

GPS and route planning for cycling.

Terminology and File formats.

A **waypoint** is ultimately a lat long coordinate with associated information: Name, icon, description. The Garmin Edge calls waypoints "locations".

A **route** is an ordered list of separate waypoints, i.e. lat long coordinates. The GPS is free to calculate its own route between each waypoint.

A **track** is a sequence of lat and long coordinates which the GPS follows precisely.

When you navigate a **course** you have a preset path that you follow.

When you navigate a **route** you have an ordered list of waypoints or places you have to go by (think of them as via points) but between them the path you follow is not preset and can vary.

.gpx format is XML format; it doesn't include cadence and heart rate without added extensions

.tcx is a proprietary Garmin format that adds fitness related info, eg cadence, heart rate, power, workouts, virtual partners etc + course points and cues.

Garmin Edge devices convert .gpx (both types) or .tcx files into courses in .fit format. The quality of the course that you get will therefore vary according to the type of source file.

If you want to follow a fully defined **course**, use a .gpx track file or a .tcx file; (avoid .gpx route files).

Which GPS?

It is strongly recommended that you buy a mapping GPS. This enables you to check your position on the map in the event that you don't get an expected turn instruction (a not uncommon event). Note that the necessary digital map is much cheaper bought with the GPS. You also need to consider whether you need accessories like a cadence counter or a heart rate monitor. These are useful for setting and monitoring training regimes and for uploading data to sites like Strava. Smart phones with GPS usually have much better displays but pay the penalty of reduced battery life. Battery life can be enhanced with an external battery pack in a top bar bag with usb connection. Here we take the very popular Garmin Edge 800 model (now obsolete but refurbished ones are still available cheaply) as an example of a dedicated, mapping, cycle GPS.

Which maps?

City Navigator (Garmin): Not free, but inexpensive when purchased with a GPS. Covers most of Europe with an adequate street and road / lane map for road cycling. Lacks detail but uncluttered, so some prefer it. No good for off-road.

OS 1:50K map of GB (Garmin version). Costs about £50 in a package with a GPS, much more otherwise. Detailed but the Garmin version is out of date. As the OS maps were originally produced by manual surveying techniques you will find there are sometimes minor discrepancies between GPS (satellite data) and the OS data. Nevertheless, my favourite map.

Google etc maps: Download the desired area in advance to your smart phone to avoid data charges. Good quality for road cycling + bonus POI information. Free. Android, iOS & Windows devices.

Velomap and **mtbmap**: These are produced by the Open Street Map collaboration. These are often very detailed, free of charge, cover most populated countries but, as the detail is provided by enthusiasts, may be of variable quality. In practice usually OK and brilliant when you just need a map for a short trip abroad. The mtb version has proved very satisfactory on the Edge 800 for hiking trips in Germany, Switzerland, Austria, France and the Azores. Often better than the OS maps for off-road and cycle paths but not as easy to read. Download is tricky. Download routeable version maps with contours: <https://www.velomap.org/download/odbl/> or <https://openmtbmap.org/download/odbl/>.

PC Mapping Programs.

Basecamp: Can be downloaded free of charge from Garmin. The program can use the maps on a connected Edge GPS for route planning, useful when there is no internet connection. Can also be used to store, sort and download rides to your GPS.

Memory Map: My favourite. Around October memory map have offers (about £50 for whole GB) on the previous year's OS 1:50K map for GB. Import a .gpx track file as an overlay into Memory Map for detailed study. Unlike Basecamp you can print the resulting OS route map. There are other similar mapping programs.

Example Garmin Edge 800 Set up.

See the separate document by Richard Haynes on Edge 800 set up. There is also a good online manual for the Edge 800 at: <http://www.cyclechat.net/threads/garmin-edge-800-user-guide-with-fancy-pics.126369/>

You can personalise the start up screen of the GPS with your name, address etc. Edit the file startup.txt in the Garmin folder of your GPS with a text editor like Notepad. My startup.txt looks like this, (the items in parentheses are not displayed):

```
<!-- Edit this file to display a message while your unit is powering on          -->
<!-- Allow one full power cycle after editing for your message to be updated      -->
<!-- Set the display number to the minimum number of seconds your message is displayed -->
<display = 10>
<!-- Type your message on the next line -->
```

If found please return to:

Michael Ward
44 G----- M---
Romsey SO51 7-- England.

01794 -----

meward@-----.-.-.

Thank you.

Further tips for personalising your Garmin Edge GPS at: <http://www.scarletfire.co.uk/garmin-edge-tips-tricks/>.

Route Planning websites.

<http://bikeroutetoaster.com/> ; <http://ridewithgps.com/> ; <http://www.bikehike.co.uk/> ; <http://www.mapmyride.com/gb/>

Having tried most, for **planning** my favourite is Bikehike (GB only). It's free, but I use it often so gave a donation. The Course Creator option has a Google or Open Street Map display (your choice), plus a separate pane providing the OS 50K map, or elevation / gradient data. The former is useful when going off road or for checking your route against the paper OS map. Start in Course creator by entering the name of the start location, e.g. Romsey. Select desired options in the panel on the right (e.g. Google; Avoid highways; Cycling). Plot your course on the Google map pane; the course follows the road by default. When you have finished, click Save Route and enter a short descriptive name e.g. Alresford 46. Next, select download to file, choose the file format & download to your PC. A .gpx track file is best for use on PC mapping programs like Memory Map; a .tcx file for the Garmin GPS itself. Locate the downloaded .tcx file in Windows Explorer and copy to the Garmin / New Files folder on the GPS via a usb cable. You can also upload existing routes from PC and reverse them. Bikehike is easy to use but there is no facility to share or archive your routes. For that, use one of the other planning websites (above) or Garmin Connect or Strava.

Recording and analysing rides on the web.

Garmin Connect: <http://connect.garmin.com/> is Garmin's site for uploading rides, archiving your activities and creating routes. It's ability to analyse your ride is rudimentary compared with Strava + Veloviewer, but if you have a Strava account you can upload rides from Garmin connect to Strava anyway. Garmin connect has a useful search facility to find archived files, provided you have been systematic naming them. It has a useful user forum.

Strava is the social media / bragging site for cyclists: <http://www.strava.com> . Basic accounts and mobile apps are free. You upload your ride from your usb - connected GPS. It analyses your performance over route segments that you or other cyclists have created, enabling you to compare your performance with other times you have ridden that segment and with other cyclists too. "Cups" are awarded for personal bests and there are various monthly challenges providing on line badges and expensive cycle shirts. Some people take it very seriously! You can "follow" your friends, they can follow you and you can share the results on Facebook or Twitter too. If you are bashful, you can select a privacy option to keep it all to yourself. It's best to obscure your exact starting point within a 0.5 km radius, so that thieves don't come and steal your expensive bikes. Premium (paying) members get more, including Training Programs, a "Suffer Score", detailed heart rate / power analysis and a very useful "Heat Map" of your routes. For even more detailed analysis use the excellent Veloviewer: <http://veloviewer.com/> which works with Strava to provide fully sortable and filterable lists, maps, graphs, & 3D profiles of your aggregated Strava history. A cycle nerd's paradise.