

GARtrip Version 204c Overview

Next: [What's new](#)

You get this help text out of the running program GARtrip:
through the *Help* menu,
or by clicking on the menu or on the (part of) window you need help on, and subsequent F1 keystroke (context sensitive help).

You move through this help text
by clicking on the underlined links, or on the *Back* button
or by the *Search* button with keywords.

You may get actual info on GARtrip on the web: www.gartrip.de

See the [Security advice](#) first!

The program GARtrip is used to manage and check the data of a Garmin or Magellan GPS-receiver. In addition you need a data cable and a free serial [port](#) on your PC.

The terms [Waypoint](#), [Proximity Waypoint](#), [Route](#) and [Track](#) (Track Log) are used with the same meaning as in the receiver manual.

see also: [Help topics](#)

Functions of the program:

All functions are accessed by mouseclick on the [main window](#).

Transfer of data from/to the Receiver:

[Waypoints and Routes](#) , Routes with estimated duration
[Tracks](#)
[check Receiver link](#)
[switch off Receiver](#)

Storage in files:

[Waypoints and Routes](#) (common file)
[Tracks](#)
each with [headline](#)

[Entering and display of Waypoints:](#)

in different [Formats](#) (Coordinate systems)
with respect to selected [Geodetic Datum](#)
with special aids for working with maps
as distance (km, miles, nautical miles or mm on map) and bearing from reference point
[name conflicts](#) are solved automatically
with [symbols](#) (if supported by the receiver)
Display of creation date and time with [time zone](#) correction
[Takeover](#) from stored Track
Averaging from stored [track](#) or from selection of [waypoints](#)

[List of Waypoints](#) in memory:

with names, descriptions and distance from common reference point
sorted alphabetically, by distance, by age, by coordinates, by symbol

[Definition of Routes](#)

Continuously when [entering Waypoints](#), or afterwards
Display of distances, per leg or accumulated
Calculation of included area

Calculation of duration, based on user estimated speed.
Bearing correction for magnetic declination, entered manually.
Use of avionics database.
Create a new route out of a track.

Chart display

on screen and printer
with map overlay (not for 16 bit version)
optionally as overview (scaled automatically) or with user defined scale, split to
several sheets if needed; portrait or landscape orientation, may be zoomed
optionally with Waypoints, Routes, Track, grid lines
Display of Data of selected track point or range
Takeover as new Waypoint
Averaging of track to increase the precision of a new waypoint
Diagram with speed or altitude

Display and analysis of the track

Clear single bad track points or ranges
Display on chart, with milestones, time stamps, and comments
Speed limit shown by color
Analysis of duration, distance, speed, etc.
Conversion into waypoint (optionally averaged) or route
Manual drawing, or correction of existing track points

Help topics:

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Main window

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The Chart drawn with mouse control

Scanned Maps

What's new

Next: Main Window
Note: Disclaimer of Warranty

Version 204c is a service release of version 204b with few new functions:

When analyzing a track with altitude data, the total ascend and total descend is displayed.

When using a Garmin receiver supporting waypoint depth (example: GPS168 Sounder) the depth is saved in the waypoint description field.

Version 204 is a service release of version 204a without new functions.

Version 204a is a service release of version 204 with few new functions:

The size of Main Window and Route Window can be changed in order to display a bigger list.

The column widths of both lists is preserved among program sessions.

The list of waypoints may be sorted by Altitude.

In release 204 following functions have been changed with respect to release 203:

All known bugs are fixed

New Garmin transfer protocol (D109) for GPS152, 168, 76, 182, eMap...

Magellan receivers are supported

Long Waypoint names (don't forget to set the length in menu Receiver Properties)

Waypoint list and route point list in explorer style; waypoint names can be edited directly in list

Opening files (.wp and .t) from explorer (even if program already active) and by drag and drop

Actual position optionally using NMEA protocol

Routes: insert multiple points at once; sort points; invert

Routes sorted alphabetically

Printing the route list with waypoint descriptions (option)

Calculation of area for closed routes and track range

Hand drawing a track: inserting at any position, shift existing points or range

Set track range to visible part after zoom operation

Chart area optionally defined by marked waypoints

New menu for map selection: open folder

Maximum number of maps is user defined

Control of brightness of map

Printing a test strip to check the quality of map printout

Diagram versus daytime

Diagram with scaling lines

Options for printed diagram: shaded or line only, to save ink

Headline of chart is user selected, optionally for print only

In release 203 following functions have been changed with respect to release 202:

Track and Waypoints with display of altitude *)

Diagram with altitude *) or speed of track

Automatic selection of best map, up to 4 maps used at once

The terms Track, Section, and Pause have been renamed:

the whole content of track memory is now called *Tracks* or *All Tracks* (formerly *Track*),

the record of a single run is now called *Track* (formerly *Section*),

a seamless part of track is now called *Segment* (formerly the gap was called *Pause*),
but the term *Range* is kept.

New coordinates format: MGRS

New file format for Import and Export: StreetAtlas 7.0

Some new functions on Routes

Play Track runs smoothly between track points

Optionally the control window stays on top of the chart

A Track Range can be defined by a rectangle on the chart

The Units for distance and speed are defined separately

The description field for Waypoints is of any length

***) The altitude is transferred by some new Receiver types only, like the eTrex. The popular GPS12c family does not. It is not a program failure if you don't see the altitude.**

DISCLAIMER OF WARRANTY:

THE USER ACCEPTS THIS SOFTWARE AS IT IS.

THERE IS NO WARRANTY OF PROPER FUNCTION.

THE USER ASSUMES THE ENTIRE RISK OF MALFUNCTION.

NEVER rely on calculations done by this program or by your receiver. Always use compass and map and your common sense in addition.

Main window

Next: [Link](#)

After **Program start-up** you will be asked to select an existing Waypoint File. In general you will start your work based on an existing set of data. If you want to start from scratch, answer with cancel.

Some program functions are accessed by buttons, others by menu control as File, Garmin(Magellan), Edit List, System,Profile and Help.

The Main window shows the headline of the currently open file;

the List of existing Waypoints, sorted by selectable criteria;

the selected Coordinate Format and the Geodetic Datum.

Buttons open additional windows:

New Waypoint opens the window Waypoint to enter a new Waypoint;

Edit opens the window Waypoint as well, to display and edit the data of a waypoint that has been selected on the List of existing Waypoints;

insert in route appends the marked waypoint to a route being selected (the window Routes must be open). If multiple waypoints have been selected all will be inserted at once. In this case you must take care on the correct order afterwards.

Routes opens the window Routes, to display and edit routes;

Chart, Map, Tracks opens the window Chart Control, to display Waypoints, Routes, map, and Track graphically.

With the symbol icon on the top right corner of Main window you may iconize all open windows of the program at a time, in order to use the screen for other programs.

Link

Next: Import, Export
Note: Waypoint Proximity waypoint Route
Track Waypoint file

Use a dedicated data cable to connect the receiver to a free serial port of your PC and switch the receiver on.

Garmin receiver: Ensure that the settings on the menu I/O SETUP of the receiver are:

GRMN/GRMN or
Garmin/Garmin
HOST

Define the used serial port within GARtrip by the menu System / Port or select "auto detect". The link will be tested automatically. On success you will get a model and software indication of your receiver.

This test can be repeated at any time by the Menu System / Interface check, Identification.

Set the properties of your receiver correctly within the menu System .

In case of a transmission error you will be prompted whether following transfers shall be tried repeatedly. With this option you have the chance to get your data in case of a weak interface, on the risk of undetected data errors.

Should you get the message *Transmission error* frequently,

close all other windows programs, even if they were iconized;

try another serial port;

ask the supplier of your data cable for a cable with level converter. In general, the signal voltage of some receivers is lower than claimed by the standard. However, most PCs can deal with it without problems.

A Waypoint is a point on earth whose coordinates have been stored. They have been either entered on the PC or on the receiver, or they have been fixed by GPS (MARK key of receiver).

The waypoint is identified by a unique name. A description of any length may be added but not all receivers will show it, or it might be shown only to limited length (16 in most cases). Date and time of creation are stored as well.

Please note that waypoint names may consist of uppercase letters, digits, and the minus sign. No other characters are allowed by the Garmin transfer protocol, although some receivers offer other characters, for example space or plus sign. Gartrip converts all other characters to minus signs.

For some receivers an additional symbol may be defined. If your receiver doesn't support this feature, or if you don't want to use it, you should switch it off in general using the menu *System*.

A Proximity Waypoint is a waypoint with a defined area around it. You define the radius and you will be warned whenever you enter the area.

If your receiver does not support Proximity Waypoints, or you don't want to use them, you should disable them on the menu *System*.

A route is a series of waypoints. The receiver uses a route to guide you to your destination. Any number of routes of any length may be defined. If you have set the limitations of your receiver correctly (Menu System) then you will get a warning if exceeding the limits on transfer.

Routes with identical sequence of waypoints are ignored.

The 16-character long names of routes must be unique within the first 13 characters for some receiver types. If this is true for your receiver you should mark the suitable option in menu System, receiver properties.

When writing to the receiver, route 00 is used only if all available routes have been defined. In this case route 20 (GARtrip) maps to route 00 (receiver). Normally route 00 remains unused because the receiver will overwrite it anyway whenever another route is activated.

A Track (Track Log) is your trace. The receiver stores it and shows it on its dynamic map screen.

A Waypoint File is named with the extension .WP and stores Waypoints, Routes, Headline, Reference point, Scale, Format and Geodetic Datum, time zone, and sorting option. The limit for the number of waypoints depends on your system. With Windows 3.1 it is 4100.

The file format is binary. In case you wish to import or export data or to edit them with a text editor, a text format is available.

Files in Waypoint+ text format, OziExplorer, PCX5 (Garmin), StreetAtlas 7.0, Atlas GIS, Fugawi, Garlink, or Gardown may be imported and exported as well.

Import, Export as text file

Next: [Menu File](#)

Note: [Headline](#)

Import and export is done using the functions *Open* or *Save as...* and selecting the proper file format.

Normally Waypoint files and track files are stored in a private binary format. This has some advantages: opening and saving is fast, and files are short. Coordinates are stored in exactly the same format as used by the receiver, i.e. without any loss of precision.

In case you wish to edit the data by other means, an ASCII text format is suitable.

You may import or export waypoints and tracks using the format of the programs Waypoint+, OziExplorer (Text file), PCX5, StreetAtlas 7.0, Atlas GIS, Fugawi, GARDOWN, GARLINK.

For general use there is a general purpose text format (*.TXT) available.

The general purpose text format (GARtrip Text *.TXT)

Coordinates of waypoints or track points are written in the format and datum selected on the main window.

Be careful when importing data. Wrong number formats may cause unpredictable results!

If you create such a text file to be imported, please follow these rules (see also the sample file SAMPLE.TXT):

Waypoint file as text:

1st line: must begin with the word "Waypoints". The coordinate format and geodetic datum may follow, both written exactly as in the selection fields of the main window. If you omit these indications, the coordinates will be interpreted according to the actual setting in the main window.

2nd line: headline for the following lines. May be omitted.

following lines: one line per waypoint. These consist of the following data fields. The field delimiter may be a tab, semicolon, or comma (only one of them for the whole file):

- > Name
- > Description
- > Zone (only if format = UTM or British Grid or Irish Grid)
- > Latitude or Easting
- > Longitude or Northing
- > Creation time (Seconds since 31-DEC-1989, 00:00:00). May be omitted.
- > Symbol code. May be omitted.
- > Altitude in meters. May be omitted.

Latitude and longitude can be imported in the wrong order, provided that the hemisphere is indicated by letters (N or S, E or W, but not + or -). The "degree" character "°" may be substituted by a space or by another special character.

Further lines define the routes. There are two formats for routes; format a is not recommended, it is there only for compatibility to former program versions.

a) one line per route. These consist of the following data fields:

- > "Route"
- > Name
- > one name field for each waypoint within this route

b) a set of lines for each route. First line:

- > "Route"
- > Name of route; more data fields are not allowed within this line

For each waypoint one line to follow, with its name in the first field. Following fields within each line are ignored.

After all waypoints of this route: "<end>"

Note: all waypoints used by routes must be defined first in the waypoint list.

When exporting, detailed information on the route legs follows. This informal fields are ignored when imported.

Track file as text:

1st line: must begin with the word "Track". The coordinate format and geodetic datum may follow, both written exactly as in the selection fields of the main window. If you omit these indications, the coordinates will be interpreted according to the actual setting in the main window.

2nd line: headline for the following lines. May be omitted.

following lines: one line per track point. These consist of the following data fields.. The field delimiter may be a tab, semicolon, or comma (only one of them for the whole file):

- > Zone (only if format = UTM or British Grid or Irish Grid)
- > Latitude or Easting
- > Longitude or Northing
- > Creation time (Seconds since 31-DEC-1989, 00:00:00). May be omitted but in this case you will get no speed indication.
- > Flag: 0=standard; 1=new Segment; 2=new Track; 3=both. May be omitted.
- > Description. May be omitted.
- > Altitude in meters. May be omitted.

You may write a short description into the headline, in case the file name is too short for clarity. The headline will be stored within the waypoint file.

Menu of Main window: File

Next: [Append, Update](#)
Note: [Message](#)

open (Function key F6)

With this function a Waypoint File will be read into the working memory of your PC, or imported.

The file selection box comes with the last use file. The 8 last used files can be chosen by a dropdown list. You may enter another file name directly, or use Browse for a general explorer style selection. In this case you may also use the file management functions of the explorer.

In case there are already data in the memory, you will be asked if the file should be appended to the existing data, to combine two data sets into a single one.

When two data sets are combined a name conflict may arise, as waypoint names must be unique. In this case see Read from receiver. Identical coordinates are detected as well.

Should the existing data have been changed before, you will be asked if they have to be stored - in case you forgot it.

See also Status Message.

save (Function key F7)

With this function the data in memory are stored in the currently opened Waypoint File.

Save as...

Like Save, with selection of another file name, and export format if desired.

On selection you may save only the waypoints you have marked on the list before, or all routes, or selected routes.

If you apply an existing file name, you may overwrite this file, or append the data to it. This helps to collect certain waypoints in different files, without the need to open these files. Or you may update other files after having changed some common waypoints, see Append, Update.

See also Status Message.

It is recommended to save data files in dedicated directories. In each case the following files must be in the same directory as the program file GARTRIP.EXE:
GARTRIP.HLP, GARTRIP.RES, DATUM.INI, SYMBOL_2.INI, SYMBOL_3.INI, GARMIN.INI.

Print

You get a list of waypoints and routes on your printer. If more than one waypoint had been marked they are printed in red. Coordinate format, geodetic datum and sorting option are used as chosen on the main window.

Each route is followed by a line named "direct". This shows the direct distance from the first to the last route point, and the direct bearing. If you use bearing correction, the direct bearing is corrected by the value defined for new route points.

Without registration you get part of your waypoints only.

Exit Program

If there are unsaved changes in memory you will be prompted for saving.

After having finished, you get a status message. You may confirm this message by

- * any keystroke
- * mouse click on any button (will be effective)
- * wiping it away using the mouse

Append, Update

Next: [Menu Garmin\(Magellan\)](#)

These functions are of interest for the experienced user who has arranged their collection of waypoints in different files.

They are accessed after *Save as...* and selecting an existing file name, but not the already opened one.

You may select multiple files at once, to be renewed the same way.

Append

You have entered new waypoints, and you want to have them in another file as well. Mark them on the list, select the save option *marked only*, and click to *Append*. The same applies to routes.

You should open the completed file soon, to have it checked for waypoint name conflicts.

Update

Although you have split your waypoints in different files, you will have some important waypoints common to several files, e.g. the waypoint HOME.

After having done changes on these common waypoints, it is tedious to do the same changes for all other files. The function *Update* helps doing that.

Do the changes on the first file manually. Save it. Then hit *Save as...* and select the next file. It doesn't matter which waypoints have been changed. Click to *Update*. This saves only those changed waypoints which have already been present in the selected file.

You may have refined the coordinates or changed the name or other properties, *but not the coordinates and name at the same time*.

You should open the completed file soon, to have it checked for replacements.

Example:

Original waypoints in two files:

| file a.wp | | file b.wp | |
|-----------|-----------|-----------|------------|
| WAYP1 | Position1 | WAYP1 | Position1 |
| WAYP2 | Position2 | WAYP2 | Position2 |
| WAYP3 | Position3 | WAYP10 | Position10 |
| WAYP4 | Position4 | WAYP11 | Position11 |
| WAYP5 | Position5 | WAYP12 | Position12 |
| WAYP6 | Position6 | | |

Now you change in file a.wp:

| | |
|-------|-------------------------------------|
| WAYP1 | renamed to HOME, position unchanged |
| WAYP2 | position2 changed to position 2a |
| WAYP3 | position3 changed to position 3a |
| WAYP7 | position7 (new waypoint) |

After *Update* to b.wp, the files will contain:

| file a.wp | | file b.wp | |
|-----------|------------|-----------|------------|
| HOME | Position1 | HOME | Position1 |
| WAYP2 | Position2a | WAYP2 | Position2a |
| WAYP3 | Position3a | WAYP10 | Position10 |

| | | | |
|-------|--------------------------|--------|------------|
| WAYP4 | Position4 | WAYP11 | Position11 |
| WAYP5 | Position5 | WAYP12 | Position12 |
| WAYP6 | Position6 | | |
| WAYP7 | Position7 (new Waypoint) | | |

Menu of Main window: Garmin (Magellan)

Next: [Menu Edit List](#)

Note: [Name conflict](#)

Reading routes or waypoints is done in separate functions. This helps to shorten the transfer time.

On the other hand routes and waypoints are stored in a common waypoint file on the PC.

read: WP (Function key F5)

All waypoints stored within the receiver will be read into the working memory.

In case there are already data in the memory, you will be asked if the read data should be appended to the existing ones. If you answer yes the newly read waypoints will be marked on the list.

Hint: When coming back from a trip, it is good practice to open the waypoint file which had been transferred to the receiver before. Then you read the waypoints back from the receiver, answering yes to the "append" question. You will be informed what data have been changed or entered during your trip.

Whenever data are appended, a new waypoint may have the same name as an old one. In this case the program proceeds as follows:

If the coordinates of the new point are the same as the old ones (up to 5 m distance) the new point is ignored.

Otherwise the points will belong to different locations. Then you are asked if you only want to go on with the old point, or only with the new point, or with both. (In the latter case the name of the new point will be changed.)

In addition it is checked whether there is another waypoint with exactly the same coordinates. In this case it is most likely that you have renamed a waypoint and you forgot to delete the old one within your receiver.

See also [Status Message](#).

read: Routes

The [Routes](#) are read from the receiver, together with the waypoints contained. (From Magellan receivers the sequence of points is read only. The suitable waypoints must have been read before.)

read: Tracks

This operation is also available on the [Chart Control](#) window..

write (Function key F8)

A subsequent option panel will ask you what to write: all waypoints, marked waypoints only, all routes, selected routes only.

When writing routes, you may define the number the receiver shall use for these routes. This allows you to avoid existing routes being overwritten. *This applies only if your receiver uses route numbers (e.g. not for GPSIII or eTrex).* (When writing to a Magellan receiver the sequence of route points is written only. The suitable waypoints must already be present in the receiver.)

You should set the proper limitations of your receiver for Waypoints and Routes by the menu [System](#). Then you will get a warning if you try to write more data than allowed.

Waypoints will be appended to already existing waypoints within the receiver. If you want the receiver to store the new waypoints only, you must delete its memory first by *DELETE*

ALL WAYPOINTS.

If a waypoint has the same name as an existing one then some receivers overwrite the old one, others rename the new one.

If the waypoint memory of the receiver is full then following transmission is ignored.

When the transmission is completed GARtrip gives you a message with the number of used waypoints within the receiver. Normally this number should be the same as the number of waypoints within the GARtrip working memory.

See also Status Message.

Power off receiver (Function key F4)

This function is much more convenient than the red key of the receiver.

When attempting to store a waypoint with an already existing name, the name of the new point will be changed automatically by appending a number, after a prompt.

Menu of Main window: Edit list

Next: [Menu System](#)

Note: [Clipboard](#)

Search...

This function marks all waypoints with a certain string in the name or description. Useful for large lists.

new WP from average

This is a function dedicated to increase the precision of GPS by averaging multiple measurements.

To get a waypoint with increased precision, do the following:

Save this position with your GPS receiver several times under different names (001, 002...). Read these waypoints into GARtrip and mark them.

The menu function *new WP from average* will create a new waypoint by averaging all marked coordinates.

The same averaging is available for a range of a track.

If one of the waypoints selected had been created itself by averaging, this one will be applied with an appropriate weight. So you may use this function again and again to add new measurements. *Valid from program version 200 on only.*

new List

With this function you may clear the working memory, to begin from scratch.

Time Zone of this list

The time zone is stored in the waypoint files, together with the waypoints themselves. Set it according to the region of your waypoints.

This way you may manage sets of waypoints of different regions, each with its correct time stamps.

Invert selection

This is for the experienced user only. Having marked several waypoints, e.g. by the search function, you intend to save not the marked ones but the unmarked ones. Just invert the selection before saving.

Mark Group

This helps housekeeping big lists. Mark a certain waypoint. Then this function helps you to mark a certain number of following waypoints.

With the following functions existing waypoints may be split among different files. This is useful to keep clear a growing collection of data. *See also: [Save](#)*

Clear marked waypoints (delete key)

With this function all marked waypoints will be removed.

Copy marked waypoints

With this function all marked waypoints are copied to the [Clipboard](#). They may be appended to a new list or to another file later.

insert

Available only if the [clipboard](#) contains data..

Herewith you may copy waypoints from the clipboard to the working memory.

This is an own clipboard of the program GARtrip. No data exchange to other windows applications is supported. The contents of this clipboard is lost when GARtrip is closed.

Menu of Main window: System

Next: [Menu Profile](#)

Note: [PC Clock](#)

All system settings will be kept when GARtrip is closed (stored in WIN.INI).

Language...

This is an on-line selection of the user language: English, German, or Spanish (others to follow). Note that the language of the help text is not changed here. To change it, the file GARTRIP.HLP must be exchanged. A German version is available on the www site.

Registration...

Here you enter your personal [registration key](#).

Receiver properties (Function key F2)

The correct [link](#) to the receiver is checked and model identification is showed together with the receiver software version.

Please enter the properties and transfer protocols of your receiver here. Then you will get a warning if you try to send more data to it. The settings "Symbols", "Altitude", and "Proximity" are set automatically upon each data transfer. You can change them manually for the moment if you want to enter waypoints for a receiver type that is not present.

If your receiver supports long waypoint names (more than 6 characters) you may enter the correct length here.

If "Proximity" is enabled and your receiver does not support proximity waypoints, or you don't want to use them, just set the memory size to 0. Then the suitable data field will not be shown on the waypoints window.

The selection "Show waypoints with altitude" defines whether you want to work with altitude values. You can enable it even if your receiver does not handle altitude. In this case the altitude values are for your information only and they will not be transferred.

Serial Port

Here you define the number of the serial PC port used by the receiver.

Backup files

If enabled, each time you overwrite a waypoint file (*.WP) or a track file (*.T) the old file will be kept and renamed to WPB or TP.

Set PC Clock

If active, the PC clock will be set to the [GPS time](#) whenever you read data from the receiver (once per session).

Time zone at home

Here you should define the local time zone valid at home. This allows the function *Set PC Clock* to convert the GPS time (UTC) to the correct local time.

Grid Coordinates with Dot (km)

Coordinates in grid formats (e.g. UTM) have been standardized with meters as unit. This results in big numbers, difficult to handle. GARtrip uses kilometers optionally (with decimal point, followed by three digits), for better readability. This setting affects the display of coordinate values, and all export file formats. See [Format](#).

Blue Background

Here you may chose the background color of the Blue Planet.

Unit for distance / speed / altitude

Here you define what units any distance, speed, and altitude shall be based on.

The internal clock of most receivers is very imprecise if not locked to satellites for a long time.

The "write to receiver" functions are normally used when preparing a trip. Sometimes the receiver may not have been used for a long time.

The "read from receiver" functions are normally used after a trip. The receiver will have fixed new positions, and it will have received the correct clock time recently.

Therefore the PC clock is set only when reading data from the receiver. Differences below 5 seconds are ignored. For differences beyond 5 minutes you will be asked if you accept the change.

Menu of Main window: Profile

Next: [Time Zone](#)

Don't worry. You may skip this subject without losing control.

Whenever you exit GARtrip the following properties will be kept for the next session:

- The position of each window (*)

- The size of the Chart on screen (*)

- Serial Port for communication with the receiver

- Time zone for new lists, and all settings of the menu *System*

- Settings of Chart control (e.g. Name, Description etc., Landscape format, auto, but not the selection of items to be drawn: Waypoints, Routes, Track, Map. You will prefer to select these each time differently.), show cursor position, play speed, record interval for actual position.

- Sorted by, Coordinates: Format and Datum (these settings are stored on the waypoint files as well. The values in waypoint file have priority. The values within the profile are only effective if you don't open a file at program start.)

- Scan resolution and stretch for new maps.

Within this menu you may define additional profiles. Later on you may switch between them at pleasure.

Example: You own two receivers. You use the GPS12XL for hiking. Then you prefer Kilometers, and you set the milestones distance to 1 km. After all these selections you create the new profile "hiking".

You use the GPSIII Pilot for avionics. You set the menu *System* accordingly, set the units to Nautical Miles, and the milestones distance to 50 nm. Then you create the new profile "avionics".

In this case you may connect both receivers to your PC at a time, using two serial ports. Selection of the profile also switches the port then.

Now you may switch among these sets of options directly by profile selection.

Note: each change of any option changes the active profile immediately.

The settings marked by (*) within the list above are not saved within the different profiles. They are saved commonly.

Whenever you create a new profile all settings of the previously active profile are copied to the new one.

Time Zone

Next: [Waypoints with symbol](#)

All Date and Time information given by the receiver is based on UTC.

This refers to the display of the creation time of waypoints within the window *Waypoint*, and to the date and time of track points within the window *Chart Control*, and to the function Set PC Clock.

If you want to get these times corrected to the local time, you must define the time zone here.

There are two time zone settings:

By the menu *System / Time zone at home* you define the time zone valid at your home. This setting controls the function "set PC clock", and it will be used whenever you start with a new waypoint list.

By the menu *Edit List / Time zone of this list* you define the time zone valid for this list of waypoints. When you travel to another country you can set the time zone of this country here, so that all creation times of waypoints, and all track time stamps, will be converted according to this setting.

Format of time zone control string:

- a) no correction, display in UTC, as it is: just set the time zone to 0.
- b) time zone without daylight saving: just enter the time shift in hours versus UTC, e.g. -5 for Eastern USA. Fractions of an hour are accepted, e.g. 6.5 or +7.25
- c) time zone with daylight saving: enter the time shift in hours versus UTC, valid during winter time, followed by a blank character.

In most cases the daylight saving period begins at the first or last Sunday of a spring month, and it ends at the first or last Sunday of an autumn month. During the daylight saving time the time shift is incremented by one hour.

Beginning: Enter the index (see below) followed by the month (as a number), then a blank character.

End: Enter the index (see below), followed by the month (as a number).

| | | |
|--------|---|-----------------------------------|
| Index: | F | : first Sunday within this month |
| | S | : second Sunday within this month |
| | T | : third Sunday within this month |
| | L | : last Sunday within this month |

Example Central European Time (CET): Winter shift is +1 hour, daylight saving from last Sunday in March until last Sunday in October: +1 L3 L10

Waypoints with Symbol

Next: [AVD functions](#)

Some receivers (e.g. GPS12XL from version 3 on) group the waypoints by symbols. You may activate this function by the menu System.

In the list of waypoints and on the Chart, symbols are shown as a short sign (up to three letters), e.g. hs for house.

The display option (symbol only, symbol + name, symbol + description) is shown on the list by an appended apostrophe (symbol + name), or two appended apostrophes (symbol + description).

You may get the waypoint list sorted by symbols, then you may mark all waypoints having a certain symbol, to delete them at once.

To change the symbol or the display mode, mark all waypoints to be changed to the same symbol or display mode, then click to *Edit* and change the symbol setting.

Denotation of symbols:

The name of symbols may be changed to your own preference by editing the file SYMBOL_2.INI (for 16 symbols) or SYMBOL_3.INI (for more than 16 symbols) using any standard editor.

This file contains one line for each symbol, with the following data fields, separated by a blank character:

- > Address (do not change!)
- > Short sign (up to 3 lowercase letters)
- > full name

You may change the order of complete lines if you want to see often used symbols on top of the selection list.

Example: You have nothing to do with fish. Therefore you want to use the symbol "fish" for restaurants instead. The according line should be, behind the address field:

rst Restaurant (fish)

If your receiver uses new symbols not known by GARtrip, you will get a message when reading such waypoints. GARtrip is learning them when reading. You should open the file SYMBOL_3.INI afterwards using a text editor like Notepad, and set the names of new symbols as described above.

AVD functions

Next: Registration

Some receivers are equipped with an internal database for avionics. These internal waypoints can be read only if they are part of a route. This leads to the following capabilities:

You already have defined a route within the receiver, using the database. Read this route into GARtrip. Then the database waypoints will appear in the list of waypoints, with an AVD index (see below) at the beginning of the description field. Further data (state, city, facility, altitude) are shown in the description field as well, whenever possible.

You also may define a route within GARtrip using database points, although GARtrip does not own the database itself. For each point you have to know the proper name, and the AVD index (see below). You need not enter the coordinates! Just enter its name, and its AVD index instead of a description. After the route is finished, write it to the receiver. Then read it back immediately. Now GARtrip will know the proper coordinates.

AVD-Index (shown and entered in the field *Description*)

1st character: @

2nd character: Class Code (A for apt, V for vor, I for int, N for ndb)

3rd and 4th character: Country Code

Whenever the name or AVD index does not agree with a database entry, the receiver will create a new user waypoint, or it will hit an error message.

Registration

Next: List of waypoints

To save unlimited data in files you must be a registered user. Please follow the instructions within the file REGIST.TXT.

After having paid the registration fee you will get a key code fitting to your name. Run *System / Registration* and enter your name and key code.

To remove the registration key from this computer, e.g. because you are going to give the computer away, call this function again, and erase the key field.

List of waypoints

*Next: [Coordinates](#)
Note: [Multi select](#)*

This list shows all waypoints in the working memory. A scrollbar on the right side allows to move through a big list, as you will know from other windows applications.

On top of the list, on the right side, the complete number of waypoints within the list is shown. If you have marked several waypoints the number of marked waypoints is shown in addition.

You may chose how the list shall be sorted, to get the best survey.

You select a waypoint by mouseclick on its entry. This selection affects the functions [Edit](#), [append to route](#), [clear](#), [copy](#) ([multiple selection](#) is possible), Chart, Print.

The list is shown like by the Windows file explorer. This allows following user options (under Windows 95 some functions may be missing):

Drag the borderline between two headers in order to change the field width.

Double click on the borderline between two headers will adjust the filed width such that all text are fully visible.

You may suppress any unwanted column by moving the borderline between two headers completely to the left (width = 0). The hidden column may be recovered by moving the mouse pointer slightly to the right of the borderline between two headers. The pointer will become a separator symbol and you may open the hidden row again by dragging the separator symbol to the right.

Move the mouse pointer to any text field. A small yellow panel with its full text will pop up.

The whole window may be resized by dragging its borderline, in order to see a bigger list.

Click to a header to get the list sorted by this column. Further sorting options are available on the selection below the list.

Double click in a list item opens this waypoint for editing.

Clicking a second time on a waypoint name after a short while, the name can be edited directly on the list.

sorted, reference point

| | |
|---|------------------------|
| Sorted by | Reference Point |
| Distance from Ref.p. ↓ | BUCHHO ↓ |
| <input type="checkbox"/> move marked on top | |

With the option field *sorted by* you select the sorting mode of the list:

Name: alphabetically by names,

Symbol: by waypoint symbol (when activated): by waypoint symbol and display mode. For example you may [select](#) all waypoints with a certain symbol in order to [delete](#) them.

Description: alphabetically by description.

Altitude: Elevation above sea level, when activated.

Distance or Bearing from Ref.P.: by distance or bearing from reference point. By this means you may group the waypoints according to regions.

Distance from nearest: Here you will see how far each waypoint is away from its closest neighbor. This helps to find out if there are multiple waypoints for the same location (distance 0.0), or if there are waypoints of a different region than the others (distance very big).

Date: by creation date,

Longitude / Easting or Latitude / Northing: by coordinates.

Routes: by appearance in routes.

Distance from routes: You will be asked which routes to consider. This option helps you so see which waypoints are **close to a route**. You may want to write only these to the receiver.

Distance from Track: referring to the nearest track point. By this option you may see which waypoints were met on a track.

Proximity (when activated): keep in mind that most receivers allow a limited number of Proximity waypoints only (if at all)

The sorting option does not affect the content of the working memory.

move marked on top: after a multiple selection you may improve the clearness of the list by arranging the marked waypoints on top.

A mouseclick to the field *Reference Point* defines the marked waypoint as the new reference point. All displayed distances refer to this reference point. You may define the reference point using the context menu on the chart as well.

There is only *one common* reference point for the distances of *all waypoints*.

The reference point will be saved in the waypoint file.

To mark a coherent range, you click on the first item. Then keep the shift key pressed and click on the last item.

To mark non-coherent items, you click on the first item. Then keep the control key pressed and click on the other items.

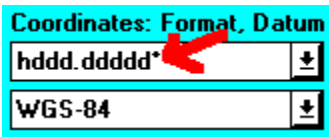
Whenever more than one item is marked, the number of marked items is shown on the top right side of the list. You may move the marked items on top of the list by checking *move marked on top*. See [Example](#).

Example: You want to mark all waypoints closer than 50 km from reference point. Chose the list sorted by distance. Click to the last waypoint within the desired distance range. Then scroll to the top of the list and click on the topmost line with the shift key pressed.

Waypoints: Format, Datum

Next: [The window Waypoint](#)
Note: [Proper settings Fixed zone](#)

Format



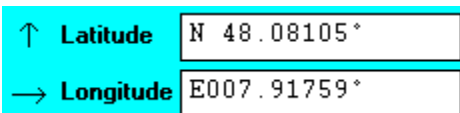
Coordinates: Format, Datum
hddd.ddddd°
WGS-84

Here you select the coordinate system for the waypoint to be entered and displayed. The grid lines on the displayed Chart refer to this selection as well. Whenever the format is selected, GARtrip will automatically activate the most likely Datum. If your map contains an indication of the proper datum, select it accordingly. See [Hint](#). You may select among nine different formats

- hddd.ddddd°
- hddd°mm.mmm°
- hddd°mm'ss.s°
- UTM (with preselection of zone)
- MGRS
- (D) Gauß-Krüger (with preselection of zone)
- (CH) Swiss Grid
- (F) Lambert (with preselection of zone)
- (GB) British Grid
- (IRL) Irish Grid
- (NZ) New Zealand Grid
- ... and any number of user defined Grids (example: Swedish Grid)

Hint: to see the exact format, it is recommended to look at an existing waypoint by using *Edit WP* before entering a new one.

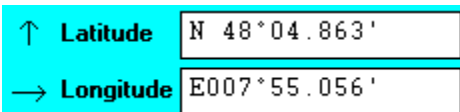
hddd.ddddd°



↑ Latitude N 48.08105°
→ Longitude E007.91759°

Direction, Degrees with decimals

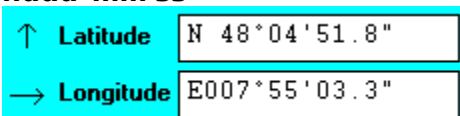
hddd°mm.mmm



↑ Latitude N 48°04.863'
→ Longitude E007°55.056''

Direction, Degrees, Minutes with decimals

hddd°mm'ss



↑ Latitude N 48°04'51.8'''
→ Longitude E007°55'03.3'''

Direction, Degrees, Minutes, Seconds with decimals

Enter:: Direction as uppercase or lowercase letter, or as plus/minus sign, leading or trailing.
For eastern longitude or northern latitude the letter E or N may be omitted.
The characters ° ' ' . are all entered by the decimal point or comma or space key

All following formats are metric grids

UTM

| | | |
|------------|---------------------------------------|-----------------|
| Zone | <input type="text" value="32U"/> | Zone 32: 9° ±3° |
| → Easting | <input type="text" value="0419.384"/> | |
| ↑ Northing | <input type="text" value="5325.876"/> | |

UTM grid, world-wide used.

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

Zone: the number defines a center meridian, the letter defines the latitude range.

Easting: The distance to the central meridian, with a constant 500 km added.

Northing: The distance from equator (if south: negative, with 10000 km added)

Projection: Transverse mercator. All values reduced by a factor of 0.9996.

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable). Right to the Zone field is shown the Zone, the center meridian and the width of the zone strip.

Enter: **Zone:** The zone letter is only required on the south half of earth.
Easting and Northing in kilometers: to be entered always with decimal point (or comma).
Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading zeroes!** Example: instead of 0414500 you may enter 04145

Hint: The UPS System for polar regions is not available.

MGRS

The MGRS grid is identical to UTM but each UTM zone is subdivided into 100x100 km squares. The square is named by two additional letters in the zone field, and the Easting and Northing values define the position within the square.

(D) Gauß-Krüger

| | | |
|------------|---------------------------------------|------------------|
| | | Zone 3: 9° ±1.5° |
| → Easting | <input type="text" value="3419.428"/> | |
| ↑ Northing | <input type="text" value="5327.568"/> | |

Gauß-Krüger grid, *German Grid*

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

Easting: A zone number, defining a central meridian, followed by the distance to the central meridian, with a constant 500 km added.

Northing: The distance from equator (North only)

Projection: Transverse mercator.

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable). The zone number is part of the LON value (first digit). Additionally shown is the Zone, the center meridian and the width of the zone strip.

Enter: **Easting and Northing in kilometers:** to be entered always with decimal point (or comma).
Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading**

zeroes! Example: instead of 0414500 you may enter 04145

(CH) Swiss Grid

| | |
|------------|---------|
| → Easting | 635.695 |
| ↑ Northing | 325.748 |

Swiss grid

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

The horizontal distance from central point (old observatory in Bern at E 7°26'22.5" N 46°57'8.66") with a constant 600 km added

The vertical distance from central point with a constant 200 km added

Projection: oblique-axis, conformal cylindrical projection.

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable).

Enter: *Easting and Northing in kilometers:* to be entered always with decimal point (or comma).

Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading zeroes!**

(F) Lambert

| | | |
|------------|----------|-----------------------|
| Zone | 2 | Zone 2 Centrale fixed |
| → Easting | 0957.287 | |
| ↑ Northing | 2330.071 | |

French grid (Quadrillage Lambert)

In most cases zone 2 is extended all over France (zone 2 étendu). For this reason, zone 2 is preselected by GARtrip.

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

The horizontal distance from central point (Pantheon in Paris at E 2°20'14" N 46°48') with a constant 600 km added

The vertical distance from central point with a constant 2200 km (zone 2) added

Projection: Lambert Conformal Conic

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable).

Enter: *Easting and Northing in kilometers:* to be entered always with decimal point (or comma).

Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading zeroes!**

(GB) British Grid

| | |
|------------|--------|
| Zone | HU |
| → Easting | 40.415 |
| ↑ Northing | 09.631 |

British Grid (British National Grid BNG, Ordnance Survey of Britain)

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

Zone: two letters define a square 100x100 km within one single transversal mercator strip. Easting and Northing define the position within this zone (0 to 99.999).

Easting: The horizontal distance to the center point (W 2°, N 49°), with a constant 400 km added.

Northing: The vertical distance from center point, with a constant 100 km subtracted.

Projection: Transverse mercator. All values reduced by a factor of 0.9996.

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable).

Enter: *Easting and Northing in kilometers:* to be entered always with decimal point (or comma).

Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading zeroes!** Example: instead of 04500 you may enter 045

(IRL) Irish Grid

| | |
|------------|--------|
| Zone | H |
| → Easting | 40.415 |
| ↑ Northing | 09.631 |

Irish Grid (Irish National Grid ING, Irish Ordnance Survey)

Both coordinates are given in meters or kilometers. Rather than longitude and latitude, this format indicates:

Zone: one letters define a square 100x100 km within one single transversal mercator strip. Easting and Northing define the position within this zone (0 to 99.999).

Easting: The horizontal distance to the center point (W 8°, N 53.5°), with a constant 250 km added.

Northing: The vertical distance from center point, with a constant 200 km added.

Projection: Transverse mercator. All values increased by a factor of 1.000035.

Display: depending on the system menu setting, the Easting and Northing is given in meters (standard) or kilometers (better readable).

Enter: *Easting and Northing in kilometers:* to be entered always with decimal point (or comma).

Easting and Northing in meters: Enter the values without point or comma. At reduced precision, you may omit trailing zeroes. **Never omit leading zeroes!** Example: instead of 04500 you may enter 045

Swedish Grid

The Swedish Grid uses the Transversal mercator projection as well. It has been realized as a User Defined Grid.

Datum

| | |
|----------------------------|---|
| Coordinates: Format, Datum | |
| hddd.ddddd* | ↓ |
| WGS-84 | ↓ |

See also: [Hint](#).

For the transformation of coordinates among the different formats the earth is described as ellipsoid. Its dimensions (radius of equator a , flattening factor f) and the position of its center have been defined differently by different nations. There is a trend towards a unique system (WGS84 with $a=6378137$ m and $f=0.003352811$). The internal coordinate system of GPS is based thereon. But it will take tens of years to use it commonly in cartography. These characteristics are called the Geodetic Datum.

GARtrip uses optionally:

| | |
|--------------|--|
| WGS-84 | (new world standard, GPS internal) |
| European1950 | (new European standard) |
| Potsdam | (Topo maps of Germany) |
| CH-1903 | (Topo maps of Switzerland) |
| NTF | (Nouvelle Triangulation Française) |
| Ord Srvy GB | (Ordnance Survey of Great Britain) |
| NAD27 CONUS | (North American Datum 1927 Continental US) |
| NAD83 | (North America) |
| RT90 | (Sweden) |
| AGD84 | (Australia) |
| Ireland 1965 | (Ireland) |
| Geodetic'49 | (New Zealand) |

In case you need another datum, and you don't know the parameters for the file DATUM.INI, look at www.gartrip.de, or ask the author.

The geodetic datums are stored in the file DATUM.INI within the working directory of GARtrip. User defined grids are defined here as well.

The file DATUM.INI

This file may be edited using a ASCII text editor (e.g. NOTEPAD), to append further geodetic datums. *Be careful! Wrong numbers within that file lead to wrong coordinate calculations!* Changes will be effective when you start GARtrip the next time.

First line:

The first line specifies the proper datum for each standard coordinate format, separated by commas.

E.g. you want the datum *European1950* to be selected automatically whenever UTM is selected: apply *European1950* at fourth position.

Subsequent lines:

One line to follow for each datum.

Each line contains following values, separated by commas:

Name
Delta a: Difference of equator radius to WGS84 in m
Delta f: Difference of flattening factor to WGS84
Delta x, Delta y, Delta z: Difference of earth center to WGS84 in m

Then the user-defined grids will follow. You may define only grids based on Transversal Mercator projection, as with your receiver. The number of grids is not limited.

As an example you find already the definition of the Swedish Grid in the file. One line follows for each user-defined grid. Each line contains following values, separated by commas:

The character # immediately followed by the grid name
Name of the proper geodetic datum
Center meridian in degrees with decimals
Latitude of origin (mostly 0) in degrees with decimals

Scale factor (mostly 0.9996 or 1)
False Easting in meters
False Northing in meters.

This hint applies to the receiver as well as GARtrip:

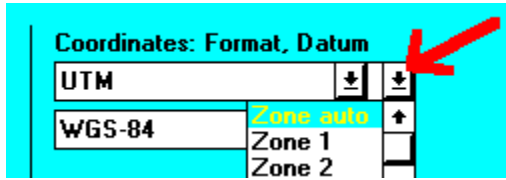
Whenever you save a position using the receivers MARK key, the settings of format and datum are irrelevant. The coordinates are stored internally in a unique format.

You may select a different format and datum afterwards, to convert the already stored coordinates.

Whenever you enter coordinates numerically, or you read them numerically, you must have selected the proper datum. Otherwise you may get errors of some hundred meters.

If you have entered some waypoints with the wrong datum you will realize this error as soon as you take a GPS fix on one of these points. Then you may correct all wrong waypoints at once on the Chart.

Near the border from one zone to another, sometimes the display of coordinates based on the neighbor zone is more useful. This leads to consistent numbers for different waypoints. For UTM, MGRS, and German grid and French grid you may preselect a zone.



Hint: outside the correct zone, the precision of coordinates is reduced.

The window *Waypoint*

Next: [Enter new waypoints](#)

Note: [Time stamp](#)

This window is opened by the buttons *New Waypoint* and *Edit* of [Main window](#).

You close that window again with the buttons *OK* (changes are kept in working memory) or *cancel* (changes are discarded).

Name, Description

The unique name and the description are entered here.

As soon as all available characters of the name have been entered, the cursor jumps to the description field automatically. This helps to write continuously, using the description as continuation of name.

The description field is of any length. Many receivers only show 16 or 40 characters. To check this limit, the number of characters entered is shown on the top right side of the entry field.

The description may contain special characters, but they will be replaced by "-" when written to the receiver. Some receivers can display special characters, but the official transfer protocol does not allow transfer of those characters for compatibility reasons.

You don't need the shift key. Lowercase letters are converted to uppercase automatically. German umlauts are converted as well (ä to ae, ß to ss etc.).

For receivers with color display, the waypoint color is defined by a [code](#) at the end of the description.

For receivers with waypoint depth data (like GPS168 Sounder) the depth is shown in the description field, beginning with "\$" and ending with the unit "m" or "ft" (do be set in the menu *System, Unit for Altitude*).

created (GPS) / created (PC) / read

This field shows [creation](#) date and device of the waypoint. The description field needs not be reserved for this purpose.

This time stamp cannot be changed by the user. The time is corrected according to the [time zone](#).

LON, LAT (Longitude, Latitude)

The coordinates of the actual waypoint are shown and entered here, according to the setting of [Formats](#) within the main window. See also [Enter new waypoints](#)

from (Reference point)

from HOME

160 * 2.24 km

Scale

from HOME

160 * 149 mm

Scale 1 : 15 000

The distance and [bearing](#) from [Reference point](#) is shown here.

Distances beyond 1000 (100) km are shown in a red (yellow) box. This should be a warning for wrong coordinate entry.

If you activate the option *Scale* and enter the scale of your map, the distance is converted to millimeters on your map.

You may enter distance and bearing values as well. The coordinates will be calculated accordingly.

nearest

The three nearest waypoints are indicated here. This gives more confidence when entering new waypoints.

If you click on one of them, this waypoint becomes a temporary reference point. To be reset by click on "nearest".

If you double click on one of them, you may change to that one. This is useful if you find that you had selected the wrong waypoint before.

Altitude (only if activated in Menu System)

Here you see the altitude in meters or feet. May be edited. The value will be transferred to the receiver only if it supports altitude (e.g. the ETrex).

Proximity (only if activated in Menu System)

If you want this waypoint be a Proximity Waypoint, click to this option box and enter the alarm radius.

If the option *Scale* is active, the alarm radius is to be given in millimeters on the map.

Symbol (*only if activated in Menu System*)

Here you select a symbol and a display mode.

To change the symbol, the display mode, or the Proximity of several waypoints at once:

Mark all waypoints to be changed. Click to *Edit*, then change the symbol or Proximity, and click to OK.

Set Default

This function is an additional aid to enter new waypoints, or to find existing waypoints on a map.

The color code is appended to the description field:

| | | | | | |
|----|-----|----|-------|----|------|
| &R | red | &G | green | &B | blue |
|----|-----|----|-------|----|------|

Some Garmin's use these codes in addition:

| | | | | | |
|-----|-------------|-----|-----------|-----|--------------|
| &BL | black | &DR | dark red | &DG | dark green |
| &DY | dark yellow | &DB | dark blue | &DM | dark magenta |
| &DC | dark cyan | &DA | dark grey | &LA | light grey |
| &Y | yellow | &M | magenta | &C | cyan |
| &W | white | | | | |

Some Garmin receiver models (GPS40, 45...) store a dedicated time stamp for each waypoint. This is shown here. The description field doesn't need to be reserved for this purpose.

Other Garmin receiver models (GPS 38, 45XL, II, 12XL...) don't store a time stamp. If the description field contains a creation date, GARtrip copies it to its time stamp when read the first time. Otherwise the date of reading is stored.

Enter new waypoints

Next: [Example](#)

Hint: If the new waypoint shall be appended to a route, open the window [Routes](#) first. Each new waypoint will be appended to the selected route automatically.

You may create a new waypoint by mouseclick directly on a [scanned map](#). If you don't use scanned maps, do the following:

You are going to enter some new waypoints taken out of a printed map.

a) The map shows a coordinate system.

See detailed [example](#).

Select the proper [Format](#) and [Datum](#).

If you have entered some waypoints with the wrong datum you will realize this error as soon as you take a GPS fix on one of these points. Then you may shift all wrong waypoints at once on the [Chart](#).

On the map, mark a reference grid line for longitude and latitude, near to the new waypoints.

Open the window *Waypoint* by clicking to *New Waypoint*.

Enter the coordinates of the reference grid lines, and click to *Set Default*.

Each time you open the window *waypoint* again by clicking to *new Waypoint*, the coordinate fields will already contain the reference coordinates. Now you have two choices:

deselect the option *Relative to Default*, and complete the coordinates manually, or

keep the option *Relative to Default / Show Default* active, and fill in the mm fields. Enter the distance of your waypoint from the reference line on your map in millimeters (check the scale setting), negative if left or down. To check the result, disable *Relative to Default*.

.

You may edit the default values all the time.

*Hint: Setting the Default is easier if you edit an existing waypoint nearby. Place the text cursor in the Lat/Lon field and hit *Set Default*. These coordinates will be taken as default for new waypoints, up to the cursor position.*

Confirm your entries by *OK* or by the *Enter* key. To enter further waypoint, hit the *Enter* key again.

b) The map does not show a coordinate system

You must know the coordinates of a reference point on the map, e.g. measured by GPS.

On the map, mark this [reference point](#), preferably with a vertical line for the protractor.

Activate *Scale* and enter the scale of your map.

Now use ruler and protractor to get distance and [bearing](#) from the reference point to the new waypoint, and enter these values into the fields *from (ref.point)*.

To find stored waypoints on a map

Both procedures described above may be reversed in order to find a stored waypoint on a printed map. In case a you must activate *Show Default*. Then GARtrip will show the coordinates of the reference lines, followed by the distance between waypoint and reference lines in millimeters.

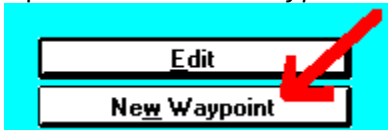
Enter new Waypoints: Example

Next: [The window Routes](#)
Note: [Bearing](#)

Assumed you use a map with longitude and latitude given in degrees, and you have set the format accordingly.

hddd*mm.mmm

Open the window *Waypoint* by the *New Waypoint* button.



As reference lines you choose: 8 degrees 8 minutes East, 47 degrees 49 minutes north. Enter these values and click to *Set Default*.

| | |
|-------------|----------|
| ↑ Latitude | N 47°49. |
| → Longitude | E 08°08. |

| |
|--|
| <input type="button" value="Set Default"/> |
| <input type="button" value="Cancel"/> |
| <input type="button" value="Ok"/> |

The following steps are to be repeated for each new waypoint.

Enter name and description.

Then measure the distance of the new waypoint from both reference lines: 15 mm to the right, 22 mm down. Enter these values into the mm fields and ensure the proper scale setting.

| | | | |
|---|----------|-----|----|
| ↑ Latitude | N 47°49. | -22 | mm |
| → Longitude | E 08°08. | +15 | mm |
| <input checked="" type="checkbox"/> relative to Default | | | |

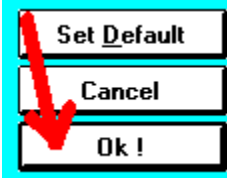
| | |
|---|------------|
| <input checked="" type="checkbox"/> Scale | 1 : 15 000 |
|---|------------|

You may check the result: by click to *Show Default* you change between the display of true coordinates and the display with reference to the reference lines.

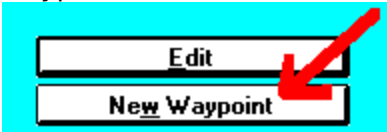
| | |
|---------------------------------------|--------------|
| ↑ Latitude | N 47°48.822' |
| → Longitude | E008°08.181' |
| <input type="checkbox"/> Show Default | |

| | | | |
|---|----------|-----|----|
| ↑ Latitude | N 47°49. | -22 | mm |
| → Longitude | E 08°08. | +15 | mm |
| <input checked="" type="checkbox"/> relative to Default | | | |

Finally you confirm your entries.



In case you want to enter further waypoints, OPEN the window *Waypoint* again by the *New Waypoint* button.



or ENTER key.

ALL BEARINGS REFER TO GEOGRAPHICAL ("TRUE") NORTH. Magnetic declination is not included.

0° is the geographic north direction.

This is valid all the time, even if a metric grid system has been selected, whose grid lines are not exactly oriented north-south.

Beginning with north = 0°, proceed clockwise: East = 90°, south = 180°, west = 270°.

The bearing leads along a great circle, i.e. it shows the direction of shortest distance.

Example: looking for the bearing from North 50° West 100° to North 50° West 30°. Although these points are on the same latitude, the bearing is not 90°. It is 62°.

The window *Routes*

Next: [The window Chart control](#)

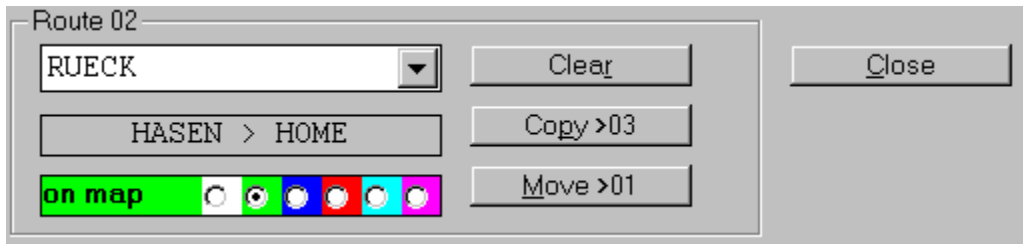
Note: [Other window](#)

This window is opened by mouseclick on the command button *Routes* within the main window.

You may go [back](#) to the main window without closing the window *Routes*.

If you use a Garmin receiver with avionics database, see also [Routes with AVD](#).

Top part: selection of route



With the *listbox on top* you select a [Route](#) to be defined or changed.

The name is entered here. Lowercase letters and umlauts are converted automatically. If you don't enter a name GARtrip will define one automatically.

Below the name of first and last waypoint is shown.

Below you select the color to be shown on Chart.

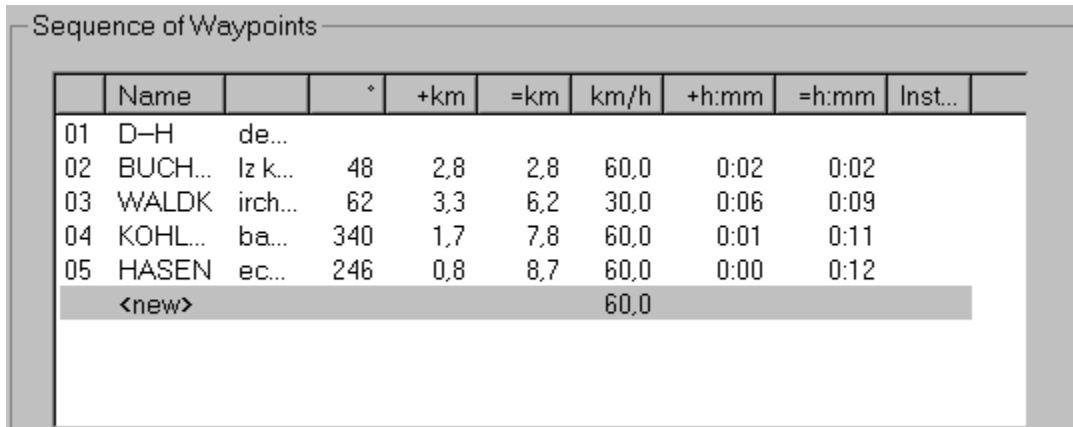
The button *clear* removes the complete route from the working memory.

The button *move* changes the order of routes. The current route is moved to top by one place.

The button *copy* creates another route with the same waypoints. Normally you will modify or invert the copied route afterwards. This way you can create two similar routes with minimum work.

The button *sort* sorts all routes alphabetically.

Bottom part: sequence of waypoints



| | Name | | ° | +km | =km | km/h | +h:mm | =h:mm | Inst... |
|----|---------|---------|-----|-----|-----|------|-------|-------|---------|
| 01 | D-H | de... | | | | | | | |
| 02 | BUCH... | lz k... | 48 | 2,8 | 2,8 | 60,0 | 0:02 | 0:02 | |
| 03 | WALDK | irch... | 62 | 3,3 | 6,2 | 30,0 | 0:06 | 0:09 | |
| 04 | KOHL... | ba... | 340 | 1,7 | 7,8 | 60,0 | 0:01 | 0:11 | |
| 05 | HASEN | ec... | 246 | 0,8 | 8,7 | 60,0 | 0:00 | 0:12 | |
| | <new> | | | | | 60,0 | | | |

Here the waypoints belonging to the selected route are listed. The filed size within this list can be modified the same way as for the [waypoint list](#) on the main panel.

Next to each waypoint name you see the waypoint description, the bearing of this route leg, the distance from previous waypoint, and the distance from beginning of route. The estimated time of this leg and of the whole route up to this point follows, provided you have

entered a speed value. The last row shows your instruction, if any.
If this is too much confusing information you may shift any row away (set its width to zero).

The screenshot shows a dialog box titled "Settings for marked legs". It has three main input sections: "Speed" with a value of "60.0" and unit "km/h"; "Bearing correction" with a value of "0" and a degree symbol; and "Instruction" which is currently empty. To the right of these inputs are four buttons: "Remove", "Move > 05", "Move > 07", and "Mark". Below the input sections are three more buttons: "Insert route...", "Invert", and "Sort Points".

To get the calculation of estimated duration, you must enter the speed first. If you want to set the same speed for the whole route, first activate *whole Route*, then enter the speed value. Otherwise you should mark the route legs yourself before entering the speed. The same way you can set a bearing correction value for the whole route or for certain legs only. This will mostly be used for magnetic declination. The value entered will be added to the calculated bearings, on the Chart and on the printed list. You may enter a instruction text for each route leg. This will be shown on the chart. You may select multiple legs or the whole route before entering the text. If your Garmin receiver shows the route links differently, a code is appended to the instructions: &A for "line", &B for "link", &C for "net", &D for "snap".

When creating a new route, the speed and bearing correction of the <new> trailer of the last route is copied.

Please keep in mind that the speed entered and the duration based thereon can be a rough estimation only, because the rout legs are considered straight lines. When you plan a ship route or a plane route the values may be precise, but in case of a hiking tour a speed value of 2 km/h will be suitable although you walk at 5 km/h. To get a good impression what value will fit in your case, look at the Chart of an already recorded track. Select *Edit Track*, then mark a typical range of the track. Look at the value for "Direct speed".

You may click to an entry in this list in order to

remove this waypoint from the route (button *clear*), or to move it one position to top or bottom (button *move*), or

to insert another waypoint at this position (normally at the end, see below)

By a double click to a waypoint in the list, this waypoint is marked on the list of main window. You may go to the main window then, to edit the waypoint.

The *Mark* button transfers the selection of waypoints in the route list to the main window.

You may combine two routes to a single one by *Insert Route*.

Invert will reverse the order of route points.

The button *Sort Points* will modify the order of route points such that they will be in a natural sequence. The first and the last point will stay at its position because you define the origin and the destination of the route. This function is recommended after inserting multiple points at once in arbitrary order. You may select any part of the route before applying this function, to restrict the part of the route to be reordered.

If all routes are ready you will close the window by the *close* button.

Insert waypoints to routes

There are three different ways to do that. Please ensure that the window *Routes* stays open all the time (maybe in the background),

a) the waypoint are already contained in the working memory: mark the route and the insert position (normally the end of the route). Go to the main window. Click to the waypoint wanted and then click to *insert in route, or double click to a waypoint in the list*.

b) Go to the window *Chart Control*. Display the waypoints. Left-Click to the wanted waypoint on the Chart and use the menu *Insert Waypoint in Route*. The route drawn will be corrected immediately.

c) the waypoints are not in the working memory: mark the route and the insert position (normally the end of the route). Go to the main window. Enter the new waypoints in the order they should be appended to the route. Or set a new waypoint by mouseclick on the chart.

Please check the correct order of route points in any case.

Storing routes

Routes are stored together with waypoints in waypoint files, see menu of main window: File.

When transferring routes to or from the receiver, only the waypoints contained in routes are transferred. See menu of main window: Garmin(Magellan).

To go to another open window, just click to a visible part of that background window. Or hit Ctrl-F6.

With the option Control window on top activated, each window is pushed on top if touched by the mouse pointer.

Should the windows overlap too much, click to the title bar on top of a certain window, keep the mouse button pressed, and drag it away.

The window *Chart Control*

Next: Selection

This window is opened by a click on the button *Chart, Track...* within the Main window.

See also: the Chart drawn.

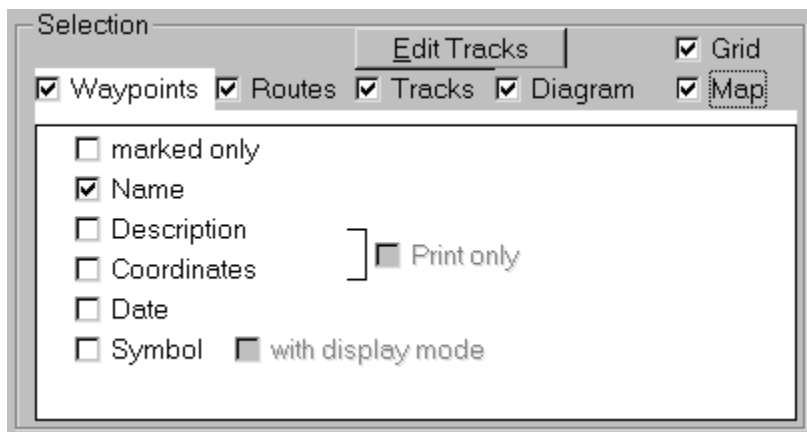
You may go back to the main window without closing the window *Chart Control*.

Some program functions are accessed by buttons, others by menu control as File, Garmin(Magellan), Map, Options.

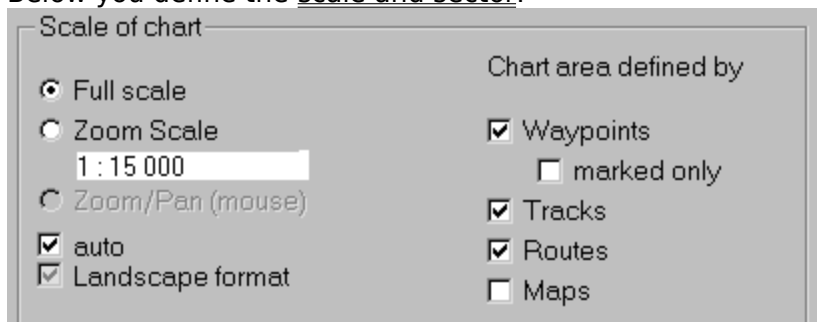
This window controls the graphical Chart display. In most cases you will first read the data of a track from a file or from the receiver. You control the track data by the menu functions File, Garmin(Magellan), and Edit Tracks. As soon as a track was read from file, its headline is displayed.

But the Chart display can also be used without a track, just to display waypoints, map, and routes.

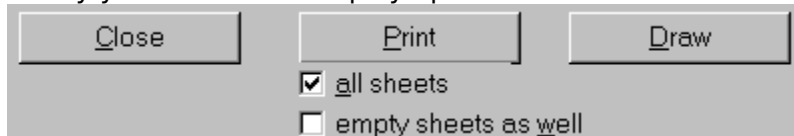
The field of option buttons defines the selection of elements to be displayed.



Below you define the scale and sector:



Finally you control the display operation:



Draw: the Chart will be displayed within an own window on screen. If you notice an error during this operation you may *cancel* it.

Print: this command button is visible only when the Chart has been drawn on screen. Before

printing you get a chance to select the printer and to change the printer settings. Then the headline definition panel comes up. During printing the screen shows a page overview, with all texts replaced by black rectangles of correct size. If you notice an error during this operation you may *cancel* it.

When printing a chart with maps you may print a small test strip first, to check the printing quality.

When you select "black only" on the printer selection box, the Chart and the list of waypoints will be printed in black and white. When using a black and white printer the printer driver would convert colored items to gray without this option. Narrow lines would become invisible. The restriction to black and white prints may be useful as well if you use a color printer and intend to take photocopies later.

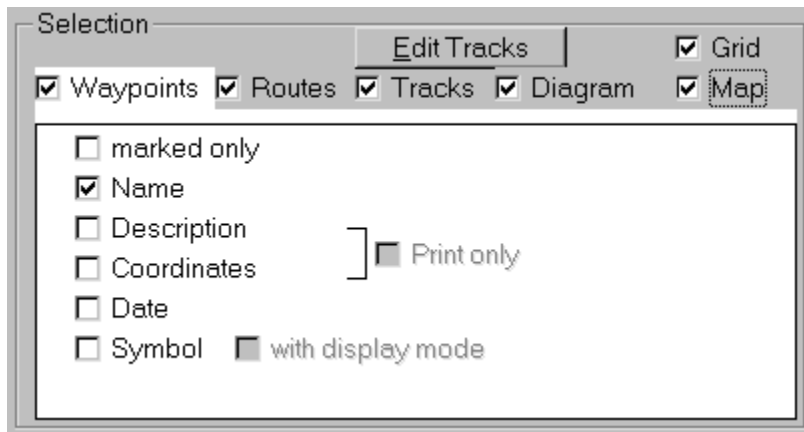
The paper print shows the same items as the screen display, but the sector partitioning lines are missing. If a print spans multiple pages, the pages overlap a little, for better handling. The exact sectors are marked by yellow lines (in black and white mode: dashed), as an aid when sticking them together. On request, *all sheets* can be printed without user interaction. Some times not all sheets contain drawing items. These empty sheets are printed only if *empty sheets as well* is enabled. This may be useful to get a complete coordinate grid.

Close: This button closes the window *Chart Control* and the Chart itself.

The window *Chart Control: Selection*

Next: [Scale](#)
Note: [Segment Track](#)

See also: [Chart Control](#), [Scale](#), [Chart](#)



You will define first what to be drawn: **Waypoints, Routes, Track, Diagram, Map, Grid**. Then the particular elements are selected on filing cards. These cards become visible whenever you **touch** their keyword (e.g. Waypoints).

Waypoints:

The waypoints within the working memory are represented as a dot on the Chart, with its name written next to. If a waypoint is presently marked on the [list of waypoints](#) within main window, the dot is red (screen only).

Hint: the left mouse key allows to mark (single click), edit (double click) or move (drag) waypoints directly on the [Chart](#).

Marked Only:

Optionally you will be shown only the waypoints marked on the [list of waypoints](#) within the main window. See also [Edit List, Mark](#) on the *main window menu*.

Name, Description, Coordinates, Date / Print only:

The name and description fields, and the creation date of the waypoints can be shown optionally. Coordinates as well on request. When printing, a small font will be used for the description. For screen display it is not recommended to show the description and coordinates, because it leads to frequent [position conflicts](#).

Symbol, with display mode (only if enabled)

The display mode controls the selection of Name and Description for each waypoint individually.

Routes:

The routes within the working memory are shown using the colors attached on the window [Routes](#).

The start point of a route is indicated by a triangle, and the end point by a rectangle.

The waypoints belonging to the routes shown are shown as well.

Marked only:

There appears a field for [selection](#) of desired routes. A double click on a route within this field will open the Window *Routes* immediately.

Route Names, Instructions, Duration, Course:

The name of the route, the instructions, and the values for course and duration (see Routes) will be shown, for each leg (*Leg*) and/or accumulated (*Total*).

Track:

The data of a track must have been read before from a file or from Garmin(Magellan). The track will be shown as a colored line. Interruptions are shown as pauses.

Edit Track:

Select this button to analyze data of certain track points, or to edit the track. Then a overlaid window Edit Track is opened.

Time stamps:

The current daytime of the recorded track can be marked in selectable intervals. These marks are shown as small circles with the time written nearby. The recorded time stamps are corrected according to the time zone setting. All pauses from 5 minutes on are shown.

Optionally the elapsed time (duration) will be shown instead of the daytime, pauses will be included or excluded optionally.

Milestones:

In user defined intervals the elapsed distance will be shown. Each new track will cause the odometer to be reset. The track speed will be shown, averaged between adjacent milestones.

Speed limit:

The line color red/blue shows whether the speed was above/below the entered value. Whenever this function is active, user defined track colors are ignored.

Altitude limit:

This option appears only if the track has altitude values attached.

The line color red/blue shows whether the altitude was above/below the entered value. Whenever this function is active, user defined track colors are ignored.

Single Dots:

All points of the track are drawn optionally, to make isolated points visible. Even with this option deselected the first point of any segment will be shown as a small circle, to make single points visible.

Diagram:

Below the chart a diagram will be drawn, showing the speed or altitude versus distance, duration, or daytime.

Note: the speed is calculated off the distance and time difference of any two track points. In case of bad GPS precision there may be big errors. It is recommended to use the option Track speed averaged. Otherwise you may use the outliers to find bad track points, in order to delete them afterwards.

Note: Some receivers (e.g. eTrex) allow SAVING the track internally. Gartrip will read those saved tracks as well but they come without time information. In this case no speed can be calculated.

Map:

A scanned map is shown as a background of the chart. *This function is not available for the 16 bit program version.*

Best Map within this folder:

The program will select the map within the selected directory which fits best to the given chart area. Your map file selection is ignored. Only the directory selection is relevant. You should only have maps with the same nominal scale in this directory.

Up to 4 at once:

Up to 4 maps are shown at once if required. If your map files are huge the drawing may take very long with this option. Whenever you deselect this option the map memory is released immediately. When working with very small map files it might be useful to increase the maximum number of maps used at a time. Use the menu *Options, Best Map: Number*.

To show the other chart objects more clearly in case of a dark map, there are three options:

Brightness:

The map can be shown in light colors. This will enhance the visibility of other objects, and it may save ink. When set to 0 the map will be shown in original colors.

Blinking objects:

All other chart objects will blink, to avoid important map features from being covered. (Not for printing, of course!) Blinking is suspended whenever you move the mouse across the chart.

White borders:

All other objects come with white borders, to make them better visible.

Grid:

In addition a coordinate grid can be drawn. You must have selected the proper coordinate format and datum (**important!**) on the main window before. The Chart will always be aligned to the coordinate system chosen (grid north). The geographical north direction is shown by an arrow in the upper right edge.

If you want the Chart to be aligned to the geographical north direction, chose a coordinate format with degrees, not a metric grid.

Whenever the track record had been interrupted (the receiver has been switched off temporarily, or POOR GPS COVERAGE), the following track point is marked as the beginning of a new segment. This enables the interruption to be shown on the Chart. You may set or reset segment marks manually (Menu Track: Edit).

A new track is marked whenever you append a track to the track memory (by opening a file, or by reading from the receiver), and at pauses longer than 8 hours. Some receivers transfer separated tracks (eTrex), others handle separated tracks but transfer them as a single one (GPSIII). Sections are shown in red or blue alternately, or in the selected colour.

You may set or reset a track mark manually (Menu Track: Edit). This is useful to get a better Chart when forth and back tracks are close to each other.

The distance measurement for milestones is reset for each new track.

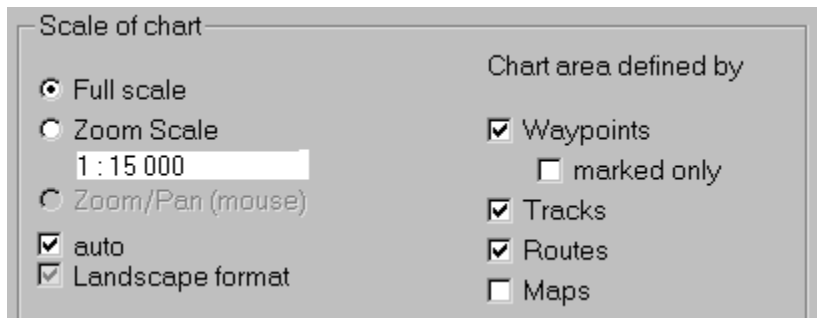
A range is a temporarily marked part of the track memory. The properties of the range are analysed and displayed, and you may save the range on file or write it to the receiver. The range marks are not saved on the track file.

The window **Chart Control: Scale of chart**

Next: [Menu Track: File](#)

Note: [Scale definition](#) [Placement](#) [Headline](#) [Track file](#)

See also: The window [Chart Control](#), [Selection](#), [Chart](#)



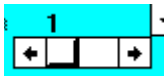
Hint: mouse clicks (right button) on the [Chart](#) allow you to change between *Full Scale*, *Scale*, and *Zoom*, and panning.

Full Scale:

The scale is defined automatically so that all items fit to one page. If you want to define the scale for later use, enter it just now. Then you will get a grid of sector partitioning lines in light blue color (on the screen only), provided that the Chart spans more than one partition. This shows you how the whole Chart will be split among several pages.

Zoom Scale:

If this option is active, the value entered into the field below defines the scale of the partition. This is a kind of true-to-scale zooming.



Panning:

A horizontal and a vertical scrollbar is visible at active scale, provided that the Chart spans more than one partition. These bars define the partition to be shown.

Hint: The partition may be panned in 1/10 steps for special purposes. On the scrollbar, click to the field between slider and arrow. If you intend to print partitions to stick together, you should use full steps only.

Hint: panning is also available by the right mouse key directly on the [Chart](#).

Zoom/Pan (mouse):

This option is accessible only by defining a range with the right mouse key directly on the [Chart](#).

auto:

This option enables the Chart orientation to be selected automatically.

Landscape format:

On request you may force the orientation yourself.

Range defined by: Waypoints (marked only), Track, Routes, Map(s)

These option buttons define the items to be included when the scale and sector of the Chart is fixed automatically. Example: You want the track to be shown completely, but the waypoints in memory are spread over a bigger area. Activate the option *Range defined by* for *Track* only. Then the track will cover the whole Chart, and the waypoints are shown only as far as they fit into the same area.

The scale is valid when printing on a DIN A 4 page, provided that your printer and printer driver works true-to-scale. The author cannot guarantee for that.

At screen display, the real scale depends on the size of your screen which is never known exactly. Therefore the following rule is used here: the screen represents an A4 page exactly, independent of its true size.

Texts (names, descriptions, time stamps) are placed to avoid overlapping trackpoints nor other texts.

In case this is impossible, you will get an additional option box *allow overlapping text*. If enabled, all texts will be shown. Overlapping texts are highlighted by yellow background in this case (on screen only).

You may write a short description into the headline, in case the file name is too short for clarity. The headline will be stored within the track file.

A track File is named with the extension .T and stores the track data and a headline.

The length of track is limited to 32000 points; you may combine several tracks into one file.

The file format is binary. In case you wish to import or export data or to edit them with a text editor, just use a filename with the extension .TXT

Files in Waypoint+ text format, OziExplorer, PCX5 (Garmin), StreetAtlas 7.0, Atlas GIS, Fugawi, Garlink, or Gardown may be imported and exported as well.

Menu *Chart Control: Track: File*

Next: [Menu Track: Garmin\(Magellan\)](#)

open

This function reads a [track file](#) into the working memory of GARtrip.

In case there are already tracks in the memory, you will be asked if the file should be appended to the existing data.

Should the existing data have been changed before, you will be asked if they have to be stored - in case you forgot it.

See also [Status Message](#).

save

This is done to store a track in the currently opened [track file](#).

Save as...

Like *Save*, with selection of another file name, and export format if desired.

In case you have marked a [range](#), you may save only this range.

If you apply an existing file name, you may overwrite this file, or append the data to it. This helps to collect certain tracks in different files, without the need to open these files.

See also [Status Message](#).

Draw by hand

This function is also reached via *Edit Tracks*.

While active, each mouse click on the chart will enter a new track point, immediately after the position of the track cursor. You also may move an existing track point just drag it by the mouse. After selecting a track range you may drag the whole range at once. Deselecting the option box *Draw by Hand* finishes this mode. When this mode is entered while the track cursor points to the end of the track, a new segment will be defined.

Menu Chart Control: Track: Garmin (Magellan)

Next: [Menu Map](#)

read (Function key F5)

All track data of the receiver will be read into the working memory.

In case there is already a track in the memory, you will be asked if the file should be appended to the existing data, to combine two tracks into a single one.

write (Function key F8)

The track data in working memory will be transferred to the receiver, i.e. appended to the existing data. Normally you will clear the memory of the receiver before by *CLEAR TRACK LOG*.

Hint: Some receivers ignore time stamps when track data are written. When reading this track back, time information is lost.

Hint: Some receivers not record a track after this operation. It will try to keep what you have written. To record again, you must enable it yourself.

Hint: If your receiver uses named tracks (example: eTrex) you should enter a text for the first track point of each track (Edit Tracks) before using the write operation. This text will be transmitted as the track name. If the name is "ACTIVE LOG" then this track will be loaded to the active track slot in your receiver.

Current position

The current position of the receiver is read and displayed each other second, optionally saved as a track, independently of the track memory of the receiver.

If you want to get the current position displayed on the Chart, draw a Chart first, using a proper scale, and activate *follow track point*. The display frame will be panned automatically to keep the current position visible.

With Garmin receivers this function can be used with both transfer protocols: GRMN or NMEA. You must set the same protocol for your receiver and for Gartrip (program menu System, [Receiver properties](#)). GRMN is better because you don't need to change the protocol each time this function is used. NMEA is better because it transfers the altitude even with receivers that don't save the altitude themselves (example: GPS12):

Power off receiver (Function key F4)

This function is much more convenient than the red key of the receiver.

Menü Chart Control: Map

Weiter: [Menü Options](#)

Open: folder

Here you enter the name of a map folder only. The option *Best map within this folder* will be selected automatically. The program will search for the best fitting map in this folder.

Open: single map

Here you select a distinct map file to be used. The option *Best map within this folder* will be deselected.

Calibrate

Select the map file to be calibrated. The option *Best map within this folder* will be disabled.

Menü *Chart Control: Options*

Weiter: [Edit Track](#)

Properties of Chart

You may change the font size and line width of each element as you like it. It is recommended to activate the option box *Headline: Print only*, to suppress the headline on screen. You will need the headline on screen only if you want to make a screen copy.

The printed diagram can be set to *shaded* or *line only* in order to save ink. These options do not affect the diagram on screen.

Track Speed not filtered / 1 minute / 5 minutes averaged

In case of "not filtered" the track speed is calculated from two succeeding points. Otherwise it is averaged over the selected time. This applies to the numeric display of speed with *Edit Track*, to *Speed limit*, and to the *diagram*.

Control window on top

By click (normal)

This is the default setting. Dies ist die Standardeinstellung. You change among windows as usual.

by mouse movement (chart control only)

To push the chart or the chart control on top, you only have to move the mouse across it.

by mouse movement (all windows)

Like above, but it also applies to the main window and routes window.

always when Edit Tracks or Calibrate Map

The window *Chart Control* will always stay on top while *Edit Tracks* or *Calibrate Map* is active. This ensures that important data are visible all the time. The chart window will pop up for a short moment when touched by the mouse pointer.

Best map: number

It is recommended to leave this setting unchanged at 4. In special cases, for example when working with very small map files, it may be good to increase the number of maps used at once (limited to 20). When used with big map files, the chart may appear very slowly, and the computer can run into memory problems.

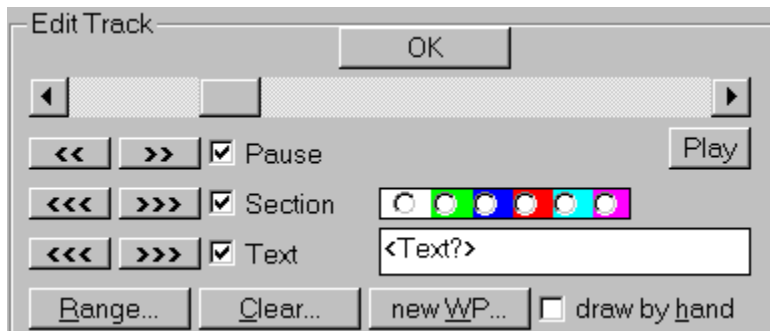
Reading tracks: Split tracks at pauses >8h

When reading tracks from the receiver, this option will insert a new track mark after each interruption of more than eight hours. This leads to automatic distinction of forth and back way in many cases.

The overlaid window *Edit Tracks*


Next: [The Chart](#)

This overlay window opens as soon as you click on *Edit Tracks* within the *Chart Control* window.



Here you find a scrollbar to mark a point on the track. *Hint*: if you click to the track on the Chart, this point will be marked as well.

The marked point will be highlighted on the Chart by a cross mark/circle with the color of the

track section . 

If the marked track point is the beginning of a segment, you will see a check mark for *Segment*. You may change this property. Using the buttons << and >> you move to the next or previous segment directly.

If the marked track point is a new track, you will see a check mark near *Track*. You may change this property. You may select the color used for this track on the Chart. If no color was selected, tracks are drawn in red and blue alternatively. Using the buttons <<< and >>> you move to the next or previous track directly.

You can attach a comment text to certain track points. Just write it into the text field. It will be shown on the chart. If your receiver supports named tracks you will find these names here at the first pint in the track.

All characteristic data of the marked track point are shown below.

If a range of the track has been defined, the range data are shown alternatively.

The *Play* function lets move forward the track point mark automatically with the selected speed. This gives an impression of the trip afterwards.

The Draw by hand function allows to create a track manually by mouse click, to write it to the receiver instead of a Route.

The option *Follow track point* pans the current Chart frame whenever the marked track point is outside.

Menu Range...

Set Begin of Range / Set End of Range

With these functions you define a range of track. Characteristics of this range are evaluated and shown in the window.

Mark the desired startpoint or endpoint first with the scrollbar or with a mouseclick on the Chart.

The range will be drawn as a bold line (on screen only).

Set range to whole segment (Function key F9) / to whole track

Mark any point first within the desired range. Of course you may adjust the beginning or end of the range afterwards.

Set range to all tracks (Function key F11)

This shows you the calculations of the whole track memory.

Set range to visible part

After zooming into the chart, this function sets the track range to the visible part of tracks.

Analyze point / Analyze track range (Function key F12)

This toggles between showing the values for a range or for a point.

Menu Clear...

Single point

Whenever a track contains a single bad point. e.g. caused by bad GPS reception, you may clear it after having set the mark on it.

All repeated points

Some receivers with barometric altimeter (like eTrex Summit or Vista) use to record track points even if they have no GPS lock. Those track points have all identical coordinates of the last known GPS position, so they can lead to some confusion. This function deletes all track points with identical coordinates to the previous one. In some cases you might lose important altitude data then.

every other point (compress)

If you work with very long track, you may reduce the amount of data using this function. On Chart you will see both versions of the track at the same time. If you see a significant difference, you should undo this function (see below).

ALL points in Range

In many cases a track will contain too much points, e.g. because you had forgotten to clear the track memory of the receiver before starting to a trip.

You may clear a range of track by

1. defining the range (see above) then
2. clicking to the menu *Clear: all points in Range*.

Hint: If you clear more than 5 points at once, the first following point will be treated as a new segment .

all points out of range

With this function you remove everything outside the marked range.

all segment marks (in Range)

The segment property of all points in the track range is cleared, optionally only for short pauses. This can be undone as well.

all repeated points (in Range)

Some receivers with barometric altimeter (eTrex Summit and Vista) sometimes use to record track points when they have no satellite coverage. Those track points come with identical coordinates and they can cause some confusion when analyzed. This function clears all unwanted track points. In some cases these points might be useful due to the altitude values.

undo

You may undo *one* clearing action.

Menu New...

New waypoint from track point

After having set the mark on special track point, you may create a new waypoint at this location. The window *waypoint* is opened, to enter a name and so on.

New waypoint from average of track range

This is a special function to increase the precision of GPS by *averaging*.

To mark a waypoint with the receiver to a precision of 10 meters, do the following:

Set the TRACK LOG SETUP of the receiver to:

RECORD TRACK: YES

criteria: Time interval: 00:05:00

(a shorter interval is useless because the GPS error (SA) changes slowly).

Wait until the first 3D-Position is shown.

Clear the track memory of the receiver: CLEAR TRACK LOG.

Record a track for an extended period of time, 8 hours minimum, better 24 hours (external power supply or BATTERY SAVE recommended). The record doesn't need to be done in one piece. Only the sum of track points is relevant.

read the track into GARtrip and clear single extreme track points (outliers).

Define the range (normally whole track).

The menu function *new WP: marked point* creates a new waypoint by averaging the range.

By this method it is easy to afterwards store a precise waypoint at a trip pause location. Provided you had your receiver switched on during a trip pause, at home you may average the track range recorded during the pause.

Note: If your receiver does not provide the selection *Time Interval* for recording the track, then this track will be useless for averaging. In automatic mode it will not record any points without motion.

New route from track range

Define a track range first. The new created route will be kept within the selected distance from the track. When "use existing waypoints" is selected, all waypoints found within the given distance are used, and new waypoints are created if needed.

In case the number of track waypoints is too big, you will be asked what to do.

The Chart

Next: [Limitations](#)
Note: [Multi select](#)

For the selection of Chart items see [the window Chart Control: selection](#).

For the definition for scale and sector see [the window Chart Control: Scale](#).

Full Screen:

With the Windows Full Screen button (top right corner) you may extend the Chart to the full screen. Then you may pop up the control window by any keyboard key.

Size change:

By dragging a border line you may change the size of the Chart on screen. *Please change the width only.* The height will be changed automatically for an aspect ratio of 1:1.4. Click to *Draw* to get the chart redrawn.

Mouse Control:

in general:

With the *left mouse key* you select Chart items (waypoints, track).

With the *right mouse key* you change the partition shown (zoom and pan), or you use a context menu.

Left mouse key (Track: Edit has not been selected)

Click to a *waypoint* to get a context menu with several functions. You may click on its name or on its yellow flag as well.

Double click to a *waypoint*. The window [Waypoint](#) will open, and you may check or edit the data.

Click to any point. You will get a context menu with the ability to clear the selection, or to create a new waypoint there.

Drag a waypoint to another location. You will be prompted to accept the change of coordinates in order to **correct** them. *If you have selected some waypoints before, optionally all these waypoints will be moved the same way. This function may be helpful if you had entered several waypoints with the wrong datum.*

Drag a *rectangle* enclosing one or more waypoints. All enclosed waypoints will be marked. You may mark several waypoints. Sometimes this is useful to show the marked waypoints only.

Left mouse key (Track: Edit has been selected)

Click to a track point. This track point will be marked as if you had selected it by the scrollbar in the overlay window [Edit Track](#).

Drag a line from one track point to another. By doing this you will mark a range of track.

Drag a *rectangle* around a part of the tracks. By doing this you will mark a range of track.

Right mouse key:

Rectangle:

Opening a rectangle with the right mouse key pressed, you define a new zoom partition. If you have checked the option *auto* on the control window, you may change the orientation as well.

Press the Alt key at the same time to pan instead.

Click near the border:

The context menu allows panning by one, 1/2 or 1/10 frame exactly.

Click at any other position:

The context menu offers a variety of zoom and pan operations. The zoom operations will center the new frame at the click position.

Click at any other position, with a control key held down (Shortcuts):

| | |
|---------------------------|------------------------------|
| Shift key: | Zoom in x2 |
| Shift and Alt key: | Zoom out /2 |
| Alt key: | Pan mouse position to center |
| Alt key, border position: | Pan 1/2 frame |
| Ctrl key: | Full scale |
| Ctrl and Alt key: | Zoom to scale |

Keep the shift key depressed to keep already marked waypoints.

Keep the control key depressed to toggle the state of enclosed waypoints.

Limitations

Next: [Map files](#)

Under certain circumstances it will be impossible to draw a Chart.

Please keep in mind that GARtrip cannot draw a range exceeding the meridian at 180°.

Message "Area too large to be shown as projection of format ... Select a format with degrees "

The Chart is always based on the projection of the coordinate format selected on the main window. If the range of the Chart cannot be expressed in the numbering system of a single grid zone, you will get this message.

Message "Chart area will be limited to 90° longitude/latitude"

You have tried to draw more than one quarter of the earth. GARtrip cannot do this.

The waypoints or the track contain one or more points far away from each other. Clear the waypoints HOME and GARMIN first.

Try to draw *only* waypoints *or* track. If even that is not possible:

Waypoints:

Mark one waypoint to be drawn on the list. Make this waypoint the reference point by clicking to the field *Reference Point*. Select the sorting option *Distance from Ref.P.* Look at the bottom of the waypoint list. Clear the waypoints with big distance.

Track:

Mark one waypoint near to the track. (If you have no appropriate waypoints, create one in the middle of the track. See Track: Edit / new waypoint.) Make this waypoint the reference point by clicking to the field *Reference Point*. Edit the track: look at the indicated distance from reference point, and clear the points with big distance.

Map files

Next: [How to create](#)

The 32 bit program version allows to put an image behind the chart. This image will be a scanned map normally. You may use image file types BMP, GIF, and JPG. The map files must be created using an external program. See [How to create a map file](#). GARtrip does not change the map files at all. Therefore you may use the same map files with other programs as well.

Before using a map file, it must be calibrated by defining the coordinates of two known points on the map. The calibration data will be stored in a separate file *.cal for each map. If you move map files to another directory afterwards, you must move the equally named cal file into the same directory, keeping it together with the map file.

You may get displayed more than one map at once on certain conditions.

How to create a map file

Next: Calibrate

The map files are not created nor modified by GARtrip. You need a image editing program to create them out of a CD ROM or to read them from a scanner.

The North direction on the map must be upwards approximately. A skew up to 20° will be allowed by the calibration. Use your image editor to turn the image by 90° or 180° if needed before saving it.

It is assumed that the scale of the map is exactly the same in horizontal and vertical direction. Otherwise you will get reduced precision which can be compensated by the stretch factor.

Maps with Mercator projection are the best for this purpose. Maps with very small scale (1 : 1 000 000 or less) are not recommended because their projection will differ from the projection used by GARtrip.

If you use a scanner, please note:

Image files are huge. For most maps a scanner resolution of 150 dpi is suitable, 200 dpi when the map is a very fine printed one. GARtrip allows any other setting as well. Adjust the scanner such that the maps don't look dark.

You may use the file formats BMP, GIF, and JPG. The GIF format creates the smallest files at best quality, but it is loaded slightly slower than BMP. When using BMP, 256 colors are suitable.

When scanning a big map divided into several A4 partitions, please note:

Please take care that all map parts are oriented identically. It is recommended to align the map border to the scanner lid border firmly. This makes the subsequent calibration very easy. This is also a precondition for the seamless display of more than one map at once.

You should scan the partitions with some overlap. 10% is a good choice. Ensure that the map is pressed tightly to the glass of the scanner. In most cases it is recommended to remove the lid of the scanner, and to use a book of proper size to press the map down. Do not fold the map.

Save all files belonging to the same paper map into the same directory, and don't save anything else there. This is also a precondition for the seamless display of more than one map at once.

There are special programs stitching the files together to one large single file. It is not recommended to do this here. The resulting files would be very huge, and they would be read slowly. In addition the calibration of such huge map areas would not be precise. It is better to use GARtrip's facility to tale the maps.

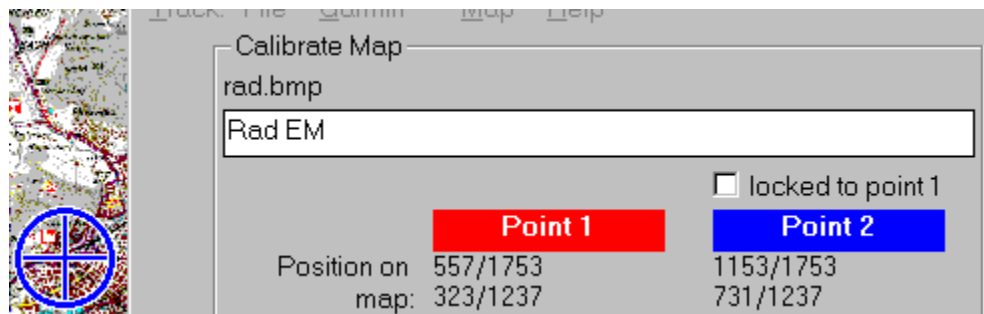
Calibrate

Next: [Multiple maps](#)

Each map file must be calibrated before being used, to define the relation to coordinates. If you select an uncalibrated map, it will be drawn without waypoints or track only.

After selecting the menu *Map / Calibration*, the map and the calibration panel will be shown. You may call this function repeatedly, to correct the settings. Whenever you leave the calibration panel by OK, the settings are saved in a file <mmm>.cal automatically. (<mmm> represents the filename of your map file).

Don't forget to fill the title field. You should describe what places are shown on this map. The title will be shown on the file selection panel later on.



Now set the red and blue mark on the map to known places (left mousekey). Crossed grid lines are the best choice, if the map has a grid. Otherwise you may set them to known waypoint locations. The marks should be spaced far away from each other. It is not relevant whether they are aligned horizontally, vertically, diagonally, or not at all. You may zoom into the map (right mousekey), to set the marks more precisely.

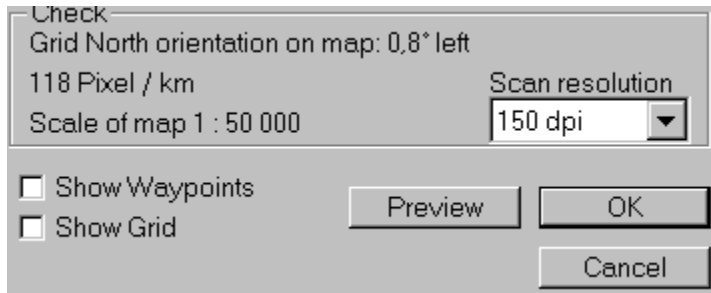
| | | |
|-----------------|----------|----------|
| Coordinates: | | |
| Easting | 3417.299 | 3422.405 |
| Northing | 5325.717 | 5329.108 |
| copied from WP | D--H | <nein> |
| denzlingen hiho | | |

Enter the coordinates for both mark points. The coordinate format and the geodetic datum applied is defined within the main window. Or select a waypoint by the selection "Copied from WP". In this case the coordinates of this waypoint will be used. This is not a permanent reference to this waypoint. This means that you may change or delete this waypoint after calibration, without any effect for the map.

Note: It is good practice not to enter coordinates from scratch but to select a waypoint first, even if you won't use an existing waypoint for calibration. Once shown, the coordinates can be edited then. This method gives you a template. It shows how the coordinates shall look like.

Perhaps you will notice a mismatch of coordinates if looking at map parts far from the calibration points. This can be seen most clearly if your map came with a printed coordinate grid and you have enabled the grid of GARtrip. Or you compare other waypoints of high precision, or a track, with the map. The reason will be a distortion of the map, caused by paper wear or folding, or by an inherent scaling error of the scanner. Many scanners don't scale the x-axis and y-axis the same exactly. You may compensate this effect by adjusting the *stretch* value. *If you are not sure about this, always leave it set to "none"*. The stretch value defines how much the long map side shall be expanded in relation to the short side, in order to get the same scale. This leads to the value being the same if a map is rotated by 90 degrees (scanning in landscape orientation), and you may keep the same value for

subsequent scans if the same scanner is used. *Note:* other programs use a third calibration point for the same purpose.



The frame "check" shows some analysis of the current calibration. Watch the values whether they are reasonable before finishing. The scale of map indicated here is calculated based on your scanner resolution entry. The value is *not* required to reflect the original scale *exactly*. At any time you may enable or disable waypoints and grid to be shown, for better clarity. The button *Preview* applies your setting to the map shown, and you may undo it by pressing *Cancel*. *Instant preview* shows the result of each change of a calibration point, coordinate, or stretch value immediately.

If the border area of the scan is not of optimum sharpness, or if there are unprinted border areas on the scan, you should mark these *borders* accordingly using the left mouse key. This is important for subsequent use of the multiple maps feature.

When calibrating a big map divided into a series of A4 maps, please note:

After having calibrated the first map with its two calibration points, you will be asked to copy this calibration for the next map to be calibrated. Please answer "yes". Then the calibration panel will show up with the option "locked to point 1" for the second calibration point enabled. This means that you only need to define the red mark and its coordinates, and the blue mark and its coordinates will be shifted in parallel.

If the subsequent maps are not oriented equally, the result will not be perfect. You should check the precision of point 2 and correct it if needed.

Multiple Maps

From program version 203 on multiple map files may be used at once.

Preconditions:

First please take care that the files (map files and their *.cal files) are saved accordingly in directories. A directory shall contain only maps with the same nominal scale, not covering each other totally. Partial overlap is allowed and useful, though. Options Options You should be very careful when scanning the maps, such that the partitions have all the same orientation, as precise as possible, see below. The number of map files per directory is not limited.

Examples:

So you should save the A4 partitions of the same paper map or several adjacent paper maps in one directory.

But you should use different directories for a) a hiking map, b) a biking map, and c) a topographic map of the same region.

You should use different directories also for a) a hiking map with scale 1:50 000 and b) a road map of scale 1:200 000.

Function "Best map within this folder":

This chart option instructs the program to use the best fitting map out of the chosen directory. The program will use the map covering the biggest part of the chart area.

You need only to select the folder by the *open: folder* dialogue.

But if you select "Chart area defined by maps" then all maps within this directory will define the chart area. The centre map will be drawn, and all other maps will be shown as rectangles. This gives you some impression on the covered area, and on the overlap of the maps.

Whenever you use zoom and pan functions to change the area drawn, a new centre map will be selected again.

Function "up to 4 at once"

When working near the borders between adjacent maps, up to 4 maps will be shown at once. The number of 4 maps should be sufficient for all practical situations. If the chart area covers more than 4 maps, for example at a very small chart scale, the exceeding maps will be shown as rectangles. It would not be of use to draw all the maps at once. At this small scale you would not see much of them, and reading all the maps would waste computer memory and time. In extreme cases it may be useful anyway to show more than 4 maps. In this case you may change the maximum number by the Options menu.

The drawing may take a bit long if your map files are big. As soon as you deactivate this function the PC memory will be released immediately.

Note: It may take very long to print multiple maps. When GARtrip seems to have finished its printing activity it may take some minutes for the printer driver to prepare the printout.

Overlapping and Borders

In many cases the maps will overlap each other. The centre map will be on top then. When you zoom or pan around and another map becomes the centre map, this new centre map will be on top. The border line between the maps will move accordingly.

If the border area of the scan is not of optimum sharpness, or if there are unprinted border areas on the scan, you should mark these *borders* accordingly when calibrating. This avoids a bad part covering a good part. Marked borders are suppressed when the option "up to 4 at

once" is activated. Otherwise the full map is shown, in case the border areas are better than nothing - they may contain useful information for calibration, for example.

Remarks on the precision with "up to 4 at once"

Maps are always displayed upright, like saved on the file. This is also true if the orientation of the map is not exactly north. GARtrip never rotates the map because this would diminish the resolution of the bitmap. To keep the relation to the objects, all objects are rotated instead. You can see this when looking at the north arrow, or at the grid lines. This was such from program version 200 on.

If more than one map is displayed at once, and if these maps don't come with exactly the same orientation, then you might see some warping along the border between adjacent maps, looking a bit odd. The relation to the objects is precise, anyway. For each point on the chart, the map used at this point is the reference for the placing of objects. If you see this kind of warping you can be sure that all objects (Waypoints, Track points) are shown according to the map at this position.

This means that a track line crossing the border of maps might do some according side step. And you can define new waypoints by mouse click anywhere on the maps.

There is only one exception: the grid is valid for the centre map only. You get a note on the left bottom of the chart.

You may see what map is valid for a given chart point. When the chart option *Cursor position: show map name* (right mouse key menu on the chart) is active, the coordinates indicator on the right bottom of the chart will say which map belongs to this point.

