Trip Manager User's Guide[1]

Trip Manager is a tool for users of the Garmin zumo XT or XT2 Satellite Navigation Devices[2]. It simplifies the transfer of navigation related data from computer to zumo and vice versa. It offers a number of useful and problem solving features, including interacting with zumo files via a large computer display, keyboard and mouse. Trip Manager can create and edit routes, tracks and points. Trip Manager is not a full-blown route planner since it does not perform routing calculations. Instead, it relies on the XT[2] or other route planning software to perform route calculations.

Trip Manager runs on Windows[3] based computers. Direct interaction with the zumo's data requires a zumo to computer connection via USB cable. Trip Manager's optional map view requires an active internet connection as does the optional GeoCoding.

Trip Manager is free software. Users assume any and all risks related to use of the software. Trip Manager is not a Garmin product and is not endorsed or supported by Garmin Ltd. It was created and generously shared by a zumo user. See https://github.com/FrankBijnen/TripManager and https://www.zumouserforums.co.uk/viewtopic.php?t=3150

Features

The zumo XT and XT2 maintain routes and related data in .trip files. Trip Manager's features include:

- Support for .trip, .gpx, .gpi, .kml and .html file types.
- Enhanced file management with bi-directional file transfer between zumo and PC, multi-select support, logical file naming, organization, and grouping.
- Automatic or easy setting of routes to "saved" rather than "imported" which prevents "RUT" behavior.
- Detailed viewing and editing of .trip file content including an overview on an Open Street Maps (OSM) map and a detailed hexadecimal view.
- Conversion of coordinates to addresses and vice versa.
- Modification of trip dates, transportation modes and routing preferences.
- Creation of .trip files on the zumo directly from .gpx files on the computer, including those created by Basecamp or other route planning software, eliminating the need to import and save routes and other data.
- Prevention of undesired Via and Shaping point renaming.
- Creation of .gpi (point of interest) files from .gpx files and display of .gpi file information.
- Post-processing of .gpx files including optional prefixing of shaping point names with route information.
- Visual comparison, on an OSM map, of .trip file content on the zumo with .gpx file content on the computer. This allows a user to check that a route calculated by the zumo matches the route specified by the .gpx file. Any desired adjustments can be made while sitting at a computer before beginning to travel rather than on the roadside when a problem arises.
- Routes can be shared with others using identical zumo models by directly sharing .trip files.

[1] As of Trip Manager File Version 1.4.0.162

[2] Garmin, zumo XT, zumo XT2 and Basecamp are trademarks of Garmin Ltd. or its subsidiaries.

[3] Windows is a trademark of Microsoft Corporation.

Contents

Change History

Version	Changes
V1.3, April 2025	Initial version of this User's Guide
V1.4, June 2025	A Trip Editor, Geocoding and a Search button for the OSM Map were added to Trip Manager. Additional changes as listed here https://github.com/FrankBijnen/TripManager/releases/tag/V1.4.0.162

Initial One-Time Setup

Software Installation

Run the Trip Manager setup exe as usual to install software on a Windows computer. When warned that the software is from an unknown publisher, choose to install anyway.

Zumo Configuration

The zumo must be configured to:

- use the Multi-media Transfer Protocol (MTP) for connection with the computer, and
- enable display of its .System directory.

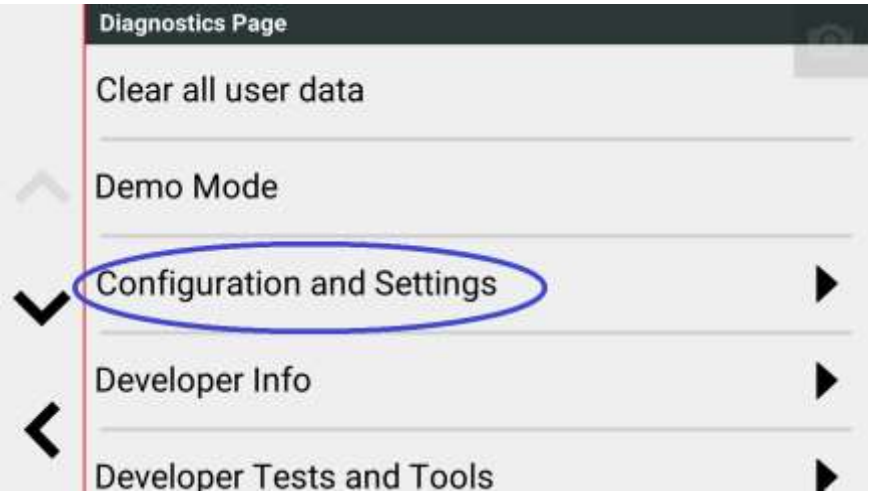
(XT2 shown, XT is similar)

Power on the zumo and select to view the map.

Click on the speed indication.

This brings up a detailed speed display. Long press the speed circle, that is press and hold about 10 seconds,.

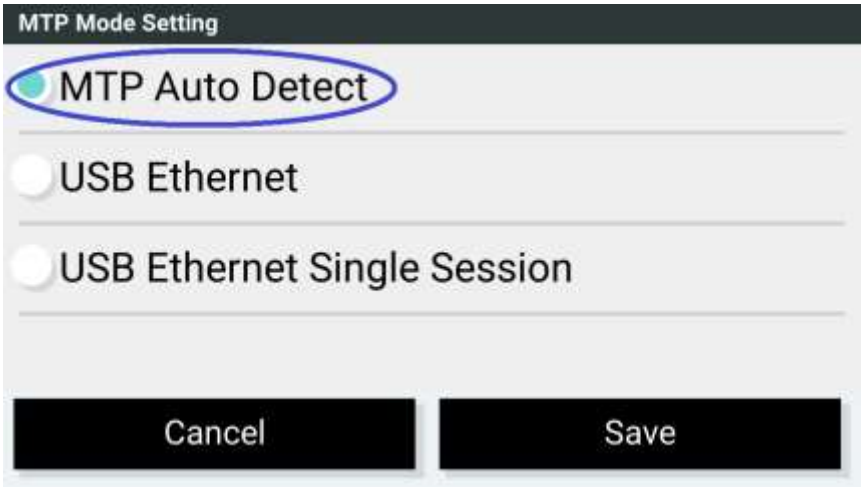
This brings up a Diagnostics Page. Click Configuration and Settings.



Then click MTP Settings.

Verify that MTP Mode is Auto Detect and Enable Show .System.

Set MTP Mode if needed.



Save and return back to the main screen on the zumo.

If the zumo is new, or has just been reset to Factory conditions, then the required directory for .trip file storage (e.g. zūmo XT2\Internal Storage\.System\Trips) will not exist on the zumo. It must be created before using Trip Manager. To do so either send a gpx file containing a route to the zumo using any normal method or create a simple route using the Trip Planner on the zumo.

GeoCoding Configuration

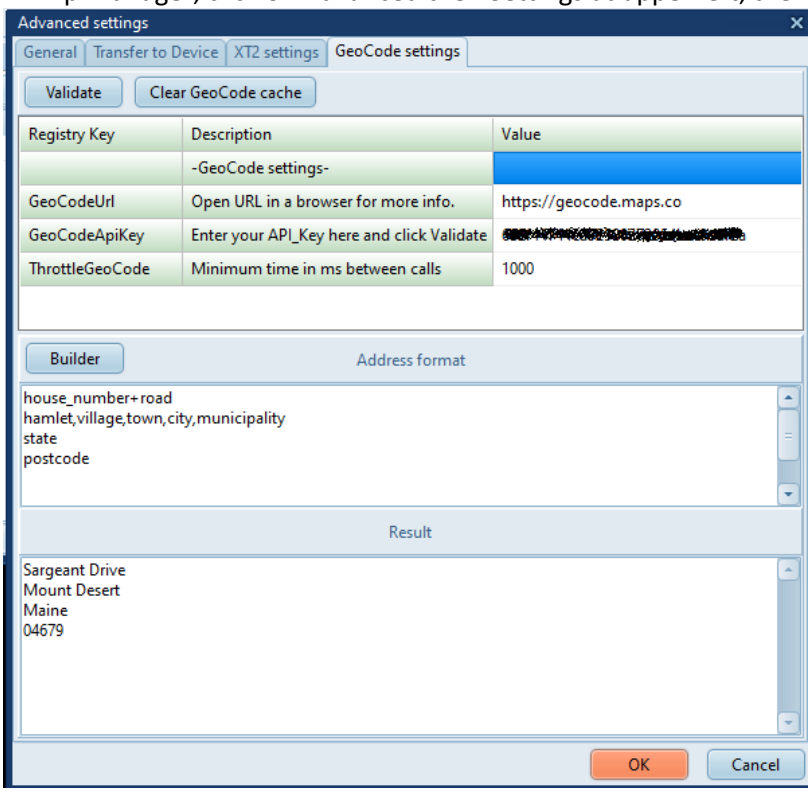
Geocoding is an optional feature. If configured GeoCoding provides the ability to lookup GPS coordinates (Latitude and Longitude) from (part of) an address, as well as the reverse, return an address from a pair of GPS coordinates. GeoCoding is available on the OSM map, and in the Trip Editor.

TripManager uses https://geocode.maps.co/ as a webservice provider. To use GeoCoding in TripManager, an Api_Key is needed. One can be obtained by registering here: https://geocode.maps.co/join/. A free plan is available which is limited to 5000 requests per day, and 1 request per second. This should be sufficient for most users. Trip Manager

caches information for faster performance and to prevent duplicate requests. There is no indication that registration leads to any spam email.

To configure GeoCoding:

1. Follow the above link to obtain an api key.
2. In Trip Manager, click on Advanced then Settings at upper left, then select the GeoCode settings tab.



3. Paste the api key obtained above into the GeoCodeApiKey Value field.
   The default value in the GeoCodeUrl field should not be changed unless GeoCode changes their url.
   The ThrottleGeoCode value of 1000 limits requests to one per 1000 milliseconds (one second) consistent with the free account.
4. Address format should be configured as appropriate for your riding location. The Builder button offers some predefined codes.
   U.S. users will want to change the Address format from the default European style to something like:
   ```
   house_number+road
   hamlet,village,town,city,municipality
   state
   postcode
   ```
   Tags separated with commas specify backup tags.
   Tags separated with a plus sign concatenate tags.
   Additional tag information can be found here: https://wiki.openstreetmap.org/wiki/Key:place
   A special tag named: `display_name` shows all data.
   A special tag named: `coords` showing only the GPS coordinates.
   The available tag names depend on the data that is available in OSM map for a location. To view all tags available for a specific location use the special tag `debug`. This will add a block with `*****Debug info *****`
5. Click OK to complete and save the configuration

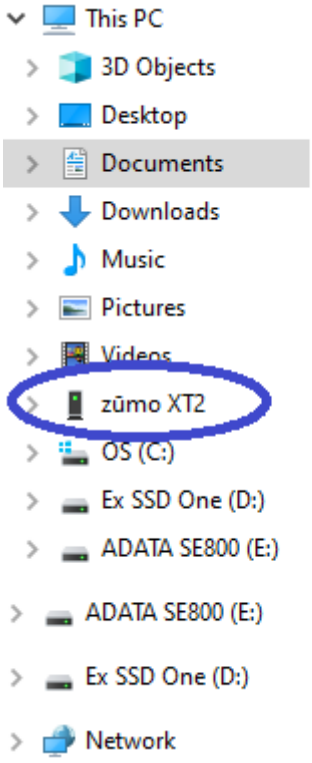
One-Time configuration is now complete.

A note regarding other advanced settings: Trip Manager includes several configuration and preferences options, which are discussed throughout this document and are available in context at associated locations of the user interface.

Trip Manager uses the Windows Registry to preserve user choices. The Advanced settings dialog allows experienced users to edit these registry settings directly.

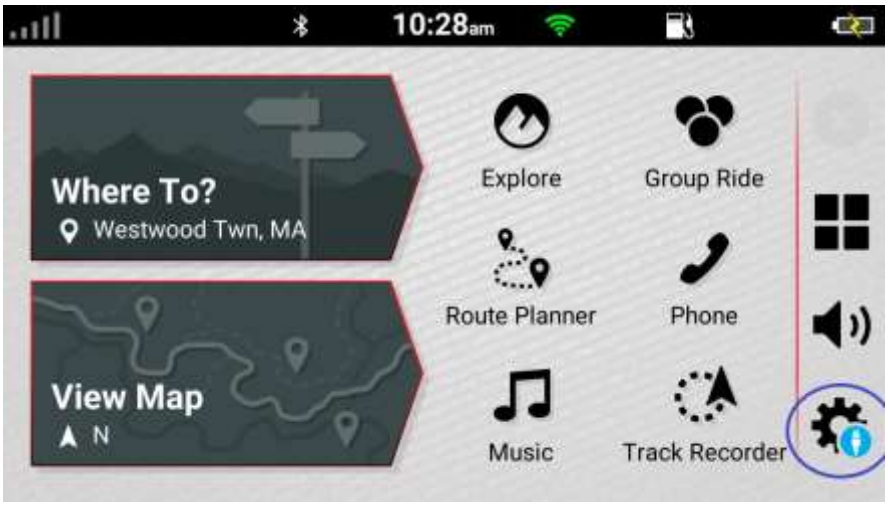
Connect zumo And Computer

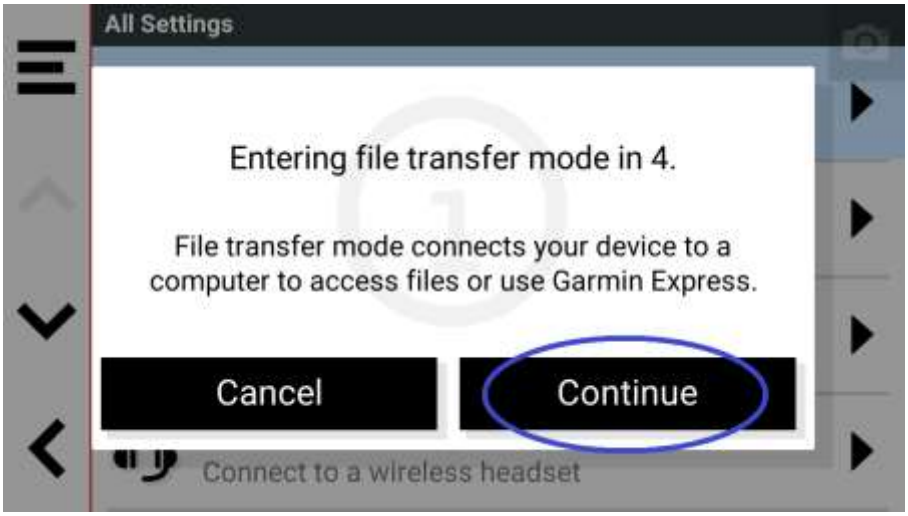
Connect a USB cable between the computer and the zumo. Turn the zumo on if it doesn't start automatically. It can take a minute for the computer to recognize the zumo. Once it does, the zumo will be visible in File Explorer.



On the zumo screen, tap to connect to the computer, if offered.

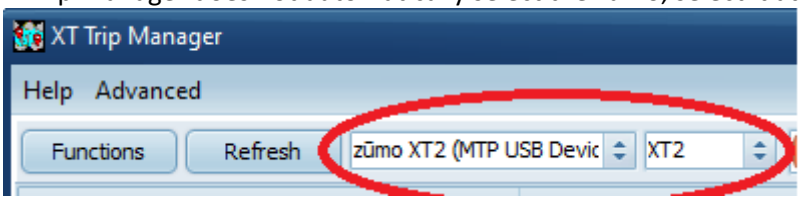
Or tap the Settings icon, and then connect.





Using Trip Manager

With configuration and connection completed, launch the Trip Manager software on the computer.
If Trip Manager does not automatically select the zumo, select it at upper left and select XT or XT2 as appropriate.

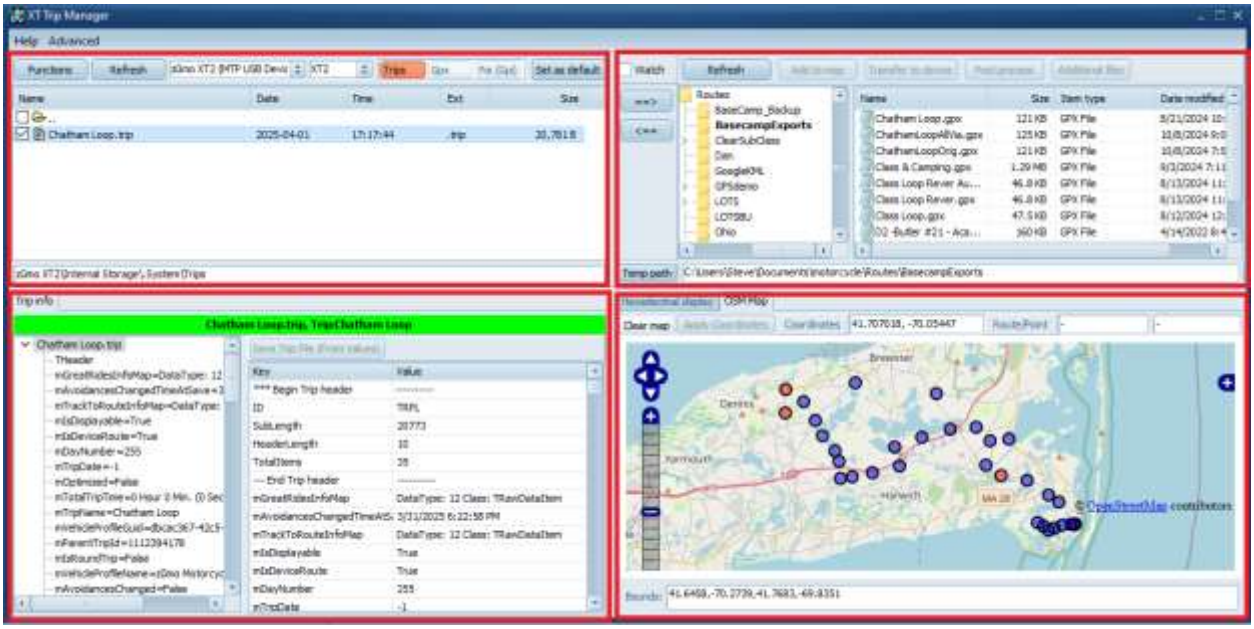


Note that if Trip Manager is started before the zumo connection to the computer completes, the zumo may not be shown as an available connection. In that case, click the Refresh button, then select the zumo.

At this point, clicking the "Set as default" button will cause Trip Manager to remember this connection so that it will re-connect automatically in the future.

Display

The Trip Manager display is divided into 4 sections.



Upper Left: The zumo file system.
Upper Right: The computer's file system.
Lower Left: Detailed information about a .trip or .gpi file selected in the upper section with access to the Trip Editor
Lower Right: Map display or hexadecimal editor.

The user can navigate within each of the two file systems by clicking on files or directories in each of the upper sections and can perform simple file copy between the two systems using the ==> and <== buttons.

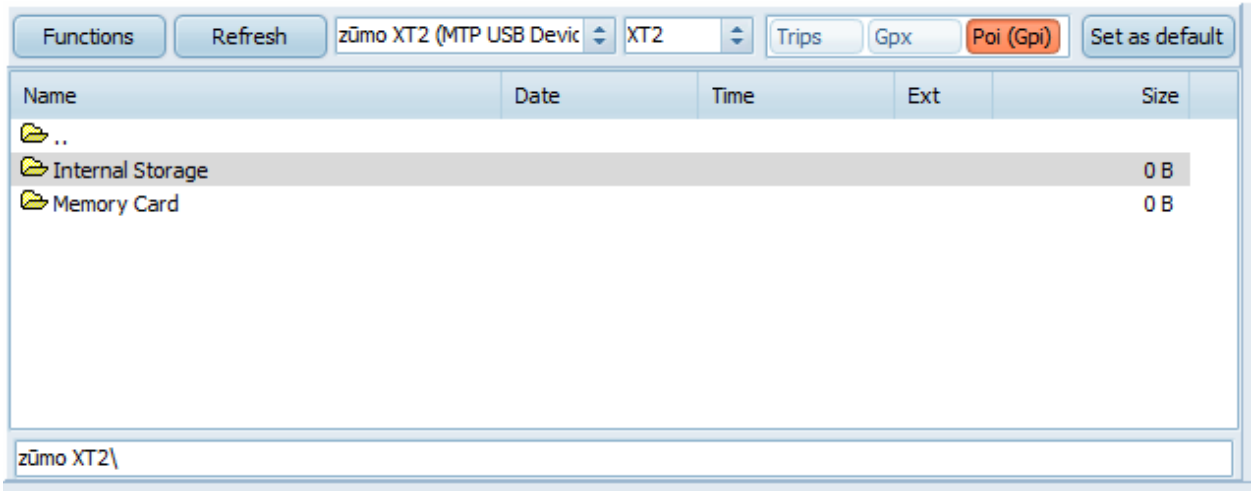
More important than simple file copy, Trip Manager offers a rich set of intelligent file and data transfer capabilities, file naming and creation options, and data manipulation functions.

Zumo File System Navigation

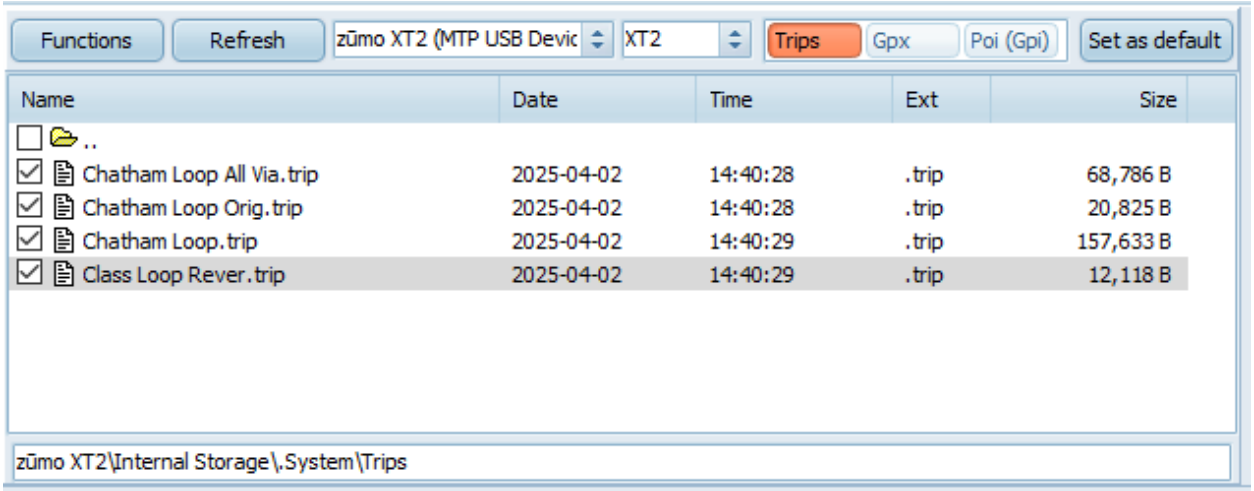
Display content can be sorted by clicking on the column headings.

The full path to the currently displayed folder is shown at the bottom of this section.

Double [left] clicking on any folder in the display will navigate to that folder. The ".." folder moves up to the parent directory. This can be used to navigate to the top of the file system or to any desired location. For example:

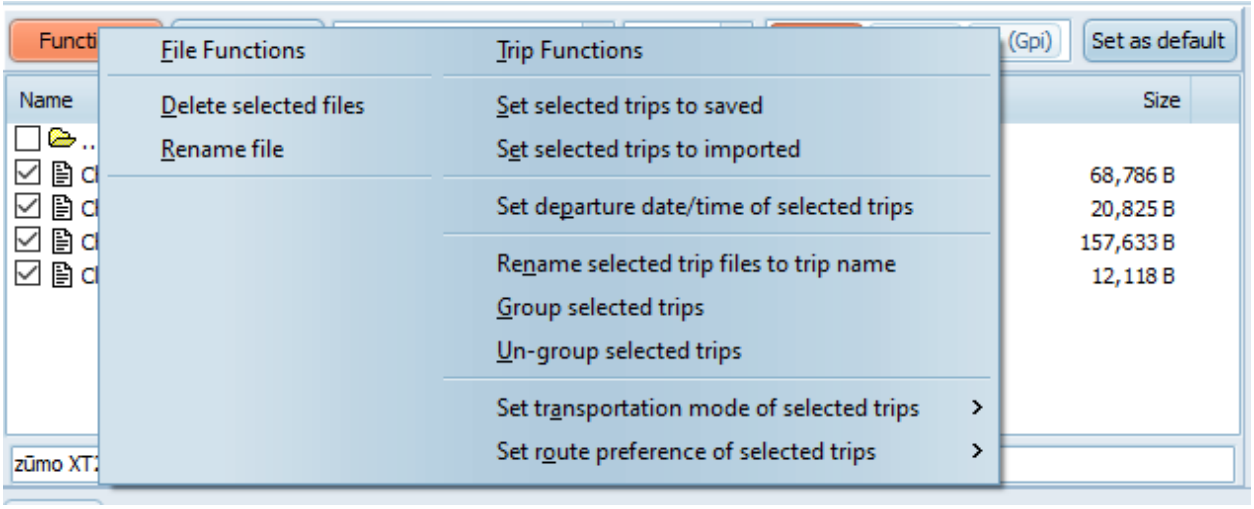


Selecting (left clicking on) a .trip file populates the lower left section of the display with that file's Trip Information and displays the trip on an OSM map in the lower right display area (internet connection required to download the map). Similarly selecting a .gpi file displays that file's information, (More on those displays below.)

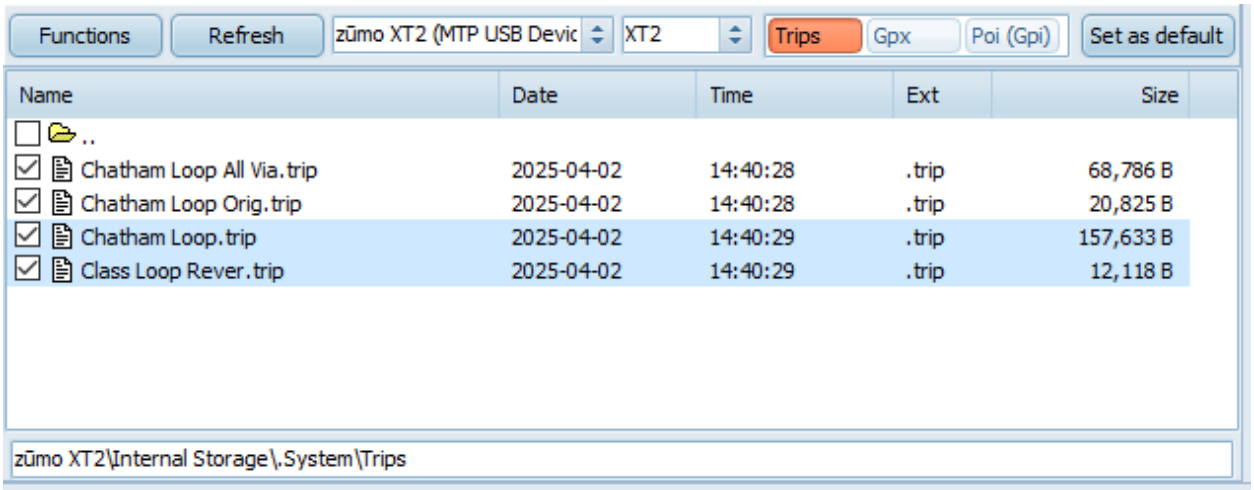


Zumo File System Functions

The Functions Button at upper left brings up available File and Trip functions which will operate on selected file(s).



It is important to note here that "selected" files are those which are highlighted, not those with boxes checked. In the image below, only the lower two trip files are "selected". The checked boxes indicate that all four files are "saved" rather than "imported" – this "RUT" fix feature is discussed below.



File selection using click, shift-click, control-click and control-a all function as usual for Windows files.

The file functions are obvious so require not further description here.

The trip functions, which are only available if trip file(s) have been navigated to, deserve further explanation.

RUT fix - Set selected trips to saved / imported: A trip (that is a route) which has been imported to the zumo, e.g. via a .gpx file from Basecamp, an sd card, or similar, is marked as "imported" (using the mImported field of the Trip info). A trip (route) which was created on the zumo, or otherwise saved on the zumo is "saved", not "imported". The checkbox at left of the file name indicates the status – a checked trip is saved; an unchecked trip is imported. This difference is important to avoiding Repeated U-Turn (RUT) behavior. Imported trips are subject to RUT. Saved trips are not. See the zumo user forum and/or appendix for a discussion of RUT.

The individual checkboxes may be set or unset by clicking each as desired. The Set selected trips to saved / imported functions allow a selected set of trips to be set at once.

Set departure date/time: Setting date and time can help with the order for route display on the zumo, especially the original XT. The XT2 does provide several sorting options which are not available on the XT.

Rename selected trip files to trip name: The default trip file naming scheme used by the zumo is fairly meaningless to humans. This function changes the name(s) of selected file(s) to the trip names, making the files much easier to identify.
Note that the ==> button can be used to copy selected trip files to the computer. This is useful for both backup and sharing routes, etc. with others. Note that .trip file format and content is zumo model specific. Trip files should only be shared among users of the same zumo model.

Group / Un-group selected trips: The zumo XT2 supports "Collections" which allow routes, tracks, etc. to be grouped together. The original XT does not support collections however.
This is an XT only function which allows multiple trips to be assembled into groups. It is not needed on, and does not work on, the XT2.
Although the standard XT interface apparently does not support trip grouping, Trip Manager does. Trips containing the same mParentId and mParentTripname will be shown grouped in the trip planner. To create a group:

1. In Trip Manager's upper left display, select the trips to be grouped together.
2. Click the functions button then "Group selected trips".
3. Enter a group name.

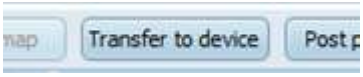
An "Un-group selected trips" function is also provided.
It is not possible to add trips to an existing group.
Multiple routes from a gpx file will automatically be grouped when using Trip Manager's "Transfer to device".
Before grouping trips, it is recommended to first rename trip files to trip name as described immediately above.

Set transportation mode: Allows selected trip(s) to be set to Automotive, Motorcycling or Offroad. See the Garmin zumo documentation and the Garmin user forum for more information regarding transportation modes. Note that the XT2 only supports Motorcycling. Both the XT and XT2 will default to Motorcycling if the mode is set to anything unsupported.

Set route preference: Allows selected trip(s) to be set to Faster time, Shorter distance, Direct routing or Curvy roads. See the Garmin zumo documentation and the Garmin user forum for further information regarding routing preference choices.

Setting Default File Destinations

The Transfer to device button,

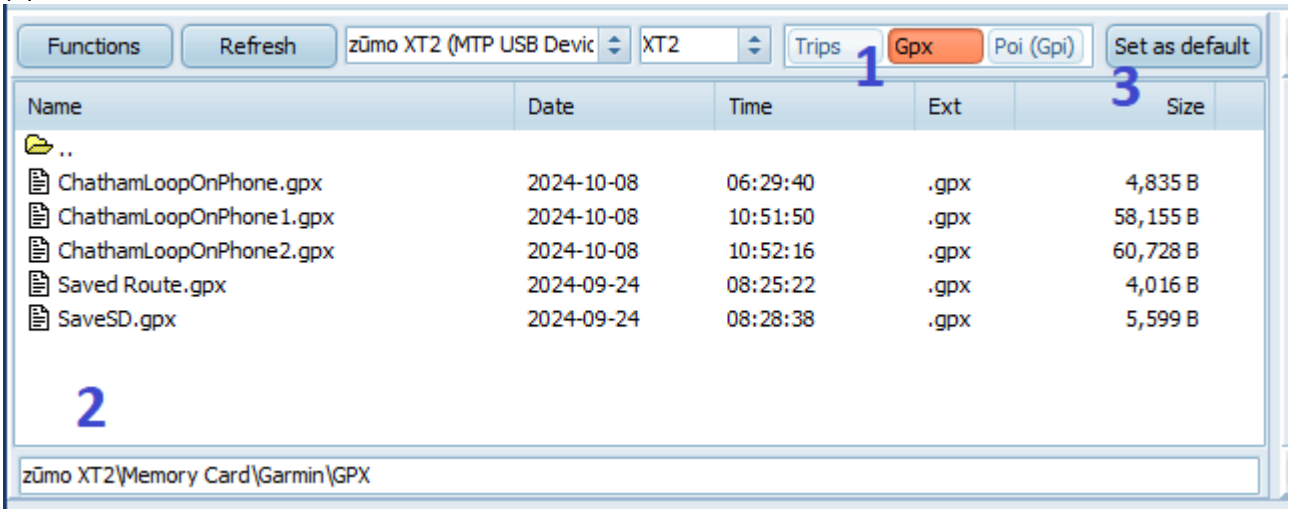


which is discussed further below, provides intelligent, enhanced, transfer of navigation data from. gpx files on the computer to multiple files on the zumo. The default locations for the relevant files are:

Trips: zūmo XT2\Internal Storage\.System\Trips
Gpx: zūmo XT2\Internal Storage\GPX
Poi (Gpi): zūmo XT2\Internal Storage\POI

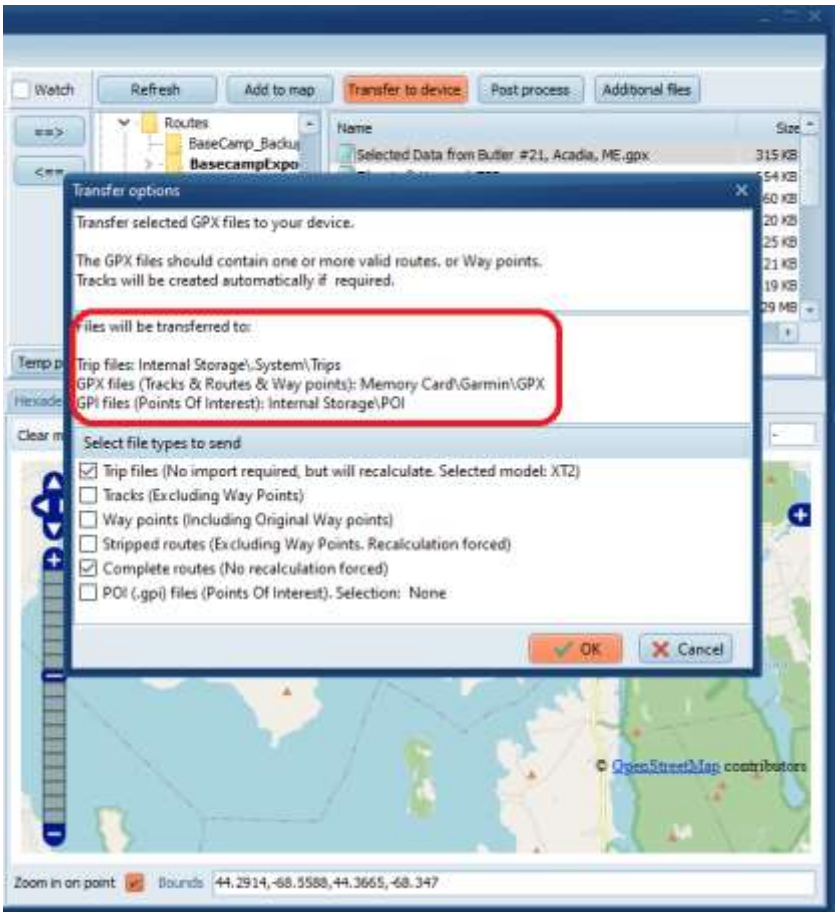
If desired, alternate locations can be configured by Trip Manager users. For example, a user may desire to send gpx files to the memory [sd] card rather than internal storage, that is to zūmo XT2\Memory Card\Garmin\GPX.
The buttons at upper right of the zumo file system section of the display are used to do so.

For the above example (1) click on the Gpx button, (2) navigate to the desired destination for transfer of gpx files, and (3) click the Set as Default button.



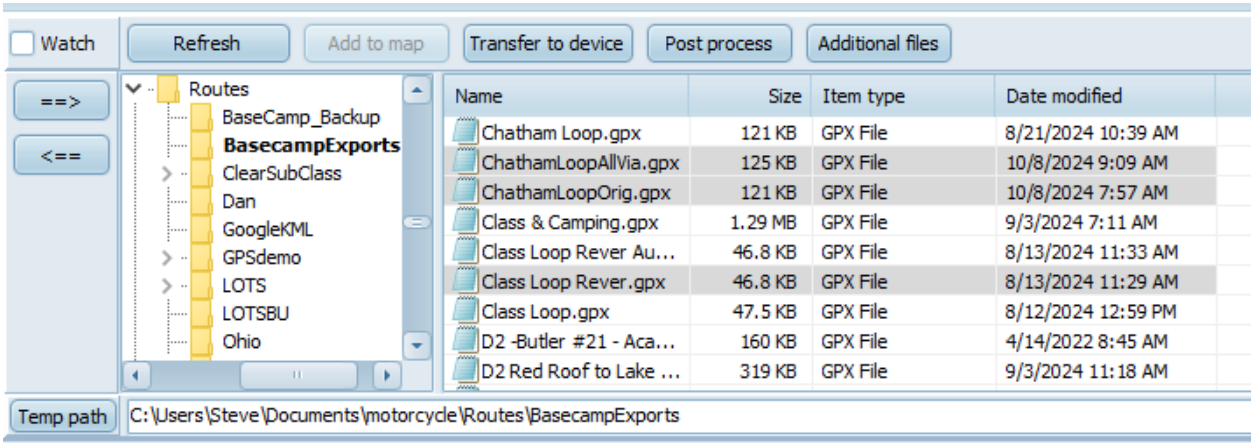
It is important to note here that the zumo expects certain files and file types to be in specific locations. Trip Manager provides great flexibility here, but the zumo may not be able to find files placed in improper locations.

Clicking on the Transfer to device button will always show the currently configured destinations for each file type. They are also available on the General tab of the Advanced settings dialog.



The Functions and options of the Transfer to device button are discussed further below.

Computer File System Navigation and Functions



Basic file and folder navigation here works the same way it does elsewhere on the Windows computer.
The current folder path is shown at the bottom of this section.

Right clicking on a file brings up the standard Windows context menu for files allowing the user to Open, Edit, Rename, etc.

The Temp path button: This is primarily a diagnostic tool for debugging. Trip Manager creates temporary files for internal use. This button opens a Windows File Explorer window to the directory containing those files.

Arrow buttons: As noted above, the ==> and <== buttons perform simple file copy between the zumo and the computer.

The Watch checkbox: When checked, Trip Manger will watch for changes to the selected directory. If a .gpx file is exported and saved to that directory, Trip Manager will automatically open the post process dialog (see Post Process below).

Add to map: will display the content of selected .gpx file(s) on the OSM map display (internet connection required to download the map).

Compare trip and .gpx: This is a significant feature of Trip manager allowing the user to verify that a zumo calculated route is consistent with the .gpx specified route. Any differences can be detected and resolved while route planning at a computer on a desk, rather than while out on the side of the road.
To compare and verify:

1. Transfer the .gpx file(s) to the zumo using the desired method. See “Transfer to device” below which is the recommended method.
2. Open the route(s) on the zumo so that the zumo will [re]calculate it (them).
   (Note that this requires restarting the zumo and not connecting to the PC.)
3. [Re]connect the zumo and PC.
4. Select both a trip file on the zumo (upper left display) and corresponding .gpx file on the PC (upper right display). Click “Add to map”. This will simultaneously show both versions of the route on the OSM map so that any differences become visible.

Tips for comparing routes:
Note the “Zoom in on point” checkbox at lower left of the OSM map display which can be unchecked when comparing an overall route or checked to automatically zoom in on selected points.

Comparing uncalculated routes provides only a limited comparison.

- If the route in the .gpx file has not been calculated, then it will contain only route points (Via and optionally Shaping points). These will be connected by straight lines drawn on the map.
- If the route in a .trip file has not been calculated, it will similarly contain only route points (Via and optionally Shaping points) which will be drawn on the map connected by straight lines.

If the comparison results in a complete match of the straight lines this verifies only that both versions of the route contain the same route points.

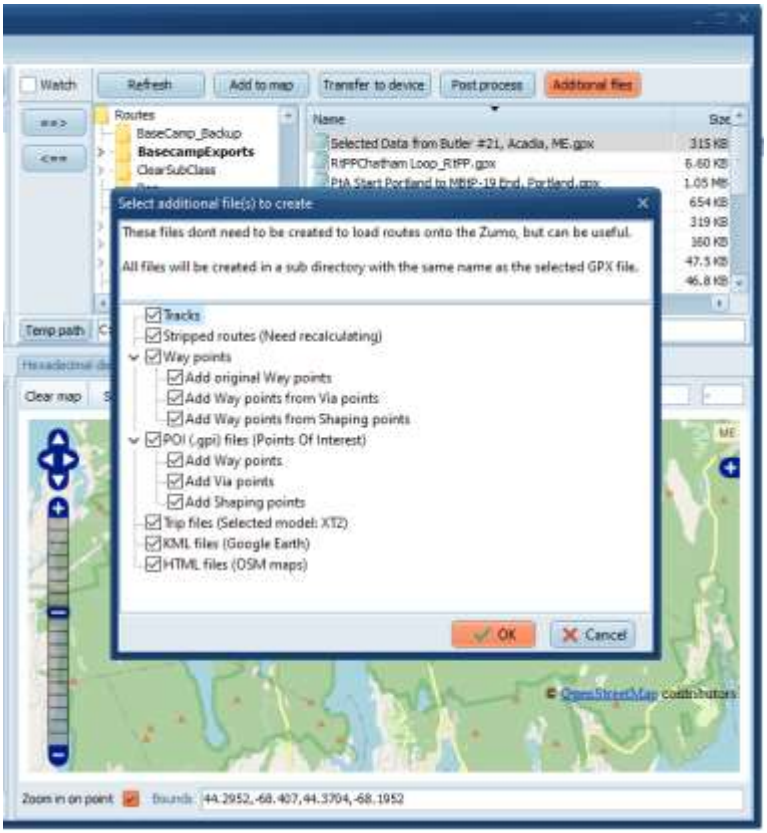
Since different devices and route planning tools can calculate different routes from the same set of route points, comparing calculated routes will help to verify that a route calculated on the XT[2] matches the route contained in the .gpx file, which may have been calculated by Basecamp or some other route planner.

- If a route in a .gpx file has been calculated, it will contain a large number of ghost points (route point extensions). This allows for the route to be drawn on the map in significant detail.
- If the route in a .trip file has been calculated, it will contain some, but not all of the route's ghost points. When drawn on the map, that route will appear in less detail than the one drawn from the .gpx file.

Small differences in the drawn routes will generally be due to differences in the level of detail. Those do not indicate a difference in the calculated routes.
Differences in calculated routes will typically appear as larger differences in the drawn routes.

Route differences, if any, are generally resolved by adding shaping or via points to the route (aka trip) in order to force the zumo's route calculations to produce the desired route. Trip Manager's Trip Editor, discussed below, provides the ability to add points to a .trip file on the zumo. The route must then be recalculated on the zumo.

Additional files: Depending on the content of an existing .gpx file on the computer, Trip manager can create a number of additional useful files. Those files can subsequently be used by Trip Manager, transferred to the zumo, or used with other routing software or devices, as desired. The created files are written to the computer, in a subdirectory created based on the gpx file name.



The tables below indicate what can be created for each selected checkbox. Appendix B: Points, Tracks, Maps, Routes, and Conversions provides additional information regarding how and why such creation works.

Checkbox	If the original .gpx file contains	A new .gpx file will be created containing
Tracks	a calculated route a track	A track generated from the route A copy of the track
Stripped routes	A route, whether calculated or not	An uncalculated route containing only Via and Shaping points, with subclass information removed. This prevents points from being renamed and relocated.
Waypoints	Way points, Via points and / or Shaping points as selected below	Waypoints
Add original Way points	Way point(s)	A copy of the Way point(s)
Add Way points from Via points	Via point(s)	Way point(s) converted from the Via point(s)
Add Way points from Shaping points	Shaping point(s)	Way point(s) converted from the Shaping point(s)

Checkbox	If the original .gpx file contains	File Created
POI (.gpi) files	Way points, Via points and / or Shaping points as selected below	A .gpi file containing Points Of Interests (POIs)
Add Way points	Way points	The created .gpi file will contain a POI generated from each Way point
Add Via points	Via points	The created .gpi file will contain a POI generated from each Via point
Add Shaping points	Shaping points	The created .gpi file will contain a POI generated from each Shaping point
Trip files (Selected model)[4]	A route, whether calculated or not	A .trip file containing the uncalculated route
KML files	A calculated or uncalculated route A track	A .kml file containing the calculated or uncalculated route as a linestring and the route points as placemarks A .kml file containing the track as a linestring and the first and last track points as placemarks
HTML files	A calculated or uncalculated route A track	An .html file with a visual image of the calculated or uncalculated route shown on a map An .html file with a visual image of the track shown on a map

[4] The zumo model, XT or XT2, is selected at the upper portion of the zumo file system section of the display. It is also the PrefDevice Registry Key on the General tab of the Advanced settings dialog.

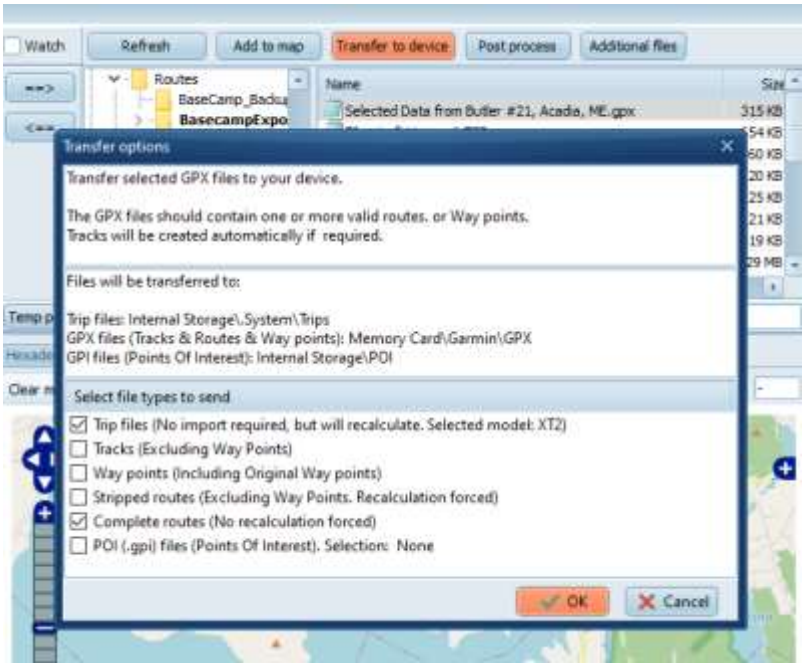
- Tracks have a number of uses including sharing routes with devices not compatible with Garmin style routes in gpx files.
- Stripped routes will contain only the Begin, End, via and shaping points of the route. Hidden points and subclasses are removed. This will force route recalculation when loaded onto the zumo or other device. It will also prevent point renaming and relocation by the zumo.
- POI creates custom Point of Interest files, in .gpi format. Custom POI's, or alerts, on the XT[2] popup during travel independent of any route that might currently be navigated. They will be displayed with the icon specified in the original .gpx file, e.g. the icon chosen in Basecamp (unless edited).
  POI files for various interests are available from a variety of sources. POI files on the computer can be transferred to the zumo using "Transfer to device". The zumo XT[2]\Memory Card\Garmin\POI folder can be a good location to save them.
- Trip files creates .trip files that can be transferred to and used directly on the zumo. Note that there are differences in trip files for the XT and XT2.

KML and HTML files are not used by the zumo but are useful to other applications.

- KML Files produced here will be usable in Google Earth, and other programs supporting this format such as Maps.Me, Organic Maps or Google My Maps.
- HTML Files generated here can be used to share images of mapped routes with anyone who is able to open a browser.

Note that double-clicking on a .gpx, .kml, or .html file in Trip Manager will open the file using the associated application on the PC, assuming there is one.

Transfer to device: is similar to the above Additional files feature but here Trip manager provides direct transfer of generated files from the computer to the connected zumo. For the various file types, the destinations in the zumo file system are displayed in the Transfer options dialog box. Those destinations are configured with the Set as default button in the zumo file system section of the display. (They are also available in the General tab of the Advanced settings dialog.)
Several file types can be selected to send to the zumo, as indicated by the dialog box. File content selections from the Additional files dialog, discussed above, are applied here. (Those setting are also on the Transfer to Device tab of the Advanced settings dialog.)



Trips transferred using the Transfer to device function are automatically set to "saved" to avoid RUT.

There are a number of techniques available to transfer routes from a computer to navigation devices such as the zumo. They depend, to some extent on the content available in the original .gpx file(s) and the desired results. There are pros and cons to each. Appendix C, Computer <-> Device Transfer Techniques discusses several route transfer techniques applicable to Trip Manager.

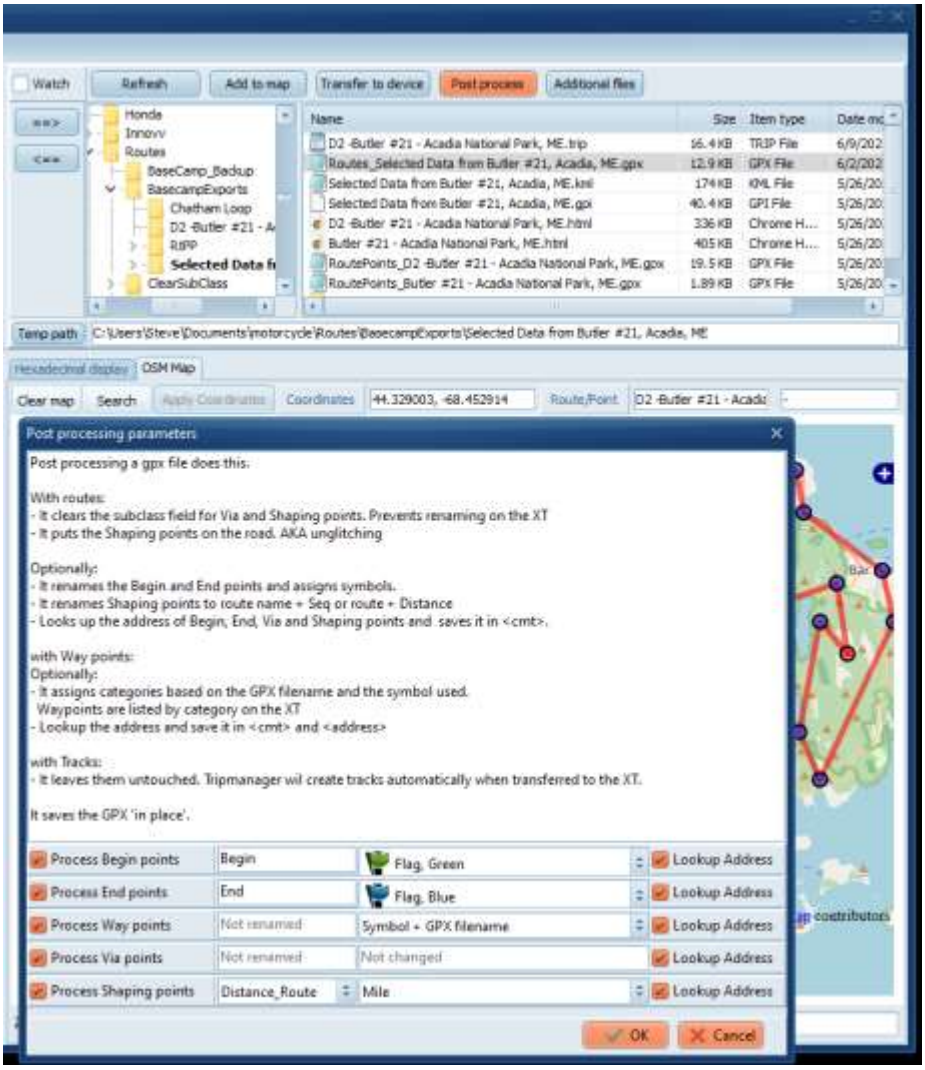
Post Process: While not required, the optional post processing of .gpx file content offers several useful modifications to the content of selected, previously created, .gpx files on the computer. The .gpx file may have been exported from Basecamp or any other route planning application. (For MRA export using the .gpx 1.1 route + track + poi option)

Select the desired .gpx file(s) on the computer using Trip Manager's upper right display, then click the "Post process" button.
Note that the .gpx file(s) will be modified "in place". Save a backup file of the original .gpx file before proceeding if desired.
Post processing will:

- Clear the subclass field. Thereby preventing a renaming of via and shaping points by the zumo.
- Put the shaping points 'on the road', which can avoid routing errors.
- Optionally rename the Begin, End and shaping points, assigning a category. (Via points are never renamed by this post processing.) A few shaping point renaming options are available. For example if the routename is 'tripmanager-demo', shaping points can be named 'tripmanagerdemo_010 Km, (025 Km etc.)' or 'tripmanager-demo_001, (002, 003 etc)'. There are also options to start the name with the distance, or have the distance in Miles.
- Optionally Waypoints can be assigned categories. EG: SYM:<name of symbol> GPX:<name of GPXfile> This makes finding waypoints (aka saved locations or favorites) easier on the XT.
- Optionally, if checked for each of the listed points or point types, the address located at the point's coordinates of can be looked up and added to the point's comment field. This requires that GeoCoding has been configured.

Post processed gpx files can be imported back into Basecamp or other application to view the post processed changes. Note that when importing routes or other data into Basecamp if an element of the same name already exists, it will cause "-1" to be added to names of the newly imported data.

Trip Manager supports Drag and Drop. Dragging a .gpx file into Trip Manager will automatically open the post process dialog. Dragging a .gpx file from Trip Manager into Basecamp will start the import. See also the "Watch checkbox" discussion above. With that selected, exporting a gpx file from Basecamp or another application into the watched directory will automatically open the post processing dialog (if Trip Manager is open on the computer).



OSM Map Display

To support convenient data viewing, Trip Manager automatically downloads the appropriate Open Street Maps segments (internet connection required) for selected trips and for .gpx file content “Added to map”.

The map view may be zoomed using a mouse wheel or the control at left. If the Zoom in on point checkbox at lower left is checked, the map view will automatically zoom to a point selected in the trip info display.
The map view may be panned by dragging with the mouse or using the control at left.
Clicking the “+” at upper right will display a legend.

As noted above, the ability to visually compare the route in a .trip file and corresponding route in a .gpx file, on a map, is a significant feature of Trip Manager. The route from a trip file on the zumo is always shown in the color magenta. The display color for routes from .gpx files on the computer is selectable.

If route points are displayed with straight lines connecting them, the route / trip has not yet been calculated or needs to be recalculated.

Clear Map: Clears all currently displayed data from the map. Selecting new trip files and/or adding .gpx file(s) to map will display data associated with the new selected file(s).

Search: The search button opens a dialog box with two tabs. Using either the free form or formatted search, enter an address and click OK. A dialog box of search results will open. Click on the desired result to center the map at that location on the map and display its coordinates. This can be used with the Trip Editor, which is discussed below.

Coordinates: Generally, displays the coordinates at the center of the currently displayed map. Alternately, Ctrl + Click will get and show the precise coordinates of the clicked location and will re-center the map on that location. This also can be used with the Trip Editor.

Apply Coordinates: This button provides a means to change the coordinates of (that is move) a via or shaping point. It can be used with the Trip Editor, which is discussed below, or with the Trip Info display as discussed here.
With a trip file selected (upper left display), the mLocations field in the Trip Info display (lower left) includes a list of all via and shaping points. The LCTN of each point includes an mScPosn which includes the coordinates of the point. To change the location:

1. Select the desired LCTN, or its mScPosn in the Trip Info.
2. Ctrl + Click the new desired position on the map.
3. Click Apply Coordinates.
4. Click Save Trip File (From Values) at upper right of the Trip Info section.
5. Click Yes in the dialog box that pops up to acknowledge that the change will require route recalculation on the zumo.

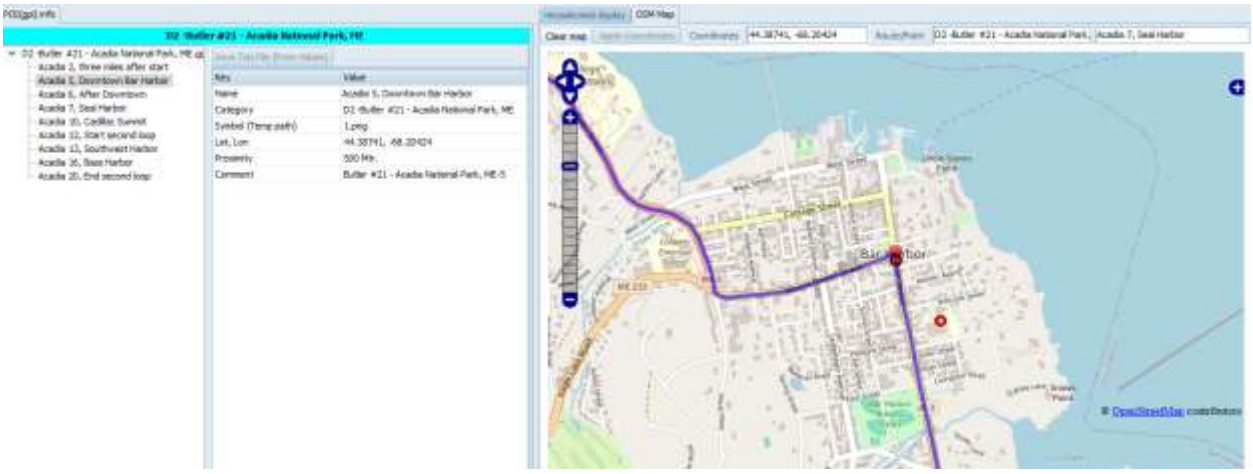
The trip file and the map display will be updated with the new location.
Note that the map display will display route points connected by straight lines until the zumo recalculates the route.

Route/Point: Displays the name of the route / route point that the mouse most recently passed over or hovered over.

Trip Info / Poi(Gpi) Display

The lower left section of Trip Manager's screen displays the detailed contents of a selected trip or point of interest (gpi) file in the common Key – Value pair format. Files may be selected from either the computer or zumo file system. Files on the zumo will show with a green banner while files on the computer will show with an aqua banner. Selecting various parameters within the tree and/or key value portion of the Info display will show related information visually on the OSM map, or if selected, the related portion of the hexadecimal display (see below).

Note that some externally source gpi files may be locked. Those cannot be opened.



Trip Editor: The Trip Editor button opens an editor that can read, write and create .trip files both on the computer and on the XT[2]. It provides the ability to:

- Review the results of a calculated trip (route)
- Edit an existing trip including:
    - Changing Trip Name, Routing Preference, Transportation Mode and Departure Date
    - Adding, deleting, relocating and reordering one or more route points
- Create a new .trip file and
    - import Waypoints and / or route points from a .gpx file
    - add route points from OSM map coordinates
      (This can be used to convert a track to a trip (aka a route). Add a .gpx file containing a track to the map, create a new .trip file, import Waypoints if the .gpx file has them, and then add additional points to the trip using the map as desired.)
- Convert coordinates to addresses with resulting data saved and available on the zumo
- Import Via, Shaping and Waypoints from .gpx files
- Export routes to .gpx files for use with Garmin Basecamp or other route planning tools

Note that any modification made to a .trip file will clear any existing route calculation requiring recalculation on the zumo XT[2]. Trip Manager does not perform routing calculations.

To edit an existing .trip file on the XT[2] or computer, select the file then click the Trip Editor button and then Edit. This will open a Trip Editor dialog showing via and shaping route points for the route in the .trip file. Clicking on any route point in the list will update the OSM map to show the point location. Note that the "Zoom in on point" checkbox at lower left of the OSM map display may be checked or unchecked as desired.

To create a new .trip file, click the Trip Editor button then New trip (Windows) or New trip (MTP device) depending on where the new file is to be created. The MTP device option is only available if a device, typically a zumo XT[2] is connected. If creating a file on an MTP device, it is important to be sure that the proper device type is selected - .trip files on the XT and XT2 are not interchangeable. Enter a trip name and edit the file location if desired, then click OK. This will open the trip editor with an empty trip.

Trip Editor Controls are the same for existing and new .trip files.
Trip Name, Routing Preference, Transportation Mode and Departure Date may be edited as desired.
The MTP device model, XT or XT2, is read only after file creation.
The ID field value of each route point is auto-generated. Any other field in the route point list can be edited directly although using the controls discussed below may be preferred. A right click on any field opens a common Windows context menu. Common keyboard shortcuts are also supported.
One or more route points in the list can be selected using standard Windows selection methods.

Any route point can be relocated using the OSM map. To do so, select the route point in the list, ctrl + left click on the new location on the OSM map and click Apply Coordinates. The route point's coordinates will be updated, its address will be updated if GeoCoding is configured, and the map will be updated to display the new location.

The control buttons at the right edge of the editor will:
- Reorder one or more selected route points, moving them up
- Insert a new route point below the selected point
- Delete the selected route point
- Reorder one or more selected route points, moving them down
- Find and update the address(es) at the point location(s) based on lat and lon coordinates, if GeoCoding is configured. Recall that GeoCoding is generally limited to 1 point per second, so this will take time to complete if multiple points are selected.
- Import from or Export to .gpx files
    - For import, Waypoints and / or routes in the .gpx file may be selected
    - For export, a route containing route points from the .trip file will be written.

Clicking OK will save changes to the .trip file, overwriting the original. Clicking Cancel will discard any changes.
Any saved changes will require the trip (route) to be recalculated by the zumo XT[2]. Until recalculation, the OSM map display can only connect the route points with straight lines.

As an alternative to the Trip Editor and for some of the Trip Info fields not included in the Trip Editor, values may be edited directly in the Trip Info display. In that case, the trip file may be resaved using the "Save Trip File (From Values) button. Again any saved changes will require the trip (route) to be recalculated by the zumo XT[2].

Hexadecimal Display

When viewing trip or .gpi file content, the OSM map display can be changed to a Hexadecimal editor for the selected file's content. Its purpose is to help decode file content. Content can be edited. Hex bytes can be copied with ctrl + c. Character content can be copied with crtl + shift + c. Trip file content can be resaved with the "Save File (From Hex)" button. Users unfamiliar with the concept of hexadecimal file editing should avoid it. Description and guidance is beyond the scope of this document.

Appendices

Appendix A: Repeated U-Turn (RUT)

If, while navigating a planned route, the motorcycle with attached zumo deviates from the route, the zumo will direct the rider to re-join the route. Typically, and logically, this will initially involve a recommended U-turn or series of short turns to get the rider back to the original route. If the rider continues along an alternate path however, it would be expected that the zumo would eventually abandoned the turn-around approach and calculate a new route to the next via point or the destination. The specific behavior will depend on whether the zumo is configured to allow U-turns, allow automatic route re-calculation, etc.

In some cases, the zumo will maintain the U-turn approach much longer than the rider would like or expect. This behavior was coined "RUT" by JFHeath on the Garmin users forum (https://www.zumouserforums.co.uk/viewforum.php?f=11). He found that the RUT behavior occurred with routes which were "imported" to the zumo, but not with routes "saved" on the zumo. Trip Manager allows RUT to be avoided by setting routes (trips) to "saved".

Detailed discussion of the RUT issue can be found here https://www.zumouserforums.co.uk/viewtopic.php?t=2904 and in several other posts on the zumo user forum.

Appendix B: Points, Tracks, Maps, Routes, and Conversions

[This document provides a limited discussion on these topics, with a focus on Trip Manager's capabilities, which are extensive.]

The Global Positioning System (GPS) is all about positions, that is, locations or points.

Tracks, calculated routes, and even digital maps are actually large numbers of points connected by straight lines. This can be seen by zooming in on a map.

Points

"GPS" devices[5] and route planning software treat points according to how they are formatted in a file, regardless of where on earth the points are located or what may be at the location. Any point may be a waypoint, route point (via or shaping) or track point in a .gpx file, a point of interest in a .gpi file, a location in a .trip file, a placemark in a .kml file, or a dot drawn on a map in an .html file. In fact, any given point may be all of those things, even all at the same time.

Waypoints are standalone saved points[6]. Track points, grouped together in proper order, will form a track. Route points, which may be via or shaping, grouped together in proper order, will form a route. Converting from one type of point to another is largely a matter of reformatting. For example:

```
<wpt lat="44.4243" lon="-68.3650"> </wpt>
<rtept lat="44.4243" lon="-68.3650"> </rtept>
<trkpt lat="44.4243" lon="-68.3650"> </>
```

Points may, optionally, include additional information which varies by point type.
In common use, track points typically contain only latitude (lat) and longitude (lon) values.

Route points often add type (via or shaping) and a name or description. They may also include information for use in routing calculation and navigation, some of which may have been obtained from a digital map.

In addition to lat and lon values, Waypoints and Points of interest often include a variety of additional information regarding a business or attraction that may exist at the location.

Waypoints and Points of Interest generally include more than enough information to allow them to be converted to Route points or Track points. Similarly, Route points include more than enough information to be converted to Track points.

Conversions in the opposite direction, for example from Track point to Route point, are also possible but the results will be more limited since less information is typically available. Similarly, as discussed further below, Track to Route conversion is more limited than Route to Track conversion.

[GPS Captured] Track

There are two primary ways to create a track – (1) capture it while traveling, or (2) generate it by converting a calculated route. The first is discussed here. The second is addressed further below.

As the GPS receiver in a phone or dedicated navigation device moves around the earth, it uses signals from GPS satellites to determine its current position. If those positions are saved, they will track the path traveled. Such a track is typically saved in a .gpx file containing only the latitude and longitude of each position captured, in order.

```
<trk>
    <trkseg>
      <trkpt lat="44.424359975382686" lon="-68.365020034834743" />
      <trkpt lat="44.42323001101613"  lon="-68.364560035988688" />
      <trkpt lat="44.422630034387112" lon="-68.36434998549521" />
      <trkpt lat="44.422310013324022" lon="-68.364200033247471" />
      <trkpt lat="44.421929977834225" lon="-68.363989982753992" />
        .
        .
```

[5] More properly a "GPS" device is a Satellite Navigation device or "SatNav". Using proper terminology, GPS refers to a system of satellites.

[6] Some of the terms used around GPS are used in varied ways. Waypoint has different meanings to different vendors and users. The terminology used here is Garmin centric. Further explanation, including a glossary of terms can be found attached to this post https://www.zumouserforums.co.uk/viewtopic.php?p=22315#p22315

```
        .
      </trkseg>
    </trk>
```

Note that this track is completely independent of any map or path. The travel captured may have been along a road, along a forest path, through thick jungle where no path exists, over water, or anywhere else on earth.

The captured track may subsequently be plotted on any map of choice. How well that track follows a particular road or other path on a map depends on the accuracy of the map, the accuracy of the device which captured the track, how frequently track points were captured, and the speed of travel. Most SatNav devices and digital maps are impressively accurate, but neither is perfect. Some variation is normal.

Digital Maps & Routing

Maps, of course, provide a visual representation of an area. As noted above, digital maps representing roads or other paths are made up of points connecting straight lines. Although hidden from view, points exist on digital maps where a road changes direction, at intersections, and at other important locations. Additional hidden information may include road type, speed limits and other characteristics. Routing algorithms use this information, along with user preference and avoidance settings (e.g. shortest vs fastest path, avoid highways, etc.) to calculate routes between user specified points.

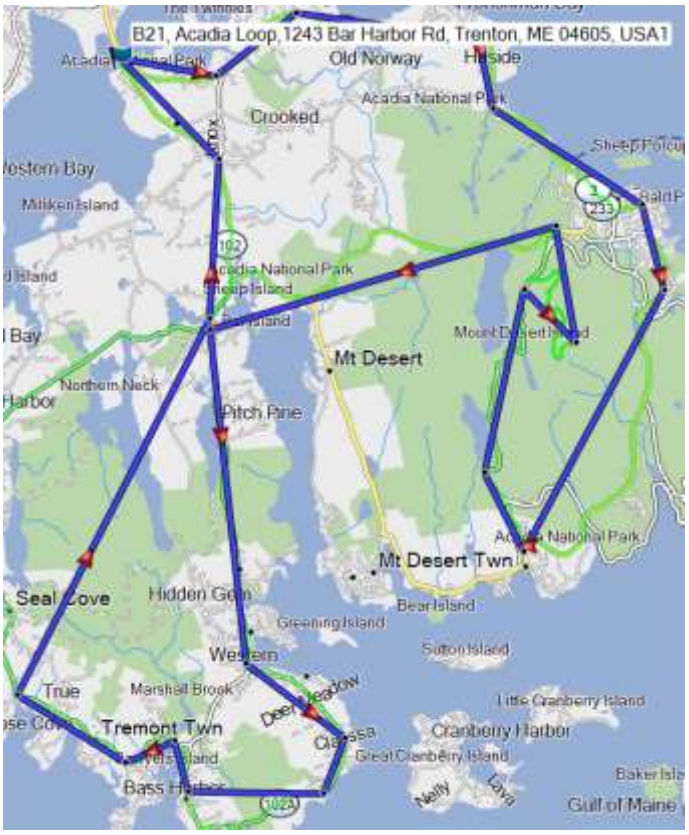
[Uncalculated] Route

The user of route planning software on a computer or built into a SatNav device can specify points on a digital map to be visited. This might be as simple as two points such as current position and final destination, or may include a number of locations of interest on a multi-day trip. The points may be specified by clicking or tapping on a map, chosen from a set of preexisting Waypoints or Points of Interest, or any combination of those.

Regardless of how the points are chosen, they are Route points. They may be specified as Via points which are important to the user or as shaping points intended only to specify travel along a particular road or path.

In addition to user specified points, depending on the Routing software used and the file format chosen, a file containing a user specified [uncalculated] route, may also contain route preference settings, desired route point symbol choices and other information.

Like any other points, user specified Route points could be plotted on a map and connected by straight lines.



In order for a route to follow roads or paths on a map, many more points [connected by straight lines] are required. It would be extremely tedious for a user to specify the hundreds or even thousands of points required. This is where digital maps and routing algorithms come in.

[Calculated] Route

A digital map will often represent a number of possible paths from each user specified Route point to the next. Route planning software will narrow down the possible paths to a single one by applying the user specified preferences and avoidances, along with the map's hidden information, to the routing algorithm coded into the software. Once the path is chosen, the map's points along that path will be added to the route as "hidden" or "ghost" points. In a gpx file, they are specified as Route Point Extensions. Additional information from the map may also be added to the route in the form of a gpxx Subclass.

There are two import things to note here:

1. the points on the map, which are connected by straight lines on the map, to represent the roads on the map, become the Route Point Extensions in the route.

   As a result, if the Route Point Extensions in a calculated route are subsequently plotted on the same map that was used to generate the route, and those points are connected by straight lines, the plotted route will perfectly follow the roads on that map since both the route and the map are using the exact same points.

   If that calculated route is plotted on a different map however, the route may not perfectly match the roads although they will often be very close.

2. Route Point Extensions:
   a. are specific to a particular map.
   b. are the result of routing calculations.

c. are never used to calculate or recalculate a route.

It is critical to note that the single path chosen during route calculation, among all of the possible paths from each user specified Route point to the next, depends on:

- the user's selected preferences,
- the map used and the hidden information it contains,
- the routing algorithm(s) coded into any particular software or device.

Any calculated route can be expected to pass through each user specified Route point. The route chosen between those points, and therefore the Route Point Extensions generated, will not be consistent unless all of the above variables are consistent.

A file containing Route points, imported to different devices or software, with different maps and different user settings, will likely result in different routes when [re]calculated. All routes should pass through all of the user specified Route points however.

[Generated] Track

Once a route has been calculated, a track which follows that calculated route can be generated by simply reformatting the Route Point Extensions as Track points.
For example

```
<gpxx:rpt lat="44.422659873962402" lon="-68.364336490631104">
    <gpxx:Subclass>0300F900D501B9F790001F00250048461E00</gpxx:Subclass>
  </gpxx:rpt>
```

becomes

```
<trkpt lat="44.422659873962402" lon="-68.364336490631104" />
```

Since the track points specify the same locations as the Route Point Extensions, which are the same points as those that specify the map which generated the route, the track will perfectly follow the roads on that map. If the track is plotted on a different map however, the track may not perfectly match the roads. Typically they will be close.

Tracks vs Routes

It is clear from the above that a route and a track can both specify the exact same locations. They are simply formatted differently. SatNav devices and route planning software treat the information differently however, depending on that format.

A track plotted on a map provides a visual representation of a path to be followed. A track, regardless of whether GPS captured or route generated, and regardless of any particular map used to generate it, will never change after it has been created. This can be an advantage. It will remain consistent when shared with others regardless of their chosen device, map(s) and routing parameter configuration. This can also be a disadvantage since a track can never be recalculated when, for example, a planned route change is required due to a closed road detour. A track cannot provide turn-by-turn directions or arrival announcements. Tracks are specified with very large numbers of track points. As noted above, those points typically contain only location information, in the form of latitude and longitude.

A route typically contains more information than a track. A route is calculated from a limited number of user specified route points. It can provide spoken turn-by-turn directions and arrival notifications. A route can be recalculated when travel varies from the originally planned route. Recalculation can be an advantage or a disadvantage.

If one or more route points are moved, added or removed, and the route is recalculated with all of the other related variables remaining consistent with the original route calculation, then the resulting route will likely be as expected.

If a route is recalculated using a different map, different route preferences or avoidances, and / or software or a device with different routing algorithms, the resulting route between specified route points can vary significantly. The greater the number of route points specified in the original route, the closer varied routing results will be.

Track to Route Conversion

As discussed above, generating a track from a calculated route is straight-forward. It is also possible to generate a route from a track. The resulting route will be limited, however. Track points, which typically contain only locations, can be converted to route point extensions containing only locations. A track does not contain any information to indicate which points should be route points rather than route point extensions. Since a route must contain at least two route points to be valid, the first and last track points in the track are converted to route points. When initially plotted, the resulting route will accurately represent the track. The route can also provide turn-by-turn directions.

Significant changes are likely to occur if this route is recalculated. As noted above, route point extensions are not used in route calculations, only the route points are used. This means that a recalculated route converted from a track will be based on only the first and last points from the original track.

Appendix C: Computer <-> Device Transfer Techniques

There are multiple methods to transfer routes and tracks, as well as additional navigation related data, between a PC and a zumo (as well as other devices). Each has their respective pros and cons. Techniques applicable to the zumo include:

1. Using Basecamp, Explore (XT only), or the Tread phone app (XT2 only).
2. Sending a track to the zumo and converting it to a trip on the zumo.
3. Sending a calculated route to the zumo.
4. Sending a “stripped’ (not calculated) route to the zumo.
5. Sending a .trip file directly to the zumo (recommended, when possible).

Number 1 is not discussed further here. Trip Manager supports methods 2 through 5 using “Transfer to device”.

If the original .gpx file contains only a track, then Trip Manager can send that track to the zumo for conversion to a trip. That technique, number 2, results in a trip that will not be altered, but has no meaningful via or shaping points. All route points will be random locations selected from the track since there is no other information available.

If the original .gpx file contains an already calculated route [which will contain many “hidden” or “ghost” points, that is route point extensions in the gpx file], then Trip Manager can send it to the zumo. Technique number 3 will result in a route on the zumo which does not require recalculation so it will **initially** match the route in the original .gpx file. All route points, via and shaping, will be those of the original .gpx file and they will not change (unless the Tread App is allowed to sync routes). However, if a route recalculation is later forced on the zumo for any reason, the resulting route (trip) may be quite different from the original.

Technique number 4 can be used if the original .gpx contains an uncalculated route. It can also be used if the original gpx file contains a calculated route because Trip Manager can “strip” the route, that is remove the “hidden” or “ghost” points so that only the via and shaping points remain. In this case, the trip(s) will always be recalculated upon importing by the zumo. This means route calculation results from the zumo can be checked and compared to the intended route(s) while comfortably sitting at a PC on a desk, avoiding potential frustrating surprises while traveling.

Most importantly, technique number 5 has the Trip Manager sending a .trip file directly to the zumo. These trips don’t need to be imported. They will be directly available in the trip planner. They are automatically set to ‘saved’, avoiding “RUT”.

Routes within the same .gpx file are automatically grouped (on the XT). The first time a trip is opened on the zumo, it will be recalculated.

Methods 2 through 5 can be completed using Trip Manager's, "Transfer to device". Starting with .gpx files containing only route(s), and optionally waypoints, Trip manager can generate trip files containing the route(s), plus corresponding tracks, waypoints and points of interest. Trip Manger can then transfer the trips directly to the proper default locations on the zumo.

Routes [re]calculated by the zumo should be checked against original routes specified in the original .gpx files. Trip Manager makes this easy as discussed in "**Compare trip and gpx".**

Appendix D: Glossary of Terms

The table below provides a brief glossary. A much more complete version can be found attached to this post https://www.zumouserforums.co.uk/viewtopic.php?p=22315#p22315

GPI	Garmin Point of Interest
GPS	Global Positioning System
GPX	GPs eXchange format
HTML	Hyper Text Markup Language
KML	Keyhole Markup Language
OSM	Open Street Maps
POI	Point Of Interest
RUT	Repeated U-Turns