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KENTUCKY TRANSPORTATION CENTER

**DEVELOPMENT OF A TRAFFIC SIGN INVENTORY SYSTEM
(SIGN CLICK)**

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Research Report
KTC-06-18/SPR318-06-1F

DEVELOPMENT OF A TRAFFIC SIGN INVENTORY SYSTEM (SIGN CLICK)

by

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Kentucky Transportation Cabinet
Commonwealth of Kentucky

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16. Abstract

A system is not currently in place to inventory traffic signs in Kentucky. A sign inventory database would be beneficial for those responsible for maintenance and management of signs. The overall safety provided the driving public could benefit from an efficient inventory system that increases an agency's knowledge of existing signs. In addition, a comprehensive inventory and mechanisms for updating the inventory could reduce the potential for liability associated with outdated, inappropriately placed, or missing signs. Software is available for this kind of inventory; however it can be expensive and would lack the specific features that could be developed in-house. It is intended that the system will serve as the model for expansion to a statewide inventory and management system for signs. This system will permit the Transportation Cabinet to track and monitor the number, location, and condition of signs that fall under their responsibility as part of the state-maintained roadways. This document will serve as a user's manual for the sign inventory software entitled, Sign Click.

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EXECUTIVE SUMMARY

A system is not currently in place to inventory traffic signs in Kentucky. A sign inventory database would be beneficial for those responsible for maintenance and management of signs. The overall safety provided the driving public could benefit from an efficient inventory system that increases an agency's knowledge of existing signs. In addition, a comprehensive inventory and mechanisms for updating the inventory could reduce the potential for liability associated with outdated, inappropriately placed, or missing signs. Software is available for this kind of inventory; however it can be expensive and would lack the specific features that could be developed in-house. It is intended that the system will serve as the model for expansion to a statewide inventory and management system for signs. This system will permit the Transportation Cabinet to track and monitor the number, location, and condition of signs that fall under their responsibility as part of the state-maintained roadways. This document will serve as a user's manual for the sign inventory software entitled, Sign Click.

ACKNOWLEDGMENTS

1.0 INTRODUCTION

Sign Click is a program developed by the Kentucky Transportation Center to create and maintain a highway sign database. The program allows a user to click on a point on the map and add a sign assembly and various details about the assembly. The program will automatically calculate the roadway location (in county, route and milepoint format), give GPS location, and determine the street address. The user can add, delete and edit existing sign assemblies.

2.0 GENERAL USAGE
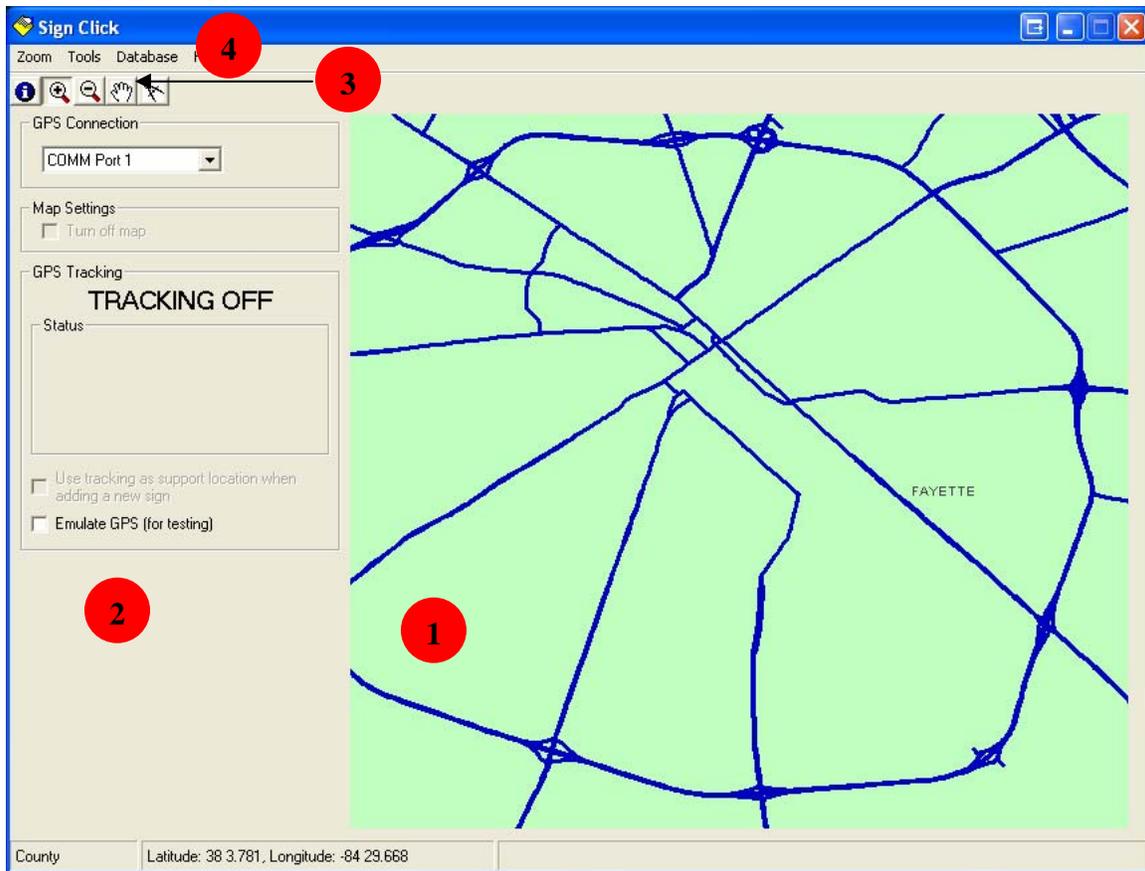
The program works like most mapping applications allowing the user to zoom in, zoom out and pan the map view. The main window generally contains four main parts (labeled in red):

1. The map view

2. The GPS settings frame

3. The main toolbar

4. The menubar

The map view window displays Kentucky roads (state and local roads), county boundaries and railroads (optionally). The layers will automatically be turned on based on your view extent. For example, you will not see the roadways while viewing the whole state. These settings can be

adjusted in the settings windows (see Settings below). The GPS settings frame can be used to quickly change your GPS settings. This will be discussed later in the GPS Communications sections below. The main toolbar allows for quick access to the five map viewing controls:

The following map tools are available:

1. ⓘ Identify – This tool is used to identify a road. Simply click on a roadway and it will give you the information. This can be helpful if the roadway isn't adequately labeled.
2. 🔍 Zoom In – This is used to zoom the map in. You can simply click on an area of the map and it will do a fixed zoom in. Alternatively you can draw a box (rubber band tool) and zoom into that area.
3. 🔍 Zoom Out – This is used to zoom the map out. You can simply click on an area and it will do a fixed zoom out (this should be used for small zoom out increments). For faster results you can use the predefined extents on the Zoom menu.
4. ✋ Pan – This tool is used to pan across the map. Simply click and hold on a point on the map and drag the map to a new view, and then let go. It can be used to view an area of the map that is just outside of your view area.
5. 🏹 Measure Tool – use this to measure a straight line distance between two points. Click one to identify the starting point and a second time to define the ending point. This tool may be slow to respond so you must be patient. Not recommended for slower computers.

3.0   THE MENU BAR

The menu bar contains basic map controls and sign database tools.

3.1   Zoom Menu

The zoom menu allows you to quickly zoom the map to the state, district, county or city level. These menu options will zoom out or in based on the current map center. You can also zoom to the previous view (similar to a browser's back button) or zoom to the default extent (similar to a browser's home button). The default extent can be set in the settings window (see below).

3.2   Tools Menu

The "Search for roadway" menu item allows you to zoom the map directly to a roadway based on road name or route number. Begin using the search form by choosing a county. This will limit the search results to only the selected county. Searching all counties will require a long time to complete. If you have a restricted dataset (i.e. you don't have all county data visible on the map) then you should only select counties that are visible. Next you must select between a route search or a road name search. Searching by route number is significantly faster. When typing in a route number only use numbers. That is, omit prefixes (US, KY, I) and suffixes (X,B,W). When searching by a road name you may select "search exact name" which will limit the search to the exact phrase you type. For example if you type in "MAIN ST" (without the quotes) and choose the exact phrase, you will not see "MAINTENANCE DR" or "W MAIN SRD" (contrary to what is shown below).
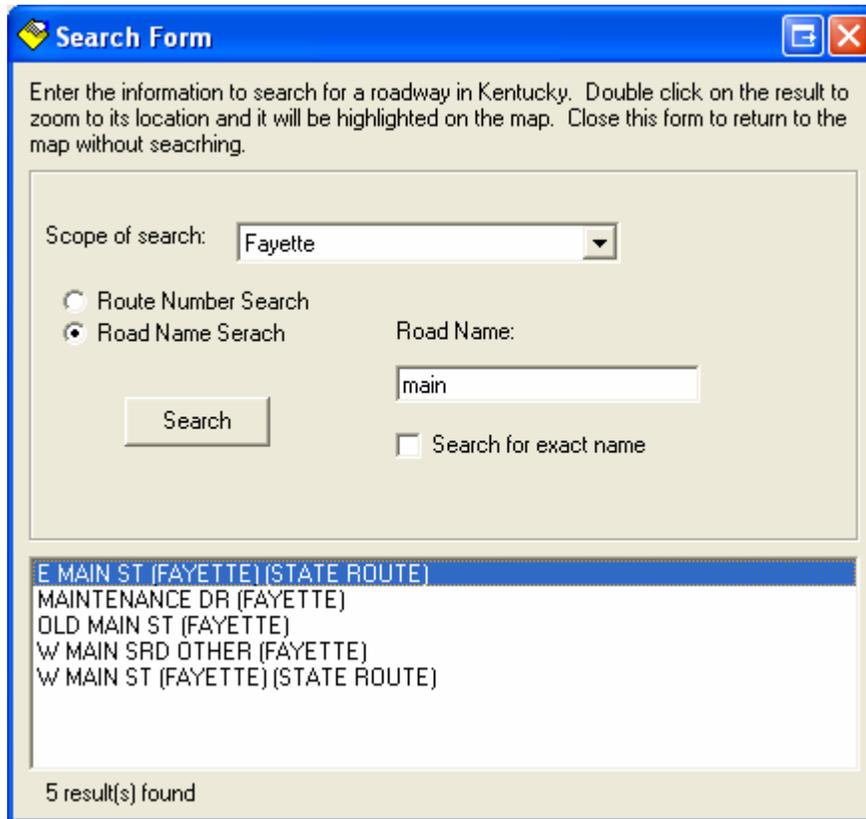
Simply click on the search button (or press enter) to display the search results. Double click any search result to zoom to it. The result will be highlighted on the map.

The "Show all railroads" menu item can be used to turn on railroads. Railroads will only be shown until your refresh the map (this will be changed in a future version).

Use the "Settings" menu item to open the settings form. This is discussed in detail below.

3.3 Help Menu

Use the help menu to open this manual. You can also check for updates by choosing "check for updates" which will take you to the sign click web site (http://www.ktc.uky.edu/SignClick/). You can view the "about" dialog to check your version number.

4.0 USING THE SIGN DATABASE

The sign database is the main component of the program. You can use this feature by selecting Open Database or Create New Database from the Database menu. When creating a new database simply browse to a location on your computer and choose a name for the database. Four files will be created: a shapefile, a shx file and two DBASE file. The first two files and one of the DBASE files will index the spatial location as well as any information for any saved support (support and assembly may be used interchangeably) location. This file can be opened

in any spatial software supporting shapefiles (this is only recommended for advanced users). The sign inventory system will be based on the location of the sign support base. The final DBASE file will store information based on signs attached to the supports. This file will be linked to the support's ID and more than one sign can be on a support. The name of the sign database file will be automatically defined as the first 7 non-space characters of the shapefile's name plus an underscore (_). Be sure not to name two shapefiles such that this naming convention isn't possible. For example naming a shapefile 'Fayette County2' will not work if you have a shapefile named 'Fayette County1' in the same folder (both will create a database file named 'fayette_').

Once a database is created or opened three new objects will be available: a toolbar on the right-hand side of the map, a sign preview frame, and a database tools menu. The database tools menu and the toolbar contain the same tools; however the toolbar will be easier to access whereas the menu offers a description of each tool as well as a hotkey.

4.1   Database Tools

The database tools menu contains three main tools and twenty favorites. The three main tools are:

1. Add Assembly – This is used to add an assembly to any point on the map. The assembly form will be shown after choosing a location.
2. Edit Assembly – This is used to edit an existing assembly. The assembly form will be show if you click on an area containing an assembly. You will be prompted to specify the assembly number if there is more than one assembly in an area.
3. Delete Assembly - This is used to delete an existing assembly. The assembly will be deleted if you click on an area containing an assembly. You will be prompted to specify the assembly number if there is more than one assembly in an area. You will be offered a confirmation.

The map tools are still in use after you open a sign database, although clicking on any database tool will turn off the current map tool. For instance, if you are panning to a location and you click on any database tool then panning mode will be turned off.

All of the favorite tools are just like the Add Assembly tool; however they will preload the assembly form any data saved into the favorite. You can save assembly information as well as signs (the sign component is discussed below).

4.2 Assembly Form

When you add a new assembly all textboxes in grey will be automatically filled in. You may edit these fields if needed but it shouldn't be necessary. The support ID cannot be edited.

The assembly location on road dropdown refers to the location of any support containing a sign facing the inventory team. Refer to the guidelines below for more details. Most of the options are self-explanatory. The dual-mounted can be used to save time if two identical signs are located on both the right and left. The side street can be used to inventory signs not on a state-maintained road that are still state property.

The cardinal direction should be checked when traveling down the road in the direction of increasing milepoints. You can determine this using a milepoint log book or by clicking various points on a roadway as if you were adding supports (the milepoint is shown in the assembly form). The cardinal direction will be stored in the registry so it will be remembered each time you add an assembly.

The value for inspector will also be stored in the registry so you won't have to reenter it each time.

The condition of the actually post can be specified as excellent, good or poor. The dot placed on the map will reflect this value as green, yellow or red, respectively.

Any assembly-related notes can be added to the notes box.

You may choose from three breakaway types or you may choose not to specify. A picture will be displayed for the three breakaway types.

A listbox is used to display all signs associated with this assembly. You can click 'add sign' to bring up the sign form (explained below) or you can highlight a sign and click remove to delete it from the assembly (please make sure the sign is fully highlighted). The deletion cannot be undone. You can double click a sign to edit it.

You must also click the save button on the assembly form in order to save its location on the map.

The tools menu allows you to save the current assembly information (and any added signs) to a favorite. The favorite form will show you what favorites are in use by hovering over the icons. You can also use the save and duplicate tool to create an assembly in the same location with most of the same information. When clicked the current assembly will be saved and a new assembly will be created.

4.3   Sign Form

The first combobox displays the MUTCD code for the sign. The second combo box displays the T-Code for the sign. The T-Code is designated by the Kentucky Transportation Cabinet. The MUTCD or T-Code value changes whenever either of the two codes change. That is, the MUTCD code will automatically become R1-1 if you change the T-code to T-52-0101. Any stored sign dimension will also be listed if available. These values are linked based on an Access database (signs.mdb) located in the program folder. These values may be adjusted and custom signs can be added, however it is highly recommended that you contact the developer of the program at the Transportation Center before doing so. A preview of each sign will be shown every time the MUTCD code changes.

You can navigate through the MUTCD codes quickly by typing the first letter of the MUTCD code. Following are the MUTCD categories (and their typical colors):

- o D – Guide Signs (Green or Blue)
- o E – Exit Signs (Green)
- o EM – Emergency Signs (White)
- o I – Informational Signs (Green)
- o M – Route Signs (White)
- o R – Regulatory Signs (White or Red)
- o RA – Recreational (Brown)
- o RG – Recreational (Brown)
- o RL – Recreational (Brown)
- o RM – Recreational (Brown)
- o RS – Recreational (Brown)
- o RW – Recreational (Brown)
- o S – School Signs (Yellow)
- o W – Warning Signs (Yellow)
- o Z – Custom Sign

Codes starting with the same letter will not have a quick key. You can move quickly between groups in the same category by holding down Ctrl and pressing the number corresponding to that group. For instance, if you are viewing R1-1 and would like to jump to the R2 categories, you can press Ctrl 2. Repeating this action goes to the next sign in the R2 group. To get to group 10 use Ctrl 0. Use Ctrl Shift *Number* to go to groups above 10.

You can set the condition of the sign in the same manner as the assembly condition. The assembly's dot color will be based on the worst condition of any signs or the assembly. That is, an assembly will show up as poor if the assembly is excellent and one sign is excellent and the other sign is poor. This allows you to visualize where any maintenance may be required on the map.

You may specify any sign text in the box provided. There is a separate textbox for notes, therefore sign specific text should not be included in the notes box.

The user will likely not know all of the sign codes; therefore a search box can be used to pull up a sign based on keywords. The keywords are stored in the above-mentioned Access database file and can be added to or edited. The sign will change as you start typing letters into the search box as long a sign is found. Typically a logical match won't be shown until you type several letters. You can use the next button to jump to the next sign matching the search criteria.

You must click the save button in order to add the sign to the assembly. The form will not close after you save a sign. You will see that the sign is added to the assembly form behind the sign form. The form will remain open until you close so that you can easily add more than one sign to the assembly.

4.4   Signs Preview

A preview of the signs saved in an assembly will be shown if you hover over an existing assembly on the map. You can also preview the signs saved in a favorite by hovering over the favorite icon on the toolbar.

5.0   GPS COMMUNICATION

This program will work with any GPS unit that communicates using the NMEA standard via a serial COMM port. USB devices may also be used if they create a virtual COMM port when connected. Select a GPS COMM port from the dropdown box before turning on tracking to save time. The program will attempt to obtain a connected device's GPS reading every 6 seconds when tracking is on. To familiarize yourself with the tracking behavior you can turn on Emulate GPS. This will emulate the behavior of the program without connecting a GPS unit. This can be used for testing or training purposes, particularly indoors. The status of the GPS communication will be displayed in the status box. Messages in red indicate an error. GPS readings fail occasionally even with sophisticated GPS units. Be patient when tracking a location.

Once your location is tracked you will be zoomed to that location and a car icon will be placed in the center of the map. The car's location can be used as an assembly's location when adding a new sign. Turn this feature on by checking the "use tracking as support location" or turn on "add here" from the tools menu. This feature will save you the effort of having to click on the location of an assembly after adding a new assembly (including using favorites). For example, with this checked you only need to click on A or a favorite number form the database toolbar to open the assembly form. The location of the assembly will be based on the tracked location. Only use this feature when you are satisfied with your tracked location.

6.0   SETTINGS

You can alter the settings by opening the settings form from the tools menu.

6.1   Startup

You can choose from seven modes that will affect what area of the state you see when you first load the program.

6.2   Zoom Level

There are four zoom levels. The zoom level is calculated every time you zoom in or out. This value is based on how much of the map you see. You can decide what features are viewable for each zoom level. Turning on more layers can make the map more confusing to view and might require a lot of processing time every time the map is refreshed. This can be particularly important when using the tracking feature.

6.3   Tracking

You can choose how often the map will refresh (in seconds) when tracking is on. Every time the map refreshes the map will zoom to set zoom level, regardless of the current zoom extent. You can define this value in the settings. The larger the value, the more area of the map you can see. This value represents the width of the map in decimal degrees. You can toggle a value called GPS sensitivity to avoid unnecessarily refreshing the map. This value is used to define how far you must move from your previous location before the map refreshes. This will be particularly useful when parked. The higher the number, the farther you can move without the map refreshing. This value will adversely affect the accuracy of the GPS and milepoint data if made too high.

7.0   GUIDELINES FOR SIGN COLLECTION

The following guidelines should be used when collecting sign inventory data.

1. You should only collect roadway data in one direction at a time. Typically you should collect roadway in two passes: cardinal and non-cardinal directions.
2. Data should be collected safely
3. Data is typically collected one county at a time.
4. Shoulders should be utilized as much as possible. If the road has no shoulders then either a median or the right lane must be used as to let the flow of traffic continue normally. On two lane roads, make sure that your vehicle is visible to the drivers and allow them to pass when oncoming traffic is clear.

8.0   TIPS FOR USAGE

o Your favorites are stored in the signs.mdb file in two tables (FavAssemblies and FavSigns). You can transfer these tables to other signs.mdb files to share your favorites.
o An easy way to zoom to a specific county is to set the startup county in the Tools>Settings window. This will take you to that county upon clicking OK.

9.0   CONTACT INFORMATION

http://www.ktc.uky.edu/SignClick/

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