

# Genasys GenaMap Reader

## FORMAT NOTES:

This format is not supported by FME Base Edition.

The GenaMap Reader module enables FME to read GenaMap Type 4, Type 5, and Type 10 maps. Type 4 maps are two-dimensional (2D) Vector maps containing point, line, and area features, Type 5 maps are the Type 4 (3D) equivalent, and Type 10 maps are Text maps containing graphical annotation information. This section assumes familiarity with these formats.

## Overview

GenaMap is a Geographic Information System (GIS) with comprehensive functionality for entering, editing, displaying, analyzing and reporting map data.

Information stored by the GenaMap system is organized on the basis of individual maps. Each map has a type number associated with it to indicate its map type. The following tables indicate the map types that the FME GenaMap reader module recognizes.

### Type 4(2D), Type 5(3D) – Point, Line, and Area Maps

A logical Type 4 or Type 5 map consists of several physical files having the following file name extensions:

File Name Extension	Contents
.FH	The Map Header contains the metadata of the vector map.
.FF	The Feature File contains information on how to form tagged point, tagged line, and area features.
.FL	The Chain File contains information on which edges are chained to form the features.
.FE	The Edge File contains references to all edges of the map.
.FN	The Node File contains all nodes of the map.
.FC	The Coordinate File contains the coordinate records that make up all edges of the map.
.FT	The Tag File contains the tag values for tagged vector features.
.FQ	The Tag/Queue File is built from destroyed features.
.FR	The Edge Minimum Bounding Rectangle's (MBR's) File contains the minimum bounding rectangle for each available edge in the map.

### Type 3 – Attribute Table

**Note:** Type 3 maps are accessed when the input Type 4 or Type 5 maps have their attribute hookup status set.

A logical Type 3 map consists of several physical files with the following file name extensions:

<b>File Name Extension</b>	<b>Contents</b>
.FA	The Attribute Header file contains the available attribute types and descriptions for the attribute table.
.FD	The Attribute Data file contains the actual values for attribute table.

### **Type 10 – Text Maps**

A logical Type 10 map consists of several physical files with these file name extensions:

<b>File Name Extension</b>	<b>Contents</b>
.FH	The Map Header contains the metadata for the text map.
.FF	The Feature File contains the text feature records. The text feature records contain indexes to the .FT, .TG, and .TS files.
.FT	The Tag File contains the tag values for tagged text features.
.TG	The Text Graphics file contains information—such as text rotation, justification, and so on—that describes the text string.
.TS	The Text String file contains the actual text string of the text.

## GenaMap Quick Facts

Format Type Identifier	GENAMAP
Reader/Writer	Reader
Licensing Level	Professional
Dependencies	None
Dataset Type	File
Feature Type	Map name
Typical File Extensions	.fh (.fa, .fc, .fd, .fe, .ff, .fl, .fq, .fr, .ft, .tg, .ts)
Automated Translation Support	Yes
User-Defined Attributes	No
Coordinate System Support	No
Generic Color Support	No
Spatial Index	Never
Schema Required	No
Transaction Support	No
Geometry Type	genamap_type

Geometry Support			
Geometry	Supported?	Geometry	Supported?
aggregate	no	point	yes
circles	no	polygon	yes
circular arc	no	raster	no
donut polygon	yes	solid	no
elliptical arc	no	surface	no
ellipses	no	text	yes
line	yes	z values	yes
none	no		

## Reader Overview

The GenaMap reader scans the map header file (.FH file) and uses it to determine if the data contains an arc/node (Type 4, 5) map or a text map.

When reading Type 4 or Type 5 maps, the GenaMap reader extracts all tagged features. If the tagging status of the input map is not complete, the reader will also extract the untagged features.

Extraction of user attribution is also supported for the input Type 4 and Type 5 maps. When the attribute hookup status of the Type 4 map is set, the features are extracted with their associated attributes. The GenaMap reader looks for the associated attributes in the attribute table, located in the ZF03 directory, referred to in the map header.

When reading Type 10 maps, the GenaMap reader extracts all text features that are contained in the .FF file.

## Reader Directives

The suffixes listed are prefixed by the current <ReaderKeyword> in a mapping file. By default, the <ReaderKeyword> for the GenaMap reader is GENAMAP.

### DATASET

**Required/Optional:** *Required*

The value for this directive is the GenaMap .FH file.

**Example:**

A typical mapping file fragment specifying an input GenaMap Type 4 dataset directory looks like:

```
GENAMAP_DATASET /usr/data/genamap/ZF04/MAP/MAP.FH
```

### FORCE\_ATTR\_HOOKUP

**Required/Optional:** *Optional*

Forces the reader to attempt translation of Type 3 maps when reading Type 4 or Type 5 maps even if the arc/node map header states that the attribute hookup was not complete.

**Valid values:** *YES | NO*

**Example:**

The following forces the reader to attempt reading the Type 3 maps, effectively ignoring the attribute hookup status flag for the arc/node maps:

```
GENAMAP_FORCE_ATTR_HOOKUP yes
```

### SCALE\_OF\_TRUE\_DISPLAY

**Required/Optional:** *Optional*

This directive allows the user to override the scale of true display found in the GenaMap map header. This may be useful for a more accurate control of the resulting text feature's text size.

**Valid values:** *positive integers*

**Example:**

```
GENAMAP_SCALE_OF_TRUE_DISPLAY 1000
```

**ALIGN\_TEXT\_COORDS\_TO\_LOWER\_LEFT****Required/Optional:** *Optional*

This directive allows the reader to align all text features into a lower-left justification. The original text justification may be found in the text feature's `genamap_original_justification` attribute.

**Valid values:** *YES | NO*

If the automatic transformation for all text features into lower-left justification is not desired, then this keyword should be set to *NO*.

**Default:** *YES***Example:**

The GenaMap justification in this case may also be found in the text feature's `genamap_original_justification` attribute.

```
GENAMAP_ALIGN_TEXT_COORDS_TO_LOWER_LEFT NO
```

**DATA\_IN\_BIG\_ENDIAN****Required/Optional:** *Optional*

This directive allows the reader to specify that the data is in big endian or little endian.

**Valid values:** *YES | NO***Default:** *YES***Example:**

The following specifies that the data to be read in is little endian:

```
GENAMAP_DATA_IN_BIG_ENDIAN NO
```

**TEXT\_TRANSFORM\_AFFINE\_COEFF****Required/Optional:** *Optional*

Allows the user to specify the coefficients for a 2D affine transformation that is to be performed on a GenaMap text feature coordinate. Affine transformations include translations, rotations, scalings, and reflections. One of the uses of this directive is to allow shifting the position of the text coordinate in any direction on the x or y axis.

**Values:**

The range of values for this directive are: "a b c d e f" where a, b, c, d, e, and f must be real numbers, white-space-separated, and enclosed within double quotation marks. a, b, c, d, e, and f are coefficients for the equations:

$$\begin{aligned}x' &= ax + by + c \\y' &= dx + ey + f\end{aligned}$$

**Default:** *NO*

The following will shift all of the text coordinates read 5 units down the y-axis:

```
GENAMAP_TEXT_TRANSFORM_AFFINE_COEFF "1 0 0 0 1 -5.0"
```

It is possible to apply an affine transformation on the coordinate of a text selectively according to the value of its GenaMap alignment. The following nine directives may be used in conjunction with, but will override the affine transformation of, the generic `TEXT_TRANSFORM_AFFINE_COEFF` directive:

`TEXT_TRANSFORM_COEFF_LL` - Applies the specified affine transformation to GenaMap text features having lower-left justifications.

`TEXT_TRANSFORM_COEFF_LC` - Applies the specified affine transformation to GenaMap text features having lower-center justifications.

`TEXT_TRANSFORM_COEFF_LR` - Applies the specified affine transformation to GenaMap text features having lower-right justifications.

`TEXT_TRANSFORM_COEFF_CL` - Applies the specified affine transformation to GenaMap text features having center-left justifications.

`TEXT_TRANSFORM_COEFF_CM` - Applies the specified affine transformation to GenaMap text features having center-middle justifications.

`TEXT_TRANSFORM_COEFF_CR` - Applies the specified affine transformation to GenaMap text features having center-right justifications.

`TEXT_TRANSFORM_COEFF_UL` - Applies the specified affine transformation to GenaMap text features having upper-left justifications.

`TEXT_TRANSFORM_COEFF_UC` - Applies the specified affine transformation to GenaMap text features having upper-center justifications.

`TEXT_TRANSFORM_COEFF_UR` - Applies the specified affine transformation to GenaMap text features having upper-right justifications.

For example, the following directives shift lower-left justified text 5 units down the y-axis, while text with other justifications are shifted 10 units up the y-axis:

```
GENAMAP_TEXT_TRANSFORM_AFFINE_COEFF_LL "1 0 0 0 1 -5.0"
GENAMAP_TEXT_TRANSFORM_AFFINE_COEFF "1 0 0 0 1 10.0"
```

## Feature Representation

In addition to the generic FME feature attributes that FME Workbench adds to all features (see *About Feature Attributes* on page 7), this format adds the format-specific attributes described in this section.

Each feature returned by the GenaMap reader has its feature type set to the name of the input map. All GenaMap FME features contain the `genamap_type` attribute that identifies the geometric type.

Attribute Name	Contents
<code>genamap_type</code>	The type of geometric entity stored within the feature. The valid values are listed below: <code>genamap_point</code> <code>genamap_line</code> <code>genamap_area</code> <code>genamap_text</code>

## General Attributes

All GenaMap FME features contain the following attribute:

Attribute Name	Contents
<code>genamap_tag</code>	The primary GenaMap attribute.

Type 4 and Type 5 maps carry the additional attribute:

Attribute Name	Contents
<code>genamap_symbology_id</code>	The GenaMap symbolization pointer value.

## Points

**genamap\_type:** `genamap_point`

GenaMap point features specify point features defined by a single x,y or x,y,z coordinate.

## Lines

**genamap\_type:** `genamap_line`

GenaMap line features specify linear features defined by a sequence of x,y or x,y,z coordinates.

## Polygons

**genamap\_type:** `genamap_polygon`

GenaMap polygon features specify area (polygonal) features. The polygon may contain holes.

## Text

**genamap\_type:** `genamap_text`

The GenaMap text features are extracted from GenaMap Type 10 maps. Each text feature has a single x and y coordinate. The text coordinate point is located at the lower left of the text string. The original GenaMap origin point and justification are also stored in the text features as the attributes `genamap_original_x`, `genamap_original_y`, and `genamap_original_justification`. Text features have the following special attributes associated with them.

<b>Attribute Name</b>	<b>Contents</b>
<code>genamap_text_string</code>	The text string. <b>Range:</b> Any character string
<code>genamap_rotation</code>	The rotation of the text measured in degrees counterclockwise from horizontal. <b>Range:</b> 0...360
<code>genamap_width</code>	The width of each text in ground units. <b>Range:</b> Any real number $\geq 0$
<code>genamap_height</code>	The height of each text in ground units. <b>Range:</b> Any real number $\geq 0$
<code>genamap_original_justification</code>	The original GenaMap alignment of the text based on the original GenaMap text origin point. <b>Range:</b> upper_left   upper_center   upper_right   center_left   center_middle   center_right   lower_left   lower_center   lower_right
<code>genamap_original_x</code>	The original GenaMap text origin point x coordinate.
<code>genamap_original_y</code>	The original GenaMap text origin point y coordinate.
<code>genamap_char_rotation</code>	The rotation of each character in the text string measured in degrees counterclockwise from the horizontal. <b>Range:</b> 0...360
<code>genamap_slant</code>	The slant for each character in the text string. A negative angle gives a clockwise slant; a positive angle gives a counterclockwise slant. <b>Range:</b> -90...90
<code>genamap_font</code>	The GenaMap lettering style. <b>Range:</b> Any valid GenaMap system font. integer $\geq 0$
<code>genamap_color</code>	The GenaMap color of the text. <b>Range:</b> GenaMap color index. integer $\geq 0$