

Developing a Vehicle Tracking System by using SMS Engine and Google Map

Manual for Software Developer and System Integrator

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3. REVISION HISTORY

<i>EDITION</i>	<i>ISSUED DATE</i>	<i>REMARK</i>
1 st	11 th of July, 2008	Draft release
2 nd	28 th of October, 2009	Appendix 1: FAQ added
3 rd	30 th of November, 2009	Minor revision.

4. INTRODUCTION

Vehicle Tracking Development Kit (VTDK) is a tool kit for developing a vehicle tracking system or location based application.

Vehicle Tracking Development Kit contains the following:-

1. GSM Modem Type Q24-VDTK
2. Intellitrac X1 -- GPS Terminal
3. SMS Engine with GPS feature
4. Vehicle Tracking Report (a web report written in PHP)

To track vehicle, you need to :-

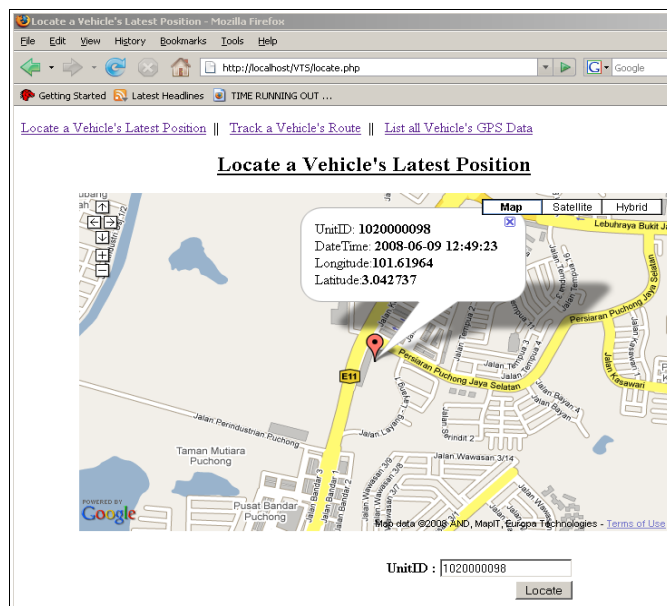
1. set-up a Monitoring Centre (MC)
2. install X1 on vehicle that you want to track

To set-up a "MC", you need to install these on a Windows PC (2000 / XP Pro / 2003) having internet access:-

1. Q24 GSM Modem
2. SMS Engine with GPS feature
3. Vehicle Tracking Report

5. HOW IT WORKS?

1. X1 will send the GPS data via SMS back to Q24
2. SMS Engine will store incoming GPS data into database
3. User will open web browser, key in the X1's ID, and will see a marker which is the location of the vehicle on a map (refer figure below)



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6. BENEFITS

Benefits to Software Developer and System Integrator:-

1. Vehicle Tracking Development Kit (VTDK) has taken care the task of collecting and storing of GPS data;
2. Fast development cycle as software developer need only to focus in:-
 - a) defining business rule, e.g. what do you want to do if vehicle did not reach the destination at the desire time;
 - b) defining escalation rule, e.g. if the vehicle is speeding then notify designated party
 - c) generating reports to end-user, e.g. driver's performance
3. PHP code (Vehicle Tracking Report) can be modified and customised; for non-PHP developers, you can connect to the database used by the VTDK to retrieve data
4. you can quickly develop a working prototype or proof of concept

7. PHP CODE

1. Acknowledgement: Mr. Lai Yong Sing (student of UNIVERSITY PUTRA MALAYSIA) has contributed to the PHP code.
2. Overview of the PHP code:-
 - a) The PHP code/application connects to database via ODBC
 - b) retrieves records/GPS data
 - c) executes JavaScript (provided by Google Map) that calls Google Map server
 - d) passes the parameter (e.g. longitude and latitude) to the Google Map server
 - e) and displays the map on browser
3. If you do not wish to use PHP, you can choose ASP, ASP.net. The flow is still the same as described in above mentioned "Overview of the PHP code".
4. Terms and Conditions of using PHP code:-
 - a) The PHP is to be used with VTDK.
 - b) You are allowed to use, modify, distribute, this code for free.
 - c) This source code is provided on "as-is" basis. No warranty nor support is provided on the use of the code.
 - d) BY USING THIS CODE, YOU ASSUME ALL THE RISK AND RESPONSIBILITY
 - e) MOBITEK System Sdn. Bhd. EXPRESSLY DISCLAIMS ANY WARRANTIES
 - f) MOBITEK System Sdn. Bhd. SHALL NOT BE LIABLE TO YOU OR ANYONE ELSE FOR ANY LOSS OR DAMAGES WHATSOEVER

8. GOOGLE MAP

Google Maps is a free web mapping service application and technology provided by Google that powers many map-based services including the Google Maps website, Google Ride Finder and embedded maps on third-party websites via the Google Maps API. It offers street maps, a route planner, and an urban business locator for numerous countries around the world.

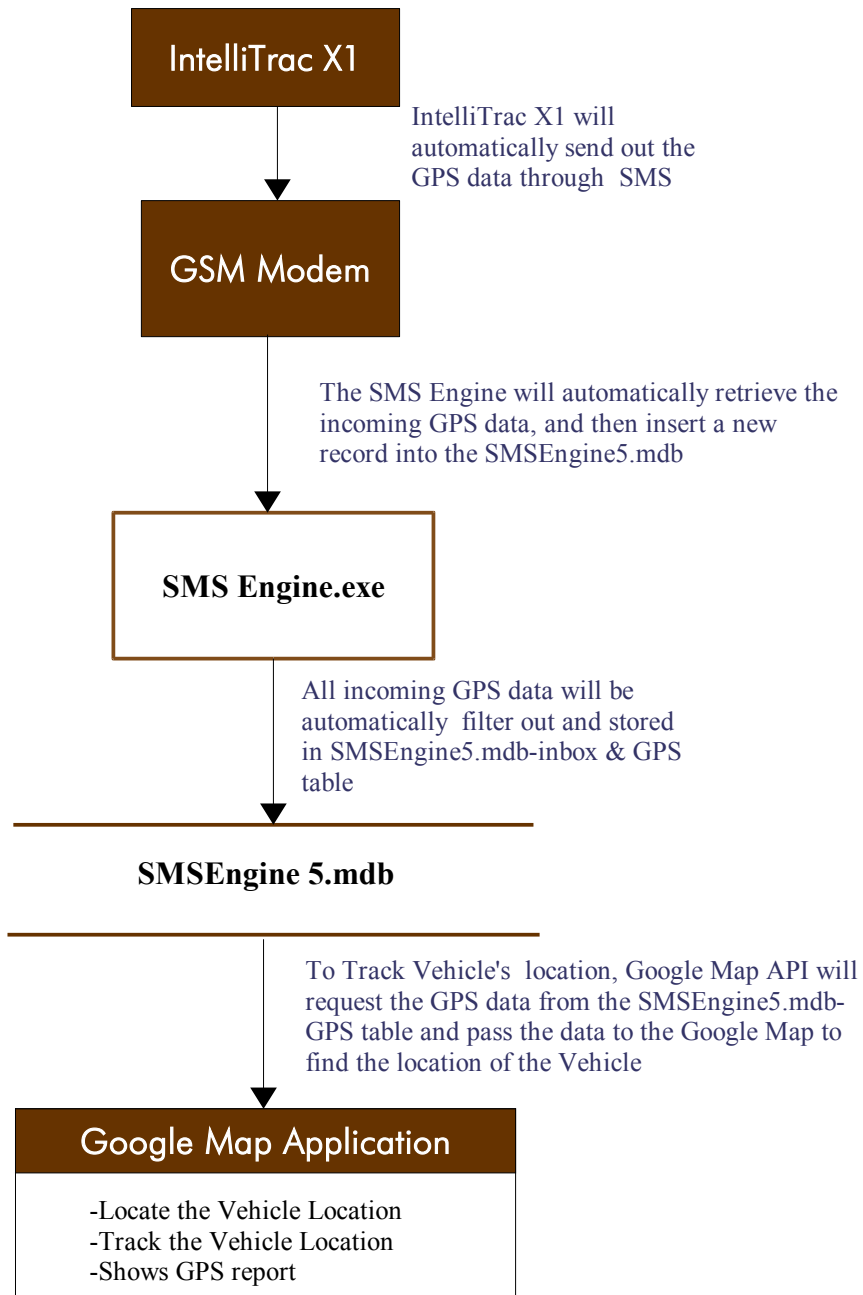
Google created the **Google Maps API** to facilitate developers integrating Google Maps into their web sites with their own data points. It is a free service, which currently does not contain ads, but Google states in their terms of use that they reserve the right to display ads in the future. The Google Maps API lets you embed Google Maps in your own web pages with JavaScript. The API provides a number of utilities for manipulating maps (just like on the <http://maps.google.com> web page) and adding content to the map through a variety of services, allowing you to create robust maps applications on your website.

To use the Google Map API, first you need to [sign up for an API key](#). Once you've received an API key, you can develop a map application following the instructions in this documentation.

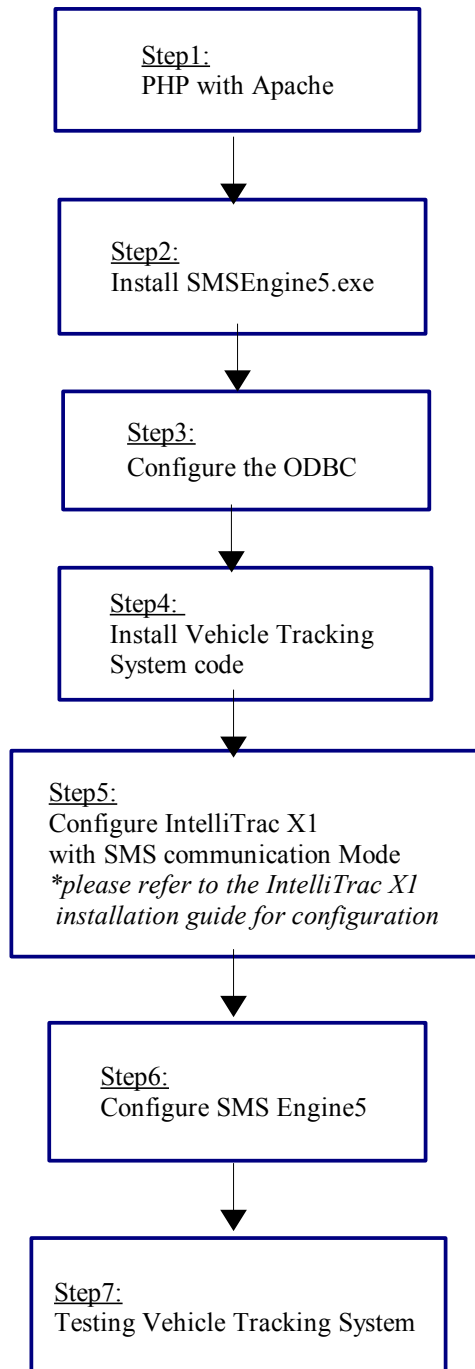
9. REQUIREMENTS

1. SI/SD must possess knowledge of PHP, Java Script, database programming and SQL statement
2. SMS ENGINE version 5
3. PHP version 5
4. Web Server – IIS or Apache
5. PC running on Windows (2000 Professional, 2000 Server, XP Pro, or 2003 Server)
6. Google Map API key ([sign up for an API key](#))

10. SYSTEM ARCHITECTURE DIAGRAM



11. SETTING-UP



STEP 1: INSTALLING PHP WITH APACHE

You can either install PHP with IIS or PHP with Apache. This section will guide you on the installation of PHP with Apache. In this guide, we will use WAMP (<http://www.wampserver.com/en/download.php>) to install PHP and Apache.

a) Apache Web Server Installation (WAMP).

1. Run the "WampServer 2 .exe".
2. Follow the on-screen instructions to install the WAMP Server.

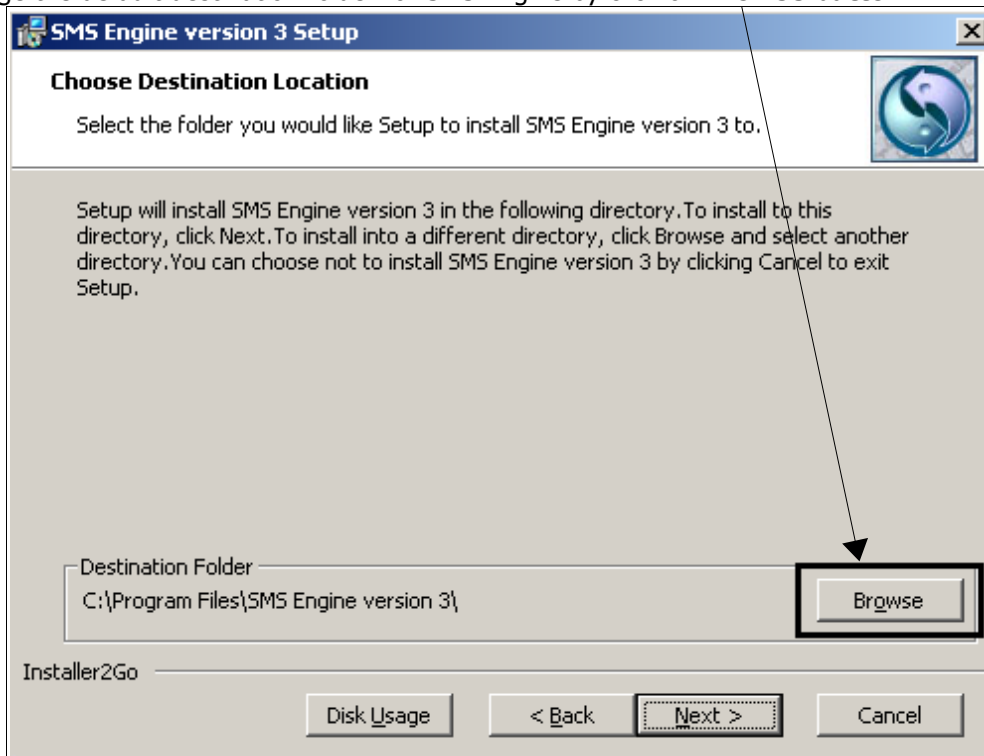
Note: WAMP is bundle package included with PHP version 5, so doesn't required to install PHP.

b) Add a new folder

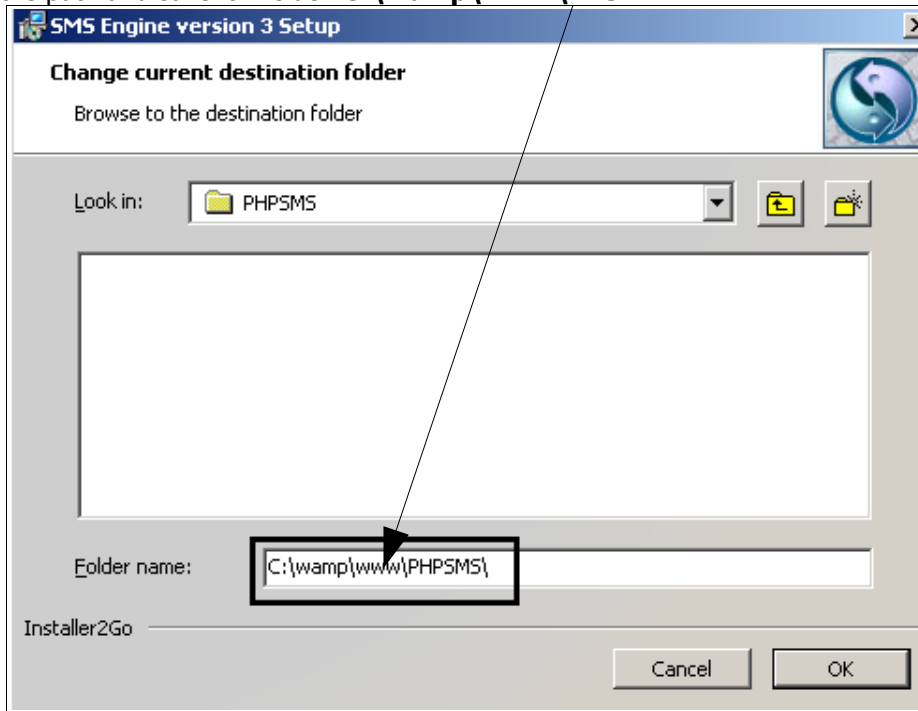
3. Add a new folder in "C:\wamp\www\", and name it as "VTS". E.g. "C:\wamp\www\VTS"

STEP 2: INSTALLING SMS ENGINE

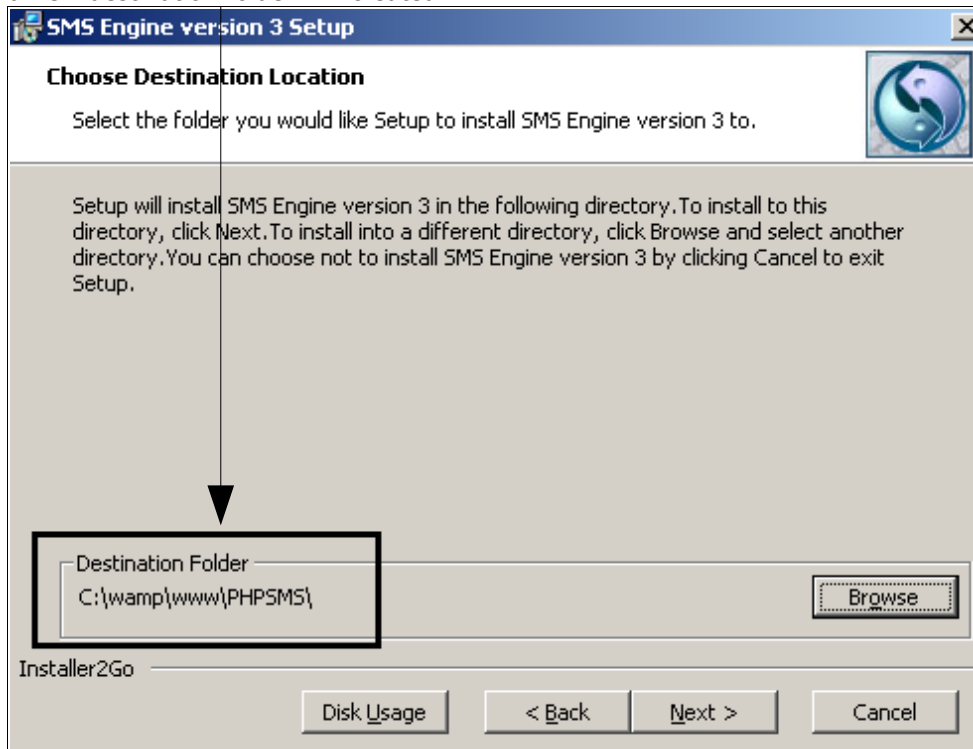
1. Run the "Setup.exe".
2. **DO NOT install the SMS Engine version 5 at the default location** - "C:\Program Files". The engine must be installed on the web server's directory.
3. Change the default destination folder for SMS Engine by click on **Browse button**.



4. Browse the path and save it inside "C:\wamp\www\VTS".

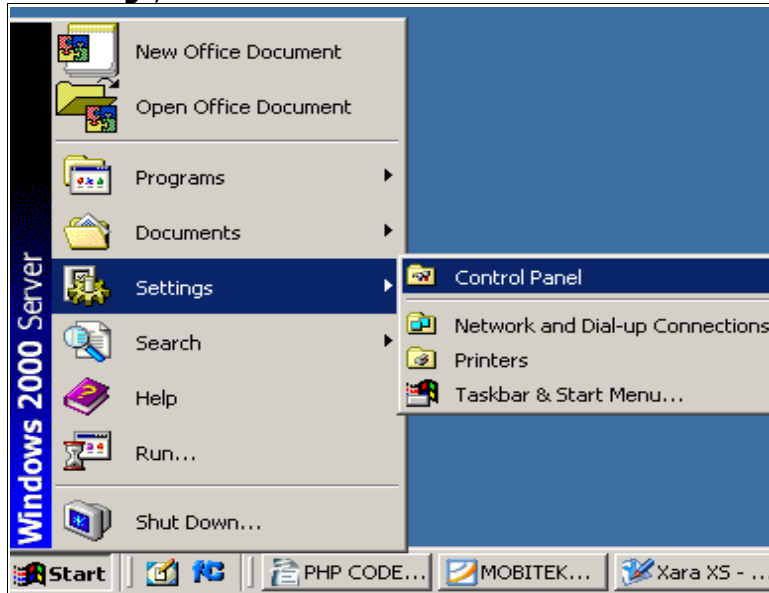


5. Then, a new destination folder will created.

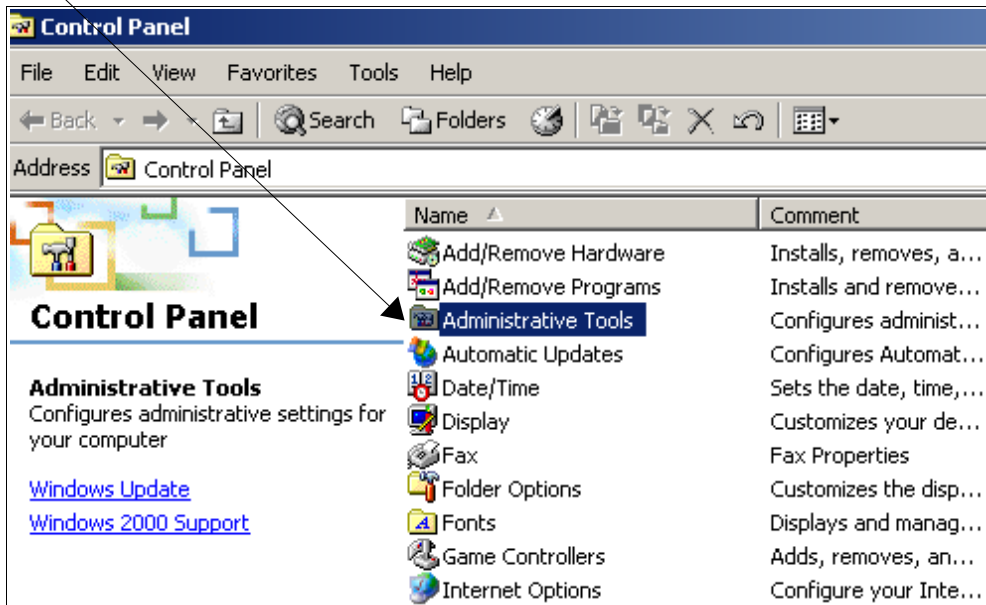


STEP 3: CONFIGURING ODBC

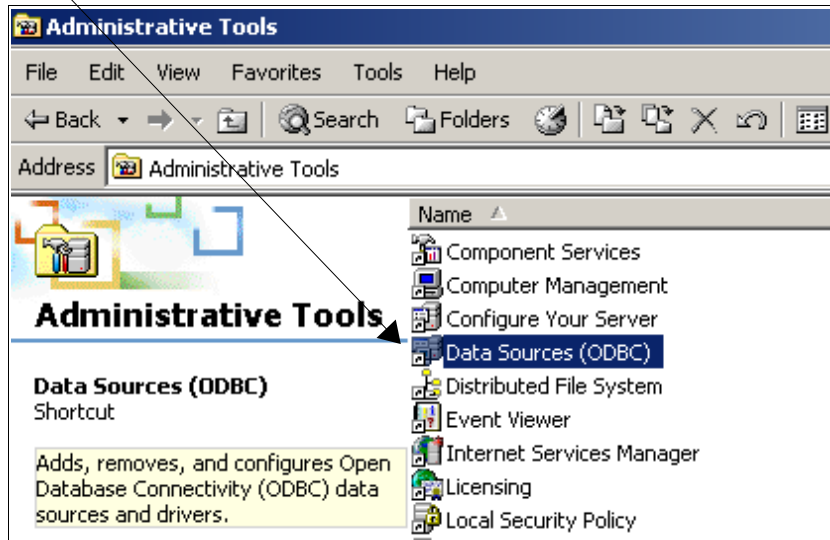
1. Click Start, click **Settings**, and click **Control Panel**.



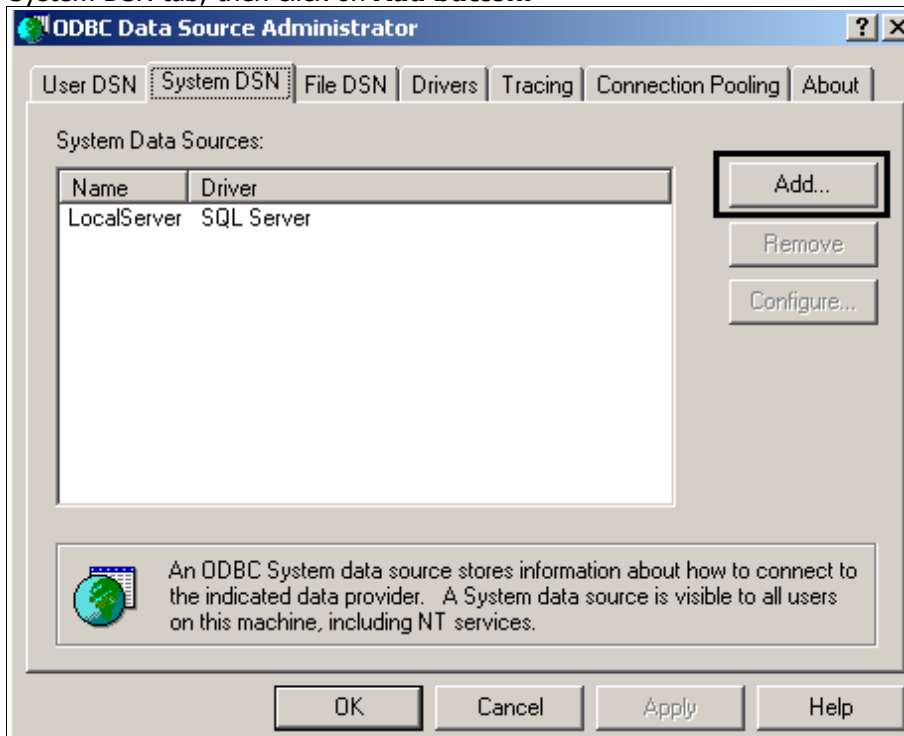
2. Click on **Administrative Tools**.



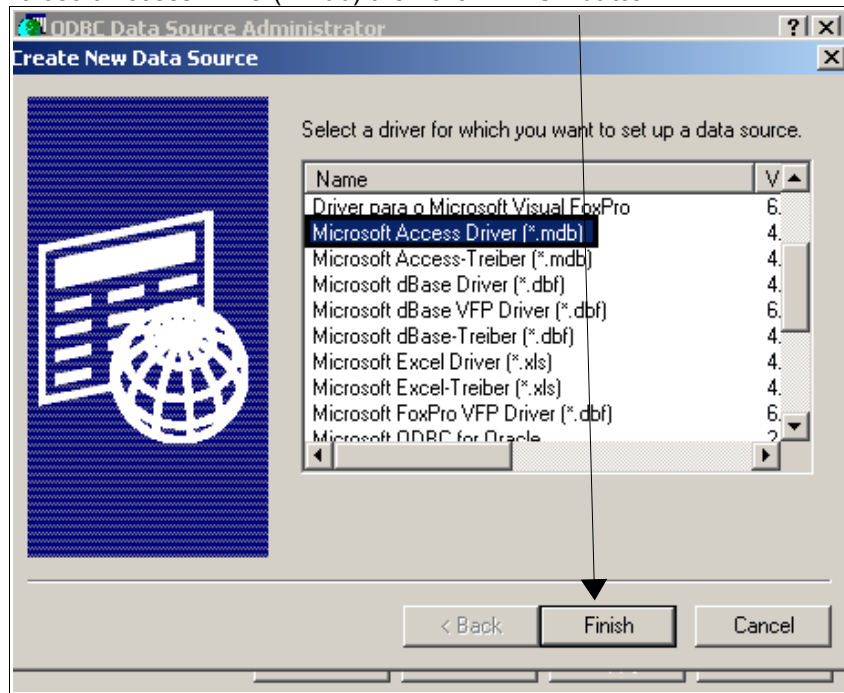
3. Then, click on **Data Sources (ODBC)**



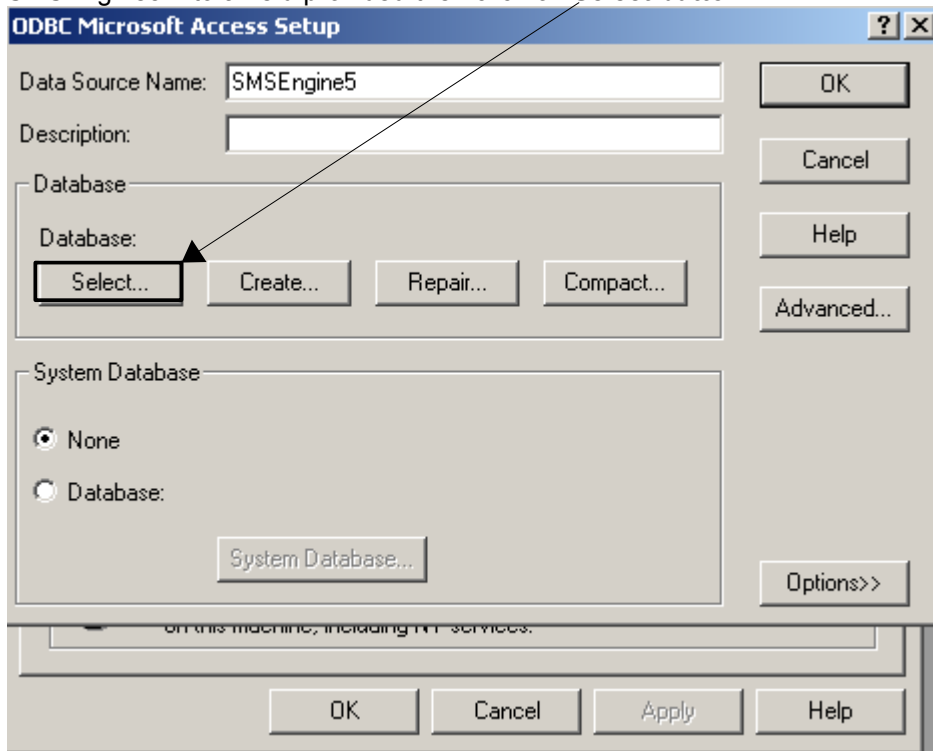
4. Choose System DSN tab, then click on **Add button.**



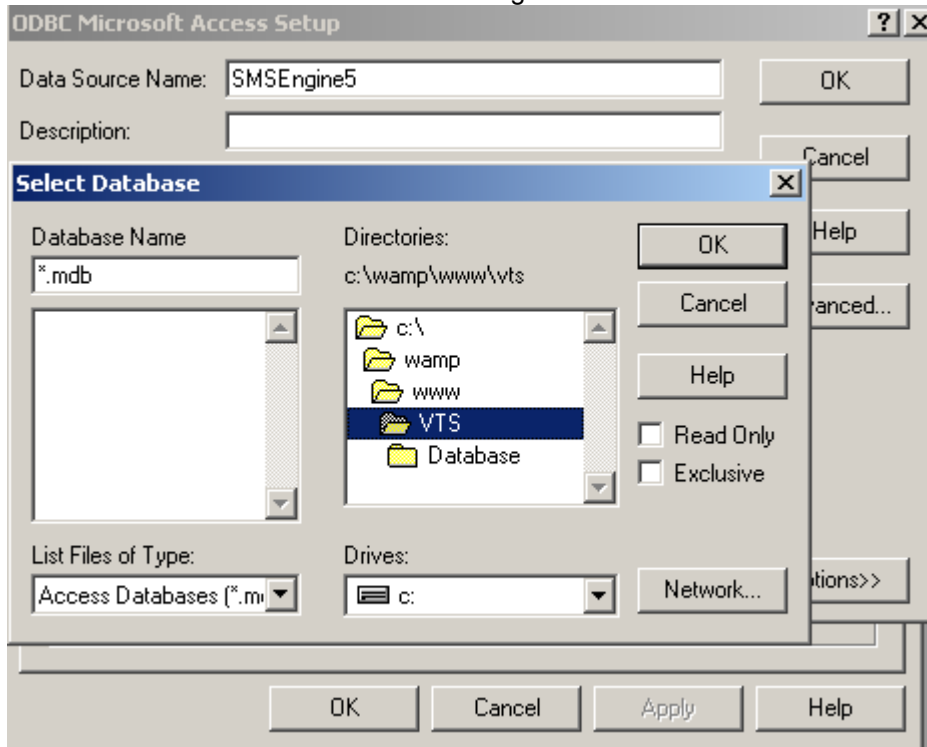
- 5. Find the Microsoft Access Driver (*.mdb) then click **Finish** button.



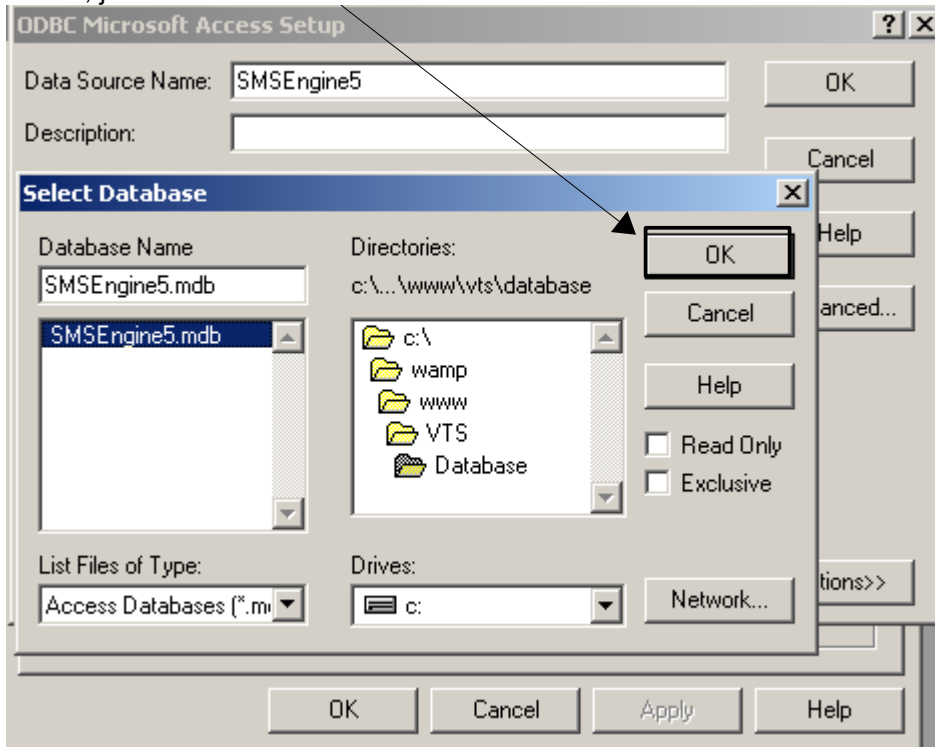
- 6. Type "SMSEngine5" into a field provided then click on **Select** button.



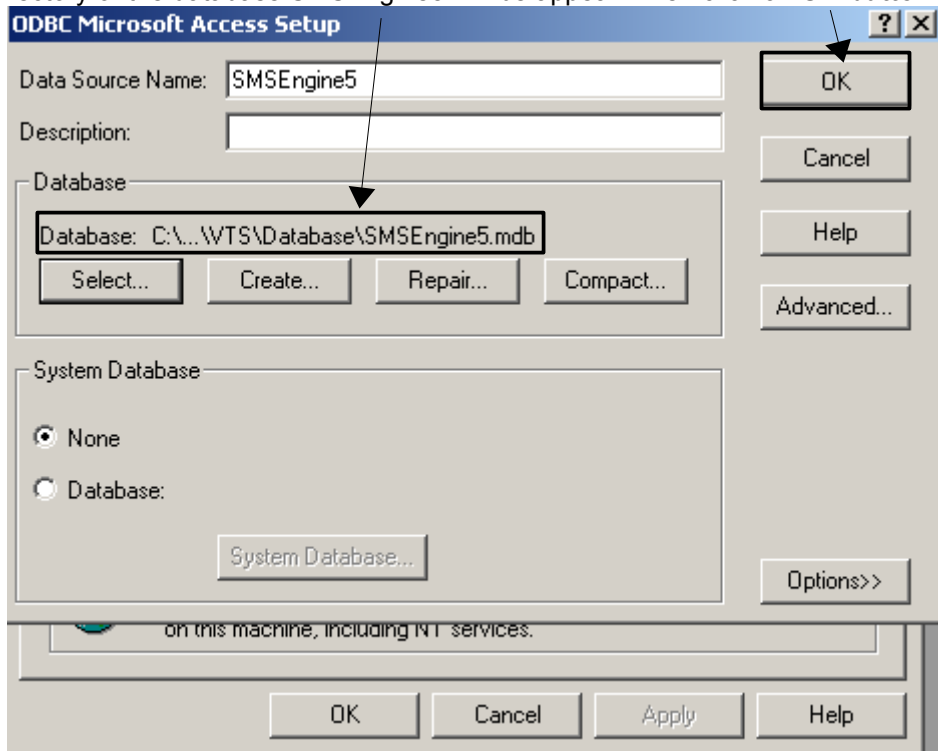
7. Locate the directories of the database in SMS Engine5.



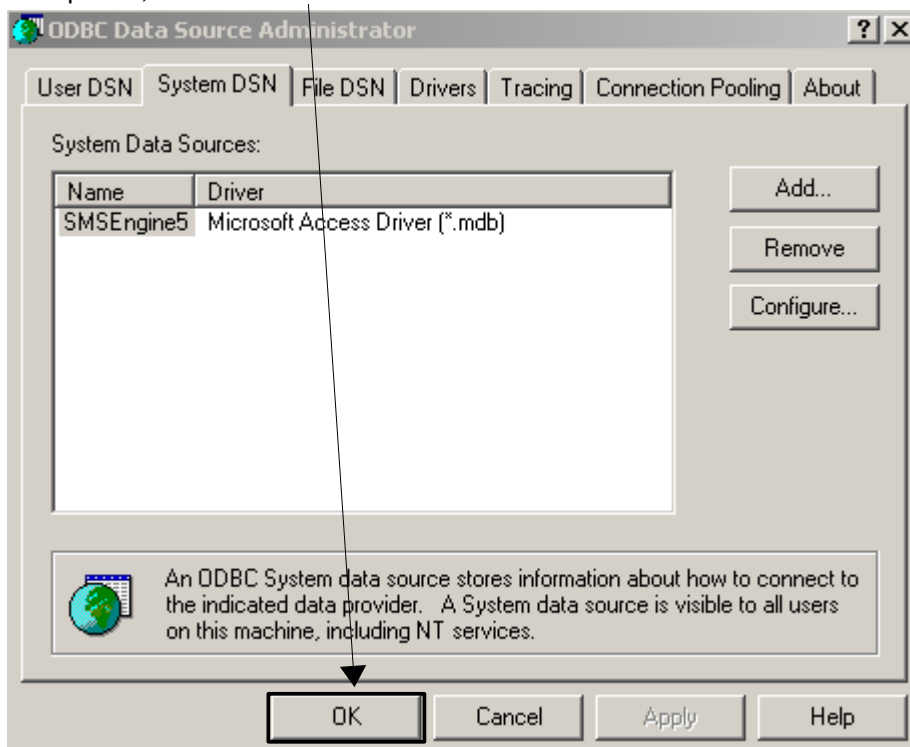
8. After found it, just click on **OK** button.



9. The directory of the database SMSEngine5 will be appear. Then click on **OK** button.

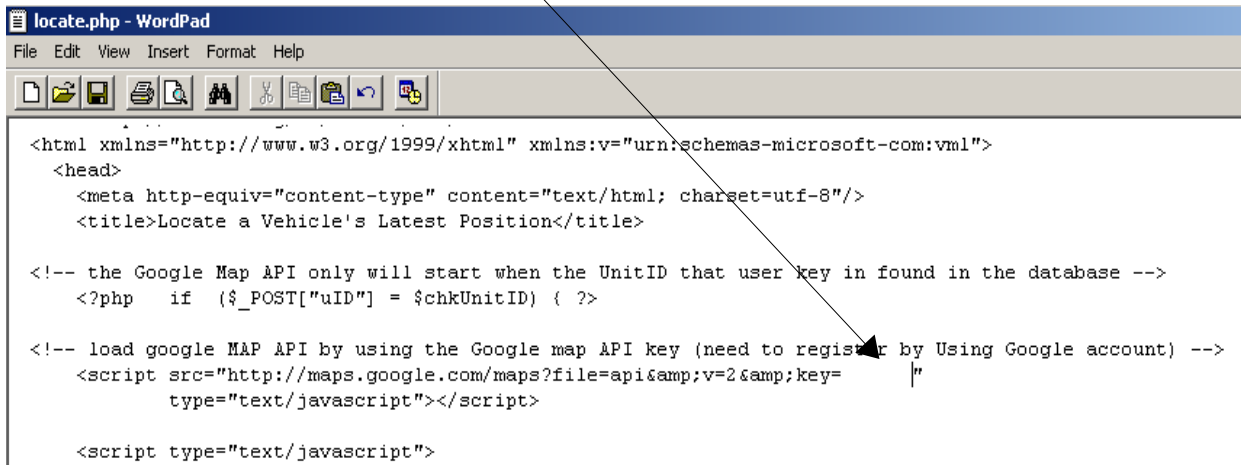


10. After completed, click on **OK** button.



STEP 4: INSTALLING PHP CODE

1. Copy these files to the directory -- "C:\wamp\www\VTs":
 - a) Index.html
 - b) Locate.php
 - c) Track.php
 - d) Report.php
2. Vehicle Tracking System was developed by using Google Map API so to use this system, first you need to sign up for Google Map API key. Once you've received an API key, you can develop a map application by follow the instructions below.
3. To Sign up for Google Map API key please click the following link and follow the instructions for registration.
<http://code.google.com/apis/maps/signup.html>
4. Once you've received the Google Map API key, follow the instructions below to copy the API key to the Locate.php,Track.php document.
5. Open the **Locate.php** document by using WordPad or NotePad program.
6. Copy the Google Map API key to the "key= " location, after that save the Locate.php document.



```

locate.php - WordPad
File Edit View Insert Format Help
[Icons]
<html xmlns="http://www.w3.org/1999/xhtml" xmlns:v="urn:schemas-microsoft-com:vml">
  <head>
    <meta http-equiv="content-type" content="text/html; charset=utf-8"/>
    <title>Locate a Vehicle's Latest Position</title>

    <!-- the Google Map API only will start when the UnitID that user key in found in the database -->
    <?php  if  ($_POST["uID"] = $chkUnitID) { ?>

    <!-- load google MAP API by using the Google map API key (need to register by Using Google account) -->
    <script src="http://maps.google.com/maps?file=api&v=2&key=
      type="text/javascript"></script>

    <script type="text/javascript">
  
```

7. Repeat step 6 for Track.php document.

STEP 5: CONFIGURING X1

1. To use This Vehicle Tracking System you must configure IntelliTracX1 to **SMS communication mode**, so to configure IntelliTracX1 to SMS communication mode please refer to the **IntelliTracX1 Installation Guide** which is inside the IntelliTracX1 documentation CD.

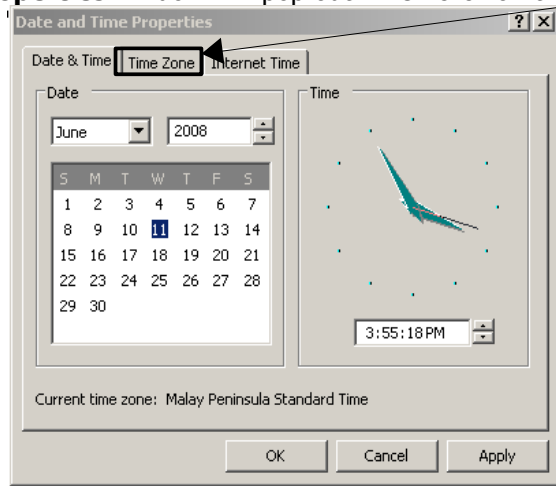
STEP 6: CONFIGURING SMS ENGINE

I) Computer Time Setting

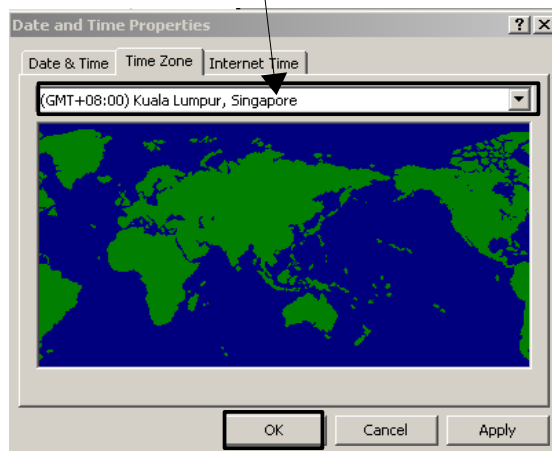
1. Before start running the SMS Engine5, be make sure that you computer time zone setting is in **local time zone** format. To make sure, double click on the **window clock time** which on the bottom right of Desktop.



2. A **Date and Time Properties** window will pop out. Then click on the **Time Zone** tab.

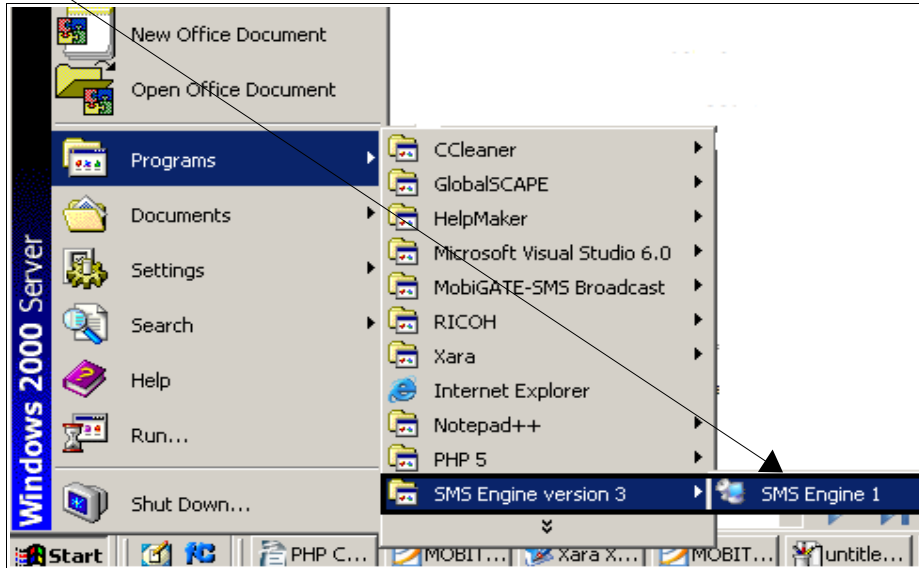


3. Select you country time zone from the list box. After finish click the **OK** button.
**Note: Because the GPS date time that send by IntelliTracX1 is in the GMT/UTC format, so be make sure that you are select you country time zone, if not the SMS Engine will convert to other county date time.*



II) Configure & Run SMS Engine5

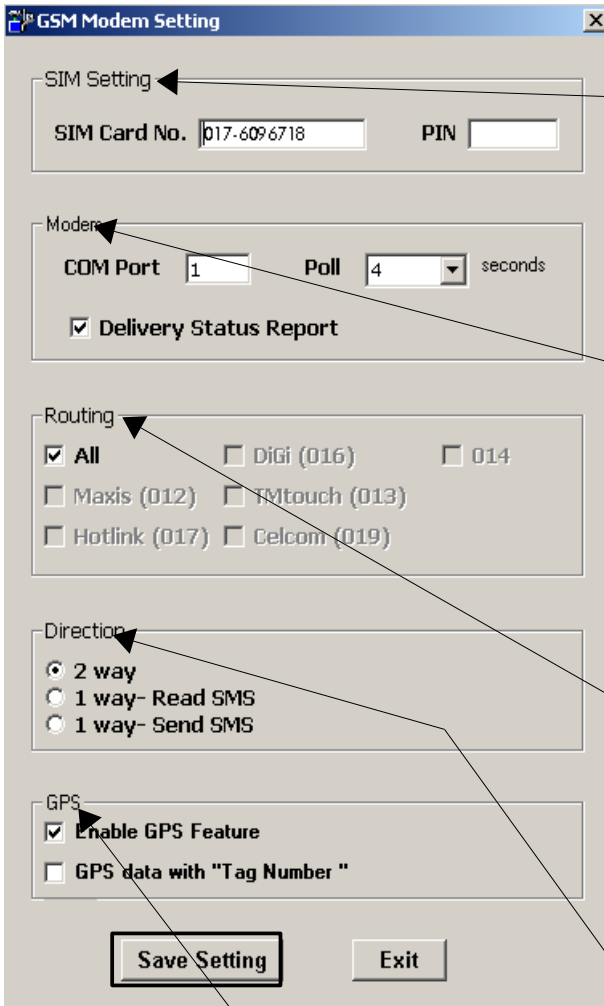
1. Run the SMS Engine



2. Click on **Setting** then choose **SMS Modem Setting**.



3. After finish up configure the GSM modem, click on **Save Setting button.**



SIM Setting
SIM Card no: also known as MSISDN
PIN: to unlock SIM operator depending on the number

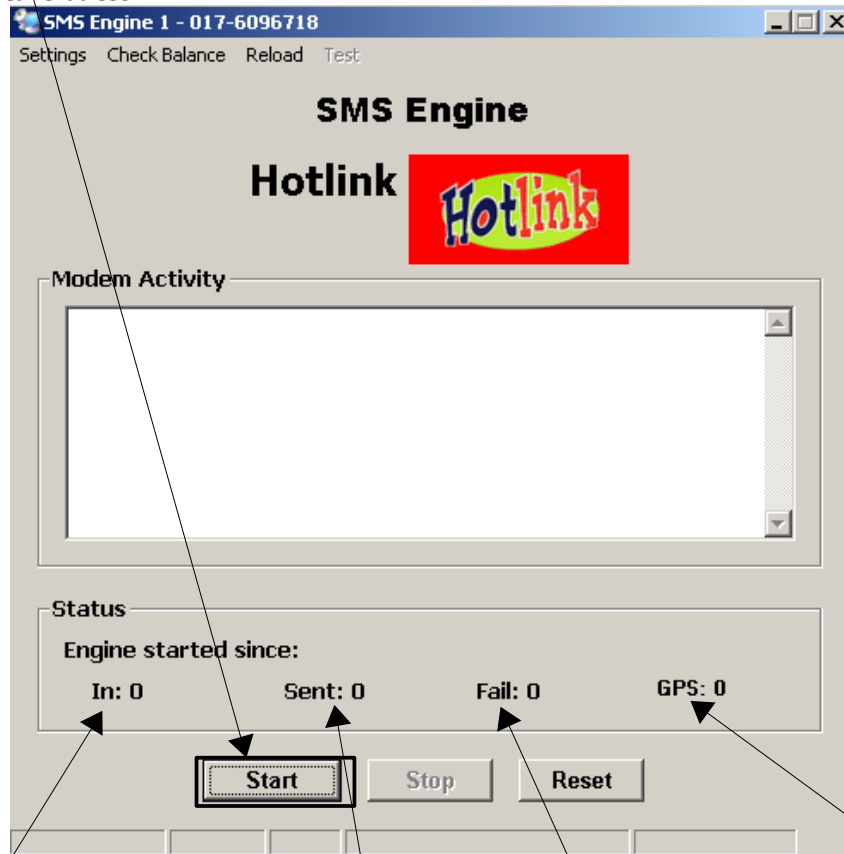
Modem
COM: Enter the port number which the GSM Modem is connected to the PC
Poll: Set how frequent the SMS Engine should access the database. If you set it to 3 seconds, then the SMS Engine will read incoming SMS, store into Inbox and query the Outbox to send out SMS in every 3 seconds.
Delivery Status Report: If checked, SMS Engine will check for the report for each outgoing SMS.

Routing: Check "All" to instruct SMS Engine to send SMS to all mobile numbers or checked the appropriate box to instruct SMS Engine to send out SMS selective numbers only. If you set to Maxis (012), then the SMS Engine will only send SMS to mobile numbers starting with 012 only.

Direction: Set the GSM modem to 2 way, 1 way read only, or 1 way send only. If you set it to 1 way read, the SMS Engine will only read incoming SMS and will not send out.

GPS
 Enable GPS Feature: If checked, SMS Engine will filter the GPS data and record it.
 GPS data with "Tag Number": If checked, SMS Engine will filter the GPS data with Tag Number and record it.
**Attention: Before setting for the GPS, be make sure that the GPS data that send by IntelliTracX1 is with or without "Tag Number".*

4. Click on **Start button**.



Incoming Message will increase one if the SMS Engine receive a message

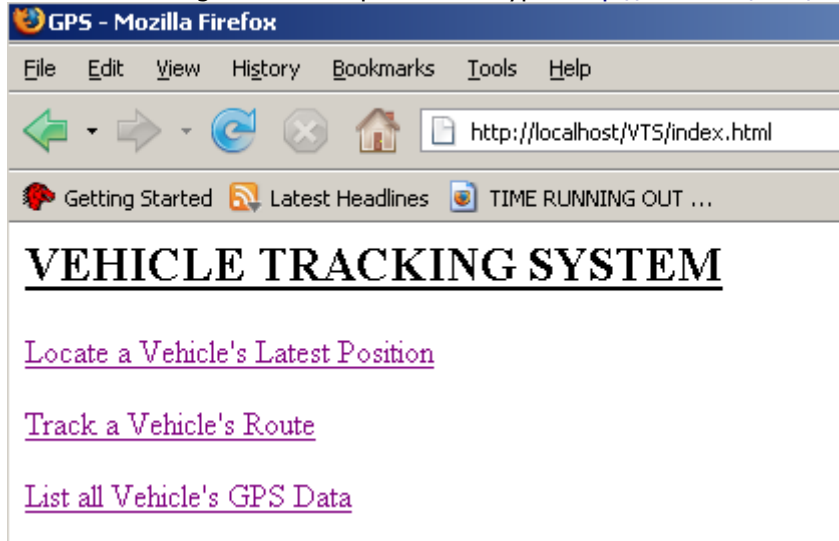
Sent Message will increase one if the SMS Engine sent out a message

Fail Message will increase one if the SMS Engine fail to sent out a message

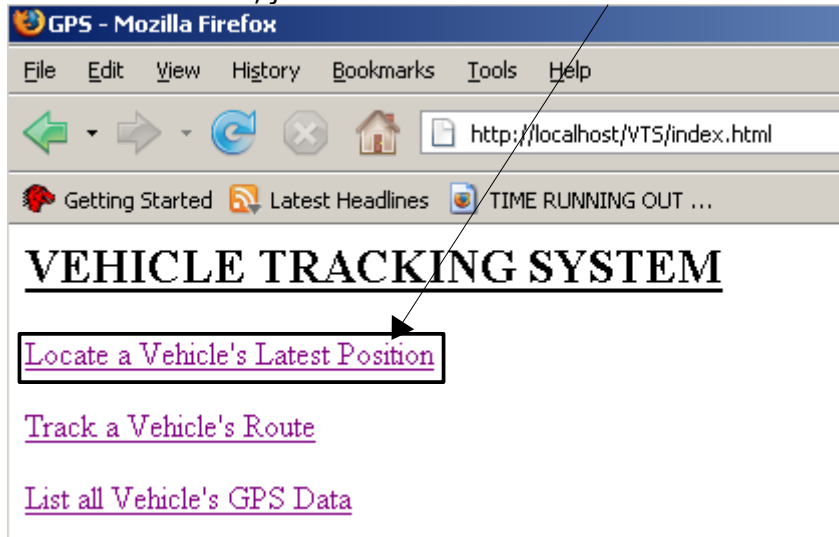
GPS will increase one if the SMS Engine receive a GPS data.

STEP 7: TESTING VEHICLE TRACKING SYSTEM

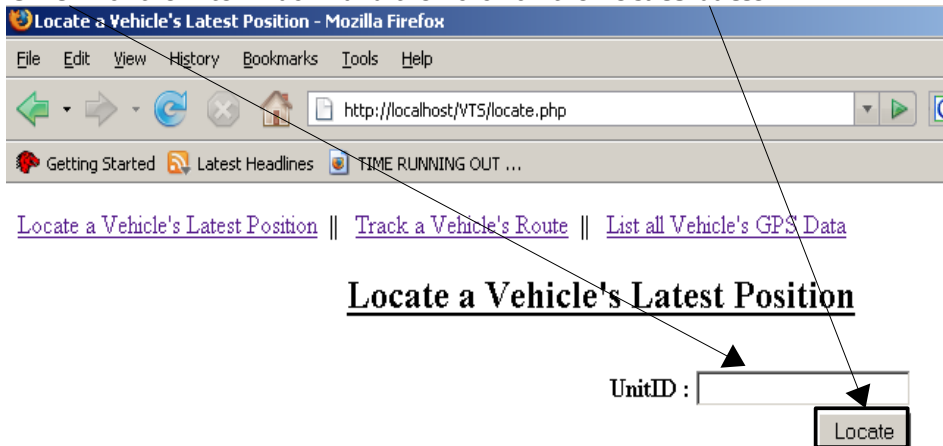
1. After that, run a web browser e.g. Internet Explorer then type "<http://localhost/VTS/index.html>".



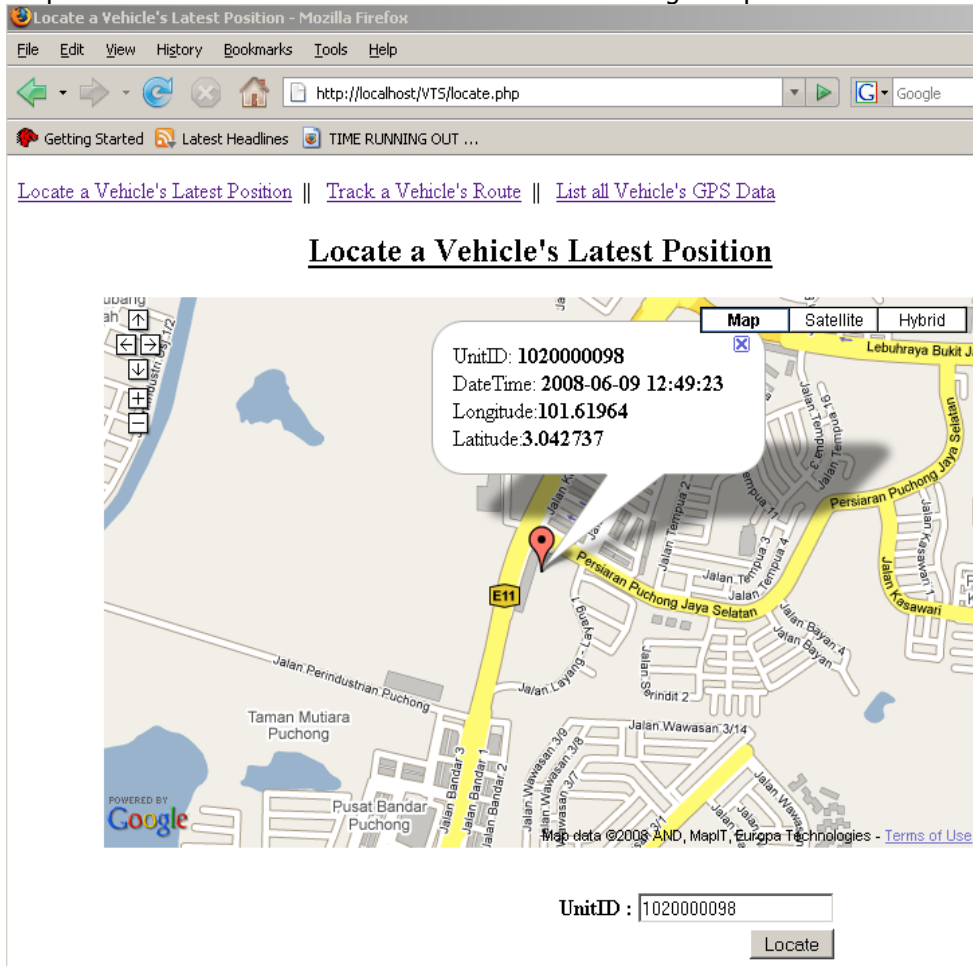
2. To Locate a Vehicle's Latest Position , just click on **Locate a Vehicle's Latest Position link.**



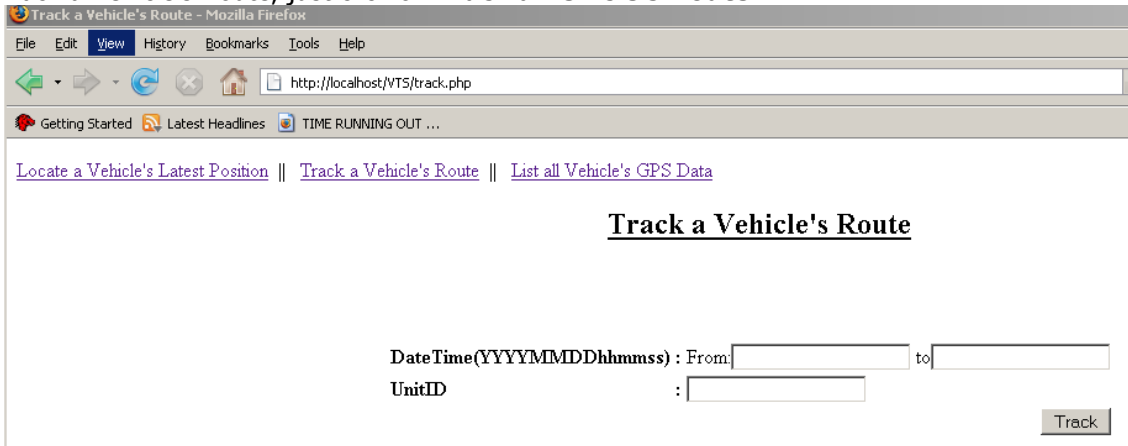
3. Type in the **UnitID** of the IntelliTracX1 and then click on the **Locate** button.



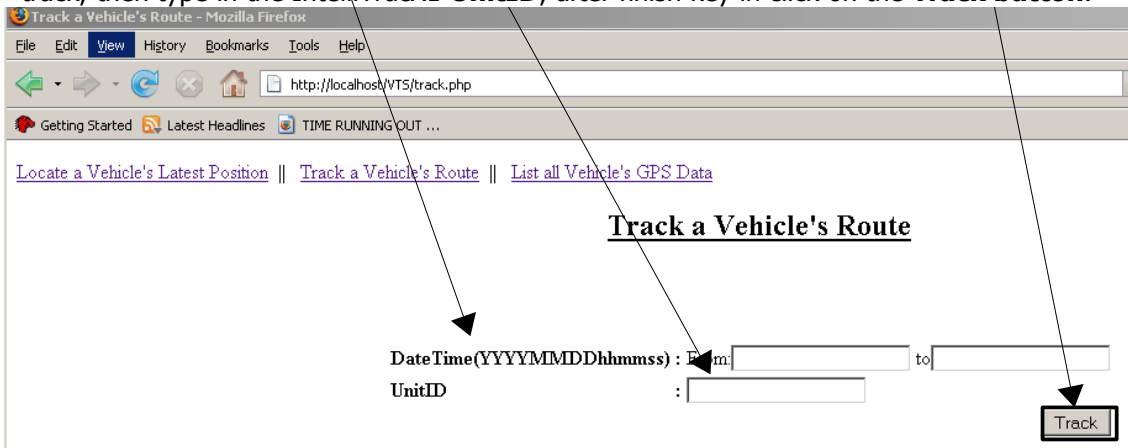
4. A Marker will point to the Latest Position of the Vehicle in the Google Map.



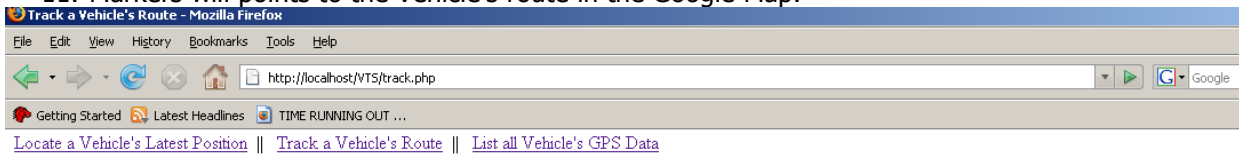
5. To Track a Vehicle's Route, just click on **Track a Vehicle's Route** link.



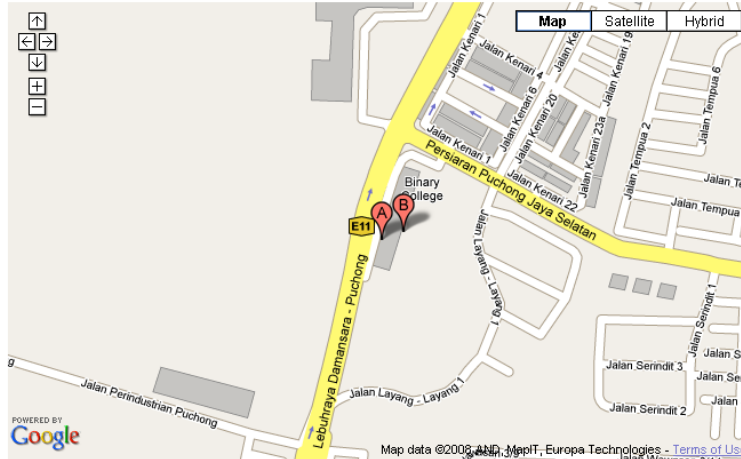
10. Type in the interval **Data Time** according to the Format (YYYYMMDDhhmmss) that you wants to track, then type in the IntelliTracX1 **UnitID**, after finish key in click on the **Track button**.



11. Markers will points to the Vehicle's route in the Google Map.



Track a Vehicle's Route

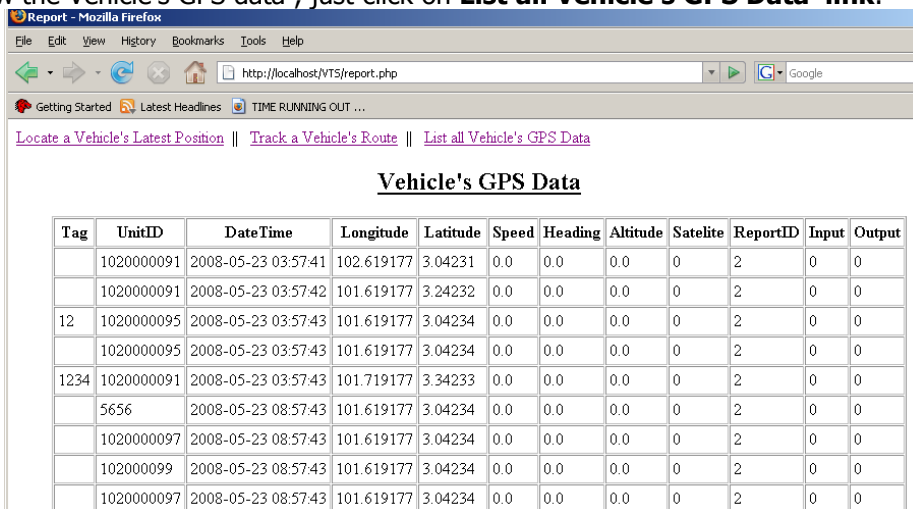


Vehicle's GPS Data:

Maker	Tag	UnitID	DateTime	Longitude	Latitude	Speed	Heading	Altitude	Satellite	ReportID	Input	Output
A		1020000098	2008-06-09 11:39:23	101.618893	3.042033	0.0	0.0	0.0	0	2	0	0
B		1020000098	2008-06-09 11:44:23	101.619317	3.0422	0.0	0.0	0.0	4	2	0	0

DateTime(YYYYMMDDhhmmss) : From to
 UnitID :

12. To View the Vehicle's GPS data , just click on **List all Vehicle's GPS Data** link.



Vehicle's GPS Data

Tag	UnitID	DateTime	Longitude	Latitude	Speed	Heading	Altitude	Satellite	ReportID	Input	Output
	1020000091	2008-05-23 03:57:41	102.619177	3.04231	0.0	0.0	0.0	0	2	0	0
	1020000091	2008-05-23 03:57:42	101.619177	3.24232	0.0	0.0	0.0	0	2	0	0
12	1020000095	2008-05-23 03:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0
	1020000095	2008-05-23 03:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0
1234	1020000091	2008-05-23 03:57:43	101.719177	3.34233	0.0	0.0	0.0	0	2	0	0
	5656	2008-05-23 08:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0
	1020000097	2008-05-23 08:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0
	1020000099	2008-05-23 08:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0
	1020000097	2008-05-23 08:57:43	101.619177	3.04234	0.0	0.0	0.0	0	2	0	0

12. VEHICLE TRACKING SYSTEM SOURCE CODE

This section is removed. Please request for the full version from us.

13. APPENDIX 1: FREQUENTLY ASKED QUESTIONS

Can I use the Google Maps API on a commercial website?

As long as your site is generally accessible to consumers without charge, you may use the Google Maps API. For example, if your website is supported by advertising, it likely falls within the Google Maps API Terms of Service. If you charge people to place information on your map (e.g. to list their homes for sale), but you display this information using the Google Maps API on a free part of your site, you'll also meet the Google Maps API Terms of Service.

However, not all commercial uses are allowed. If your site meets any of the following criteria you must use Google Maps API Premier:

- a) Your site is only available to paying customers.
- b) Your site is only accessible within your company or on your intranet.

Remember, Google reserves the right to suspend or terminate your use of the Google Maps API at any time, so please ensure that you read the Terms of Service carefully.

Can I use the Google Maps APIs for tracking applications?

There is no restriction on displaying real-time data (tracking) with the Google Maps APIs provided that the application is publicly available without charge and otherwise complies with the Terms of Service. For internal-only applications, Google Maps API Premier must be used. See Section 10.9 of the Terms of Service for more information.

Is Google Map really free?

So it is free as long as:-

- a) you DO NOT charge customer for using Google Map
- b) the web site is public e.g. www.mobitek-system.com and NOT an intranet e.g. <http://192.168.1.1/mobitek/map>

For more information, please refer to

- a) <http://code.google.com/apis/maps/terms.html>
- b) <http://code.google.com/apis/maps/faq.html>