

Garmin TDB File Format

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TDB File Format

The TDB file contains summary information about the individual IMG files that make up a MapSource map set. This file is read by Garmin's MapSource application, which uses the data to both display map information as well as download IMG files to Garmin GPS receivers. The TDB file has a flat structure, though its exact makeup is dependant upon the file version.

Unless otherwise noted, all integers are stored in little-endian format (LSB to MSB).

v3.00 File Overview

The v3.00 TDB is comprised of four sections: the header block, the copyrights block, the overview block, and the detail map blocks (one block for each detail map in the product). It is used for topographic and older, non-routable maps that only have RGN, LBL and TRE map sections in their IMG files.

Table 1: TDB v3.00

Header block	
Copyright block	Copyright segment 1
	...
	Copyright segment <i>n</i>
Overview block	
Detail blocks	Detail map block 1
	...
	Detail map block <i>n</i>

Each block has the following structure.

Table 2. TDB block structure

Rel Offset	Contents	Length (bytes)
0x0	Block ID	1
0x1	Block length, l_b	2
0x3	Block data	l_b

The block data varies based on the type of block that is being defined. The block ID determines the block type.

Header (block ID 0x50)

The header block structure is as follows:

Table 3: v3.x Header Block

Rel Offset	Contents	Length (bytes)
0x0	Product ID	2
0x2	0x0000	2

0x4	TDB Version e.g., 0x012c (300)	2
0x6	Map series name (0x00 terminated)	varies, length l_s
0x6+ l_s	Product version	2
0x8+ l_s	Map family name (0x00 terminated)	varies, length l_f

The *Product ID* is a unique number that is associated with the map product. It is stored in the Windows registry.

The map *series* and *family names* are text strings, 0x00 terminated, that describe the map product. Generally, the map series would be a name defining the superset of map products of which the current map product is a part, such as “US Topo”. The map family, then, would be a description of the individual product that is part of that series, such as “US Topo – Hawaii”, “US Topo – West”, etc.

The *TDB version* obviously indicates the TDB version that is in use to describe the map product. The version is encoded as a two-byte integer which is divided by 100 to obtain the actual version. For TDV v3.00 versions, this value is 0x012C, or decimal 300. Dividing by 100 we get v3.00.

The Product Version is similarly encoded, and is the version number that is assigned to the map product.

Copyright Block (block ID 0x44)

The copyright block has a flat data structure:

Table 4: v3.00 Copyright Block

Rel Offset	Contents	Length (bytes)
0x0	Array of copyright segment(s)	Varies

It contains one or more copyright segments that are displayed in the product info screen of MapSource or when a map is printed out. Each copyright segment has the following structure.

Table 5: Copyright segment

Data member	Size (bytes)
Copyright code	1
Where code	1
Extra properties	2
Copyright string, 0x00 terminated	Varies

The copyright code defines what kind of copyright information is present in the segment. This code also determines what data, if any, is present in the extra properties field. The copyright codes and their meaning are listed below.

Table 6: Copyright codes

Code	Extra properties	Meaning
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0x00	n/a (0x0000)	Source information text string. Describes what data sources were used in generating the map data.
0x06	n/a (0x0000)	Copyright text string. Copyright information from the map manufacturer.
0x07	BMP scale factor	Copyright bitmap reference. A filename that contains a BMP image to be printed along with the map.

For bitmap images, the scale factor indicates how large the copyright bitmap should be on the printed map page. This value should be adjusted depending on the size of your copyright bitmap image. Trial and error is the best approach for setting the scale. As an example, NavTeq's copyright image is 278x99 pixels and is shown with a scale factor of 15 (0xF).

The *where* field indicates where the copyright information should be displayed.

Table 7: Where codes

<i>Code</i>	<i>Meaning</i>
0x01	The copyright text is printed in the "product information" screen in MapSource. This value has no meaning for bitmap images.
0x02	The copyright text or bitmap image should be printed when a map is printed from MapSource.
0x03	The copyright text should be printed on both the "product information" screen and any printed maps.

Overview Map Block (block ID 0x42)

The overview map block describes the overview IMG file to MapSource.

MapSource uses the so-called overview map to provide a low-detail, reference image for the detailed maps. Generally, the overview map for a given product lives in the root directory of the MapSource install while the detail maps live in a subdirectory. In addition to containing a low-resolution map, the overview image file has a number of 0x4A type polygons (known as "definition areas"). These definition areas are labeled after, and correspond to, the detail map image files. Each detail map image contains a "background" polygon (type 0x4B) which matches the definition area in the overview map.

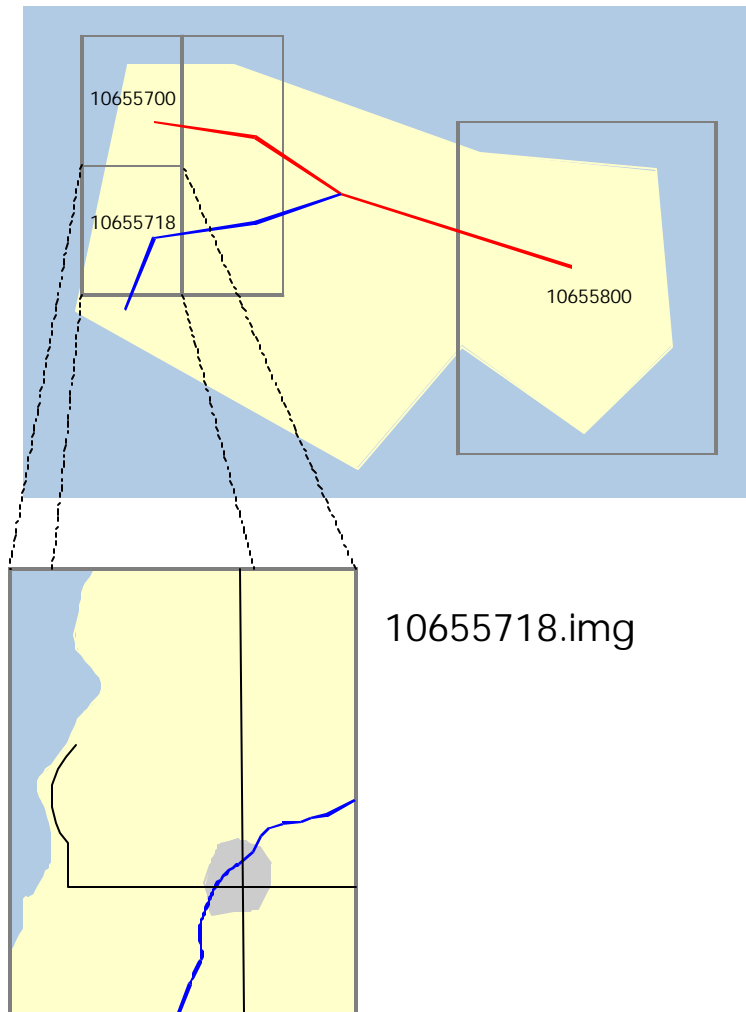


Figure 1: Overview and detail map relationship

Figure 1: Overview and detail map relationship Figure 1 shows, through simple example, the relationship between an overview map and its detail maps. The overview map contains a low-resolution image of the entire area covered by the map product. It also includes several “definition areas”, polygon type 0x4A, labeled 10655700, 10655718, 10655800 and so on. Each of these definition areas refers to a detail image file in the map product directory. The figure shows, visually, the IMG file named 10655718.img which is the detail map corresponding to definition area 10655718. Here, we see the “high resolution” map data that gets downloaded to the GPS.

When you select a map set in MapSource, you are selecting the definition areas in the overview map. MapSource consults the label associated with the selected definition area and uses those to find the corresponding detail map files.

The overview map block of the TDB file defines the parent map number, its geographic limits and a description string associated with the overview image, itself.

The structure of the overview map block is as follows:

Table 8: Overview map block

Rel Offset	Contents	Length (bytes)
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0x0	Map number	4
0x4	Parent map number 0x00000000	4
0x8	Latitude, N limit	4
0xC	Longitude, E limit	4
0x10	Latitude, S limit	4
0x14	Longitude, W limit	4
0x18	Description string, 0x00 terminated	Varies

Latitudes and longitudes are given in degrees as 32-bit integers (four bytes) in the TDB file (note that this differs from the IMG file format and the TDB v4.x format, where they are given as 24-bit integers).

$$\text{Conversion: 1 TDB map unit} = \frac{360}{2^{32}} \text{ degrees}$$

Note that these are signed integers, so values greater than 0x7FFFFFFF are negative.

The *map number* is the IMG file's unique map number. Detail maps will reference the overview map's map number as their "parent map". Overview maps do not have parent maps, so the parent map is generally set to 0x00000000. (In theory, it appears that a TDB could support nested layers of overview maps by defining multiple overview maps and setting their parents appropriately, but the author has not seen any such configuration.)

Finally, a *description string* describes the overview map. It is 0x00 terminated.

Detail Map Block (block ID 0x4c)

Each TDB file has one or more detail map blocks, with each block corresponding to a specific IMG file (detail map) in the map product. The detail map block structure is very similar to that of the overview map.

Table 9: Detail map block

Rel Offset	Contents	Length (bytes)
0x0	Map number	4
0x4	Parent map number	4
0x8	Latitude, N limit	4
0xC	Longitude, E limit	4
0x10	Latitude, S limit	4
0x14	Longitude, W limit	4
0x18	Description string, 0x00 terminated	Varies, l_s
0x18+ l_s	Unknown Always 0x0004?	2

0x1A+l _s	Unknown Always 0x0003?	2
0x1C+l _s	RGN data size	4
0x20+l _s	TRE data size	4
0x24+l _s	LBL data size	4
0x28+l _s	Unknown. End of block flag? Always 0x01?	1

The *parent map number* refers to the overview map that holds the definition area polygons for the detail map.

The three size blocks, *RGN size*, *TRE size* and *LBL size*, correspond to the physical size, in bytes, of the RGN, TRE and LBL sections of the detail map, respectively. These numbers are used by MapSource to estimate the total map selection set size prior to transferring the maps to the GPS.

The final byte in each detail map block appears to be a terminating byte, 0x01.