

ASN1C

ASN.1 Compiler
Version 7.3
OER Runtime
Reference Manual

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Chapter 1

Module Index

1.1 Modules

Here is a list of all modules:

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- OER Message Buffer Classes 10
- OER Runtime Library Functions. 11
- OER C Decode Functions. 13
- OER C Encode Functions. 39

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

- ASN1MessageBuffer
- ASN1OERMessageBuffer [66](#)
- ASN1OERDecodeBuffer [57](#)
- ASN1OEREncodeBuffer [61](#)

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

ASN1OERDecodeBuffer	57
ASN1OEREncodeBuffer	61
ASN1OERMessageBuffer	66

Chapter 4

File Index

4.1 File List

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

asn1oer.h	71
asn1OerCppTypes.h	73

Chapter 5

Module Documentation

5.1 OER C++ Runtime Classes.

Modules

- [OER Message Buffer Classes](#)

5.1.1 Detailed Description

5.2 OER Message Buffer Classes

Classes

- class [ASN1OERMessageBuffer](#)
- class [ASN1OEREncodeBuffer](#)
- class [ASN1OERDecodeBuffer](#)

5.2.1 Detailed Description

The ASN.1 C++ runtime classes are wrapper classes that provide an object-oriented interface to the ASN.1 C runtime library functions. These classes are derived from the common classes documented in the ASN1C C/C++ Common Runtime Functions manual and are specific to the Octet Encoding Rules (OER). These classes manage the buffers for encoding and decoding ASN.1 OER messages.

5.3 OER Runtime Library Functions.

Modules

- [OER C Decode Functions.](#)
- [OER C Encode Functions.](#)

Functions

- int **oerDecDate** (OSCTXT *pctx, char *pString, OSUINT32 flags)
- int **oerDecTimeOfDay** (OSCTXT *pctx, char *pString, OSUINT32 flags)
- int **oerEncIdent** (OSCTXT *pctx, OSUINT64 ident)
- OSSIZE **oerLenLength** (size_t length)
- OSSIZE **oerTagLength** (ASN1TAG tag)
- int **oerWriteIdent** (OSUINT64 ident, OSOCTET *buffer, OSSIZE bufsize)
- int **oerWriteLen** (size_t length, OSOCTET *buffer, OSSIZE bufsize)
- int **oerWriteTag** (ASN1TAG tag, OSOCTET *buffer, OSSIZE bufsize)

5.3.1 Detailed Description

The ASN.1 Octet Encoding Rules (OER) runtime library contains the low-level constants, types, and functions that are assembled by the compiler to encode/decode more complex structures. The OER low-level C encode/decode functions are identified by their prefixes: oerEnc for encode, oerDec for decode, and oerUtil for utility functions.

5.3.2 Function Documentation

5.3.2.1 oerLenLength()

```
OSSIZE oerLenLength (  
    size_t length )
```

Return the number of bytes required to encode the given length.

5.3.2.2 oerTagLength()

```
OSSIZE oerTagLength (  
    ASN1TAG tag )
```

Return the number of bytes required to encode the given tag.

5.3.2.3 oerWriteIdent()

```
int oerWriteIdent (
    OSUINT64 ident,
    OSOCTET * buffer,
    OSSIZE bufsize )
```

Encode the given tag identifier into the given buffer.

Returns

of bytes used or RTERR_BUFOVFLW

5.3.2.4 oerWriteLen()

```
int oerWriteLen (
    size_t length,
    OSOCTET * buffer,
    OSSIZE bufsize )
```

Encode the given length into the given buffer.

Returns

of bytes used or RTERR_TOOBIG

5.3.2.5 oerWriteTag()

```
int oerWriteTag (
    ASN1TAG tag,
    OSOCTET * buffer,
    OSSIZE bufsize )
```

Encode the given tag into the given buffer.

Returns

of bytes used or RTERR_BUFOVFLW

5.4 OER C Decode Functions.

Macros

- #define `oerDecInt8`(pctx, pvalue) `rtxReadBytes`(pctx,pvalue,1)
- #define `oerDecUInt8`(pctx, pvalue) `rtxReadBytes`(pctx,pvalue,1)
- #define `oerDecUnrestInt` `oerDecUnrestInt32`
- #define `oerDecUnrestUInt` `oerDecUnrestUInt32`

Functions

- int `oerDecBitStr` (OSCTXT *pctx, OSOCTET *pvalue, size_t bufsiz, OSUINT32 *pnbits)
- int `oerDecBitStrExt` (OSCTXT *pctx, OSOCTET *pvalue, size_t bufsiz, OSUINT32 *pnbits, OSOCTET **extdata)
- int `oerDecBMPStr` (OSCTXT *pctx, ASN1BMPString *pvalue)
- int `oerDecChoiceExt` (OSCTXT *pctx, ASN1TAG tag, OSOCTET **ppvalue, OSSIZE *pnocets)
- int `oerDecUnivStr` (OSCTXT *pctx, ASN1UniversalString *pvalue)
- int `oerDecDynBitStr` (OSCTXT *pctx, const OSOCTET **ppvalue, OSUINT32 *pnbits)
- int `oerDecCharStr` (OSCTXT *pctx, char *pvalue, OSSIZE sz)
- int `oerDecDynCharStr` (OSCTXT *pctx, char **ppvalue)
- int `oerDecDynOctStr` (OSCTXT *pctx, OSOCTET **ppvalue, OSUINT32 *pnocets, size_t len)
- int `oerDecDynOctStr64` (OSCTXT *pctx, OSOCTET **ppvalue, OSSIZE *pnocets, size_t len)
- int `oerDecInt16` (OSCTXT *pctx, OSINT16 *pvalue)
- int `oerDecInt32` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecInt64` (OSCTXT *pctx, OSINT64 *pvalue)
- int `oerDecUnrestInt64` (OSCTXT *pctx, OSINT64 *pvalue)
- int `oerDecLen` (OSCTXT *pctx, OSSIZE *plength)
- int `oerDecLen32` (OSCTXT *pctx, OSUINT32 *plength)
- int `oerDecObjId` (OSCTXT *pctx, ASN1OBJID *pvalue)
- int `oerDecRelObjId` (OSCTXT *pctx, ASN1OBJID *pvalue)
- int `oerDecReal` (OSCTXT *pctx, OSREAL *value)
- int `oerDecReal2` (OSCTXT *pctx, OSREAL *value)
- int `oerDecReal10` (OSCTXT *pctx, OSREAL *value)
- int `oerDecRealNTCIP` (OSCTXT *pctx, OSREAL *value)
- int `oerDecFloat` (OSCTXT *pctx, OSREAL *value)
- int `oerDecDouble` (OSCTXT *pctx, OSREAL *value)
- int `oerDecSignedEnum` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecTag` (OSCTXT *pctx, ASN1TAG *ptag)
- int `oerDecUInt16` (OSCTXT *pctx, OSUINT16 *pvalue)
- int `oerDecUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestSignedUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestInt32` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecUnrestSignedUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecUnrestUInt8` (OSCTXT *pctx, OSUINT8 *pvalue)
- int `oerDecUnrestUInt16` (OSCTXT *pctx, OSUINT16 *pvalue)
- int `oerDecUnrestUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecBigInt` (OSCTXT *pctx, const char **ppvalue, int radix)

- int `oerDecBigUInt` (OSCTXT *pctxt, const char **ppvalue, int radix)
- int `oerDecUnrestSize` (OSCTXT *pctxt, OSSIZE *pvalue)
- int `oerDecUnsignedEnum` (OSCTXT *pctxt, OSUINT32 *pvalue)
- int `oerDecDateStr` (OSCTXT *pctxt, char **ppString, OSUINT32 flags)
- int `oerDecDateTimeStr` (OSCTXT *pctxt, char **ppString, OSUINT32 flags)
- int `oerDecDurationStr` (OSCTXT *pctxt, char **ppString)
- int `oerDecTimeDiffStr` (OSCTXT *pctxt, char *pString)
- int `oerDecTimeOfDayStr` (OSCTXT *pctxt, char **ppString, OSUINT32 flags)

5.4.1 Detailed Description

OER C decode functions handle the decoding of the primitive ASN.1 data types and ASN.1 length and tag fields within a message. Calls to these functions are assembled in the C source code generated by the ASN1C compiler to decode complex ASN.1 structures. These functions are also directly callable from within a user's application program if the need to decode a primitive data item exists.

5.4.2 Macro Definition Documentation

5.4.2.1 `oerDecInt8`

```
#define oerDecInt8(
    pctxt,
    pvalue ) rtxReadBytes(pctxt,pvalue,1)
```

This macro decodes an OER 8-bit signed integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 16-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.2.2 oerDecUInt8

```
#define oerDecUInt8(  
    pctxt,  
    pvalue ) rtxReadBytes(pctxt,pvalue,1)
```

This macro decodes an OER 8-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 16-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3 Function Documentation

5.4.3.1 oerDecBigInt()

```
int oerDecBigInt (  
    OSCTXT * pctxt,  
    const char ** ppvalue,  
    int radix )
```

This function decodes an OER length determinant and unbound signed integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to a character pointer variable to receive the decoded unsigned value. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function. The memory might be allocated despite the negative return status.
<i>radix</i>	Radix to be used for decoded string. Valid values are 2, 8, 10, or 16.

Returns

Completion status of operation:

- 0 (0) = success,
- ASN_E_NOTCANON successful but encoding was non-canonical (caller may treat this as success or failure, as appropriate)
- negative return value is error.

5.4.3.2 oerDecBigUInt()

```
int oerDecBigUInt (
    OSCTXT * pctxt,
    const char ** ppvalue,
    int radix )
```

This function decodes an OER length determinant and unbound unsigned integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to a character pointer variable to receive the decoded unsigned value. Dynamic memory is allocated for the variable using the ::rtxMemAlloc function. The memory might be allocated despite the negative return status.
<i>radix</i>	Radix to be used for decoded string. Valid values are 2, 8, 10, or 16.

Returns

Completion status of operation:

- 0 (0) = success,
- ASN_E_NOTCANON successful but encoding was non-canonical (caller may treat this as success or failure, as appropriate)
- negative return value is error.

5.4.3.3 oerDecBitStr()

```
int oerDecBitStr (
    OSCTXT * pctxt,
    OSOCTET * pvalue,
    size_t bufsiz,
    OSUINT32 * pnbits )
```

This function decodes an OER bit string. This assumes a variable length string. Fixed-sized strings (i.e SIZE(N)) are encoded with no length or unused bit descriptors. This is handled by the compiler.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to static byte array into which data is to be read. The buffer must be large enough to hold the decoded value.
<i>bufsiz</i>	Size of the static byte array into which data is to be read.
<i>pnbits</i>	Pointer to a variable to receive the decoded number of bits.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.4 oerDecBitStrExt()

```
int oerDecBitStrExt (
    OSCTXT * pctxt,
    OSOCTET * pvalue,
    size_t bufsiz,
    OSUINT32 * pnbits,
    OSOCTET ** extdata )
```

This function decodes an OER bit string. This assumes a variable length string. Fixed-sized strings (i.e SIZE(N)) are encoded with no length or unused bit descriptors. This is handled by the compiler. This method handles bit strings with an extdata member present.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to static byte array into which data is to be read. The buffer must be large enough to hold the decoded value.
<i>bufsiz</i>	Size of the static byte array into which data is to be read.
<i>pnbits</i>	Pointer to a variable to receive the decoded number of bits.
<i>extdata</i>	Pointer to byte array containing extension data.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.5 oerDecBMPStr()

```
int oerDecBMPStr (
    OSCTXT * pctxt,
    ASN1BMPString * pvalue )
```

This function decodes an OER BMP string.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to Asn1BMPString structure to be populated with the decoded information.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.6 oerDecCharStr()

```
int oerDecCharStr (
    OSCTXT * pctxt,
    char * pvalue,
    OSSIZE sz )
```

This function decodes an OER character string into a character array.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to character array to receive null-terminated char string. If null, the string is decoded but the content is discarded.
<i>sz</i>	Size of the array. It must be large enough to hold the decoded string with the null terminator.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.7 oerDecChoiceExt()

```
int oerDecChoiceExt (
    OSCTXT * pctxt,
    ASN1TAG tag,
    OSOCTET ** ppvalue,
    OSSIZE * pnocts )
```

This function decodes an unknown CHOICE extension element. It captures the encoded tag, length determinant, and encoding of the alternative itself.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>tag</i>	The previously decoded tag, provided so that it can be captured as part of data in <i>ppvalue</i> , for possible later reencoding.
<i>ppvalue</i>	Receives a pointer to dynamically allocated buffer holding the tag, length determinant, and alternative encoding. Memory for the buffer is allocated using the <code>rtxMemAlloc</code> function and should be subsequently freed using the <code>rtxMemFree</code> or <code>rtxMemFreePtr</code> functions.
<i>pnocts</i>	Pointer to variable to receive the size of the data held in the buffer pointed to by <i>ppvalue</i> .

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.8 oerDecDateStr()

```
int oerDecDateStr (
    OSCTXT * pctxt,
    char ** ppString,
    OSUINT32 flags )
```

This function is used to decode an ISO 8601 DATE type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppString</i>	Pointer to string variable to receive decoded value in string form (YYYY-MM-DD).
<i>flags</i>	Set of flags: OSYEAR, OSMONTH, OSDAY, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.9 oerDecDateTimeStr()

```
int oerDecDateTimeStr (
    OSCTXT * pctxt,
    char ** ppString,
    OSUINT32 flags )
```

This function is used to decode an ISO 8601 DATE-TIME type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppString</i>	Pointer to string variable to receive decoded value in string form (YYYY-MM-DDTHH:MM:SS). n - set digit number of fraction part.
<i>flags</i>	Set of flags: OSYEAR, OSMONTH, OSHOURS, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.10 oerDecDouble()

```
int oerDecDouble (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode a REAL value that has been constrained to be in the range of the binary64 (double precision) floating-point format specified in IEEE 754.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.11 oerDecDurationStr()

```
int oerDecDurationStr (
    OSCTXT * pctxt,
    char ** ppString )
```

This function is used to decode an ISO 8601 DURATION type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppString</i>	Pointer to string variable to receive decoded value in string form (PnYnMnDTnHnMnS).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.12 oerDecDynBitStr()

```
int oerDecDynBitStr (
    OSCTXT * pctxt,
    const OSOCTET ** ppvalue,
    OSUINT32 * pnbits )
```

This function decodes an OER bit string into a dynamic memory buffer. Memory for the buffer is allocated using the `rtxMemAlloc` function and should be subsequently freed using the `rtxMemFree` or `rtxMemFreePtr` functions. This assumes a variable length string. Fixed-sized strings (i.e. SIZE(N)) are encoded with no length or unused bit descriptors. This is handled by the compiler.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to receive pointer to allocated byte buffer.
<i>pnbits</i>	Pointer to a variable to receive the decoded number of bits.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.13 oerDecDynCharStr()

```
int oerDecDynCharStr (
    OSCTXT * pctx,
    char ** ppvalue )
```

This function decodes an OER character string into a dynamic memory buffer. Memory for the buffer is allocated using the `rtxMemAlloc` function and should be subsequently freed using the `rtxMemFree` or `rtxMemFreePtr` functions.

Parameters

<i>pctx</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to receive pointer to null-terminated char string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.14 oerDecDynOctStr()

```
int oerDecDynOctStr (
    OSCTXT * pctx,
    OSOCTET ** ppvalue,
    OSUINT32 * pnocts,
    size_t len )
```

This function decodes an OER octet string into a dynamic memory buffer. Memory for the buffer is allocated using the `rtxMemAlloc` function and should be subsequently freed using the `rtxMemFree` or `rtxMemFreePtr` functions.

Parameters

<i>pctx</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to receive pointer to allocated byte buffer.
<i>pnocts</i>	Pointer to a variable to receive the decoded number of octets (bytes).
<i>len</i>	Length of string to decoded. If zero, it is assumed the string is variable length and the length is decoded within the function.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.15 oerDecDynOctStr64()

```
int oerDecDynOctStr64 (
    OSCTXT * pctxt,
    OSOCTET ** ppvalue,
    OSSIZE * pnocts,
    size_t len )
```

This function decodes an OER octet string into a dynamic memory buffer. Memory for the buffer is allocated using the `rtxMemAlloc` function and should be subsequently freed using the `rtxMemFree` or `rtxMemFreePtr` functions.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppvalue</i>	Pointer to receive pointer to allocated byte buffer.
<i>pnocts</i>	Pointer to a variable to receive the decoded number of octets (bytes).
<i>len</i>	Length of string to decoded. If zero, it is assumed the string is variable length and the length is decoded within the funtion.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.16 oerDecFloat()

```
int oerDecFloat (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode a REAL value that has been constrained to be in the range of the binary32 (single precision) floating-point format specified in IEEE 754.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.17 oerDecInt16()

```
int oerDecInt16 (
    OSCTXT * pctxt,
    OSINT16 * pvalue )
```

This function decodes an OER 16-bit signed integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 16-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.18 oerDecInt32()

```
int oerDecInt32 (
    OSCTXT * pctxt,
    OSINT32 * pvalue )
```

This function decodes an OER 32-bit signed integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 32-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.19 oerDecInt64()

```
int oerDecInt64 (
    OSCTXT * pctxt,
    OSINT64 * pvalue )
```

This function decodes an OER 64-bit signed integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 64-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.20 oerDecLen()

```
int oerDecLen (
    OSCTXT * pctxt,
    OSSIZE * plength )
```

This function is used to decode an OER length determinant value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>plength</i>	Pointer to variable to receive decoded length.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.21 oerDecLen32()

```
int oerDecLen32 (
    OSCTXT * pctxt,
    OSUINT32 * plength )
```

This function is used to decode an OER length determinant value. In this case, the length is restricted to a 32-bit unsigned integer maximum value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>plength</i>	Pointer to variable to receive decoded length.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.22 oerDecObjId()

```
int oerDecObjId (
    OSCTXT * pctxt,
    ASN1OBJID * pvalue )
```

This function is used to decode an OER object identifier value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.23 oerDecReal()

```
int oerDecReal (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode an unconstrained REAL value, which may be encoded in base 2 or base 10.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.24 oerDecReal10()

```
int oerDecReal10 (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode a REAL value constrained to base 10. The encoding must be in base 10.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.25 oerDecReal2()

```
int oerDecReal2 (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode a REAL value constrained to base 2. The encoding must be in base 2.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.26 oerDecRealNTCIP()

```
int oerDecRealNTCIP (
    OSCTXT * pctxt,
    OSREAL * value )
```

This function is used to decode an unconstrained REAL value. The encoding is expected to be in base 10 form, following NTCIP 1102.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Pointer to variable to receive decoded the value.

Returns

Completion status of operation:

- 0 (0) = success,

- negative return value is error.

5.4.3.27 oerDecRelObjId()

```
int oerDecRelObjId (
    OSCTXT * pctxt,
    ASN1OBJID * pvalue )
```

This function is used to decode an OER relative object identifier value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.28 oerDecSignedEnum()

```
int oerDecSignedEnum (
    OSCTXT * pctxt,
    OSINT32 * pvalue )
```

This function is used to decode a signed enumerated value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.29 oerDecTag()

```
int oerDecTag (
    OSCTXT * pctxt,
    ASN1TAG * ptag )
```

This function decodes an ASN.1 tag into a standard 32-bit unsigned integer type. The bits used to represent the components of a tag are as follows:

Bit Fields:

- 31-30 Class (00 = UNIV, 01 = APPL, 10 = CTXT, 11 = PRIV)
- 29 Form (not used for OER)
- 28-0 ID code value

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ptag</i>	Pointer to variable to receive decoded tag info.

Returns

Completion status of operation: 0 (0) = success, negative return value is error.

5.4.3.30 oerDecTimeDiffStr()

```
int oerDecTimeDiffStr (
    OSCTXT * pctxt,
    char * pString )
```

This function is used to decode an ISO 8601 TIME "DIFF" value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Pointer to string variable to receive decoded value in string form.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.31 oerDecTimeOfDayStr()

```
int oerDecTimeOfDayStr (
    OSCTXT * pctxt,
    char ** ppString,
    OSUINT32 flags )
```

This function is used to decode an ISO 8601 TIME-OF-DAY type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>ppString</i>	Pointer to string variable to receive decoded value in string form (HH:MM:SS).
<i>flags</i>	Set of flags: OSHOURS, OSMINUTES, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.32 oerDecUInt16()

```
int oerDecUInt16 (
    OSCTXT * pctxt,
    OSUINT16 * pvalue )
```

This function decodes an OER 16-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 16-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.33 oerDecUInt32()

```
int oerDecUInt32 (
    OSCTXT * pctxt,
    OSUINT32 * pvalue )
```

This function decodes an OER 32-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 32-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.34 oerDecUInt64()

```
int oerDecUInt64 (
    OSCTXT * pctxt,
    OSUINT64 * pvalue )
```

This function decodes an OER 64-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 64-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.35 oerDecUnivStr()

```
int oerDecUnivStr (
    OSCTXT * pctxt,
    ASN1UniversalString * pvalue )
```

This function decodes an OER universal string.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to Asn1UniversalString structure to be populated with the decoded information.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.36 oerDecUnrestInt32()

```
int oerDecUnrestInt32 (
    OSCTXT * pctxt,
    OSINT32 * pvalue )
```

This function decodes an OER unrestricted signed integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in a 32-bit integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 32-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.37 oerDecUnrestInt64()

```
int oerDecUnrestInt64 (
    OSCTXT * pctxt,
    OSINT64 * pvalue )
```

This function decodes an OER unrestricted signed integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in a 64-bit signed integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 64-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.38 oerDecUnrestSignedUInt32()

```
int oerDecUnrestSignedUInt32 (
    OSCTXT * pctxt,
    OSUINT32 * pvalue )
```

This function decodes an OER unrestricted signed integer at the current message buffer/stream location and advances the pointer to the next field. The value must fit in an unsigned 32-bit integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 32-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.39 oerDecUnrestSignedUInt64()

```
int oerDecUnrestSignedUInt64 (
    OSCTXT * pctxt,
    OSUINT64 * pvalue )
```

This function decodes an OER unrestricted signed integer at the current message buffer/stream location and advances the pointer to the next field. The value must fit in a 64-bit unsigned integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 64-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.40 oerDecUnrestSize()

```
int oerDecUnrestSize (
    OSCTXT * pctxt,
    OSSIZE * pvalue )
```

This function decodes an OER unrestricted size-typed value at the current message buffer/stream location and advances the pointer to the next field.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded size-typed value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.41 oerDecUnrestUInt16()

```
int oerDecUnrestUInt16 (
    OSCTXT * pctxt,
    OSUINT16 * pvalue )
```

This function decodes an OER unrestricted 16-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in an 16-bit integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 16-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.42 oerDecUnrestUInt32()

```
int oerDecUnrestUInt32 (
    OSCTXT * pctxt,
    OSUINT32 * pvalue )
```

This function decodes an OER unrestricted unsigned integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in a 32-bit integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 32-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.43 oerDecUnrestUInt64()

```
int oerDecUnrestUInt64 (
    OSCTXT * pctxt,
    OSUINT64 * pvalue )
```

This function decodes an OER unrestricted unsigned integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in a 64-bit unsigned integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 64-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.44 oerDecUnrestUInt8()

```
int oerDecUnrestUInt8 (
    OSCTXT * pctxt,
    OSUINT8 * pvalue )
```

This function decodes an OER unrestricted 8-bit unsigned integer at the current message buffer/stream location and advances the pointer to the next field. It is assumed that the value will fit in an 8-bit integer variable.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to decoded 8-bit integer value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.4.3.45 oerDecUnsignedEnum()

```
int oerDecUnsignedEnum (
    OSCTXT * pctxt,
    OSUINT32 * pvalue )
```

This function is used to decode an unsigned enumerated value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5 OER C Encode Functions.

Functions

- int `oerEncBigInt` (OSCTXT *pctxt, const char *pvalue, int radix)
- int `oerEncBigIntValue` (OSCTXT *pctxt, struct OSBigInt *pvalue)
- int `oerEncBitStr` (OSCTXT *pctxt, const OSOCTET *pvalue, size_t numbits)
- int `oerEncBitStrExt` (OSCTXT *pctxt, const OSOCTET *pvalue, size_t numbits, const OSOCTET *extdata, size_t dataSize)
- int `oerEncBMPStr` (OSCTXT *pctxt, ASN1BMPString *pvalue)
- int `oerEncUnivStr` (OSCTXT *pctxt, ASN1UniversalString *pvalue)
- int `oerEncExtElem` (OSCTXT *pctxt, OSRTBuffer *pbuffer)
- int `oerEncInt` (OSCTXT *pctxt, OSINT64 value, size_t size)
- int `oerEncUnrestInt64` (OSCTXT *pctxt, OSINT64 value)
- int `oerEncUnrestSignedUInt64` (OSCTXT *pctxt, OSUINT64 value)
- int `oerEncLen` (OSCTXT *pctxt, size_t length)
- int `oerEncObjId` (OSCTXT *pctxt, const ASN1OBJID *pvalue)
- int `oerEncRelObjId` (OSCTXT *pctxt, const ASN1OBJID *pvalue)
- int `oerEncObjId64` (OSCTXT *pctxt, const ASN1OID64 *pvalue)
- int `oerEncOpenExt` (OSCTXT *pctxt, OSRTDList *pElemList)
- int `oerEncRelOID64` (OSCTXT *pctxt, const ASN1OID64 *pvalue)
- int `oerEncReal` (OSCTXT *pctxt, OSREAL value)
- int `oerEncReal10` (OSCTXT *pctxt, const char *object_p)
- int `oerEncRealNTCIP` (OSCTXT *pctxt, OSREAL value)
- int `oerEncFloat` (OSCTXT *pctxt, OSREAL value)
- int `oerEncDouble` (OSCTXT *pctxt, OSREAL value)
- int `oerEncSignedEnum` (OSCTXT *pctxt, OSINT32 value)
- int `oerEncTag` (OSCTXT *pctxt, ASN1TAG tag)
- int `oerEncUInt` (OSCTXT *pctxt, OSUINT64 value, size_t size)
- int `oerEncUnrestUInt64` (OSCTXT *pctxt, OSUINT64 value)
- int `oerEncUnrestInt32` (OSCTXT *pctxt, OSINT32 value)
- int `oerEncUnrestSignedUInt32` (OSCTXT *pctxt, OSUINT32 value)
- int `oerEncUnrestUInt32` (OSCTXT *pctxt, OSUINT32 value)
- int `oerEncUnrestSize` (OSCTXT *pctxt, OSSIZE value)
- int `oerEncUnsignedEnum` (OSCTXT *pctxt, OSUINT32 value)
- int `oerEncDateStr` (OSCTXT *pctxt, const char *pString, OSUINT32 flags)
- int `oerEncDateTimeStr` (OSCTXT *pctxt, const char *pString, OSUINT32 flags)
- int `oerEncDurationStr` (OSCTXT *pctxt, const char *pString)
- int `oerEncTimeDiffStr` (OSCTXT *pctxt, const char *pString)
- int `oerEncTimeOfDayStr` (OSCTXT *pctxt, const char *pString, OSUINT32 flags)

5.5.1 Detailed Description

OER C encode functions handle the OER encoding of the primitive ASN.1 data types and ASN.1 length and tag fields within a message. Calls to these functions are assembled in the C source code generated by the ASN1C compiler to accomplish the encoding of complex ASN.1 structures. These functions are also directly callable from within a user's application program if the need to accomplish a low level encoding function exists.

5.5.2 Function Documentation

5.5.2.1 oerEncBigInt()

```
int oerEncBigInt (
    OSCTXT * pctxt,
    const char * pvalue,
    int radix )
```

This function encodes an OER length determinant and signed integer at the current message buffer/stream location. The encoding will be canonical.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to a character string representing the integer to be encoded, in the given radix.
<i>radix</i>	Radix of the given integer character string. Valid values are 2, 8, 10, or 16.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.2 oerEncBitStr()

```
int oerEncBitStr (
    OSCTXT * pctxt,
    const OSOCTET * pvalue,
    size_t numbits )
```

This function encodes an OER bit string. This assumes a variable length string. Fixed-sized strings (i.e SIZE(N)) are encoded with no length or unused bit descriptors. This is handled by the compiler.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to binary data to encode.
<i>numbits</i>	Number of bits in the bit string.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.3 oerEncBitStrExt()

```
int oerEncBitStrExt (
    OSCTXT * pctxt,
    const OSOCTET * pvalue,
    size_t numbits,
    const OSOCTET * extdata,
    size_t dataSize )
```

This function encodes an OER bit string. This assumes a variable length string. Fixed-sized strings (i.e SIZE(N)) are encoded with no length or unused bit descriptors. This is handled by the compiler. This method handles bit strings with an extdata member present.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to binary data to encode.
<i>numbits</i>	Number of bits in the bit string.
<i>extdata</i>	Pointer to byte array containing extension data.
<i>dataSize</i>	Size, in octets, of the root bit string data.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.4 oerEncBMPStr()

```
int oerEncBMPStr (
    OSCTXT * pctxt,
    ASN1BMPString * pvalue )
```

This function encodes an OER BMP string.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to Asn1BMPString structure that contains the value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.5 oerEncDateStr()

```
int oerEncDateStr (
    OSCTXT * pctxt,
    const char * pString,
    OSUINT32 flags )
```

This function is used to encode an ISO 8601 DATE type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Character string variable containing value to be encoded in string form (YYYY-MM-DD).
<i>flags</i>	Set of flags: OSYEAR, OSMONTH, OSDAY, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.6 oerEncDateTimeStr()

```
int oerEncDateTimeStr (
    OSCTXT * pctxt,
    const char * pString,
    OSUINT32 flags )
```

This function is used to encode an ISO 8601 DATE-TIME type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Character string variable containing value to be encoded in string form (YYYY-MM-DDTHH:MM:SS).
<i>flags</i>	Set of flags: OSYEAR, OSMONTH, OSHOURS, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.7 oerEncDouble()

```
int oerEncDouble (
    OSCTXT * pctxt,
    OSREAL value )
```

This function is used to encode an value of the ASN.1 REAL data type that has been constrained to be in the range of the binary64 (double precision) floating-point format specified in IEEE 754.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.8 oerEncDurationStr()

```
int oerEncDurationStr (
    OSCTXT * pctxt,
    const char * pString )
```

This function is used to encode an ISO 8601 DURATION type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Character string variable containing value to be encoded in string form (PnYnMnDTnHnMnS).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.9 oerEncExtElem()

```
int oerEncExtElem (
    OSCTXT * pctxt,
    OSRTBuffer * pBuffer )
```

This function encodes a known extension element in a SEQUENCE or similar construct.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pbuffer</i>	Pointer to run-time buffer containing encoded element.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.10 oerEncFloat()

```
int oerEncFloat (
    OSCTXT * pctxt,
    OSREAL value )
```

This function is used to encode an value of the ASN.1 REAL data type that has been constrained to be in the range of the binary32 (single precision) floating-point format specified in IEEE 754.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.11 oerEncInt()

```
int oerEncInt (
    OSCTXT * pctxt,
    OSINT64 value,
    size_t size )
```

This function encodes an OER fixed-size integer (1, 2, 4, or 8 bytes) and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.
<i>size</i>	Size of the encoded field (1, 2, 4, or 8 bytes).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.12 oerEncLen()

```
int oerEncLen (
    OSCTXT * pctxt,
    size_t length )
```

This function is used to encode an OER length determinant value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>length</i>	The length to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.13 oerEncObjId()

```
int oerEncObjId (
    OSCTXT * pctxt,
    const ASN1OBJID * pvalue )
```

This function is used to encode an OER object identifier value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable containing value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.14 oerEncOpenExt()

```
int oerEncOpenExt (
    OSCTXT * pctxt,
    OSRTDList * pElemList )
```

This function will encode an ASN.1 open type extension. An open type extension field is the data that potentially resides after the ... marker in a version-1 message. The open type structure contains a complete encoded bit set including option element bits or choice index, length, and data. Typically, this data is populated when a version-1 system decodes a version-2 message. The extension fields are retained and can then be re-encoded if a new message is to be sent out (for example, in a store and forward system).

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pElemList</i>	A pointer to the open type to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.15 oerEncReal()

```
int oerEncReal (
    OSCTXT * pctxt,
    OSREAL value )
```

This function is used to encode an unconstrained value of the ASN.1 REAL data type. The encoding will be in base 2 form.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.16 oerEncReal10()

```
int oerEncReal10 (
    OSCTXT * pctxt,
    const char * object_p )
```

This function will encode a REAL constrained to base 10 using base 10 encoding (as required). The number is provided to this function as a character string, which may be in integer, decimal, or exponent form.

Parameters

<i>pctxt</i>	Pointer to a context structure. This provides a storage area for the function to store all working variables that must be maintained between function calls.
<i>object</i> ↔ <i>_p</i>	Value to be encoded.

Returns

Length of the encoded message component. A negative status value will be returned if encoding is not successful.

5.5.2.17 oerEncRealNTCIP()

```
int oerEncRealNTCIP (
    OSCTXT * pctxt,
    OSREAL value )
```

This function is used to encode an unconstrained value of the ASN.1 REAL data type. The encoding will be in base 10 form, following NTCIP 1102.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.18 oerEncRelObjId()

```
int oerEncRelObjId (
    OSCTXT * pctxt,
    const ASN1OBJID * pvalue )
```

This function is used to encode an OER relative object identifier value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable containing value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.19 oerEncRelOID64()

```
int oerEncRelOID64 (
    OSCTXT * pctxt,
    const ASN1OID64 * pvalue )
```

This function is used to encode an OER relative object identifier value. In this case, the arc values can be up to 64-bits in size.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to variable to receive decoded value.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.20 oerEncSignedEnum()

```
int oerEncSignedEnum (
    OSCTXT * pctxt,
    OSINT32 value )
```

This function is used to encode a signed OER enumerated value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.21 oerEncTag()

```
int oerEncTag (
    OSCTXT * pctxt,
    ASN1TAG tag )
```

This function encodes an ASN.1 tag specified using a standard 32-bit unsigned integer type. The bits used to represent the components of a tag are as follows:

Bit Fields:

- 31-30 Class (00 = UNIV, 01 = APPL, 10 = CTXT, 11 = PRIV)
- 29 Form (not used for OER)
- 28-0 ID code value

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>tag</i>	Tag value to be encoded.

Returns

Completion status of operation: 0 (0) = success, negative return value is error.

5.5.2.22 oerEncTimeDiffStr()

```
int oerEncTimeDiffStr (
    OSCTXT * pctxt,
    const char * pString )
```

This function is used to encode an ISO 8601 TIME "DIFF" value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Character string variable containing value to be encoded in string form (HH:MM:SS).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.23 oerEncTimeOfDayStr()

```
int oerEncTimeOfDayStr (
    OSCTXT * pctxt,
    const char * pString,
    OSUINT32 flags )
```

This function is used to encode an ISO 8601 TIME-OF-DAY type.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pString</i>	Character string variable containing value to be encoded in string form (HH:MM:SS).
<i>flags</i>	Set of flags: OSHOURS, OSMINUTES, etc.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.24 oerEncUInt()

```
int oerEncUInt (
    OSCTXT * pctxt,
    OSUINT64 value,
    size_t size )
```

This function encodes an OER unsigned fixed-size integer (1, 2, 4, or 8 bytes) and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.
<i>size</i>	Size of the encoded field (1, 2, 4, or 8 bytes).

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.25 oerEncUnivStr()

```
int oerEncUnivStr (
    OSCTXT * pctxt,
    ASN1UniversalString * pvalue )
```

This function encodes an OER universal string.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>pvalue</i>	Pointer to Asn1UniversalString structure that contains the value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.26 oerEncUnrestInt32()

```
int oerEncUnrestInt32 (
    OSCTXT * pctxt,
    OSINT32 value )
```

This function encodes an OER unrestricted signed integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.27 oerEncUnrestInt64()

```
int oerEncUnrestInt64 (  
    OSCTXT * pctxt,  
    OSINT64 value )
```

This function encodes a 64-bit signed integer value as an OER unrestricted signed integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.28 oerEncUnrestSignedUInt32()

```
int oerEncUnrestSignedUInt32 (  
    OSCTXT * pctxt,  
    OSUINT32 value )
```

This function encodes an OER unrestricted signed integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.29 oerEncUnrestSignedUInt64()

```
int oerEncUnrestSignedUInt64 (
    OSCTXT * pctxt,
    OSUINT64 value )
```

This function encodes a 64-bit unsigned integer value as an OER unrestricted signed integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.30 oerEncUnrestSize()

```
int oerEncUnrestSize (
    OSCTXT * pctxt,
    OSSIZE value )
```

This function encodes an OER unrestricted size-typed value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.31 oerEncUnrestUInt32()

```
int oerEncUnrestUInt32 (
    OSCTXT * pctxt,
    OSUINT32 value )
```

This function encodes an OER unrestricted unsigned integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.32 oerEncUnrestUInt64()

```
int oerEncUnrestUInt64 (
    OSCTXT * pctxt,
    OSUINT64 value )
```

This function encodes an unsigned 64-bit integer value as an OER unrestricted unsigned integer value and writes the encoded value to the output buffer/stream.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	Integer value to be encoded.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

5.5.2.33 oerEncUnsignedEnum()

```
int oerEncUnsignedEnum (
    OSCTXT * pctxt,
    OSUINT32 value )
```

This function is used to encode an unsigned OER enumerated value.

Parameters

<i>pctxt</i>	Pointer to context block structure.
<i>value</i>	The variable containing the value to encode.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

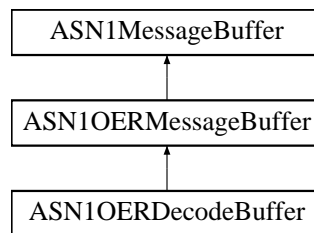
Chapter 6

Class Documentation

6.1 ASN1OERDecodeBuffer Class Reference

```
#include <asn1OerCppTypes.h>
```

Inheritance diagram for ASN1OERDecodeBuffer:



Public Member Functions

- [ASN1OERDecodeBuffer](#) ()
- [ASN1OERDecodeBuffer](#) (const OSOCTET *pMsgBuf, size_t msgBufLen)
- [ASN1OERDecodeBuffer](#) (const OSOCTET *pMsgBuf, size_t msgBufLen, OSRTContext *pContext)
- EXTOERMETHOD [ASN1OERDecodeBuffer](#) (OSRTInputStream &istream)
- EXTOERMETHOD [ASN1OERDecodeBuffer](#) (const char *filePath)
- virtual OSBOOL [isA](#) (Type bufferType)
- EXTOERMETHOD int [peekByte](#) (OSOCTET &ub)
- EXTOERMETHOD int [readBinaryFile](#) (const char *filePath)
- EXTOERMETHOD int [readBytes](#) (OSOCTET *buffer, size_t bufsize, size_t nbytes)

Additional Inherited Members

6.1.1 Detailed Description

The [ASN1OERDecodeBuffer](#) class is derived from the [ASN1OERMessageBuffer](#) base class. It contains variables and methods specific to decoding ASN.1 OER messages. It is used to manage the input buffer containing the ASN.1 message to be decoded. This class has 3 overloaded constructors.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 ASN1OERDecodeBuffer() [1/5]

```
ASN1OERDecodeBuffer::ASN1OERDecodeBuffer ( ) [inline]
```

This is a default constructor. Use `getStatus()` method to determine has error occurred during the initialization or not.

6.1.2.2 ASN1OERDecodeBuffer() [2/5]

```
ASN1OERDecodeBuffer::ASN1OERDecodeBuffer (
    const OSOCTET * pMsgBuf,
    size_t msgBufLen ) [inline]
```

This constructor is used to describe the message to be decoded. Use `getStatus()` method to determine has error occurred during the initialization or not.

Parameters

<i>pMsgBuf</i>	A pointer to the message to be decoded.
<i>msgBufLen</i>	Length of the message buffer.

6.1.2.3 ASN1OERDecodeBuffer() [3/5]

```
ASN1OERDecodeBuffer::ASN1OERDecodeBuffer (
    const OSOCTET * pMsgBuf,
    size_t msgBufLen,
    OSRTContext * pContext ) [inline]
```

This constructor is used to describe the message to be decoded. Use `getStatus()` method to determine has error occurred during the initialization or not.

Parameters

<i>pMsgBuf</i>	A pointer to the message to be decoded.
<i>msgBufLen</i>	Length of the message buffer.
<i>pContext</i>	A pointer to an OSRTContext structure created by the user.

6.1.2.4 ASN1OERDecodeBuffer() [4/5]

```
EXTOERMETHOD ASN1OERDecodeBuffer::ASN1OERDecodeBuffer (
    OSRTInputStream & istream )
```

This version of the [ASN1OERDecodeBuffer](#) constructor takes a reference to an input stream object (stream decoding version).

Parameters

<i>istream</i>	A reference to an input stream object.
----------------	--

6.1.2.5 ASN1OERDecodeBuffer() [5/5]

```
EXTOERMETHOD ASN1OERDecodeBuffer::ASN1OERDecodeBuffer (
    const char * filePath )
```

This constructor takes a pointer to the path of a file containing a binary OER message to be decoded.

Parameters

<i>filePath</i>	Complete file path and name of file to read.
-----------------	--

6.1.3 Member Function Documentation

6.1.3.1 isA()

```
virtual OSBOOL ASN1OERDecodeBuffer::isA (
    Type bufferType ) [inline], [virtual]
```

This method checks the type of the message buffer.

Parameters

<i>bufferType</i>	Enumerated identifier specifying a derived class. The only possible value for this class is OERDecode.
-------------------	--

Returns

Boolean result of the match operation. True if this is the class corresponding to the identifier argument.

6.1.3.2 peekByte()

```
EXTOERMETHOD int ASN1OERDecodeBuffer::peekByte (
    OSOCKET & ub )
```

This method is used to peek at the next available byte in the decode buffer/stream without advancing the cursor.

Parameters

<i>ub</i>	Single byte buffer to receive peeked byte.
-----------	--

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.1.3.3 readBinaryFile()

```
EXTOERMETHOD int ASN1OERDecodeBuffer::readBinaryFile (
    const char * filePath )
```

This method reads the file into the buffer to decode.

Parameters

<i>filePath</i>	The zero-terminated string containing the path to the file.
-----------------	---

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.1.3.4 readBytes()

```
EXTOERMETHOD int ASN1OERDecodeBuffer::readBytes (
    OSOCKET * buffer,
```

```

size_t bufsize,
size_t nbytes )

```

This method is used to read the given number of bytes from the underlying buffer/stream into the given buffer.

Parameters

<i>buffer</i>	Buffer into which data should be read.
<i>bufsize</i>	Size of the buffer
<i>nbytes</i>	Number of bytes to read. Must be <= bufsize.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

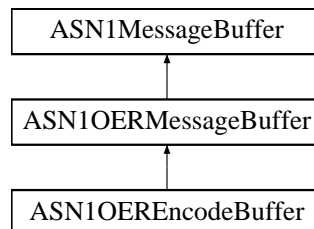
The documentation for this class was generated from the following file:

- [asn1OerCppTypes.h](#)

6.2 ASN1OEREncodeBuffer Class Reference

```
#include <asn1OerCppTypes.h>
```

Inheritance diagram for ASN1OEREncodeBuffer:



Public Member Functions

- [ASN1OEREncodeBuffer](#) ()
- [ASN1OEREncodeBuffer](#) (OSOCKET *pMsgBuf, size_t msgBufLen)
- [ASN1OEREncodeBuffer](#) (OSOCKET *pMsgBuf, size_t msgBufLen, OSRTContext *pContext)
- EXTOERMETHOD [ASN1OEREncodeBuffer](#) (OSRTOutputStream &ostream)
- int [encodeBit](#) (OSBOOL value)
- int [encodeBits](#) (const OSOCKET *pvalue, size_t nbits, OSUINT32 bitOffset=0)
- virtual EXTOERMETHOD OSOCKET * [getMsgCopy](#) ()
- virtual EXTOERMETHOD const OSOCKET * [getMsgPtr](#) ()
- EXTOERMETHOD int [init](#) ()
- virtual OSBOOL [isA](#) (Type bufferType)
- EXTOERMETHOD int [writeBytes](#) (const OSOCKET *buffer, size_t nbytes)

Additional Inherited Members

6.2.1 Detailed Description

The [ASN1OEREncodeBuffer](#) class is derived from the [ASN1OERMessageBuffer](#) base class. It contains variables and methods specific to encoding ASN.1 messages. It is used to manage the buffer into which an ASN.1 OER message is to be encoded.

6.2.2 Constructor & Destructor Documentation

6.2.2.1 [ASN1OEREncodeBuffer\(\)](#) [1/4]

```
ASN1OEREncodeBuffer::ASN1OEREncodeBuffer ( ) [inline]
```

This version of the [ASN1OEREncodeBuffer](#) constructor creates a dynamic memory buffer into which an OER message is encoded.

6.2.2.2 [ASN1OEREncodeBuffer\(\)](#) [2/4]

```
ASN1OEREncodeBuffer::ASN1OEREncodeBuffer (
    OSOCTET * pMsgBuf,
    size_t msgBufLen ) [inline]
```

This version of the [ASN1OEREncodeBuffer](#) constructor takes a message buffer and size argument (static encoding version).

Parameters

<i>pMsgBuf</i>	A pointer to a fixed-size message buffer to receive the encoded message.
<i>msgBufLen</i>	Size of the fixed-size message buffer.

6.2.2.3 [ASN1OEREncodeBuffer\(\)](#) [3/4]

```
ASN1OEREncodeBuffer::ASN1OEREncodeBuffer (
    OSOCTET * pMsgBuf,
    size_t msgBufLen,
    OSRTContext * pContext ) [inline]
```

This version of the [ASN1OEREncodeBuffer](#) constructor takes a message buffer and size argument (static encoding version) as well as a pointer to an existing context object.

Parameters

<i>pMsgBuf</i>	A pointer to a fixed-size message buffer to receive the encoded message.
<i>msgBufLen</i>	Size of the fixed-size message buffer.
<i>pContext</i>	A pointer to an OSRTContext structure created by the user.

6.2.2.4 ASN1OEREncodeBuffer() [4/4]

```
EXTOERMETHOD ASN1OEREncodeBuffer::ASN1OEREncodeBuffer (  
    OSRTOutputStream & ostream )
```

This version of the [ASN1OEREncodeBuffer](#) constructor takes a reference to an output stream object (stream encoding version).

Parameters

<i>ostream</i>	A reference to an output stream object.
----------------	---

6.2.3 Member Function Documentation

6.2.3.1 encodeBit()

```
int ASN1OEREncodeBuffer::encodeBit (  
    OSBOOL value ) [inline]
```

This method writes a single encoded bit value to the output buffer or stream.

Parameters

<i>value</i>	Boolean value of bit to be written.
--------------	-------------------------------------

Returns

Status of operation: 0 = success, negative value if error occurred.

6.2.3.2 encodeBits()

```
int ASN1OEREncodeBuffer::encodeBits (
    const OSOCTET * pvalue,
    size_t nbits,
    OSUINT32 bitOffset = 0 ) [inline]
```

This method writes the given number of bits from the byte array to the output buffer or stream starting from the given bit offset.

Parameters

<i>pvalue</i>	Pointer to byte array containing data to be encoded.
<i>nbits</i>	Number of bits to copy from byte array to encode buffer.
<i>bitOffset</i>	Starting bit offset from which bits are to be copied.

Returns

Status of operation: 0 = success, negative value if error occurred.

6.2.3.3 getMsgCopy()

```
virtual EXTOERMETHOD OSOCTET* ASN1OEREncodeBuffer::getMsgCopy ( ) [virtual]
```

This method returns a copy of the current encoded message. Memory is allocated for the message using the 'new' operation. It is the user's responsibility to free the memory using 'delete'.

Returns

Pointer to copy of encoded message. It is the user's responsibility to release the memory using the 'delete' operator (i.e., delete [] ptr;)

6.2.3.4 getMsgPtr()

```
virtual EXTOERMETHOD const OSOCTET* ASN1OEREncodeBuffer::getMsgPtr ( ) [virtual]
```

This method returns the internal pointer to the current encoded message.

Returns

Pointer to encoded message.

6.2.3.5 init()

```
EXTOERMETHOD int ASN1OEREncodeBuffer::init ( )
```

This method reinitializes the encode buffer pointer to allow a new message to be encoded. This makes it possible to reuse one message buffer object in a loop to encode multiple messages. After this method is called, any previously encoded message in the buffer will be overwritten on the next encode call.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.2.3.6 isA()

```
virtual OSBOOL ASN1OEREncodeBuffer::isA (
    Type bufferType ) [inline], [virtual]
```

This method checks the type of the message buffer.

Parameters

<i>bufferType</i>	Enumerated identifier specifying a derived class. The only possible value for this class is OEREncode.
-------------------	--

Returns

Boolean result of the match operation. True if this is the class corresponding to the identifier argument.

6.2.3.7 writeBytes()

```
EXTOERMETHOD int ASN1OEREncodeBuffer::writeBytes (
    const OSOCTET * buffer,
    size_t nbytes )
```

This method is used to write the given number of bytes from the given buffer to the encode buffer or stream.

Parameters

<i>buffer</i>	Buffer from which data should be read.
<i>nbytes</i>	Number of bytes to write.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

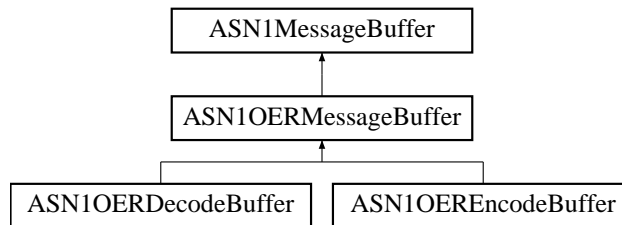
The documentation for this class was generated from the following file:

- [asn1OerCppTypes.h](#)

6.3 ASN1OERMessageBuffer Class Reference

```
#include <asn1OerCppTypes.h>
```

Inheritance diagram for ASN1OERMessageBuffer:



Public Member Functions

- void [binDump](#) (const char *)
- void [hexDump](#) ()
- virtual size_t [getMsgLen](#) ()
- EXTOERMETHOD int [setBuffer](#) (const OSOCTET *pMsgBuf, size_t msgBufLen)
- void [setTrace](#) (OSBOOL)

Protected Member Functions

- EXTOERMETHOD [ASN1OERMessageBuffer](#) (Type bufferType)
- EXTOERMETHOD [ASN1OERMessageBuffer](#) (OSRTStream &stream)
- EXTOERMETHOD [ASN1OERMessageBuffer](#) (Type bufferType, OSOCTET *pMsgBuf, size_t msgBufLen)
- EXTOERMETHOD [ASN1OERMessageBuffer](#) (Type bufferType, OSOCTET *pMsgBuf, size_t msgBufLen, OSRTContext *pContext)

6.3.1 Detailed Description

The [ASN1OERMessageBuffer](#) class is derived from the [ASN1MessageBuffer](#) base class. It is the base class for the [ASN1OEREncodeBuffer](#) and [ASN1OERDecodeBuffer](#) derived classes. It contains variables and methods specific to encoding or decoding ASN.1 messages using the Octet Encoding Rules (OER). It is used to manage the buffer into which an ASN.1 message is to be encoded or decoded.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 ASN1OERMessageBuffer() [1/4]

```
EXTOERMETHOD ASN1OERMessageBuffer::ASN1OERMessageBuffer (
    Type bufferType ) [protected]
```

This constructor does not set a OER input source. It is used by the derived encode buffer classes. Use the getStatus() method to determine if an error has occurred during initialization.

Parameters

<i>bufferType</i>	Type of message buffer that is being created (for example, OEREncode or OERDecode).
-------------------	---

6.3.2.2 ASN1OERMessageBuffer() [2/4]

```
EXTOERMETHOD ASN1OERMessageBuffer::ASN1OERMessageBuffer (
    OSRStream & stream ) [protected]
```

This constructor associates a stream with a OER encode or decode buffer. It is used by the derived encode buffer classes to create a stream-based OER encoder or decoder.

Parameters

<i>stream</i>	Stream class reference.
---------------	-------------------------

6.3.2.3 ASN1OERMessageBuffer() [3/4]

```
EXTOERMETHOD ASN1OERMessageBuffer::ASN1OERMessageBuffer (
    Type bufferType,
    OSOCTET * pMsgBuf,
    size_t msgBufLen ) [protected]
```

This constructor allows a memory buffer holding a binary OER message to be specified. Use the getStatus() method to determine if an error has occurred during initialization.

Parameters

<i>bufferType</i>	Type of message buffer that is being created (for example, OEREncode or OERDecode).
<i>pMsgBuf</i>	A pointer to a fixed size message buffer to receive the encoded message.
<i>msgBufLen</i>	Size of the fixed-size message buffer. 67

6.3.2.4 ASN1OERMessageBuffer() [4/4]

```
EXTOERMETHOD ASN1OERMessageBuffer::ASN1OERMessageBuffer (
    Type bufferType,
    OSOCTET * pMsgBuf,
    size_t msgBufLen,
    OSRTContext * pContext ) [protected]
```

This constructor allows a memory buffer holding a binary OER message to be specified. It also allows a pre-existing context to be associated with this buffer. Use the `getStatus()` method to determine if an error has occurred during initialization.

Parameters

<i>bufferType</i>	Type of message buffer that is being created (for example, OEREncode or OERDecode).
<i>pMsgBuf</i>	A pointer to a fixed size message buffer to receive the encoded message.
<i>msgBufLen</i>	Size of the fixed-size message buffer.
<i>pContext</i>	A pointer to an OSRTContext structure.

6.3.3 Member Function Documentation

6.3.3.1 binDump()

```
void ASN1OERMessageBuffer::binDump (
    const char * ) [inline]
```

Binary dump not supported for OER. Method is needed as a placeholder for client/server code generation.

6.3.3.2 getMsgLen()

```
virtual size_t ASN1OERMessageBuffer::getMsgLen ( ) [inline], [virtual]
```

This method returns the length of a previously encoded PER message.

Parameters

-	none
---	------

6.3.3.3 hexDump()

```
void ASN1OERMessageBuffer::hexDump ( ) [inline]
```

This method outputs a hexadecimal dump of the current buffer contents to stdout.

Parameters

-	none
---	------

6.3.3.4 setBuffer()

```
EXTOERMETHOD int ASN1OERMessageBuffer::setBuffer (
    const OSOCTET * pMsgBuf,
    size_t msgBufLen )
```

This method sets a buffer to receive the encoded message.

Parameters

<i>pMsgBuf</i>	A pointer to a memory buffer to use to encode a message. The buffer should be declared as an array of unsigned characters (OSOCTETs). This parameter can be set to NULL to specify dynamic encoding (i.e., the encode functions will dynamically allocate a buffer for the message).
<i>msgBufLen</i>	The length of the memory buffer in bytes. If pMsgBuf is NULL, this parameter specifies the initial size of the dynamic buffer; if 0 - the default size will be used.

Returns

Completion status of operation:

- 0 (0) = success,
- negative return value is error.

6.3.3.5 setTrace()

```
void ASN1OERMessageBuffer::setTrace (
    OSBOOL ) [inline]
```

Set bit trace not supported for OER. Method is needed as a placeholder for client/server code generation.

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

- [asn1OerCppTypes.h](#)

Chapter 7

File Documentation

7.1 asn1oer.h File Reference

```
#include "rtsrc/asn1type.h"  
#include "rtsrc/asn1CharSet.h"  
#include "rtxsrc/rtxBuffer.h"
```

Macros

- #define **EXTOERMETHOD**
- #define **EXTERNOER**
- #define **EXTOERCLASS**
- #define **oerDecInt8**(pctxt, pvalue) rtxReadBytes(pctxt,pvalue,1)
- #define **oerDecUInt8**(pctxt, pvalue) rtxReadBytes(pctxt,pvalue,1)
- #define **oerDecUnrestInt** **oerDecUnrestInt32**
- #define **oerDecUnrestUInt** **oerDecUnrestUInt32**

Functions

- int **oerDecBitStr** (OSCTXT *pctxt, OSOCTET *pvalue, size_t bufsiz, OSUINT32 *pnbits)
- int **oerDecBitStrExt** (OSCTXT *pctxt, OSOCTET *pvalue, size_t bufsiz, OSUINT32 *pnbits, OSOCTET **extdata)
- int **oerDecBMPStr** (OSCTXT *pctxt, ASN1BMPString *pvalue)
- int **oerDecChoiceExt** (OSCTXT *pctxt, ASN1TAG tag, OSOCTET **ppvalue, OSSIZE *pnocets)
- int **oerDecUnivStr** (OSCTXT *pctxt, ASN1UniversalString *pvalue)
- int **oerDecDynBitStr** (OSCTXT *pctxt, const OSOCTET **ppvalue, OSUINT32 *pnbits)
- int **oerDecCharStr** (OSCTXT *pctxt, char *pvalue, OSSIZE sz)
- int **oerDecDynCharStr** (OSCTXT *pctxt, char **ppvalue)
- int **oerDecDynOctStr** (OSCTXT *pctxt, OSOCTET **ppvalue, OSUINT32 *pnocets, size_t len)
- int **oerDecDynOctStr64** (OSCTXT *pctxt, OSOCTET **ppvalue, OSSIZE *pnocets, size_t len)
- int **oerDecInt16** (OSCTXT *pctxt, OSINT16 *pvalue)

- int `oerDecInt32` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecInt64` (OSCTXT *pctx, OSINT64 *pvalue)
- int `oerDecUnrestInt64` (OSCTXT *pctx, OSINT64 *pvalue)
- int `oerDecLen` (OSCTXT *pctx, OSSIZE *plength)
- int `oerDecLen32` (OSCTXT *pctx, OSUINT32 *plength)
- int `oerDecObjId` (OSCTXT *pctx, ASN1OBJID *pvalue)
- int `oerDecRelObjId` (OSCTXT *pctx, ASN1OBJID *pvalue)
- int `oerDecReal` (OSCTXT *pctx, OSREAL *value)
- int `oerDecReal2` (OSCTXT *pctx, OSREAL *value)
- int `oerDecReal10` (OSCTXT *pctx, OSREAL *value)
- int `oerDecRealNTCIP` (OSCTXT *pctx, OSREAL *value)
- int `oerDecFloat` (OSCTXT *pctx, OSREAL *value)
- int `oerDecDouble` (OSCTXT *pctx, OSREAL *value)
- int `oerDecSignedEnum` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecTag` (OSCTXT *pctx, ASN1TAG *ptag)
- int `oerDecUInt16` (OSCTXT *pctx, OSUINT16 *pvalue)
- int `oerDecUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestSignedUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestUInt64` (OSCTXT *pctx, OSUINT64 *pvalue)
- int `oerDecUnrestInt32` (OSCTXT *pctx, OSINT32 *pvalue)
- int `oerDecUnrestSignedUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecUnrestUInt8` (OSCTXT *pctx, OSUINT8 *pvalue)
- int `oerDecUnrestUInt16` (OSCTXT *pctx, OSUINT16 *pvalue)
- int `oerDecUnrestUInt32` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecBigInt` (OSCTXT *pctx, const char **ppvalue, int radix)
- int `oerDecBigUInt` (OSCTXT *pctx, const char **ppvalue, int radix)
- int `oerDecUnrestSize` (OSCTXT *pctx, OSSIZE *pvalue)
- int `oerDecUnsignedEnum` (OSCTXT *pctx, OSUINT32 *pvalue)
- int `oerDecDateStr` (OSCTXT *pctx, char **ppString, OSUINT32 flags)
- int `oerDecDateTimeStr` (OSCTXT *pctx, char **ppString, OSUINT32 flags)
- int `oerDecDurationStr` (OSCTXT *pctx, char **ppString)
- int `oerDecTimeDiffStr` (OSCTXT *pctx, char *pString)
- int `oerDecTimeOfDayStr` (OSCTXT *pctx, char **ppString, OSUINT32 flags)
- int `oerEncBigInt` (OSCTXT *pctx, const char *pvalue, int radix)
- int `oerEncBigIntValue` (OSCTXT *pctx, struct OSBigInt *pvalue)
- int `oerEncBitStr` (OSCTXT *pctx, const OSOCTET *pvalue, size_t numbits)
- int `oerEncBitStrExt` (OSCTXT *pctx, const OSOCTET *pvalue, size_t numbits, const OSOCTET *extdata, size_t dataSize)
- int `oerEncBMPStr` (OSCTXT *pctx, ASN1BMPString *pvalue)
- int `oerEncUnivStr` (OSCTXT *pctx, ASN1UniversalString *pvalue)
- int `oerEncExtElem` (OSCTXT *pctx, OSRTBuffer *pbuffer)
- int `oerEncInt` (OSCTXT *pctx, OSINT64 value, size_t size)
- int `oerEncUnrestInt64` (OSCTXT *pctx, OSINT64 value)
- int `oerEncUnrestSignedUInt64` (OSCTXT *pctx, OSUINT64 value)
- int `oerEncLen` (OSCTXT *pctx, size_t length)
- int `oerEncObjId` (OSCTXT *pctx, const ASN1OBJID *pvalue)
- int `oerEncRelObjId` (OSCTXT *pctx, const ASN1OBJID *pvalue)
- int `oerEncObjId64` (OSCTXT *pctx, const ASN1OID64 *pvalue)
- int `oerEncOpenExt` (OSCTXT *pctx, OSRTDList *pElemList)
- int `oerEncRelOID64` (OSCTXT *pctx, const ASN1OID64 *pvalue)

- int [oerEncReal](#) (OSCTXT *pctxt, OSREAL value)
- int [oerEncReal10](#) (OSCTXT *pctxt, const char *object_p)
- int [oerEncRealNTCIP](#) (OSCTXT *pctxt, OSREAL value)
- int [oerEncFloat](#) (OSCTXT *pctxt, OSREAL value)
- int [oerEncDouble](#) (OSCTXT *pctxt, OSREAL value)
- int [oerEncSignedEnum](#) (OSCTXT *pctxt, OSINT32 value)
- int [oerEncTag](#) (OSCTXT *pctxt, ASN1TAG tag)
- int [oerEncUInt](#) (OSCTXT *pctxt, OSUINT64 value, size_t size)
- int [oerEncUnrestUInt64](#) (OSCTXT *pctxt, OSUINT64 value)
- int [oerEncUnrestInt32](#) (OSCTXT *pctxt, OSINT32 value)
- int [oerEncUnrestSignedUInt32](#) (OSCTXT *pctxt, OSUINT32 value)
- int [oerEncUnrestUInt32](#) (OSCTXT *pctxt, OSUINT32 value)
- int [oerEncUnrestSize](#) (OSCTXT *pctxt, OSSIZE value)
- int [oerEncUnsignedEnum](#) (OSCTXT *pctxt, OSUINT32 value)
- int [oerEncDateStr](#) (OSCTXT *pctxt, const char *pString, OSUINT32 flags)
- int [oerEncDateTimeStr](#) (OSCTXT *pctxt, const char *pString, OSUINT32 flags)
- int [oerEncDurationStr](#) (OSCTXT *pctxt, const char *pString)
- int [oerEncTimeDiffStr](#) (OSCTXT *pctxt, const char *pString)
- int [oerEncTimeOfDayStr](#) (OSCTXT *pctxt, const char *pString, OSUINT32 flags)
- int [oerDecDate](#) (OSCTXT *pctxt, char *pString, OSUINT32 flags)
- int [oerDecTimeOfDay](#) (OSCTXT *pctxt, char *pString, OSUINT32 flags)
- int [oerEncIdent](#) (OSCTXT *pctxt, OSUINT64 ident)
- OSSIZE [oerLenLength](#) (size_t length)
- OSSIZE [oerTagLength](#) (ASN1TAG tag)
- int [oerWriteIdent](#) (OSUINT64 ident, OSOCTET *buffer, OSSIZE bufsize)
- int [oerWriteLen](#) (size_t length, OSOCTET *buffer, OSSIZE bufsize)
- int [oerWriteTag](#) (ASN1TAG tag, OSOCTET *buffer, OSSIZE bufsize)

7.1.1 Detailed Description

ASN.1 runtime constants, data structure definitions, and functions to support the Octet Encoding Rules (OER) as defined in the National Transportation Communications for ITS Protocol (NTCIP) 1102 standard.

7.2 asn1OerCppTypes.h File Reference

```
#include "rtoersrc/asnloer.h"
#include "rtsrc/asn1CppTypes.h"
#include "rtxsrc/rtxBitEncode.h"
#include "rtxsrc/rtxHexDump.h"
```

Classes

- class [ASN1OERMessageBuffer](#)
- class [ASN1OEREncodeBuffer](#)
- class [ASN1OERDecodeBuffer](#)

7.2.1 Detailed Description

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