

dgnlib



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# Chapter 1

## Class Index

### 1.1 Class List

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# Chapter 2

## File Index

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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.stype 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:

- [dgndlib.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 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.stype 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.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 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\_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 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, 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.style 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](#)
-

# 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](#)

## Defines

- #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\_PATTERNELEMENT** 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
- #define **DGNJ\_LEFTMARGIN\_CENTER** 4
- #define **DGNJ\_LEFTMARGIN\_BOTTOM** 5
- #define **DGNJ\_CENTER\_TOP** 6
- #define **DGNJ\_CENTER\_CENTER** 7
- #define **DGNJ\_CENTER\_BOTTOM** 8
- #define **DGNJ\_RIGHTMARGIN\_TOP** 9
- #define **DGNJ\_RIGHTMARGIN\_CENTER** 10
- #define **DGNJ\_RIGHTMARGIN\_BOTTOM** 11
- #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 [DGNElemInfo](#) [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)
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- [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 Define 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\_COLORTABLE 3

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

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**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

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### 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:

*hDGN* the file to which the element corresponds.

*psElement* the element being updated.

*nLinkageType* link type (DGNLT\_\*). Usually one of DGNLT\_DMRS, DGNLT\_INFORMIX, DGNLT\_ODBC, DGNLT\_ORACLE, DGNLT\_RIS, DGNLT\_SYBASE, or DGNLT\_XBASE.

*nEntityNum* indicator of the table referenced on target database.

*nMSLink* 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:

*hDGN* the file to which the element corresponds.

---

*psElement* the element being updated.  
*nLinkSize* the size of the linkage in bytes.  
*pabyRawLinkData* 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:**

*hDGN* the file to which the element corresponds.  
*psElement* the element being updated.  
*nColor* 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:**

*hDGNSrc* the source file (from which psSrcElement was read).  
*hDGNDst* the destination file (to which the returned element may be written).  
*psSrcElement* 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:**

*hDGN* Handle from [DGNOpen\(\)](#) for file to close.

#### 4.1.4.6 DGNHandle CPL\_DLL DGNCreat (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:

*pszNewFilename* the filename to create. If it already exists it will be overwritten.

*pszSeedFile* the seed file to copy header from.

*nCreationFlags* An ORing of DGNCF\_\* flags that are to take effect.

*dfOriginX* the X origin for the file.

*dfOriginY* the Y origin for the file.

*dfOriginZ* the Z origin for the file.

*nSubUnitPerMasterUnit* the number of subunits in one master unit.

*nUORPerSubUnit* the number of UOR (units of resolution) per subunit.

*pszMasterUnits* the name of the master units (2 characters).

*pszSubUnits* 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 [DGNUUpdateElemCore\(\)](#) on the element before writing to set these values.

---



**Parameters:**

*hDGN* the DGN file on which the element will eventually be written.  
*nType* either DGNT\_ELLIPSE or DGNT\_ARC to select element type.  
*dfOriginX* the origin (center of rotation) of the arc (X).  
*dfOriginY* the origin (center of rotation) of the arc (Y).  
*dfOriginZ* the origin (center of rotation) of the arc (Z).  
*dfPrimaryAxis* the length of the primary axis.  
*dfSecondaryAxis* the length of the secondary axis.  
*dfStartAngle* start angle, degrees counterclockwise of primary axis.  
*dfSweepAngle* sweep angle, degrees  
*dfRotation* Counterclockwise rotation in degrees.  
*panQuaternion* 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:**

*hDGN* the file handle on which the element is to be written.  
*nTotLength* total length of cell in words not including the 38 bytes of the cell header that occur before the totlength indicator.  
*nClass* the class value for the cell.  
*panLevels* an array of shorts holding the bit mask of levels in effect for this cell. This array should contain 4 shorts (64 bits).  
*psRangeLow* the cell diagonal origin in original cell file coordinates.  
*psRangeHigh* the cell diagonal top left corner in original cell file coordinates.  
*psOrigin* the origin of the cell in output file coordinates.  
*dfXScale* the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.  
*dfYScale* the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.  
*dfRotation* 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:

*hDGN* the file handle on which the element is to be written.

*nClass* the class value for the cell.

*panLevels* 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.

*psOrigin* the origin of the cell in output file coordinates.

*dfXScale* the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.

*dfYScale* the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.

*dfRotation* 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:

*hDGN* the file to which the element will eventually be written.

*nScreenFlag* the screen to which the color table applies (0 = left, 1 = right).

*abyColorInfo*[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\* DGNCreatComplexHeaderElem** (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:**

*hDGN* the file on which the element will be written.

*nType* 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.

*nTotLength* the value of the totlength field in the element.

*nNumElems* 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:**

*hDGN* the file on which the element will be written.

*nType* 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.

*nNumElems* the number of elements in the complex group not including the header element.

*papsElems* 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.

---

#### 4.1.4.13 DGNElemCore CPL\_DLL\* DGNCreatConeElem (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 [DGNUUpdateElemCore\(\)](#) on the element before writing to set these values.

##### Parameters:

*hDGN* the DGN file on which the element will eventually be written.

*dfCenter1X* the center of the first bounding circle (X).

*dfCenter1Y* the center of the first bounding circle (Y).

*dfCenter1Z* the center of the first bounding circle (Z).

*dfRadius1* the radius of the first bounding circle.

*dfCenter2X* the center of the second bounding circle (X).

*dfCenter2Y* the center of the second bounding circle (Y).

*dfCenter2Z* the center of the second bounding circle (Z).

*dfRadius2* the radius of the second bounding circle.

*panQuaternion* 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\* DGNCreatMultiPointElem (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 [DGNUUpdateElemCore\(\)](#) 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:

*hDGN* the file on which the element will eventually be written.

*nType* 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.

*nPointCount* the number of points in the *pasVertices* list.

*pasVertices* 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\* DGNCreatSolidHeaderElem** (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 [DGNUUpdateElemCore\(\)](#) 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:

*hDGN* the file on which the element will be written.

*nType* DGNT\_3DSURFACE\_HEADER or DGNT\_3DSOLID\_HEADER.

*nSurfType* the surface/solid type, one of DGNSUT\_\* or DGNSOT\_\*.

*nBoundElems* the number of elements in each boundary.

*nTotLength* the value of the totlength field in the element.

*nNumElems* 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:

*hDGN* the file on which the element will be written.

*nType* DGNT\_3DSURFACE\_HEADER or DGNT\_3DSOLID\_HEADER.

*nSurfType* the surface/solid type, one of DGNSUT\_\* or DGNSOT\_\*.

*nBoundElems* the number of boundary elements.

*nNumElems* the number of elements in the solid not including the header element.

*papsElems* 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.

---

#### 4.1.4.17 **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:

*hDGN* the file on which the element will eventually be written.

*pszText* the string of text.

*nFontId* microstation font id for the text. 1 may be used as default.

*nJustification* 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.

*dfLengthMult* character width in master units.

*dfHeightMult* character height in master units.

*dfRotation* Counterclockwise text rotation in degrees.

*panQuaternion* 3D orientation quaternion (NULL to use rotation).

*dfOriginX* Text origin (X).

*dfOriginY* Text origin (Y).

*dfOriginZ* 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:

*hDGN* the file from which the element originated.

*psElement* the element to report on.

*fp* 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:**

*nElemType* 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:**

*hDGN* handle to file from which the element was read.

*psElement* the element structure returned by [DGNReadElement\(\)](#).

**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:**

*hDGN* the file.

*psElem* 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:**

*hDGN* the file from which the element originated.

*psElement* the element to report on.

*nOffset* 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:

*hDGN* the handle of the file to read from.

*psElement* the element to extract extents from.

*psMin* structure loaded with X, Y and Z minimum values for the extent.

*psMax* 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:

*hDGN* the file to get an index for.

*pnElementCount* 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:**

*hDGN* the file to get extents for.

*padfExtents* 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:**

*hDGN* the file from which the element originated.

*psElement* the element to report on.

*iIndex* the zero based index of the linkage to fetch.

*pnLinkageType* variable to return linkage type. This may be one of the predefined DGNLT\_ values or a different value. This pointer may be NULL.

*pnEntityNum* variable to return the entity number in or NULL if not required.

*pnMSLink* variable to return the MSLink value in, or NULL if not required.

*pnLength* 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 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:**

*hDGN* the file.

*psElem* the element.

*pnColor* 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:**

*hDGN* the file to affect.

*element\_id* 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:**

*hDGN* the file.  
*color\_index* the color index to lookup.  
*red* location to put red component.  
*green* location to put green component.  
*blue* 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 `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 `CPL_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.

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

**Parameters:**

*pszFilename* name of file to try opening.  
*bUpdate* 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 `DGN_GotoElement()` 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:**

*hDGN* 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 `DGN_FreeElement()` 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:**

*hDGN* the DGN file on which the element lives.

*psElement* the element to alter.

*nNewSize* 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:**

*hDGN* 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:**

*hDGN* handle to file returned by [DGNOpen\(\)](#).

*nOptions* 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:**

*hDGN* Handle from [DGNOpen\(\)](#) for file to update.

*dfXMin* minimum x coordinate for extents (georeferenced coordinates).

*dfYMin* minimum y coordinate for extents (georeferenced coordinates).

*dfXMax* maximum x coordinate for extents (georeferenced coordinates).

*dfYMax* 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:**

*hFile* the DGN file to which the arc belongs (currently not used).

*psArc* the arc to be approximated.

*nPoints* the number of points to use to approximate the arc.

*pasPoints* the array of points into which to put the results. There must be room for at least *nPoints* 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:**

*hFile* the DGN file to which the arc belongs (currently not used).

---

*psCurve* the curve to be approximated.

*nPoints* the number of points to use to approximate the curve.

*pasPoints* the array of points into which to put the results. There must be room for at least *nPoints* points.

**Returns:**

TRUE on success or FALSE on failure.

#### 4.1.4.40 int CPL\_DLL DGNTTestOpen (GByte \* *pabyHeader*, int *nByteCount*)

Test if header is DGN.

**Parameters:**

*pabyHeader* block of header data from beginning of file.

*nByteCount* number of bytes in *pabyHeader*.

**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:**

*nType* 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 DGNUUpdateElemCore (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:**

*hDGN* the file on which the element belongs.

*psElement* the element to modify.

*nLevel* the new level value.

*nGraphicGroup* the new graphic group value.

---

*nColor* the new color index.  
*nWeight* the new element weight.  
*nStyle* 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:**

*hDGN* the file to which the element belongs.  
*psElement* 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 DGNCreate\*() 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:**

*hDGN* the file to write the element to.  
*psElement* the element to write.

**Returns:**

TRUE on success or FALSE in case of failure.

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