

dgnlib

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Chapter 1

Class Index

1.1 Class List

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Chapter 2

File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

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Chapter 3

Class Documentation

3.1 `_DGNTagDef` Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- `char * name`
- `int id`
- `char * prompt`
- `int type`
- `tagValueUnion defaultValue`

3.1.1 Detailed Description

Tag definition.

Structure holding definition of one tag within a `DGNTagSet`.

3.1.2 Member Data Documentation

3.1.2.1 `defaultValue`

```
tagValueUnion _DGNTagDef::defaultValue
```

Default tag value

3.1.2.2 id

```
int _DGNTagDef::id
```

Tag index/identifier.

3.1.2.3 name

```
char* _DGNTagDef::name
```

Name of this tag.

3.1.2.4 prompt

```
char* _DGNTagDef::prompt
```

User prompt when requesting value.

3.1.2.5 type

```
int _DGNTagDef::type
```

Tag type (one of DGNTT_STRING(1), DGNTT_INTEGER(3) or DGNTT_FLOAT(4)).

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.2 DGNElemArc Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- [DGNPoint](#) **origin**
- double [primary_axis](#)
- double [secondary_axis](#)
- double [rotation](#)
- int **quat** [4]
- double [startang](#)
- double [sweepang](#)

3.2.1 Detailed Description

Ellipse element

The core.stype code is DGNST_ARC.

Used for: DGNT_ELLIPSE(15), DGNT_ARC(16)

3.2.2 Member Data Documentation

3.2.2.1 origin

```
DGNPoint DGNElemArc::origin
```

Origin of ellipse

3.2.2.2 primary_axis

```
double DGNElemArc::primary_axis
```

Primary axis length

3.2.2.3 rotation

```
double DGNElemArc::rotation
```

Counterclockwise rotation in degrees

3.2.2.4 secondary_axis

```
double DGNElemArc::secondary_axis
```

Secondary axis length

3.2.2.5 startang

```
double DGNElemArc::startang
```

Start angle (degrees counterclockwise of primary axis)

3.2.2.6 sweepang

```
double DGNElemArc::sweepang
```

Sweep angle (degrees)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.3 DGNElemBSplineCurveHeader Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- long [desc_words](#)
- unsigned char [order](#)
- unsigned char [properties](#)
- unsigned char [curve_type](#)
- short [num_poles](#)
- short [num_knots](#)

3.3.1 Detailed Description

B-Spline Curve Header element

The core.type code is DGNST_BSPLINE_CURVE_HEADER.

Used for: DGNT_BSPLINE_CURVE_HEADER(27)

3.3.2 Member Data Documentation

3.3.2.1 curve_type

```
unsigned char DGNElemBSplineCurveHeader::curve_type
```

curve type

3.3.2.2 desc_words

```
long DGNElemBSplineCurveHeader::desc_words
```

Total length of B-Spline curve in words, excluding the first 20 words (header + desc_words field)

3.3.2.3 num_knots

```
short DGNElemBSplineCurveHeader::num_knots
```

number of knots

3.3.2.4 num_poles

```
short DGNElemBSplineCurveHeader::num_poles
```

number of poles, max. 101

3.3.2.5 order

```
unsigned char DGNElemBSplineCurveHeader::order
```

B-spline order: 2-15

3.3.2.6 properties

```
unsigned char DGNElemBSplineCurveHeader::properties
```

Properties: ORing of DGNBSC_ flags

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.4 DGNElemBSplineSurfaceBoundary Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- short [number](#)
- short [numverts](#)
- [DGNPoint](#) [vertices](#) [1]

3.4.1 Detailed Description

B-Spline Surface Boundary element

The core.type code is DGNST_BSPLINE_SURFACE_BOUNDARY

Used for: DGNT_BSPLINE_SURFACE_BOUNDARY(25)

3.4.2 Member Data Documentation

3.4.2.1 number

```
short DGNElemBSplineSurfaceBoundary::number
```

boundary number

3.4.2.2 numverts

```
short DGNElemBSplineSurfaceBoundary::numverts
```

number of boundary vertices

3.4.2.3 vertices

```
DGNPoint DGNElemBSplineSurfaceBoundary::vertices[1]
```

Array of 1 or more 2D boundary vertices (in UV space)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.5 DGNElemBSplineSurfaceHeader Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- long [desc_words](#)
- unsigned char [curve_type](#)
- unsigned char [u_order](#)
- unsigned short [u_properties](#)
- short [num_poles_u](#)
- short [num_knots_u](#)
- short [rule_lines_u](#)
- unsigned char [v_order](#)
- unsigned short [v_properties](#)
- short [num_poles_v](#)
- short [num_knots_v](#)
- short [rule_lines_v](#)
- short [num_bounds](#)

3.5.1 Detailed Description

B-Spline Surface Header element

The core.type code is DGNST_BSPLINE_SURFACE_HEADER.

Used for: DGNT_BSPLINE_SURFACE_HEADER(24)

3.5.2 Member Data Documentation

3.5.2.1 curve_type

```
unsigned char DGNElemBSplineSurfaceHeader::curve_type
```

curve type

3.5.2.2 desc_words

```
long DGNElemBSplineSurfaceHeader::desc_words
```

Total length of B-Spline surface in words, excluding the first 20 words (header + desc_words field)

3.5.2.3 num_bounds

```
short DGNElemBSplineSurfaceHeader::num_bounds
```

number of boundaries

3.5.2.4 num_knots_u

```
short DGNElemBSplineSurfaceHeader::num_knots_u
```

number of knots

3.5.2.5 num_knots_v

```
short DGNElemBSplineSurfaceHeader::num_knots_v
```

number of knots

3.5.2.6 num_poles_u

```
short DGNElemBSplineSurfaceHeader::num_poles_u
```

number of poles

3.5.2.7 num_poles_v

`short DGNElemBSplineSurfaceHeader::num_poles_v`

number of poles

3.5.2.8 rule_lines_u

`short DGNElemBSplineSurfaceHeader::rule_lines_u`

number of rule lines

3.5.2.9 rule_lines_v

`short DGNElemBSplineSurfaceHeader::rule_lines_v`

number of rule lines

3.5.2.10 u_order

`unsigned char DGNElemBSplineSurfaceHeader::u_order`

B-spline U order: 2-15

3.5.2.11 u_properties

`unsigned short DGNElemBSplineSurfaceHeader::u_properties`

surface U properties: ORing of DGNBSC_ flags

3.5.2.12 v_order

`unsigned char DGNElemBSplineSurfaceHeader::v_order`

B-spline V order: 2-15

3.5.2.13 v_properties

`unsigned short DGNElemBSplineSurfaceHeader::v_properties`

surface V properties: Oring of DGNBSS_ flags

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.6 DGNElemCellHeader Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [totlength](#)
- char [name](#) [7]
- unsigned short [cclass](#)
- unsigned short [levels](#) [4]
- [DGNPoint](#) [rnglow](#)
- [DGNPoint](#) [rnghigh](#)
- double [trans](#) [9]
- [DGNPoint](#) [origin](#)
- double **xscale**
- double **yscale**
- double **rotation**

3.6.1 Detailed Description

Cell Header.

The core.stype code is DGNST_CELL_HEADER.

Returned for DGNT_CELL_HEADER(2).

3.6.2 Member Data Documentation

3.6.2.1 cclass

```
unsigned short DGNElemCellHeader::cclass
```

Class bitmap

3.6.2.2 levels

```
unsigned short DGNElemCellHeader::levels[4]
```

Levels used in cell

3.6.2.3 name

```
char DGNElemCellHeader::name[7]
```

Cell name

3.6.2.4 origin

`DGNPoint DGNElemCellHeader::origin`

Cell Origin

3.6.2.5 rnghigh

`DGNPoint DGNElemCellHeader::rnghigh`

X/Y/Z maximums for cell

3.6.2.6 rnglow

`DGNPoint DGNElemCellHeader::rnglow`

X/Y/Z minimums for cell

3.6.2.7 totlength

`int DGNElemCellHeader::totlength`

Total length of cell in words, excluding the first 19 words (header + totlength field)

3.6.2.8 trans

`double DGNElemCellHeader::trans[9]`

2D/3D Transformation Matrix

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.7 DGNElemCellLibrary Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- `DGNElemCore` **core**
- short `celltype`
- short `attindx`
- char `name` [7]
- int `numwords`
- short `dispsymb`
- unsigned short `cclass`
- unsigned short `levels` [4]
- char `description` [28]

3.7.1 Detailed Description

Cell Library.

The core.type code is DGNST_CELL_LIBRARY.

Returned for DGNT_CELL_LIBRARY(1).

3.7.2 Member Data Documentation

3.7.2.1 attindx

```
short DGNElemCellLibrary::attindx
```

Attribute linkage.

3.7.2.2 cclass

```
unsigned short DGNElemCellLibrary::cclass
```

Class bitmap

3.7.2.3 celltype

```
short DGNElemCellLibrary::celltype
```

Cell type.

3.7.2.4 description

```
char DGNElemCellLibrary::description[28]
```

Description

3.7.2.5 dispsymb

```
short DGNElemCellLibrary::dispsymb
```

Display symbol

3.7.2.6 levels

```
unsigned short DGNElemCellLibrary::levels[4]
```

Levels used in cell

3.7.2.7 name

```
char DGNElemCellLibrary::name[7]
```

Cell name

3.7.2.8 numwords

```
int DGNElemCellLibrary::numwords
```

Number of words in cell definition

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.8 DGNElemColorTable Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int **screen_flag**
- GByte [color_info](#) [256][3]

3.8.1 Detailed Description

Color table.

The core.stype code is DGNST_COLORTABLE.

Returned for DGNT_GROUP_DATA(5) elements, with a level number of DGN_GDL_COLOR_TABLE(1).

3.8.2 Member Data Documentation

3.8.2.1 color_info

```
GByte DGNElemColorTable::color_info[256][3]
```

Color table, 256 colors by red (0), green(1) and blue(2) component.

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.9 DGNElemComplexHeader Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [totlength](#)
- int [numelems](#)
- int [surftype](#)
- int [boundelms](#)

3.9.1 Detailed Description

Complex header element

The core.stype code is DGNST_COMPLEX_HEADER.

Used for: DGNT_COMPLEX_CHAIN_HEADER(12), DGNT_COMPLEX_SHAPE_HEADER(14), DGNT_3DSURFACE_HEADER(18) and DGNT_3DSOLID_HEADER(19).

Compatible with DGNT_TEXT_NODE (7), see [DGNAddRawAttrLink\(\)](#)

3.9.2 Member Data Documentation

3.9.2.1 boundelms

```
int DGNElemComplexHeader::boundelms
```

of elements in each boundary

(only used for 3D surface/solid).

3.9.2.2 numelems

```
int DGNElemComplexHeader::numelems
```

of elements in surface

3.9.2.3 surftype

```
int DGNElemComplexHeader::surftype
```

surface/solid type (only used for 3D surface/solid). One of DGNSUT_* or DGNSOT_*.

3.9.2.4 totlength

```
int DGNElemComplexHeader::totlength
```

Total length of surface in words, excluding the first 19 words (header + totlength field)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.10 DGNElemCone Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- short [unknown](#)
- int [quat](#) [4]
- [DGNPoint](#) [center_1](#)
- double [radius_1](#)
- [DGNPoint](#) [center_2](#)
- double [radius_2](#)

3.10.1 Detailed Description

Cone element

The core.stype code is DGNST_CONE.

Used for: DGNT_CONE(23)

3.10.2 Member Data Documentation

3.10.2.1 center_1

```
DGNPoint DGNElemCone::center_1
```

center of first circle

3.10.2.2 center_2

`DGNPoint DGNElemCone::center_2`

center of second circle

3.10.2.3 quat

`int DGNElemCone::quat[4]`

Orientation quaternion

3.10.2.4 radius_1

`double DGNElemCone::radius_1`

radius of first circle

3.10.2.5 radius_2

`double DGNElemCone::radius_2`

radius of second circle

3.10.2.6 unknown

`short DGNElemCone::unknown`

Unknown data

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.11 DGNElemCore Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- int **offset**
- int **size**
- int [element_id](#)
- int [stype](#)
- int [level](#)
- int [type](#)
- int [complex](#)
- int [deleted](#)
- int [graphic_group](#)
- int [properties](#)
- int [color](#)
- int [weight](#)
- int [style](#)
- int [attr_bytes](#)
- unsigned char * [attr_data](#)
- int [raw_bytes](#)
- unsigned char * [raw_data](#)

3.11.1 Detailed Description

Core element structure.

Core information kept about each element that can be read from a DGN file. This structure is the first component of each specific element structure (like [DGNElemMultiPoint](#)). Normally the [DGNElemCore.stype](#) field would be used to decide what specific structure type to case the [DGNElemCore](#) pointer to.

3.11.2 Member Data Documentation

3.11.2.1 [attr_bytes](#)

```
int DGNElemCore::attr_bytes
```

Bytes of attribute data, usually zero.

3.11.2.2 [attr_data](#)

```
unsigned char* DGNElemCore::attr_data
```

Raw attribute data

3.11.2.3 [color](#)

```
int DGNElemCore::color
```

Color index (0-255)

3.11.2.4 complex

```
int DGNElemCore::complex
```

Is element complex?

3.11.2.5 deleted

```
int DGNElemCore::deleted
```

Is element deleted?

3.11.2.6 element_id

```
int DGNElemCore::element_id
```

Element number (zero based)

3.11.2.7 graphic_group

```
int DGNElemCore::graphic_group
```

Graphic group number

3.11.2.8 level

```
int DGNElemCore::level
```

Element Level: 0-63

3.11.2.9 properties

```
int DGNElemCore::properties
```

Properties: ORing of DGNPF_ flags

3.11.2.10 raw_bytes

```
int DGNElemCore::raw_bytes
```

Bytes of raw data, usually zero.

3.11.2.11 raw_data

```
unsigned char* DGNElemCore::raw_data
```

All raw element data including header.

3.11.2.12 style

```
int DGNElemCore::style
```

Line Style: One of DGNS_* values

3.11.2.13 stype

```
int DGNElemCore::stype
```

Structure type: (DGNST_*)

3.11.2.14 type

```
int DGNElemCore::type
```

Element type (DGNT_)

3.11.2.15 weight

```
int DGNElemCore::weight
```

Line Weight (0-31)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.12 DGNElementInfo Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- unsigned char [level](#)
- unsigned char [type](#)
- unsigned char [stype](#)
- unsigned char [flags](#)
- vsi_l_offset [offset](#)

3.12.1 Detailed Description

Element summary information.

Minimal information kept about each element if an element summary index is built for a file by [DGNGetElementIndex\(\)](#).

3.12.2 Member Data Documentation

3.12.2.1 flags

```
unsigned char DGNElementInfo::flags
```

Other flags

3.12.2.2 level

```
unsigned char DGNElementInfo::level
```

Element Level: 0-63

3.12.2.3 offset

```
vsi_l_offset DGNElementInfo::offset
```

Offset within file (private)

3.12.2.4 stype

```
unsigned char DGNElementInfo::stype
```

Structure type (DGNST_*)

3.12.2.5 type

```
unsigned char DGNElementInfo::type
```

Element type (DGNT_*)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.13 DGNElemKnotWeight Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- float [array](#) [1]

3.13.1 Detailed Description

B-Spline Knot/Weight element

The core.stype code is DGNST_KNOT_WEIGHT

Used for: DGNT_BSPLINE_KNOT(26), DGNT_BSPLINE_WEIGHT_FACTOR(28)

3.13.2 Member Data Documentation

3.13.2.1 array

```
float DGNElemKnotWeight::array[1]
```

array (variable length). Length is given in the corresponding B-Spline header.

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.14 DGNElemMultiPoint Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [num_vertices](#)
- [DGNPoint](#) [vertices](#) [1]

3.14.1 Detailed Description

Multipoint element

The core.stype code is DGNST_MULTIPPOINT.

Used for: DGNT_LINE(3), DGNT_LINE_STRING(4), DGNT_SHAPE(6), DGNT_CURVE(11), DGNT_BSPLINE_↔ POLE(21)

3.14.2 Member Data Documentation

3.14.2.1 num_vertices

```
int DGNElemMultiPoint::num_vertices
```

Number of vertices in "vertices"

3.14.2.2 vertices

```
DGNPoint DGNElemMultiPoint::vertices[1]
```

Array of two or more vertices

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.15 DGNElemSharedCellDefn Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [totlength](#)

3.15.1 Detailed Description

Shared Cell Definition.

The core.type code is DGNST_SHARED_CELL_DEFN.

Returned for DGNT_SHARED_CELL_DEFN(2).

3.15.2 Member Data Documentation

3.15.2.1 totlength

```
int DGNElemSharedCellDefn::totlength
```

Total length of cell in words, excluding the first 19 words (header + totlength field)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.16 DGNElemTagSet Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [tagCount](#)
- int [tagSet](#)
- int [flags](#)
- char * [tagSetName](#)
- [DGNTagDef](#) * [tagList](#)

3.16.1 Detailed Description

Tag Set.

The core.stype code is DGNST_TAG_SET.

Returned for DGNT_APPLICATION_ELEM(66), Level: 24.

3.16.2 Member Data Documentation

3.16.2.1 flags

```
int DGNElemTagSet::flags
```

Tag flags - not too much known.

3.16.2.2 tagCount

```
int DGNElemTagSet::tagCount
```

Number of tags in tagList.

3.16.2.3 tagList

`DGNTagDef* DGNElemTagSet::tagList`

List of tag definitions in this set.

3.16.2.4 tagSet

`int DGNElemTagSet::tagSet`

Tag set index.

3.16.2.5 tagSetName

`char* DGNElemTagSet::tagSetName`

Tag set name.

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.17 DGNElemTagValue Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [tagType](#)
- int [tagSet](#)
- int [tagIndex](#)
- int [tagLength](#)
- [tagValueUnion](#) [tagValue](#)

3.17.1 Detailed Description

Tag Value.

The core.stype code is DGNST_TAG_VALUE.

Returned for DGNT_TAG_VALUE(37).

3.17.2 Member Data Documentation

3.17.2.1 tagIndex

```
int DGNElemTagValue::tagIndex
```

Tag index within tag set.

3.17.2.2 tagLength

```
int DGNElemTagValue::tagLength
```

Length of tag information (text)

3.17.2.3 tagSet

```
int DGNElemTagValue::tagSet
```

Which tag set does this relate to?

3.17.2.4 tagType

```
int DGNElemTagValue::tagType
```

Tag type indicator, DGNTT_*

3.17.2.5 tagValue

```
tagValueUnion DGNElemTagValue::tagValue
```

Textual value of tag

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.18 DGNElemTCB Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [dimension](#)
- double [origin_x](#)
- double [origin_y](#)
- double [origin_z](#)
- long [uor_per_subunit](#)
- char [sub_units](#) [3]
- long [subunits_per_master](#)
- char [master_units](#) [3]
- [DGNViewInfo](#) **views** [8]

3.18.1 Detailed Description

Terminal Control Block (header).

The core.stype code is DGNST_TCB.

Returned for DGNT_TCB(9).

The first TCB in the file is used to determine the dimension (2D vs. 3D), and transformation from UOR (units of resolution) to subunits, and subunits to master units. This is handled transparently within [DGNReadElement\(\)](#), so it is not normally necessary to handle this element type at the application level, though it can be useful to get the sub_units, and master_units names.

3.18.2 Member Data Documentation

3.18.2.1 dimension

```
int DGNElemTCB::dimension
```

Dimension (2 or 3)

3.18.2.2 master_units

```
char DGNElemTCB::master_units[3]
```

User name for master units (2 chars)

3.18.2.3 origin_x

```
double DGNElemTCB::origin_x
```

X origin of UOR space in master units(?)

3.18.2.4 origin_y

```
double DGNElemTCB::origin_y
```

Y origin of UOR space in master units(?)

3.18.2.5 origin_z

```
double DGNElemTCB::origin_z
```

Z origin of UOR space in master units(?)

3.18.2.6 sub_units

```
char DGNElemTCB::sub_units[3]
```

User name for subunits (2 chars)

3.18.2.7 subunits_per_master

```
long DGNElemTCB::subunits_per_master
```

Subunits per master unit.

3.18.2.8 uor_per_subunit

```
long DGNElemTCB::uor_per_subunit
```

UOR per subunit.

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.19 DGNElemText Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [font_id](#)
- int [justification](#)
- double [length_mult](#)
- double [height_mult](#)
- double [rotation](#)
- [DGNPoint](#) **origin**
- char [string](#) [1]

3.19.1 Detailed Description

Text element

The core.stype code is DGNST_TEXT.

NOTE: Currently we are not capturing the "editable fields" information.

Used for: DGNT_TEXT(17).

3.19.2 Member Data Documentation

3.19.2.1 font_id

```
int DGNElemText::font_id
```

Microstation font id, no list available

3.19.2.2 height_mult

```
double DGNElemText::height_mult
```

Char height in master units

3.19.2.3 justification

```
int DGNElemText::justification
```

Justification, see DGNJ_*

3.19.2.4 length_mult

```
double DGNElemText::length_mult
```

Char width in master (if square)

3.19.2.5 origin

```
DGNPoint DGNElemText::origin
```

Bottom left corner of text.

3.19.2.6 rotation

```
double DGNElemText::rotation
```

Counterclockwise rotation in degrees

3.19.2.7 string

```
char DGNElemText::string[1]
```

Actual text (length varies, \0 terminated)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.20 DGNElemTextNode Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- [DGNElemCore](#) **core**
- int [totlength](#)
- int [numelems](#)
- int [node_number](#)
- short [max_length](#)
- short [max_used](#)
- short [font_id](#)
- short [justification](#)
- long [line_spacing](#)
- double [length_mult](#)
- double [height_mult](#)
- double [rotation](#)
- [DGNPoint](#) [origin](#)

3.20.1 Detailed Description

Text Node Header.

The core.stype code is DGNST_TEXT_NODE.

Used for DGNT_TEXT_NODE (7). First fields (up to numelems) are compatible with DGNT_COMPLEX_HEADER (7),

See also

[DGNAddRawAttrLink\(\)](#)

3.20.2 Member Data Documentation

3.20.2.1 font_id

```
short DGNElemTextNode::font_id
```

text font used

3.20.2.2 height_mult

```
double DGNElemTextNode::height_mult
```

height multiplier

3.20.2.3 justification

`short DGNElemTextNode::justification`

justification type, see DGNJ_

3.20.2.4 length_mult

`double DGNElemTextNode::length_mult`

length multiplier

3.20.2.5 line_spacing

`long DGNElemTextNode::line_spacing`

spacing between text strings

3.20.2.6 max_length

`short DGNElemTextNode::max_length`

maximum length allowed, characters

3.20.2.7 max_used

`short DGNElemTextNode::max_used`

maximum length used

3.20.2.8 node_number

`int DGNElemTextNode::node_number`

text node number

3.20.2.9 numelems

`int DGNElemTextNode::numelems`

Number of text strings

3.20.2.10 origin

`DGNPoint DGNElemTextNode::origin`

Snap origin (as defined by user)

3.20.2.11 rotation

```
double DGNElemTextNode::rotation
```

rotation angle (2d)

3.20.2.12 totlength

```
int DGNElemTextNode::totlength
```

Total length of the node (bytes = totlength * 2 + 38)

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.21 DGNPoint Struct Reference

```
#include <dgnlib.h>
```

Public Attributes

- double [x](#)
- double [y](#)
- double [z](#)

3.21.1 Detailed Description

DGN Point structure.

Note that the [DGNReadElement\(\)](#) function transforms points into "master" coordinate system space when they are in the file in UOR (units of resolution) coordinates.

3.21.2 Member Data Documentation

3.21.2.1 x

```
double DGNPoint::x
```

x (normally eastwards) coordinate.

3.21.2.2 y

```
double DGNPoint::y
```

y (normally northwards) coordinate.

3.21.2.3 z

```
double DGNPoint::z
```

z, up coordinate. Zero for 2D objects.

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.22 DGNViewInfo Struct Reference

Public Attributes

- int **flags**
- unsigned char **levels** [8]
- [DGNPoint](#) **origin**
- [DGNPoint](#) **delta**
- double **transmatrx** [9]
- double **conversion**
- unsigned long **activez**

The documentation for this struct was generated from the following file:

- [dgnlib.h](#)

3.23 tagValueUnion Union Reference

Public Attributes

- char * **string**
- GLint32 **integer**
- double **real**

The documentation for this union was generated from the following file:

- [dgnlib.h](#)

Chapter 4

File Documentation

4.1 dgnlib.h File Reference

```
#include "cpl_conv.h"
```

Classes

- struct [DGNPoint](#)
- struct [DGNElementInfo](#)
- struct [DGNElemCore](#)
- struct [DGNElemMultiPoint](#)
- struct [DGNElemArc](#)
- struct [DGNElemText](#)
- struct [DGNElemComplexHeader](#)
- struct [DGNElemColorTable](#)
- struct [DGNViewInfo](#)
- struct [DGNElemTCB](#)
- struct [DGNElemCellHeader](#)
- struct [DGNElemCellLibrary](#)
- struct [DGNElemSharedCellDefn](#)
- union [tagValueUnion](#)
- struct [DGNElemTagValue](#)
- struct [_DGNTagDef](#)
- struct [DGNElemTagSet](#)
- struct [DGNElemCone](#)
- struct [DGNElemTextNode](#)
- struct [DGNElemBSplineSurfaceHeader](#)
- struct [DGNElemBSplineCurveHeader](#)
- struct [DGNElemBSplineSurfaceBoundary](#)
- struct [DGNElemKnotWeight](#)

Macros

- `#define CPLE_DGN_ERROR_BASE`
- `#define CPLE_ElementTooBig CPLE_DGN_ERROR_BASE+1`
- `#define DGNTT_STRING 1`
- `#define DGNTT_INTEGER 3`
- `#define DGNTT_FLOAT 4`
- `#define DGNST_CORE 1`
- `#define DGNST_MULTIPPOINT 2`
- `#define DGNST_COLORTABLE 3`
- `#define DGNST_TCB 4`
- `#define DGNST_ARC 5`
- `#define DGNST_TEXT 6`
- `#define DGNST_COMPLEX_HEADER 7`
- `#define DGNST_CELL_HEADER 8`
- `#define DGNST_TAG_VALUE 9`
- `#define DGNST_TAG_SET 10`
- `#define DGNST_CELL_LIBRARY 11`
- `#define DGNST_CONE 12`
- `#define DGNST_TEXT_NODE 13`
- `#define DGNST_BSPLINE_SURFACE_HEADER 14`
- `#define DGNST_BSPLINE_CURVE_HEADER 15`
- `#define DGNST_BSPLINE_SURFACE_BOUNDARY 16`
- `#define DGNST_KNOT_WEIGHT 17`
- `#define DGNST_SHARED_CELL_DEFN 18`
- `#define DGNT_CELL_LIBRARY 1`
- `#define DGNT_CELL_HEADER 2`
- `#define DGNT_LINE 3`
- `#define DGNT_LINE_STRING 4`
- `#define DGNT_GROUP_DATA 5`
- `#define DGNT_SHAPE 6`
- `#define DGNT_TEXT_NODE 7`
- `#define DGNT_DIGITIZER_SETUP 8`
- `#define DGNT_TCB 9`
- `#define DGNT_LEVEL_SYMBLOGY 10`
- `#define DGNT_CURVE 11`
- `#define DGNT_COMPLEX_CHAIN_HEADER 12`
- `#define DGNT_COMPLEX_SHAPE_HEADER 14`
- `#define DGNT_ELLIPSE 15`
- `#define DGNT_ARC 16`
- `#define DGNT_TEXT 17`
- `#define DGNT_3DSURFACE_HEADER 18`
- `#define DGNT_3DSOLID_HEADER 19`
- `#define DGNT_BSPLINE_POLE 21`
- `#define DGNT_POINT_STRING 22`
- `#define DGNT_BSPLINE_SURFACE_HEADER 24`
- `#define DGNT_BSPLINE_SURFACE_BOUNDARY 25`
- `#define DGNT_BSPLINE_KNOT 26`
- `#define DGNT_BSPLINE_CURVE_HEADER 27`
- `#define DGNT_BSPLINE_WEIGHT_FACTOR 28`
- `#define DGNT_CONE 23`
- `#define DGNT_SHARED_CELL_DEFN 34`
- `#define DGNT_SHARED_CELL_ELEM 35`
- `#define DGNT_TAG_VALUE 37`
- `#define DGNT_APPLICATION_ELEM 66`

- `#define DGNS_SOLID 0`
- `#define DGNS_DOTTED 1`
- `#define DGNS_MEDIUM_DASH 2`
- `#define DGNS_LONG_DASH 3`
- `#define DGNS_DOT_DASH 4`
- `#define DGNS_SHORT_DASH 5`
- `#define DGNS_DASH_DOUBLE_DOT 6`
- `#define DGNS_LONG_DASH_SHORT_DASH 7`
- `#define DGNSUT_SURFACE_OF_PROJECTION 0`
- `#define DGNSUT_BOUNDED_PLANE 1`
- `#define DGNSUT_BOUNDED_PLANE2 2`
- `#define DGNSUT_RIGHT_CIRCULAR_CYLINDER 3`
- `#define DGNSUT_RIGHT_CIRCULAR_CONE 4`
- `#define DGNSUT_TABULATED_CYLINDER 5`
- `#define DGNSUT_TABULATED_CONE 6`
- `#define DGNSUT_CONVOLUTE 7`
- `#define DGNSUT_SURFACE_OF_REVOLUTION 8`
- `#define DGNSUT_WARPED_SURFACE 9`
- `#define DGNSOT_VOLUME_OF_PROJECTION 0`
- `#define DGNSOT_VOLUME_OF_REVOLUTION 1`
- `#define DGNSOT_BOUNDED_VOLUME 2`
- `#define DGNC_PRIMARY 0`
- `#define DGNC_PATTERN_COMPONENT 1`
- `#define DGNC_CONSTRUCTION_ELEMENT 2`
- `#define DGNC_DIMENSION_ELEMENT 3`
- `#define DGNC_PRIMARY_RULE_ELEMENT 4`
- `#define DGNC_LINEAR_PATTERNEED_ELEMENT 5`
- `#define DGNC_CONSTRUCTION_RULE_ELEMENT 6`
- `#define DGN_GDL_COLOR_TABLE 1`
- `#define DGN_GDL_NAMED_VIEW 3`
- `#define DGN_GDL_REF_FILE 9`
- `#define DGNPF_HOLE 0x8000`
- `#define DGNPF_SNAPPABLE 0x4000`
- `#define DGNPF_PLANAR 0x2000`
- `#define DGNPF_ORIENTATION 0x1000`
- `#define DGNPF_ATTRIBUTES 0x0800`
- `#define DGNPF_MODIFIED 0x0400`
- `#define DGNPF_NEW 0x0200`
- `#define DGNPF_LOCKED 0x0100`
- `#define DGNPF_CLASS 0x000f`
- `#define DGNEIF_DELETED 0x01`
- `#define DGNEIF_COMPLEX 0x02`
- `#define DGNJ_LEFT_TOP 0`
- `#define DGNJ_LEFT_CENTER 1`
- `#define DGNJ_LEFT_BOTTOM 2`
- `#define DGNJ_LEFTMARGIN_TOP 3 /* text node header only */`
- `#define DGNJ_LEFTMARGIN_CENTER 4 /* text node header only */`
- `#define DGNJ_LEFTMARGIN_BOTTOM 5 /* text node header only */`
- `#define DGNJ_CENTER_TOP 6`
- `#define DGNJ_CENTER_CENTER 7`
- `#define DGNJ_CENTER_BOTTOM 8`
- `#define DGNJ_RIGHTMARGIN_TOP 9 /* text node header only */`
- `#define DGNJ_RIGHTMARGIN_CENTER 10 /* text node header only */`
- `#define DGNJ_RIGHTMARGIN_BOTTOM 11 /* text node header only */`
- `#define DGNJ_RIGHT_TOP 12`

- `#define DGNJ_RIGHT_CENTER 13`
- `#define DGNJ_RIGHT_BOTTOM 14`
- `#define DGNO_CAPTURE_RAW_DATA 0x01`
- `#define DGNLT_DMRS 0x0000`
- `#define DGNLT_INFORMIX 0x3848`
- `#define DGNLT_ODBC 0x5e62`
- `#define DGNLT_ORACLE 0x6091`
- `#define DGNLT_RIS 0x71FB`
- `#define DGNLT_SYBASE 0x4f58`
- `#define DGNLT_XBASE 0x1971`
- `#define DGNLT_SHAPE_FILL 0x0041`
- `#define DGNLT_ASSOC_ID 0x7D2F`
- `#define DGNCF_USE_SEED_UNITS 0x01`
- `#define DGNCF_USE_SEED_ORIGIN 0x02`
- `#define DGNCF_COPY_SEED_FILE_COLOR_TABLE 0x04`
- `#define DGNCF_COPY_WHOLE_SEED_FILE 0x08`
- `#define DGNBSC_CURVE_DISPLAY 0x10`
- `#define DGNBSC_POLY_DISPLAY 0x20`
- `#define DGNBSC_RATIONAL 0x40`
- `#define DGNBSC_CLOSED 0x80`
- `#define DGNBSS_ARC_SPACING 0x40`
- `#define DGNBSS_CLOSED 0x80`

Typedefs

- `typedef struct _DGNTagDef DGNTagDef`
- `typedef void * DGNHandle`

Functions

- `DGNHandle CPL_DLL DGNOpen (const char *, int)`
- `void CPL_DLL DGNSetOptions (DGNHandle, int)`
- `int CPL_DLL DGNTestOpen (GByte *, int)`
- `const DGNElementInfo CPL_DLL * DGNGetElementIndex (DGNHandle, int *)`
- `int CPL_DLL DGNGetExtents (DGNHandle, double *)`
- `int CPL_DLL DGNGetDimension (DGNHandle)`
- `DGNElemCore CPL_DLL * DGNReadElement (DGNHandle)`
- `void CPL_DLL DGNFreeElement (DGNHandle, DGNElemCore *)`
- `void CPL_DLL DGNRewind (DGNHandle)`
- `int CPL_DLL DGNGotoElement (DGNHandle, int)`
- `void CPL_DLL DGNClose (DGNHandle)`
- `int CPL_DLL DGNLoadTCB (DGNHandle)`
- `int CPL_DLL DGNLookupColor (DGNHandle, int, int *, int *, int *)`
- `int CPL_DLL DGNGetShapeFillInfo (DGNHandle, DGNElemCore *, int *)`
- `int CPL_DLL DGNGetAssocID (DGNHandle, DGNElemCore *)`
- `int CPL_DLL DGNGetElementExtents (DGNHandle, DGNElemCore *, DGNPoint *, DGNPoint *)`
- `void CPL_DLL DGNDumpElement (DGNHandle, DGNElemCore *, FILE *)`
- `const char CPL_DLL * DGNTypeToName (int)`
- `void CPL_DLL DGNRotationToQuaternion (double, int *)`
- `void CPL_DLL DGNQuaternionToMatrix (int *, float *)`
- `int CPL_DLL DGNStrokeArc (DGNHandle, DGNElemArc *, int, DGNPoint *)`
- `int CPL_DLL DGNStrokeCurve (DGNHandle, DGNElemMultiPoint *, int, DGNPoint *)`

- void CPL_DLL [DGNSetSpatialFilter](#) (DGNHandle hDGN, double dfXMin, double dfYMin, double dfXMax, double dfYMax)
- int CPL_DLL [DGNGetAttrLinkSize](#) (DGNHandle, DGNElemCore *, int)
- unsigned char CPL_DLL * [DGNGetLinkage](#) (DGNHandle hDGN, DGNElemCore *psElement, int iIndex, int *pnLinkageType, int *pnEntityNum, int *pnMSLink, int *pnLinkSize)
- int CPL_DLL [DGNWriteElement](#) (DGNHandle, DGNElemCore *)
- int CPL_DLL [DGNResizeElement](#) (DGNHandle, DGNElemCore *, int)
- DGNHandle CPL_DLL [DGNCreate](#) (const char *pszNewFilename, const char *pszSeedFile, int nCreationFlags, double dfOriginX, double dfOriginY, double dfOriginZ, int nMasterUnitPerSubUnit, int nUORPerSubUnit, const char *pszMasterUnits, const char *pszSubUnits)
- DGNElemCore CPL_DLL * [DGNCloneElement](#) (DGNHandle hDGNSrc, DGNHandle hDGNdst, DGNElemCore *psSrcElement)
- int CPL_DLL [DGNUpdateElemCore](#) (DGNHandle hDGN, DGNElemCore *psElement, int nLevel, int nGraphicGroup, int nColor, int nWeight, int nStyle)
- int CPL_DLL [DGNUpdateElemCoreExtended](#) (DGNHandle hDGN, DGNElemCore *psElement)
- DGNElemCore CPL_DLL * [DGNCreateMultiPointElem](#) (DGNHandle hDGN, int nType, int nPointCount, DGNPoint *pasVertices)
- DGNElemCore CPL_DLL * [DGNCreateArcElem2D](#) (DGNHandle hDGN, int nType, double dfOriginX, double dfOriginY, double dfPrimaryAxis, double dfSecondaryAxis, double dfRotation, double dfStartAngle, double dfSweepAngle)
- DGNElemCore CPL_DLL * [DGNCreateArcElem](#) (DGNHandle hDGN, int nType, double dfOriginX, double dfOriginY, double dfOriginZ, double dfPrimaryAxis, double dfSecondaryAxis, double dfStartAngle, double dfSweepAngle, double dfRotation, int *panQuaternion)
- DGNElemCore CPL_DLL * [DGNCreateConeElem](#) (DGNHandle hDGN, double center_1X, double center_1Y, double center_1Z, double radius_1, double center_2X, double center_2Y, double center_2Z, double radius_2, int *panQuaternion)
- DGNElemCore CPL_DLL * [DGNCreateTextElem](#) (DGNHandle hDGN, const char *pszText, int nFontId, int nJustification, double dfLengthMult, double dfHeightMult, double dfRotation, int *panQuaternion, double dfOriginX, double dfOriginY, double dfOriginZ)
- DGNElemCore CPL_DLL * [DGNCreateColorTableElem](#) (DGNHandle hDGN, int nScreenFlag, GByte abyColorInfo[256][3])
- DGNElemCore CPL_DLL * [DGNCreateComplexHeaderElem](#) (DGNHandle hDGN, int nType, int nTotLength, int nNumElems)
- DGNElemCore CPL_DLL * [DGNCreateComplexHeaderFromGroup](#) (DGNHandle hDGN, int nType, int nNumElems, DGNElemCore **papsElems)
- DGNElemCore CPL_DLL * [DGNCreateSolidHeaderElem](#) (DGNHandle hDGN, int nType, int nSurfType, int nBoundElems, int nTotLength, int nNumElems)
- DGNElemCore CPL_DLL * [DGNCreateSolidHeaderFromGroup](#) (DGNHandle hDGN, int nType, int nSurfType, int nBoundElems, int nNumElems, DGNElemCore **papsElems)
- DGNElemCore CPL_DLL * [DGNCreateCellHeaderElem](#) (DGNHandle hDGN, int nTotLength, const char *pszName, short nClass, short *panLevels, DGNPoint *psRangeLow, DGNPoint *psRangeHigh, DGNPoint *psOrigin, double dfXScale, double dfYScale, double dfRotation)
- DGNElemCore CPL_DLL * [DGNCreateCellHeaderFromGroup](#) (DGNHandle hDGN, const char *pszName, short nClass, short *panLevels, int nNumElems, DGNElemCore **papsElems, DGNPoint *psOrigin, double dfXScale, double dfYScale, double dfRotation)
- int CPL_DLL [DGNAddMSLink](#) (DGNHandle hDGN, DGNElemCore *psElement, int nLinkageType, int nEntityNum, int nMSLink)
- int CPL_DLL [DGNAddRawAttrLink](#) (DGNHandle hDGN, DGNElemCore *psElement, int nLinkSize, unsigned char *pabyRawLinkData)
- int CPL_DLL [DGNAddShapeFillInfo](#) (DGNHandle hDGN, DGNElemCore *psElement, int nColor)
- int CPL_DLL [DGNElemTypeHasDispHdr](#) (int nElemType)

4.1.1 Detailed Description

Definitions of public structures and API of DGN Library.

4.1.2 Macro Definition Documentation

4.1.2.1 DGNST_ARC

```
#define DGNST_ARC 5
```

[DGNElemCore](#) style: Element uses [DGNElemArc](#) structure

4.1.2.2 DGNST_BSPLINE_CURVE_HEADER

```
#define DGNST_BSPLINE_CURVE_HEADER 15
```

[DGNElemCore](#) style: Element uses [DGNElemBSplineCurveHeader](#) structure

4.1.2.3 DGNST_BSPLINE_SURFACE_BOUNDARY

```
#define DGNST_BSPLINE_SURFACE_BOUNDARY 16
```

[DGNElemCore](#) style: Element uses [DGNElemBSplineSurfaceBoundary](#) structure

4.1.2.4 DGNST_BSPLINE_SURFACE_HEADER

```
#define DGNST_BSPLINE_SURFACE_HEADER 14
```

[DGNElemCore](#) style: Element uses [DGNElemBSplineSurfaceHeader](#) structure

4.1.2.5 DGNST_CELL_HEADER

```
#define DGNST_CELL_HEADER 8
```

[DGNElemCore](#) style: Element uses [DGNElemCellHeader](#) structure

4.1.2.6 DGNST_CELL_LIBRARY

```
#define DGNST_CELL_LIBRARY 11
```

[DGNElemCore](#) style: Element uses [DGNElemCellLibrary](#) structure

4.1.2.7 DGNST_COLORTABLE

```
#define DGNST_COLORTABLE 3
```

[DGNElemCore](#) style: Element uses [DGNElemColorTable](#) structure

4.1.2.8 DGNST_COMPLEX_HEADER

```
#define DGNST_COMPLEX_HEADER 7
```

[DGNElemCore](#) style: Element uses [DGNElemComplexHeader](#) structure

4.1.2.9 DGNST_CONE

```
#define DGNST_CONE 12
```

[DGNElemCore](#) style: Element uses [DGNElemCone](#) structure

4.1.2.10 DGNST_CORE

```
#define DGNST_CORE 1
```

[DGNElemCore](#) style: Element uses [DGNElemCore](#) structure

4.1.2.11 DGNST_KNOT_WEIGHT

```
#define DGNST_KNOT_WEIGHT 17
```

[DGNElemCore](#) style: Element uses [DGNElemKnotWeight](#) structure

4.1.2.12 DGNST_MULTIPPOINT

```
#define DGNST_MULTIPPOINT 2
```

[DGNElemCore](#) style: Element uses [DGNElemMultiPoint](#) structure

4.1.2.13 DGNST_SHARED_CELL_DEFN

```
#define DGNST_SHARED_CELL_DEFN 18
```

[DGNElemCore](#) style: Element uses [DGNElemSharedCellDefn](#) structure

4.1.2.14 DGNST_TAG_SET

```
#define DGNST_TAG_SET 10
```

[DGNElemCore](#) style: Element uses [DGNElemTagSet](#) structure

4.1.2.15 DGNST_TAG_VALUE

```
#define DGNST_TAG_VALUE 9
```

[DGNElemCore](#) style: Element uses [DGNElemTagValue](#) structure

4.1.2.16 DGNST_TCB

```
#define DGNST_TCB 4
```

[DGNElemCore](#) style: Element uses [DGNElemTCB](#) structure

4.1.2.17 DGNST_TEXT

```
#define DGNST_TEXT 6
```

[DGNElemCore](#) style: Element uses [DGNElemText](#) structure

4.1.2.18 DGNST_TEXT_NODE

```
#define DGNST_TEXT_NODE 13
```

[DGNElemCore](#) style: Element uses [DGNElemTextNode](#) structure

4.1.3 Typedef Documentation

4.1.3.1 DGNHandle

```
typedef void* DGNHandle
```

Opaque handle representing DGN file, used with DGN API.

4.1.3.2 DGNTagDef

```
typedef struct \_DGNTagDef DGNTagDef
```

Tag definition.

Structure holding definition of one tag within a [DGNTagSet](#).

4.1.4 Function Documentation

4.1.4.1 DGNAddMSLink()

```
int CPL_DLL DGNAddMSLink (  
    DGNHandle hDGN,  
    DGNElemCore * psElement,  
    int nLinkageType,  
    int nEntityNum,  
    int nMSLink )
```

Add a database link to element.

The target element must already have raw_data loaded, and it will be resized (see [DGNResizeElement\(\)](#)) as needed for the new attribute data. Note that the element is not written to disk immediate. Use [DGNWriteElement\(\)](#) for that.

Parameters

<i>hDGN</i>	the file to which the element corresponds.
<i>psElement</i>	the element being updated.
<i>nLinkageType</i>	link type (DGNLT_*). Usually one of DGNLT_DMRS, DGNLT_INFORMIX, DGNLT_ODBC, DGNLT_ORACLE, DGNLT_RIS, DGNLT_SYBASE, or DGNLT_XBASE.
<i>nEntityNum</i>	indicator of the table referenced on target database.
<i>nMSLink</i>	indicator of the record referenced on target table.

Returns

-1 on failure, or the link index.

4.1.4.2 DGNAddRawAttrLink()

```
int CPL_DLL DGNAddRawAttrLink (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    int nLinkSize,
    unsigned char * pabyRawLinkData )
```

Add a raw attribute linkage to element.

Given a raw data buffer, append it to this element as an attribute linkage without trying to interpret the linkage data.

The target element must already have raw_data loaded, and it will be resized (see [DGNResizeElement\(\)](#)) as needed for the new attribute data. Note that the element is not written to disk immediate. Use [DGNWriteElement\(\)](#) for that.

This function will take care of updating the "totlength" field of complex chain or shape headers to account for the extra attribute space consumed in the header element.

Parameters

<i>hDGN</i>	the file to which the element corresponds.
<i>psElement</i>	the element being updated.
<i>nLinkSize</i>	the size of the linkage in bytes.
<i>pabyRawLinkData</i>	the raw linkage data (nLinkSize bytes worth).

Returns

-1 on failure, or the link index.

4.1.4.3 DGNAddShapeFillInfo()

```
int CPL_DLL DGNAddShapeFillInfo (
    DGNHandle hDGN,
```

```

    DGNElemCore * psElement,
    int nColor )

```

Add a shape fill attribute linkage.

The target element must already have raw_data loaded, and it will be resized (see [DGNResizeElement\(\)](#)) as needed for the new attribute data. Note that the element is not written to disk immediate. Use [DGNWriteElement\(\)](#) for that.

Parameters

<i>hDGN</i>	the file to which the element corresponds.
<i>psElement</i>	the element being updated.
<i>nColor</i>	fill color (color index from palette).

Returns

-1 on failure, or the link index.

4.1.4.4 DGNClose()

```

void CPL_DLL DGNClose (
    DGNHandle hDGN )

```

Close DGN file.

Parameters

<i>hDGN</i>	Handle from DGNOpen() for file to close.
-------------	--

4.1.4.5 DGNCreate()

```

DGNHandle CPL_DLL DGNCreate (
    const char * pszNewFilename,
    const char * pszSeedFile,
    int nCreationFlags,
    double dfOriginX,
    double dfOriginY,
    double dfOriginZ,
    int nSubUnitsPerMasterUnit,
    int nUORPerSubUnit,
    const char * pszMasterUnits,
    const char * pszSubUnits )

```

Create new DGN file.

This function will create a new DGN file based on the provided seed file, and return a handle on which elements may be read and written.

The following creation flags may be passed:

- **DGNCF_USE_SEED_UNITS**: The master and subunit resolutions and names from the seed file will be used in the new file. The `nMasterUnitPerSubUnit`, `nUORPerSubUnit`, `pszMasterUnits`, and `pszSubUnits` arguments will be ignored.
- **DGNCF_USE_SEED_ORIGIN**: The origin from the seed file will be used and the X, Y and Z origin passed into the call will be ignored.
- **DGNCF_COPY_SEED_FILE_COLOR_TABLE**: Should the first color table occurring in the seed file also be copied?
- **DGNCF_COPY_WHOLE_SEED_FILE**: By default only the first three elements (TCB, Digitizer Setup and Level Symbology) are copied from the seed file. If this flag is provided the entire seed file is copied verbatim (with the TCB origin and units possibly updated).

Parameters

<i>pszNewFilename</i>	the filename to create. If it already exists it will be overwritten.
<i>pszSeedFile</i>	the seed file to copy header from.
<i>nCreationFlags</i>	An ORing of DGNCF_* flags that are to take effect.
<i>dfOriginX</i>	the X origin for the file.
<i>dfOriginY</i>	the Y origin for the file.
<i>dfOriginZ</i>	the Z origin for the file.
<i>nSubUnitsPerMasterUnit</i>	the number of subunits in one master unit.
<i>nUORPerSubUnit</i>	the number of UOR (units of resolution) per subunit.
<i>pszMasterUnits</i>	the name of the master units (2 characters).
<i>pszSubUnits</i>	the name of the subunits (2 characters).

4.1.4.6 DGNCreateArcElem()

```

DGNElemCore CPL_DLL* DGNCreateArcElem (
    DGNHandle hDGN,
    int nType,
    double dfOriginX,
    double dfOriginY,
    double dfOriginZ,
    double dfPrimaryAxis,
    double dfSecondaryAxis,
    double dfStartAngle,
    double dfSweepAngle,
    double dfRotation,
    int * panQuaternion )

```

Create Arc or Ellipse element.

Create a new 2D or 3D arc or ellipse element. The start angle, and sweep angle are ignored for **DGNT_ELLIPSE** but used for **DGNT_ARC**.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

Parameters

<i>hDGN</i>	the DGN file on which the element will eventually be written.
<i>nType</i>	either DGNT_ELLIPSE or DGNT_ARC to select element type.
<i>dfOriginX</i>	the origin (center of rotation) of the arc (X).
<i>dfOriginY</i>	the origin (center of rotation) of the arc (Y).
<i>dfOriginZ</i>	the origin (center of rotation) of the arc (Z).
<i>dfPrimaryAxis</i>	the length of the primary axis.
<i>dfSecondaryAxis</i>	the length of the secondary axis.
<i>dfStartAngle</i>	start angle, degrees counterclockwise of primary axis.
<i>dfSweepAngle</i>	sweep angle, degrees
<i>dfRotation</i>	Counterclockwise rotation in degrees.
<i>panQuaternion</i>	3D orientation quaternion (NULL to use rotation).

Returns

the new element ([DGNElemArc](#)) or NULL on failure.

4.1.4.7 DGNCreateCellHeaderElem()

```

DGNElemCore CPL_DLL* DGNCreateCellHeaderElem (
    DGNHandle hDGN,
    int nTotLength,
    const char * pszName,
    short nClass,
    short * panLevels,
    DGNPoint * psRangeLow,
    DGNPoint * psRangeHigh,
    DGNPoint * psOrigin,
    double dfXScale,
    double dfYScale,
    double dfRotation )

```

Create cell header.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

Generally speaking the function [DGNCreateCellHeaderFromGroup\(\)](#) should be used instead of this function.

Parameters

<i>hDGN</i>	the file handle on which the element is to be written.
<i>nTotLength</i>	total length of cell in words not including the 38 bytes of the cell header that occur before the totlength indicator.
<i>nClass</i>	the class value for the cell.
<i>panLevels</i>	an array of shorts holding the bit mask of levels in effect for this cell. This array should contain 4 shorts (64 bits).
<i>psRangeLow</i>	the cell diagonal origin in original cell file coordinates.
<i>psRangeHigh</i>	the cell diagonal top left corner in original cell file coordinates.

Parameters

<i>psOrigin</i>	the origin of the cell in output file coordinates.
<i>dfXScale</i>	the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.
<i>dfYScale</i>	the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.
<i>dfRotation</i>	the amount of rotation (degrees counterclockwise) in mapping from cell coordinates to output file coordinates.

Returns

the new element ([DGNElemCellHeader](#)) or NULL on failure.

4.1.4.8 DGNCreateCellHeaderFromGroup()

```

DGNElemCore CPL_DLL* DGNCreateCellHeaderFromGroup (
    DGNHandle hDGN,
    const char * pszName,
    short nClass,
    short * panLevels,
    int nNumElems,
    DGNElemCore ** papsElems,
    DGNPoint * psOrigin,
    double dfXScale,
    double dfYScale,
    double dfRotation )

```

Create cell header from a group of elements.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

This function will compute the total length, bounding box, and diagonal range values from the set of provided elements. Note that the proper diagonal range values will only be written if 1.0 is used for the x and y scale values, and 0.0 for the rotation. Use of other values will result in incorrect scaling handles being presented to the user in Microstation when they select the element.

Parameters

<i>hDGN</i>	the file handle on which the element is to be written.
<i>nClass</i>	the class value for the cell.
<i>panLevels</i>	an array of shorts holding the bit mask of levels in effect for this cell. This array should contain 4 shorts (64 bits). This array would normally be passed in as NULL, and the function will build a mask from the passed list of elements.
<i>psOrigin</i>	the origin of the cell in output file coordinates.
<i>dfXScale</i>	the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.
<i>dfYScale</i>	the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.
<i>dfRotation</i>	the amount of rotation (degrees counterclockwise) in mapping from cell coordinates to output file coordinates.

Returns

the new element ([DGNElemCellHeader](#)) or NULL on failure.

4.1.4.9 DGNCreateColorTableElem()

```
DGNElemCore CPL_DLL* DGNCreateColorTableElem (
    DGNHandle hDGN,
    int nScreenFlag,
    GByte abyColorInfo[256][3] )
```

Create color table element.

Creates a color table element with the indicated color table.

Note that color table elements are actually of type DGNT_GROUP_DATA(5) and always on level 1. Do not alter the level with [DGNUUpdateElemCore\(\)](#) or the element will essentially be corrupt.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUUpdateElemCore\(\)](#) on the element before writing to set these values.

Parameters

<i>hDGN</i>	the file to which the element will eventually be written.
<i>nScreenFlag</i>	the screen to which the color table applies (0 = left, 1 = right).
<i>abyColorInfo</i>	array of 256 color entries. The first is the background color.

Returns

the new element ([DGNElemColorTable](#)) or NULL on failure.

4.1.4.10 DGNCreateComplexHeaderElem()

```
DGNElemCore CPL_DLL* DGNCreateComplexHeaderElem (
    DGNHandle hDGN,
    int nType,
    int nTotLength,
    int nNumElems )
```

Create complex chain/shape header.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUUpdateElemCore\(\)](#) on the element before writing to set these values.

The nTotLength is the sum of the size of all elements in the complex group plus 5. The [DGNCreateComplexHeaderFromGroup\(\)](#) can be used to build a complex element from the members more conveniently.

Parameters

<i>hDGN</i>	the file on which the element will be written.
<i>nType</i>	DGNT_COMPLEX_CHAIN_HEADER or DGNT_COMPLEX_SHAPE_HEADER. depending on whether the list is open or closed (last point equal to last) or if the object represents a surface or a solid.
<i>nTotLength</i>	the value of the totlength field in the element.
<i>nNumElems</i>	the number of elements in the complex group not including the header element.

Returns

the new element ([DGNElemComplexHeader](#)) or NULL on failure.

4.1.4.11 DGNCreateComplexHeaderFromGroup()

```
DGNElemCore CPL_DLL* DGNCreateComplexHeaderFromGroup (
    DGNHandle hDGN,
    int nType,
    int nNumElems,
    DGNElemCore ** papsElems )
```

Create complex chain/shape header.

This function is similar to [DGNCreateComplexHeaderElem\(\)](#), but it takes care of computing the total size of the set of elements being written, and collecting the bounding extents. It also takes care of some other convenience issues, like marking all the member elements as complex, and setting the level based on the level of the member elements.

Parameters

<i>hDGN</i>	the file on which the element will be written.
<i>nType</i>	DGNT_COMPLEX_CHAIN_HEADER or DGNT_COMPLEX_SHAPE_HEADER. depending on whether the list is open or closed (last point equal to last) or if the object represents a surface or a solid.
<i>nNumElems</i>	the number of elements in the complex group not including the header element.
<i>papsElems</i>	array of pointers to nNumElems elements in the complex group. Some updates may be made to these elements.

Returns

the new element ([DGNElemComplexHeader](#)) or NULL on failure.

4.1.4.12 DGNCreateConeElem()

```
DGNElemCore CPL_DLL* DGNCreateConeElem (
    DGNHandle hDGN,
```

```

double dfCenter_1X,
double dfCenter_1Y,
double dfCenter_1Z,
double dfRadius_1,
double dfCenter_2X,
double dfCenter_2Y,
double dfCenter_2Z,
double dfRadius_2,
int * panQuaternion )

```

Create Cone element.

Create a new 3D cone element.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

Parameters

<i>hDGN</i>	the DGN file on which the element will eventually be written.
<i>dfCenter_1X</i>	the center of the first bounding circle (X).
<i>dfCenter_1Y</i>	the center of the first bounding circle (Y).
<i>dfCenter_1Z</i>	the center of the first bounding circle (Z).
<i>dfRadius_1</i>	the radius of the first bounding circle.
<i>dfCenter_2X</i>	the center of the second bounding circle (X).
<i>dfCenter_2Y</i>	the center of the second bounding circle (Y).
<i>dfCenter_2Z</i>	the center of the second bounding circle (Z).
<i>dfRadius_2</i>	the radius of the second bounding circle.
<i>panQuaternion</i>	3D orientation quaternion (NULL for default orientation - circles parallel to the X-Y plane).

Returns

the new element ([DGNElemCone](#)) or NULL on failure.

4.1.4.13 DGNCreateMultiPointElem()

```

DGNElemCore CPL_DLL* DGNCreateMultiPointElem (
    DGNHandle hDGN,
    int nType,
    int nPointCount,
    DGNPoint * pasVertices )

```

Create new multi-point element.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

NOTE: There are restrictions on the nPointCount for some elements. For instance, DGNT_LINE can only have 2 points. Maximum element size precludes very large numbers of points.

Parameters

<i>hDGN</i>	the file on which the element will eventually be written.
<i>nType</i>	the type of the element to be created. It must be one of DGNT_LINE, DGNT_LINE_STRING, DGNT_SHAPE, DGNT_CURVE or DGNT_BSPLINE_POLE.
<i>nPointCount</i>	the number of points in the pasVertices list.
<i>pasVertices</i>	the list of points to be written.

Returns

the new element (a [DGNElemMultiPoint](#) structure) or NULL on failure.

4.1.4.14 DGNCreateSolidHeaderElem()

```
DGNElemCore CPL_DLL* DGNCreateSolidHeaderElem (
    DGNHandle hDGN,
    int nType,
    int nSurfType,
    int nBoundElems,
    int nTotLength,
    int nNumElems )
```

Create 3D solid/surface.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

The nTotLength is the sum of the size of all elements in the solid group plus 6. The [DGNCreateSolidHeaderFromGroup\(\)](#) can be used to build a solid element from the members more conveniently.

Parameters

<i>hDGN</i>	the file on which the element will be written.
<i>nType</i>	DGNT_3DSURFACE_HEADER or DGNT_3DSOLID_HEADER.
<i>nSurfType</i>	the surface/solid type, one of DGNSUT_* or DGNSOT_*.
<i>nBoundElems</i>	the number of elements in each boundary.
<i>nTotLength</i>	the value of the totlength field in the element.
<i>nNumElems</i>	the number of elements in the solid not including the header element.

Returns

the new element ([DGNElemComplexHeader](#)) or NULL on failure.

4.1.4.15 DGNCreateSolidHeaderFromGroup()

```
DGNElemCore CPL_DLL* DGNCreateSolidHeaderFromGroup (
    DGNHandle hDGN,
```

```

    int nType,
    int nSurfType,
    int nBoundElems,
    int nNumElems,
    DGNElemCore ** papsElems )

```

Create 3D solid/surface header.

This function is similar to [DGNCreatSolidHeaderElem\(\)](#), but it takes care of computing the total size of the set of elements being written, and collecting the bounding extents. It also takes care of some other convenience issues, like marking all the member elements as complex, and setting the level based on the level of the member elements.

Parameters

<i>hDGN</i>	the file on which the element will be written.
<i>nType</i>	DGNT_3DSURFACE_HEADER or DGNT_3DSOLID_HEADER.
<i>nSurfType</i>	the surface/solid type, one of DGNSUT_* or DGNSOT_*.
<i>nBoundElems</i>	the number of boundary elements.
<i>nNumElems</i>	the number of elements in the solid not including the header element.
<i>papsElems</i>	array of pointers to nNumElems elements in the solid. Some updates may be made to these elements.

Returns

the new element ([DGNElemComplexHeader](#)) or NULL on failure.

4.1.4.16 DGNCreatTextElem()

```

DGNElemCore CPL_DLL* DGNCreatTextElem (
    DGNHandle hDGN,
    const char * pszText,
    int nFontId,
    int nJustification,
    double dfLengthMult,
    double dfHeightMult,
    double dfRotation,
    int * panQuaternion,
    double dfOriginX,
    double dfOriginY,
    double dfOriginZ )

```

Create text element.

The newly created element will still need to be written to file using [DGNWriteElement\(\)](#). Also the level and other core values will be defaulted. Use [DGNUpdateElemCore\(\)](#) on the element before writing to set these values.

Parameters

<i>hDGN</i>	the file on which the element will eventually be written.
<i>pszText</i>	the string of text.
<i>nFontId</i>	microstation font id for the text. 1 may be used as default.

Parameters

<i>nJustification</i>	text justification. One of DGNJ_LEFT_TOP, DGNJ_LEFT_CENTER, DGNJ_LEFT_BOTTOM, DGNJ_CENTER_TOP, DGNJ_CENTER_CENTER, DGNJ_CENTER_BOTTOM, DGNJ_RIGHT_TOP, DGNJ_RIGHT_CENTER, DGNJ_RIGHT_BOTTOM.
<i>dfLengthMult</i>	character width in master units.
<i>dfHeightMult</i>	character height in master units.
<i>dfRotation</i>	Counterclockwise text rotation in degrees.
<i>panQuaternion</i>	3D orientation quaternion (NULL to use rotation).
<i>dfOriginX</i>	Text origin (X).
<i>dfOriginY</i>	Text origin (Y).
<i>dfOriginZ</i>	Text origin (Z).

Returns

the new element ([DGNElemText](#)) or NULL on failure.

4.1.4.17 DGNDumpElement()

```
void CPL_DLL DGNDumpElement (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    FILE * fp )
```

Emit textual report of an element.

This function exists primarily for debugging, and will produce a textual report about any element type to the designated file.

Parameters

<i>hDGN</i>	the file from which the element originated.
<i>psElement</i>	the element to report on.
<i>fp</i>	the file (such as stdout) to report the element information to.

4.1.4.18 DGNElemTypeHasDispHdr()

```
int CPL_DLL DGNElemTypeHasDispHdr (
    int nElemType )
```

Does element type have display header.

Parameters

<i>nElemType</i>	element type (0-63) to test.
------------------	------------------------------

Returns

TRUE if elements of passed in type have a display header after the core element header, or FALSE otherwise.

4.1.4.19 DGNGetAssocID()

```
int CPL_DLL DGNGetAssocID (
    DGNHandle hDGN,
    DGNElemCore * psElem )
```

Fetch association id for an element.

This method will check if an element has an association id, and if so returns it, otherwise returning -1. Association ids are kept as a user attribute linkage where present.

Parameters

<i>hDGN</i>	the file.
<i>psElem</i>	the element.

Returns

The id or -1 on failure.

4.1.4.20 DGNGetDimension()

```
int CPL_DLL DGNGetDimension (
    DGNHandle hDGN )
```

Return 2D/3D dimension of file.

Return 2 or 3 depending on the dimension value of the provided file.

4.1.4.21 DGNGetElementExtents()

```
int CPL_DLL DGNGetElementExtents (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    DGNPoint * psMin,
    DGNPoint * psMax )
```

Fetch extents of an element.

This function will return the extents of the passed element if possible. The extents are extracted from the element header if it contains them, and transformed into master georeferenced format. Some element types do not have extents at all and will fail.

This call will also fail if the extents raw data for the element is not available. This will occur if it was not the most recently read element, and if the raw_data field is not loaded.

Parameters

<i>hDGN</i>	the handle of the file to read from.
<i>psElement</i>	the element to extract extents from.
<i>psMin</i>	structure loaded with X, Y and Z minimum values for the extent.
<i>psMax</i>	structure loaded with X, Y and Z maximum values for the extent.

Returns

TRUE on success of FALSE if extracting extents fails.

4.1.4.22 DGNGetElementIndex()

```
const DGNElementInfo CPL_DLL* DGNGetElementIndex (
    DGNHandle hDGN,
    int * pnElementCount )
```

Fetch element index.

This function will return an array with brief information about every element in a DGN file. It requires one pass through the entire file to generate (this is not repeated on subsequent calls).

The returned array of [DGNElementInfo](#) structures contain the level, type, stype, and other flags for each element in the file. This can facilitate application level code representing the number of elements of various types efficiently.

Note that while building the index requires one pass through the whole file, it does not generally request much processing for each element.

Parameters

<i>hDGN</i>	the file to get an index for.
<i>pnElementCount</i>	the integer to put the total element count into.

Returns

a pointer to an internal array of [DGNElementInfo](#) structures (there will be *pnElementCount entries in the array), or NULL on failure. The returned array should not be modified or freed, and will last only as long as the DGN file remains open.

4.1.4.23 DGNGetExtents()

```
int CPL_DLL DGNGetExtents (
    DGNHandle hDGN,
    double * padfExtents )
```

Fetch overall file extents.

The extents are collected for each element while building an index, so if an index has not already been built, it will be built when [DGNGetExtents\(\)](#) is called.

The Z min/max values are generally meaningless (0 and 0xffffffff in uor space).

Parameters

<i>hDGN</i>	the file to get extents for.
<i>padfExtents</i>	pointer to an array of six doubles into which are loaded the values xmin, ymin, zmin, xmax, ymax, and zmax.

Returns

TRUE on success or FALSE on failure.

4.1.4.24 DGNGetLinkage()

```
unsigned char CPL_DLL* DGNGetLinkage (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    int iIndex,
    int * pnLinkageType,
    int * pnEntityNum,
    int * pnMSLink,
    int * pnLength )
```

Returns requested linkage raw data.

A pointer to the raw data for the requested attribute linkage is returned as well as (potentially) various information about the linkage including the linkage type, database entity number and MSLink value, and the length of the raw linkage data in bytes.

If the requested linkage (iIndex) does not exist a value of zero is returned.

The entity number is (loosely speaking) the index of the table within the current database to which the MSLINK value will refer. The entity number should be used to lookup the table name in the MSCATALOG table. The MSLINK value is the key value for the record in the target table.

Parameters

<i>hDGN</i>	the file from which the element originated.
<i>psElement</i>	the element to report on.
<i>iIndex</i>	the zero based index of the linkage to fetch.
<i>pnLinkageType</i>	variable to return linkage type. This may be one of the predefined DGNLT_ values or a different value. This pointer may be NULL.
<i>pnEntityNum</i>	variable to return the entity number in or NULL if not required.
<i>pnMSLink</i>	variable to return the MSLINK value in, or NULL if not required.
<i>pnLength</i>	variable to returned the linkage size in bytes or NULL.

Returns

pointer to raw internal linkage data. This data should not be altered or freed. NULL returned on failure.

4.1.4.25 DGNGetShapeFillInfo()

```
int CPL_DLL DGNGetShapeFillInfo (
    DGNHandle hDGN,
    DGNElemCore * psElem,
    int * pnColor )
```

Fetch fill color for a shape.

This method will check for a 0x0041 user attribute linkaged with fill color information for the element. If found the function returns TRUE, and places the fill color in *pnColor, otherwise FALSE is returned and *pnColor is not updated.

Parameters

<i>hDGN</i>	the file.
<i>psElem</i>	the element.
<i>pnColor</i>	the location to return the fill color.

Returns

TRUE on success or FALSE on failure.

4.1.4.26 DNGGotoElement()

```
int CPL_DLL DNGGotoElement (
    DGNHandle hDGN,
    int element_id )
```

Seek to indicated element.

Changes what element will be read on the next call to [DGNReadElement\(\)](#). Note that this function requires an index, and one will be built if not already available.

Parameters

<i>hDGN</i>	the file to affect.
<i>element_id</i>	the element to seek to. These values are sequentially ordered starting at zero for the first element.

Returns

returns TRUE on success or FALSE on failure.

4.1.4.27 DGNLoadTCB()

```
int CPL_DLL DGNLoadTCB (
    DGNHandle hDGN )
```


Load TCB if not already loaded.

This function will load the TCB element if it is not already loaded. It is used primarily to ensure the TCB is loaded before doing any operations that require TCB values (like creating new elements).

Returns

FALSE on failure or TRUE on success.

4.1.4.28 DGNLookupColor()

```
int CPL_DLL DGNLookupColor (
    DGNHandle hDGN,
    int color_index,
    int * red,
    int * green,
    int * blue )
```

Translate color index into RGB values.

If no color table has yet been encountered in the file a hard-coded "default" color table will be used. This seems to be what Microstation uses as a color table when there isn't one in a DGN file but I am not absolutely convinced it is appropriate.

Parameters

<i>hDGN</i>	the file.
<i>color_index</i>	the color index to lookup.
<i>red</i>	location to put red component.
<i>green</i>	location to put green component.
<i>blue</i>	location to put blue component.

Returns

TRUE on success or FALSE on failure. May fail if *color_index* is out of range.

4.1.4.29 DGNOpen()

```
DGNHandle CPL_DLL DGNOpen (
    const char * pszFilename,
    int bUpdate )
```

Open a DGN file.

The file is opened, and minimally verified to ensure it is a DGN (ISFF) file. If the file cannot be opened for read access an error with code `CPL_OpenFailed` will be reported via `CPL_Error()` and NULL returned. If the file header

does not appear to be a DGN file, an error with code `CPLD_AppDefined` will be reported via `CPL_Error()`, and `NULL` returned.

If successful a handle for further access is returned. This should be closed with `DGN_Close()` when no longer needed.

`DGN_Open()` does not scan the file on open, and should be very fast even for large files.

Parameters

<i>pszFilename</i>	name of file to try opening.
<i>bUpdate</i>	should the file be opened with read+update (r+) mode?

Returns

handle to use for further access to file using DGN API, or NULL if open fails.

4.1.4.30 DGNReadElement()

```
DGNElemCore CPL_DLL* DGNReadElement (
    DGNHandle hDGN )
```

Read a DGN element.

This function will return the next element in the file, starting with the first. It is affected by [DGNGotoElement\(\)](#) calls.

The element is read into a structure which includes the [DGNElemCore](#) structure. It is expected that applications will inspect the stype field of the returned [DGNElemCore](#) and use it to cast the pointer to the appropriate element structure type such as [DGNElemMultiPoint](#).

Parameters

<i>hDGN</i>	the handle of the file to read from.
-------------	--------------------------------------

Returns

pointer to element structure, or NULL on EOF or processing error. The structure should be freed with [DGNFreeElement\(\)](#) when no longer needed.

4.1.4.31 DGNResizeElement()

```
int CPL_DLL DGNResizeElement (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    int nNewSize )
```

Resize an existing element.

If the new size is the same as the old nothing happens.

Otherwise, the old element in the file is marked as deleted, and the [DGNElemCore.offset](#) and [element_id](#) are set to -1 indicating that the element should be written to the end of file when next written by [DGNWriteElement\(\)](#). The internal raw data buffer is updated to the new size.

Only elements with "raw_data" loaded may be moved.

In normal use the [DGNResizeElement\(\)](#) call would be called on a previously loaded element, and afterwards the raw_data would be updated before calling [DGNWriteElement\(\)](#). If [DGNWriteElement\(\)](#) isn't called after [DGNResizeElement\(\)](#) then the element will be lost having been marked as deleted in its old position but never written at the new location.

Parameters

<i>hDGN</i>	the DGN file on which the element lives.
<i>psElement</i>	the element to alter.
<i>nNewSize</i>	the desired new size of the element in bytes. Must be a multiple of 2.

Returns

TRUE on success, or FALSE on error.

4.1.4.32 DGNRewind()

```
void CPL_DLL DGNRewind (
    DGNHandle hDGN )
```

Rewind element reading.

Rewind the indicated DGN file, so the next element read with [DGNReadElement\(\)](#) will be the first. Does not require indexing like the more general [DGNReadElement\(\)](#) function.

Parameters

<i>hDGN</i>	handle to file.
-------------	-----------------

4.1.4.33 DGNSetOptions()

```
void CPL_DLL DGNSetOptions (
    DGNHandle hDGN,
    int nOptions )
```

Set file access options.

Sets a flag affecting how the file is accessed. Currently there is only one support flag:

DGNO_CAPTURE_RAW_DATA: If this is enabled (it is off by default), then the raw binary data associated with elements will be kept in the `raw_data` field within the [DGNElemCore](#) when they are read. This is required if the application needs to interpret the raw data itself. It is also necessary if the element is to be written back to this file, or another file using [DGNWriteElement\(\)](#). Off by default (to conserve memory).

Parameters

<i>hDGN</i>	handle to file returned by DGNOpen() .
<i>nOptions</i>	ORed option flags.

4.1.4.34 DGNSetSpatialFilter()

```
void CPL_DLL DGNSetSpatialFilter (
    DGNHandle hDGN,
    double dfXMin,
    double dfYMin,
    double dfXMax,
    double dfYMax )
```

Set rectangle for which features are desired.

If a spatial filter is set with this function, [DGNReadElement\(\)](#) will only return spatial elements (elements with a known bounding box) and only those elements for which this bounding box overlaps the requested region.

If all four values (dfXMin, dfXMax, dfYMin and dfYMax) are zero, the spatial filter is disabled. Note that installing a spatial filter won't reduce the amount of data read from disk. All elements are still scanned, but the amount of processing work for elements outside the spatial filter is minimized.

Parameters

<i>hDGN</i>	Handle from DGNOpen() for file to update.
<i>dfXMin</i>	minimum x coordinate for extents (georeferenced coordinates).
<i>dfYMin</i>	minimum y coordinate for extents (georeferenced coordinates).
<i>dfXMax</i>	maximum x coordinate for extents (georeferenced coordinates).
<i>dfYMax</i>	maximum y coordinate for extents (georeferenced coordinates).

4.1.4.35 DGNTestOpen()

```
int CPL_DLL DGNTestOpen (
    GByte * pabyHeader,
    int nByteCount )
```

Test if header is DGN.

Parameters

<i>pabyHeader</i>	block of header data from beginning of file.
<i>nByteCount</i>	number of bytes in pabyHeader.

Returns

TRUE if the header appears to be from a DGN file, otherwise FALSE.

4.1.4.36 DGNTypetoName()

```
const char CPL_DLL* DGNTypetoName (
    int nType )
```

Convert type to name.

Returns a human readable name for an element type such as DGNT_LINE.

Parameters

<i>nType</i>	the DGNT_* type code to translate.
--------------	------------------------------------

Returns

a pointer to an internal string with the translation. This string should not be modified or freed.

4.1.4.37 DGNUpdateElemCore()

```
int CPL_DLL DGNUpdateElemCore (
    DGNHandle hDGN,
    DGNElemCore * psElement,
    int nLevel,
    int nGraphicGroup,
    int nColor,
    int nWeight,
    int nStyle )
```

Change element core values.

The indicated values in the element are updated in the structure, as well as in the raw data. The updated element is not written to disk. That must be done with [DGNWriteElement\(\)](#). The element must have raw_data loaded.

Parameters

<i>hDGN</i>	the file on which the element belongs.
<i>psElement</i>	the element to modify.
<i>nLevel</i>	the new level value.
<i>nGraphicGroup</i>	the new graphic group value.
<i>nColor</i>	the new color index.
<i>nWeight</i>	the new element weight.
<i>nStyle</i>	the new style value for the element.

Returns

Returns TRUE on success or FALSE on failure.

4.1.4.38 DGNWriteElement()

```
int CPL_DLL DGNWriteElement (
    DGNHandle hDGN,
    DGNElemCore * psElement )
```

Write element to file.

Only elements with "raw_data" loaded may be written. This should include elements created with the various `D↔GNCreate*()` functions, and those read from the file with the `DGNO_CAPTURE_RAW_DATA` flag turned on with [DGNSetOptions\(\)](#).

The passed element is written to the indicated file. If the `DGNElemCore.offset` field is -1 then the element is written at the end of the file (and offset/element are reset properly) otherwise the element is written back to the location indicated by `DGNElemCore.offset`.

If the element is added at the end of the file, and if an element index has already been built, it will be updated to reference the new element.

This function takes care of ensuring that the end-of-file marker is maintained after the last element.

Parameters

<i>hDGN</i>	the file to write the element to.
<i>psElement</i>	the element to write.

Returns

TRUE on success or FALSE in case of failure.

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