

# **Garmin Topographics Database (TDB)**

## **File Format**

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# Garmin Topographics Database (TDB) File Format

Filename extension \*.tdb

The File that holds the information which \*.img belong to the mapset.

Mapset: An assortment of map tiles (\*.img) that is joined together by .tdb, overview image (mapset00.img), and .mdx (Taken from [3]).

This documentation is based on own research and the sources listed in the references section.

## Basic data types

All values are serialized in little-endian byte order (least significant byte first).

Type	Length	Description
char	1	ASCII character, see [7]
byte	1	8 bit unsigned integer (range 0 .. 255)
ushort	2	16 bit unsigned integer (range 0 .. 65535)
uint	4	32 bit unsigned integer (range 0 .. 4294967295)
string	1..n	0-terminated string (may be empty)

Version:

A byte or ushort where the value is calculated as major version x 100 + minor Version.

E.g. 0x0064 = 100 = V1.0

## General file structure

The general format is the same as that of MPS file format within IMG files.

The file consists of a sequence of variable sized records. Each record looks like this:

Offset	Type	Content
0x00	char	Record type. Known values: 'P', 'D', 'R', 'S', 'B', 'L' and 'T'
0x01	ushort	Record length, excluding the record type and length
0x03		Payload

Usual record sequence: P [D] [R] [S] (B L\*)+ [T]

Record D is not present in version 1.00, but present (and mandatory) from version 3.00 onward.

Records R and S were introduced with TDB version 4.00. Both are optional.

## Record 'P': Product definition

Fields since V1.00:

Offset	Type	Content
0x03	ushort	Product ID
0x05	ushort	Family ID
0x07	ushort	TDB version. Values seen: 1.00 (with worldmap.tdb installed with MapSource V2.00), 3.00, 4.03, 4.06, 4.07, 4.11, 4.12 Values mentioned somewhere: 4.00, 4.02, 4.03 in cpgsmapper [6] source tdb.cpp; 4.08, 4.09
0x09	string	Map series name

Additional fields since V3.00:

Offset	Type	Content
	ushort	Product version
	string	Map family name

Additional fields since V4.00:

Offset	Type	Content
	byte	Locked. 0=no, 1=yes
	byte	Lowest map level. Values seen 16, 17, 18 and 19
	byte	=1
	byte	=1
	byte	=1
	byte	Transparent. 0=no, 1=yes
	uint	=0

Additional fields since V4.02:

Offset	Type	Content
	byte	NOD bit size? Highest routable? Values seen 0, 16, 18, 19, 20, 21, 23 and 24

Additional fields since V4.03:

Offset	Type	Content
	byte	Fill type
	byte	Background color. 8 for marine, 0 otherwise. Values seen 0, 4 and 8
	byte	Routing protect
	uint	North boundary
	uint	East boundary
	uint	South boundary
	uint	West boundary

Additional fields since V4.06:

Offset	Type	Content
	uint	Codepage (see [4] and [5]). Value seen 1250, 1251 and 1252
	uint	=10000

Offset	Type	Content
	byte	Map is routable. 0=no, 1=yes

Additional fields since V4.07:

Offset	Type	Content
	byte	Map has profile information. 0=no, 1=yes * MapSource says when this is 0: "does not contain any elevation data"
	byte	Map has DEM sub files. 0=no, 1=yes *

\* TDB Editor shows the first byte as DEM and the second as Profile. Hmm.

Additional fields since V4.11: (according to one source since V4.09)

Offset	Type	Content
	byte[8]	Probably contains flags. Seen value =0
	byte	Map is NOT printable. 0=no, 1=yes
	byte[8]	byte[0-2]: if != 0, TDB Editor sets tick mark in box 'Map Window'
	byte	Seen values: 0, 1, 58
	byte[2 or 9]	Seen values 00 00 or 00 00 00 00 00 11 00 00 00 The length often but not always is determined by the byte directly before – if 0 it is 2 and if 1 it is 9.

Some 4.11 files have an additional byte 0x00 here. These seem to be created by "gps\_mapper", so that might be a bug in that program.

## Record 'D': Copyright strings

Consists of a sequence of the following sub-records until the end of the record:

Offset	Type	Content
	byte	Copyright code 0: Source information. Describes, what data sources were used in generating the map data. 2: ?? (seen in Map.EU.2019.30) 3: Logo?? (seen in City Navigator Europe NTU) 4: ?? (seen in BaseCamp_2.0.7\Maps\Global Application Basemap v2.gmap\Product1\Global_Application_Basemap_v2.tdb) 6: Copyright information from the map manufacturer. 7: Copyright bitmap reference. A file name that contains a BMP image to be printed along with the map.
	byte	Where code 0: ?? (seen in torquay.tdb from tdb_editor) 1: Copyright text is printed in the “product information” screen in MapSource. No meaning for bitmap images. 2: Copyright text or bitmap image should be printed when a map is printed from MapSource. 3: Copyright text should be printed on both the “product information” screen and any printed maps.
	ushort	Extra properties

Offset	Type	Content
		If copyright code == 3: Values seen 0x0800 (2048) and 0x0F00 (3840) – maybe BMP scale factor as well If copyright code == 7: BMP scale factor, value seen 0x0F00 (3840) Otherwise: Shall be 0
	string	Copyright If copyright code == 3 or 7: BMP file name Otherwise: Message

## Record 'R': Trademarks

Consists of a sequence of the following sub-records until the end of the record:

Offset	Type	Content
	byte	Subfamily. Values seen 1, 195
	string	Name. Values seen: "Map", "Preview Test Map", "Test preview map"

## Record 'S': Regions

Consists of a sequence of the following sub-records until the end of the record:

Offset	Type	Content
	byte	=1
	byte	Starts with one and is increasing (but sometimes values are left out)
	string	Seen value: "All"

## Record 'B': Overview map

Offset	Type	Content
0x03	uint	Map number ("area code")
0x07	uint	Parent map number =0
0x0B	uint	North boundary
0x0F	uint	East boundary
0x13	uint	South boundary
0x17	uint	West boundary
0x1B	string	Description

## Record 'L': Detail map

Fields since V3.00:

Offset	Type	Content
0x03	uint	Map number ("IMG ID")
0x07	uint	Parent map number ("area code")
0x0B	uint	North boundary
0x0F	uint	East boundary
0x13	uint	South boundary

Offset	Type	Content
0x17	uint	West boundary
0x1B	string	Description
	ushort	Number of Subfiles +1. Values seen 2-7
	ushort	Number of Subfiles. Values seen 1-6
	n x uint	Sizes of the Subfiles. TDB version < 4.03: the sizes are in order RGN, TRE, LBL, NET, NOD, .. TDB version >= 4.03: the sizes follow the order of the filenames.
	byte	Terminator? Value seen 1

Additional fields since V4.03:

Offset	Type	Content
	ushort	Region ID. Value seen 1, 0xC3
	uint	MDR len. Value seen 255, 256 (is this a real length or something else?) and all kinds of probably real lengths.
	n x string	Filenames of the Subfiles. Usually, the filename without extension is always same. The extensions are GMP, TRE, RGN, LBL, NET, NOD, DEM.

Additional fields since V4.06:

Offset	Type	Content
	ushort	Number of following entries (only seen 0 prior to 4.12)
	n x Entry	See below

Entry:

Offset	Type	Content
0x00	byte	Seen value: 0x01
0x01	byte	Value is increasing from entry to entry, could be zoom level

## Record 'T': Signature

Offset	Type	Content
0x03	byte[20]	filled with random data, then CRC result is strewn in: byte[2] = high byte byte[9] = mid-high byte byte[12] = mid-low byte byte[17] = low byte

32 bit CRC calculated over complete file up to the start of the 'T' record.

Algorithm is standard CRC32, see [2].

## References

### Used sources of information

- [1] [http://wiki.openstreetmap.org/wiki/OSM\\_Map\\_On\\_Garmin/TDB\\_File\\_Format](http://wiki.openstreetmap.org/wiki/OSM_Map_On_Garmin/TDB_File_Format)
- [2] Catalogue of parametrised CRC algorithms <http://reveng.sourceforge.net/crc-catalogue/all.htm>
- [3] [https://www.velomap.org/velomaporg/archive/install\\_maps\\_with\\_gmaptool/](https://www.velomap.org/velomaporg/archive/install_maps_with_gmaptool/)
- [4] Code Pages <http://msdn.microsoft.com/en-us/goglobal/bb964653.aspx>
- [5] Code Pages [http://en.wikipedia.org/wiki/Code\\_page](http://en.wikipedia.org/wiki/Code_page)
- [6] cgpsmapper (was: <http://cgpsmapper.com/>), source <https://sourceforge.net/projects/cgpsmapper/>

### Standards and specifications

- [7] ISO/IEC 646:1991, Information technology – ISO 7-bit coded character set for information interchange

### Sources of sample files

- none -