

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

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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 `tagValueUnion _DGNTagDef::defaultValue`

Default tag value

##### 3.1.2.2 `int _DGNTagDef::id`

Tag index/identifier.

##### 3.1.2.3 `char* _DGNTagDef::name`

Name of this tag.

##### 3.1.2.4 `char* _DGNTagDef::prompt`

User prompt when requesting value.

### 3.1.2.5 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 DGNPoint DGNElemArc::origin

Origin of ellipse

#### 3.2.2.2 double DGNElemArc::primary\_axis

Primary axis length

#### 3.2.2.3 double DGNElemArc::rotation

Counterclockwise rotation in degrees

#### 3.2.2.4 double DGNElemArc::secondary\_axis

Secondary axis length

#### 3.2.2.5 double DGNElemArc::startang

Start angle (degrees counterclockwise of primary axis)



#### 3.2.2.6 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 unsigned char DGNElemBSplineCurveHeader::curve\_type

curve type

##### 3.3.2.2 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 short DGNElemBSplineCurveHeader::num\_knots

number of knots

##### 3.3.2.4 short DGNElemBSplineCurveHeader::num\_poles

number of poles, max. 101

##### 3.3.2.5 unsigned char DGNElemBSplineCurveHeader::order

B-spline order: 2-15

### 3.3.2.6 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.stype code is DGNST\_BSPLINE\_SURFACE\_BOUNDARY

Used for: DGNT\_BSPLINE\_SURFACE\_BOUNDARY(25)

### 3.4.2 Member Data Documentation

#### 3.4.2.1 short DGNElemBSplineSurfaceBoundary::number

boundary number

#### 3.4.2.2 short DGNElemBSplineSurfaceBoundary::numverts

number of boundary vertices

#### 3.4.2.3 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 unsigned char DGNElemBSplineSurfaceHeader::curve\_type

curve type

#### 3.5.2.2 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 short DGNElemBSplineSurfaceHeader::num\_bounds

number of boundaries

#### 3.5.2.4 short DGNElemBSplineSurfaceHeader::num\_knots\_u

number of knots

#### 3.5.2.5 short DGNElemBSplineSurfaceHeader::num\_knots\_v

number of knots

#### 3.5.2.6 short DGNElemBSplineSurfaceHeader::num\_poles\_u

number of poles

### 3.5.2.7 short DGNElemBSplineSurfaceHeader::num\_poles\_v

number of poles

### 3.5.2.8 short DGNElemBSplineSurfaceHeader::rule\_lines\_u

number of rule lines

### 3.5.2.9 short DGNElemBSplineSurfaceHeader::rule\_lines\_v

number of rule lines

### 3.5.2.10 unsigned char DGNElemBSplineSurfaceHeader::u\_order

B-spline U order: 2-15

### 3.5.2.11 unsigned short DGNElemBSplineSurfaceHeader::u\_properties

surface U properties: ORing of DGNBSC\_ flags

### 3.5.2.12 unsigned char DGNElemBSplineSurfaceHeader::v\_order

B-spline V order: 2-15

### 3.5.2.13 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 unsigned short DGNElemCellHeader::cclass

Class bitmap

#### 3.6.2.2 unsigned short DGNElemCellHeader::levels[4]

Levels used in cell

#### 3.6.2.3 char DGNElemCellHeader::name[7]

Cell name

#### 3.6.2.4 DGNPoint DGNElemCellHeader::origin

Cell Origin

#### 3.6.2.5 DGNPoint DGNElemCellHeader::rnghigh

X/Y/Z maximums for cell

#### 3.6.2.6 DGNPoint DGNElemCellHeader::rnglow

X/Y/Z minimums for cell

#### 3.6.2.7 int DGNElemCellHeader::totlength

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

#### 3.6.2.8 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.stype code is DGNST\_CELL\_LIBRARY.

Returned for DGNT\_CELL\_LIBRARY(1).

### 3.7.2 Member Data Documentation

#### 3.7.2.1 short DGNElemCellLibrary::attindx

Attribute linkage.

#### 3.7.2.2 unsigned short DGNElemCellLibrary::cclass

Class bitmap

#### 3.7.2.3 short DGNElemCellLibrary::celltype

Cell type.

#### 3.7.2.4 char DGNElemCellLibrary::description[28]

Description

#### 3.7.2.5 short DGNElemCellLibrary::dispsymb

Display symbol

#### 3.7.2.6 unsigned short DGNElemCellLibrary::levels[4]

Levels used in cell

#### 3.7.2.7 char DGNElemCellLibrary::name[7]

Cell name

### 3.7.2.8 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 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 int DGNElemComplexHeader::boundelms

of elements in each boundary

(only used for 3D surface/solid).

#### 3.9.2.2 int DGNElemComplexHeader::numelems

of elements in surface

#### 3.9.2.3 int DGNElemComplexHeader::surftype

surface/solid type (only used for 3D surface/solid). One of DGNSUT\_\* or DGNSOT\_\*.

#### 3.9.2.4 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 DGNPoint DGNElemCone::center\_1

center of first circle

#### 3.10.2.2 DGNPoint DGNElemCone::center\_2

center of second circle

#### 3.10.2.3 int DGNElemCone::quat[4]

Orientation quaternion

#### 3.10.2.4 double DGNElemCone::radius\_1

radius of first circle

#### 3.10.2.5 double DGNElemCone::radius\_2

radius of second circle

#### 3.10.2.6 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.style](#) 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 int [DGNElemCore::attr\\_bytes](#)

Bytes of attribute data, usually zero.

#### 3.11.2.2 unsigned char\* [DGNElemCore::attr\\_data](#)

Raw attribute data

#### 3.11.2.3 int [DGNElemCore::color](#)

Color index (0-255)

#### 3.11.2.4 int [DGNElemCore::complex](#)

Is element complex?

#### 3.11.2.5 int [DGNElemCore::deleted](#)

Is element deleted?

#### 3.11.2.6 int [DGNElemCore::element\\_id](#)

Element number (zero based)

#### 3.11.2.7 int [DGNElemCore::graphic\\_group](#)

Graphic group number

#### 3.11.2.8 int [DGNElemCore::level](#)

Element Level: 0-63

#### 3.11.2.9 int [DGNElemCore::properties](#)

Properties: ORing of [DGNPF\\_flags](#)

#### 3.11.2.10 int DGNElemCore::raw\_bytes

Bytes of raw data, usually zero.

#### 3.11.2.11 unsigned char\* DGNElemCore::raw\_data

All raw element data including header.

#### 3.11.2.12 int DGNElemCore::style

Line Style: One of DGNS\_\* values

#### 3.11.2.13 int DGNElemCore::stype

Structure type: (DGNST\_\*)

#### 3.11.2.14 int DGNElemCore::type

Element type (DGNT\_)

#### 3.11.2.15 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](#)
- long [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 unsigned char DGNElementInfo::flags

Other flags

#### 3.12.2.2 unsigned char `DGNElementInfo::level`

Element Level: 0-63

#### 3.12.2.3 long `DGNElementInfo::offset`

Offset within file (private)

#### 3.12.2.4 unsigned char `DGNElementInfo::stype`

Structure type (`DGNST_*`)

#### 3.12.2.5 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 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](#) [2]

### 3.14.1 Detailed Description

Multipoint element

The core.stype code is DGNST\_MULTIPOINT.

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 int DGNElemMultiPoint::num\_vertices

Number of vertices in "vertices"

#### 3.14.2.2 [DGNPoint](#) DGNElemMultiPoint::vertices[2]

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.stype code is DGNST\_SHARED\_CELL\_DEFN.

Returned for DGNT\_SHARED\_CELL\_DEFN(2).

### 3.15.2 Member Data Documentation

#### 3.15.2.1 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 int DGNElemTagSet::flags

Tag flags - not too much known.

#### 3.16.2.2 int DGNElemTagSet::tagCount

Number of tags in tagList.

#### 3.16.2.3 [DGNTagDef](#)\* DGNElemTagSet::tagList

List of tag definitions in this set.

#### 3.16.2.4 int DGNElemTagSet::tagSet

Tag set index.

#### 3.16.2.5 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 int DGNElemTagValue::tagIndex

Tag index within tag set.

#### 3.17.2.2 int DGNElemTagValue::tagLength

Length of tag information (text)

#### 3.17.2.3 int DGNElemTagValue::tagSet

Which tag set does this relate to?

#### 3.17.2.4 int DGNElemTagValue::tagType

Tag type indicator, DGNTT\_\*

#### 3.17.2.5 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 int DGNElemTCB::dimension

Dimension (2 or 3)

#### 3.18.2.2 char DGNElemTCB::master\_units[3]

User name for master units (2 chars)

#### 3.18.2.3 double DGNElemTCB::origin\_x

X origin of UOR space in master units(?)

#### 3.18.2.4 double DGNElemTCB::origin\_y

Y origin of UOR space in master units(?)

#### 3.18.2.5 double DGNElemTCB::origin\_z

Z origin of UOR space in master units(?)

#### 3.18.2.6 char DGNElemTCB::sub\_units[3]

User name for subunits (2 chars)

#### 3.18.2.7 long DGNElemTCB::subunits\_per\_master

Subunits per master unit.



### 3.18.2.8 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 int DGNElemText::font\_id

Microstation font id, no list available

#### 3.19.2.2 double DGNElemText::height\_mult

Char height in master units

#### 3.19.2.3 int DGNElemText::justification

Justification, see DGNJ\_\*

#### 3.19.2.4 double DGNElemText::length\_mult

Char width in master (if square)

### 3.19.2.5 DGNPoint DGNElemText::origin

Bottom left corner of text.

### 3.19.2.6 double DGNElemText::rotation

Counterclockwise rotation in degrees

### 3.19.2.7 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 short DGNElemTextNode::font\_id

text font used

**3.20.2.2 double DGNElemTextNode::height\_mult**

height multiplier

**3.20.2.3 short DGNElemTextNode::justification**

justification type, see DGNJ\_

**3.20.2.4 double DGNElemTextNode::length\_mult**

length multiplier

**3.20.2.5 long DGNElemTextNode::line\_spacing**

spacing between text strings

**3.20.2.6 short DGNElemTextNode::max\_length**

maximum length allowed, characters

**3.20.2.7 short DGNElemTextNode::max\_used**

maximum length used

**3.20.2.8 int DGNElemTextNode::node\_number**

text node number

**3.20.2.9 int DGNElemTextNode::numelems**

Number of text strings

**3.20.2.10 DGNPoint DGNElemTextNode::origin**

Snap origin (as defined by user)

**3.20.2.11 double DGNElemTextNode::rotation**

rotation angle (2d)

**3.20.2.12 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 double DGNPoint::x

x (normally eastwards) coordinate.

#### 3.21.2.2 double DGNPoint::y

y (normally northwards) coordinate.

#### 3.21.2.3 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 **transmatrix** [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**
- GInt32 **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** `CPLD_DGN_ERROR_BASE`
- **#define** `CPLD_ElementTooBig CPLD_DGN_ERROR_BASE+1`
- **#define** `DGNTT_STRING 1`
- **#define** `DGNTT_INTEGER 3`
- **#define** `DGNTT_FLOAT 4`

- #define DGNST\_CORE 1
- #define DGNST\_MULTIPOINT 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 DNGGotoElement` (`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 [DGNCreat](#) (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 \* [DGNCloseElement](#) ([DGNHandle](#) hDGNSrc, [DGNHandle](#) hDGNDst, [DGNElemCore](#) \*psSrcElement)
- int CPL\_DLL [DGNUUpdateElemCore](#) ([DGNHandle](#) hDGN, [DGNElemCore](#) \*psElement, int nLevel, int nGraphicGroup, int nColor, int nWeight, int nStyle)
- int CPL\_DLL [DGNUUpdateElemCoreExtended](#) ([DGNHandle](#) hDGN, [DGNElemCore](#) \*psElement)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatMultiPointElem](#) ([DGNHandle](#) hDGN, int nType, int nPointCount, [DGNPoint](#) \*pasVertices)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatArcElem2D](#) ([DGNHandle](#) hDGN, int nType, double dfOriginX, double dfOriginY, double dfPrimaryAxis, double dfSecondaryAxis, double dfRotation, double dfStartAngle, double dfSweepAngle)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatArcElem](#) ([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 \* [DGNCreatConeElem](#) ([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 \* [DGNCreatTextElem](#) ([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 \* [DGNCreatColorTableElem](#) ([DGNHandle](#) hDGN, int nScreenFlag, GByte abyColorInfo[256][3])
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatComplexHeaderElem](#) ([DGNHandle](#) hDGN, int nType, int nTotLength, int nNumElems)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatComplexHeaderFromGroup](#) ([DGNHandle](#) hDGN, int nType, int nNumElems, [DGNElemCore](#) \*\*papsElems)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatSolidHeaderElem](#) ([DGNHandle](#) hDGN, int nType, int nSurfType, int nBoundElems, int nTotLength, int nNumElems)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatSolidHeaderFromGroup](#) ([DGNHandle](#) hDGN, int nType, int nSurfType, int nBoundElems, int nNumElems, [DGNElemCore](#) \*\*papsElems)
- [DGNElemCore](#) CPL\_DLL \* [DGNCreatCellHeaderElem](#) ([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 \* [DGNCreatCellHeaderFromGroup](#) ([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 #define DGNST\_ARC 5

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

#### 4.1.2.2 #define DGNST\_BSPLINE\_CURVE\_HEADER 15

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

#### 4.1.2.3 #define DGNST\_BSPLINE\_SURFACE\_BOUNDARY 16

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

#### 4.1.2.4 #define DGNST\_BSPLINE\_SURFACE\_HEADER 14

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

#### 4.1.2.5 #define DGNST\_CELL\_HEADER 8

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

#### 4.1.2.6 #define DGNST\_CELL\_LIBRARY 11

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

#### 4.1.2.7 #define DGNST\_COLOR\_TABLE 3

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

#### 4.1.2.8 #define DGNST\_COMPLEX\_HEADER 7

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

#### 4.1.2.9 #define DGNST\_CONE 12

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

#### 4.1.2.10 #define DGNST\_CORE 1

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

#### 4.1.2.11 #define DGNST\_KNOT\_WEIGHT 17

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

#### 4.1.2.12 #define DGNST\_MULTIPPOINT 2

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

#### 4.1.2.13 #define DGNST\_SHARED\_CELL\_DEFN 18

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

4.1.2.14 `#define DGNST_TAG_SET 10`

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

4.1.2.15 `#define DGNST_TAG_VALUE 9`

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

4.1.2.16 `#define DGNST_TCB 4`

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

4.1.2.17 `#define DGNST_TEXT 6`

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

4.1.2.18 `#define DGNST_TEXT_NODE 13`

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

## 4.1.3 Typedef Documentation

4.1.3.1 `typedef void* DGNHandle`

Opaque handle representing DGN file, used with DGN API.

4.1.3.2 `typedef struct _DGNTagDef DGNTagDef`

Tag definition.

Structure holding definition of one tag within a DGNTagSet.

## 4.1.4 Function Documentation

4.1.4.1 `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** `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>pabyRawLink-Data</i>	the raw linkage data (nLinkSize bytes worth).

**Returns**

-1 on failure, or the link index.

**4.1.4.3** `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** `DGNElemCore CPL_DLL* DGNCloneElement ( DGNHandle hDGNSrc, DGNHandle hDGNdst, DGNElemCore * psSrcElement )`

Clone a retargetted element.

Creates a copy of an element in a suitable form to write to a different file than that it was read from.

NOTE: At this time the clone operation will fail if the source and destination file have a different origin or master/sub units.

## Parameters

<i>hDGNSrc</i>	the source file (from which psSrcElement was read).
<i>hDGNDst</i>	the destination file (to which the returned element may be written).
<i>psSrcElement</i>	the element to be cloned (from hDGNSrc).

## Returns

NULL on failure, or an appropriately modified copy of the source element suitable to write to hDGNDst.

## 4.1.4.5 void CPL\_DLL DGNClose ( DGNHandle hDGN )

Close DGN file.

## Parameters

<i>hDGN</i>	Handle from <a href="#">DGNOpen()</a> for file to close.
-------------	--

4.1.4.6 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>pszNew-Filename</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>nSubUnitPer-MasterUnit</i>	the number of subunits in one master unit.
<i>nUORPerSub-Unit</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).

**4.1.4.7 DGNElemCore CPL\_DLL\* DGNCreatArcElem ( 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.

**4.1.4.8 DGNElemCore CPL\_DLL\* DGNCreatCellHeaderElem ( 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 [DGNCreatCellHeaderFromGroup\(\)](#) 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.
<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 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.

**4.1.4.10 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 [DGNUpdateElemCore\(\)](#) 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 [DGNUpdateElemCore\(\)](#) 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>abyColor-Info</i> [8][3]	array of 256 color entries. The first is the background color.

## Returns

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

#### 4.1.4.11 **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 [DGNUpdateElemCore\(\)](#) 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.

#### 4.1.4.12 **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 <i>nNumElems</i> elements in the complex group. Some updates may be made to these elements.

## Returns

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

#### 4.1.4.13 **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>dfCenter1X</i>	the center of the first bounding circle (X).
<i>dfCenter1Y</i>	the center of the first bounding circle (Y).
<i>dfCenter1Z</i>	the center of the first bounding circle (Z).
<i>dfRadius1</i>	the radius of the first bounding circle.
<i>dfCenter2X</i>	the center of the second bounding circle (X).
<i>dfCenter2Y</i>	the center of the second bounding circle (Y).
<i>dfCenter2Z</i>	the center of the second bounding circle (Z).
<i>dfRadius2</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.

#### 4.1.4.14 **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 <code>DGNT_LINE</code> , <code>DGNT_LINE_STRING</code> , <code>DGNT_SHAPE</code> , <code>DGNT_CURVE</code> or <code>DGNT_BSPLINE_POLE</code> .
<i>nPointCount</i>	the number of points in the <i>pasVertices</i> list.
<i>pasVertices</i>	the list of points to be written.

#### Returns

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

#### 4.1.4.15 **DGNElemCore CPL\_DLL\*** [DGNCreateSolidHeaderElem](#) ( **DGNHandle** *hDGN*, **int** *nType*, **int** *nSurfType*, **int** *nBoundElems*, **int** *nTotLength*, **int** *NumElems* )

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.

#### 4.1.4.16 **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 [DGNCreateSolidHeaderElem\(\)](#), 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 <i>nNumElems</i> elements in the solid. Some updates may be made to these elements.

## Returns

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

#### 4.1.4.17 **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* )

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.
<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.

#### 4.1.4.18 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.

#### 4.1.4.19 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.

#### 4.1.4.20 void CPL\_DLL DGNFreeElement ( DGNHandle *hDGN*, DGNElemCore \* *psElement* )

Free an element structure.

This function will deallocate all resources associated with any element structure returned by [DGNReadElement\(\)](#).

#### Parameters

<i>hDGN</i>	handle to file from which the element was read.
<i>psElement</i>	the element structure returned by <a href="#">DGNReadElement()</a> .

#### 4.1.4.21 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.

#### 4.1.4.22 int CPL\_DLL DGNGetAttrLinkSize ( DGNHandle *hDGN*, DGNElemCore \* *psElement*, int *nOffset* )

Get attribute linkage size.

Returns the size, in bytes, of the attribute linkage starting at byte offset *nOffset*. On failure a value of 0 is returned.

## Parameters

<i>hDGN</i>	the file from which the element originated.
<i>psElement</i>	the element to report on.
<i>nOffset</i>	byte offset within attribute data of linkage to check.

## Returns

size of linkage in bytes, or zero.

#### 4.1.4.23 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.

#### 4.1.4.24 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.

#### 4.1.4.25 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 effeciently.

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.

#### 4.1.4.26 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.

#### 4.1.4.27 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.

#### 4.1.4.28 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 linked 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.

#### 4.1.4.29 int CPL\_DLL DGNGotoElement ( 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 and 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.

#### 4.1.4.30 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.



#### 4.1.4.31 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.

#### 4.1.4.32 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 CPLE\_OpenFailed will be reported via CPLError() and NULL returned. If the file header does not appear to be a DGN file, an error with code CPLE\_AppDefined will be reported via CPLError(), and NULL returned.

If successful a handle for further access is returned. This should be closed with [DGNClose\(\)](#) when no longer needed.

[DGNOpen\(\)](#) 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.

#### 4.1.4.33 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.

#### 4.1.4.34 `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 it's 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.

#### 4.1.4.35 `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.
-------------	-----------------

#### 4.1.4.36 `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 <a href="#">DGNOpen()</a> .
<i>nOptions</i>	ORed option flags.

**4.1.4.37** 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 <a href="#">DGNOpen()</a> 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).

**4.1.4.38** int CPL\_DLL DGNStrokeArc ( DGNHandle *hFile*, DGNElemArc \* *psArc*, int *nPoints*, DGNPoint \* *pasPoints* )

Generate a polyline approximation of an arc.

Produce a series of equidistant (actually equi-angle) points along an arc. Currently this only works for 2D arcs (and ellipses).

#### Parameters

<i>hFile</i>	the DGN file to which the arc belongs (currently not used).
<i>psArc</i>	the arc to be approximated.
<i>nPoints</i>	the number of points to use to approximate the arc.
<i>pasPoints</i>	the array of points into which to put the results. There must be room for at least <i>nPoints</i> points.

#### Returns

TRUE on success or FALSE on failure.

**4.1.4.39** int CPL\_DLL DGNStrokeCurve ( DGNHandle *hFile*, DGNElemMultiPoint \* *psCurve*, int *nPoints*, DGNPoint \* *pasPoints* )

Generate a polyline approximation of a curve.

Produce a series of equidistant points along a microstation curve element. Currently this only works for 2D.

#### Parameters

<i>hFile</i>	the DGN file to which the arc belongs (currently not used).
<i>psCurve</i>	the curve to be approximated.
<i>nPoints</i>	the number of points to use to approximate the curve.
<i>pasPoints</i>	the array of points into which to put the results. There must be room for at least <i>nPoints</i> points.

#### Returns

TRUE on success or FALSE on failure.

#### 4.1.4.40 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 <i>pabyHeader</i> .

##### Returns

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

#### 4.1.4.41 const char CPL\_DLL\* DGNTTypeToName ( 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.

#### 4.1.4.42 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.

#### 4.1.4.43 int CPL\_DLL DGNUpdateElemCoreExtended ( DGNHandle *hDGN*, DGNElemCore \* *psElement* )

Update internal raw data representation.

The raw\_data representation of the passed element is updated to reflect the various core fields. The [DGNElemCore](#) level, type, complex, deleted, graphic\_group, properties, color, weight and style values are all applied to the raw\_data representation. Spatial bounds, element type specific information and attributes are not updated in the raw data.

## Parameters

<i>hDGN</i>	the file to which the element belongs.
<i>psElement</i>	the element to be updated.

## Returns

TRUE on success, or FALSE on failure.

**4.1.4.44 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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