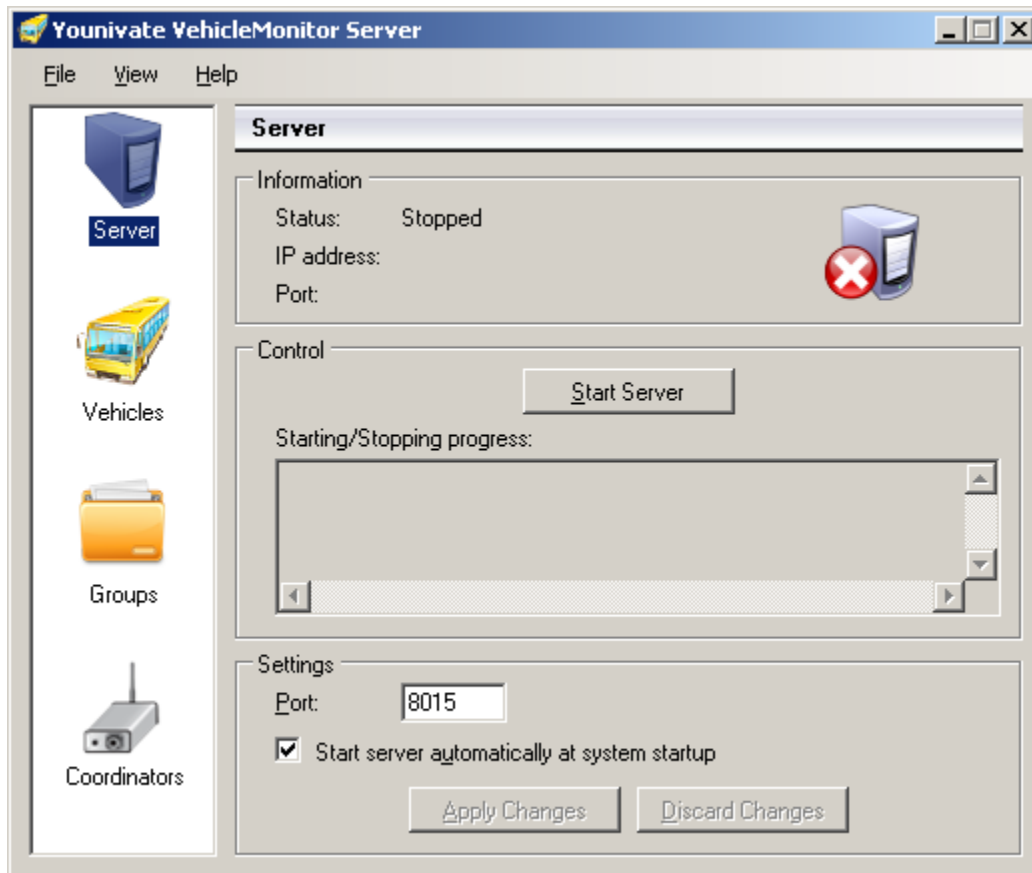


Figure 3: VehicleMonitor Server Main Window.

The pages available are as follows:

- **Server:** View status information about the Server, start and stop the Server, and specify a few settings.
- **Vehicles:** Define vehicles and associate them with DLDs.
- **Groups:** Define groups of vehicles.
- **Coordinators:** Monitor-connected Coordinators, search for Coordinators on the local network, and configure them.

6.1.4 Server Page

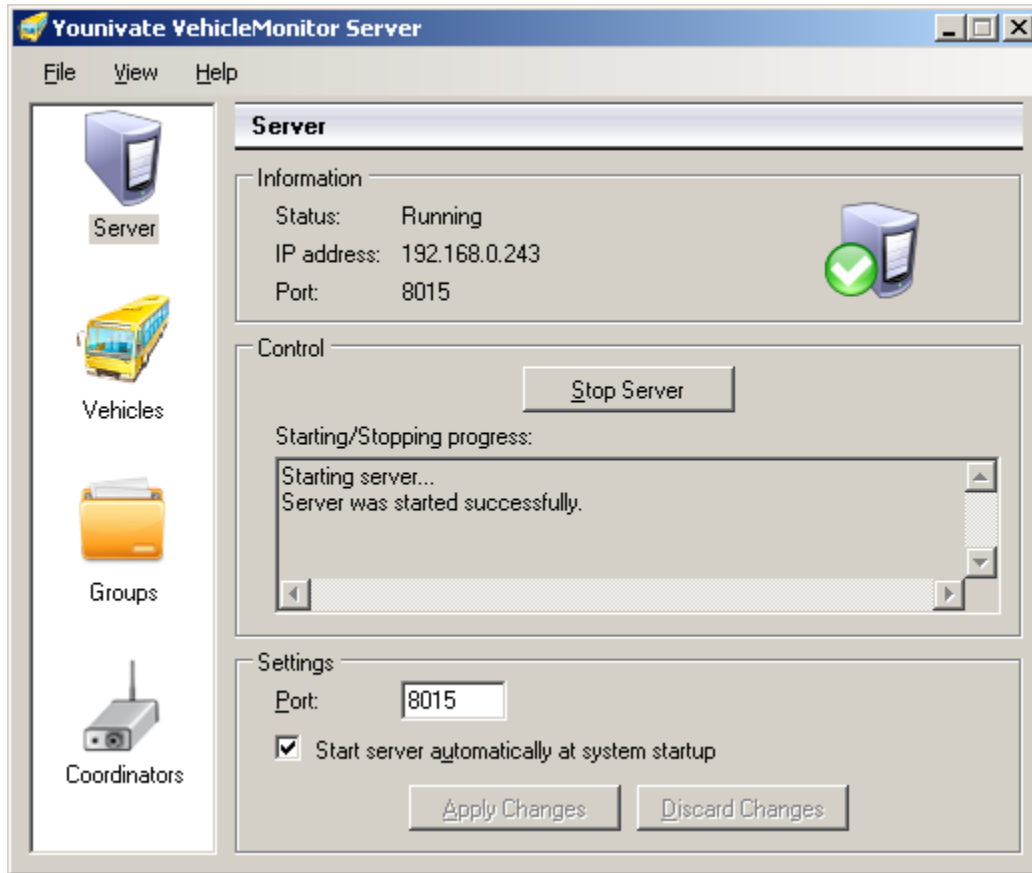


Figure 4: Server Page.

The status information displayed on this page includes whether the Server is currently started or stopped and, if started, its IP address and the port on which it is listening.

If the Server is stopped, as would be indicated by the status information, it can be started by clicking the **Start Server** button. Similarly, if the Server is started, it can be stopped by clicking the **Stop Server** button. In both cases, the progress of the operation is displayed.

Note that some of the functions provided by the Server Application depend on the status of the Server (being started or stopped). For example, vehicles and groups cannot be added or edited unless the Server is stopped.

It should be noted that starting/stopping the Server corresponds to starting/stopping a Windows service. When started, this service, running in the background, communicates with Coordinators, processes received logs, and serves Viewers. Therefore, if the Server Application is closed, then this doesn't mean that the Server is not up and running.

At the bottom of the page, a few settings are provided. These include the following:

- The port on which the Server should listen.
- Whether the Server should start automatically when the operating system starts up. If this is set, the Server will be running even if no one is logged into the system.

Clicking the **Apply Changes** button stores and applies the specified settings. If the Server is already started, the specified port will be used the next time the Server is started. Clicking the **Discard Changes** button resets the fields to their current values.

The Server serves Coordinators as well as Viewers. These should be configured, as explained later, to use the IP address displayed in the status information on this page. However, the port used for Coordinators is different from that used for Viewers. Therefore, we have two ports involved:

- Port for Viewers: The port specified and displayed on this page is used for Viewers, and thus, only Viewers should be set to reach the Server on this port.
- Port for Coordinators: This is set using a Server configuration setting, as described in the following subsection.

Active firewalls on the Server machine, if any, should be configured to allow communications through both ports.

6.1.5 Server Configuration Settings

Some settings that affect the behavior of the Server are set in the file *VehicleMonitorService.exe.config*, which is located inside the installation folder. This configuration file can be edited using any text editor, like Notepad. For the changes to take effect, the file should be saved with the desired values before starting the Server. Figure 5 shows the section of the file we are interested in.

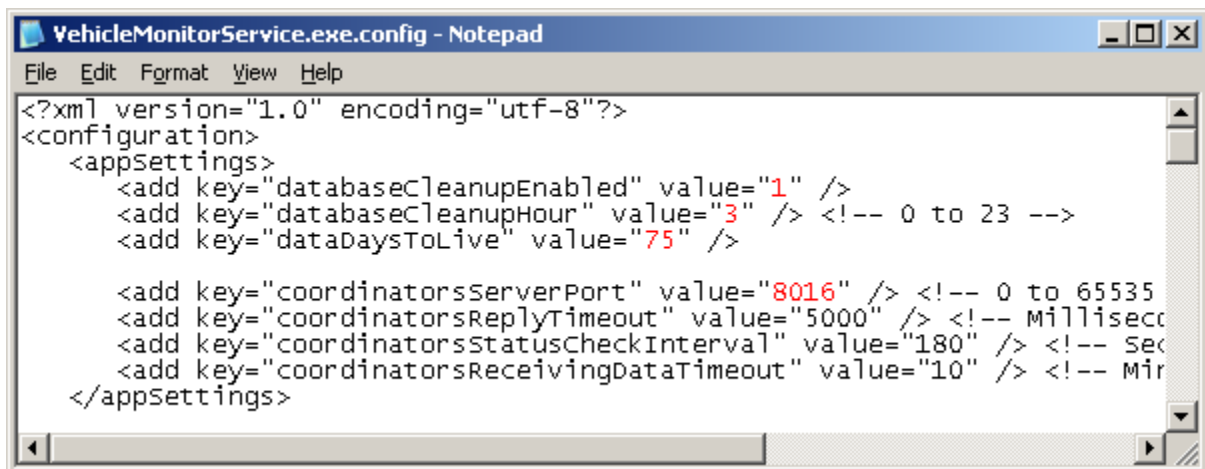


Figure 5: Settings Section of *VehicleMonitorService.exe.config*.

The value of a setting should go between the two “double quotes” of the `value` attribute in the corresponding element.

The settings are:

- **databaseCleanupEnabled:** If set to 0, automatic database cleanup for old records is disabled; any other numeric value enables the cleanup.
- **databaseCleanupHour:** The hour (0 to 23), during the day, at which the database cleanup, if enabled, should occur.
- **dataDaysToLive:** The number of days that should elapse before a record is considered old and thus wiped out, if the database cleanup is enabled.
- **coordinatorsServerPort:** The port used for Coordinators.

The rest of the settings are for advanced use and should be left at their default values.

6.1.6 Vehicles Page

The **Vehicles** page is shown in Figure 6. In this page, new vehicles can be defined and existing vehicles can be viewed, edited, or removed. Note that the server must be stopped in order to add, edit, or remove a vehicle.

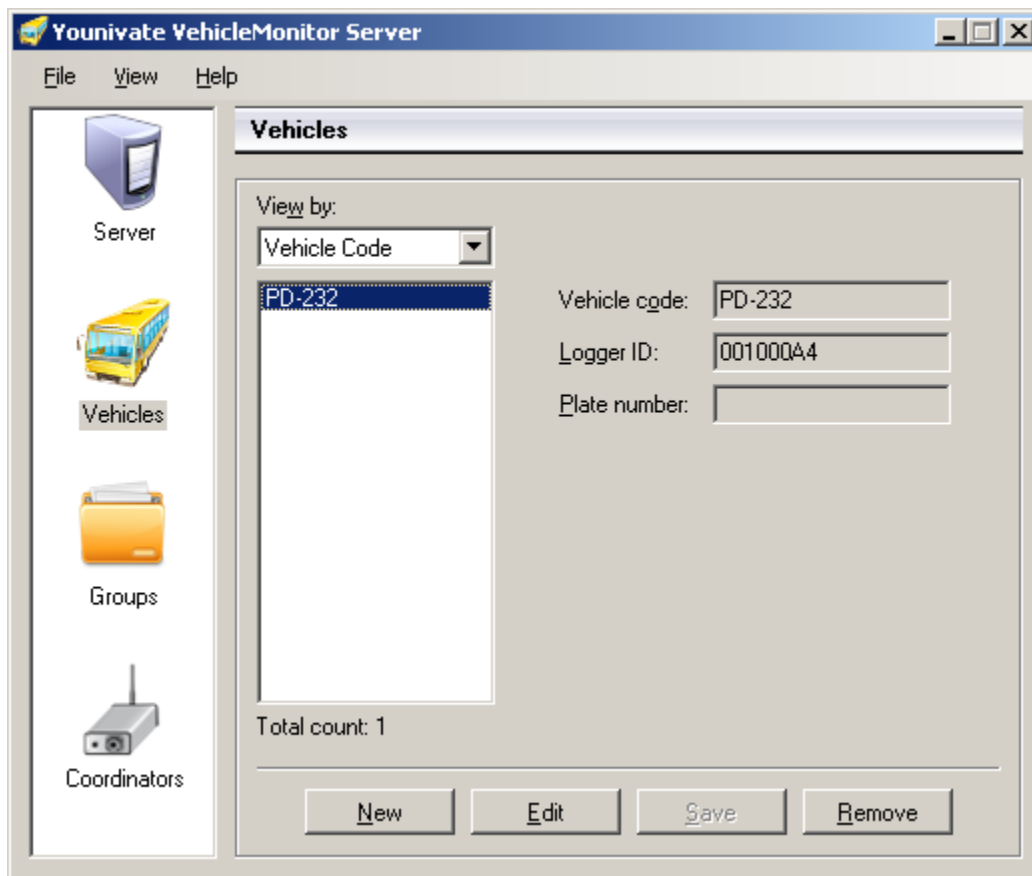


Figure 6: Vehicles Page.

Click the **New** button to define a new vehicle. The relevant parameters are:

- **Vehicle code:** A user-specific code assigned to the vehicle. This is required and must be unique for each defined vehicle.
- **Logger ID:** The ID of the DLD installed in the vehicle, in hexadecimal. This ID, along with a barcode encoding the value, can be found on the label affixed to the DLD. This is required and must be unique for each defined vehicle.
- **Plate number:** The plate number of the vehicle. This is optional, but, if supplied, must be unique for each defined vehicle.

When the parameters are filled in, click the **Save** button to add the vehicle.

Clicking the **Edit** button puts the currently selected vehicle in the editing mode to be able to modify its parameters. Clicking the **Remove** button deletes the currently selected vehicles. (In this page and the other pages, multiple selections in lists that allow this can be made by holding the **Ctrl** key while selecting the desired items.)

Vehicles can be listed either by their codes or by the IDs of their DLDs. The number of defined vehicles is also given on the page.

6.1.7 Groups Page

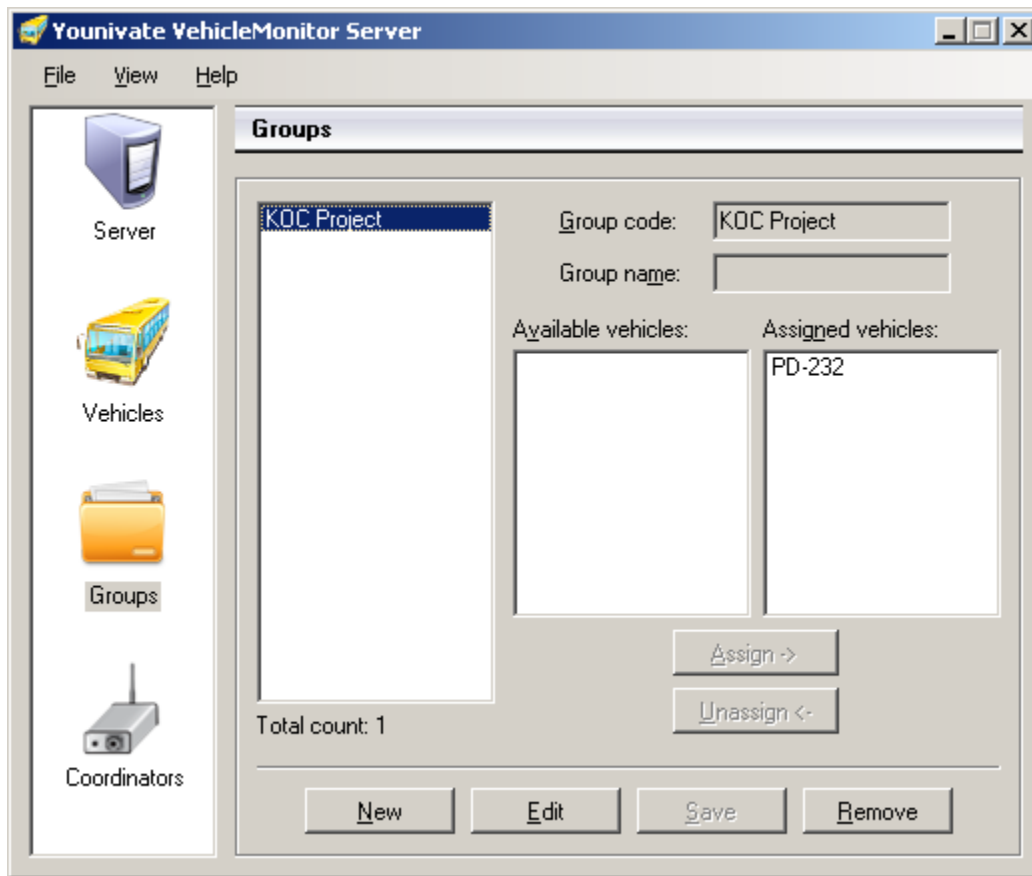


Figure 7: Groups Page.

Defined vehicles can be sorted into groups. For example, if some vehicles are assigned to a particular project, a group can be defined for this project to include only these vehicles. This way, a Viewer can be used to generate a report for all the vehicles assigned to the project by selecting the group, as will be described later.

In this page, new groups can be defined and existing groups can be viewed, edited, or removed. Note that the Server must be stopped in order to add, edit, or remove a group.

Click the **New** button to define a new group. The relevant parameters are:

- **Group code:** A user-specific code assigned to the group. This is required and must be unique for each defined group.
- **Group name:** A name given to the group. This is optional and doesn't need to be unique.
- **Assigned vehicles:** The vehicles included by the group. To include one or more vehicles, select the vehicles under the "**Available vehicles**" list and then click the **Assign** button. To remove assigned vehicles from the group, select the vehicles under the "**Assigned vehicles**" list and then click the **Unassign** button. A vehicle cannot be included in more than one group.

Clicking the **Edit** button puts the currently selected group in the editing mode to be able to modify its parameters. Clicking the **Remove** button deletes the currently selected groups. The number of defined groups is given on the page.

6.1.8 Coordinators Page

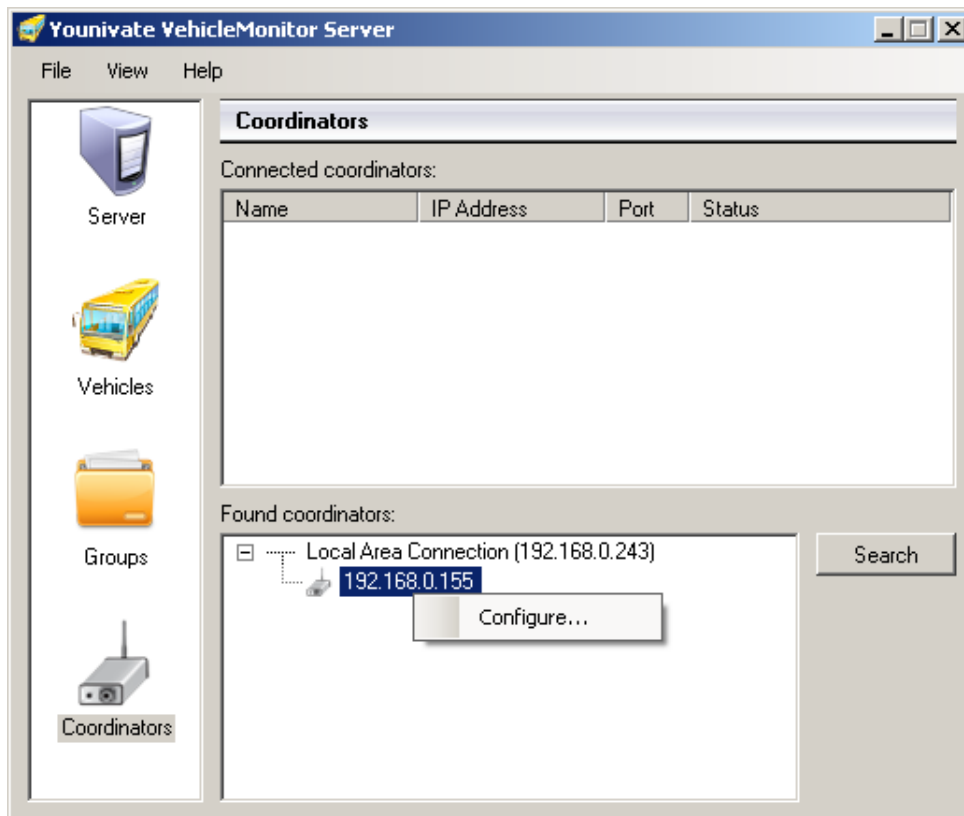


Figure 8: Coordinators Page.

Coordinators must be configured so that they can operate well on the network and communicate with the Server. The configuration procedure for a Coordinator needs to be done only once (the configuration is retained without power).

After the Coordinator is powered and connected to the network, the procedure begins by searching for the Coordinators connected to the local network. This is done by clicking the **Search** button. The discovered Coordinators are listed in the list next to the button. To configure the Coordinator, select its IP address and then right-click it and select **Configure...** from the context menu. This will bring up a console window (Figure 9).

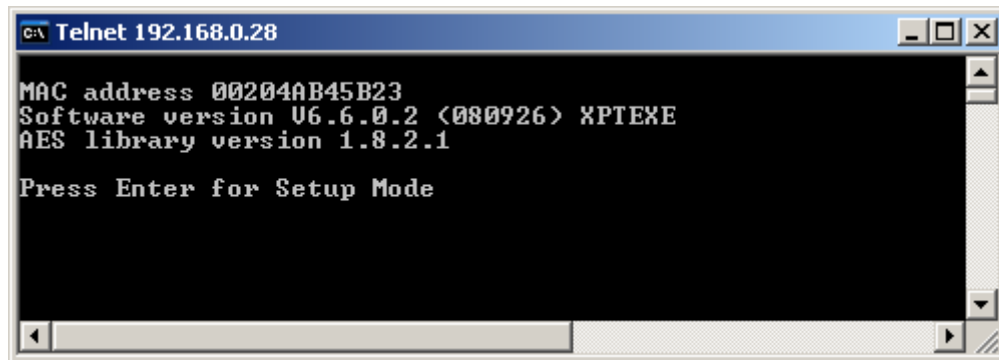


Figure 9: Console Window.

Press **Enter** within 5 seconds to enter the Setup Mode and get the **Change Setup** menu.

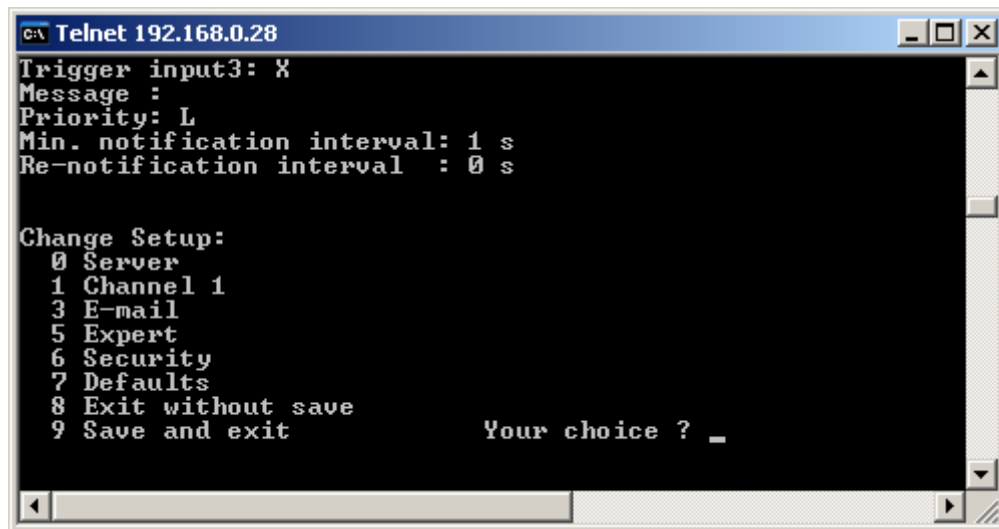


Figure 10: Setup Mode.

You can now select an option on the menu by entering its number and pressing **Enter**. Afterwards, to enter a value for a parameter, type the value and press **Enter**; you can also accept the current value of the parameter (which is displayed between parentheses) by just pressing **Enter**.

To exit the Setup Mode, you can select **9 Save and exit** to save all the changes made to the configuration parameters and reboot the Coordinator, or you can select **8 Exit without save** to exit without saving any changes or rebooting.

The configuration parameters we are interested in can be classified into two sets: The network-related parameters and the server-related parameters. The former set is necessary for the Coordinator to operate well on the network, while the other set is necessary for the communication between the Coordinator and the Server. It should be noted that the rest of the configuration parameters are for advanced use and shouldn't be modified as this would affect the operation of the Coordinator. In what follows, both sets of parameters are discussed.

6.1.9 Network-Related Configuration Parameters

The coordinator is preconfigured at the factory to obtain an IP address automatically (using DHCP, BOOTP, or Auto-IP). This way, it can be connected to the network, discovered as just described, and then configured as desired.

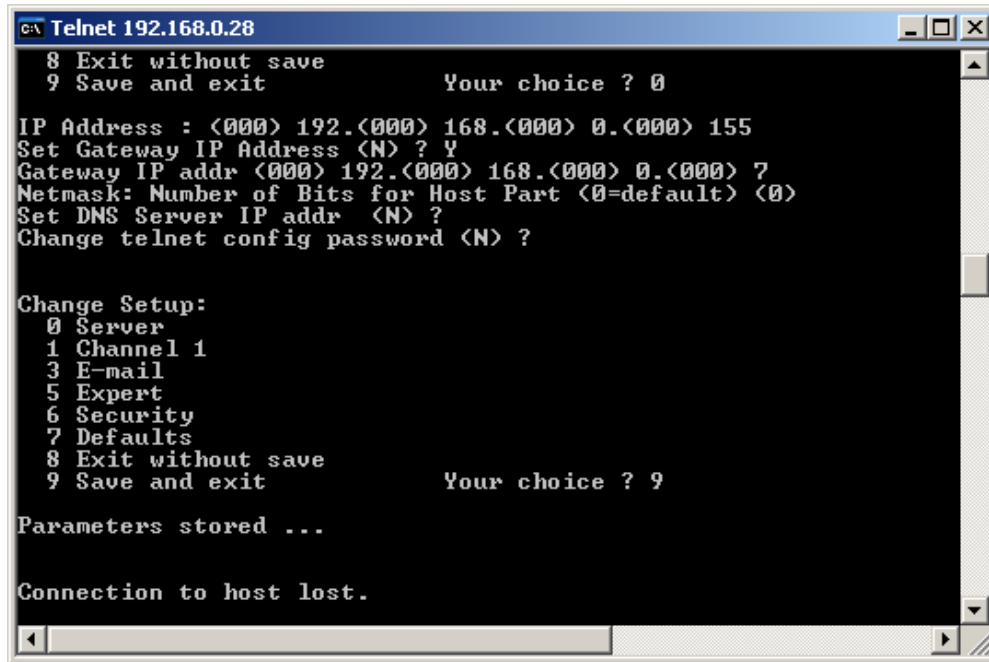
To assign a specific IP address to the Coordinator (refer to Figure 11):

- 1- Select **0 Server** on the **Change Setup** menu.
- 2- **IP Address:** Enter the desired IP address (enter each octet and press **Enter** between each section).
- 3- **Set Gateway IP Address:** If a gateway IP address is to be specified, type **Y**. Otherwise, type **N**.
- 4- **Gateway IP Address:** Enter the gateway IP address. (This is displayed only if the choice in the previous step was to set a gateway IP address.)
- 5- **Netmask: Number of Bits for Host Part (0=default):** Enter the number of bits, taken from the IP address, that are assigned for the host part. If this is set to 0, the Coordinator will set the default subnet mask. Table 1 lists the number of host bits for the standard subnet masks.

Table 1: Host Bits for Standard Subnet Masks

Number of Host Bits	Subnet Mask
8	255.255.255.0
16	255.255.0.0
24	255.0.0.0

- 6- Leave the rest of the parameters at their default values by just pressing **Enter** for each.

A screenshot of a Telnet window titled "Telnet 192.168.0.28". The window shows a text-based configuration menu. The first menu has options 8 (Exit without save) and 9 (Save and exit), with "Your choice ? 0" entered. The second menu shows configuration options: IP Address (192.168.0.155), Gateway IP (192.168.0.7), Netmask (0), DNS Server IP, and Change telnet config password. The third menu, "Change Setup:", has options 0 (Server), 1 (Channel 1), 3 (E-mail), 5 (Expert), 6 (Security), 7 (Defaults), 8 (Exit without save), and 9 (Save and exit), with "Your choice ? 9" entered. The session concludes with "Parameters stored ..." and "Connection to host lost.".

```
ca Telnet 192.168.0.28
8 Exit without save
9 Save and exit          Your choice ? 0

IP Address : <000> 192.<000> 168.<000> 0.<000> 155
Set Gateway IP Address <N> ? Y
Gateway IP addr <000> 192.<000> 168.<000> 0.<000> 7
Netmask: Number of Bits for Host Part <0=default> <0>
Set DNS Server IP addr <N> ?
Change telnet config password <N> ?

Change Setup:
0 Server
1 Channel 1
3 E-mail
5 Expert
6 Security
7 Defaults
8 Exit without save
9 Save and exit          Your choice ? 9

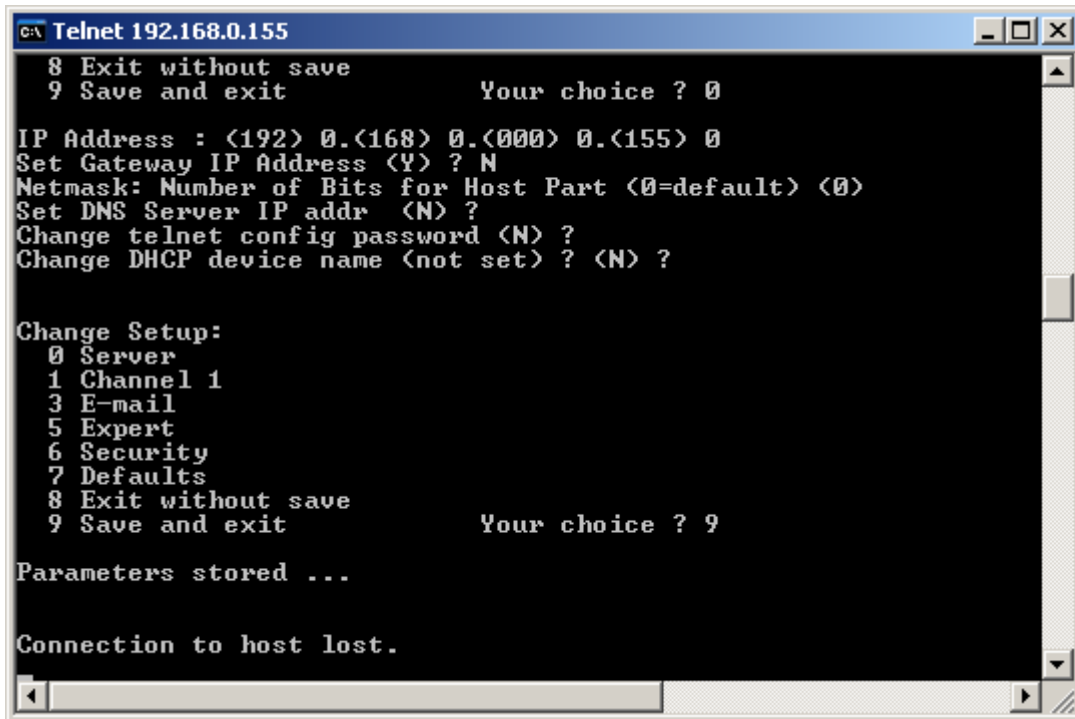
Parameters stored ...

Connection to host lost.
```

Figure 11: Assigning IP Address to Coordinator.

To configure the Coordinator to obtain an IP address automatically (refer to Figure 12):

- 1- Select **0 Server** on the **Change Setup** menu.
- 2- **IP Address:** Set all octets to **0**. This way, the Coordinator will obtain the IP address automatically (using DHCP, BOOTP, or Auto-IP).
- 3- **Set Gateway IP Address:** Type **N**.
- 4- Leave the rest of the parameters at their default values by just pressing **Enter** for each.



```
c:\ Telnet 192.168.0.155
 8 Exit without save
 9 Save and exit                Your choice ? 0

IP Address : <(192) 0.<(168) 0.<(000) 0.<(155) 0
Set Gateway IP Address <Y> ? N
Netmask: Number of Bits for Host Part <0=default> <0>
Set DNS Server IP addr <N> ?
Change telnet config password <N> ?
Change DHCP device name <not set> ? <N> ?

Change Setup:
 0 Server
 1 Channel 1
 3 E-mail
 5 Expert
 6 Security
 7 Defaults
 8 Exit without save
 9 Save and exit                Your choice ? 9

Parameters stored ...

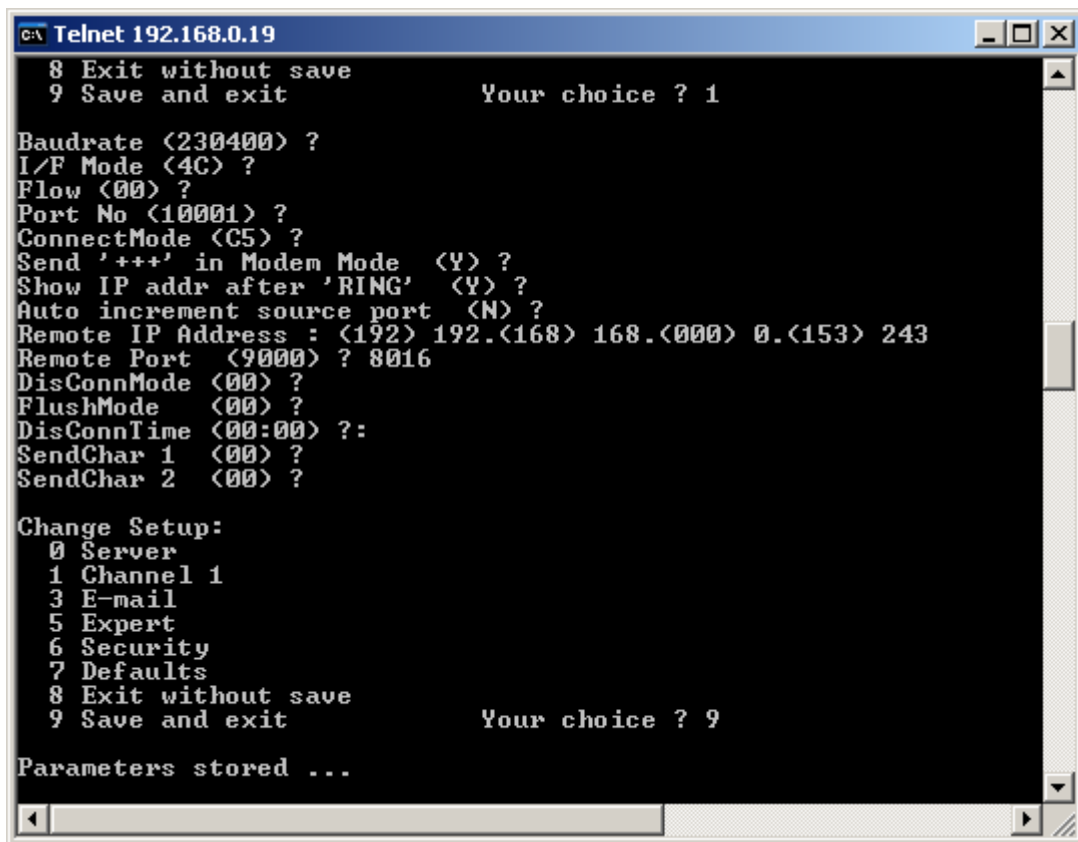
Connection to host lost.
```

Figure 12: Configuring the Coordinator to obtain IP address automatically.

6.1.10 Server-Related Configuration Parameters

These parameters are necessary for the communication between the Coordinator and the Server. To set them (refer to Figure 13):

- 1- Select **1 Channel 1** on the **Change Setup** menu.
- 2- Leave the first 8 parameters at their default values by just pressing **Enter** for each.
- 3- **Remote IP Address:** Enter the IP address of the Server. When the Server is started, the IP address is part of the status information displayed on the **Server** page.
- 4- **Remote Port:** Enter the port used for the Coordinators. This is the port that is set as a server configuration setting (see 6.1.5 Server Configuration Settings). Note that this port is *not* the one displayed on the **Server** page.
- 5- Leave the rest of the parameters at their default values by just pressing **Enter** for each.

A screenshot of a Telnet window titled 'Telnet 192.168.0.19'. The window shows a configuration menu with the following text:

```
8 Exit without save
9 Save and exit          Your choice ? 1

Baudrate <230400> ?
I/F Mode <4C> ?
Flow <00> ?
Port No <10001> ?
ConnectMode <C5> ?
Send '+++> in Modem Mode <Y> ?
Show IP addr after 'RING' <Y> ?
Auto increment source port <N> ?
Remote IP Address : <192> 192.<168> 168.<000> 0.<153> 243
Remote Port <9000> ? 8016
DisConnMode <00> ?
FlushMode <00> ?
DisConnTime <00:00> ? :
SendChar 1 <00> ?
SendChar 2 <00> ?

Change Setup:
0 Server
1 Channel 1
3 E-mail
5 Expert
6 Security
7 Defaults
8 Exit without save
9 Save and exit          Your choice ? 9

Parameters stored ...
```

Figure 13: Server-Related Configuration.

6.1.11 Monitoring Connected Coordinators

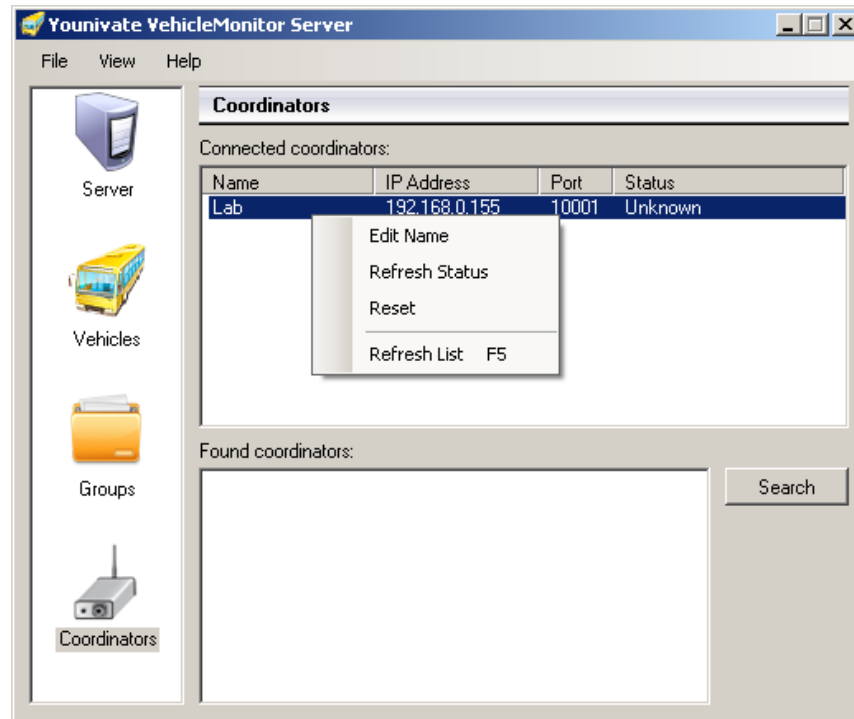


Figure 14: Monitoring Coordinators.

The list at the top of the **Coordinators** page lists the Coordinators that are currently connected to the Server. For each Coordinator, the IP address, the port, and the last known status are displayed. The list can be refreshed by selecting **Refresh List** from the context menu. Of course, if the Server is stopped, no Coordinators are listed.

A Coordinator can be given a name, associated with its IP address, for ease of identification. This can be done by right-clicking the Coordinator on the list and selecting **Edit Name**.

The statuses of the listed Coordinators are automatically refreshed periodically. However, you can receive the current status of the Coordinator by right-clicking on the list and selecting **Refresh Status** from the context menu. Also, you can request a Coordinator to reset its internal state machine by selecting **Reset**.

6.2 VehicleMonitor Viewer

6.2.1 System Requirements

These are the minimum recommended specifications for the machine on which the Viewer is to be installed:

- 1 GHz processor.
- 256 MB RAM.
- More than 500 MB free hard disk space.
- Windows XP SP2, or later.

6.2.2 Installation

To install the Viewer, insert the product CD into your computer's CD or DVD drive. The installer should start automatically. If it doesn't, navigate to the root of the product CD and double-click **Setup.exe**. Follow the on-screen instructions to complete the installation.

The setup creates a group in the **Start** menu and a shortcut to the application on the desktop.

The Viewer can be uninstalled as usual from the Add or Remove Programs. New versions of the viewer can be installed without first uninstalling the old version.

6.2.3 Getting Around the Viewer Application

Similar to the Server Application, the main window of the Viewer basically contains a sidebar that provides links to pages, and a working area where a page is displayed, as depicted Figure 15.

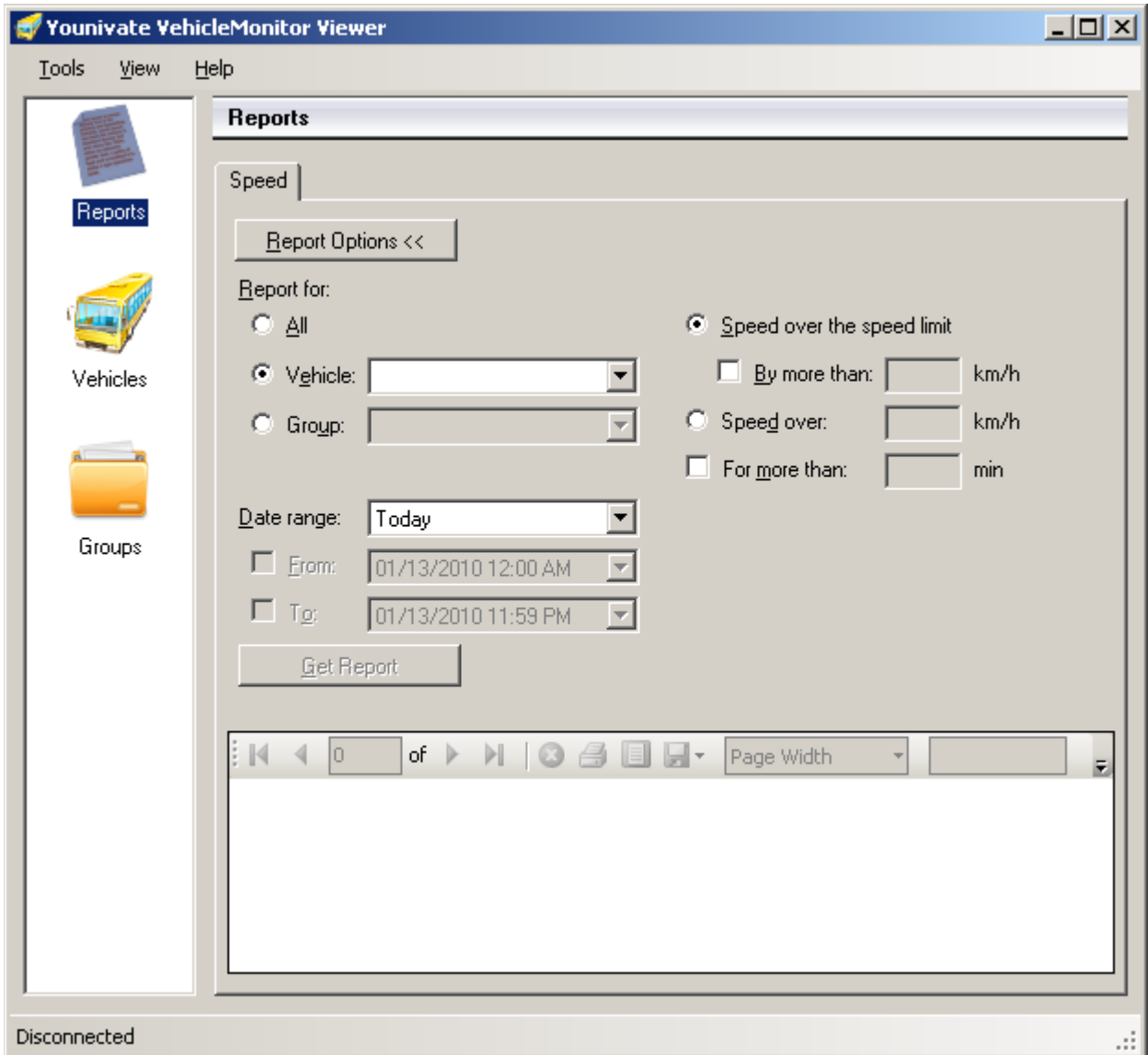


Figure 15: VehicleMonitor Viewer Main Window.

Before the Viewer can be used to generate reports and view data, it should first connect to the Server. The Server settings can be set by selecting **Options...** from the **Tools** menu; the **Options** window will show up (see Figure 16).

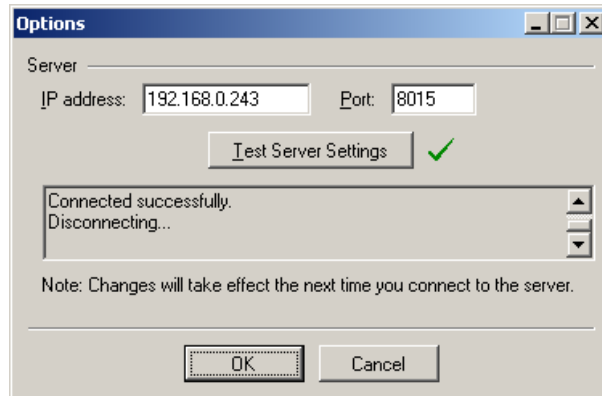


Figure 16: Options Window.

In the **IP address** field, enter the IP address of the Server. When the Server is started, the IP address is part of the status information displayed on the **Server** page of the Server Application. In the **Port** field, enter the Server's port used for Viewers. This port is also part of the status information displayed by the Server Application. You can click **Test Server Settings** to test the entered settings by temporarily connecting to the Server. To save the settings, click the **OK** button.

Having the Server settings set correctly, you can connect to the Server by selecting **Connect** from the **Tools** menu. Once the connection is accomplished, the status bar at the bottom displays **Ready**.

The **Vehicles** and **Groups** pages are similar to those of the Server Application, except that they can be used for viewing only.

6.2.4 Reports Page

In the **Reports** page (shown in Figure 17), with the Viewer connected to the Server, reports can be requested from the Server and viewed. Currently, only speed reports can be generated.

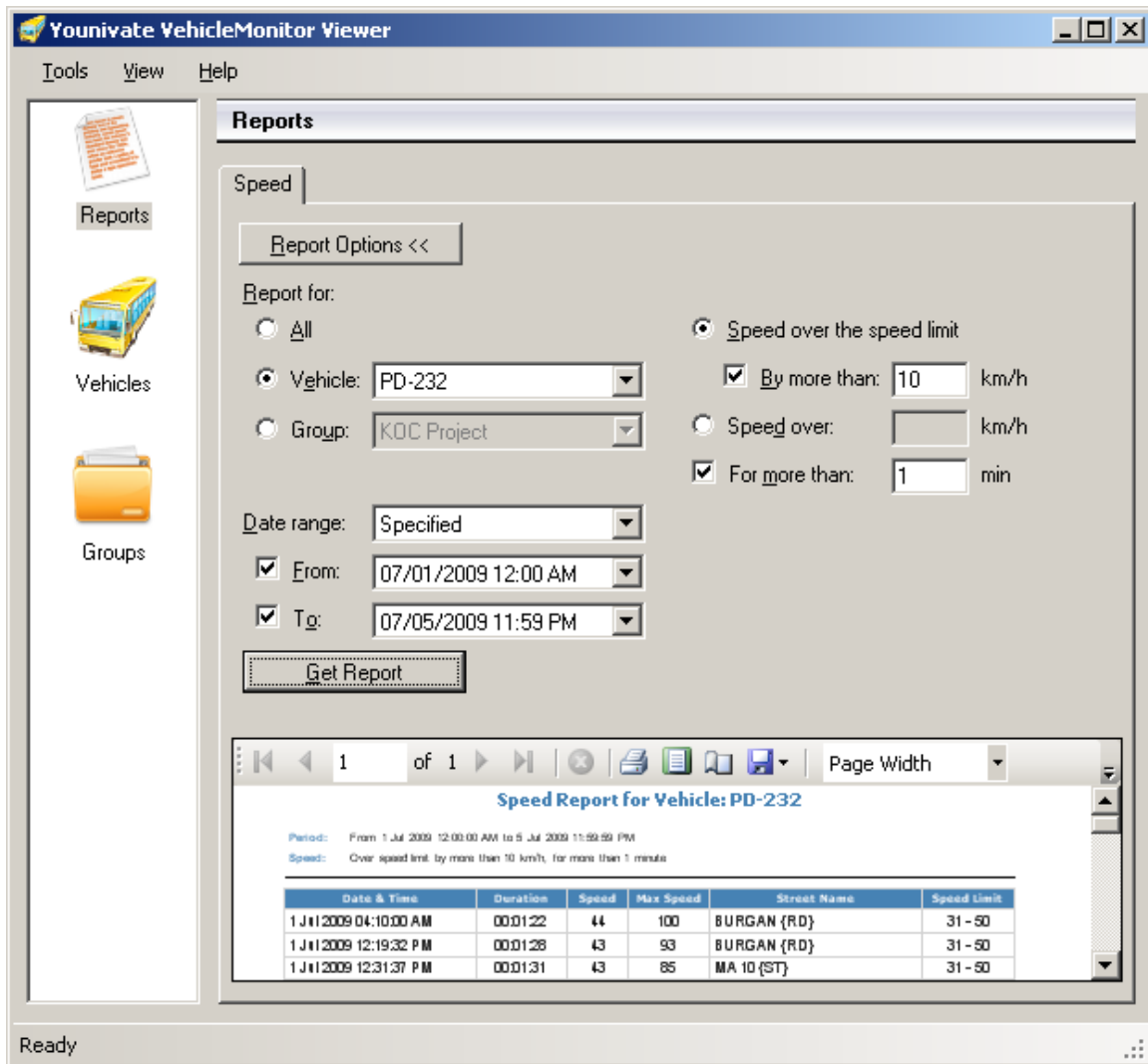


Figure 17: Reports Page.

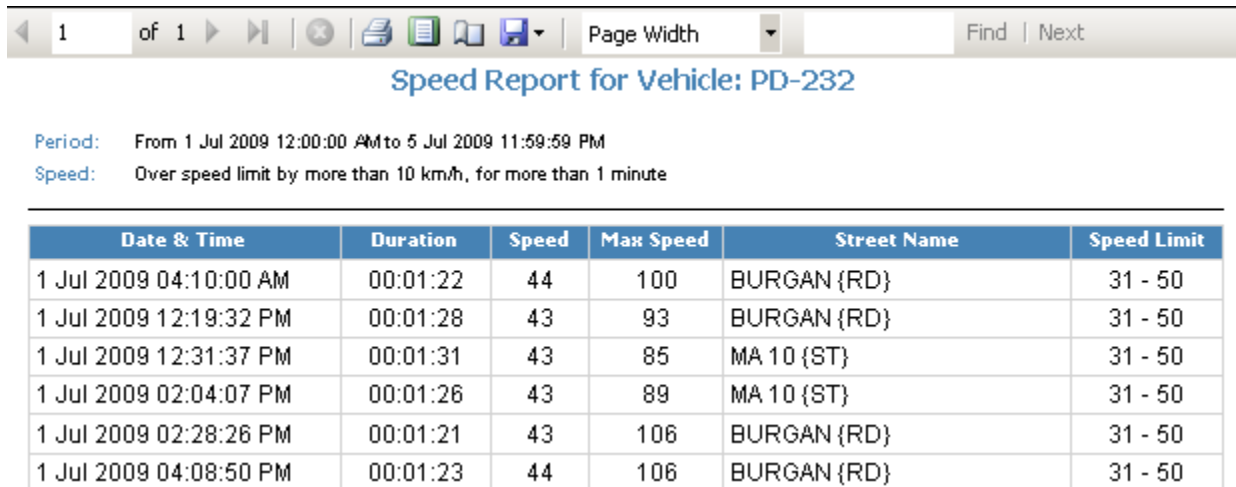
Before requesting a speed report, you need to specify the report parameters, as detailed in the following paragraphs.

A report can be generated for all the vehicles defined, for a specific vehicle, or for a group of vehicles. The vehicles and groups defined at the Server are retrieved once the Viewer is connected. The corresponding lists are filled with the retrieved data.

You can also restrict the report to a certain time period using the **Date range**, **From**, and **To** fields.

The speed criterion of the report can be based either on the speed limits of the streets or on a specific speed. In the first case, a tolerance on speed can be specified. In both cases, a tolerance on duration can be specified.

When the report parameters are specified, click the **Get Report** button to receive the report from the Server and view it afterwards. A sample report is shown in Figure 18.



Date & Time	Duration	Speed	Max Speed	Street Name	Speed Limit
1 Jul 2009 04:10:00 AM	00:01:22	44	100	BURGAN {RD}	31 - 50
1 Jul 2009 12:19:32 PM	00:01:28	43	93	BURGAN {RD}	31 - 50
1 Jul 2009 12:31:37 PM	00:01:31	43	85	MA 10 {ST}	31 - 50
1 Jul 2009 02:04:07 PM	00:01:26	43	89	MA 10 {ST}	31 - 50
1 Jul 2009 02:28:26 PM	00:01:21	43	106	BURGAN {RD}	31 - 50
1 Jul 2009 04:08:50 PM	00:01:23	44	106	BURGAN {RD}	31 - 50

Figure 18: Sample Report.

You can search in the report, print it, and export it to an Excel or a PDF file.

7 TECHNICAL SUPPORT

For any confusion or clarification required at any stages of the installation/operation of the YouniVu™ solution, kindly contact **Younivate** technical team at techsupport@younivate.com.