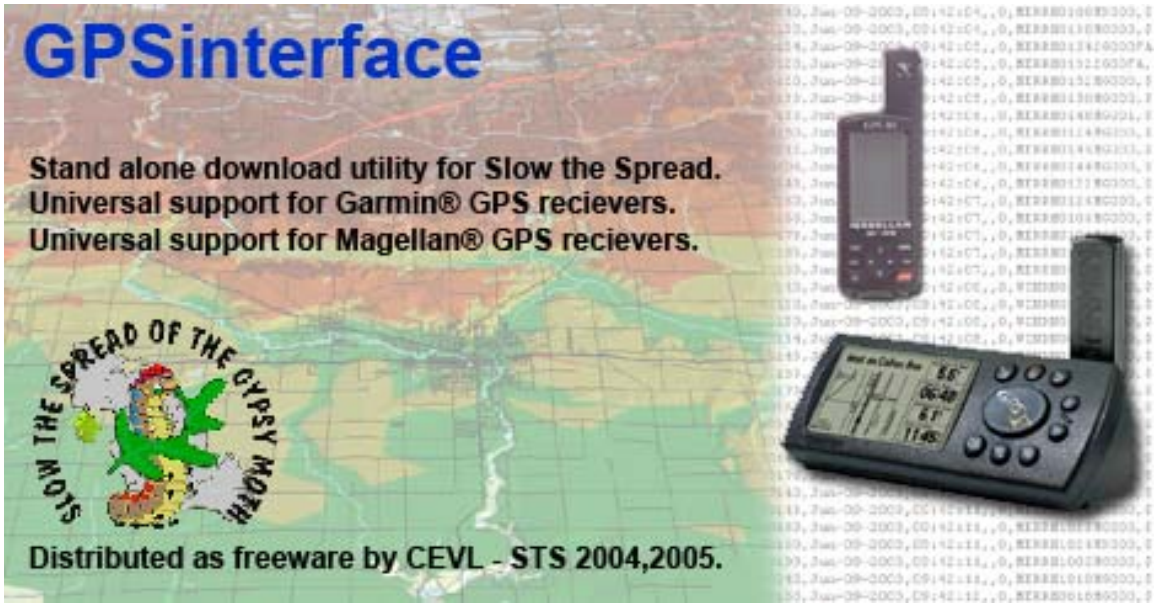

GPSinterface Stand Alone Interface for Waypoint Management

User Manual and Technical Documentation

July 2005 versions 2.6 +
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Introduction

GPSinterface is a stand alone utility for the downloading, uploading, managing and exporting of waypoints with Garmin or Magellan GPS receivers. The program is able to connect via serial cable to either of these manufacturers units, provided your computer has a serial communications port.

If your machine lacks a serial port, usb to serial adapters are available that will provide a work around. Two commonly used examples are covered on the last page.

This program evolved in response to cooperators' requests for a tool that does not require elaborate computer knowledge and does not require installation of larger programs with features that may not necessarily be needed. The result was a smaller package that has streamlined features, as well as, additional advanced capabilities.

The look of the interface is similar to what TrapView users are used to and the commands follow the same line of data flow.

Basic Use – Getting Started

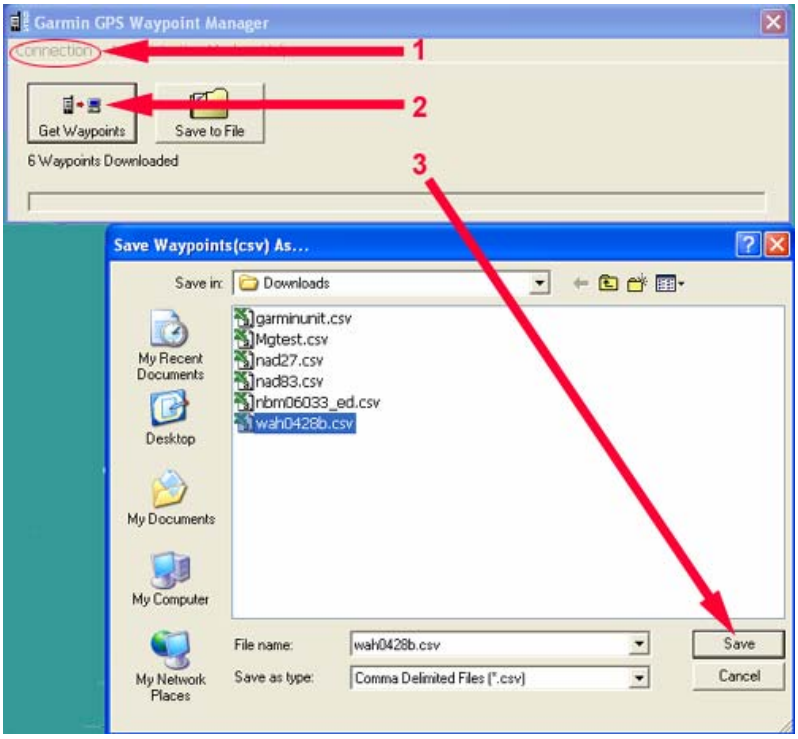
After connecting the cable between the computer and the GPS unit, any user can retrieve waypoints and save the file in CSV format in just 4 steps.

Clicking on either the desktop shortcut or start menu > programs shortcut will launch the window pictured at left.

Click either the Magellan or the Garmin button to let the program know what type of receiver you want to download from.

The older Magellan 315s do not allow access to date information associated with waypoints. This screen will remind you what your system clock is set to because this timestamp is used to mark your waypoints (Magellan models). A rudimentary help guide is also available by clicking on the User Guide button.

The next window to appear is the basic interface pictured at right. Note that in this simple mode, the Garmin and Magellan interfaces are identical.



The first step requires going to the (1) connection menu and selecting connect. The program then notifies you of the connection status.

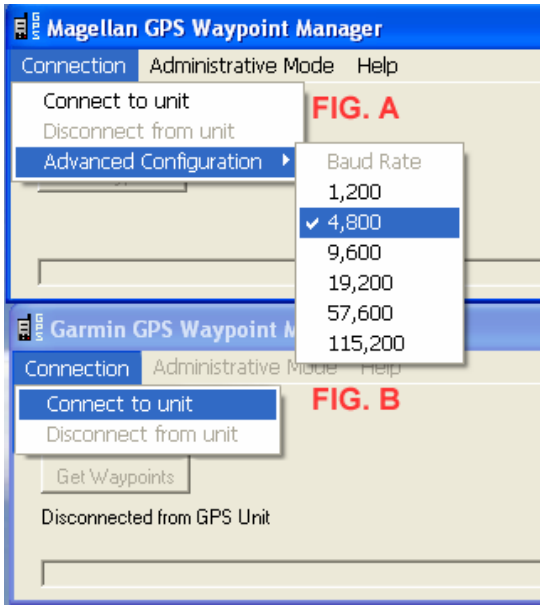
Second, press the Get Waypoints (2) button. You will see the progress of this action and how many waypoints were downloaded as the process completes. After the unit has finished sending the Waypoints, a save dialog opens automatically to the recommended STS Downloads folder.

Type the name for the CSV file and click save (3) as the third and final step. A Save to File button has now appeared in the main interface that allows returning to this dialog at a later point if you do not wish to save at this time.

Advanced Functionality

The typical user can disconnect through the connection menu mentioned before or simply click on the X in the upper right hand corner of the window. It is necessary to disconnect before hooking up another GPS unit.

The following instructions are intended for power users with greater needs from a GPS utility.



Since the program is designed to accommodate every unit in production, the baud rate must be adjustable for Magellan units. Most older units are set to 4800 by default. If you use a Magellan model such as the Meridian, the rate may be 115200.

To connect a non-STS issued receiver, determine your baud rate by consulting the unit's documentation and click the corresponding choice in this menu.

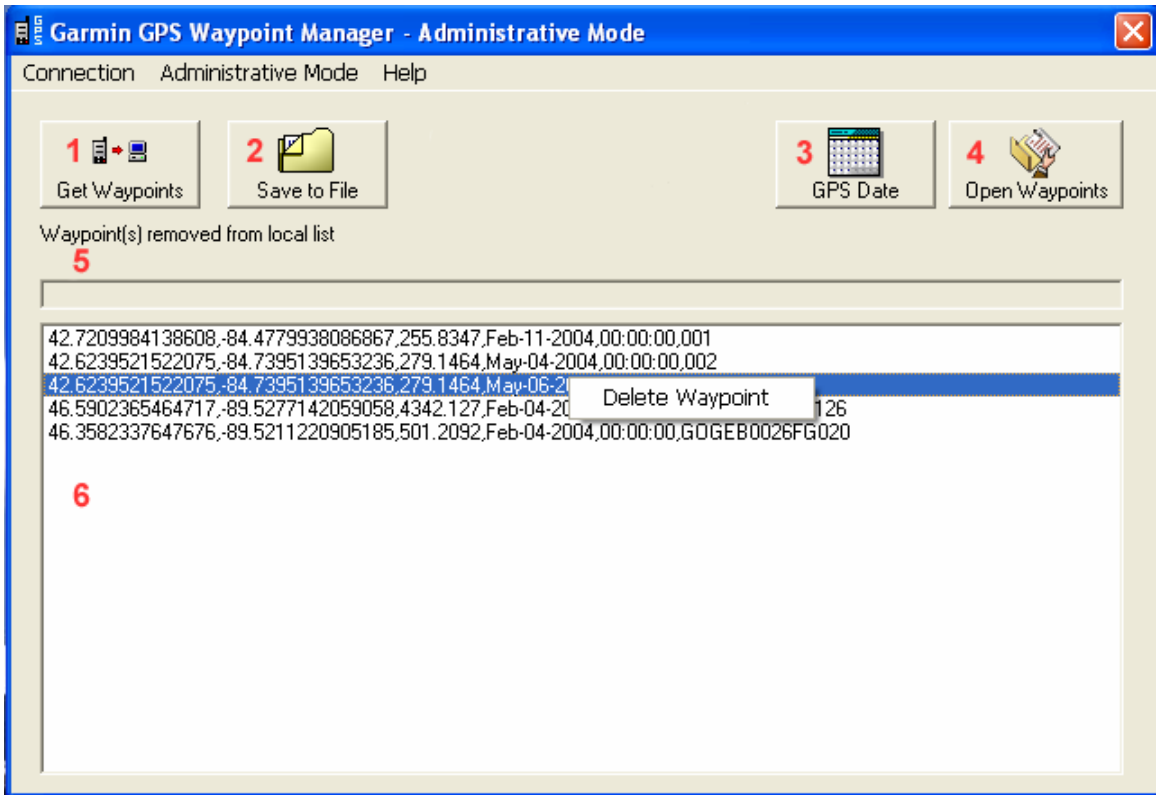
The Garmin interface does not have this option because the protocol is different and can be handled automatically.

Further advanced features are available by navigating to the Administrative Mode menu > Unlock. Selecting this will produce a prompt as pictured below. This feature is the same for both the Garmin and the Magellan units.

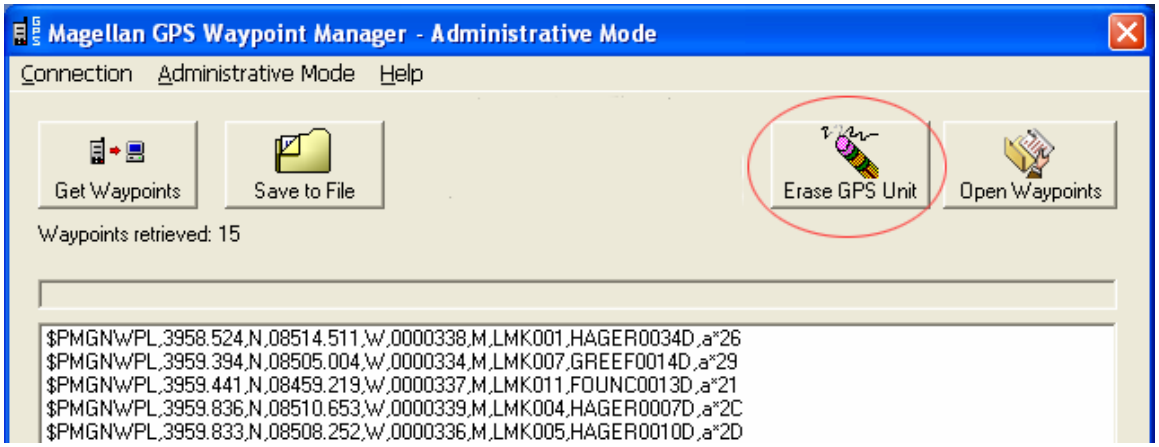
This functionality is locked away from mischievous fingers to protect the data integrity. It is recommended that you exercise caution regarding who is given the functionality because waypoints and data can be permanently erased.

To unlock the features, type the password into the Password Box. Click the key button to submit the password. If the password is correct, the interface will be unlocked. If you enter no password or a wrong one, the interface will lock down.

The expanded interface will appear with some new features and commands. The first two buttons remain as they were in the simple mode.



The third button allows a quick check of the receivers on board clock. This option differs for the Magellan interface.

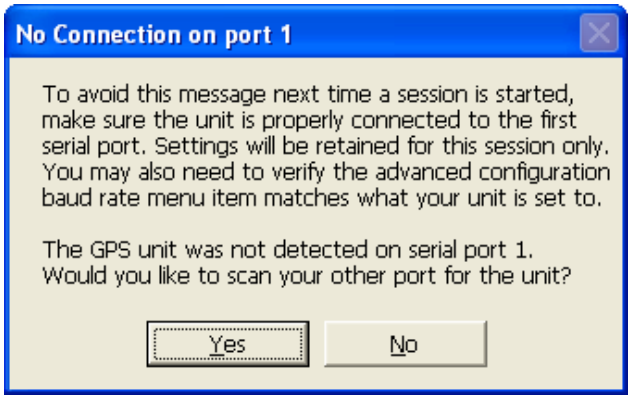


In this case, the third button can erase all data in the GPS unit. The Garmin protocol isn't capable of doing this. This is a significant difference between units. The fourth button allows the user to open a previously saved waypoint file.

Each time you save a file, a .mup or .gup file with the same filename is created in C:\GM_STS\GPS_Files\Orig\QC. Navigating to this location will be automatic upon clicking the button. Select the file to be loaded and these records will appear in the window area (6) and a message will confirm this in the message area (5). At this point the caption of the open button will change to Upload Waypoints. Using the mouse and Ctrl button select some records in area 6. Only the selected records will be uploaded. These will overwrite records of the same name already in the unit. If no records are selected, nothing will be uploaded. Also note that by right clicking with records selected, a pop-up menu appears allowing you to delete the selected records from the list. This doesn't have any value for the upload process, but if used before saving a CSV file then those records will not be included. It will not remove points from QC upload files.

Connection Notes

The most likely problems encountered with this utility will be connection or permissions related. Every attempt has been made in advance to deal with these, but knowledge of what is happening can be helpful in avoiding any issues at all.



Some machines have more than one serial port. By default, GPSi looks to the first port.

When this dialog appears there is a good probability that the GPS unit was connected to the second port. Other possible problems can include the baud rate of the unit being higher than the default 4800, which can be adjusted for the Magellan via the connection > advanced menu as mentioned earlier. Sometimes other software may gain control of the port from startup until it is manually disabled. Finally, ensure that if you connect a particular make that you have in fact tried to connect to that make (i.e. don't select Garmin if you connected a Magellan). On a machine with only one serial port, this dialog becomes meaningless and the program will halt further execution.

For users of Windows XP and 2000 who are running a NTFS file system with restricted rights, this GPSi program must be installed by an administrator. The program will adjust only the GM_STS folders that it saves data to. Once the installation has completed, all users will be able to work inside this structure without special permissions, but wouldn't be able to just save to any other random location depending on what the local policy is. Windows 9x is not affected by this consideration at all.

Geodetic Notes

Earlier versions of this program (prior to 2.6) produced a 7~20 meter error when converting GPS waypoints to UTM NAD27 coordinates.

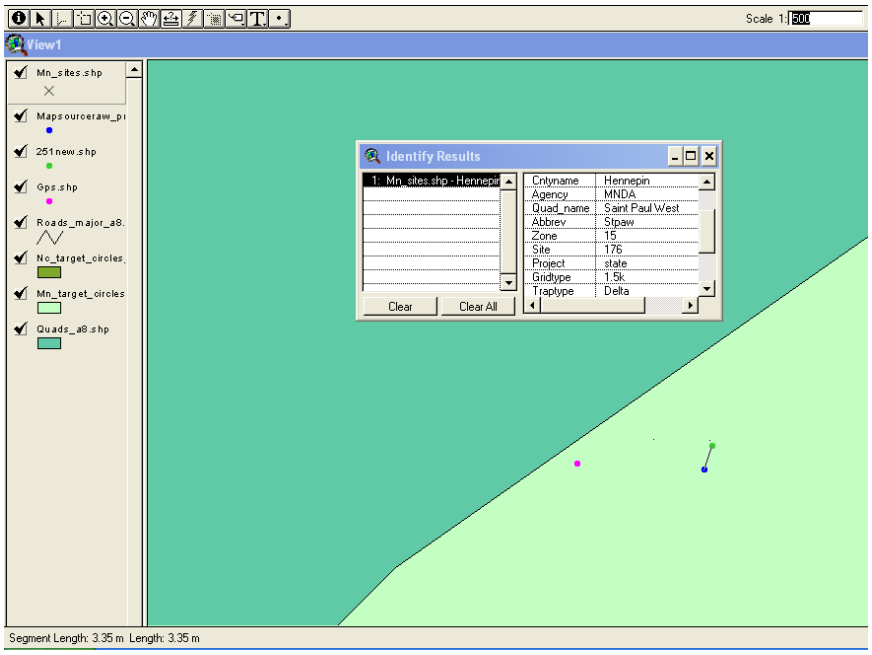
All GPS units send waypoints in the Lat Lon coordinate system using a WGS 84 datum. It is not correct to simply transform these raw coordinates without specifying datum shift information (for the specific area of the world) and geocentric transformation when transforming to the NAD27 datum.

In this scenario, 3 parameters are passed to the NADCON equation represented as:

$\Delta_x, \Delta_y, \Delta_z$

Rx-rotation X,Ry-rotation Y,Rz-rotationZ,M_BF-Scaling can also be passed, but are not necessary

The first three parameters represent 3 dimensional (Cartesian) coordinates, the rotational parameters represent the sine of the rotational angle multiplied by the ellipsoid axis length as defined by ESRI©, and the scaling represents scale change in parts/million. These parameters vary by region, but are generally consistent throughout the continental US. They were hard coded into the program since the scope of the STS project does not exceed this region. The potential error returned from this equation now becomes 1.5 centimeters for the CONUS region.



This ArcView screenshot illustrates the deviations involved for a waypoint in Minnesota. All points were projected to UTM NAD27. The blue dot is the actual position of the waypoint, the purple dot has no transformation applied, and the green dot only has NADCON.

USB Serial Adapter Installation Advisory

Situation:

GPS download software throws an exception when trying to connect to a unit or simply indicates that no GPS unit was found. This is a universal issue with all download software including commercial products. This is hardware related.

Problem:

Toshiba USFS laptops lack a serial port and require the use of an adapter to connect GPS units. There are now two different models of USB to serial adapter in circulation. They can be identified as illustrated below:

The Belkin can be distinguished by noticing the longer body, three LED lights perpendicular to the cord along the base and the word “Belkin” molded into the unit. The IO Gear can be distinguished by the shorter body, two LED lights in line with the cable, and the label “IO Gear” on the back of the unit.

The drivers for the units are not interchangeable. A laptop can be configured to use one model of unit or the other on any given USB port, but not both.

Solution:

It is necessary to know what type of adapter you possess and to use the driver for that model; otherwise the unit will not work. Additionally, you will need to keep the model you configure to a laptop assigned to that laptop throughout the season to avoid reconfiguration.

The drivers are available on the installation CD that ships with your laptop. If you encounter difficulties installing the driver, or are unable to determine the appropriate driver for your adapter contact MSU technical support.