

Beamlib

3.3.2

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Chapter 1

Beamlib

Author

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Version

3.0.0

Date

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1.1 Introduction

The Beamlib C++ class library provides a system portable base library for developing real-time and other applications with multi-processor and multi-host support. It was initially started in the late 1980's to add Smalltalk like constructions/components to the emerging C++ language for use within Beam for real-time data processing and embedded system uses. Over the years it has been extended as needed to support wildly differing projects.

The Beamlib system has the following features:

- Simple Object Orientated development.
- Simple class library for Strings, Lists, Arrays, Dictionaries, Network access etc.
- Support for multi-threaded applications with Mutex Objects etc.
- Usable from C++ and Python with wrapper.
- IDL based object creation tool allows easy creation of C++ and Python objects from IDL language with RPC access across networks.
- IDL provides the ability to create SQL database schema automatically.
- Database access that allows Objects to be stored.
- BOAP (Beam Object Access Protocol) provides a simple, low overhead protocol, that allows access to remote objects using an RPC mechanism.

- Database access via a layer that allows simultaneous access to different database systems including MYSQL and BEAM BDEV native object database.
- Simple HTTP/HTML WEB service support for application embedding.

The Beamlib class library can be installed from the following RPM packages:

- beamlib-lib: Runtime shared libraries.
- beamlib-utils: Runtime tools.
- beamlib-devel: Development include files and shared and static libraries.
- beamlib-doc: Documentation.

1.2 Components

The Beamlib system is split into the following libraries:

- Base: This is the base class library containing the base 'C++' classes.
- Http: This provides HTTP/HTML classes
- Widgets: This provides Qt widgets to be used on top of the standard Qt widgets.
- Gui1: This provides a simple GUI library for embedded systems.

The Beamlib system uses a few utility programs:

- bidl: This provides an IDL description file to C++ class generator.HTTP/HTML classes
- boapns: This provides a BOAP name server providing a name top object mapping system
- boapnsc: This provides a BOAP name server client for testing

For an overview and usage details please see the [BeamlibApiManual](#).

1.3 and License

Beam Ltd holds the copyright of the Beamlib library. We provide it under the GNU GPLv3 General Public License version 3.0 open source licence for use by others, see LICENSE_GPLv3.txt. For projects Beam Ltd is involved in with our clients and for commercial use the software is available under other licenses including the LGPL license. Contact Beam Ltd for details.

1.4 API Examples

1.5 Examples

Some simple client examples are listed below:

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Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

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------------------------	-------	----

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Hierarchical Index

3.1 Class Hierarchy

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BErrorTime	96
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BFifo< Type >	108
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BFirmwareFileHeader	132

BFirmwareInfo	134
BFirmwareSegHeader	136
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BQueue< T >	235
BList< BArray< BString > >	139
BList< BDictItem< Type > >	139
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BArray< BString >	19
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BArray< T >	19

Chapter 4

Class Index

4.1 Class List

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

BArray< T >	Template based Array class	19
BAtomic< Type >	BAtomic class increments/decrements different integer types	22
BAtomicCount	BAtomicCount class	24
BBuffer	Create and manipulate a variable sized byte data buffer	26
BBufferStore	Create and manipulate a variable sized byte data buffer. Has functions to store and retrieve basic and extended types/classes in the binary buffer	29
BComms	A base class for communications classes having a generic API	36
BCond	Thread safe conditional variable	42
BCondBool	Thread conditional boolean	43
BCondInt	Thread conditional value	45
BCondResource	Resource lock	48
BCondValue	Thread conditional value	50
BCondWrap	Thread conditional unsigned 32 bit integer value that can wrap around	53
BConfig	This class implements the configuration file access	57
BDataChunk	A chunk of data allowing writes of multiple chunks of segmented data	58
BDate	This class store a UTC calendar date as a year and a year's day	60
BDebugBacktrace	Backtrace on crash class	66
BDict< Type >	Dictionary list class using templates	68

BDictItem< Type >	Template based Dictionary classes item	72
BDictMap< Value >	Mapped Dictionary class	74
BDir	File system directory class	77
BDuration	Stores and manipulates a time to the nearest microsecond and a maximum of 24 hours	80
BEntry	Manipulate a name value pair	83
BEntryFile	A file based list of string name/value pairs	86
BEntryList	List of Entries. Where each entry is a name value pair	89
BError	Error return class. This class is used to return the error status from a function. It encapsulates an integer error number and a string	92
BErrorTime	Error return class with time field	96
BEvent	An event description class	98
BEvent1	This class provides a base class for all event objects that can be sent over the events interface	99
BEvent1Error	This class provides a class to send a BError event	101
BEvent1Int	This class provides an interface for sending simple integer events via a file descriptor. This allows threads to send events that can be picked up by the poll system call	102
BEvent1Pipe	This class provides a base interface for sending events via a pipe. This allows threads to send events that can be picked up by the poll system call	104
BEventPipe	This class provides an interface for sending simple integer events via a pipe file descriptor	106
BFifo< Type >	A template first in first out data buffer to store any object types	108
BFifoCirc< Type >	This class implements a thread safe FIFO buffer using a binary sized circular memory	115
BFifoCircPos	This class implements a pointer into the Fifo's circular buffer	121
BFile	File operations class	123
BFileCsv	A class to read and write CSV formatted files	129
BFileData	A class to implement a data storage file	131
BFirmwareFileHeader	132
BFirmwareInfo	134
BFirmwareSegHeader	136
BIter	Iterator for BLists	138
BList< T >	Template based list class	139
BList< T >::Node	A BList internal Node	151
BMutex	Mutex class. Note these are recursive Mutexes and so you need to make sure the number of unlocks equals the number of locks	152

BMutexLock	Mutex class that removes the lock on deletion and so is useful to lock data in a function call . .	154
BMySQL	A class to provide access to a MySQL database	155
BNameValue< T >	A simple, templated, name/value pair	158
BNameValueList< T >	A simple, templated, name/value pair list	159
BNode	A BList entry's node	160
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Boapns::Boapns		196
BoapPacket	Boap packet	198
BoapPacketHead	Boap packet header	205
BoapServer	Boap server	207
BoapServerConnection	Boap server connection	215
BoapServiceEntry	Boap server single service entry	217
BoapServiceObject	Boap service object	218
BoapSignalObject	A Boap object to send signals using an RPC mechanism	223
BObj	A generic object base class that has runtime definable data feilds	225
BObjMember	A structure to define a member of a generic BObj	227
BPoll	This class provides an interface for polling a number of file descriptors. It uses round robin polling	229
BProc	Implements system process manager	231
BQueue< T >	Provides a thread save queue of objects that can be used to communicate between threads . .	235
BRefData	A pointer to a variable sized data area with reference counting so the data areas can be shared	237
BRtc	Realtime clock for access to the systems real time battery backed up time hardware	239
BRtcThreaded	A thread safe class to access to the systems real time battery backed up time hardware	241
BRWLock	Thread read-write lock	242

BSema	Sempahore class	244
BSemaphore	Base Semaphore class	247
BSemaphoreBool	Boolean semaphore	248
BSemaphoreCount	Integer counting semaphore	251
BSocket	A network communications socket	253
BSocketAddress	Socket Address	260
BSocketAddressINET	IPv4 aware socket address	263
BSpi	BSpi class for accessing SPI hardware devices	266
BString	This class stores and manipulates ASCII strings	267
BStringLocked	Provides a basic thread locked string	287
BStringMutex	Thread locked string internal mutex	289
BTable	A simple string based table structure	290
BTask	Implements a thread of execution	291
BThread	Implements a program execution thread	295
BTime	Implements a simple date/time class. Stores the date/time as a number of seconds since Unix epoch 1970-01-02T00:00:00	297
BTimer	Stopwatch style timer	303
BTimeStamp	A date and time storage class with microsecond resolution	305
BTimeStampMs	A date and time storage class with millisecond resolution and an extra field to indicate a particular sampleNumber it reffers to	316
BTimeUs	Time storage as an unsigned 64bit value to TAI standard	324
BUrl	Access to a Url	330

Chapter 5

File Index

5.1 File List

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Chapter 6

Namespace Documentation

6.1 Boapns Namespace Reference

Classes

- class [BoapEntry](#)
- class [Boapns](#)

Variables

- const [BUInt32](#) [apiVersion](#) = 0

6.1.1 Variable Documentation

6.1.1.1 apiVersion

```
const BUInt32 Boapns::apiVersion = 0
```


Chapter 7

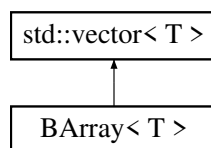
Class Documentation

7.1 BArray< T > Class Template Reference

Template based Array class.

```
#include <BArray.h>
```

Inheritance diagram for BArray< T >:



Public Types

- typedef int(* [SortFunc](#)) (T &a, T &b)
Prototype for sorting function.

Public Member Functions

- [BArray](#) ()
- [BArray](#) (BSize size, T value=T())
- [BArray](#) (const [BArray](#) &array)
- [BUInt](#) number () const
- void [append](#) (const T &value)
- void [append](#) (const [BArray](#)< T > &array)
- void [insert](#) (BUInt pos, const T &value)
- void [del](#) (BUInt pos, BUInt num=1)
- T & [rear](#) ()
- void [sort](#) ()

7.1.1 Detailed Description

```
template<class T>
class BArray< T >
```

Template based Array class.

The [BArray](#) class is a simple contiguous in memory list of objects. It is used to store an ordered list of any type/class of objects. It is based on the Standard C++ library vector class and has all of the functionality of that class.

7.1.2 Member Typedef Documentation

7.1.2.1 SortFunc

```
template<class T >
typedef int (* BArray< T >::SortFunc) (T &a, T &b)
```

Prototype for sorting function.

7.1.3 Constructor & Destructor Documentation

7.1.3.1 BArray() [1/3]

```
template<class T >
BArray< T >::BArray ( ) [inline]
```

7.1.3.2 BArray() [2/3]

```
template<class T >
BArray< T >::BArray (
    BSize size,
    T value = T() ) [inline]
```

7.1.3.3 BArray() [3/3]

```
template<class T >
BArray< T >::BArray (
    const BArray< T > & array ) [inline]
```


7.1.4 Member Function Documentation

7.1.4.1 number()

```
template<class T >
BUInt BArray< T >::number ( ) const [inline]
```

7.1.4.2 append() [1/2]

```
template<class T >
void BArray< T >::append (
    const T & value ) [inline]
```

7.1.4.3 append() [2/2]

```
template<class T >
void BArray< T >::append (
    const BArray< T > & array )
```

7.1.4.4 insert()

```
template<class T >
void BArray< T >::insert (
    BUInt pos,
    const T & value ) [inline]
```

7.1.4.5 del()

```
template<class T >
void BArray< T >::del (
    BUInt pos,
    BUInt num = 1 ) [inline]
```

7.1.4.6 rear()

```
template<class T >
T & BArray< T >::rear ( ) [inline]
```

7.1.4.7 sort()

```
template<class T >
void BArray< T >::sort ( ) [inline]
```

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

- [BArray.h](#)

7.2 BAtomic< Type > Class Template Reference

[BAtomic](#) class increments/decrements different integer types.

```
#include <BAtomic.h>
```

Public Member Functions

- [BAtomic](#) (Type value=0)
- Type [getValue](#) () const
- Type [add](#) (long value)
- Type [operator++](#) (int)
- Type [operator++](#) ()
- Type [operator--](#) (int)
- Type [operator--](#) ()
- [operator Type](#) () const

7.2.1 Detailed Description

```
template<class Type>
class BAtomic< Type >
```

[BAtomic](#) class increments/decrements different integer types.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 BAtomic()

```
template<class Type >
BAtomic< Type >::BAtomic (
    Type value = 0 ) [inline]
```

7.2.3 Member Function Documentation

7.2.3.1 getValue()

```
template<class Type >
Type BAtomic< Type >::getValue ( ) const [inline]
```

7.2.3.2 add()

```
template<class Type >
Type BAtomic< Type >::add (
    long value ) [inline]
```

7.2.3.3 operator++() [1/2]

```
template<class Type >
Type BAtomic< Type >::operator++ (
    int ) [inline]
```

7.2.3.4 operator++() [2/2]

```
template<class Type >
Type BAtomic< Type >::operator++ ( ) [inline]
```

7.2.3.5 operator--() [1/2]

```
template<class Type >
Type BAtomic< Type >::operator-- (
    int ) [inline]
```

7.2.3.6 operator--() [2/2]

```
template<class Type >
Type BAtomic< Type >::operator-- ( ) [inline]
```

7.2.3.7 operator Type()

```
template<class Type >
BAtomic< Type >::operator Type ( ) const [inline]
```

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

- [BAtomic.h](#)

7.3 BAtomicCount Class Reference

[BAtomicCount](#) class.

```
#include <BAtomicCount.h>
```

Public Member Functions

- [BAtomicCount](#) (long value=0)
- long [getValue](#) () const
- long [add](#) (long value)
- long [operator++](#) (int)
- long [operator++](#) ()
- long [operator--](#) (int)
- long [operator--](#) ()
- [operator long](#) () const

7.3.1 Detailed Description

[BAtomicCount](#) class.

7.3.2 Constructor & Destructor Documentation

7.3.2.1 BAtomicCount()

```
BAtomicCount::BAtomicCount (
    long value = 0 ) [inline]
```

7.3.3 Member Function Documentation

7.3.3.1 getValue()

```
long BAtomicCount::getValue ( ) const [inline]
```

7.3.3.2 add()

```
long BAtomicCount::add (
    long value ) [inline]
```

7.3.3.3 operator++() [1/2]

```
long BAtomicCount::operator++ (
    int ) [inline]
```

7.3.3.4 operator++() [2/2]

```
long BAtomicCount::operator++ ( ) [inline]
```

7.3.3.5 operator--() [1/2]

```
long BAtomicCount::operator-- (
    int ) [inline]
```

7.3.3.6 operator--() [2/2]

```
long BAtomicCount::operator-- ( ) [inline]
```

7.3.3.7 operator long()

```
BAtomicCount::operator long ( ) const [inline]
```

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

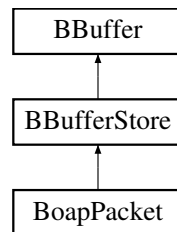
- [BAtomicCount.h](#)

7.4 BBuffer Class Reference

Create and manipulate a variable sized byte data buffer.

```
#include <BBuffer.h>
```

Inheritance diagram for BBuffer:



Public Member Functions

- [BBuffer](#) ([BUInt](#) size=0)
- [~BBuffer](#) ()
- [int setSize](#) ([BUInt32](#) size)
Sets the bufer size.
- [int setData](#) (const void *[data](#), [BUInt32](#) size)
Sets buffer data resized to contain the data.
- [int writeData](#) ([BUInt32](#) pos, const void *[data](#), [BUInt32](#) size)
Writes data into buffer from offset pos.
- [char * data](#) ()
The data.
- [BUInt32 size](#) ()
Size of the buffer in bytes.
- [int resize](#) ([BUInt32](#) size)
Alternative to [setSize\(\)](#)

Protected Attributes

- [BUInt32 odataSize](#)
- [char * odata](#)
- [BUInt32 osize](#)

7.4.1 Detailed Description

Create and manipulate a variable sized byte data buffer.

7.4.2 Constructor & Destructor Documentation

7.4.2.1 BBuffer()

```
BBuffer::BBuffer (
    BUInt size = 0 )
```

7.4.2.2 ~BBuffer()

```
BBuffer::~BBuffer ( )
```

7.4.3 Member Function Documentation

7.4.3.1 setSize()

```
int BBuffer::setSize (
    BUInt32 size )
```

Sets the bufer size.

7.4.3.2 setData()

```
int BBuffer::setData (
    const void * data,
    BUInt32 size )
```

Sets buffer data resized to contain the data.

7.4.3.3 writeData()

```
int BBuffer::writeData (
    BUInt32 pos,
    const void * data,
    BUInt32 size )
```

Writes data into buffer from offset pos.

7.4.3.4 data()

```
char * BBuffer::data ( )
```

The data.

7.4.3.5 size()

```
BUInt32 BBuffer::size ( )
```

Size of the buffer in bytes.

7.4.3.6 resize()

```
int BBuffer::resize (
    BUInt32 size ) [inline]
```

Alternative to [setSize\(\)](#)

7.4.4 Member Data Documentation

7.4.4.1 odataSize

```
BUInt32 BBuffer::odataSize [protected]
```

7.4.4.2 odata

```
char* BBuffer::odata [protected]
```


7.4.4.3 osize

```
BUInt32 BBuffer::osize [protected]
```

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

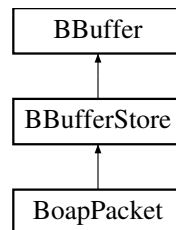
- [BBuffer.h](#)
- [BBuffer.cpp](#)

7.5 BBufferStore Class Reference

Create and manipulate a variable sized byte data buffer. Has functions to store and retrieve basic and extended types/classes in the binary buffer.

```
#include <BBuffer.h>
```

Inheritance diagram for BBufferStore:



Public Member Functions

- [BBufferStore](#) ([BUInt](#) size=0, int swapBytes=[BBigEndian](#))
- [~BBufferStore](#) ()
- [BUInt32](#) [getPos](#) ()
- void [setPos](#) ([BUInt32](#) pos)
- [BString](#) [getHexString](#) ()
- void [setHexString](#) ([BString](#) s)
- int [push](#) ([BInt8](#) v)
- int [push](#) ([BUInt8](#) v)
- int [push](#) ([BInt16](#) v)
- int [push](#) ([BUInt16](#) v)
- int [push](#) ([BInt32](#) v)
- int [push](#) ([BUInt32](#) v)
- int [push](#) ([BInt64](#) v)
- int [push](#) ([BUInt64](#) v)
- int [push](#) ([BFloat32](#) v)
- int [push](#) ([BFloat64](#) v)
- int [push](#) (const [BString](#) &v)
- int [push](#) (const [BError](#) &v)
- int [push](#) (const [BTimeStamp](#) &v)
- int [push](#) (const [BComplex](#) &v)
- int [push](#) ([BUInt32](#) nBytes, const void *data, const char *swapType="1")
- int [pop](#) ([BInt8](#) &v)
- int [pop](#) ([BUInt8](#) &v)

- int [pop](#) (BInt16 &v)
- int [pop](#) (BUInt16 &v)
- int [pop](#) (BInt32 &v)
- int [pop](#) (BUInt32 &v)
- int [pop](#) (BInt64 &v)
- int [pop](#) (BUInt64 &v)
- int [pop](#) (BFloat32 &v)
- int [pop](#) (BFloat64 &v)
- int [pop](#) (BString &v)
- int [pop](#) (BError &v)
- int [pop](#) (BTimeStamp &v)
- int [pop](#) (BComplex &v)
- int [pop](#) (BUInt32 nBytes, void *data, const char *swapType="1")

Protected Attributes

- [BUInt32](#) opos
- int [oswapBytes](#)

7.5.1 Detailed Description

Create and manipulate a variable sized byte data buffer. Has functions to store and retrieve basic and extended types/classes in the binary buffer.

7.5.2 Constructor & Destructor Documentation

7.5.2.1 BBufferStore()

```
BBufferStore::BBufferStore (
    BUInt size = 0,
    int swapBytes = BBigEndian )
```

7.5.2.2 ~BBufferStore()

```
BBufferStore::~~BBufferStore ( )
```

7.5.3 Member Function Documentation

7.5.3.1 getPos()

```
BUInt32 BBufferStore::getPos ( )
```

7.5.3.2 setPos()

```
void BBufferStore::setPos (
    BUInt32 pos )
```

7.5.3.3 getHexString()

```
BString BBufferStore::getHexString ( )
```

7.5.3.4 setHexString()

```
void BBufferStore::setHexString (
    BString s )
```

7.5.3.5 push() [1/15]

```
int BBufferStore::push (
    BInt8 v )
```

7.5.3.6 push() [2/15]

```
int BBufferStore::push (
    BUInt8 v )
```

7.5.3.7 push() [3/15]

```
int BBufferStore::push (
    BInt16 v )
```

7.5.3.8 push() [4/15]

```
int BBufferStore::push (  
    BUInt16 v )
```

7.5.3.9 push() [5/15]

```
int BBufferStore::push (  
    BInt32 v )
```

7.5.3.10 push() [6/15]

```
int BBufferStore::push (  
    BUInt32 v )
```

7.5.3.11 push() [7/15]

```
int BBufferStore::push (  
    BInt64 v )
```

7.5.3.12 push() [8/15]

```
int BBufferStore::push (  
    BUInt64 v )
```

7.5.3.13 push() [9/15]

```
int BBufferStore::push (  
    BFloat32 v )
```

7.5.3.14 push() [10/15]

```
int BBufferStore::push (  
    BFloat64 v )
```

7.5.3.15 push() [11/15]

```
int BBufferStore::push (
    const BString & v )
```

7.5.3.16 push() [12/15]

```
int BBufferStore::push (
    const BError & v )
```

7.5.3.17 push() [13/15]

```
int BBufferStore::push (
    const BTimeStamp & v )
```

7.5.3.18 push() [14/15]

```
int BBufferStore::push (
    const BComplex & v )
```

7.5.3.19 push() [15/15]

```
int BBufferStore::push (
    BUInt32 nBytes,
    const void * data,
    const char * swapType = "1" )
```

7.5.3.20 pop() [1/15]

```
int BBufferStore::pop (
    BInt8 & v )
```

7.5.3.21 pop() [2/15]

```
int BBufferStore::pop (
    BUInt8 & v )
```

7.5.3.22 pop() [3/15]

```
int BBufferStore::pop (
    BInt16 & v )
```

7.5.3.23 pop() [4/15]

```
int BBufferStore::pop (
    BUInt16 & v )
```

7.5.3.24 pop() [5/15]

```
int BBufferStore::pop (
    BInt32 & v )
```

7.5.3.25 pop() [6/15]

```
int BBufferStore::pop (
    BUInt32 & v )
```

7.5.3.26 pop() [7/15]

```
int BBufferStore::pop (
    BInt64 & v )
```

7.5.3.27 pop() [8/15]

```
int BBufferStore::pop (
    BUInt64 & v )
```

7.5.3.28 pop() [9/15]

```
int BBufferStore::pop (
    BFloat32 & v )
```

7.5.3.29 pop() [10/15]

```
int BBufferStore::pop (
    BFloat64 & v )
```

7.5.3.30 pop() [11/15]

```
int BBufferStore::pop (
    BString & v )
```

7.5.3.31 pop() [12/15]

```
int BBufferStore::pop (
    BError & v )
```

7.5.3.32 pop() [13/15]

```
int BBufferStore::pop (
    BTimeStamp & v )
```

7.5.3.33 pop() [14/15]

```
int BBufferStore::pop (
    BComplex & v )
```

7.5.3.34 pop() [15/15]

```
int BBufferStore::pop (
    BUInt32 nBytes,
    void * data,
    const char * swapType = "1" )
```

7.5.4 Member Data Documentation

7.5.4.1 opos

```
BUInt32 BBufferStore::opos [protected]
```

7.5.4.2 oswapBytes

```
int BBufferStore::oswapBytes [protected]
```

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

- [BBuffer.h](#)
- [BBuffer.cpp](#)

7.6 BComms Class Reference

A base class for communications classes having a generic API.

```
#include <BComms.h>
```

Public Types

- enum [Flush](#) { [FlushRead](#) , [FlushWrite](#) , [FlushReadWrite](#) }

Public Member Functions

- [BComms](#) ()
- virtual [~BComms](#) ()
- virtual [BError](#) [init](#) ()
- virtual void [close](#) ()
- virtual const char * [name](#) ()
The name of this interface.
- virtual [BUInt32](#) [byteRate](#) ()
The byte rate of this interface.
- virtual [BError](#) [setPacketMode](#) ([Bool](#) [packetMode](#))
Set packet mode.
- virtual [Bool](#) [packetMode](#) ()
Device is in packet mode.
- virtual [BError](#) [setTimeout](#) ([BTimeout](#) [timeoutUs](#))
Set communication timeout.
- virtual [BError](#) [connect](#) (const char *[resource](#))
Create a connection.
- virtual [Bool](#) [isConnected](#) ()
- virtual [BError](#) [disconnect](#) ()
Disconnect.
- virtual void [flush](#) ([Flush](#) [flush](#))
- virtual [BUInt](#) [writeAvailable](#) ()
- virtual [BError](#) [write](#) (const void *[data](#), [BUInt32](#) [nBytes](#), [BUInt32](#) &[nTrans](#))=0
- virtual [BError](#) [writeChunks](#) (const [BDataChunk](#) *[chunks](#), [BUInt](#) [nChunks](#), [BUInt32](#) &[nTrans](#))
- virtual [BUInt](#) [readAvailable](#) ()
- virtual [BError](#) [read](#) (void *[data](#), [BUInt32](#) [num](#), [BUInt32](#) &[nTrans](#))=0
- virtual [BError](#) [wait](#) ([BUInt32](#) [eventSet](#), [BTimeout](#) [timeoutUs](#)=[BTimeoutForever](#), [BUInt32](#) [num](#)=1)
- virtual void [eventQueue](#) ([BEventQueue](#) *[eventQueue](#), [BUInt32](#) [event](#), [BUInt32](#) [eventSet](#), [BUInt](#) [num](#)=1)
- virtual void [eventEnable](#) ([Bool](#) [on](#))
Enable events to be sent.

Protected Attributes

- Bool oconnected
- Bool opacketMode
- BTimeout otimeout
- BEventQueue * oeventQueue
- Bool oeventEnabled
- BUInt32 oevent
- BUInt32 oeventSet
- BUInt oeventNum

7.6.1 Detailed Description

A base class for communications classes having a generic API.

7.6.2 Member Enumeration Documentation

7.6.2.1 Flush

```
enum BComms::Flush
```

Enumerator

FlushRead	
FlushWrite	
FlushReadWrite	

7.6.3 Constructor & Destructor Documentation

7.6.3.1 BComms()

```
BComms::BComms ( )
```

7.6.3.2 ~BComms()

```
BComms::~~BComms ( ) [virtual]
```

7.6.4 Member Function Documentation

7.6.4.1 init()

```
BError BComms::init ( ) [virtual]
```

7.6.4.2 close()

```
void BComms::close ( ) [virtual]
```

7.6.4.3 name()

```
const char * BComms::name ( ) [virtual]
```

The name of this interface.

7.6.4.4 byteRate()

```
BUInt32 BComms::byteRate ( ) [virtual]
```

The byte rate of this interface.

7.6.4.5 setPacketMode()

```
BError BComms::setPacketMode (
    Bool packetMode ) [virtual]
```

Set packet mode.

7.6.4.6 packetMode()

```
Bool BComms::packetMode ( ) [virtual]
```

Device is in packet mode.

7.6.4.7 setTimeout()

```
BError BComms::setTimeout (
    BTimeout timeoutUs ) [virtual]
```

Set communication timeout.

7.6.4.8 connect()

```
BError BComms::connect (
    const char * resource ) [virtual]
```

Create a connection.

7.6.4.9 isConnected()

```
Bool BComms::isConnected ( ) [virtual]
```

7.6.4.10 disconnect()

```
BError BComms::disconnect ( ) [virtual]
```

Disconnect.

7.6.4.11 flush()

```
void BComms::flush (
    Flush flush ) [virtual]
```

7.6.4.12 writeAvailable()

```
BUInt BComms::writeAvailable ( ) [virtual]
```

7.6.4.13 write()

```
virtual BError BComms::write (
    const void * data,
    BUInt32 nBytes,
    BUInt32 & nTrans ) [pure virtual]
```

7.6.4.14 writeChunks()

```
BError BComms::writeChunks (
    const BDataChunk * chunks,
    BUInt nChunks,
    BUInt32 & nTrans ) [virtual]
```

7.6.4.15 readAvailable()

```
BUInt BComms::readAvailable ( ) [virtual]
```

7.6.4.16 read()

```
virtual BError BComms::read (
    void * data,
    BUInt32 num,
    BUInt32 & nTrans ) [pure virtual]
```

7.6.4.17 wait()

```
BError BComms::wait (
    BUInt32 eventSet,
    BTimeout timeoutUs = BTimeoutForever,
    BUInt32 num = 1 ) [virtual]
```

7.6.4.18 eventQueue()

```
void BComms::eventQueue (
    BEventQueue * eventQueue,
    BUInt32 event,
    BUInt32 eventSet,
    BUInt num = 1 ) [virtual]
```

7.6.4.19 eventEnable()

```
void BComms::eventEnable (
    Bool on ) [virtual]
```

Enable events to be sent.

7.6.5 Member Data Documentation

7.6.5.1 oconnected

```
Bool BComms::oconnected [protected]
```

7.6.5.2 opacketMode

```
Bool BComms::opacketMode [protected]
```

7.6.5.3 otimeout

```
BTimeout BComms::otimeout [protected]
```

7.6.5.4 oeventQueue

```
BEventQueue* BComms::oeventQueue [protected]
```

7.6.5.5 oeventEnabled

```
Bool BComms::oeventEnabled [protected]
```

7.6.5.6 oevent

```
BUInt32 BComms::oevent [protected]
```

7.6.5.7 oeventSet

```
BUInt32 BComms::oeventSet [protected]
```

7.6.5.8 oeventNum

```
BUInt BComms::oeventNum [protected]
```

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

- [BComms.h](#)
- [BComms.cpp](#)

7.7 BCond Class Reference

Thread safe conditional variable.

```
#include <BCond.h>
```

Public Member Functions

- [BCond](#) ()
- [~BCond](#) ()
- int [signal](#) ()
- int [wait](#) ()
- int [timedWait](#) (int timeOutUs)

7.7.1 Detailed Description

Thread safe conditional variable.

7.7.2 Constructor & Destructor Documentation

7.7.2.1 BCond()

```
BCond::BCond ( )
```

7.7.2.2 ~BCond()

```
BCond::~~BCond ( )
```

7.7.3 Member Function Documentation

7.7.3.1 signal()

```
int BCond::signal ( )
```

7.7.3.2 wait()

```
int BCond::wait ( )
```

7.7.3.3 timedWait()

```
int BCond::timedWait (
    int timeoutUs )
```

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

- [BCond.h](#)
- [BCond.cpp](#)

7.8 BCondBool Class Reference

Thread conditional boolean.

```
#include <BCondInt.h>
```

Public Member Functions

- [BCondBool](#) ()
- [~BCondBool](#) ()
- int [set](#) ()
Set value. Wakes waiting.
- int [clear](#) ()
Clear Value.
- int [value](#) ()
Current value.
- int [wait](#) ()
Wait until value is true.
- int [timedWait](#) (int timeoutUs)
Wait until set, with timeout.
- [operator int](#) ()

7.8.1 Detailed Description

Thread conditional boolean.

7.8.2 Constructor & Destructor Documentation

7.8.2.1 BCondBool()

```
BCondBool::BCondBool ( )
```

7.8.2.2 ~BCondBool()

```
BCondBool::~~BCondBool ( )
```

7.8.3 Member Function Documentation

7.8.3.1 set()

```
int BCondBool::set ( )
```

Set value. Wakes waiting.

7.8.3.2 clear()

```
int BCondBool::clear ( )
```

Clear Value.

7.8.3.3 value()

```
int BCondBool::value ( )
```

Current value.

7.8.3.4 wait()

```
int BCondBool::wait ( )
```

Wait until value is true.

7.8.3.5 timedWait()

```
int BCondBool::timedWait (
    int timeoutUs )
```

Wait until set, with timeout.

7.8.3.6 operator int()

```
BCondBool::operator int ( ) [inline]
```

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

- [BCondInt.h](#)
- [BCondInt.cpp](#)

7.9 BCondInt Class Reference

Thread conditional value.

```
#include <BCondInt.h>
```

Public Member Functions

- [BCondInt](#) ()
- [~BCondInt](#) ()
- void [setValue](#) (BInt value)
Set the value. Wakes waiting.
- [BInt value](#) () const
Current value.
- [BInt increment](#) (BInt v=1)
Increment. Wakes waiting.
- [BInt decrement](#) (BInt v=1)
Decrement. Wakes waiting.
- [Bool waitMoreThanOrEqual](#) (BInt v, [Bool](#) decrement=0, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait until value is at least the value given.
- [Bool waitLessThanOrEqual](#) (BInt v, [Bool](#) increment=0, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait until value is equal to or below the value given.
- [Bool waitLessThan](#) (BInt v, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait until value is equal to or below the value given.
- void [operator+=](#) (int v)
Add to value. Wakes waiting.
- void [operator-=](#) (int v)
Subtract from value. Wakes waiting.
- void [operator++](#) (int)
Increment value. Wakes waiting.
- void [operator--](#) (int)
Decrement value. Wakes waiting.

7.9.1 Detailed Description

Thread conditional value.

7.9.2 Constructor & Destructor Documentation

7.9.2.1 BCondInt()

```
BCondInt::BCondInt ( )
```

7.9.2.2 ~BCondInt()

```
BCondInt::~~BCondInt ( )
```

7.9.3 Member Function Documentation

7.9.3.1 setValue()

```
void BCondInt::setValue (
    BInt value )
```

Set the value. Wakes waiting.

7.9.3.2 value()

```
BInt BCondInt::value ( ) const
```

Current value.

7.9.3.3 increment()

```
BInt BCondInt::increment (
    BInt v = 1 )
```

Increment. Wakes waiting.

7.9.3.4 decrement()

```
BInt BCondInt::decrement (
    BInt v = 1 )
```

Decrement. Wakes waiting.

7.9.3.5 waitMoreThanOrEqual()

```
Bool BCondInt::waitMoreThanOrEqual (
    BInt v,
    Bool decrement = 0,
    BTimeout timeoutUs = BTimeoutForever )
```

Wait until value is at least the value given.

7.9.3.6 waitLessThanOrEqual()

```
Bool BCondInt::waitLessThanOrEqual (
    BInt v,
    Bool increment = 0,
    BTimeout timeoutUs = BTimeoutForever )
```

Wait until value is equal to or below the value given.

7.9.3.7 waitLessThan()

```
Bool BCondInt::waitLessThan (
    BInt v,
    BTimeout timeoutUs = BTimeoutForever )
```

Wait until value is equal to or below the value given.

7.9.3.8 operator+=()

```
void BCondInt::operator+= (
    int v ) [inline]
```

Add to value. Wakes waiting.

7.9.3.9 operator-=()

```
void BCondInt::operator-= (
    int v ) [inline]
```

Subtract from value. Wakes waiting.

7.9.3.10 operator++()

```
void BCondInt::operator++ (
    int ) [inline]
```

Increment value. Wakes waiting.

7.9.3.11 operator--()

```
void BCondInt::operator-- (
    int ) [inline]
```

Decrement value. Wakes waiting.

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

- [BCondInt.h](#)
- [BCondInt.cpp](#)

7.10 BCondResource Class Reference

Resource lock.

```
#include <BCondInt.h>
```

Public Member Functions

- [BCondResource](#) ()
- [~BCondResource](#) ()
- int [lock](#) (uint32_t timeOutUs=0)
Lock the resource, will wait for all usage to be 0.
- int [unlock](#) ()
Unlock the resource.
- int [start](#) (uint32_t timeOutUs=0)
Start using the resource.
- int [end](#) ()
Finish using the resource.
- int [locked](#) ()
- int [inUse](#) ()

7.10.1 Detailed Description

Resource lock.

7.10.2 Constructor & Destructor Documentation

7.10.2.1 BCondResource()

```
BCondResource::BCondResource ( )
```

7.10.2.2 ~BCondResource()

```
BCondResource::~~BCondResource ( )
```

7.10.3 Member Function Documentation

7.10.3.1 lock()

```
int BCondResource::lock (
    uint32_t timeoutUs = 0 )
```

Lock the resource, will wait for all usage to be 0.

7.10.3.2 unlock()

```
int BCondResource::unlock ( )
```

Unlock the resource.

7.10.3.3 start()

```
int BCondResource::start (
    uint32_t timeoutUs = 0 )
```

Start using the resource.

7.10.3.4 end()

```
int BCondResource::end ( )
```

Finish using the resource.

7.10.3.5 locked()

```
int BCondResource::locked ( )
```

7.10.3.6 inUse()

```
int BCondResource::inUse ( )
```

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

- [BCondInt.h](#)
- [BCondInt.cpp](#)

7.11 BCondValue Class Reference

Thread conditional value.

```
#include <BCondInt.h>
```

Public Member Functions

- [BCondValue](#) ()
- [~BCondValue](#) ()
- void [setValue](#) (int [value](#))
Set the value. Wakes waiting.
- int [value](#) ()
Current value.
- int [increment](#) (int v=1)
Increment. Wakes waiting.
- int [decrement](#) (int v=1)
Decrement. Wakes waiting.
- int [waitMoreThanOrEqual](#) (int v, int [decrement](#)=0, int timeOutUs=0)
Wait until value is at least the value given.
- int [waitLessThanOrEqual](#) (int v, int [increment](#)=0, int timeOutUs=0)
Wait until value is equal to or below the value given.
- int [waitLessThan](#) (int v, int timeOutUs=0)
Wait until value is equal to or below the value given.
- void [operator+=](#) (int v)
Add to value. Wakes waiting.
- void [operator-=](#) (int v)
Subtract from value. Wakes waiting.
- void [operator++](#) (int)
Increment value. Wakes waiting.
- void [operator--](#) (int)
Decrement value. Wakes waiting.

7.11.1 Detailed Description

Thread conditional value.

7.11.2 Constructor & Destructor Documentation

7.11.2.1 BCondValue()

```
BCondValue::BCondValue ( )
```

7.11.2.2 ~BCondValue()

```
BCondValue::~~BCondValue ( )
```

7.11.3 Member Function Documentation

7.11.3.1 setValue()

```
void BCondValue::setValue (
    int value )
```

Set the value. Wakes waiting.

7.11.3.2 value()

```
int BCondValue::value ( )
```

Current value.

7.11.3.3 increment()

```
int BCondValue::increment (
    int v = 1 )
```

Increment. Wakes waiting.

7.11.3.4 decrement()

```
int BCondValue::decrement (
    int v = 1 )
```

Decrement. Wakes waiting.

7.11.3.5 waitMoreThanOrEqual()

```
int BCondValue::waitMoreThanOrEqual (
    int v,
    int decrement = 0,
    int timeoutUs = 0 )
```

Wait until value is at least the value given.

7.11.3.6 waitLessThanOrEqual()

```
int BCondValue::waitLessThanOrEqual (
    int v,
    int increment = 0,
    int timeoutUs = 0 )
```

Wait until value is equal to or below the value given.

7.11.3.7 waitLessThan()

```
int BCondValue::waitLessThan (
    int v,
    int timeoutUs = 0 )
```

Wait until value is equal to or below the value given.

7.11.3.8 operator+=()

```
void BCondValue::operator+= (
    int v ) [inline]
```

Add to value. Wakes waiting.

7.11.3.9 operator-=()

```
void BCondValue::operator-= (
    int v ) [inline]
```

Subtract from value. Wakes waiting.

7.11.3.10 operator++()

```
void BCondValue::operator++ (
    int ) [inline]
```

Increment value. Wakes waiting.

7.11.3.11 operator--()

```
void BCondValue::operator-- (
    int ) [inline]
```

Decrement value. Wakes waiting.

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

- [BCondInt.h](#)
- [BCondInt.cpp](#)

7.12 BCondWrap Class Reference

Thread conditional unsigned 32 bit integer value that can wrap around.

```
#include <BCondInt.h>
```

Public Member Functions

- [BCondWrap](#) ()
- [~BCondWrap](#) ()
- void [setValue](#) (uint32_t [value](#))
Set the value. Wakes waiting.
- uint32_t [value](#) ()
Current value.
- uint32_t [increment](#) (uint32_t v=1)
Increment. Wakes waiting.
- uint32_t [decrement](#) (uint32_t v=1)
Decrement. Wakes waiting.
- int [waitMoreThanOrEqual](#) (uint32_t v, uint32_t [decrement](#)=0, uint32_t timeOutUs=0)
Wait until value is at least the value given.
- int [waitLessThanOrEqual](#) (uint32_t v, uint32_t [increment](#)=0, uint32_t timeOutUs=0)
Wait until value is equal to or below the value given.
- int [waitLessThan](#) (uint32_t v, uint32_t timeOutUs=0)
Wait until value is equal to or below the value given.
- void [operator+=](#) (int v)
Add to value. Wakes waiting.
- void [operator-=](#) (int v)
Subtract from value. Wakes waiting.
- void [operator++](#) (int)
Increment value. Wakes waiting.
- void [operator--](#) (int)
Decrement value. Wakes waiting.

7.12.1 Detailed Description

Thread conditional unsigned 32 bit integer value that can wrap around.

7.12.2 Constructor & Destructor Documentation

7.12.2.1 BCondWrap()

```
BCondWrap::BCondWrap ( )
```

7.12.2.2 ~BCondWrap()

```
BCondWrap::~~BCondWrap ( )
```

7.12.3 Member Function Documentation

7.12.3.1 setValue()

```
void BCondWrap::setValue (
    uint32_t value )
```

Set the value. Wakes waiting.

7.12.3.2 value()

```
uint32_t BCondWrap::value ( )
```

Current value.

7.12.3.3 increment()

```
uint32_t BCondWrap::increment (
    uint32_t v = 1 )
```

Increment. Wakes waiting.

7.12.3.4 decrement()

```
uint32_t BCondWrap::decrement (
    uint32_t v = 1 )
```

Decrement. Wakes waiting.

7.12.3.5 waitMoreThanOrEqual()

```
int BCondWrap::waitMoreThanOrEqual (
    uint32_t v,
    uint32_t decrement = 0,
    uint32_t timeoutUs = 0 )
```

Wait until value is at least the value given.

7.12.3.6 waitLessThanOrEqual()

```
int BCondWrap::waitLessThanOrEqual (
    uint32_t v,
    uint32_t increment = 0,
    uint32_t timeOutUs = 0 )
```

Wait until value is equal to or below the value given.

7.12.3.7 waitLessThan()

```
int BCondWrap::waitLessThan (
    uint32_t v,
    uint32_t timeOutUs = 0 )
```

Wait until value is equal to or below the value given.

7.12.3.8 operator+=()

```
void BCondWrap::operator+= (
    int v ) [inline]
```

Add to value. Wakes waiting.

7.12.3.9 operator-=()

```
void BCondWrap::operator-= (
    int v ) [inline]
```

Subtract from value. Wakes waiting.

7.12.3.10 operator++()

```
void BCondWrap::operator++ (
    int ) [inline]
```

Increment value. Wakes waiting.

7.12.3.11 operator--()

```
void BCondWrap::operator-- (
    int ) [inline]
```

Decrement value. Wakes waiting.

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

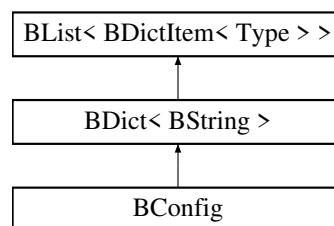
- [BCondInt.h](#)
- [BCondInt.cpp](#)

7.13 BConfig Class Reference

This class implements the configuration file access.

```
#include <BConfig.h>
```

Inheritance diagram for BConfig:



Public Member Functions

- [BError open](#) ([BString](#) fileName, [BString](#) mode="r")
- void [close](#) ()
- [BError read](#) ()
- [BError write](#) ()
- [BString findValue](#) ([BString](#) name)
- [BString fileName](#) ()

Additional Inherited Members

7.13.1 Detailed Description

This class implements the configuration file access.

7.13.2 Member Function Documentation

7.13.2.1 open()

```
BError BConfig::open (
    BString fileName,
    BString mode = "r" )
```

7.13.2.2 close()

```
void BConfig::close ( )
```

7.13.2.3 read()

```
BError BConfig::read ( )
```

7.13.2.4 write()

```
BError BConfig::write ( )
```

7.13.2.5 findValue()

```
BString BConfig::findValue (
    BString name )
```

7.13.2.6 fileName()

```
BString BConfig::fileName ( )
```

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

- [BConfig.h](#)
- [BConfig.cpp](#)

7.14 BDataChunk Class Reference

A chunk of data allowing writes of multiple chunks of segmented data.

```
#include <BTypes.h>
```

Public Member Functions

- [BDataChunk](#) (void *[data](#)=0, [BUInt](#) [size](#)=0)

Public Attributes

- void * [data](#)
- [BUInt](#) [size](#)

7.14.1 Detailed Description

A chunk of data allowing writes of multiple chunks of segmented data.

7.14.2 Constructor & Destructor Documentation

7.14.2.1 BDataChunk()

```
BDataChunk::BDataChunk (
    void * data = 0,
    BUInt size = 0 ) [inline]
```

7.14.3 Member Data Documentation

7.14.3.1 data

```
void* BDataChunk::data
```

7.14.3.2 size

```
BUInt BDataChunk::size
```

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

- [BTypes.h](#)

7.15 BDate Class Reference

This class store a UTC calendar date as a year and a year's day.

```
#include <BDate.h>
```

Public Member Functions

- [BDate](#) (int [year](#)=0, int [month](#)=1, int [day](#)=1)
- [BDate](#) ([BString](#) str)
- [~BDate](#) ()
- void [clear](#) ()
Clear the date/time.
- void [setFirst](#) ()
Set the first date available.
- void [setLast](#) ()
Set the last date available.
- void [set](#) (time_t time)
Set time using Unix time (seconds from 1970-01-01)
- void [set](#) (int [year](#)=0, int [month](#)=1, int [day](#)=1)
- void [setYDay](#) (int [year](#)=0, int [yday](#)=0)
- void [setNow](#) ()
Set the timeStamp to now.
- int [year](#) ()
- int [yday](#) ()
- int [month](#) ()
- int [day](#) ()
- void [getDate](#) (int &[year](#), int &mon, int &[day](#))
- [BString](#) [getString](#) ()
Get the time as an ISO date/time string.
- [BString](#) [getStringFormatted](#) ([BString](#) format)
Gets the time in a string form as per the format. Format syntax as per strftime()
- [BError](#) [setString](#) ([BString](#) str)
Set the time from an ISO date/time.
- int [isSet](#) ()
Check if the date has been set.
- int [compare](#) (const [BDate](#) &date) const
Compare two dates.
- [operator](#) [BString](#) ()
- int [operator==](#) (const [BDate](#) &date) const
- int [operator!=](#) (const [BDate](#) &date) const
- int [operator>](#) (const [BDate](#) &date) const
- int [operator>=](#) (const [BDate](#) &date) const
- int [operator<](#) (const [BDate](#) &date) const
- int [operator<=](#) (const [BDate](#) &date) const

Static Public Member Functions

- static int [isLeap](#) (int [year](#))
- static int [daysInMonth](#) (int [year](#), int [month](#))

Public Attributes

- uint16_t [oyear](#)
Year (0 .. 65535)
- uint16_t [oyday](#)
Day in year (0 .. 365)

7.15.1 Detailed Description

This class store a UTC calendar date as a year and a year's day.

The [BDate](#) class stores a calendar date wit a year and day in the year components. It provides functions to set this date from a string and convert the data to a string as well as [BDate](#) comparison functions.

7.15.2 Constructor & Destructor Documentation

7.15.2.1 BDate() [1/2]

```
BDate::BDate (
    int year = 0,
    int month = 1,
    int day = 1 )
```

7.15.2.2 BDate() [2/2]

```
BDate::BDate (
    BString str )
```

7.15.2.3 ~BDate()

```
BDate::~~BDate ( )
```

7.15.3 Member Function Documentation

7.15.3.1 clear()

```
void BDate::clear ( )
```

Clear the date/time.

7.15.3.2 setFirst()

```
void BDate::setFirst ( )
```

Set the first date available.

7.15.3.3 setLast()

```
void BDate::setLast ( )
```

Set the last date available.

7.15.3.4 set() [1/2]

```
void BDate::set (
    time_t time )
```

Set time using Unix time (seconds from 1970-01-01)

7.15.3.5 set() [2/2]

```
void BDate::set (
    int year = 0,
    int month = 1,
    int day = 1 )
```

7.15.3.6 setYDay()

```
void BDate::setYDay (
    int year = 0,
    int yday = 0 )
```

7.15.3.7 setNow()

```
void BDate::setNow ( )
```

Set the timeStamp to now.

7.15.3.8 year()

```
int BDate::year ( )
```

7.15.3.9 yday()

```
int BDate::yday ( )
```

7.15.3.10 month()

```
int BDate::month ( )
```

7.15.3.11 day()

```
int BDate::day ( )
```

7.15.3.12 getDate()

```
void BDate::getDate (
    int & year,
    int & mon,
    int & day )
```

7.15.3.13 getString()

```
BString BDate::getString ( )
```

Get the time as an ISO date/time string.

7.15.3.14 getStringFormatted()

```
BString BDate::getStringFormatted (
    BString format )
```

Gets the time in a string form as per the format. Format syntax as per strftime()

7.15.3.15 setString()

```
BError BDate::setString (
    BString str )
```

Set the time from an ISO date/time.

7.15.3.16 isSet()

```
int BDate::isSet ( ) [inline]
```

Check if the date has been set.

7.15.3.17 compare()

```
int BDate::compare (
    const BDate & date ) const
```

Compare two dates.

7.15.3.18 operator BString()

```
BDate::operator BString ( ) [inline]
```

7.15.3.19 operator==()

```
int BDate::operator== (
    const BDate & date ) const [inline]
```

7.15.3.20 operator"!="()

```
int BDate::operator!= (
    const BDate & date ) const [inline]
```

7.15.3.21 operator>()

```
int BDate::operator> (
    const BDate & date ) const [inline]
```

7.15.3.22 operator>=()

```
int BDate::operator>= (
    const BDate & date ) const [inline]
```

7.15.3.23 operator<()

```
int BDate::operator< (
    const BDate & date ) const [inline]
```

7.15.3.24 operator<=()

```
int BDate::operator<= (
    const BDate & date ) const [inline]
```

7.15.3.25 isLeap()

```
int BDate::isLeap (
    int year ) [static]
```

7.15.3.26 daysInMonth()

```
int BDate::daysInMonth (
    int year,
    int month ) [static]
```

7.15.4 Member Data Documentation

7.15.4.1 oyear

`uint16_t BDate::oyear`

Year (0 .. 65535)

7.15.4.2 oyday

`uint16_t BDate::oyday`

Day in year (0 .. 365)

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

- [BDate.h](#)
- [BDate.cpp](#)

7.16 BDebugBacktrace Class Reference

Backtrace on crash class.

```
#include <BDebug.h>
```

Public Member Functions

- [BDebugBacktrace](#) ()
- [~BDebugBacktrace](#) ()
- void [dumpBacktraceStdout](#) (char *comment)
- int [dumpBacktraceFile](#) (char *fileName, char *comment)
- void [dumpBacktraceSyslog](#) (char *comment)
- void [dumpBacktrace](#) (char *strBuf, int strBufLen, char *comment)

7.16.1 Detailed Description

Backtrace on crash class.

7.16.2 Constructor & Destructor Documentation

7.16.2.1 BDebugBacktrace()

```
BDebugBacktrace::BDebugBacktrace ( )
```

7.16.2.2 ~BDebugBacktrace()

```
BDebugBacktrace::~~BDebugBacktrace ( )
```

7.16.3 Member Function Documentation

7.16.3.1 dumpBacktraceStdout()

```
void BDebugBacktrace::dumpBacktraceStdout (
    char * comment )
```

7.16.3.2 dumpBacktraceFile()

```
int BDebugBacktrace::dumpBacktraceFile (
    char * fileName,
    char * comment )
```

7.16.3.3 dumpBacktraceSyslog()

```
void BDebugBacktrace::dumpBacktraceSyslog (
    char * comment )
```

7.16.3.4 dumpBacktrace()

```
void BDebugBacktrace::dumpBacktrace (
    char * strBuf,
    int strBufLen,
    char * comment )
```

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

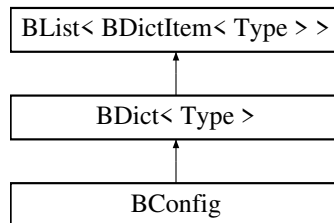
- [BDebug.h](#)

7.17 BDict< Type > Class Template Reference

Dictionary list class using templates.

```
#include <BDict.h>
```

Inheritance diagram for BDict< Type >:



Public Types

- typedef [Blter](#) iterator

Public Member Functions

- [BDict](#) (int hashSize=100)
- [BDict](#) (const [BDict](#)< Type > &dict)
- int [hasKey](#) (const [BString](#) &k) const
- [BString](#) [key](#) (const [Blter](#) &i) const
- void [clear](#) ()
Clear the list.
- void [insert](#) ([Blter](#) &i, const [BDictItem](#)< Type > &item)
- void [append](#) (const [BDictItem](#)< Type > &item)
- void [append](#) (const [BDict](#)< Type > &dict)
- void [del](#) (const [BString](#) &k)
- void [del](#) ([Blter](#) &i)
Delete specified item.
- [Blter](#) [find](#) (const [BString](#) &k) const
- Type & [operator\[\]](#) (const [BString](#) &i)
- const Type & [operator\[\]](#) (const [BString](#) &i) const
- Type & [operator\[\]](#) (const [Blter](#) &i)
- const Type & [operator\[\]](#) (const [Blter](#) &i) const
- Type & [operator\[\]](#) (int i)
- const Type & [operator\[\]](#) (int i) const
- [BDict](#)< Type > [operator+](#) (const [BDict](#)< Type > &dict) const
- [BDict](#)< Type > & [operator=](#) (const [BDict](#)< Type > &dict)
- void [hashPrint](#) ()

Additional Inherited Members

7.17.1 Detailed Description

```
template<class Type>
class BDict< Type >
```

Dictionary list class using templates.

7.17.2 Member Typedef Documentation

7.17.2.1 iterator

```
template<class Type >
typedef BIter BDict< Type >::iterator
```

7.17.3 Constructor & Destructor Documentation

7.17.3.1 BDict() [1/2]

```
template<class Type >
BDict< Type >::BDict (
    int hashSize = 100 )
```

7.17.3.2 BDict() [2/2]

```
template<class Type >
BDict< Type >::BDict (
    const BDict< Type > & dict )
```

7.17.4 Member Function Documentation

7.17.4.1 hasKey()

```
template<class Type >
int BDict< Type >::hasKey (
    const BString & k ) const
```

7.17.4.2 key()

```
template<class Type >
BString BDict< Type >::key (
    const BIter & i ) const
```

7.17.4.3 clear()

```
template<class Type >
void BDict< Type >::clear [virtual]
```

Clear the list.

Reimplemented from [BList< BDictItem< Type > >](#).

7.17.4.4 insert()

```
template<class Type >
void BDict< Type >::insert (
    BIter & i,
    const BDictItem< Type > & item )
```

7.17.4.5 append() [1/2]

```
template<class Type >
void BDict< Type >::append (
    const BDictItem< Type > & item )
```

7.17.4.6 append() [2/2]

```
template<class Type >
void BDict< Type >::append (
    const BDict< Type > & dict )
```

7.17.4.7 del() [1/2]

```
template<class Type >
void BDict< Type >::del (
    const BString & k )
```

7.17.4.8 del() [2/2]

```
template<class Type >
void BDict< Type >::del (
    BIter & i ) [virtual]
```

Delete specified item.

Reimplemented from [BList< BDictItem< Type > >](#).

7.17.4.9 find()

```
template<class Type >
BIter BDict< Type >::find (
    const BString & k ) const
```

7.17.4.10 operator[]() [1/6]

```
template<class Type >
Type & BDict< Type >::operator[] (
    const BString & i )
```

7.17.4.11 operator[]() [2/6]

```
template<class Type >
const Type & BDict< Type >::operator[] (
    const BString & i ) const
```

7.17.4.12 operator[]() [3/6]

```
template<class Type >
Type & BDict< Type >::operator[] (
    const BIter & i )
```

7.17.4.13 operator[]() [4/6]

```
template<class Type >
const Type & BDict< Type >::operator[] (
    const BIter & i ) const
```

7.17.4.14 operator[]() [5/6]

```
template<class Type >
Type & BDict< Type >::operator[] (
    int i )
```

7.17.4.15 operator[]() [6/6]

```
template<class Type >
const Type & BDict< Type >::operator[] (
    int i ) const
```

7.17.4.16 operator+()

```
template<class Type >
BDict< Type > BDict< Type >::operator+ (
    const BDict< Type > & dict ) const
```

7.17.4.17 operator=()

```
template<class Type >
BDict< Type > & BDict< Type >::operator= (
    const BDict< Type > & dict )
```

7.17.4.18 hashPrint()

```
template<class Type >
void BDict< Type >::hashPrint
```

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

- [BDict.h](#)

7.18 BDictItem< Type > Class Template Reference

Template based Dictionary classes item.

```
#include <BDict.h>
```

Public Member Functions

- [BDictItem](#) (BString k="", Type v=Type())

Public Attributes

- [BString](#) [key](#)
- [Type](#) [value](#)

7.18.1 Detailed Description

```
template<class Type>
class BDictItem< Type >
```

Template based Dictionary classes item.

7.18.2 Constructor & Destructor Documentation

7.18.2.1 BDictItem()

```
template<class Type >
BDictItem< Type >::BDictItem (
    BString k = "",
    Type v = Type() ) [inline]
```

7.18.3 Member Data Documentation

7.18.3.1 key

```
template<class Type >
BString BDictItem< Type >::key
```

7.18.3.2 value

```
template<class Type >
Type BDictItem< Type >::value
```

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

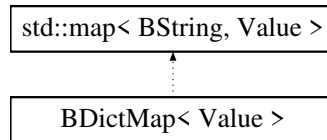
- [BDict.h](#)

7.19 BDictMap< Value > Class Template Reference

Mapped Dictionary class.

```
#include <BDictMap.h>
```

Inheritance diagram for BDictMap< Value >:



Public Types

- typedef [BDictMap](#)< Value >::iterator [iterator](#)

Public Member Functions

- void [clear](#) ()
- int [hasKey](#) (const [BString](#) &k)
- [BString](#) [key](#) ([iterator](#) &i)
- unsigned int [size](#) ()
- void [start](#) ([iterator](#) &i)
- int [isEnd](#) ([iterator](#) &i)
- void [next](#) ([iterator](#) &i)
- void [del](#) (const [iterator](#) &i)
- void [del](#) (const [BString](#) &k)
- Value & [operator\[\]](#) ([iterator](#) &i)
- Value & [operator\[\]](#) (const [BString](#) &i)

7.19.1 Detailed Description

```
template<typename Value>
class BDictMap< Value >
```

Mapped Dictionary class.

This is based on the Standard C++ library map class and has all of the functionality of that class.

7.19.2 Member Typedef Documentation

7.19.2.1 iterator

```
template<typename Value >
typedef BDictMap<Value>::iterator BDictMap< Value >::iterator
```

7.19.3 Member Function Documentation

7.19.3.1 clear()

```
template<typename Value >
void BDictMap< Value >::clear ( ) [inline]
```

7.19.3.2 hasKey()

```
template<typename Value >
int BDictMap< Value >::hasKey (
    const BString & k ) [inline]
```

7.19.3.3 key()

```
template<typename Value >
BString BDictMap< Value >::key (
    iterator & i ) [inline]
```

7.19.3.4 size()

```
template<typename Value >
unsigned int BDictMap< Value >::size ( ) [inline]
```

7.19.3.5 start()

```
template<typename Value >
void BDictMap< Value >::start (
    iterator & i ) [inline]
```

7.19.3.6 isEnd()

```
template<typename Value >
int BDictMap< Value >::isEnd (
    iterator & i ) [inline]
```

7.19.3.7 next()

```
template<typename Value >
void BDictMap< Value >::next (
    iterator & i ) [inline]
```

7.19.3.8 del() [1/2]

```
template<typename Value >
void BDictMap< Value >::del (
    const iterator & i ) [inline]
```

7.19.3.9 del() [2/2]

```
template<typename Value >
void BDictMap< Value >::del (
    const BString & k ) [inline]
```

7.19.3.10 operator[]() [1/2]

```
template<typename Value >
Value & BDictMap< Value >::operator[] (
    iterator & i ) [inline]
```

7.19.3.11 operator[]() [2/2]

```
template<typename Value >
Value & BDictMap< Value >::operator[] (
    const BString & i ) [inline]
```

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

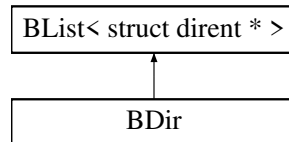
- [BDictMap.h](#)

7.20 BDir Class Reference

File system directory class.

```
#include <BDir.h>
```

Inheritance diagram for BDir:



Public Member Functions

- [BDir](#) ()
- [BDir](#) (BString name)
- [~BDir](#) ()
- [BError open](#) (BString name)
Reads named directory.
- [BError error](#) ()
Current value of error.
- [BError read](#) ()
read/re-reads directory
- void [clear](#) ()
Clears list.
- void [setWild](#) (BString wild)
Set wildcard filter string used on read.
- void [setSort](#) (int on)
Set alpha sort on/off.
- [BString entryName](#) (BIter i)
Get filename.
- struct stat [entryStat](#) (BIter i)
Get file stats.
- struct stat64 [entryStat64](#) (BIter i)
Get file stats 64.

Additional Inherited Members

7.20.1 Detailed Description

File system directory class.

7.20.2 Constructor & Destructor Documentation

7.20.2.1 BDir() [1/2]

```
BDir::BDir ( )
```

7.20.2.2 BDir() [2/2]

```
BDir::BDir (
    BString name )
```

7.20.2.3 ~BDir()

```
BDir::~~BDir ( )
```

7.20.3 Member Function Documentation

7.20.3.1 open()

```
BError BDir::open (
    BString name )
```

Reads named directory.

7.20.3.2 error()

```
BError BDir::error ( )
```

Current value of error.

7.20.3.3 read()

```
BError BDir::read ( )
```

read/re-reads directory

7.20.3.4 clear()

```
void BDir::clear ( ) [virtual]
```

Clears list.

Reimplemented from [BList< struct dirent * >](#).

7.20.3.5 setWild()

```
void BDir::setWild (
    BString wild )
```

Set wildcard filter string used on read.

7.20.3.6 setSort()

```
void BDir::setSort (
    int on )
```

Set alpha sort on/off.

7.20.3.7 entryName()

```
BString BDir::entryName (
    BIter i )
```

Get filename.

7.20.3.8 entryStat()

```
struct stat BDir::entryStat (
    BIter i )
```

Get file stats.

7.20.3.9 entryStat64()

```
struct stat64 BDir::entryStat64 (
    BIter i )
```

Get file stats 64.

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

- [BDir.h](#)
- [BDir.cpp](#)

7.21 BDuration Class Reference

Stores and manipulates a time to the nearest microsecond and a maximum of 24 hours.

```
#include <BDuration.h>
```

Public Member Functions

- [BDuration](#) (int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int microsecond=0)
- [BDuration](#) (BString str)
- [~BDuration](#) ()
- void [clear](#) ()
Clear the duration.
- void [set](#) (int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int microsecond=0)
- void [addMilliSeconds](#) (int64_t milliSeconds)
Add the given number of milli seconds.
- void [addMicroSeconds](#) (int64_t microSeconds)
Add the given number of micro seconds.
- void [addSeconds](#) (int seconds)
Add the given number of seconds.
- uint32_t [getSeconds](#) ()
Get number of seconds.
- uint64_t [getMicroSeconds](#) ()
Get number of micro seconds.
- int [hour](#) ()
- int [minute](#) ()
- int [second](#) ()
- int [microSecond](#) ()
- BString [getString](#) ()
Get the time as an ISO date/time string.
- BError [setString](#) (BString time)
Set the time from an ISO date/time.

7.21.1 Detailed Description

Stores and manipulates a time to the nearest microsecond and a maximum of 24 hours.

7.21.2 Constructor & Destructor Documentation

7.21.2.1 BDuration() [1/2]

```
BDuration::BDuration (
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.21.2.2 BDuration() [2/2]

```
BDuration::BDuration (
    BString str )
```

7.21.2.3 ~BDuration()

```
BDuration::~~BDuration ( )
```

7.21.3 Member Function Documentation

7.21.3.1 clear()

```
void BDuration::clear ( )
```

Clear the duration.

7.21.3.2 set()

```
void BDuration::set (
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.21.3.3 addMilliseconds()

```
void BDuration::addMilliseconds (
    int64_t milliseconds )
```

Add the given number of milli seconds.

7.21.3.4 addMicroSeconds()

```
void BDuration::addMicroSeconds (
    int64_t microSeconds )
```

Add the given number of micro seconds.

7.21.3.5 addSeconds()

```
void BDuration::addSeconds (
    int seconds )
```

Add the given number of seconds.

7.21.3.6 getSeconds()

```
uint32_t BDuration::getSeconds ( )
```

Get number of seconds.

7.21.3.7 getMicroSeconds()

```
uint64_t BDuration::getMicroSeconds ( )
```

Get number of micro seconds.

7.21.3.8 hour()

```
int BDuration::hour ( )
```

7.21.3.9 minute()

```
int BDuration::minute ( )
```

7.21.3.10 second()

```
int BDuration::second ( )
```

7.21.3.11 microSecond()

```
int BDuration::microSecond ( )
```

7.21.3.12 getString()

```
BString BDuration::getString ( )
```

Get the time as an ISO date/time string.

7.21.3.13 setString()

```
BError BDuration::setString (
    BString time )
```

Set the time from an ISO date/time.

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

- [BDuration.h](#)
- [BDuration.cpp](#)

7.22 BEntry Class Reference

Manipulate a name value pair.

```
#include <BEntry.h>
```

Public Member Functions

- [BEntry](#) ()
- [BEntry](#) ([BString](#) name, [BString](#) value)
Set name and value.
- [BEntry](#) ([BString](#) line)
Set name and value from white space delimited string.
- [BString](#) [getName](#) ()
Get the name.
- [BString](#) [getValue](#) ()
Get the value.
- void [setLine](#) ([BString](#) line)
Set name and value from white space delimited string.
- void [setName](#) ([BString](#) name)
Set the name.
- void [setValue](#) ([BString](#) value)
Set the value.
- [BString](#) [line](#) ()
Return name and value as padded single string.
- void [print](#) ()
Print name and value.

7.22.1 Detailed Description

Manipulate a name value pair.

7.22.2 Constructor & Destructor Documentation

7.22.2.1 [BEntry](#)() [1/3]

```
BEntry::BEntry ( )
```

7.22.2.2 [BEntry](#)() [2/3]

```
BEntry::BEntry (
    BString name,
    BString value )
```

Set name and value.

7.22.2.3 BEntry() [3/3]

```
BEntry::BEntry (
    BString line )
```

Set name and value from white space delimited string.

7.22.3 Member Function Documentation

7.22.3.1 getName()

```
BString BEntry::getName ( )
```

Get the name.

7.22.3.2 getValue()

```
BString BEntry::getValue ( )
```

Get the value.

7.22.3.3 setLine()

```
void BEntry::setLine (
    BString line )
```

Set name and value from white space delimited string.

7.22.3.4 setName()

```
void BEntry::setName (
    BString name )
```

Set the name.

7.22.3.5 setValue()

```
void BEntry::setValue (
    BString value )
```

Set the value.

7.22.3.6 line()

```
BString BEntry::line ( )
```

Return name and value as padded single string.

7.22.3.7 print()

```
void BEntry::print ( )
```

Print name and value.

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

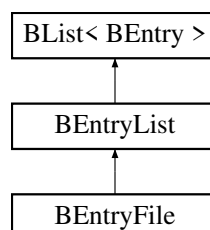
- [BEntry.h](#)
- [BEntry.cpp](#)

7.23 BEntryFile Class Reference

A file based list of string name/value pairs.

```
#include <BEntry.h>
```

Inheritance diagram for BEntryFile:



Public Member Functions

- [BEntryFile](#) ()
- [BEntryFile](#) (BString filename)
Opens entryfile.
- [~BEntryFile](#) ()
- int [open](#) (BString filename)
Opens entryfile.
- int [read](#) ()
Reads entry file and builds list.
- int [write](#) ()
Writes list to entryfile.
- int [writeList](#) (BEntryList &l)
Writes specified list to file.
- void [clear](#) ()
Clears current list.
- [BString filename](#) ()
Returns the filename.

Additional Inherited Members

7.23.1 Detailed Description

A file based list of string name/value pairs.

7.23.2 Constructor & Destructor Documentation

7.23.2.1 BEntryFile() [1/2]

```
BEntryFile::BEntryFile ( )
```

7.23.2.2 BEntryFile() [2/2]

```
BEntryFile::BEntryFile (
    BString filename )
```

Opens entryfile.

7.23.2.3 ~BEntryFile()

```
BEntryFile::~~BEntryFile ( )
```

7.23.3 Member Function Documentation

7.23.3.1 open()

```
int BEntryFile::open (
    BString filename )
```

Opens entryfile.

7.23.3.2 read()

```
int BEntryFile::read ( )
```

Reads entry file and builds list.

7.23.3.3 write()

```
int BEntryFile::write ( )
```

Writes list to entryfile.

7.23.3.4 writeList()

```
int BEntryFile::writeList (
    BEntryList & l )
```

Writes specified list to file.

7.23.3.5 clear()

```
void BEntryFile::clear ( ) [virtual]
```

Clears current list.

Reimplemented from [BEntryList](#).

7.23.3.6 filename()

```
BString BEntryFile::filename ( )
```

Returns the filename.

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

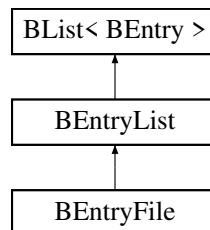
- [BEntry.h](#)
- [BEntry.cpp](#)

7.24 BEntryList Class Reference

List of Entries. Where each entry is a name value pair.

```
#include <BEntry.h>
```

Inheritance diagram for BEntryList:



Public Member Functions

- [BEntryList](#) ()
- int [isSet](#) ([BString](#) name)
1 if name is in list and value is set
- [BEntry](#) * [find](#) ([BString](#) name)
Returns entry if name is found otherwise NULL.
- [BString](#) [findValue](#) ([BString](#) name)
Returns value of name. Returns "" if name not found.
- int [setValue](#) ([BString](#) name, [BString](#) value)
Set the value of name. Returns 0 if name not found.
- int [setValueRaw](#) ([BString](#) name, [BString](#) value)
Raw setting of value without looking up existing entry.
- void [deleteEntry](#) ([BString](#) name)
Deletes the entry.
- void [print](#) ()
Print list.
- [BString](#) [getString](#) ()
Return list as string. Each Entry padded and on a new line.
- void [insert](#) ([Blter](#) &i, const [BEntry](#) &item)
- void [del](#) ([Blter](#) &i)
Delete specified item.
- void [clear](#) ()
Clear the list.
- [BEntryList](#) & [operator=](#) (const [BEntryList](#) &l)

Additional Inherited Members

7.24.1 Detailed Description

List of Entries. Where each entry is a name value pair.

7.24.2 Constructor & Destructor Documentation

7.24.2.1 BEntryList()

```
BEntryList::BEntryList ( )
```

7.24.3 Member Function Documentation

7.24.3.1 isSet()

```
int BEntryList::isSet (
    BString name )
```

1 if name is in list and value is set

7.24.3.2 find()

```
BEntry * BEntryList::find (
    BString name )
```

Returns entry if name is found otherwise NULL.

7.24.3.3 findValue()

```
BString BEntryList::findValue (
    BString name )
```

Returns value of name. Returns "" if name not found.

7.24.3.4 setValue()

```
int BEntryList::setValue (
    BString name,
    BString value )
```

Set the value of name. Returns 0 if name not found.

7.24.3.5 setValueRaw()

```
int BEntryList::setValueRaw (
    BString name,
    BString value )
```

Raw setting of value without looking up existing entry.

7.24.3.6 deleteEntry()

```
void BEntryList::deleteEntry (
    BString name )
```

Deletes the entry.

7.24.3.7 print()

```
void BEntryList::print ( )
```

Print list.

7.24.3.8 getString()

```
BString BEntryList::getString ( )
```

Return list as string. Each Entry padded and on a new line.

7.24.3.9 insert()

```
void BEntryList::insert (
    BIter & i,
    const BEntry & item )
```

7.24.3.10 del()

```
void BEntryList::del (
    BIter & i ) [virtual]
```

Delete specified item.

Reimplemented from [BList< BEntry >](#).

7.24.3.11 clear()

```
void BEntryList::clear ( ) [virtual]
```

Clear the list.

Reimplemented from [BList< BEntry >](#).

Reimplemented in [BEntryFile](#).

7.24.3.12 operator=()

```
BEntryList & BEntryList::operator= (
    const BEntryList & l )
```

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

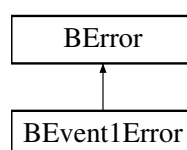
- [BEntry.h](#)
- [BEntry.cpp](#)

7.25 BError Class Reference

Error return class. This class is used to return the error status from a function. It encapsulates an integer error number and a string.

```
#include <BError.h>
```

Inheritance diagram for BError:



Public Member Functions

- **BError** (int errNo=**ErrorOk**, **BString** errStr="")
Create object.
- **BError** (**BString** errStr)
Create with error set and error string.
- **BError** copy ()
Return an independant copy.
- **BError** & **set** (int errNo, **BString** errStr="")
Set error number and message.
- **BError** & **clear** ()
Clear the error.
- **BError** & **setError** (**BString** errStr="")
Set error type ERROR with optional message.
- **BString** **getString** () const
Get error message.
- int **getNumber** () const
Get The error number.
- int **num** () const
Get The error number.
- const char * **str** () const
Return a char string.*
- int **getErrorNo** () const
Get The error number.
- **operator int** () const
Return error number.

7.25.1 Detailed Description

Error return class. This class is used to return the error status from a function. It encapsulates an integer error number and a string.

An error number of **ErrorOk** (0) indicates no error, a value of **ErrorMisc** (1) indicates some error and a value of **ErrorWarning** (2) indicates a warning. Specific error numbers are defined in **BErrorNum**. System low level errors (errno) are defined by negative values. Specific application errors are those above the value 64.

7.25.2 Constructor & Destructor Documentation

7.25.2.1 BError() [1/2]

```
BError::BError (
    int errNo = ErrorOk,
    BString errStr = "" )
```

Create object.

7.25.2.2 BError() [2/2]

```
BError::BError (
    BString errStr )
```

Create with error set and error string.

7.25.3 Member Function Documentation

7.25.3.1 copy()

```
BError BError::copy ( )
```

Return an independant copy.

7.25.3.2 set()

```
BError & BError::set (
    int errNo,
    BString errStr = "" )
```

Set error number and message.

7.25.3.3 clear()

```
BError & BError::clear ( )
```

Clear the error.

7.25.3.4 setError()

```
BError & BError::setError (
    BString errStr = "" )
```

Set error type ERROR with optional message.

7.25.3.5 getString()

```
BString BError::getString ( ) const
```

Get error message.

7.25.3.6 getNumber()

```
int BError::getNumber ( ) const
```

Get The error number.

7.25.3.7 num()

```
int BError::num ( ) const
```

Get The error number.

7.25.3.8 str()

```
const char * BError::str ( ) const
```

Return a char* string.

7.25.3.9 getErrorNo()

```
int BError::getErrorNo ( ) const
```

Get The error number.

7.25.3.10 operator int()

```
BError::operator int ( ) const [inline]
```

Return error number.

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

- [BError.h](#)
- [BError.cpp](#)

7.26 BErrorTime Class Reference

Error return class with time field.

```
#include <BErrorTime.h>
```

Public Types

- enum [Type](#) { [None](#) = 0 , [Error](#) = 1 }

Public Member Functions

- [BErrorTime](#) (int errNo=[None](#), [BTimeStamp](#) errTime=[BTimeStamp](#)(), [BString](#) errStr="")
Create object.
- [BErrorTime](#) & [set](#) (int errNo, [BTimeStamp](#) errTime=[BTimeStamp](#)(), [BString](#) errStr="")
Set error number and message.
- [BErrorTime](#) & [clear](#) ()
Clear the error.
- int [getErrorNo](#) () const
Get The error number.
- [BTimeStamp](#) [getTime](#) () const
Get time.
- [BString](#) [getString](#) () const
Get error message.
- [BErrorTime](#) [copy](#) ()
Return an independant copy.
- [operator int](#) () const
Return error number.

7.26.1 Detailed Description

Error return class with time field.

This provides an alternative to the standard [BError](#) return type for errors but includes [BTimeStamp](#) information.

7.26.2 Member Enumeration Documentation

7.26.2.1 Type

```
enum BErrorTime::Type
```

Enumerator

None	
Error	

7.26.3 Constructor & Destructor Documentation

7.26.3.1 BErrorTime()

```
BErrorTime::BErrorTime (
    int errNo = None,
    BTimeStamp errTime = BTimeStamp(),
    BString errStr = "" )
```

Create object.

7.26.4 Member Function Documentation

7.26.4.1 set()

```
BErrorTime & BErrorTime::set (
    int errNo,
    BTimeStamp errTime = BTimeStamp(),
    BString errStr = "" )
```

Set error number and message.

7.26.4.2 clear()

```
BErrorTime & BErrorTime::clear ( )
```

Clear the error.

7.26.4.3 getErrorNo()

```
int BErrorTime::getErrorNo ( ) const
```

Get The error number.

7.26.4.4 getTime()

```
BTimeStamp BErrorTime::getTime ( ) const
```

Get time.

7.26.4.5 getString()

```
BString BErrorTime::getString ( ) const
```

Get error message.

7.26.4.6 copy()

```
BErrorTime BErrorTime::copy ( )
```

Return an independant copy.

7.26.4.7 operator int()

```
BErrorTime::operator int ( ) const
```

Return error number.

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

- [BErrorTime.h](#)
- [BErrorTime.cpp](#)

7.27 BEvent Class Reference

An event description class.

```
#include <BEvent.h>
```

Public Member Functions

- [BEvent](#) (BUInt32 type=[BEventTypeNone](#), BUInt32 arg=0)
- [BUInt32 type](#) ()
- [BUInt32 arg](#) ()

7.27.1 Detailed Description

An event description class.

7.27.2 Constructor & Destructor Documentation

7.27.2.1 BEvent()

```
BEvent::BEvent (
    BUInt32 type = BEventTypeNone,
    BUInt32 arg = 0 )
```

7.27.3 Member Function Documentation

7.27.3.1 type()

```
BUInt32 BEvent::type ( )
```

7.27.3.2 arg()

```
BUInt32 BEvent::arg ( )
```

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

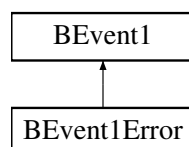
- [BEvent.h](#)
- [BEvent.cpp](#)

7.28 BEvent1 Class Reference

This class provides a base class for all event objects that can be sent over the events interface.

```
#include <BEvent1.h>
```

Inheritance diagram for BEvent1:



Public Member Functions

- [BEvent1](#) (uint32_t type)
- virtual [~BEvent1](#) ()
- uint32_t [getType](#) ()
- virtual [BError](#) [getBinary](#) (void *data, uint32_t &size)
- virtual [BError](#) [setBinary](#) (void *data, uint32_t &size)

7.28.1 Detailed Description

This class provides a base class for all event objects that can be sent over the events interface.

7.28.2 Constructor & Destructor Documentation

7.28.2.1 BEvent1()

```
BEvent1::BEvent1 (
    uint32_t type )
```

7.28.2.2 ~BEvent1()

```
BEvent1::~~BEvent1 ( ) [virtual]
```

7.28.3 Member Function Documentation

7.28.3.1 getType()

```
uint32_t BEvent1::getType ( )
```

7.28.3.2 getBinary()

```
BError BEvent1::getBinary (
    void * data,
    uint32_t & size ) [virtual]
```

Reimplemented in [BEvent1Error](#).

7.28.3.3 setBinary()

```
BError BEvent1::setBinary (
    void * data,
    uint32_t & size ) [virtual]
```

Reimplemented in [BEvent1Error](#).

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

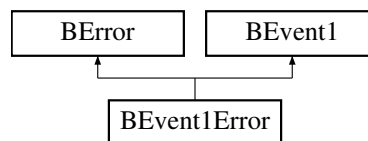
- [BEvent1.h](#)
- [BEvent1.cpp](#)

7.29 BEvent1Error Class Reference

This class provides a class to send a [BError](#) event.

```
#include <BEvent1.h>
```

Inheritance diagram for BEvent1Error:



Public Member Functions

- [BEvent1Error](#) (int errNo=[ErrorOk](#), [BString](#) errStr="")
- [BError getBinary](#) (void *data, uint32_t &size)
- [BError setBinary](#) (void *data, uint32_t &size)

7.29.1 Detailed Description

This class provides a class to send a [BError](#) event.

7.29.2 Constructor & Destructor Documentation

7.29.2.1 BEvent1Error()

```
BEvent1Error::BEvent1Error (
    int errNo = ErrorOk,
    BString errStr = "" )
```

7.29.3 Member Function Documentation

7.29.3.1 `getBinary()`

```
BError BEvent1Error::getBinary (
    void * data,
    uint32_t & size ) [virtual]
```

Reimplemented from [BEvent1](#).

7.29.3.2 `setBinary()`

```
BError BEvent1Error::setBinary (
    void * data,
    uint32_t & size ) [virtual]
```

Reimplemented from [BEvent1](#).

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

- [BEvent1.h](#)
- [BEvent1.cpp](#)

7.30 BEvent1Int Class Reference

This class provides an interface for sending simple integer events via a file descriptor. This allows threads to send events that can be picked up by the poll system call.

```
#include <BEvent1.h>
```

Public Member Functions

- [BEvent1Int](#) ()
- [~BEvent1Int](#) ()
- void [clear](#) ()
Clear events pending.
- [BError sendEvent](#) (int event)
Send an event.
- [BError getEvent](#) (int &event, int timeOutUs=-1)
Receive the event.
- int [getFd](#) ()

7.30.1 Detailed Description

This class provides an interface for sending simple integer events via a file descriptor. This allows threads to send events that can be picked up by the poll system call.

7.30.2 Constructor & Destructor Documentation

7.30.2.1 BEvent1Int()

```
BEvent1Int::BEvent1Int ( )
```

7.30.2.2 ~BEvent1Int()

```
BEvent1Int::~~BEvent1Int ( )
```

7.30.3 Member Function Documentation

7.30.3.1 clear()

```
void BEvent1Int::clear ( )
```

Clear events pending.

7.30.3.2 sendEvent()

```
BError BEvent1Int::sendEvent (
    int event )
```

Send an event.

7.30.3.3 getEvent()

```
BError BEvent1Int::getEvent (
    int & event,
    int timeoutUs = -1 )
```

Receive the event.

7.30.3.4 getFd()

```
int BEvent1Int::getFd ( )
```

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

- [BEvent1.h](#)
- [BEvent1.cpp](#)

7.31 BEvent1Pipe Class Reference

This class provides a base interface for sending events via a pipe. This allows threads to send events that can be picked up by the poll system call.

```
#include <BEvent1.h>
```

Public Member Functions

- [BEvent1Pipe](#) ()
- [~BEvent1Pipe](#) ()
- void [clear](#) ()
Clear events pending.
- [BError sendEvent](#) ([BEvent1](#) *event)
Send an event.
- [BError getEvent](#) ([BEvent1](#) *event, int timeOutUs=-1)
Receive the event.
- int [getReceiveFd](#) ()
returns the receive file descriptor for the poll system call

7.31.1 Detailed Description

This class provides a base interface for sending events via a pipe. This allows threads to send events that can be picked up by the poll system call.

7.31.2 Constructor & Destructor Documentation

7.31.2.1 BEvent1Pipe()

```
BEvent1Pipe::BEvent1Pipe ( )
```

7.31.2.2 ~BEvent1Pipe()

```
BEvent1Pipe::~~BEvent1Pipe ( )
```

7.31.3 Member Function Documentation

7.31.3.1 clear()

```
void BEvent1Pipe::clear ( )
```

Clear events pending.

7.31.3.2 sendEvent()

```
BError BEvent1Pipe::sendEvent (
    BEvent1 * event )
```

Send an event.

7.31.3.3 getEvent()

```
BError BEvent1Pipe::getEvent (
    BEvent1 * event,
    int timeoutUs = -1 )
```

Receive the event.

7.31.3.4 getReceiveFd()

```
int BEvent1Pipe::getReceiveFd ( )
```

returns the receive file descriptor for the poll system call

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

- [BEvent1.h](#)
- [BEvent1.cpp](#)

7.32 BEventPipe Class Reference

This class provides an interface for sending simple integer events via a pipe file descriptor.

```
#include <BEvent.h>
```

Public Member Functions

- [BEventPipe](#) ()
- [~BEventPipe](#) ()
- void [clear](#) ()
Clear events pending.
- int [getFd](#) ()
- [BUInt writeAvailable](#) () const
- [BError write](#) (const [BEvent](#) &event, [BTimeout](#) timeout=[BTimeoutForever](#))
Append an item onto the queue.
- [BUInt readAvailable](#) () const
- [BError read](#) ([BEvent](#) &event, [BTimeout](#) timeout=[BTimeoutForever](#))
Get an item from the queue.

7.32.1 Detailed Description

This class provides an interface for sending simple integer events via a pipe file descriptor.

7.32.2 Constructor & Destructor Documentation

7.32.2.1 BEventPipe()

```
BEventPipe::BEventPipe ( )
```

7.32.2.2 ~BEventPipe()

```
BEventPipe::~~BEventPipe ( )
```

7.32.3 Member Function Documentation

7.32.3.1 clear()

```
void BEventPipe::clear ( )
```

Clear events pending.

7.32.3.2 getFd()

```
int BEventPipe::getFd ( )
```

7.32.3.3 writeAvailable()

```
BUInt BEventPipe::writeAvailable ( ) const
```

7.32.3.4 write()

```
BError BEventPipe::write (
    const BEvent & event,
    BTimeout timeout = BTimeoutForever )
```

Append an item onto the queue.

7.32.3.5 readAvailable()

```
BUInt BEventPipe::readAvailable ( ) const
```

7.32.3.6 read()

```
BError BEventPipe::read (
    BEvent & event,
    BTimeout timeout = BTimeoutForever )
```

Get an item from the queue.

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

- [BEvent.h](#)
- [BEvent.cpp](#)

7.33 BFifo< Type > Class Template Reference

A template first in first out data buffer to store any object types.

```
#include <BFifo.h>
```

Public Member Functions

- [BFifo](#) (BUInt size)
- [~BFifo](#) ()
- void [clear](#) ()
- [BUInt size](#) ()
Returns fifo size.
- [BError resize](#) (BUInt size)
Resize FIFO, clears it as well.
- [BError rebase](#) ()
Rebases fifo so read pointer is at zero moving memory as needed.
- [BUInt writeAvailable](#) ()
How many items that can be written.
- [BUInt writeAvailableChunk](#) ()
How many items that can be written in a chunk.
- [BError write](#) (const Type v)
Write a single item.
- [BError write](#) (const Type *data, BUInt num)
Write a set of items. Can only write a maximum of [writeAvailableChunk\(\)](#) to save going beyond end of FIFO buffer.
- Type * [writeData](#) ()
Returns a pointer to the data.
- Type * [writeData](#) (BUInt &num)
Returns a pointer to the data and how many can be written in a chunk.
- void [writeDone](#) (BUInt num)
Indicates when write is complete.
- void [writeBackup](#) (BUInt num)
Backup, remove num items at end of fifo. Careful, make sure read is not already happening.
- [BUInt readAvailable](#) ()
How many items are available to read.
- [BUInt readAvailableChunk](#) ()
How many items are available to read in a chunk.
- Type [read](#) ()
Read one item.
- [BError read](#) (Type *data, BUInt num)
Read a set of items.
- Type * [readData](#) ()
Returns a pointer to the data.
- Type * [readData](#) (BUInt &num)
Returns a pointer to the data and how many can be read in a chunk.
- void [readDone](#) (BUInt num)
- Type [readPos](#) (BUInt pos)
Read item at given offset from current read position.
- void [writePos](#) (BUInt pos, const Type &v)
Write item at given offset from current read position.
- Type & [operator\[\]](#) (int pos)
Direct access to read samples in buffer.

Protected Attributes

- BUInt `osize`
The size of the FIFO.
- Type * `odata`
FIFO memory buffer.
- volatile BUInt `owritePos`
The write pointer.
- volatile BUInt `oreadPos`
The read pointer.

7.33.1 Detailed Description

```
template<class Type>
class BFifo< Type >
```

A template first in first out data buffer to store any object types.

This class stores data in a ring buffer. It can store up to (size - 1) items. It has separate read and write pointers. These are thread safe. Note the read and write routines do not bounds check the Fifo. You have to use [readAvailable\(\)](#)/[writeAvailable\(\)](#) functions to check how much can be read/written before performing the reads or writes.

7.33.2 Constructor & Destructor Documentation

7.33.2.1 BFifo()

```
template<class Type >
BFifo< Type >::BFifo (
    BUInt size )
```

7.33.2.2 ~BFifo()

```
template<class Type >
BFifo< Type >::~~BFifo ( )
```

7.33.3 Member Function Documentation

7.33.3.1 clear()

```
template<class Type >
void BFifo< Type >::clear ( )
```

7.33.3.2 size()

```
template<class Type >
BUInt BFifo< Type >::size ( )
```

Returns fifo size.

7.33.3.3 resize()

```
template<class Type >
BError BFifo< Type >::resize (
    BUInt size )
```

Resize FIFO, clears it as well.

7.33.3.4 rebase()

```
template<class Type >
BError BFifo< Type >::rebase ( )
```

Rebases fifo so read pointer is at zero moving memory as needed.

7.33.3.5 writeAvailable()

```
template<class Type >
BUInt BFifo< Type >::writeAvailable ( )
```

How many items that can be written.

7.33.3.6 writeAvailableChunk()

```
template<class Type >
BUInt BFifo< Type >::writeAvailableChunk ( )
```

How many items that can be written in a chunk.

7.33.3.7 write() [1/2]

```
template<class Type >
BError BFifo< Type >::write (
    const Type v )
```

Write a single item.

7.33.3.8 write() [2/2]

```
template<class Type >
BError BFifo< Type >::write (
    const Type * data,
    BUInt num )
```

Write a set of items. Can only write a maximum of [writeAvailableChunk\(\)](#) to save going beyond end of FIFO buffer.

7.33.3.9 writeData() [1/2]

```
template<class Type >
Type * BFifo< Type >::writeData ( )
```

Returns a pointer to the data.

7.33.3.10 writeData() [2/2]

```
template<class Type >
Type * BFifo< Type >::writeData (
    BUInt & num )
```

Returns a pointer to the data and how many can be written in a chunk.

7.33.3.11 writeDone()

```
template<class Type >
void BFifo< Type >::writeDone (
    BUInt num )
```

Indicates when write is complete.

7.33.3.12 writeBackup()

```
template<class Type >
void BFifo< Type >::writeBackup (
    BUInt num )
```

Backup, remove num items at end of fifo. Careful, make sure read is not already happening.

7.33.3.13 readAvailable()

```
template<class Type >
BUInt BFifo< Type >::readAvailable ( )
```

How many items are available to read.

7.33.3.14 readAvailableChunk()

```
template<class Type >
BUInt BFifo< Type >::readAvailableChunk ( )
```

How many items are available to read in a chunk.

7.33.3.15 read() [1/2]

```
template<class Type >
Type BFifo< Type >::read ( )
```

Read one item.

7.33.3.16 read() [2/2]

```
template<class Type >
BError BFifo< Type >::read (
    Type * data,
    BUInt num )
```

Read a set of items.

7.33.3.17 readData() [1/2]

```
template<class Type >
Type * BFifo< Type >::readData ( )
```

Returns a pointer to the data.

7.33.3.18 readData() [2/2]

```
template<class Type >
Type * BFifo< Type >::readData (
    BUInt & num )
```

Returns a pointer to the data and how many can be read in a chunk.

7.33.3.19 readDone()

```
template<class Type >
void BFifo< Type >::readDone (
    BUInt num )
```

7.33.3.20 readPos()

```
template<class Type >
Type BFifo< Type >::readPos (
    BUInt pos )
```

Read item at given offset from current read position.

7.33.3.21 writePos()

```
template<class Type >
void BFifo< Type >::writePos (
    BUInt pos,
    const Type & v )
```

Write item at given offset from current read position.

7.33.3.22 operator[]()

```
template<class Type >
Type & BFifo< Type >::operator[] (
    int pos )
```

Direct access to read samples in buffer.

7.33.4 Member Data Documentation

7.33.4.1 osize

```
template<class Type >
BUInt BFifo< Type >::osize [protected]
```

The size of the FIFO.

7.33.4.2 odata

```
template<class Type >
Type* BFifo< Type >::odata [protected]
```

FIFO memory buffer.

7.33.4.3 owritePos

```
template<class Type >
volatile BUInt BFifo< Type >::owritePos [protected]
```

The write pointer.

7.33.4.4 oreadPos

```
template<class Type >
volatile BUInt BFifo< Type >::oreadPos [protected]
```

The read pointer.

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

- [BFifo.h](#)

7.34 BFifoCirc< Type > Class Template Reference

This class implements a thread safe FIFO buffer using a binary sized circular memory.

```
#include <BFifoCirc.h>
```

Public Types

- enum { `defaultSize` = 1024 }

Public Member Functions

- `BFifoCirc` (uint32_t `size`=`defaultSize`)
- `~BFifoCirc` ()
- uint32_t `size` ()
Return the buffers actual size.
- void `clear` ()
Clear all of the data in the buffer.
- uint32_t `writeAvailable` ()
Returns the space available to write.
- `BError writeWaitAvailable` (uint32_t numFifoSamples)
Wait for the given number of samples.
- `BError write` (const Type *`data`, uint32_t numFifoSamples)
Writes the data to the buffer. Blocks until complete.
- Type * `writeData` ()
Return a pointer to the current start of the buffer.
- void `writeDone` (uint32_t numFifoSamples)
Update the write pointer.
- uint32_t `readAvailable` ()
Returns the number of bytes of data available.
- `BError readWaitAvailable` (uint32_t numFifoSamples)
Wait for given number of samples.
- `BError read` (Type *`data`, uint32_t numFifoSamples)
- Type * `readData` ()
Pointer to raw data.
- `BError readDone` (uint32_t numFifoSamples)
Updates read pointer.
- Type & `operator[]` (int pos)
Direct access to read samples in buffer.

Protected Member Functions

- `BError mapCircularBuffer` (uint32_t `size`)
- void `unmapCircularBuffer` ()

Protected Attributes

- [BMutex olock](#)
- `uint32_t ovmSize`
- `uint32_t osize`
- `Type * odata`
- [BFifoCircPos owritePos](#)
Current write position.
- [BCondValue owriteNumFifoSamples](#)
The number of samples in the FIFO.
- [BFifoCircPos oreadPos](#)
Current read position.

7.34.1 Detailed Description

```
template<class Type>
class BFifoCirc< Type >
```

This class implements a thread safe FIFO buffer using a binary sized circular memory.

This class stores data in a ring buffer where the actual buffer is circular. It can store up to (size - 1) items. It has separate read and write pointers. These are thread safe. Note the read and write routines do not bounds check the Fifo. You have to use [readAvailable\(\)](#)/[writeAvailable\(\)](#) functions to check how much can be read/written before performing the reads or writes. The CPU's MMU is used to create a binary sized memory area that wraps around on itself.

7.34.2 Member Enumeration Documentation

7.34.2.1 anonymous enum

```
template<class Type >
anonymous enum
```

Enumerator

defaultSize	
-------------	--

7.34.3 Constructor & Destructor Documentation

7.34.3.1 BFifoCirc()

```
template<class Type >
BFifoCirc< Type >::BFifoCirc (
    uint32_t size = defaultSize )
```


7.34.3.2 ~BFifoCirc()

```
template<class Type >
BFifoCirc< Type >::~~BFifoCirc ( )
```

7.34.4 Member Function Documentation

7.34.4.1 size()

```
template<class Type >
uint32_t BFifoCirc< Type >::size ( )
```

Return the buffers actual size.

7.34.4.2 clear()

```
template<class Type >
void BFifoCirc< Type >::clear ( )
```

Clear all of the data in the buffer.

7.34.4.3 writeAvailable()

```
template<class Type >
uint32_t BFifoCirc< Type >::writeAvailable ( )
```

Returns the space available to write.

7.34.4.4 writeWaitAvailable()

```
template<class Type >
BError BFifoCirc< Type >::writeWaitAvailable (
    uint32_t numFifoSamples )
```

Wait for the given number of samples.

7.34.4.5 write()

```
template<class Type >
BError BFifoCirc< Type >::write (
    const Type * data,
    uint32_t numFifoSamples )
```

Writes the data to the buffer. Blocks until complete.

7.34.4.6 writeData()

```
template<class Type >
Type * BFifoCirc< Type >::writeData ( )
```

Return a pointer to the current start of the buffer.

7.34.4.7 writeDone()

```
template<class Type >
void BFifoCirc< Type >::writeDone (
    uint32_t numFifoSamples )
```

Update the write pointer.

7.34.4.8 readAvailable()

```
template<class Type >
uint32_t BFifoCirc< Type >::readAvailable ( )
```

Returns the number of bytes of data available.

7.34.4.9 readWaitAvailable()

```
template<class Type >
BError BFifoCirc< Type >::readWaitAvailable (
    uint32_t numFifoSamples )
```

Wait for given number of samples.

7.34.4.10 read()

```
template<class Type >
BError BFifoCirc< Type >::read (
    Type * data,
    uint32_t numFifoSamples )
```

7.34.4.11 readData()

```
template<class Type >
Type * BFifoCirc< Type >::readData ( )
```

Pointer to raw data.

7.34.4.12 readDone()

```
template<class Type >
BError BFifoCirc< Type >::readDone (
    uint32_t numFifoSamples )
```

Updates read pointer.

7.34.4.13 operator[]()

```
template<class Type >
Type & BFifoCirc< Type >::operator[] (
    int pos )
```

Direct access to read samples in buffer.

7.34.4.14 mapCircularBuffer()

```
template<class Type >
BError BFifoCirc< Type >::mapCircularBuffer (
    uint32_t size ) [protected]
```

7.34.4.15 unmapCircularBuffer()

```
template<class Type >
void BFifoCirc< Type >::unmapCircularBuffer ( ) [protected]
```

7.34.5 Member Data Documentation

7.34.5.1 olock

```
template<class Type >  
BMutex BFifoCirc< Type >::olock [protected]
```

7.34.5.2 ovmSize

```
template<class Type >  
uint32_t BFifoCirc< Type >::ovmSize [protected]
```

7.34.5.3 osize

```
template<class Type >  
uint32_t BFifoCirc< Type >::osize [protected]
```

7.34.5.4 odata

```
template<class Type >  
Type* BFifoCirc< Type >::odata [protected]
```

7.34.5.5 owritePos

```
template<class Type >  
BFifoCircPos BFifoCirc< Type >::owritePos [protected]
```

Current write position.

7.34.5.6 owriteNumFifoSamples

```
template<class Type >  
BCondValue BFifoCirc< Type >::owriteNumFifoSamples [protected]
```

The number of samples in the FIFO.

7.34.5.7 oreadPos

```
template<class Type >
BFifoCircPos BFifoCirc< Type >::oreadPos [protected]
```

Current read position.

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

- [BFifoCirc.h](#)

7.35 BFifoCircPos Class Reference

This class implements a pointer into the Fifo's circular buffer.

```
#include <BFifoCirc.h>
```

Public Member Functions

- [BFifoCircPos](#) (uint32_t size)
- void [setSize](#) (uint32_t size)
- void [set](#) (uint32_t pos)
Sets the position.
- uint32_t [pos](#) ()
The current position.
- void [increment](#) (uint32_t numFifoSamples)
Increment the pointer by the given value.
- uint32_t [difference](#) (const [BFifoCircPos](#) &pos)
Return the difference between the two pointers.
- [operator int](#) ()
- void [operator+=](#) (uint32_t numFifoSamples)
- int [operator==](#) (const [BFifoCircPos](#) &pos)
- int [operator!=](#) (const [BFifoCircPos](#) &pos)

7.35.1 Detailed Description

This class implements a pointer into the Fifo's circular buffer.

7.35.2 Constructor & Destructor Documentation

7.35.2.1 BFifoCircPos()

```
BFifoCircPos::BFifoCircPos (
    uint32_t size )
```

7.35.3 Member Function Documentation

7.35.3.1 setSize()

```
void BFifoCircPos::setSize (
    uint32_t size )
```

7.35.3.2 set()

```
void BFifoCircPos::set (
    uint32_t pos )
```

Sets the position.

7.35.3.3 pos()

```
uint32_t BFifoCircPos::pos ( )
```

The current position.

7.35.3.4 increment()

```
void BFifoCircPos::increment (
    uint32_t numFifoSamples )
```

Increment the pointer by the given value.

7.35.3.5 difference()

```
uint32_t BFifoCircPos::difference (
    const BFifoCircPos & pos )
```

Return the difference between the two pointers.

7.35.3.6 operator int()

```
BFifoCircPos::operator int ( )
```

7.35.3.7 operator+=()

```
void BFifoCircPos::operator+= (
    uint32_t numFifoSamples )
```

7.35.3.8 operator==()

```
int BFifoCircPos::operator== (
    const BFifoCircPos & pos )
```

7.35.3.9 operator!=(=)

```
int BFifoCircPos::operator!= (
    const BFifoCircPos & pos )
```

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

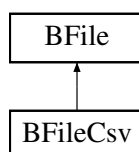
- [BFifoCirc.h](#)
- [BFifoCirc.cpp](#)

7.36 BFile Class Reference

File operations class.

```
#include <BFile.h>
```

Inheritance diagram for BFile:



Public Member Functions

- [BFile](#) ()
- [BFile](#) (const [BFile](#) &file)
Create opened specified file.
- [~BFile](#) ()
- [BError open](#) ([BString](#) name, [BString](#) mode)
Open file.
- [BError open](#) (FILE *file)
Assign object to opened file handle.
- [BError open](#) (int fd, [BString](#) mode)
Assign object to opened file descriptor.
- [BError openTemp](#) ([BString](#) name, [BString](#) mode)
Open a temporary file with the given name prefix.
- [BError close](#) ()
Close file.
- int [isOpen](#) ()
Returns 1 if the file is open.
- int [isEnd](#) ()
Returns 1 if at the end of the file, 0 otherwise.
- FILE * [getFd](#) ()
File descriptor.
- [BUInt64 length](#) ()
File size in bytes.
- int [setVBuf](#) (char *buf, int mode, size_t size)
Set stream buffering options.
- int [read](#) (void *buf, int nbytes)
Read from file.
- int [readString](#) ([BString](#) &str)
Read string. (ref fgets)
- char * [fgets](#) (char *buf, size_t size)
- int [write](#) (const void *buf, int nbytes)
Write to file.
- int [writeString](#) (const [BString](#) &str)
Write string to file.
- int [seek](#) ([BUInt64](#) pos)
Set seek position.
- [BUInt64 position](#) ()
The files position.
- int [printf](#) (const char *fmt,...)
Formatted print into the file.
- [BError truncate](#) ()
Truncate the file.
- [BError flush](#) ()
Flush the file.
- [BString fileName](#) ()
Return file name.
- [BFile](#) & [operator=](#) (const [BFile](#) &file)

7.36.1 Detailed Description

File operations class.

7.36.2 Constructor & Destructor Documentation

7.36.2.1 BFile() [1/2]

```
BFile::BFile ( )
```

7.36.2.2 BFile() [2/2]

```
BFile::BFile (
    const BFile & file )
```

Create opened specified file.

7.36.2.3 ~BFile()

```
BFile::~~BFile ( )
```

7.36.3 Member Function Documentation

7.36.3.1 open() [1/3]

```
BError BFile::open (
    BString name,
    BString mode )
```

Open file.

7.36.3.2 open() [2/3]

```
BError BFile::open (
    FILE * file )
```

Assign object to opened file handle.

7.36.3.3 open() [3/3]

```
BError BFile::open (
    int fd,
    BString mode )
```

Assign object to opened file descriptor.

7.36.3.4 openTemp()

```
BError BFile::openTemp (
    BString name,
    BString mode )
```

Open a temporary file with the given name prefix.

7.36.3.5 close()

```
BError BFile::close ( )
```

Close file.

7.36.3.6 isOpen()

```
int BFile::isOpen ( )
```

Returns 1 if the file is open.

7.36.3.7 isEnd()

```
int BFile::isEnd ( )
```

Returns 1 if at the end of the file, 0 otherwise.

7.36.3.8 getFd()

```
FILE * BFile::getFd ( )
```

File descriptor.

7.36.3.9 length()

```
BUInt64 BFile::length ( )
```

File size in bytes.

7.36.3.10 setVBuf()

```
int BFile::setVBuf (
    char * buf,
    int mode,
    size_t size )
```

Set stream buffering options.

7.36.3.11 read()

```
int BFile::read (
    void * buf,
    int nbytes )
```

Read from file.

7.36.3.12 readString()

```
int BFile::readString (
    BString & str )
```

Read string. (ref fgets)

7.36.3.13 fgets()

```
char * BFile::fgets (
    char * buf,
    size_t size )
```

7.36.3.14 write()

```
int BFile::write (
    const void * buf,
    int nbytes )
```

Write to file.

7.36.3.15 writeString()

```
int BFile::writeString (
    const BString & str )
```

Write string to file.

7.36.3.16 seek()

```
int BFile::seek (
    BUInt64 pos )
```

Set seek position.

7.36.3.17 position()

```
BUInt64 BFile::position ( )
```

The files position.

7.36.3.18 printf()

```
int BFile::printf (
    const char * fmt,
    ... )
```

Formatted print into the file.

7.36.3.19 truncate()

```
BError BFile::truncate ( )
```

Truncate the file.

7.36.3.20 flush()

```
BError BFile::flush ( )
```

Flush the file.

7.36.3.21 fileName()

```
BString BFile::fileName ( )
```

Return file name.

7.36.3.22 operator=()

```
BFile & BFile::operator= (
    const BFile & file )
```

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

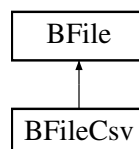
- [BFile.h](#)
- [BFile.cpp](#)

7.37 BFileCsv Class Reference

A class to read and write CSV formatted files.

```
#include <BFileCsv.h>
```

Inheritance diagram for BFileCsv:



Public Member Functions

- [BFileCsv](#) (char separator=';')
- [BError readCsv](#) ([BStringList](#) &csvList)
- [BError writeCsv](#) ([BStringList](#) &csvList)

7.37.1 Detailed Description

A class to read and write CSV formatted files.

7.37.2 Constructor & Destructor Documentation

7.37.2.1 BFileCsv()

```
BFileCsv::BFileCsv (  
    char separator = ';' )
```

7.37.3 Member Function Documentation

7.37.3.1 readCsv()

```
BError BFileCsv::readCsv (  
    BStringList & csvList )
```

7.37.3.2 writeCsv()

```
BError BFileCsv::writeCsv (  
    BStringList & csvList )
```

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

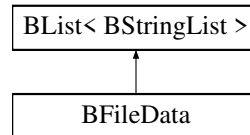
- [BFileCsv.h](#)
- [BFileCsv.cpp](#)

7.38 BFileData Class Reference

A class to implement a data storage file.

```
#include <BFileData.h>
```

Inheritance diagram for BFileData:



Public Member Functions

- [BError open](#) ([BString](#) filename)
- [BError getNextId](#) (int &id)
- [BError find](#) (int id, [BStringList](#) &csvList)
- [BError write](#) (int id, [BStringList](#) &csvList)
- [BError del](#) (int id)

Additional Inherited Members

7.38.1 Detailed Description

A class to implement a data storage file.

7.38.2 Member Function Documentation

7.38.2.1 open()

```
BError BFileData::open (  
    BString filename )
```

7.38.2.2 getNextId()

```
BError BFileData::getNextId (  
    int & id )
```

7.38.2.3 find()

```
BError BFileData::find (
    int id,
    BStringList & csvList )
```

7.38.2.4 write()

```
BError BFileData::write (
    int id,
    BStringList & csvList )
```

7.38.2.5 del()

```
BError BFileData::del (
    int id )
```

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

- [BFileData.h](#)
- [BFileData.cpp](#)

7.39 BFirmwareFileHeader Struct Reference

```
#include <BFirmware.h>
```

Public Attributes

- [BUInt32 magic](#)
- [BUInt32 itemType](#)
- [BUInt32 fileLength](#)
- [BUInt32 checksum](#)
- [BUInt32 platform](#)
- [BUInt32 format](#)
- [BUInt32 numSegments](#)
- [BUInt32 startAddress](#)
- [BUInt8 ver0](#)
- [BUInt8 ver1](#)
- [BUInt8 ver2](#)
- [BUInt8 ver3](#)
- [BUInt32 special](#) [7]

7.39.1 Member Data Documentation

7.39.1.1 magic

`BUInt32` BFirmwareFileHeader::magic

7.39.1.2 itemType

`BUInt32` BFirmwareFileHeader::itemType

7.39.1.3 fileLength

`BUInt32` BFirmwareFileHeader::fileLength

7.39.1.4 checksum

`BUInt32` BFirmwareFileHeader::checksum

7.39.1.5 platform

`BUInt32` BFirmwareFileHeader::platform

7.39.1.6 format

`BUInt32` BFirmwareFileHeader::format

7.39.1.7 numSegments

`BUInt32` BFirmwareFileHeader::numSegments

7.39.1.8 startAddress

`BUInt32 BFirmwareFileHeader::startAddress`

7.39.1.9 ver0

`BUInt8 BFirmwareFileHeader::ver0`

7.39.1.10 ver1

`BUInt8 BFirmwareFileHeader::ver1`

7.39.1.11 ver2

`BUInt8 BFirmwareFileHeader::ver2`

7.39.1.12 ver3

`BUInt8 BFirmwareFileHeader::ver3`

7.39.1.13 special

`BUInt32 BFirmwareFileHeader::special[7]`

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

- [BFirmware.h](#)

7.40 BFirmwareInfo Struct Reference

```
#include <BFirmware.h>
```

Public Attributes

- [BUInt32 magic](#)
- [BUInt32 length](#)
- [BUInt32 checksum](#)
- [BUInt8 type](#)
- [BUInt8 ver0](#)
- [BUInt8 ver1](#)
- [BUInt8 ver2](#)

7.40.1 Member Data Documentation

7.40.1.1 magic

[BUInt32](#) BFirmwareInfo::magic

7.40.1.2 length

[BUInt32](#) BFirmwareInfo::length

7.40.1.3 checksum

[BUInt32](#) BFirmwareInfo::checksum

7.40.1.4 type

[BUInt8](#) BFirmwareInfo::type

7.40.1.5 ver0

[BUInt8](#) BFirmwareInfo::ver0

7.40.1.6 ver1

`BUInt8 BFWareInfo::ver1`

7.40.1.7 ver2

`BUInt8 BFWareInfo::ver2`

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

- [BFWare.h](#)

7.41 BFWareSegHeader Struct Reference

```
#include <BFWare.h>
```

Public Attributes

- [BUInt32 magic](#)
- [BUInt32 itemType](#)
- [BUInt32 fileLength](#)
- [BUInt32 checksum](#)
- [BUInt32 platform](#)
- [BUInt32 format](#)
- [BUInt32 dataLength](#)
- [BUInt32 address](#)
- [BUInt32 length](#)
- [BUInt32 special](#) [7]

7.41.1 Member Data Documentation

7.41.1.1 magic

`BUInt32 BFWareSegHeader::magic`

7.41.1.2 itemType

`BUInt32 BFWareSegHeader::itemType`

7.41.1.3 fileLength

`BUInt32 BFirmwareSegHeader::fileLength`

7.41.1.4 checksum

`BUInt32 BFirmwareSegHeader::checksum`

7.41.1.5 platform

`BUInt32 BFirmwareSegHeader::platform`

7.41.1.6 format

`BUInt32 BFirmwareSegHeader::format`

7.41.1.7 dataLength

`BUInt32 BFirmwareSegHeader::dataLength`

7.41.1.8 address

`BUInt32 BFirmwareSegHeader::address`

7.41.1.9 length

`BUInt32 BFirmwareSegHeader::length`

7.41.1.10 special

```
BUInt32 BFirmwareSegHeader::special[7]
```

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

- [BFirmware.h](#)

7.42 Blter Class Reference

Iterator for BLists.

```
#include <BList.h>
```

Public Member Functions

- [Blter](#) ([BNode](#) *i=0)
- [operator BNode *](#) ()
- [int operator==](#) (const [Blter](#) &i)
- [int valid](#) ()

7.42.1 Detailed Description

Iterator for BLists.

7.42.2 Constructor & Destructor Documentation

7.42.2.1 Blter()

```
BIter::BIter (  
    BNode * i = 0 ) [inline]
```

7.42.3 Member Function Documentation

7.42.3.1 operator BNode *()

```
BIter::operator BNode * ( ) [inline]
```

7.42.3.2 operator==()

```
int BIter::operator== (
    const BIter & i ) [inline]
```

7.42.3.3 valid()

```
int BIter::valid ( ) [inline]
```

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

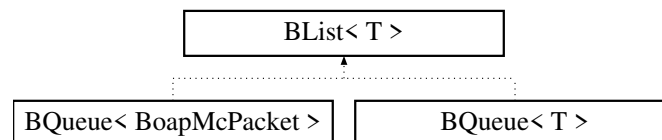
- [BList.h](#)

7.43 BList< T > Class Template Reference

Template based list class.

```
#include <BList.h>
```

Inheritance diagram for BList< T >:



Classes

- class [Node](#)
A [BList](#) internal [Node](#).

Public Types

- typedef int(* [SortFunc](#)) (T &a, T &b)
Prototype for sorting function.

Public Member Functions

- [BList](#) ()
- [BList](#) (const [BList](#)< T > &l)
- virtual [~BList](#) ()
- void [start](#) ([Blter](#) &i) const
Iterator to start of list.
- [Blter begin](#) () const
Iterator for start of list.
- [Blter end](#) () const
Iterator for end of list.
- [Blter end](#) ([Blter](#) &i) const
Iterator for end of list.
- void [next](#) ([Blter](#) &i) const
Iterator for next item in list.
- void [prev](#) ([Blter](#) &i)
Iterator for previous item in list.
- [Blter goTo](#) (int pos) const
Iterator for pos item in list.
- int [position](#) ([Blter](#) i)
Postition in list item with iterator i.
- unsigned int [number](#) () const
Number of items in list.
- unsigned int [size](#) () const
Number of items in list.
- int [isStart](#) ([Blter](#) &i) const
True if iterator refers to first item.
- int [isEnd](#) ([Blter](#) &i) const
True if iterator refers to last item.
- T & [front](#) ()
Get first item in list.
- T & [rear](#) ()
Get last item in list.
- T & [get](#) ([Blter](#) i)
Get item specified by iterator in list.
- const T & [get](#) ([Blter](#) i) const
Get item specified by iterator in list.
- void [append](#) (const T &item)
Append item to list.
- virtual void [insert](#) ([Blter](#) &i, const T &item)
Insert item before item.
- void [insertAfter](#) ([Blter](#) &i, const T &item)
Insert item after item.
- virtual void [clear](#) ()
Clear the list.
- virtual void [del](#) ([Blter](#) &i)
Delete specified item.
- void [deleteLast](#) ()
Delete last item.
- void [deleteFirst](#) ()
Delete fisrt item.

- void `push` (const T &i)
Push item onto list.
- T `pop` ()
Pop item from list deleteing item.
- void `queueAdd` (const T &i)
Add item to end of list.
- T `queueGet` ()
Get item from front of list deleteing item.
- void `append` (const BList< T > &l)
Append list to list.
- int `has` (const T &i) const
Checks if the item is in the list.
- void `swap` (Blter i1, Blter i2)
Swap two items in list.
- void `sort` ()
Sort list based on get(i) values.
- void `sort` (SortFunc func)
Sort list based on Sort func.
- BList< T > & `operator=` (const BList< T > &l)
- T & `operator[]` (int i)
- const T & `operator[]` (int i) const
- T & `operator[]` (Blter i)
- const T & `operator[]` (const Blter &i) const
- BList< T > `operator+` (const BList< T > &l) const

Protected Member Functions

- virtual Node * `nodeGet` (Blter i)
- virtual const Node * `nodeGet` (Blter i) const
- virtual Node * `nodeCreate` (const T &item)

Protected Attributes

- Node * `onodes`
- unsigned int `olength`

7.43.1 Detailed Description

```
template<class T>
class BList< T >
```

Template based list class.

The `BList` class is a simple doubly linked list of objects. It is used to store an ordered list of any type/class of objects. The class provides a simple iteration system to allow easy navigation through the list. You can access objects stored in the list with the `get()` function or the `[]` operator. The list supports stack functions `push()` and `pop()` and queueing functions such as `queueAdd()` and `queueGet()`. There is a macro `BListLoop(list, iterator)` that provides a concise way to iterate over a lists objects.

7.43.2 Member Typedef Documentation

7.43.2.1 SortFunc

```
template<class T >
typedef int (* BList< T >::SortFunc) (T &a, T &b)
```

Prototype for sorting function.

7.43.3 Constructor & Destructor Documentation

7.43.3.1 BList() [1/2]

```
template<class T >
BList< T >::BList
```

7.43.3.2 BList() [2/2]

```
template<class T >
BList< T >::BList (
    const BList< T > & l )
```

7.43.3.3 ~BList()

```
template<class T >
BList< T >::~~BList [virtual]
```

7.43.4 Member Function Documentation

7.43.4.1 start()

```
template<class T >
void BList< T >::start (
    BIter & i ) const
```

Iterator to start of list.

7.43.4.2 begin()

```
template<class T >
BIter BList< T >::begin
```

Iterator for start of list.

7.43.4.3 end() [1/2]

```
template<class T >
BIter BList< T >::end
```

Iterator for end of list.

7.43.4.4 end() [2/2]

```
template<class T >
BIter BList< T >::end (
    BIter & i ) const
```

Iterator for end of list.

7.43.4.5 next()

```
template<class T >
void BList< T >::next (
    BIter & i ) const
```

Iterator for next item in list.

7.43.4.6 prev()

```
template<class T >
void BList< T >::prev (
    BIter & i )
```

Iterator for previous item in list.

7.43.4.7 goto()

```
template<class T >
BIter BList< T >::goto (
    int pos ) const
```

Iterator for pos item in list.

7.43.4.8 position()

```
template<class T >
int BList< T >::position (
    BIter i )
```

Postition in list item with iterator i.

7.43.4.9 number()

```
template<class T >
unsigned int BList< T >::number
```

Number of items in list.

7.43.4.10 size()

```
template<class T >
unsigned int BList< T >::size
```

Number of items in list.

7.43.4.11 isStart()

```
template<class T >
int BList< T >::isStart (
    BIter & i ) const
```

True if iterator refers to first item.

7.43.4.12 isEnd()

```
template<class T >
int BList< T >::isEnd (
    BIter & i ) const
```

True if iterator refers to last item.

7.43.4.13 front()

```
template<class T >
T & BList< T >::front
```

Get first item in list.

7.43.4.14 rear()

```
template<class T >
T & BList< T >::rear
```

Get last item in list.

7.43.4.15 get() [1/2]

```
template<class T >
T & BList< T >::get (
    BIter i )
```

Get item specified by iterator in list.

7.43.4.16 get() [2/2]

```
template<class T >
const T & BList< T >::get (
    BIter i ) const
```

Get item specified by iterator in list.

7.43.4.17 `append()` [1/2]

```
template<class T >
void BList< T >::append (
    const T & item )
```

Append item to list.

7.43.4.18 `insert()`

```
template<class T >
void BList< T >::insert (
    BIter & i,
    const T & item ) [virtual]
```

Insert item before item.

7.43.4.19 `insertAfter()`

```
template<class T >
void BList< T >::insertAfter (
    BIter & i,
    const T & item )
```

Insert item after item.

7.43.4.20 `clear()`

```
template<class T >
void BList< T >::clear [virtual]
```

Clear the list.

Reimplemented in [BDict< Type >](#), [BDir](#), [BEntryList](#), [BEntryFile](#), [BQueue< T >](#), and [BQueue< BoapMcPacket >](#).

7.43.4.21 `del()`

```
template<class T >
void BList< T >::del (
    BIter & i ) [virtual]
```

Delete specified item.

Reimplemented in [BDict< Type >](#), and [BEntryList](#).

7.43.4.22 deleteLast()

```
template<class T >
void BList< T >::deleteLast
```

Delete last item.

7.43.4.23 deleteFirst()

```
template<class T >
void BList< T >::deleteFirst
```

Delete first item.

7.43.4.24 push()

```
template<class T >
void BList< T >::push (
    const T & i )
```

Push item onto list.

7.43.4.25 pop()

```
template<class T >
T BList< T >::pop
```

Pop item from list deleting item.

7.43.4.26 queueAdd()

```
template<class T >
void BList< T >::queueAdd (
    const T & i )
```

Add item to end of list.

7.43.4.27 queueGet()

```
template<class T >
T BList< T >::queueGet
```

Get item from front of list deleteing item.

7.43.4.28 append() [2/2]

```
template<class T >
void BList< T >::append (
    const BList< T > & l )
```

Append list to list.

7.43.4.29 has()

```
template<class T >
int BList< T >::has (
    const T & i ) const
```

Checks if the item is in the list.

7.43.4.30 swap()

```
template<class T >
void BList< T >::swap (
    BIter i1,
    BIter i2 )
```

Swap two items in list.

7.43.4.31 sort() [1/2]

```
template<class T >
void BList< T >::sort
```

Sort list based on get(i) values.

7.43.4.32 sort() [2/2]

```
template<class T >
void BList< T >::sort (
    SortFunc func )
```

Sort list based on Sort func.

7.43.4.33 operator=()

```
template<class T >
BList< T > & BList< T >::operator= (
    const BList< T > & l )
```

7.43.4.34 operator[]() [1/4]

```
template<class T >
T & BList< T >::operator[] (
    int i )
```

7.43.4.35 operator[]() [2/4]

```
template<class T >
const T & BList< T >::operator[] (
    int i ) const
```

7.43.4.36 operator[]() [3/4]

```
template<class T >
T & BList< T >::operator[] (
    BIter i )
```

7.43.4.37 operator[]() [4/4]

```
template<class T >
const T & BList< T >::operator[] (
    const BIter & i ) const
```

7.43.4.38 operator+()

```
template<class T >
BList< T > BList< T >::operator+ (
    const BList< T > & l ) const
```

7.43.4.39 nodeGet() [1/2]

```
template<class T >
BList< T >::Node * BList< T >::nodeGet (
    BIter i ) [protected], [virtual]
```

7.43.4.40 nodeGet() [2/2]

```
template<class T >
const BList< T >::Node * BList< T >::nodeGet (
    BIter i ) const [protected], [virtual]
```

7.43.4.41 nodeCreate()

```
template<class T >
BList< T >::Node * BList< T >::nodeCreate (
    const T & item ) [protected], [virtual]
```

7.43.5 Member Data Documentation

7.43.5.1 onodes

```
template<class T >
Node* BList< T >::onodes [protected]
```

7.43.5.2 olength

```
template<class T >
unsigned int BList< T >::olength [protected]
```

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

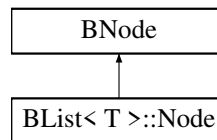
- [BList.h](#)
- [BList_func.h](#)

7.44 BList< T >::Node Class Reference

A BList internal Node.

```
#include <BList.h>
```

Inheritance diagram for BList< T >::Node:



Public Member Functions

- [Node](#) (const T &i)

Public Attributes

- T [item](#)

7.44.1 Detailed Description

```
template<class T>  
class BList< T >::Node
```

A BList internal Node.

7.44.2 Constructor & Destructor Documentation

7.44.2.1 Node()

```
template<class T >  
BList< T >::Node::Node (  
    const T & i ) [inline]
```

7.44.3 Member Data Documentation

7.44.3.1 item

```
template<class T >
T BList< T >::Node::item
```

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

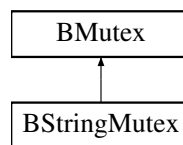
- [BList.h](#)

7.45 BMutex Class Reference

Mutex class. Note these are recursive Mutexes and so you need to make sure the number of unlocks equals the number of locks.

```
#include <BMutex.h>
```

Inheritance diagram for BMutex:



Public Types

- enum [Type](#) { [Normal](#) , [Recursive](#) }

Public Member Functions

- [BMutex](#) ([Type](#) type=[Normal](#))
- [BMutex](#) (const [BMutex](#) &mutex)
- [~BMutex](#) ()
- int [lock](#) ()
Set lock, wait as necessary.
- int [timedLock](#) (int timeoutUs)
Set lock, wait as necessary but timeout after given time.
- int [unlock](#) ()
Unlock the lock.
- int [tryLock](#) ()
Test the lock.
- [BMutex](#) & [operator=](#) (const [BMutex](#) &mutex)

7.45.1 Detailed Description

Mutex class. Note these are recursive Mutexes and so you need to make sure the number of unlocks equals the number of locks.

7.45.2 Member Enumeration Documentation

7.45.2.1 Type

```
enum BMutex::Type
```

Enumerator

Normal	
Recursive	

7.45.3 Constructor & Destructor Documentation

7.45.3.1 BMutex() [1/2]

```
BMutex::BMutex (
    Type type = Normal )
```

7.45.3.2 BMutex() [2/2]

```
BMutex::BMutex (
    const BMutex & mutex )
```

7.45.3.3 ~BMutex()

```
BMutex::~~BMutex ( )
```

7.45.4 Member Function Documentation

7.45.4.1 lock()

```
int BMutex::lock ( )
```

Set lock, wait as necessary.

7.45.4.2 timedLock()

```
int BMutex::timedLock (
    int timeoutUs )
```

Set lock, wait as necessary but timeout after given time.

7.45.4.3 unlock()

```
int BMutex::unlock ( )
```

Unlock the lock.

7.45.4.4 tryLock()

```
int BMutex::tryLock ( )
```

Test the lock.

7.45.4.5 operator=()

```
BMutex & BMutex::operator= (
    const BMutex & mutex )
```

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

- [BMutex.h](#)
- [BMutex.cpp](#)

7.46 BMutexLock Class Reference

Mutex class that removes the lock on deletion and so is useful to lock data in a function call.

```
#include <BMutex.h>
```

Public Member Functions

- [BMutexLock](#) ([BMutex](#) &[lock](#), int doLock=0)
- [~BMutexLock](#) ()
- int [lock](#) ()
- int [unlock](#) ()

7.46.1 Detailed Description

Mutex class that removes the lock on deletion and so is useful to lock data in a function call.

7.46.2 Constructor & Destructor Documentation

7.46.2.1 BMutexLock()

```
BMutexLock::BMutexLock (
    BMutex & lock,
    int doLock = 0 ) [inline]
```

7.46.2.2 ~BMutexLock()

```
BMutexLock::~BMutexLock ( ) [inline]
```

7.46.3 Member Function Documentation

7.46.3.1 lock()

```
int BMutexLock::lock ( ) [inline]
```

7.46.3.2 unlock()

```
int BMutexLock::unlock ( ) [inline]
```

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

- [BMutex.h](#)

7.47 Bmysql Class Reference

A class to provide access to a MySQL database.

```
#include <Bmysql.h>
```

Public Member Functions

- [Bmysql](#) ()
- [~Bmysql](#) ()
- [BError open](#) ([BString](#) hostName, [BString](#) dataBase, [BString](#) userName, [BString](#) password)
- void [close](#) ()
- [BError get](#) ([BString](#) table, [BString](#) where, [BDictString](#) &fields)
- [BError insert](#) ([BString](#) table, [BDictString](#) fields, [BUInt32](#) *id=0)
- [BError update](#) ([BString](#) table, [BUInt32](#) id, [BDictString](#) fields)
- [BError del](#) ([BString](#) table, [BUInt32](#) id)
 - Delete record from table.*
- [BError flush](#) ()
 - Flush all data to disk.*
- [BString escapeString](#) ([BString](#) str)
 - Escapes special characters in the string.*
- [BError query](#) ([BString](#) cmd, [BList](#)< [BDictString](#) > &result)
- [MYSQL](#) & [db](#) ()
- void [setDebug](#) (int debug)

7.47.1 Detailed Description

A class to provide access to a MySQL database.

7.47.2 Constructor & Destructor Documentation

7.47.2.1 BMySQL()

```
BMySQL::BMySQL ( )
```

7.47.2.2 ~BMySQL()

```
BMySQL::~~BMySQL ( )
```

7.47.3 Member Function Documentation

7.47.3.1 open()

```
BError BMySQL::open (
    BString hostName,
    BString dataBase,
    BString userName,
    BString password )
```

7.47.3.2 close()

```
void BMySQL::close ( )
```

7.47.3.3 get()

```
BError BMySQL::get (
    BString table,
    BString where,
    BDictString & fields )
```


7.47.3.4 insert()

```
BError Bmysql::insert (
    BString table,
    BDictString fields,
    BUInt32 * id = 0 )
```

7.47.3.5 update()

```
BError Bmysql::update (
    BString table,
    BUInt32 id,
    BDictString fields )
```

7.47.3.6 del()

```
BError Bmysql::del (
    BString table,
    BUInt32 id )
```

Delete record from table.

7.47.3.7 flush()

```
BError Bmysql::flush ( )
```

Flush all data to disk.

7.47.3.8 escapeString()

```
BString Bmysql::escapeString (
    BString str )
```

Escapes special characters in the string.

7.47.3.9 query()

```
BError Bmysql::query (
    BString cmd,
    BList< BDictString > & result )
```

7.47.3.10 db()

```
MYSQL & Bmysql::db ( )
```

7.47.3.11 setDebug()

```
void Bmysql::setDebug (
    int debug )
```

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

- [Bmysql.h](#)
- [Bmysql.cpp](#)

7.48 BNameValue< T > Class Template Reference

A simple, templated, name/value pair.

```
#include <BNameValue.h>
```

Public Member Functions

- [BNameValue](#) ()
- [BNameValue](#) ([BString](#) name, const T &value)
- [BString](#) [getName](#) ()
- T & [getValue](#) ()

7.48.1 Detailed Description

```
template<class T>
class BNameValue< T >
```

A simple, templated, name/value pair.

7.48.2 Constructor & Destructor Documentation

7.48.2.1 BNameValue() [1/2]

```
template<class T >
BNameValue< T >::BNameValue ( ) [inline]
```

7.48.2.2 BNameValue() [2/2]

```
template<class T >
BNameValue< T >::BNameValue (
    BString name,
    const T & value ) [inline]
```

7.48.3 Member Function Documentation

7.48.3.1 getName()

```
template<class T >
BString BNameValue< T >::getName ( ) [inline]
```

7.48.3.2 getValue()

```
template<class T >
T & BNameValue< T >::getValue ( ) [inline]
```

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

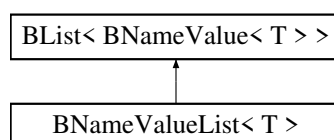
- [BNameValue.h](#)

7.49 BNameValueList< T > Class Template Reference

A simple, templated, name/value pair list.

```
#include <BNameValue.h>
```

Inheritance diagram for BNameValueList< T >:



Public Member Functions

- T * [find](#) (BString name)
- [Blter findPos](#) (BString name)

Additional Inherited Members

7.49.1 Detailed Description

```
template<class T>
class BNameValueList< T >
```

A simple, templated, name/value pair list.

7.49.2 Member Function Documentation

7.49.2.1 find()

```
template<class T >
T * BNameValueList< T >::find (
    BString name ) [inline]
```

7.49.2.2 findPos()

```
template<class T >
BIter BNameValueList< T >::findPos (
    BString name ) [inline]
```

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

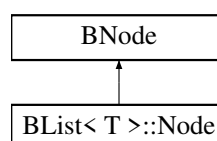
- [BNameValue.h](#)

7.50 BNode Class Reference

A [BList](#) entry's node.

```
#include <BList.h>
```

Inheritance diagram for BNode:



Public Member Functions

- [BNode](#) ()

Public Attributes

- [BNode](#) * [next](#)
- [BNode](#) * [prev](#)

7.50.1 Detailed Description

A [BList](#) entry's node.

7.50.2 Constructor & Destructor Documentation

7.50.2.1 BNode()

```
BNode::BNode ( ) [inline]
```

7.50.3 Member Data Documentation

7.50.3.1 next

[BNode](#)* [BNode::next](#)

7.50.3.2 prev

[BNode](#)* [BNode::prev](#)

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

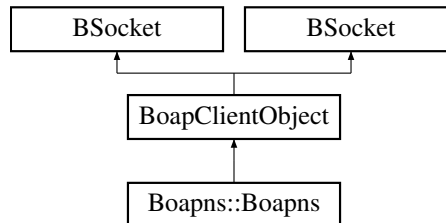
- [BList.h](#)

7.51 BoapClientObject Class Reference

Base for all Boap client objects.

```
#include <Boap.h>
```

Inheritance diagram for BoapClientObject:



Public Member Functions

- [BoapClientObject](#) ([BString](#) name="")
- virtual [~BoapClientObject](#) ()
- [BUInt32](#) [apiVersion](#) ()
Returns the API version.
- [BError](#) [connectService](#) ([BString](#) name)
Connects to the named service.
- [BError](#) [disconnectService](#) ()
Disconnects from the named service.
- [BString](#) [getServiceName](#) ()
Get the name of the service.
- [BError](#) [ping](#) ([BUInt32](#) &[apiVersion](#))
Pings the connection and finds the remotes version number.
- [BError](#) [setConnectionPriority](#) ([BoapPriority](#) priority)
Sets the connection priority.
- void [setMaxLength](#) ([BUInt32](#) maxLength)
Sets the maximum packet length.
- void [setTimeout](#) (int timeout)
Sets the timeout in micro seconds. -1 is wait indefinitely.
- [BoapClientObject](#) ([BString](#) name)
- [BError](#) [connectService](#) ([BString](#) name)

Protected Member Functions

- [BError](#) [pingLocked](#) ([BUInt32](#) &[apiVersion](#))
- [BError](#) [checkApiVersion](#) ()
- [BError](#) [performCall](#) ([BoapPacket](#) &tx, [BoapPacket](#) &rx)
Performs a RPC call to the named service.
- [BError](#) [performSend](#) ([BoapPacket](#) &tx)
Performs a send to the named service.
- [BError](#) [performRecv](#) ([BoapPacket](#) &rx)
Performs a receive.
- virtual [BError](#) [handleReconnect](#) ([BError](#) err)
Handle a reconnect performing autorisaztion if required.
- [BError](#) [performSend](#) ([BoapPacket](#) &tx)
- [BError](#) [performRecv](#) ([BoapPacket](#) &rx)
- [BError](#) [performCall](#) ([BoapPacket](#) &tx, [BoapPacket](#) &rx)

Protected Attributes

- [BString](#) `oname`
- [BUInt32](#) `oapiVersion`
- [BoapPriority](#) `opriority`
- [BoapService](#) `oservice`
- [int](#) `oconnected`
- [BUInt32](#) `omaxLength`
- [BoapPacket](#) `otx`
- [BoapPacket](#) `orx`
- [BMutex](#) `oclock`
- [int](#) `otimeout`
- [int](#) `oreconnect`

Handle an automatic reconnect on timeout.

Additional Inherited Members

7.51.1 Detailed Description

Base for all Boap client objects.

7.51.2 Constructor & Destructor Documentation

7.51.2.1 BoapClientObject() [1/2]

```
BoapClientObject::BoapClientObject (
    BString name = "" )
```

7.51.2.2 ~BoapClientObject()

```
BoapClientObject::~~BoapClientObject ( ) [virtual]
```

7.51.2.3 BoapClientObject() [2/2]

```
BoapClientObject::BoapClientObject (
    BString name )
```

7.51.3 Member Function Documentation

7.51.3.1 `apiVersion()`

```
BUInt32 BoapClientObject::apiVersion ( )
```

Returns the API version.

7.51.3.2 `connectService()` [1/2]

```
BError BoapClientObject::connectService (
    BString name )
```

Connects to the named service.

7.51.3.3 `disconnectService()`

```
BError BoapClientObject::disconnectService ( )
```

Disconnects from the named service.

7.51.3.4 `getServiceName()`

```
BString BoapClientObject::getServiceName ( )
```

Get the name of the service.

7.51.3.5 `ping()`

```
BError BoapClientObject::ping (
    BUInt32 & apiVersion )
```

Pings the connection and finds the remotes version number.

7.51.3.6 `setConnectionPriority()`

```
BError BoapClientObject::setConnectionPriority (
    BoapPriority priority )
```

Sets the connection priority.

7.51.3.7 setMaxLength()

```
void BoapClientObject::setMaxLength (
    BUInt32 maxLength )
```

Sets the maximum packet length.

7.51.3.8 setTimeout()

```
void BoapClientObject::setTimeout (
    int timeout )
```

Sets the timeout in micro seconds. -1 is wait indefinitely.

7.51.3.9 pingLocked()

```
BError BoapClientObject::pingLocked (
    BUInt32 & apiVersion ) [protected]
```

7.51.3.10 checkApiVersion()

```
BError BoapClientObject::checkApiVersion ( ) [protected]
```

7.51.3.11 performCall() [1/2]

```
BError BoapClientObject::performCall (
    BoapPacket & tx,
    BoapPacket & rx ) [protected]
```

Performs a RPC call to the named service.

7.51.3.12 performSend() [1/2]

```
BError BoapClientObject::performSend (
    BoapPacket & tx ) [protected]
```

Performs a send to the named service.

7.51.3.13 performRecv() [1/2]

```
BError BoapClientObject::performRecv (
    BoapPacket & rx ) [protected]
```

Performs a receive.

7.51.3.14 handleReconnect()

```
BError BoapClientObject::handleReconnect (
    BError err ) [protected], [virtual]
```

Handle a reconnect performing autorisaztion if required.

7.51.3.15 connectService() [2/2]

```
BError BoapClientObject::connectService (
    BString name )
```

7.51.3.16 performSend() [2/2]

```
BError BoapClientObject::performSend (
    BoapPacket & tx ) [protected]
```

7.51.3.17 performRecv() [2/2]

```
BError BoapClientObject::performRecv (
    BoapPacket & rx ) [protected]
```

7.51.3.18 performCall() [2/2]

```
BError BoapClientObject::performCall (
    BoapPacket & tx,
    BoapPacket & rx ) [protected]
```

7.51.4 Member Data Documentation

7.51.4.1 oname

`BString` BoapClientObject::oname [protected]

7.51.4.2 oapiVersion

`BUInt32` BoapClientObject::oapiVersion [protected]

7.51.4.3 opriority

`BoapPriority` BoapClientObject::opriority [protected]

7.51.4.4 oservice

`BoapService` BoapClientObject::oservice [protected]

7.51.4.5 oconnected

`int` BoapClientObject::oconnected [protected]

7.51.4.6 omaxLength

`BUInt32` BoapClientObject::omaxLength [protected]

7.51.4.7 otx

`BoapPacket` BoapClientObject::otx [protected]

7.51.4.8 orx

`BoapPacket` BoapClientObject::orx [protected]

7.51.4.9 olock

[BMutex](#) BoapClientObject::olock [protected]

7.51.4.10 otimeout

int BoapClientObject::otimeout [protected]

7.51.4.11 oreconnect

int BoapClientObject::oreconnect [protected]

Handle an automatic reconnect on timeout.

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

- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.52 BoapFuncEntry Class Reference

Boap service function.

```
#include <Boap.h>
```

Public Member Functions

- [BoapFuncEntry](#) (int cmd, [BoapFunc](#) func)
- [BoapFuncEntry](#) (int cmd, [BoapFunc](#) func)

Public Attributes

- [BUInt32](#) ocmd
- [BoapFunc](#) ofunc
- [UInt32](#) ocmd

7.52.1 Detailed Description

Boap service function.

7.52.2 Constructor & Destructor Documentation

7.52.2.1 BoapFuncEntry() [1/2]

```
BoapFuncEntry::BoapFuncEntry (
    int cmd,
    BoapFunc func )
```

7.52.2.2 BoapFuncEntry() [2/2]

```
BoapFuncEntry::BoapFuncEntry (
    int cmd,
    BoapFunc func )
```

7.52.3 Member Data Documentation

7.52.3.1 ocmd [1/2]

```
BUInt32 BoapFuncEntry::ocmd
```

7.52.3.2 ofunc

```
BoapFunc BoapFuncEntry::ofunc
```

7.52.3.3 ocmd [2/2]

```
UInt32 BoapFuncEntry::ocmd
```

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

- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.53 BoapMc1Comms Class Reference

```
#include <BoapMc1.h>
```

Public Member Functions

- [BoapMc1Comms](#) ([Bool](#) threaded=0, [BUInt](#) reqSize=512)
- virtual [~BoapMc1Comms](#) ()
- void [setCommsMode](#) ([Bool](#) halfDuplex)
 - Sets half duplex mode.*
- void [setComms](#) ([BComms](#) &comms)
 - Sets the communications interface to use.*
- void [setComms](#) ([BComms](#) *comms)
 - Sets the communications interface to use.*
- void [setAddress](#) ([BUInt16](#) addressTo, [BUInt16](#) addressFrom)
 - Sets the to and from addresses.*
- [BUInt32](#) [getApiVersion](#) ()
 - Returns the API version.*
- [BUInt32](#) [setTimeout](#) ([BUInt32](#) timeoutUs)
 - Sets the call timeout returning the current value.*
- virtual [BError](#) [validate](#) ()
 - Validate the request.*
- [BoapMc1Packet](#) * [packetRx](#) ()
 - Returns a reference to the current RX packet.*
- virtual [BError](#) [processRx](#) ()
 - Process any RX packets queuing them as needed.*

Protected Member Functions

- virtual [BError](#) [processRequests](#) ()
 - Check and process any requests.*
- virtual [BError](#) [processRequest](#) ()
 - Check and process any request.*
- [BError](#) [packetTx](#) ([BDataChunk](#) *chunks, [BUInt](#) nChunks, [BUInt16](#) waitCmdReply)
- [BError](#) [packetRxData](#) (void *data, [BUInt](#) nBytes)
- [BError](#) [packetRxEnd](#) ()

Protected Attributes

- [Bool](#) othreaded
 - Threaded operation.*
- [BUInt32](#) oreqSize
 - The maximum request size.*
- [BMutex](#) olockCall
 - Lock for RPC calls. Only one at a time.*
- [BMutex](#) olockTx
 - Lock for TX.*
- [BComms](#) * ocomms
- [BUInt32](#) oapiVersion

- [Bool ohalfDuplex](#)
Half duplex mode.
- [BUInt32 otimeout](#)
The timeout in us for calls.
- [BUInt16 oaddressTo](#)
- [BUInt16 oaddressFrom](#)
- [BoapMc1Packet opacketRxBase](#)
- [BoapMc1Packet * opacketRx](#)
The RX packet.
- [BoapMc1Packet opacketTxBase](#)
- [BoapMc1Packet * opacketTx](#)
The TX packet.
- [BUInt opacketRpcCmd](#)
Waiting for RPC reply to cmd.
- [BSemaphore opacketRpcSema](#)
Wait RPC reply semaphore.
- [BSemaphore opacketRpcDoneSema](#)
Wait RPC complete semaphore.
- [BoapMc1Error oerror](#)
The call return error;.

7.53.1 Constructor & Destructor Documentation

7.53.1.1 BoapMc1Comms()

```
BoapMc1Comms::BoapMc1Comms (
    Bool threaded = 0,
    BUInt reqSize = 512 )
```

7.53.1.2 ~BoapMc1Comms()

```
BoapMc1Comms::~~BoapMc1Comms ( ) [virtual]
```

7.53.2 Member Function Documentation

7.53.2.1 setCommsMode()

```
void BoapMc1Comms::setCommsMode (
    Bool halfDuplex )
```

Sets half duplex mode.

7.53.2.2 **setComms()** [1/2]

```
void BoapMclComms::setComms (
    BComms & comms )
```

Sets the communications interface to use.

7.53.2.3 **setComms()** [2/2]

```
void BoapMclComms::setComms (
    BComms * comms )
```

Sets the communications interface to use.

7.53.2.4 **setAddress()**

```
void BoapMclComms::setAddress (
    BUInt16 addressTo,
    BUInt16 addressFrom )
```

Sets the to and from addresses.

7.53.2.5 **getApiVersion()**

```
BUInt32 BoapMclComms::getApiVersion ( )
```

Returns the API version.

7.53.2.6 **setTimeout()**

```
BUInt32 BoapMclComms::setTimeout (
    BUInt32 timeoutUs )
```

Sets the call timeout returning the current value.

7.53.2.7 **validate()**

```
BError BoapMclComms::validate ( ) [virtual]
```

Validate the request.

7.53.2.8 packetRx()

```
BoapMc1Packet * BoapMc1Comms::packetRx ( )
```

Returns a reference to the current RX packet.

7.53.2.9 processRx()

```
BError BoapMc1Comms::processRx ( ) [virtual]
```

Process any RX packets queuing them as needed.

7.53.2.10 processRequests()

```
BError BoapMc1Comms::processRequests ( ) [protected], [virtual]
```

Check and process any requests.

7.53.2.11 processRequest()

```
BError BoapMc1Comms::processRequest ( ) [protected], [virtual]
```

Check and process any request.

7.53.2.12 packetTx()

```
BError BoapMc1Comms::packetTx (
    BDataChunk * chunks,
    BUInt nChunks,
    BUInt16 waitCmdReply ) [protected]
```

7.53.2.13 packetRxData()

```
BError BoapMc1Comms::packetRxData (
    void * data,
    BUInt nBytes ) [protected]
```

7.53.2.14 packetRxEnd()

`BError` BoapMclComms::packetRxEnd () [protected]

7.53.3 Member Data Documentation

7.53.3.1 othreaded

`Bool` BoapMclComms::othreaded [protected]

Threaded operation.

7.53.3.2 oreqSize

`BUInt32` BoapMclComms::oreqSize [protected]

The maximum request size.

7.53.3.3 olockCall

`BMutex` BoapMclComms::olockCall [protected]

Lock for RPC calls. Only one at a time.

7.53.3.4 olockTx

`BMutex` BoapMclComms::olockTx [protected]

Lock for TX.

7.53.3.5 ocomms

`BComms*` BoapMclComms::ocomms [protected]

7.53.3.6 oapiVersion

`BUInt32 BoapMc1Comms::oapiVersion [protected]`

7.53.3.7 ohalfDuplex

`Bool BoapMc1Comms::ohalfDuplex [protected]`

Half duplex mode.

7.53.3.8 otimeout

`BUInt32 BoapMc1Comms::otimeout [protected]`

The timeout in us for calls.

7.53.3.9 oaddressTo

`BUInt16 BoapMc1Comms::oaddressTo [protected]`

7.53.3.10 oaddressFrom

`BUInt16 BoapMc1Comms::oaddressFrom [protected]`

7.53.3.11 opacketRxBase

`BoapMc1Packet BoapMc1Comms::opacketRxBase [protected]`

7.53.3.12 opacketRx

`BoapMc1Packet* BoapMc1Comms::opacketRx [protected]`

The RX packet.

7.53.3.13 opacketTxBase

[BoapMc1Packet](#) BoapMc1Comms::opacketTxBase [protected]

7.53.3.14 opacketTx

[BoapMc1Packet*](#) BoapMc1Comms::opacketTx [protected]

The TX packet.

7.53.3.15 opacketRpcCmd

[BUInt](#) BoapMc1Comms::opacketRpcCmd [protected]

Waiting for RPC reply to cmd.

7.53.3.16 opacketRpcSema

[BSemaphore](#) BoapMc1Comms::opacketRpcSema [protected]

Wait RPC reply semaphore.

7.53.3.17 opacketRpcDoneSema

[BSemaphore](#) BoapMc1Comms::opacketRpcDoneSema [protected]

Wait RPC complete semaphore.

7.53.3.18 oerror

[BoapMc1Error](#) BoapMc1Comms::oerror [protected]

The call return error;.

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

- [BoapMc1.h](#)
- [BoapMc1.cpp](#)

7.54 BoapMc1Error Struct Reference

```
#include <BoapMc1.h>
```

Public Attributes

- [BInt16 number](#)
The error number.
- char [string](#) [32]
The error string.

7.54.1 Member Data Documentation

7.54.1.1 number

```
BInt16 BoapMc1Error::number
```

The error number.

7.54.1.2 string

```
char BoapMc1Error::string[32]
```

The error string.

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

- [BoapMc1.h](#)

7.55 BoapMc1Packet Class Reference

```
#include <BoapMc1.h>
```

Public Attributes

- [BoapMc1PacketHead head](#)
- char [data](#) [8]

7.55.1 Member Data Documentation

7.55.1.1 head

[BoapMc1PacketHead](#) `BoapMc1Packet::head`

7.55.1.2 data

`char BoapMc1Packet::data[8]`

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

- [BoapMc1.h](#)

7.56 BoapMc1PacketHead Struct Reference

```
#include <BoapMc1.h>
```

Public Attributes

- [BUInt16 magic](#)
Packet magic pattern.
- [BUInt16 length](#)
Total packet length including the header.
- [BUInt16 addressTo](#)
Address to send to.
- [BUInt16 addressFrom](#)
Address packet is from.
- [BUInt16 cmd](#)
The RPC command or reply number.
- [BInt16 error](#)
Error number.
- [BUInt32 checksum](#)
Packet checksum, when used.

7.56.1 Member Data Documentation

7.56.1.1 magic

`BUInt16 BoapMc1PacketHead::magic`

Packet magic pattern.

7.56.1.2 length

`BUInt16 BoapMc1PacketHead::length`

Total packet length including the header.

7.56.1.3 addressTo

`BUInt16 BoapMc1PacketHead::addressTo`

Address to send to.

7.56.1.4 addressFrom

`BUInt16 BoapMc1PacketHead::addressFrom`

Address packet is from.

7.56.1.5 cmd

`BUInt16 BoapMc1PacketHead::cmd`

The RPC command or reply number.

7.56.1.6 error

`BInt16 BoapMc1PacketHead::error`

Error number.

7.56.1.7 checksum

`BUInt32 BoapMc1PacketHead::checksum`

Packet checksum, when used.

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

- [BoapMc1.h](#)

7.57 BoapMcClientObject Class Reference

```
#include <BoapMc.h>
```

Public Member Functions

- [BoapMcClientObject](#) ([BComms](#) &comms)
- virtual [~BoapMcClientObject](#) ()
- void [setAddress](#) ([BUInt8](#) addressTo, [BUInt8](#) addressFrom)
- [BUInt32](#) [getApiVersion](#) ()

Returns the API version.

Protected Member Functions

- [BError](#) [performCall](#) ()
Performs a RPC call to the named service.
- [BError](#) [performSend](#) ()
Performs a send to the named service.
- [BError](#) [performRecv](#) ()
Performs a receive.

Protected Attributes

- [BUInt32](#) [oapiVersion](#)
- [BComms](#) & [ocomms](#)
- [BUInt8](#) [oaddressTo](#)
- [BUInt8](#) [oaddressFrom](#)
- [BoapMcPacket](#) [opacket](#)

7.57.1 Constructor & Destructor Documentation

7.57.1.1 BoapMcClientObject()

```
BoapMcClientObject::BoapMcClientObject (
    BComms & comms )
```

7.57.1.2 ~BoapMcClientObject()

```
BoapMcClientObject::~~BoapMcClientObject ( ) [virtual]
```

7.57.2 Member Function Documentation

7.57.2.1 setAddress()

```
void BoapMcClientObject::setAddress (
    BUInt8 addressTo,
    BUInt8 addressFrom )
```

7.57.2.2 getApiVersion()

```
BUInt32 BoapMcClientObject::getApiVersion ( )
```

Returns the API version.

7.57.2.3 performCall()

```
BError BoapMcClientObject::performCall ( ) [protected]
```

Performs a RPC call to the named service.

7.57.2.4 performSend()

```
BError BoapMcClientObject::performSend ( ) [protected]
```

Performs a send to the named service.

7.57.2.5 performRecv()

`BError` BoapMcClientObject::performRecv () [protected]

Performs a receive.

7.57.3 Member Data Documentation

7.57.3.1 oapiVersion

`BUInt32` BoapMcClientObject::oapiVersion [protected]

7.57.3.2 ocomms

`BComms&` BoapMcClientObject::ocomms [protected]

7.57.3.3 oaddressTo

`BUInt8` BoapMcClientObject::oaddressTo [protected]

7.57.3.4 oaddressFrom

`BUInt8` BoapMcClientObject::oaddressFrom [protected]

7.57.3.5 opacket

`BoapMcPacket` BoapMcClientObject::opacket [protected]

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

- [BoapMc.h](#)
- [BoapMc.cpp](#)

7.58 BoapMcComms Class Reference

```
#include <BoapMc.h>
```

Public Member Functions

- [BoapMcComms](#) ([Bool](#) threaded=0, [BUInt](#) rxQueueSize=4)
- virtual [~BoapMcComms](#) ()
- void [setCommsMode](#) ([Bool](#) slave, [BUInt](#) txQueueSize)

Sets slave mode.
- void [setComms](#) ([BComms](#) &comms)

Sets the communications interface to use.
- void [setComms](#) ([BComms](#) *comms)

Sets the communications interface to use.
- void [setAddress](#) ([BUInt8](#) addressTo, [BUInt8](#) addressFrom)

Sets the to and from addresses.
- [BUInt32](#) [getApiVersion](#) ()

Returns the API version.
- [BUInt32](#) [setTimeout](#) ([BUInt32](#) timeoutUs)

Sets the call timeout returning the current value.
- virtual [BError](#) [processRx](#) ([BTimeout](#) timeoutUs=[BTimeoutForever](#))

Process any RX packets queuing them as needed.
- virtual [BError](#) [processRequests](#) ([BTimeout](#) timeoutUs=[BTimeoutForever](#))

Check and process all requests.
- virtual [BError](#) [processRequest](#) ([BTimeout](#) timeoutUs=[BTimeoutForever](#))

Check and process any request.
- virtual [BError](#) [processPacket](#) ([BoapMcPacket](#) &rx, [BoapMcPacket](#) &tx)

Process a recieved packet.

Protected Member Functions

- [BError](#) [performCall](#) ()

Performs a RPC call to the remote side.
- [BError](#) [performSend](#) ()

Performs a RPC send to the remote side.
- [BError](#) [packetSend](#) ([BoapMcPacket](#) &packet)

Receives a packet.
- [BError](#) [packetRecv](#) ([BoapMcPacket](#) &packet)

Receives a packet.

Protected Attributes

- [Bool othreaded](#)
- [BMutex olockCall](#)
Lock for RPC calls. Only one at a time.
- [BMutex olockTx](#)
Lock for TX.
- [BComms * ocomms](#)
- [BUInt32 oapiVersion](#)
- [Bool oslave](#)
Set slave mode.
- [BUInt32 otimeout](#)
The timeout in us for calls.
- [BUInt8 oaddressTo](#)
- [BUInt8 oaddressFrom](#)
- [BoapMcPacket opacket](#)
Packet RX buffer.
- [BoapMcPacket opacketTx](#)
Packet TX buffer for calls.
- [BoapMcPacket opacketRx](#)
Packet RX buffer for calls.
- [BSemaphore opacketRxSema](#)
Wait RX semaphore.
- [BoapMcPacket opacketReqTx](#)
Packet TX buffer for requests.
- [BoapMcPacket opacketReqRx](#)
Packet RX buffer for requests.
- [BQueue< BoapMcPacket > opacketReqQueue](#)
Packet RX buffer queue for requests.
- [BFifo< BoapMcPacket > opacketTxQueue](#)
Packet TX Queue.
- [BSemaphoreCount opacketTxQueueWriteNum](#)
Packet TX Queue number.
- [BSemaphore opacketTxSema](#)
Wait for TX semaphore.

7.58.1 Constructor & Destructor Documentation

7.58.1.1 BoapMcComms()

```
BoapMcComms::BoapMcComms (
    Bool threaded = 0,
    BUInt rxQueueSize = 4 )
```

7.58.1.2 ~BoapMcComms()

```
BoapMcComms::~~BoapMcComms ( ) [virtual]
```

7.58.2 Member Function Documentation

7.58.2.1 setCommsMode()

```
void BoapMcComms::setCommsMode (
    Bool slave,
    BUInt txQueueSize )
```

Sets slave mode.

7.58.2.2 setComms() [1/2]

```
void BoapMcComms::setComms (
    BComms & comms )
```

Sets the communications interface to use.

7.58.2.3 setComms() [2/2]

```
void BoapMcComms::setComms (
    BComms * comms )
```

Sets the communications interface to use.

7.58.2.4 setAddress()

```
void BoapMcComms::setAddress (
    BUInt8 addressTo,
    BUInt8 addressFrom )
```

Sets the to and from addresses.

7.58.2.5 getApiVersion()

```
BUInt32 BoapMcComms::getApiVersion ( )
```

Returns the API version.

7.58.2.6 setTimeout()

```
BUInt32 BoapMcComms::setTimeout (
    BUInt32 timeoutUs )
```

Sets the call timeout returning the current value.

7.58.2.7 processRx()

```
BError BoapMcComms::processRx (
    BTimeout timeoutUs = BTimeoutForever ) [virtual]
```

Process any RX packets queuing them as needed.

!!! This should wait on comms for timeoutUs !!!

7.58.2.8 processRequests()

```
BError BoapMcComms::processRequests (
    BTimeout timeoutUs = BTimeoutForever ) [virtual]
```

Check and process all requests.

7.58.2.9 processRequest()

```
BError BoapMcComms::processRequest (
    BTimeout timeoutUs = BTimeoutForever ) [virtual]
```

Check and process any request.

7.58.2.10 processPacket()

```
BError BoapMcComms::processPacket (
    BoapMcPacket & rx,
    BoapMcPacket & tx ) [virtual]
```

Process a recieved packet.

7.58.2.11 performCall()

`BError BoapMcComms::performCall () [protected]`

Performs a RPC call to the remote side.

7.58.2.12 performSend()

`BError BoapMcComms::performSend () [protected]`

Performs a RPC send to the remote side.

7.58.2.13 packetSend()

`BError BoapMcComms::packetSend (
 BoapMcPacket & packet) [protected]`

Receives a packet.

7.58.2.14 packetRecv()

`BError BoapMcComms::packetRecv (
 BoapMcPacket & packet) [protected]`

Receives a packet.

7.58.3 Member Data Documentation

7.58.3.1 othreaded

`Bool BoapMcComms::othreaded [protected]`

7.58.3.2 olockCall

`BMutex BoapMcComms::olockCall [protected]`

Lock for RPC calls. Only one at a time.

7.58.3.3 olockTx

`BMutex` BoapMcComms::olockTx [protected]

Lock for TX.

7.58.3.4 ocomms

`BComms*` BoapMcComms::ocomms [protected]

7.58.3.5 oapiVersion

`BUInt32` BoapMcComms::oapiVersion [protected]

7.58.3.6 oslave

`Bool` BoapMcComms::oslave [protected]

Set slave mode.

7.58.3.7 otimeout

`BUInt32` BoapMcComms::otimeout [protected]

The timeout in us for calls.

7.58.3.8 oaddressTo

`BUInt8` BoapMcComms::oaddressTo [protected]

7.58.3.9 oaddressFrom

`BUInt8` BoapMcComms::oaddressFrom [protected]

7.58.3.10 opacket

`BoapMcPacket` `BoapMcComms::opacket` [protected]

Packet RX buffer.

7.58.3.11 opacketTx

`BoapMcPacket` `BoapMcComms::opacketTx` [protected]

Packet TX buffer for calls.

7.58.3.12 opacketRx

`BoapMcPacket` `BoapMcComms::opacketRx` [protected]

Packet RX buffer for calls.

7.58.3.13 opacketRxSema

`BSemaphore` `BoapMcComms::opacketRxSema` [protected]

Wait RX semaphore.

7.58.3.14 opacketReqTx

`BoapMcPacket` `BoapMcComms::opacketReqTx` [protected]

Packet TX buffer for requests.

7.58.3.15 opacketReqRx

`BoapMcPacket` `BoapMcComms::opacketReqRx` [protected]

Packet RX buffer for requests.

7.58.3.16 opacketReqQueue

[BQueue<BoapMcPacket>](#) BoapMcComms::opacketReqQueue [protected]

Packet RX buffer queue for requests.

7.58.3.17 opacketTxQueue

[BFifo<BoapMcPacket>](#) BoapMcComms::opacketTxQueue [protected]

Packet TX Queue.

7.58.3.18 opacketTxQueueWriteNum

[BSemaphoreCount](#) BoapMcComms::opacketTxQueueWriteNum [protected]

Packet TX Queue number.

7.58.3.19 opacketTxSema

[BSemaphore](#) BoapMcComms::opacketTxSema [protected]

Wait for TX semaphore.

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

- [BoapMc.h](#)
- [BoapMc.cpp](#)

7.59 BoapMcPacket Class Reference

```
#include <BoapMc.h>
```

Public Attributes

- [BoapMcPacketHead](#) head
- char [data](#) [256 - sizeof([BoapMcPacketHead](#))]

7.59.1 Member Data Documentation

7.59.1.1 head

```
BoapMcPacketHead BoapMcPacket::head
```

7.59.1.2 data

```
char BoapMcPacket::data[256 - sizeof(BoapMcPacketHead)]
```

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

- [BoapMc.h](#)

7.60 BoapMcPacketHead Struct Reference

```
#include <BoapMc.h>
```

Public Attributes

- [BUInt8 length](#)
- [BUInt8 addressTo](#)
- [BUInt8 addressFrom](#)
- [BUInt8 cmd](#)
- [BUInt16 error](#)
- [BUInt16 checksum](#)

7.60.1 Member Data Documentation

7.60.1.1 length

```
BUInt8 BoapMcPacketHead::length
```

7.60.1.2 addressTo

```
BUInt8 BoapMcPacketHead::addressTo
```

7.60.1.3 addressFrom

[BUInt8](#) BoapMcPacketHead::addressFrom

7.60.1.4 cmd

[BUInt8](#) BoapMcPacketHead::cmd

7.60.1.5 error

[BUInt16](#) BoapMcPacketHead::error

7.60.1.6 checksum

[BUInt16](#) BoapMcPacketHead::checksum

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

- [BoapMc.h](#)

7.61 BoapMcServiceObject Class Reference

```
#include <BoapMc.h>
```

Public Member Functions

- [BoapMcServiceObject](#) ()
- virtual [~BoapMcServiceObject](#) ()
- virtual [BError process](#) ([BoapMcPacket](#) &rx, [BoapMcPacket](#) &tx)
- virtual [BError processEvent](#) ([BoapMcPacket](#) &rx)

Protected Member Functions

- [BError sendEvent](#) ([BoapMcPacket](#) &tx)

Protected Attributes

- [BUInt32 oapiVersion](#)

7.61.1 Constructor & Destructor Documentation

7.61.1.1 BoapMcServiceObject()

```
BoapMcServiceObject::BoapMcServiceObject ( )
```

7.61.1.2 ~BoapMcServiceObject()

```
BoapMcServiceObject::~~BoapMcServiceObject ( ) [virtual]
```

7.61.2 Member Function Documentation

7.61.2.1 process()

```
BError BoapMcServiceObject::process (
    BoapMcPacket & rx,
    BoapMcPacket & tx ) [virtual]
```

7.61.2.2 processEvent()

```
BError BoapMcServiceObject::processEvent (
    BoapMcPacket & rx ) [virtual]
```

7.61.2.3 sendEvent()

```
BError BoapMcServiceObject::sendEvent (
    BoapMcPacket & tx ) [protected]
```

7.61.3 Member Data Documentation

7.61.3.1 oapiVersion

[BUInt32](#) BoapMcServiceObject::oapiVersion [protected]

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

- [BoapMc.h](#)
- [BoapMc.cpp](#)

7.62 BoapMcSignalObject Class Reference

```
#include <BoapMc.h>
```

Public Member Functions

- [BoapMcSignalObject](#) ([BComms](#) &comms)

Protected Member Functions

- [BError](#) performSend ([BoapMcPacket](#) &tx)

Protected Attributes

- [BComms](#) & ocomms

7.62.1 Constructor & Destructor Documentation

7.62.1.1 BoapMcSignalObject()

```
BoapMcSignalObject::BoapMcSignalObject (
    BComms & comms )
```

7.62.2 Member Function Documentation

7.62.2.1 performSend()

```
BError BoapMcSignalObject::performSend (
    BoapMcPacket & tx ) [protected]
```

7.62.3 Member Data Documentation

7.62.3.1 ocomms

`BComms& BoapMcSignalObject::ocomms` [protected]

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

- [BoapMc.h](#)
- [BoapMc.cpp](#)

7.63 Boapns::BoapEntry Class Reference

```
#include <BoapnsD.h>
```

Public Member Functions

- [BoapEntry](#) ([BString](#) name=[BString](#)(), [BString](#) hostName=[BString](#)(), [BList](#)< [BString](#) > addressList=[BList](#)< [BString](#) >(), [BUInt32](#) port=0, [BUInt32](#) service=0)

Public Attributes

- [BString](#) name
- [BString](#) hostName
- [BList](#)< [BString](#) > addressList
- [BUInt32](#) port
- [BUInt32](#) service

7.63.1 Constructor & Destructor Documentation

7.63.1.1 BoapEntry()

```
Boapns::BoapEntry::BoapEntry (  
    BString name = BString(),  
    BString hostName = BString(),  
    BList< BString > addressList = BList<BString >(),  
    BUInt32 port = 0,  
    BUInt32 service = 0 )
```

7.63.2 Member Data Documentation

7.63.2.1 name

`BString` `Boapns::BoapEntry::name`

7.63.2.2 hostName

`BString` `Boapns::BoapEntry::hostName`

7.63.2.3 addressList

`BList<BString >` `Boapns::BoapEntry::addressList`

7.63.2.4 port

`BUInt32` `Boapns::BoapEntry::port`

7.63.2.5 service

`BUInt32` `Boapns::BoapEntry::service`

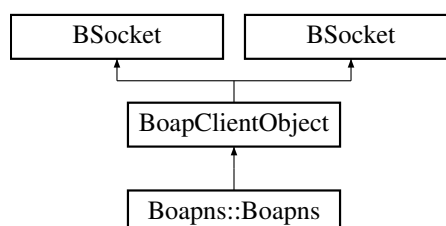
The documentation for this class was generated from the following files:

- [BoapnsD.h](#)
- [BoapnsD.cpp](#)

7.64 Boapns::Boapns Class Reference

```
#include <BoapnsC.h>
```

Inheritance diagram for `Boapns::Boapns`:



Public Member Functions

- [Boapns](#) ([BString](#) name="")
- [BError getVersion](#) ([BString](#) &version)
Get the [Boapns](#) version.
- [BError getEntryList](#) ([BList](#)< [BoapEntry](#) > &entryList)
- [BError getEntry](#) ([BString](#) name, [BoapEntry](#) &entry)
- [BError addEntry](#) ([BoapEntry](#) entry)
- [BError delEntry](#) ([BString](#) name)
- [BError getNewName](#) ([BString](#) &name)

Additional Inherited Members

7.64.1 Constructor & Destructor Documentation

7.64.1.1 Boapns()

```
Boapns::Boapns::Boapns (
    BString name = "" )
```

7.64.2 Member Function Documentation

7.64.2.1 getVersion()

```
BError Boapns::Boapns::getVersion (
    BString & version )
```

Get the [Boapns](#) version.

7.64.2.2 getEntryList()

```
BError Boapns::Boapns::getEntryList (
    BList< BoapEntry > & entryList )
```

7.64.2.3 getEntry()

```
BError Boapns::Boapns::getEntry (
    BString name,
    BoapEntry & entry )
```

7.64.2.4 addEntry()

```
BError Boapns::Boapns::addEntry (
    BoapEntry entry )
```

7.64.2.5 delEntry()

```
BError Boapns::Boapns::delEntry (
    BString name )
```

7.64.2.6 getNewName()

```
BError Boapns::Boapns::getNewName (
    BString & name )
```

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

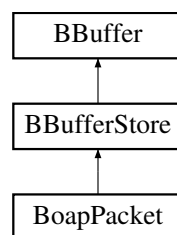
- [BoapnsC.h](#)
- [BoapnsC.cpp](#)

7.65 BoapPacket Class Reference

Boap packet.

```
#include <Boap.h>
```

Inheritance diagram for BoapPacket:



Public Member Functions

- [BoapPacket](#) ()
- [~BoapPacket](#) ()
- [BUInt32](#) getCmd ()
- [int](#) peekHead ([BoapPacketHead](#) &head)
- [int](#) pushHead ([BoapPacketHead](#) &head)
- [int](#) popHead ([BoapPacketHead](#) &head)
- [void](#) updateHead ()
- [BoapPacket](#) ()
- [~BoapPacket](#) ()
- [int](#) resize ([int](#) size)
- [BError](#) setData ([void](#) *data, [int](#) nbytes)
- [int](#) nbytes ()
- [char](#) * data ()
- [int](#) pushHead ([BoapPacketHead](#) &head)
- [int](#) push ([Int8](#) v)
- [int](#) push ([UInt8](#) v)
- [int](#) push ([Int16](#) v)
- [int](#) push ([UInt16](#) v)
- [int](#) push ([Int32](#) v)
- [int](#) push ([UInt32](#) v)
- [int](#) push ([BString](#) &v)
- [int](#) push ([Double](#) v)
- [int](#) push ([BError](#) &v)
- [int](#) push ([UInt32](#) nBytes, [const void](#) *data)
- [int](#) popHead ([BoapPacketHead](#) &head)
- [int](#) pop ([Int8](#) &v)
- [int](#) pop ([UInt8](#) &v)
- [int](#) pop ([Int16](#) &v)
- [int](#) pop ([UInt16](#) &v)
- [int](#) pop ([Int32](#) &v)
- [int](#) pop ([UInt32](#) &v)
- [int](#) pop ([BString](#) &v)
- [int](#) pop ([Double](#) &v)
- [int](#) pop ([BError](#) &v)
- [int](#) pop ([UInt32](#) nBytes, [void](#) *data)

Additional Inherited Members

7.65.1 Detailed Description

Boap packet.

7.65.2 Constructor & Destructor Documentation

7.65.2.1 BoapPacket() [1/2]

```
BoapPacket::BoapPacket ( )
```

7.65.2.2 ~BoapPacket() [1/2]

```
BoapPacket::~~BoapPacket ( )
```

7.65.2.3 BoapPacket() [2/2]

```
BoapPacket::BoapPacket ( )
```

7.65.2.4 ~BoapPacket() [2/2]

```
BoapPacket::~~BoapPacket ( )
```

7.65.3 Member Function Documentation

7.65.3.1 getCmd()

```
BUInt32 BoapPacket::getCmd ( )
```

7.65.3.2 peekHead()

```
int BoapPacket::peekHead (
    BoapPacketHead & head )
```

7.65.3.3 pushHead() [1/2]

```
int BoapPacket::pushHead (
    BoapPacketHead & head )
```

7.65.3.4 popHead() [1/2]

```
int BoapPacket::popHead (
    BoapPacketHead & head )
```

7.65.3.5 updateHead()

```
void BoapPacket::updateHead ( )
```

7.65.3.6 resize()

```
int BoapPacket::resize (
    int size )
```

7.65.3.7 setData()

```
BError BoapPacket::setData (
    void * data,
    int nbytes )
```

7.65.3.8 nbytes()

```
int BoapPacket::nbytes ( )
```

7.65.3.9 data()

```
char * BoapPacket::data ( )
```

7.65.3.10 pushHead() [2/2]

```
int BoapPacket::pushHead (
    BoapPacketHead & head )
```

7.65.3.11 push() [1/10]

```
int BoapPacket::push (  
    Int8 v )
```

7.65.3.12 push() [2/10]

```
int BoapPacket::push (  
    UInt8 v )
```

7.65.3.13 push() [3/10]

```
int BoapPacket::push (  
    Int16 v )
```

7.65.3.14 push() [4/10]

```
int BoapPacket::push (  
    UInt16 v )
```

7.65.3.15 push() [5/10]

```
int BoapPacket::push (  
    Int32 v )
```

7.65.3.16 push() [6/10]

```
int BoapPacket::push (  
    UInt32 v )
```

7.65.3.17 push() [7/10]

```
int BoapPacket::push (  
    BString & v )
```

7.65.3.18 push() [8/10]

```
int BoapPacket::push (
    Double v )
```

7.65.3.19 push() [9/10]

```
int BoapPacket::push (
    BError & v )
```

7.65.3.20 push() [10/10]

```
int BoapPacket::push (
    UInt32 nBytes,
    const void * data )
```

7.65.3.21 popHead() [2/2]

```
int BoapPacket::popHead (
    BoapPacketHead & head )
```

7.65.3.22 pop() [1/10]

```
int BoapPacket::pop (
    Int8 & v )
```

7.65.3.23 pop() [2/10]

```
int BoapPacket::pop (
    UInt8 & v )
```

7.65.3.24 pop() [3/10]

```
int BoapPacket::pop (
    Int16 & v )
```

7.65.3.25 pop() [4/10]

```
int BoapPacket::pop (
    UInt16 & v )
```

7.65.3.26 pop() [5/10]

```
int BoapPacket::pop (
    Int32 & v )
```

7.65.3.27 pop() [6/10]

```
int BoapPacket::pop (
    UInt32 & v )
```

7.65.3.28 pop() [7/10]

```
int BoapPacket::pop (
    BString & v )
```

7.65.3.29 pop() [8/10]

```
int BoapPacket::pop (
    Double & v )
```

7.65.3.30 pop() [9/10]

```
int BoapPacket::pop (
    BError & v )
```


7.65.3.31 pop() [10/10]

```
int BoapPacket::pop (
    UInt32 nBytes,
    void * data )
```

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

- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.66 BoapPacketHead Struct Reference

Boap packet header.

```
#include <Boap.h>
```

Public Attributes

- [BUInt32 type](#)
- [BUInt32 length](#)
- [BUInt32 service](#)
- [BUInt32 cmd](#)
- [UInt32 length](#)
- [BoapType type](#)
- [BoapService service](#)
- [UInt32 cmd](#)
- [UInt32 reserved](#) [12]

7.66.1 Detailed Description

Boap packet header.

7.66.2 Member Data Documentation

7.66.2.1 type [1/2]

[BUInt32](#) BoapPacketHead::type

7.66.2.2 length [1/2]

`BUInt32` BoapPacketHead::length

7.66.2.3 service [1/2]

`BUInt32` BoapPacketHead::service

7.66.2.4 cmd [1/2]

`BUInt32` BoapPacketHead::cmd

7.66.2.5 length [2/2]

`UInt32` BoapPacketHead::length

7.66.2.6 type [2/2]

`BoapType` BoapPacketHead::type

7.66.2.7 service [2/2]

`BoapService` BoapPacketHead::service

7.66.2.8 cmd [2/2]

`UInt32` BoapPacketHead::cmd

7.66.2.9 reserved

```
UInt32 BoapPacketHead::reserved[12]
```

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

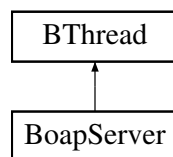
- [Boap.h](#)
- [BoapSimple.h](#)

7.67 BoapServer Class Reference

Boap server.

```
#include <Boap.h>
```

Inheritance diagram for BoapServer:



Public Types

- enum { [NOTHEADS](#) =0 , [THREADED](#) =1 }

Public Member Functions

- [BoapServer](#) ()
- virtual [~BoapServer](#) ()
- virtual [BError](#) [init](#) ([BString](#) boapNsHost="", int port=0, int threaded=0, int isBoapns=0)
- virtual [BError](#) [run](#) (int inThread=0)
- virtual [BError](#) [process](#) ([BoapServerConnection](#) *conn, [BoapPacket](#) &rx, [BoapPacket](#) &tx)
- virtual [BError](#) [processEvent](#) ([BoapPacket](#) &rx)
- virtual [BError](#) [addObject](#) ([BoapServiceObject](#) *object)
- virtual [BError](#) [sendEvent](#) ([BoapPacket](#) &tx)
- virtual [BError](#) [processEvent](#) (int fd)
- virtual void [clientGone](#) ([BoapServerConnection](#) *client)
- [BSocket](#) & [getSocket](#) ()
- [BSocket](#) & [getEventSocket](#) ()
- [BString](#) [getHostName](#) ()
- int [getConnectionsNumber](#) ()
- void [closeConnections](#) ()
- virtual [BoapServerConnection](#) * [newConnection](#) (int fd, [BSocketAddressINET](#) address)
- [BoapServer](#) ()
- [BError](#) [init](#) (int boapNs=0)
- [BError](#) [run](#) ()
- [BError](#) [processEvent](#) ([BoapPacket](#) &rx)
- [BError](#) [addObject](#) ([BoapServiceObject](#) *object)
- [BError](#) [process](#) (int fd)
- [BError](#) [sendEvent](#) ([BoapPacket](#) &tx)
- [BSocket](#) & [getSocket](#) ()
- [BSocket](#) & [getEventSocket](#) ()
- [BError](#) [processEvent](#) (int fd)
- [BString](#) [getHostName](#) ()

Public Attributes

- [BUInt64 onumOperations](#)

Protected Member Functions

- void * [function](#) ()

Protected Attributes

- [BMutex olock](#)
- int [othreaded](#)
- int [oisBoapns](#)
- [Boapns::Boapns](#) * [oboapns](#)
- [BList](#)< [BoapServerConnection](#) * > [oclients](#)
- [BEvent1Int](#) [oclientGoneEvent](#)
- [BList](#)< [BoapServiceEntry](#) > [oservices](#)
- [BPoll](#) [opoll](#)
- [BSocket](#) [onet](#)
- [BSocket](#) [onetEvent](#)
- [BSocketAddressINET](#) [onetEventAddress](#)
- [BString](#) [ohostName](#)

7.67.1 Detailed Description

Boap server.

7.67.2 Member Enumeration Documentation

7.67.2.1 anonymous enum

anonymous enum

Enumerator

NOTHEADS	
THREADED	

7.67.3 Constructor & Destructor Documentation

7.67.3.1 BoapServer() [1/2]

```
BoapServer::BoapServer ( )
```

7.67.3.2 ~BoapServer()

```
BoapServer::~~BoapServer ( ) [virtual]
```

7.67.3.3 BoapServer() [2/2]

```
BoapServer::BoapServer ( )
```

7.67.4 Member Function Documentation

7.67.4.1 init() [1/2]

```
BError BoapServer::init (
    BString boapNsHost = "",
    int port = 0,
    int threaded = 0,
    int isBoapns = 0 ) [virtual]
```

7.67.4.2 run() [1/2]

```
BError BoapServer::run (
    int inThread = 0 ) [virtual]
```

7.67.4.3 process() [1/2]

```
BError BoapServer::process (
    BoapServerConnection * conn,
    BoapPacket & rx,
    BoapPacket & tx ) [virtual]
```

7.67.4.4 processEvent() [1/4]

```
BError BoapServer::processEvent (
    BoapPacket & rx ) [virtual]
```

7.67.4.5 addObject() [1/2]

```
BError BoapServer::addObject (
    BoapServiceObject * object ) [virtual]
```

7.67.4.6 sendEvent() [1/2]

```
BError BoapServer::sendEvent (
    BoapPacket & tx ) [virtual]
```

7.67.4.7 processEvent() [2/4]

```
BError BoapServer::processEvent (
    int fd ) [virtual]
```

7.67.4.8 clientGone()

```
void BoapServer::clientGone (
    BoapServerConnection * client ) [virtual]
```

7.67.4.9 getSocket() [1/2]

```
BSocket & BoapServer::getSocket ( )
```

7.67.4.10 getEventSocket() [1/2]

```
BSocket & BoapServer::getEventSocket ( )
```

7.67.4.11 getHostName() [1/2]

```
BString BoapServer::getHostName ( )
```

7.67.4.12 getConnectionsNumber()

```
int BoapServer::getConnectionsNumber ( )
```

7.67.4.13 closeConnections()

```
void BoapServer::closeConnections ( )
```

7.67.4.14 newConnection()

```
BSoapServerConnection * BoapServer::newConnection (
    int fd,
    BSocketAddressINET address ) [virtual]
```

7.67.4.15 function()

```
void * BoapServer::function ( ) [protected], [virtual]
```

Reimplemented from [BThread](#).

7.67.4.16 init() [2/2]

```
BError BoapServer::init (
    int boapNs = 0 )
```

7.67.4.17 run() [2/2]

```
BError BoapServer::run ( )
```

7.67.4.18 processEvent() [3/4]

```
BError BoapServer::processEvent (
    BoapPacket & rx )
```

7.67.4.19 addObject() [2/2]

```
BError BoapServer::addObject (
    BoapServiceObject * object )
```

7.67.4.20 process() [2/2]

```
BError BoapServer::process (
    int fd )
```

7.67.4.21 sendEvent() [2/2]

```
BError BoapServer::sendEvent (
    BoapPacket & tx )
```

7.67.4.22 getSocket() [2/2]

```
BSocket & BoapServer::getSocket ( )
```

7.67.4.23 getEventSocket() [2/2]

```
BSocket & BoapServer::getEventSocket ( )
```

7.67.4.24 processEvent() [4/4]

```
BError BoapServer::processEvent (
    int fd )
```


7.67.4.25 getHostName() [2/2]

`BString` BoapServer::getHostName ()

7.67.5 Member Data Documentation

7.67.5.1 olock

`BMutex` BoapServer::olock [protected]

7.67.5.2 othreaded

`int` BoapServer::othreaded [protected]

7.67.5.3 oisBoapns

`int` BoapServer::oisBoapns [protected]

7.67.5.4 oboapns

`Boapns::Boapns*` BoapServer::oboapns [protected]

7.67.5.5 oclients

`BList<BoapServerConnection*>` BoapServer::oclients [protected]

7.67.5.6 oclientGoneEvent

`BEventlInt` BoapServer::oclientGoneEvent [protected]

7.67.5.7 oservices

`BList< BoapServiceEntry > BoapServer::oservices` [protected]

7.67.5.8 opoll

`BPoll BoapServer::opoll` [protected]

7.67.5.9 onet

`BSocket BoapServer::onet` [protected]

7.67.5.10 onetEvent

`BSocket BoapServer::onetEvent` [protected]

7.67.5.11 onetEventAddress

`BSocketAddressINET BoapServer::onetEventAddress` [protected]

7.67.5.12 ohostName

`BString BoapServer::ohostName` [protected]

7.67.5.13 onumOperations

`BUInt64 BoapServer::onumOperations`

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

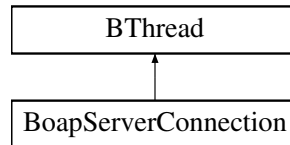
- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.68 BoapServerConnection Class Reference

Boap server connection.

```
#include <Boap.h>
```

Inheritance diagram for BoapServerConnection:



Public Member Functions

- [BoapServerConnection](#) ([BoapServer](#) &boapServer, int fd)
- virtual [~BoapServerConnection](#) ()
- virtual [BError](#) [init](#) ()
Initialise connection.
- virtual [BError](#) [process](#) ()
- virtual [BSocket](#) & [getSocket](#) ()
- virtual void [setMaxLength](#) ([BUInt32](#) maxLength)
- virtual [BError](#) [getHead](#) ([BoapPacketHead](#) &head)
- virtual [BError](#) [validate](#) ()
Validate the connection.

7.68.1 Detailed Description

Boap server connection.

7.68.2 Constructor & Destructor Documentation

7.68.2.1 BoapServerConnection()

```
BoapServerConnection::BoapServerConnection (
    BoapServer & boapServer,
    int fd )
```

7.68.2.2 ~BoapServerConnection()

```
BoapServerConnection::~BoapServerConnection ( ) [virtual]
```

7.68.3 Member Function Documentation

7.68.3.1 init()

```
BError BoapServerConnection::init ( ) [virtual]
```

Initialise connection.

7.68.3.2 process()

```
BError BoapServerConnection::process ( ) [virtual]
```

7.68.3.3 getSocket()

```
BSocket & BoapServerConnection::getSocket ( ) [virtual]
```

7.68.3.4 setMaxLength()

```
void BoapServerConnection::setMaxLength (
    BUInt32 maxLength ) [virtual]
```

7.68.3.5 getHead()

```
BError BoapServerConnection::getHead (
    BoapPacketHead & head ) [virtual]
```

7.68.3.6 validate()

```
BError BoapServerConnection::validate ( ) [virtual]
```

Validate the connection.

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

- [Boap.h](#)
- [Boap.cpp](#)

7.69 BoapServiceEntry Class Reference

Boap server single service entry.

```
#include <Boap.h>
```

Public Member Functions

- [BoapServiceEntry](#) ([BoapService](#) service=0, [BoapServiceObject](#) *object=0)
- [BoapServiceEntry](#) ([BoapService](#) service=0, [BoapServiceObject](#) *object=0)

Public Attributes

- [BoapService](#) oservice
- [BoapServiceObject](#) * oobject

7.69.1 Detailed Description

Boap server single service entry.

7.69.2 Constructor & Destructor Documentation

7.69.2.1 BoapServiceEntry() [1/2]

```
BoapServiceEntry::BoapServiceEntry (  
    BoapService service = 0,  
    BoapServiceObject * object = 0 ) [inline]
```

7.69.2.2 BoapServiceEntry() [2/2]

```
BoapServiceEntry::BoapServiceEntry (  
    BoapService service = 0,  
    BoapServiceObject * object = 0 ) [inline]
```

7.69.3 Member Data Documentation

7.69.3.1 oservice

```
BoapService BoapServiceEntry::oservice
```

7.69.3.2 oobject

```
BoapServiceObject * BoapServiceEntry::oobject
```

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

- [Boap.h](#)
- [BoapSimple.h](#)

7.70 BoapServiceObject Class Reference

Boap service object.

```
#include <Boap.h>
```

Public Member Functions

- [BoapServiceObject](#) ([BoapServer](#) &server, [BString](#) name="")
- virtual [~BoapServiceObject](#) ()
- [BError](#) setName ([BString](#) name)
- [BError](#) sendEvent ([BString](#) signalName, [BInt32](#) arg)
- virtual [BError](#) processEvent ([BString](#) objectName, [BString](#) name, [BInt32](#) arg)
- [BString](#) name ()
- [BUInt32](#) apiVersion ()
- *Returns the API version.*
- [BError](#) doPing ([BoapServerConnection](#) *conn, [BoapPacket](#) &rx, [BoapPacket](#) &tx)
- [BError](#) doConnectionPriority ([BoapServerConnection](#) *conn, [BoapPacket](#) &rx, [BoapPacket](#) &tx)
- [BError](#) process ([BoapServerConnection](#) *conn, [BoapPacket](#) &rx, [BoapPacket](#) &tx)
- virtual [BError](#) processEvent ([BoapPacket](#) &rx)
- [BoapServiceObject](#) ([BoapServer](#) &server, [BString](#) name)
- virtual [~BoapServiceObject](#) ()
- [BError](#) sendEvent ([BString](#) signalName, [Int32](#) arg)
- virtual [BError](#) processEvent ([BString](#) objectName, [BString](#) name, [Int32](#) arg)
- [BString](#) name ()
- [BError](#) process ([BoapPacket](#) &rx, [BoapPacket](#) &tx)
- virtual [BError](#) processEvent ([BoapPacket](#) &rx)

Protected Member Functions

- [BError](#) sendEvent ([BoapPacket](#) &tx)
- [BError](#) sendEvent ([BoapPacket](#) &tx)

Protected Attributes

- [BoapServer](#) & [oserver](#)
- [BString](#) [oname](#)
- [BUInt32](#) [oapiVersion](#)
- [BList](#)< [BoapFuncEntry](#) > [ofuncList](#)

7.70.1 Detailed Description

Boap service object.

7.70.2 Constructor & Destructor Documentation

7.70.2.1 BoapServiceObject() [1/2]

```
BoapServiceObject::BoapServiceObject (
    BoapServer & server,
    BString name = "" )
```

7.70.2.2 ~BoapServiceObject() [1/2]

```
BoapServiceObject::~~BoapServiceObject ( ) [virtual]
```

7.70.2.3 BoapServiceObject() [2/2]

```
BoapServiceObject::BoapServiceObject (
    BoapServer & server,
    BString name )
```

7.70.2.4 ~BoapServiceObject() [2/2]

```
virtual BoapServiceObject::~~BoapServiceObject ( ) [virtual]
```

7.70.3 Member Function Documentation

7.70.3.1 setName()

```
BError BoapServiceObject::setName (
    BString name )
```

7.70.3.2 sendEvent() [1/4]

```
BError BoapServiceObject::sendEvent (
    BString signalName,
    BInt32 arg )
```

7.70.3.3 processEvent() [1/4]

```
BError BoapServiceObject::processEvent (
    BString objectName,
    BString name,
    BInt32 arg ) [virtual]
```

7.70.3.4 name() [1/2]

```
BString BoapServiceObject::name ( )
```

7.70.3.5 apiVersion()

```
BUInt32 BoapServiceObject::apiVersion ( )
```

Returns the API version.

7.70.3.6 doPing()

```
BError BoapServiceObject::doPing (
    BoapServerConnection * conn,
    BoapPacket & rx,
    BoapPacket & tx )
```


7.70.3.7 doConnectionPriority()

```
BError BoapServiceObject::doConnectionPriority (
    BoapServerConnection * conn,
    BoapPacket & rx,
    BoapPacket & tx )
```

7.70.3.8 process() [1/2]

```
BError BoapServiceObject::process (
    BoapServerConnection * conn,
    BoapPacket & rx,
    BoapPacket & tx )
```

7.70.3.9 processEvent() [2/4]

```
BError BoapServiceObject::processEvent (
    BoapPacket & rx ) [virtual]
```

7.70.3.10 sendEvent() [2/4]

```
BError BoapServiceObject::sendEvent (
    BoapPacket & tx ) [protected]
```

7.70.3.11 sendEvent() [3/4]

```
BError BoapServiceObject::sendEvent (
    BString signalName,
    Int32 arg )
```

7.70.3.12 processEvent() [3/4]

```
virtual BError BoapServiceObject::processEvent (
    BString objectName,
    BString name,
    Int32 arg ) [virtual]
```

7.70.3.13 name() [2/2]

```
BString BoapServiceObject::name ( )
```

7.70.3.14 process() [2/2]

```
BError BoapServiceObject::process (
    BoapPacket & rx,
    BoapPacket & tx )
```

7.70.3.15 processEvent() [4/4]

```
virtual BError BoapServiceObject::processEvent (
    BoapPacket & rx ) [virtual]
```

7.70.3.16 sendEvent() [4/4]

```
BError BoapServiceObject::sendEvent (
    BoapPacket & tx ) [protected]
```

7.70.4 Member Data Documentation

7.70.4.1 oserver

```
BoapServer & BoapServiceObject::oserver [protected]
```

7.70.4.2 oname

```
BString BoapServiceObject::oname [protected]
```

7.70.4.3 oapiVersion

```
BUInt32 BoapServiceObject::oapiVersion [protected]
```

7.70.4.4 ofuncList

```
BList< BoapFuncEntry > BoapServiceObject::ofuncList [protected]
```

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

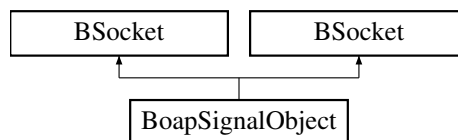
- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.71 BoapSignalObject Class Reference

A Boap object to send signals using an RPC mechanism.

```
#include <Boap.h>
```

Inheritance diagram for BoapSignalObject:



Public Member Functions

- [BoapSignalObject \(\)](#)
- [BoapSignalObject \(\)](#)

Protected Member Functions

- [BError performSend \(BoapPacket &tx\)](#)
- [BError performSend \(BoapPacket &tx\)](#)

Protected Attributes

- [BoapPacket otx](#)
- [BoapPacket orx](#)

Additional Inherited Members

7.71.1 Detailed Description

A Boap object to send signals using an RPC mechanism.

7.71.2 Constructor & Destructor Documentation

7.71.2.1 BoapSignalObject() [1/2]

```
BoapSignalObject::BoapSignalObject ( )
```

7.71.2.2 BoapSignalObject() [2/2]

```
BoapSignalObject::BoapSignalObject ( )
```

7.71.3 Member Function Documentation

7.71.3.1 performSend() [1/2]

```
BError BoapSignalObject::performSend (
    BoapPacket & tx ) [protected]
```

7.71.3.2 performSend() [2/2]

```
BError BoapSignalObject::performSend (
    BoapPacket & tx ) [protected]
```

7.71.4 Member Data Documentation

7.71.4.1 otx

```
BoapPacket BoapSignalObject::otx [protected]
```

7.71.4.2 orx

`BoapPacket` `BoapSignalObject::orx` [protected]

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

- [Boap.h](#)
- [BoapSimple.h](#)
- [Boap.cpp](#)
- [BoapSimple.cc](#)

7.72 BObj Class Reference

A generic object base class that has runtime definable data feilds.

```
#include <BObj.h>
```

Public Member Functions

- [BObj](#) ()
 - virtual [~BObj](#) ()
 - virtual const char * [getType](#) () const
 - virtual const [BObjMember](#) * [getMembers](#) () const
 - virtual [BError](#) [getMembers](#) ([BDictString](#) &members)
 - virtual [BError](#) [getMember](#) ([BString](#) name, [BString](#) &value)
 - virtual [BError](#) [setMembers](#) ([BDictString](#) &members)
 - virtual [BError](#) [setMember](#) ([BString](#) name, [BString](#) value)
 - virtual void [membersPrint](#) () const
- Prints out members.*
- virtual [BString](#) [getDebugString](#) ()
- Returns contents as a debug string.*

7.72.1 Detailed Description

A generic object base class that has runtime definable data feilds.

7.72.2 Constructor & Destructor Documentation

7.72.2.1 BObj()

```
BObj::BObj ( )
```

7.72.2.2 ~BObj()

```
BObj::~~BObj ( ) [virtual]
```

7.72.3 Member Function Documentation

7.72.3.1 getType()

```
const char * BObj::getType ( ) const [virtual]
```

7.72.3.2 getMembers() [1/2]

```
const BObjMember * BObj::getMembers ( ) const [virtual]
```

7.72.3.3 getMembers() [2/2]

```
BError BObj::getMembers (
    BDictString & members ) [virtual]
```

7.72.3.4 getMember()

```
BError BObj::getMember (
    BString name,
    BString & value ) [virtual]
```

7.72.3.5 setMembers()

```
BError BObj::setMembers (
    BDictString & members ) [virtual]
```

7.72.3.6 setMember()

```
BError BObj::setMember (
    BString name,
    BString value ) [virtual]
```

7.72.3.7 membersPrint()

```
void BObj::membersPrint ( ) const [virtual]
```

Prints out members.

7.72.3.8 getDebugString()

```
BString BObj::getDebugString ( ) [virtual]
```

Returns contents as a debug string.

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

- [BObj.h](#)
- [BObj.cpp](#)

7.73 BObjMember Struct Reference

A structure to define a member of a generic [BObj](#).

```
#include <BTypes.h>
```

Public Attributes

- [BType](#) type
- [BTypeComp](#) typeComp
- [BUInt16](#) dataOffset
- [BUInt16](#) size
- const char * [typeName](#)
- const char * [name](#)

7.73.1 Detailed Description

A structure to define a member of a generic [BObj](#).

7.73.2 Member Data Documentation

7.73.2.1 type

[BType](#) BObjMember::type

7.73.2.2 typeComp

[BTypeComp](#) BObjMember::typeComp

7.73.2.3 dataOffset

[BUInt16](#) BObjMember::dataOffset

7.73.2.4 size

[BUInt16](#) BObjMember::size

7.73.2.5 typeName

const char* BObjMember::typeName

7.73.2.6 name

const char* BObjMember::name

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

- [BTypes.h](#)

7.74 BPoll Class Reference

This class provides an interface for polling a number of file descriptors. It uses round robin polling.

```
#include <BPoll.h>
```

Public Types

- typedef struct pollfd [PollFd](#)

Public Member Functions

- [BPoll](#) ()
- [~BPoll](#) ()
- void [append](#) (int fd, int events=POLLIN|POLLERR|POLLHUP|POLLNVAL)
Append a file descriptor to polling list.
- void [delFd](#) (int fd)
Remove a file descriptor from polling list.
- [BError doPoll](#) (int &fd, int timeoutUs=-1)
Perform polling operation.
- [BError doPollEvents](#) (int &fd, int &events, int timeoutUs=-1)
Perform polling operation and return events.
- int [getPollFdsNum](#) ()
- [PollFd *](#) [getPollFds](#) ()
- void [clear](#) ()

7.74.1 Detailed Description

This class provides an interface for polling a number of file descriptors. It uses round robin polling.

7.74.2 Member Typedef Documentation

7.74.2.1 PollFd

```
typedef struct pollfd BPoll::PollFd
```

7.74.3 Constructor & Destructor Documentation

7.74.3.1 BPoll()

```
BPoll::BPoll ( )
```

7.74.3.2 ~BPoll()

```
BPoll::~~BPoll ( )
```

7.74.4 Member Function Documentation

7.74.4.1 append()

```
void BPoll::append (
    int fd,
    int events = POLLIN|POLLERR|POLLHUP|POLLNVAL )
```

Append a file descriptor to polling list.

7.74.4.2 delFd()

```
void BPoll::delFd (
    int fd )
```

Remove a file descriptor from polling list.

7.74.4.3 doPoll()

```
BError BPoll::doPoll (
    int & fd,
    int timeoutUs = -1 )
```

Perform polling operation.

7.74.4.4 doPollEvents()

```
BError BPoll::doPollEvents (
    int & fd,
    int & events,
    int timeoutUs = -1 )
```

Perform polling operation and return events.

7.74.4.5 getPollFdsNum()

```
int BPoll::getPollFdsNum ( )
```

7.74.4.6 getPollFds()

```
BPoll::PollFd * BPoll::getPollFds ( )
```

7.74.4.7 clear()

```
void BPoll::clear ( )
```

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

- [BPoll.h](#)
- [BPoll.cpp](#)

7.75 BProc Class Reference

Implements system process manager.

```
#include <BProc.h>
```

Public Member Functions

- [BProc](#) ()
- [~BProc](#) ()
- [BError usePipes](#) ([Bool](#) fileIn, [Bool](#) fileOut, [Bool](#) fileErr)
Enable IO pipes for the processes standard file descriptors.
- [BError runForeground](#) ([BString](#) cmd, [BStringList](#) argList=[BStringList](#)(), [int](#) *status=0, [int](#) timeoutMs=-1)
Run the program in the foreground with optional status return value and timeout.
- [BError runBackground](#) ([BString](#) cmd, [BStringList](#) argList=[BStringList](#)())
Run the program in the background.
- [int getpid](#) ()
Return the process ID of the program.
- [int getFd](#) ([int](#) cmdFd)
Return the stdin - 0, stdout - 1 or stderr -2 file descriptor pipes to send or receive data to/from the process.
- [BError wait](#) ([int](#) &status, [int](#) timeoutMs=-1)
Wait for the process to complete. The programs exist status is returned in status. The call will block unless the timeoutMs value is given.
- [BError kill](#) ([int](#) sig=SIGTERM)
Kill the process by sending it a signal.
- [void finish](#) ()
Tidy up when finised (closes all pipes).

7.75.1 Detailed Description

Implements system process manager.

[BProc](#) class. This class is used to run programs on the system.

A system program can be run either in the forground where the run function will block or in the background. In both cases the full path of the program is provided in the cmd argument and a set of optional program arguments is provided in the argList argument. The processes arg0 value is set to the programs file name.

When run in the foreground with [runForeground\(\)](#) function, the user can supply an [int](#) pointer to return the programs exit status and a timeout in ms to wait for the process to complete. By default the timeout of -1 means the function will wait forever. If the status pointer is NULL, then the programs return status will be returned in the [BError](#) return value otherwise the return [BError](#) will be set to an appropriate error status.

When run in the background with [runBackground\(\)](#) function, the parenet process can wait for completion using the [wait\(\)](#) call. The [wait\(\)](#) call will return the programs exit status or an error. The exit staus value is the same as the normal [wait\(\)](#) system call.

The processes standard 0, 1, 2 file descriptors can be overridden with IO pipes using the [usePipes\(\)](#) function. If any of these pipes are enabled, then the [getFd\(\)](#) function will return the parant processe's file descriptor for writing or reading data from the processe's standard file descriptors. The [usePipes\(\)](#) function should be called before each run call.

7.75.2 Constructor & Destructor Documentation

7.75.2.1 BProc()

```
BProc::BProc ( )
```

7.75.2.2 ~BProc()

```
BProc::~~BProc ( )
```

7.75.3 Member Function Documentation

7.75.3.1 usePipes()

```
BError BProc::usePipes (
    Bool fileIn,
    Bool fileOut,
    Bool fileErr )
```

Enable IO pipes for the processes standard file descriptors.

7.75.3.2 runForeground()

```
BError BProc::runForeground (
    BString cmd,
    BStringList argList = BStringList(),
    int * status = 0,
    int timeoutMs = -1 )
```

Run the program in the foreground with optional status return value and timeout.

7.75.3.3 runBackground()

```
BError BProc::runBackground (
    BString cmd,
    BStringList argList = BStringList() )
```

Run the program in the background.

7.75.3.4 getpid()

```
int BProc::getPid ( )
```

Return the process ID of the program.

7.75.3.5 getFd()

```
int BProc::getFd (
    int cmdFd )
```

Return the stdin - 0, stdout - 1 or stderr -2 file descriptor pipes to send or receive data to/from the process.

7.75.3.6 wait()

```
BError BProc::wait (
    int & status,
    int timeoutMs = -1 )
```

Wait for the process to complete. The programs exist status is returned in status. The call will block unless the timeoutMs value is given.

7.75.3.7 kill()

```
BError BProc::kill (
    int sig = SIGTERM )
```

Kill the process by sending it a signal.

7.75.3.8 finish()

```
void BProc::finish ( )
```

Tidy up when finished (closes all pipes).

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

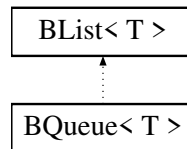
- [BProc.h](#)
- [BProc.cpp](#)

7.76 BQueue< T > Class Template Reference

Provides a thread save queue of objects that can be used to communicate between threads.

```
#include <BQueue.h>
```

Inheritance diagram for BQueue< T >:



Public Member Functions

- [BQueue](#) ([BUInt](#) size)
- [~BQueue](#) ()
- void [clear](#) ()
Clear the queue.
- [BUInt writeAvailable](#) () const
- [BError write](#) (const T &v, [BTimeout](#) timeout=[BTimeoutForever](#))
Append an item onto the queue.
- [BUInt readAvailable](#) () const
- [BError read](#) (T &v, [BTimeout](#) timeout=[BTimeoutForever](#))
Get an item from the queue.

7.76.1 Detailed Description

```
template<class T>
class BQueue< T >
```

Provides a thread save queue of objects that can be used to communicate between threads.

7.76.2 Constructor & Destructor Documentation

7.76.2.1 BQueue()

```
template<class T >
BQueue< T >::BQueue (
    BUInt size )
```

7.76.2.2 ~BQueue()

```
template<class T >
BQueue< T >::~~BQueue
```

7.76.3 Member Function Documentation

7.76.3.1 clear()

```
template<class T >
void BQueue< T >::clear [virtual]
```

Clear the queue.

Reimplemented from [BList< T >](#).

7.76.3.2 writeAvailable()

```
template<class T >
BUInt BQueue< T >::writeAvailable
```

7.76.3.3 write()

```
template<class T >
BError BQueue< T >::write (
    const T & v,
    BTimeout timeout = BTimeoutForever )
```

Append an item onto the queue.

7.76.3.4 readAvailable()

```
template<class T >
BUInt BQueue< T >::readAvailable
```


7.76.3.5 read()

```
template<class T >
BError BQueue< T >::read (
    T & v,
    BTimeout timeout = BTimeoutForever )
```

Get an item from the queue.

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

- [BQueue.h](#)

7.77 BRefData Class Reference

A pointer to a variable sized data area with reference counting so the data areas can be shared.

```
#include <BRefData.h>
```

Public Member Functions

- [BRefData](#) ()
- [BRefData](#) (int len)
- [BRefData](#) (const [BRefData](#) &refData)
- [~BRefData](#) ()
- [BRefData](#) * [copy](#) ()
Create a copy of this reference for writing, if necessary
- [BRefData](#) * [addRef](#) ()
Increment the reference counter.
- int [deleteRef](#) ()
Decrement the reference counter.
- char * [data](#) ()
Return the raw data pointer.
- int [len](#) ()
Return the length in bytes.
- [BRefData](#) & [operator=](#) (const [BRefData](#) &refData)
- void [setLen](#) (int len)
Set the length in bytes. Note should only be used if orefCount = 1.

7.77.1 Detailed Description

A pointer to a variable sized data area with reference counting so the data areas can be shared.

This is Thread safe to a degree. The reference counting is protected. However, [setLen\(\)](#) is not and should be protected at a higher level.

7.77.2 Constructor & Destructor Documentation

7.77.2.1 BRefData() [1/3]

```
BRefData::BRefData ( )
```

7.77.2.2 BRefData() [2/3]

```
BRefData::BRefData (
    int len )
```

7.77.2.3 BRefData() [3/3]

```
BRefData::BRefData (
    const BRefData & refData )
```

7.77.2.4 ~BRefData()

```
BRefData::~BRefData ( )
```

7.77.3 Member Function Documentation

7.77.3.1 copy()

```
BRefData * BRefData::copy ( )
```

Create a copy of this reference for writing, if necessary

7.77.3.2 addRef()

```
BRefData * BRefData::addRef ( )
```

Increment the reference counter.

7.77.3.3 deleteRef()

```
int BRefData::deleteRef ( )
```

Decrement the reference counter.

7.77.3.4 data()

```
char * BRefData::data ( ) [inline]
```

Return the raw data pointer.

7.77.3.5 len()

```
int BRefData::len ( ) [inline]
```

Return the length in bytes.

7.77.3.6 operator=()

```
BRefData & BRefData::operator= (
    const BRefData & refData )
```

7.77.3.7 setLen()

```
void BRefData::setLen (
    int len )
```

Set the length in bytes. Note should only be used if orefCount = 1.

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

- [BRefData.h](#)
- [BRefData.cpp](#)

7.78 BRtc Class Reference

Realtime clock for access to the systems real time battery backed up time hardware.

```
#include <BRtc.h>
```

Public Member Functions

- [BRtc](#) ()
- [~BRtc](#) ()
- [BError init](#) (int rate)
Setup interrupt rate.
- void [wait](#) (int [delayUs](#))
Wait specified uS.

7.78.1 Detailed Description

Realtime clock for access to the systems real time battery backed up time hardware.

7.78.2 Constructor & Destructor Documentation

7.78.2.1 BRtc()

```
BRtc::BRtc ( )
```

7.78.2.2 ~BRtc()

```
BRtc::~~BRtc ( )
```

7.78.3 Member Function Documentation

7.78.3.1 init()

```
BError BRtc::init (  
    int rate )
```

Setup interrupt rate.

7.78.3.2 wait()

```
void BRtc::wait (
    int delayUs )
```

Wait specified uS.

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

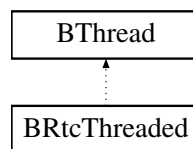
- [BRtc.h](#)
- [BRtc.cpp](#)

7.79 BRtcThreaded Class Reference

A thread safe class to access to the systems real time battery backed up time hardware.

```
#include <BRtc.h>
```

Inheritance diagram for BRtcThreaded:



Public Member Functions

- [BRtcThreaded](#) ()
- [~BRtcThreaded](#) ()
- [BError init](#) (int rate)
Setup interrupt rate.
- void [wait](#) (int [delayUs](#))
Wait specified uS.

7.79.1 Detailed Description

A thread safe class to access to the systems real time battery backed up time hardware.

7.79.2 Constructor & Destructor Documentation

7.79.2.1 BRtcThreaded()

```
BRtcThreaded::BRtcThreaded ( )
```

7.79.2.2 ~BRtcThreaded()

```
BRtcThreaded::~BRtcThreaded ( )
```

7.79.3 Member Function Documentation

7.79.3.1 init()

```
BError BRtcThreaded::init (
    int rate )
```

Setup interrupt rate.

7.79.3.2 wait()

```
void BRtcThreaded::wait (
    int delayUs )
```

Wait specified uS.

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

- [BRtc.h](#)
- [BRtc.cpp](#)

7.80 BRWLock Class Reference

Thread read-write lock.

```
#include <BRWLock.h>
```

Public Member Functions

- [BRWLock](#) ()
- [BRWLock](#) (const [BRWLock](#) &rwlock)
- [~BRWLock](#) ()
- int [rdLock](#) ()
Set lock, wait if necessary.
- int [tryRdLock](#) ()
Test the lock.
- int [wrLock](#) ()
Set lock, wait if necessary.
- int [tryWrLock](#) ()
Test the lock.
- int [unlock](#) ()
Unlock the lock.
- [BRWLock](#) & [operator=](#) (const [BRWLock](#) &rwlock)

7.80.1 Detailed Description

Thread read-write lock.

7.80.2 Constructor & Destructor Documentation

7.80.2.1 BRWLock() [1/2]

```
BRWLock::BRWLock ( )
```

7.80.2.2 BRWLock() [2/2]

```
BRWLock::BRWLock (
    const BRWLock & rlock )
```

7.80.2.3 ~BRWLock()

```
BRWLock::~BRWLock ( )
```

7.80.3 Member Function Documentation

7.80.3.1 rdLock()

```
int BRWLock::rdLock ( )
```

Set lock, wait if necessary.

7.80.3.2 tryRdLock()

```
int BRWLock::tryRdLock ( )
```

Test the lock.

7.80.3.3 wrLock()

```
int BRWLock::wrLock ( )
```

Set lock, wait if necessary.

7.80.3.4 tryWrLock()

```
int BRWLock::tryWrLock ( )
```

Test the lock.

7.80.3.5 unlock()

```
int BRWLock::unlock ( )
```

Unlock the lock.

7.80.3.6 operator=()

```
BRWLock & BRWLock::operator= (
    const BRWLock & rlock )
```

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

- [BRWLock.h](#)
- [BRWLock.cpp](#)

7.81 BSema Class Reference

Sempahore class.

```
#include <BSema.h>
```


Public Member Functions

- [BSema](#) (int value=0)
- [BSema](#) (const [BSema](#) &sema)
- [~BSema](#) ()
- int [post](#) ()
Post condition.
- int [wait](#) ()
Wait for contition.
- int [timedWait](#) (int timeUs)
Wait for condition with timeout.
- int [tryWait](#) ()
Test for the condition.
- int [getValue](#) () const
- [BSema](#) & [operator=](#) (const [BSema](#) &sema)

7.81.1 Detailed Description

Sempahore class.

7.81.2 Constructor & Destructor Documentation

7.81.2.1 BSema() [1/2]

```
BSema::BSema (
    int value = 0 )
```

7.81.2.2 BSema() [2/2]

```
BSema::BSema (
    const BSema & sema )
```

7.81.2.3 ~BSema()

```
BSema::~~BSema ( )
```

7.81.3 Member Function Documentation

7.81.3.1 post()

```
int BSema::post ( )
```

Post condition.

7.81.3.2 wait()

```
int BSema::wait ( )
```

Wait for contition.

7.81.3.3 timedWait()

```
int BSema::timedWait (
    int timeUs )
```

Wait for condition with timeout.

7.81.3.4 tryWait()

```
int BSema::tryWait ( )
```

Test for the condition.

7.81.3.5 getValue()

```
int BSema::getValue ( ) const
```

7.81.3.6 operator=()

```
BSema & BSema::operator= (
    const BSema & sema )
```

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

- [BSema.h](#)
- [BSema.cpp](#)

7.82 BSemaphore Class Reference

Base Semaphore class.

```
#include <BSemaphore.h>
```

Public Member Functions

- [BSemaphore](#) ()
- [BSemaphore](#) (const [BSemaphore](#) &semaphore)
- [~BSemaphore](#) ()
- [Bool](#) wait ([BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait for the semaphore.
- void [set](#) ()
Set the semaphore.
- int [getValue](#) () const
- [BSemaphore](#) & [operator=](#) (const [BSemaphore](#) &semaphore)

7.82.1 Detailed Description

Base Semaphore class.

7.82.2 Constructor & Destructor Documentation

7.82.2.1 BSemaphore() [1/2]

```
BSemaphore::BSemaphore ( )
```

7.82.2.2 BSemaphore() [2/2]

```
BSemaphore::BSemaphore (
    const BSemaphore & semaphore )
```

7.82.2.3 ~BSemaphore()

```
BSemaphore::~~BSemaphore ( )
```

7.82.3 Member Function Documentation

7.82.3.1 wait()

```
Bool BSemaphore::wait (
    BTimeout timeoutUs = BTimeoutForever )
```

Wait for the semaphore.

7.82.3.2 set()

```
void BSemaphore::set ( )
```

Set the semaphore.

7.82.3.3 getValue()

```
int BSemaphore::getValue ( ) const
```

7.82.3.4 operator=()

```
BSemaphore & BSemaphore::operator= (
    const BSemaphore & semaphore )
```

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

- [BSemaphore.h](#)
- [BSemaphore.cpp](#)

7.83 BSemaphoreBool Class Reference

Boolean semaphore.

```
#include <BSemaphore.h>
```

Public Member Functions

- [BSemaphoreBool](#) ()
- [BSemaphoreBool](#) (const [BSemaphoreBool](#) &semaphore)
- [~BSemaphoreBool](#) ()
- void [set](#) ([Bool](#) on=1)
- void [clear](#) ()
- [Bool](#) [wait](#) ([Bool](#) v=1, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait for the semaphore.
- [Bool](#) [value](#) ()
- [operator int](#) ()
- int [operator==](#) ([Bool](#) on)
- [BSemaphoreBool](#) & [operator=](#) ([Bool](#) on)

7.83.1 Detailed Description

Boolean semaphore.

7.83.2 Constructor & Destructor Documentation

7.83.2.1 BSemaphoreBool() [1/2]

```
BSemaphoreBool::BSemaphoreBool ( )
```

7.83.2.2 BSemaphoreBool() [2/2]

```
BSemaphoreBool::BSemaphoreBool (
    const BSemaphoreBool & semaphore )
```

7.83.2.3 ~BSemaphoreBool()

```
BSemaphoreBool::~~BSemaphoreBool ( )
```

7.83.3 Member Function Documentation

7.83.3.1 set()

```
void BSemaphoreBool::set (
    Bool on = 1 )
```

7.83.3.2 clear()

```
void BSemaphoreBool::clear ( )
```

7.83.3.3 wait()

```
Bool BSemaphoreBool::wait (
    Bool v = 1,
    BTimeout timeoutUs = BTimeoutForever )
```

Wait for the semaphore.

7.83.3.4 value()

```
Bool BSemaphoreBool::value ( )
```

7.83.3.5 operator int()

```
BSemaphoreBool::operator int ( )
```

7.83.3.6 operator==()

```
int BSemaphoreBool::operator== (
    Bool on )
```

7.83.3.7 operator=()

```
BSemaphoreBool & BSemaphoreBool::operator= (
    Bool on )
```

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

- [BSemaphore.h](#)
- [BSemaphore.cpp](#)

7.84 BSemaphoreCount Class Reference

Integer counting semaphore.

```
#include <BSemaphore.h>
```

Public Member Functions

- [BSemaphoreCount](#) ()
- [BSemaphoreCount](#) (const [BSemaphoreCount](#) &semaphore)
- [~BSemaphoreCount](#) ()
- void [setValue](#) ([BUInt](#) v)
- void [add](#) (int v=1)
Set the semaphore.
- [Bool](#) [wait](#) ([BUInt](#) v=1, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Wait for the semaphore.
- [Bool](#) [take](#) ([BUInt](#) v=1, [BTimeout](#) timeoutUs=[BTimeoutForever](#))
Take for the semaphore.
- [BUInt](#) [value](#) ()
- [BSemaphoreCount](#) & [operator=](#) (const [BSemaphoreCount](#) &semaphore)

7.84.1 Detailed Description

Integer counting semaphore.

7.84.2 Constructor & Destructor Documentation

7.84.2.1 BSemaphoreCount() [1/2]

```
BSemaphoreCount::BSemaphoreCount ( )
```

7.84.2.2 BSemaphoreCount() [2/2]

```
BSemaphoreCount::BSemaphoreCount (
    const BSemaphoreCount & semaphore )
```

7.84.2.3 ~BSemaphoreCount()

```
BSemaphoreCount::~~BSemaphoreCount ( )
```

7.84.3 Member Function Documentation

7.84.3.1 setValue()

```
void BSemaphoreCount::setValue (
    BUInt v )
```

7.84.3.2 add()

```
void BSemaphoreCount::add (
    int v = 1 )
```

Set the semaphore.

7.84.3.3 wait()

```
Bool BSemaphoreCount::wait (
    BUInt v = 1,
    BTimeout timeoutUs = BTimeoutForever )
```

Wait for the semaphore.

7.84.3.4 take()

```
Bool BSemaphoreCount::take (
    BUInt v = 1,
    BTimeout timeoutUs = BTimeoutForever )
```

Take for the semaphore.

7.84.3.5 value()

```
BUInt BSemaphoreCount::value ( )
```


7.84.3.6 operator=()

```
BSemaphoreCount & BSemaphoreCount::operator= (
    const BSemaphoreCount & semaphore )
```

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

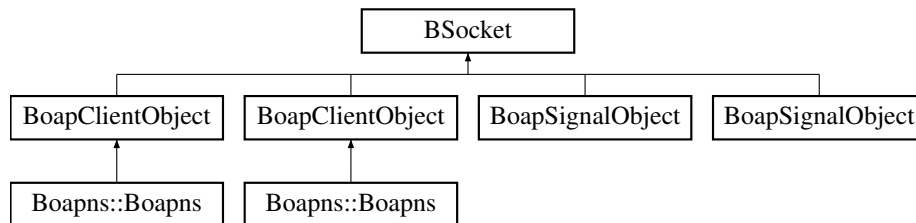
- [BSemaphore.h](#)
- [BSemaphore.cpp](#)

7.85 BSocket Class Reference

A network communications socket.

```
#include <BSocket.h>
```

Inheritance diagram for BSocket:



Public Types

- enum [NType](#) { [STREAM](#) , [DGRAM](#) }
- enum [Priority](#) { [PriorityLow](#) , [PriorityNormal](#) , [PriorityHigh](#) }

Public Member Functions

- [BSocket](#) ()
- [BSocket](#) (int fd)
- [BSocket](#) (NType type)
- [BSocket](#) (int domain, int type, int protocol)
- [~BSocket](#) ()
- [BError init](#) (int domain, int type, int protocol)
- [BError init](#) (NType type)
- void [setFd](#) (int fd)
- int [getFd](#) ()
- [BError bind](#) (const [BSocketAddress](#) &add)
- [BError connect](#) (const [BSocketAddress](#) &add)
- [BError shutdown](#) (int how)
- [BError close](#) ()
- [BError listen](#) (int backlog=5)
- [BError accept](#) (int &fd)
- [BError accept](#) (int &fd, [BSocketAddress](#) &address)
- [BError send](#) (const void *buf, [BSize](#) nbytes, [BSize](#) &nbytesSent, int flags=0)

- **BError** `sendTo` (const [BSocketAddress](#) &address, const void *buf, [BSize](#) nbytes, [BSize](#) &nbytesSent, int flags=0)
- **BError** `sendChunks` (const [BDataChunk](#) *chunks, [BSize](#) nChunks, [BSize](#) &nbytesSent, int flags=0)
- **BError** `recv` (void *buf, [BSize](#) maxbytes, [BSize](#) &nbytesRecv, int flags=0)
- **BError** `recvFrom` ([BSocketAddress](#) &address, void *buf, [BSize](#) maxbytes, [BSize](#) &nbytesRecv, int flags=0)
- **BError** `recvWithTimeout` (void *buf, [BSize](#) maxbytes, [BSize](#) &nbytesRecv, int timeout, int flags=0)
- **BError** `recvFromWithTimeout` ([BSocketAddress](#) &address, void *buf, [BSize](#) maxbytes, [BSize](#) &nbytesRecv, int timeout, int flags=0)
- **BUInt** `recvAvailable` ()
- **BError** `setSockOpt` (int level, int optname, void *optval, unsigned int optlen)
- **BError** `getSockOpt` (int level, int optname, void *optval, unsigned int *optlen)
- **BError** `setReuseAddress` (int on)
- **BError** `setBroadCast` (int on)
- **BError** `setPriority` ([Priority](#) priority)
- **BError** `getMTU` (uint32_t &mtu)
- **BError** `getAddress` ([BSocketAddress](#) &address)

7.85.1 Detailed Description

A network communications socket.

7.85.2 Member Enumeration Documentation

7.85.2.1 NType

```
enum BSocket::NType
```

Enumerator

STREAM	
DGRAM	

7.85.2.2 Priority

```
enum BSocket::Priority
```

Enumerator

PriorityLow	
PriorityNormal	
PriorityHigh	

7.85.3 Constructor & Destructor Documentation

7.85.3.1 BSocket() [1/4]

```
BSocket::BSocket ( )
```

7.85.3.2 BSocket() [2/4]

```
BSocket::BSocket (
    int fd )
```

7.85.3.3 BSocket() [3/4]

```
BSocket::BSocket (
    NType type )
```

7.85.3.4 BSocket() [4/4]

```
BSocket::BSocket (
    int domain,
    int type,
    int protocol )
```

7.85.3.5 ~BSocket()

```
BSocket::~~BSocket ( )
```

7.85.4 Member Function Documentation

7.85.4.1 init() [1/2]

```
BError BSocket::init (
    int domain,
    int type,
    int protocol )
```

7.85.4.2 init() [2/2]

```
BError BSocket::init (
    NType type )
```

7.85.4.3 setFd()

```
void BSocket::setFd (
    int fd )
```

7.85.4.4 getFd()

```
int BSocket::getFd ( )
```

7.85.4.5 bind()

```
BError BSocket::bind (
    const BSocketAddress & add )
```

7.85.4.6 connect()

```
BError BSocket::connect (
    const BSocketAddress & add )
```

7.85.4.7 shutdown()

```
BError BSocket::shutdown (
    int how )
```

7.85.4.8 close()

```
BError BSocket::close ( )
```

7.85.4.9 listen()

```
BError BSocket::listen (
    int backlog = 5 )
```

7.85.4.10 accept() [1/2]

```
BError BSocket::accept (
    int & fd )
```

7.85.4.11 accept() [2/2]

```
BError BSocket::accept (
    int & fd,
    BSocketAddress & address )
```

7.85.4.12 send()

```
BError BSocket::send (
    const void * buf,
    BSize nbytes,
    BSize & nbytesSent,
    int flags = 0 )
```

7.85.4.13 sendTo()

```
BError BSocket::sendTo (
    const BSocketAddress & address,
    const void * buf,
    BSize nbytes,
    BSize & nbytesSent,
    int flags = 0 )
```

7.85.4.14 sendChunks()

```
BError BSocket::sendChunks (
    const BDataChunk * chunks,
    BSize nChunks,
    BSize & nbytesSent,
    int flags = 0 )
```

7.85.4.15 recv()

```
BError BSocket::recv (
    void * buf,
    BSize maxbytes,
    BSize & nbytesRecv,
    int flags = 0 )
```

7.85.4.16 recvFrom()

```
BError BSocket::recvFrom (
    BSocketAddress & address,
    void * buf,
    BSize maxbytes,
    BSize & nbytesRecv,
    int flags = 0 )
```

7.85.4.17 recvWithTimeout()

```
BError BSocket::recvWithTimeout (
    void * buf,
    BSize maxbytes,
    BSize & nbytesRecv,
    int timeout,
    int flags = 0 )
```

7.85.4.18 recvFromWithTimeout()

```
BError BSocket::recvFromWithTimeout (
    BSocketAddress & address,
    void * buf,
    BSize maxbytes,
    BSize & nbytesRecv,
    int timeout,
    int flags = 0 )
```

7.85.4.19 recvAvailable()

```
BUInt BSocket::recvAvailable ( )
```

7.85.4.20 setSockOpt()

```
BError BSocket::setSockOpt (
    int level,
    int optname,
    void * optval,
    unsigned int optlen )
```

7.85.4.21 getSockOpt()

```
BError BSocket::getSockOpt (
    int level,
    int optname,
    void * optval,
    unsigned int * optlen )
```

7.85.4.22 setReuseAddress()

```
BError BSocket::setReuseAddress (
    int on )
```

7.85.4.23 setBroadCast()

```
BError BSocket::setBroadCast (
    int on )
```

7.85.4.24 setPriority()

```
BError BSocket::setPriority (
    Priority priority )
```

7.85.4.25 getMTU()

```
BError BSocket::getMTU (
    uint32_t & mtu )
```

7.85.4.26 getAddress()

```
BError BSocket::getAddress (
    BSocketAddress & address )
```

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

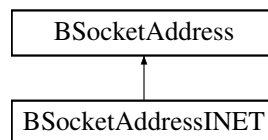
- [BSocket.h](#)
- [BSocket.cpp](#)

7.86 BSocketAddress Class Reference

Socket Address.

```
#include <BSocket.h>
```

Inheritance diagram for BSocketAddress:



Public Types

- typedef struct sockaddr [SockAddr](#)

Public Member Functions

- [BSocketAddress](#) ()
- [BSocketAddress](#) (const [BSocketAddress](#) &add)
- [BSocketAddress](#) ([SockAddr](#) *address, int len)
- [~BSocketAddress](#) ()
- [BError](#) set ([SockAddr](#) *address, int len)
- const [SockAddr](#) * raw () const
- int len () const
- [BString](#) getString () const
- *Return string version of address <ip>.<port>*
- [BSocketAddress](#) & operator= (const [BSocketAddress](#) &add)
- operator const [SockAddr](#) * () const
- int operator== (const [BSocketAddress](#) &add) const
- int operator!= (const [BSocketAddress](#) &add) const

7.86.1 Detailed Description

Socket Address.

7.86.2 Member Typedef Documentation

7.86.2.1 SockAddr

```
typedef struct sockaddr BSocketAddress::SockAddr
```

7.86.3 Constructor & Destructor Documentation

7.86.3.1 BSocketAddress() [1/3]

```
BSocketAddress::BSocketAddress ( )
```

7.86.3.2 BSocketAddress() [2/3]

```
BSocketAddress::BSocketAddress (
    const BSocketAddress & add )
```

7.86.3.3 BSocketAddress() [3/3]

```
BSocketAddress::BSocketAddress (
    SockAddr * address,
    int len )
```

7.86.3.4 ~BSocketAddress()

```
BSocketAddress::~BSocketAddress ( )
```

7.86.4 Member Function Documentation

7.86.4.1 set()

```
BError BSocketAddress::set (
    SockAddr * address,
    int len )
```

7.86.4.2 raw()

```
const BSocketAddress::SockAddr * BSocketAddress::raw ( ) const
```

7.86.4.3 len()

```
int BSocketAddress::len ( ) const
```

7.86.4.4 getString()

```
BString BSocketAddress::getString ( ) const
```

Return string version of address <ip>:<port>

7.86.4.5 operator=()

```
BSocketAddress & BSocketAddress::operator= (
    const BSocketAddress & add )
```

7.86.4.6 operator const SockAddr *()

```
BSocketAddress::operator const SockAddr * ( ) const [inline]
```

7.86.4.7 operator==()

```
int BSocketAddress::operator== (
    const BSocketAddress & add ) const
```

7.86.4.8 operator"!=()

```
int BSocketAddress::operator!= (
    const BSocketAddress & add ) const
```

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

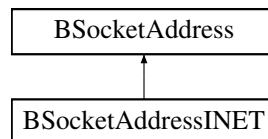
- [BSocket.h](#)
- [BSocket.cpp](#)

7.87 BSocketAddressINET Class Reference

IPv4 aware socket address.

```
#include <BSocket.h>
```

Inheritance diagram for BSocketAddressINET:



Public Types

- typedef struct sockaddr_in [SockAddrIP](#)

Public Member Functions

- [BError set](#) (BString hostName, uint32_t port)
- [BError set](#) (uint32_t address, uint32_t port)
- [BError set](#) (BString hostName, BString service, BString type)
- void [setPort](#) (uint32_t port)
- uint32_t [address](#) ()
Returns socket ip address.
- uint32_t [port](#) ()
Returns socket port.
- BString [getString](#) ()
Return string version of address <ip>:<port>

Static Public Member Functions

- static BString [getHostName](#) ()
Get this hosts network name.
- static BList< uint32_t > [getIpAddresses](#) ()
Get a list of all the IP addresses of this host.
- static BList< BString > [getIpAddressList](#) ()
Get a list of all the IP addresses of this host under hostname.
- static BList< BString > [getIpAddressListAll](#) ()
Get a list of all the IP addresses of this host looking at physical interfaces.

7.87.1 Detailed Description

IPV4 aware socket address.

7.87.2 Member Typedef Documentation

7.87.2.1 SocketAddrIP

```
typedef struct sockaddr_in BSocketAddressINET::SocketAddrIP
```

7.87.3 Member Function Documentation

7.87.3.1 set() [1/3]

```
BError BSocketAddressINET::set (
    BString hostName,
    uint32_t port )
```

7.87.3.2 set() [2/3]

```
BError BSocketAddressINET::set (
    uint32_t address,
    uint32_t port )
```

7.87.3.3 set() [3/3]

```
BError BSocketAddressINET::set (
    BString hostName,
    BString service,
    BString type )
```

7.87.3.4 setPort()

```
void BSocketAddressINET::setPort (
    uint32_t port )
```

7.87.3.5 address()

```
uint32_t BSocketAddressINET::address ( )
```

Returns socket ip address.

7.87.3.6 port()

```
uint32_t BSocketAddressINET::port ( )
```

Returns socket port.

7.87.3.7 getString()

```
BString BSocketAddressINET::getString ( )
```

Return string version of address <ip>:<port>

7.87.3.8 getHostName()

```
BString BSocketAddressINET::getHostName ( ) [static]
```

Get this hosts network name.

7.87.3.9 getIpAddresses()

```
BList< uint32_t > BSocketAddressINET::getIpAddresses ( ) [static]
```

Get a list of all the IP addresses of this host.

7.87.3.10 getIpAddressList()

```
BList< BString > BSocketAddressINET::getIpAddressList ( ) [static]
```

Get a list of all the IP addresses of this host under hostname.

7.87.3.11 getIpAddressListAll()

```
BList< BString > BSocketAddressINET::getIpAddressListAll ( ) [static]
```

Get a list of all the IP addresses of this host looking at physical interfaces.

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

- [BSocket.h](#)
- [BSocket.cpp](#)

7.88 BSpI Class Reference

[BSpI](#) class for accessing SPI hardware devices.

```
#include <BSpI.h>
```

Public Types

- enum [Mode](#) { [Mode0](#) = 0 , [Mode1](#) = 1 , [Mode2](#) = 2 , [Mode3](#) = 3 }

Public Member Functions

- [BSpI](#) ()
- [BError](#) [init](#) ([BString](#) devName, [BUInt](#) speed=1000000, [Mode](#) mode=[Mode1](#), [Bool](#) csActive=0)
- [BError](#) [transact](#) ([BUInt8](#) dev, void *txBuf, int txLen, int pad, void *rxBuf, int rxLen)

7.88.1 Detailed Description

[BSpI](#) class for accessing SPI hardware devices.

7.88.2 Member Enumeration Documentation

7.88.2.1 Mode

```
enum BSpI::Mode
```

Enumerator

Mode0	
Mode1	
Mode2	
Mode3	

7.88.3 Constructor & Destructor Documentation

7.88.3.1 BSpi()

```
BSpi::BSpi ( )
```

7.88.4 Member Function Documentation

7.88.4.1 init()

```
BError BSpi::init (
    BString devName,
    BUInt speed = 1000000,
    Mode mode = Model,
    Bool csActive = 0 )
```

7.88.4.2 transact()

```
BError BSpi::transact (
    BUInt8 dev,
    void * txBuf,
    int txLen,
    int pad,
    void * rxBuf,
    int rxLen )
```

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

- [BSpi.h](#)
- [BSpi.cpp](#)

7.89 BString Class Reference

This class stores and manipulates ASCII strings.

```
#include <BString.h>
```

Public Member Functions

- [BString](#) ()
- [BString](#) (const [BString](#) &[string](#))
- [BString](#) (const char *[str](#))
- [BString](#) (const char *[str](#), unsigned int [len](#))
- [BString](#) (char [ch](#))
- [BString](#) ([BInt](#) [v](#))
- [BString](#) ([BUInt](#) [v](#))
- [BString](#) ([BUInt64](#) [v](#))
- [BString](#) (double [v](#))
- [~BString](#) ()
- [BString copy](#) () const
Return an independant copy.
- int [len](#) () const
Length of string.
- const char * [retStr](#) () const
Ptr to char representation.*
- const char * [str](#) () const
Ptr to char representation.*
- char * [retStrDup](#) () const
Ptr to newly malloc'd char.*
- int [retInt](#) () const
Return string as a int.
- unsigned int [retUInt](#) () const
Return string as a int.
- double [retDouble](#) () const
Return string as a double.
- [BFloat64](#) [retFloat64](#) () const
Return string as a BFloat64.
- int [compare](#) (const [BString](#) &[string](#)) const
Compare strings. Returns 0 for match.
- int [compareWild](#) (const [BString](#) &[string](#)) const
Compare string to string with wildcards . Returns 0 for match.
- int [compareWildExpression](#) (const [BString](#) &[string](#)) const
Compare string to space delimited patterns. Returns 0 for match.
- int [compareRegex](#) (const [BString](#) &[pattern](#), int ignoreCase=0) const
Compare strings. Returns 1 for match.
- [BString](#) & [truncate](#) (int [len](#))
Truncate to length len.
- [BString](#) & [pad](#) (int [len](#))
Pad to length len.
- void [clear](#) ()
Clear the string.
- [BString](#) & [toUpper](#) ()
Convert to uppercase.
- [BString](#) & [toLower](#) ()
Convert to lowercase.
- [BString](#) [lowerFirst](#) ()
Return string with lowercase first character.
- void [removeNL](#) ()
Remove if present NL from last char.

- **BString** **justify** (int leftMargin, int width)
Justify the string to the given width.
- **BString** **fixedLen** (int length, int rightJustify=0)
return string formatted to fixed length
- **BString** **firstLine** ()
Return first line.
- **BString** **translateChar** (char ch, **BString** replace=" ")
Translate character converting them to the given string.
- **BString** **reverse** () const
Reverse character order.
- **BString** **subString** (int start, int len) const
Returns substring.
- int **del** (int start, int len)
Delete substring.
- int **insert** (int start, **BString** str)
Insert substring.
- int **append** (const **BString** &str)
Append a string.
- **BString** **add** (const **BString** &str) const
Add strings returning result.
- **BString** & **printf** (const char *fmt,...)
Formatted print into the string.
- int **find** (char ch) const
Find ch in string searching forwards. Returns -1 if not found.
- int **find** (**BString** str) const
Find string in string searching forwards. Returns -1 if not found.
- int **findReverse** (char ch) const
Find ch in string searching backwards. Returns -1 if not found.
- **BString** **csvEncode** () const
Encode a string for CSV.
- **BString** & **csvDecode** (const **BString** str)
Decode a string from CSV.
- **BString** **base64Encode** () const
Encode a string to base64.
- **BError** **base64Decode** (**BString** &str) const
Decode a string from base64.
- **BList**< **BString** > **getTokenList** (**BString** separators)
Break string into tokens.
- **BList**< **BString** > **getTokenList** (char separator)
Break string into tokens.
- **BString** **removeSeparators** (**BString** separators)
Remove any char from sepatators from string.
- **BString** **pullToken** (**BString** terminators)
Pull token from start of string.
- **BString** **pullSeparators** (**BString** separators)
Pull separators from start of string.
- **BString** **pullWord** ()
Pull a word out of the head of the string.
- **BString** **pullLine** ()
Pull a line out of the head of the string.
- **BList**< **BString** > **split** (char splitChar)

- Split string into an array based on the character separator.*
- **BString** **dirname** ()
 - Return the directory component if the string is a file path name.*
- **BString** **filename** ()
 - Return the filename component if the string is a file path name.*
- **BString** **basename** ()
 - Return the file name component if the string is a file path name.*
- **BString** **extension** ()
 - Return the file extension component if the string is a file path name.*
- **BString** **extensionFull** ()
 - Return the file extension component with leading '.' if the string is a file path name.*
- **BUInt32** **hash** () const
 - Create a 32bit hash number for the string.*
- char & **get** (int pos)
 - Return the character at the position give. Will print an error message and raise the SIGABORT exception if out of range.*
- const char & **get** (int pos) const
 - Return the character at the position give. Will print an error message and raise the SIGABORT exception if out of range.*
- **BString** & **operator=** (const **BString** &string)
- char & **operator[]** (int pos)
- int **operator==** (const **BString** &s) const
- int **operator==** (const char *s) const
- int **operator>** (const **BString** &s) const
- int **operator>** (const char *s) const
- int **operator<** (const **BString** &s) const
- int **operator<** (const char *s) const
- int **operator>=** (const **BString** &s) const
- int **operator<=** (const **BString** &s) const
- int **operator!=** (const **BString** &s) const
- int **operator!=** (const char *s) const
- **BString** **operator+** (const **BString** &s) const
- **BString** **operator+** (const char *s) const
- **BString** **operator+=** (const **BString** &s)
- **BString** **operator+=** (const char *s)
- **BString** **operator+** (char ch) const
- **BString** **operator+** (**BInt** i) const
- **BString** **operator+** (**BUInt** i) const
- **BString** **operator+** (**BUInt64** i) const
- **operator** const char * () const
- **BString** **field** (int field) const
 - Deprecated function.*
- char ** **fields** ()
 - Deprecated function.*

Static Public Member Functions

- static **BString** **convert** (char ch)
 - Converts char to string.*
- static **BString** **convert** (**BInt** value)
 - Converts int to string.*
- static **BString** **convert** (**BUInt** value)

Converts uint to string.

- static [BString convert](#) (double value, int eFormat=0)

Converts double to string.

- static [BString convert](#) (BUInt64 value)

Converts long long to string.

- static [BString convertHex](#) (BInt value)

Converts int to string as hex value.

- static [BString convertHex](#) (BUInt value)

Converts uint to string as hex value.

Protected Attributes

- [BRefData](#) * ostr

This is the reference counted string storage.

7.89.1 Detailed Description

This class stores and manipulates ASCII strings.

The [BString](#) class is designed for the storage and manipulation of variable length ASCII strings. It uses the [BRefData](#) class to store the null terminated strings in shared and references counted shared memory areas on the heap. This efficient method reduces memory allocation, deallocation and copying. Copying or just passing a string in and out of a function becomes a simple pointer copy with the string data reference count incremented.

You can convert a BString to a const char* using the [BString::str\(\)](#) method. You can create a [BString](#) from a char* with its constructor [BString\(const char*\)](#) which is used implicitly for conversions. The [BString](#) also supports conversion to and from Qt QStrings if the Qt headers are included before the [BString.h](#) header. The [BString](#) also supports input and output from std::iostream objects.

As well as its constructor function, [BString](#) supports a number of explicit [convert\(\)](#) functions that can convert basic types such as integers to a [BString](#). There are also some ret*() functions to parse the [BString](#) for integer and floating point values.

The operators: =, +, <, >, >=, <=, ==, != operate as you would expect with the "+" appending strings.

7.89.2 Constructor & Destructor Documentation

7.89.2.1 BString() [1/9]

```
BString::BString ( )
```

7.89.2.2 BString() [2/9]

```
BString::BString (
    const BString & string )
```

7.89.2.3 BString() [3/9]

```
BString::BString (
    const char * str )
```

7.89.2.4 BString() [4/9]

```
BString::BString (
    const char * str,
    unsigned int len )
```

7.89.2.5 BString() [5/9]

```
BString::BString (
    char ch )
```

7.89.2.6 BString() [6/9]

```
BString::BString (
    BInt v )
```

7.89.2.7 BString() [7/9]

```
BString::BString (
    BUInt v )
```

7.89.2.8 BString() [8/9]

```
BString::BString (
    BUInt64 v )
```

7.89.2.9 BString() [9/9]

```
BString::BString (
    double v )
```

7.89.2.10 ~BString()

```
BString::~BString ( )
```

7.89.3 Member Function Documentation

7.89.3.1 convert() [1/5]

```
BString BString::convert (
    char ch ) [static]
```

Converts char to string.

7.89.3.2 convert() [2/5]

```
BString BString::convert (
    BInt value ) [static]
```

Converts int to string.

7.89.3.3 convert() [3/5]

```
BString BString::convert (
    BUInt value ) [static]
```

Converts uint to string.

7.89.3.4 convert() [4/5]

```
BString BString::convert (
    double value,
    int eFormat = 0 ) [static]
```

Converts double to string.

7.89.3.5 convert() [5/5]

```
BString BString::convert (
    BUInt64 value ) [static]
```

Converts long long to string.

7.89.3.6 convertHex() [1/2]

```
BString BString::convertHex (
    BInt value ) [static]
```

Converts int to string as hex value.

7.89.3.7 convertHex() [2/2]

```
BString BString::convertHex (
    BUInt value ) [static]
```

Converts uint to string as hex value.

7.89.3.8 copy()

```
BString BString::copy ( ) const
```

Return an independant copy.

7.89.3.9 len()

```
int BString::len ( ) const
```

Length of string.

7.89.3.10 retStr()

```
const char * BString::retStr ( ) const
```

Ptr to char* representation.

7.89.3.11 str()

```
const char * BString::str ( ) const
```

Ptr to char* representation.

7.89.3.12 retStrDup()

```
char * BString::retStrDup ( ) const
```

Ptr to newly malloc'd char*.

7.89.3.13 retInt()

```
int BString::retInt ( ) const
```

Return string as a int.

7.89.3.14 retUInt()

```
unsigned int BString::retUInt ( ) const
```

Return string as a int.

7.89.3.15 retDouble()

```
double BString::retDouble ( ) const
```

Return string as a double.

7.89.3.16 retFloat64()

```
BFloat64 BString::retFloat64 ( ) const
```

Return string as a BFloat64.

7.89.3.17 compare()

```
int BString::compare (
    const BString & string ) const
```

Compare strings. Returns 0 for match.

7.89.3.18 compareWild()

```
int BString::compareWild (
    const BString & string ) const
```

Compare string to string with wildcards . Returns 0 for match.

7.89.3.19 compareWildExpression()

```
int BString::compareWildExpression (
    const BString & string ) const
```

Compare string to space delimited patterns. Returns 0 for match.

7.89.3.20 compareRegex()

```
int BString::compareRegex (
    const BString & pattern,
    int ignoreCase = 0 ) const
```

Compare strings. Returns 1 for match.

7.89.3.21 truncate()

```
BString & BString::truncate (
    int len )
```

Truncate to length len.

7.89.3.22 pad()

```
BString & BString::pad (
    int len )
```

Pad to length len.

7.89.3.23 clear()

```
void BString::clear ( )
```

Clear the string.

7.89.3.24 toUpper()

```
BString & BString::toUpper ( )
```

Convert to uppercase.

7.89.3.25 toLower()

```
BString & BString::toLower ( )
```

Convert to lowercase.

7.89.3.26 lowerFirst()

```
BString BString::lowerFirst ( )
```

Return string with lowercase first character.

7.89.3.27 removeNL()

```
void BString::removeNL ( )
```

Remove if present NL from last char.

7.89.3.28 justify()

```
BString BString::justify (
    int leftMargin,
    int width )
```

Justify the string to the given width.

7.89.3.29 fixedLen()

```
BString BString::fixedLen (
    int length,
    int rightJustify = 0 )
```

return string formatted to fixed length

7.89.3.30 firstLine()

```
BString BString::firstLine ( )
```

Return first line.

7.89.3.31 translateChar()

```
BString BString::translateChar (
    char ch,
    BString replace = " " )
```

Translate character converting them to the given string.

7.89.3.32 reverse()

```
BString BString::reverse ( ) const
```

Reverse character order.

7.89.3.33 subString()

```
BString BString::subString (
    int start,
    int len ) const
```

Returns substring.

7.89.3.34 del()

```
int BString::del (
    int start,
    int len )
```

Delete substring.

7.89.3.35 insert()

```
int BString::insert (
    int start,
    BString str )
```

Insert substring.

7.89.3.36 append()

```
int BString::append (
    const BString & str )
```

Append a string.

7.89.3.37 add()

```
BString BString::add (
    const BString & str ) const
```

Add strings returning result.

7.89.3.38 printf()

```
BString & BString::printf (
    const char * fmt,
    ... )
```

Formatted print into the string.

7.89.3.39 find() [1/2]

```
int BString::find (
    char ch ) const
```

Find *ch* in string searching forwards. Returns -1 if not found.

7.89.3.40 find() [2/2]

```
int BString::find (
    BString str ) const
```

Find string in string searching forwards. Returns -1 if not found.

7.89.3.41 findReverse()

```
int BString::findReverse (
    char ch ) const
```

Find *ch* in string searching backwards. Returns -1 if not found.

7.89.3.42 csvEncode()

```
BString BString::csvEncode ( ) const
```

Encode a string for CSV.

7.89.3.43 csvDecode()

```
BString & BString::csvDecode (
    const BString str )
```

Decode a string from CSV.

7.89.3.44 base64Encode()

```
BString BString::base64Encode ( ) const
```

Encode a string to base64.

7.89.3.45 base64Decode()

```
BError BString::base64Decode (
    BString & str ) const
```

Decode a string from base64.

7.89.3.46 getTokenList() [1/2]

```
BList< BString > BString::getTokenList (
    BString separators )
```

Break string into tokens.

7.89.3.47 getTokenList() [2/2]

```
BList< BString > BString::getTokenList (
    char separator )
```

Break string into tokens.

7.89.3.48 removeSeparators()

```
BString BString::removeSeparators (
    BString separators )
```

Remove any char from separators from string.

7.89.3.49 pullToken()

```
BString BString::pullToken (
    BString terminators )
```

Pull token from start of string.

7.89.3.50 pullSeparators()

```
BString BString::pullSeparators (
    BString separators )
```

Pull separators from start of string.

7.89.3.51 pullWord()

```
BString BString::pullWord ( )
```

Pull a word out of the head of the string.

7.89.3.52 pullLine()

```
BString BString::pullLine ( )
```

Pull a line out of the head of the string.

7.89.3.53 split()

```
BList< BString > BString::split (
    char splitChar )
```

Split string into an array based on the character separator.

7.89.3.54 dirname()

```
BString BString::dirname ( )
```

Return the directory component if the string is a file path name.

7.89.3.55 filename()

```
BString BString::filename ( )
```

Return the filename component if the string is a file path name.

7.89.3.56 basename()

```
BString BString::basename ( )
```

Return the file name component if the string is a file path name.

7.89.3.57 extension()

```
BString BString::extension ( )
```

Return the file extension component if the string is a file path name.

7.89.3.58 extensionFull()

```
BString BString::extensionFull ( )
```

Return the file extension component with leading '.' if the string is a file path name.

7.89.3.59 hash()

```
BUInt32 BString::hash ( ) const
```

Create a 32bit hash number for the string.

7.89.3.60 get() [1/2]

```
char & BString::get (
    int pos )
```

Return the character at the position give. Will print an error message and raise the SIGABORT exception if out of range.

7.89.3.61 get() [2/2]

```
const char & BString::get (
    int pos ) const
```

Return the character at the position give. Will print an error message and raise the SIGABORT exception if out of range.

7.89.3.62 operator=()

```
BString & BString::operator= (
    const BString & string )
```

7.89.3.63 operator[]()

```
char & BString::operator[] (
    int pos )
```

7.89.3.64 operator==() [1/2]

```
int BString::operator== (
    const BString & s ) const [inline]
```

7.89.3.65 operator==() [2/2]

```
int BString::operator== (
    const char * s ) const [inline]
```

7.89.3.66 operator>() [1/2]

```
int BString::operator> (
    const BString & s ) const [inline]
```

7.89.3.67 operator>() [2/2]

```
int BString::operator> (
    const char * s ) const [inline]
```

7.89.3.68 operator<() [1/2]

```
int BString::operator< (
    const BString & s ) const [inline]
```


7.89.3.69 operator<() [2/2]

```
int BString::operator< (
    const char * s ) const    [inline]
```

7.89.3.70 operator>=()

```
int BString::operator>= (
    const BString & s ) const    [inline]
```

7.89.3.71 operator<=()

```
int BString::operator<= (
    const BString & s ) const    [inline]
```

7.89.3.72 operator"!=() [1/2]

```
int BString::operator!= (
    const BString & s ) const    [inline]
```

7.89.3.73 operator"!=() [2/2]

```
int BString::operator!= (
    const char * s ) const    [inline]
```

7.89.3.74 operator+() [1/6]

```
BString BString::operator+ (
    const BString & s ) const    [inline]
```

7.89.3.75 operator+() [2/6]

```
BString BString::operator+ (
    const char * s ) const    [inline]
```

7.89.3.76 operator+=() [1/2]

```
BString BString::operator+= (
    const BString & s ) [inline]
```

7.89.3.77 operator+=() [2/2]

```
BString BString::operator+= (
    const char * s ) [inline]
```

7.89.3.78 operator+() [3/6]

```
BString BString::operator+ (
    char ch ) const [inline]
```

7.89.3.79 operator+() [4/6]

```
BString BString::operator+ (
    BInt i ) const [inline]
```

7.89.3.80 operator+() [5/6]

```
BString BString::operator+ (
    BUInt i ) const [inline]
```

7.89.3.81 operator+() [6/6]

```
BString BString::operator+ (
    BUInt64 i ) const [inline]
```

7.89.3.82 operator const char *()

```
BString::operator const char * ( ) const [inline]
```

7.89.3.83 field()

```
BString BString::field (
    int field ) const
```

Deprecated function.

7.89.3.84 fields()

```
char ** BString::fields ( )
```

Deprecated function.

7.89.4 Member Data Documentation

7.89.4.1 ostr

```
BRefData* BString::ostr [protected]
```

This is the reference counted string storage.

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

- [BString.h](#)
- [BString.cpp](#)

7.90 BStringLocked Class Reference

Provides a basic thread locked string.

```
#include <BStringLocked.h>
```

Public Member Functions

- [BStringLocked](#) ()
- [BStringLocked](#) (const [BStringLocked](#) &s)
- [BStringLocked](#) (const [BString](#) &s)
- int [len](#) () const
Length of string.
- [operator BString](#) () const
- [BStringLocked operator+](#) (const [BStringLocked](#) &s) const
- [BStringLocked & operator=](#) (const [BStringLocked](#) &s)

7.90.1 Detailed Description

Provides a basic thread locked string.

7.90.2 Constructor & Destructor Documentation

7.90.2.1 BStringLocked() [1/3]

```
BStringLocked::BStringLocked ( ) [inline]
```

7.90.2.2 BStringLocked() [2/3]

```
BStringLocked::BStringLocked (
    const BStringLocked & s ) [inline]
```

7.90.2.3 BStringLocked() [3/3]

```
BStringLocked::BStringLocked (
    const BString & s ) [inline]
```

7.90.3 Member Function Documentation

7.90.3.1 len()

```
int BStringLocked::len ( ) const [inline]
```

Length of string.

7.90.3.2 operator BString()

```
BStringLocked::operator BString ( ) const [inline]
```

7.90.3.3 operator+()

```
BStringLocked BStringLocked::operator+ (
    const BStringLocked & s ) const [inline]
```

7.90.3.4 operator=()

```
BStringLocked & BStringLocked::operator= (
    const BStringLocked & s ) [inline]
```

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

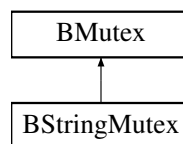
- [BStringLocked.h](#)

7.91 BStringMutex Class Reference

Thread locked string internal mutex.

```
#include <BStringLocked.h>
```

Inheritance diagram for BStringMutex:



Public Member Functions

- [BStringMutex](#) ()

Additional Inherited Members

7.91.1 Detailed Description

Thread locked string internal mutex.

7.91.2 Constructor & Destructor Documentation

7.91.2.1 BStringMutex()

```
BStringMutex::BStringMutex ( ) [inline]
```

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

- [BStringLocked.h](#)

7.92 BTable Class Reference

A simple string based table structure.

```
#include <BTable.h>
```

Public Member Functions

- [BTable](#) ()
- [~BTable](#) ()
- void [clear](#) ()
- void [setTitle](#) (BArray< [BString](#) > title)
- void [addRow](#) (BArray< [BString](#) > data)
- [BString](#) [getString](#) ()
- void [print](#) (FILE *file=stdout)

7.92.1 Detailed Description

A simple string based table structure.

7.92.2 Constructor & Destructor Documentation

7.92.2.1 BTable()

```
BTable::BTable ( )
```

7.92.2.2 ~BTable()

```
BTable::~~BTable ( )
```

7.92.3 Member Function Documentation

7.92.3.1 clear()

```
void BTable::clear ( )
```

7.92.3.2 setTitle()

```
void BTable::setTitle (
    BArray< BString > title )
```

7.92.3.3 addRow()

```
void BTable::addRow (
    BArray< BString > data )
```

7.92.3.4 getString()

```
BString BTable::getString ( )
```

7.92.3.5 print()

```
void BTable::print (
    FILE * file = stdout )
```

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

- [BTable.h](#)
- [BTable.cpp](#)

7.93 BTask Class Reference

Implements a thread of execution.

```
#include <BTask.h>
```

Public Member Functions

- [BTask](#) (const char *name="", [BUInt](#) stackSize=0, [BUInt](#) priority=1)
- virtual [~BTask](#) ()
- void [init](#) (const char *name, [BUInt](#) stackSize=0, [BUInt](#) priority=1)
- [BError](#) [start](#) ()
Starts the task running.
- void [stop](#) ()
- void [waitForCompletion](#) ()
- int [setPriority](#) ([BUInt](#) priority)
Set the priority of the task: 0 upwards.
- virtual void [run](#) ()

Static Protected Member Functions

- static void * [taskFunc](#) (void *)

Protected Attributes

- const char * [oname](#)
- [BUInt](#) [ostackSize](#)
- [BUInt](#) [opolicy](#)
- [BUInt](#) [opriority](#)
- pthread_t [othread](#)
- [Bool](#) [orunning](#)

7.93.1 Detailed Description

Implements a thread of execution.

7.93.2 Constructor & Destructor Documentation

7.93.2.1 BTask()

```
BTask::BTask (
    const char * name = "",
    BUInt stackSize = 0,
    BUInt priority = 1 )
```

7.93.2.2 ~BTask()

```
BTask::~~BTask ( ) [virtual]
```


7.93.3 Member Function Documentation

7.93.3.1 init()

```
void BTask::init (
    const char * name,
    BUInt stackSize = 0,
    BUInt priority = 1 )
```

7.93.3.2 start()

```
BError BTask::start ( )
```

Starts the task running.

7.93.3.3 stop()

```
void BTask::stop ( )
```

7.93.3.4 waitForCompletion()

```
void BTask::waitForCompletion ( )
```

7.93.3.5 setPriority()

```
int BTask::setPriority (
    BUInt priority )
```

Set the priority of the task: 0 upwards.

7.93.3.6 run()

```
void BTask::run ( ) [virtual]
```

7.93.3.7 taskFunc()

```
void * BTask::taskFunc (  
    void * arg )    [static], [protected]
```

7.93.4 Member Data Documentation

7.93.4.1 oname

```
const char* BTask::oname    [protected]
```

7.93.4.2 ostackSize

```
BUInt BTask::ostackSize    [protected]
```

7.93.4.3 opolicy

```
BUInt BTask::opolicy    [protected]
```

7.93.4.4 opriority

```
BUInt BTask::opriority    [protected]
```

7.93.4.5 othread

```
pthread_t BTask::othread    [protected]
```

7.93.4.6 orunning

```
Bool BTask::orunning    [protected]
```

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

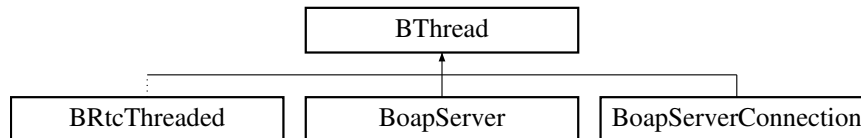
- [BTask.h](#)
- [BTask.cpp](#)

7.94 BThread Class Reference

Implements a program execution thread.

```
#include <BThread.h>
```

Inheritance diagram for BThread:



Public Member Functions

- [BThread](#) ()
- virtual [~BThread](#) ()
- int [setInitPriority](#) (int policy, int priority)
- int [setInitStackSize](#) (size_t stackSize)
- int [start](#) ()
- void * [result](#) ()
- int [running](#) ()
- int [setPriority](#) (int policy, int priority)
- int [cancel](#) ()
- void * [waitForCompletion](#) ()
- pthread_t [getThread](#) ()
- virtual void * [function](#) ()

7.94.1 Detailed Description

Implements a program execution thread.

7.94.2 Constructor & Destructor Documentation

7.94.2.1 BThread()

```
BThread::BThread ( )
```

7.94.2.2 ~BThread()

```
BThread::~~BThread ( ) [virtual]
```

7.94.3 Member Function Documentation

7.94.3.1 setInitPriority()

```
int BThread::setInitPriority (
    int policy,
    int priority )
```

7.94.3.2 setInitStackSize()

```
int BThread::setInitStackSize (
    size_t stackSize )
```

7.94.3.3 start()

```
int BThread::start ( )
```

7.94.3.4 result()

```
void * BThread::result ( )
```

7.94.3.5 running()

```
int BThread::running ( )
```

7.94.3.6 setPriority()

```
int BThread::setPriority (
    int policy,
    int priority )
```

7.94.3.7 cancel()

```
int BThread::cancel ( )
```

7.94.3.8 waitForCompletion()

```
void * BThread::waitForCompletion ( )
```

7.94.3.9 getThread()

```
pthread_t BThread::getThread ( )
```

7.94.3.10 function()

```
void * BThread::function ( ) [virtual]
```

Reimplemented in [BoapServer](#).

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

- [BThread.h](#)
- [BThread.cpp](#)

7.95 BTime Class Reference

Implements a simple date/time class. Stores the date/time as a number of seconds since Unix epoch 1970-01-02T00:00:00.

```
#include <BTime.h>
```

Public Member Functions

- [BTime](#) ([BUInt32](#) t=0)
- void [set](#) ([BUInt32](#) seconds)
Set the date and time.
- void [set](#) ([BUInt](#) year, [BUInt](#) month, [BUInt](#) day, [BUInt](#) hour=0, [BUInt](#) minute=0, [BUInt](#) second=0)
Set the date and time.
- void [setYearDay](#) ([BUInt](#) year, [BUInt](#) yearDay, [BUInt](#) hour=0, [BUInt](#) minute=0, [BUInt](#) second=0)
Set the date and time.
- void [getDate](#) ([BUInt](#) &year, [BUInt](#) &month, [BUInt](#) &day) const
Return the date information.
- void [getTime](#) ([BUInt](#) &hour, [BUInt](#) &minute, [BUInt](#) &second) const
Return the time information.
- [BUInt32](#) [getSeconds](#) () const
Return the number of seconds.
- int [isSet](#) () const
Check if set.
- int [isLeapYear](#) ()
Returns if a leap year.
- void [addSeconds](#) (int seconds)
Add the given number of seconds.
- [BString](#) [getString](#) ([BString](#) format="iso") const
Gets the date/time in string format.
- [BError](#) [setString](#) (const [BString](#) dateTime)
Sets the date/time from string format.
- [BTime](#) [utcToLocal](#) () const
Converts a UTC time to a local time.
- [BTime](#) [localToUtc](#) () const
Converts a local time to UTC time.
- [BString](#) [getStringLocal](#) ([BString](#) format="iso") const
Gets the date/time in string format.
- [BError](#) [setStringLocal](#) (const [BString](#) dateTime)
Sets the date/time from string format.
- int [operator==](#) (const [BTime](#) &time) const
- int [operator!=](#) (const [BTime](#) &time) const
- int [operator>](#) (const [BTime](#) &time) const
- int [operator>=](#) (const [BTime](#) &time) const
- int [operator<](#) (const [BTime](#) &time) const
- int [operator<=](#) (const [BTime](#) &time) const
- [BTime](#) [operator+](#) (int seconds) const
- [BTime](#) & [operator+=](#) (int seconds)

7.95.1 Detailed Description

Implements a simple date/time class. Stores the date/time as a number of seconds since Unix epoch 1970-01-02T00:00:00.

[BTime](#) has a range until 2106-02-07. This sets and returns datetime strings in UTC time by default. There are also *Local() functions to return and set using local time strings.

Uses some special values. 0 - DateTime not set.

7.95.2 Constructor & Destructor Documentation

7.95.2.1 BTime()

```
BTime::BTime (
    BUInt32 t = 0 )
```

7.95.3 Member Function Documentation

7.95.3.1 set() [1/2]

```
void BTime::set (
    BUInt32 seconds )
```

Set the date and time.

7.95.3.2 set() [2/2]

```
void BTime::set (
    BUInt year,
    BUInt month,
    BUInt day,
    BUInt hour = 0,
    BUInt minute = 0,
    BUInt second = 0 )
```

Set the date and time.

7.95.3.3 setYearDay()

```
void BTime::setYearDay (
    BUInt year,
    BUInt yearDay,
    BUInt hour = 0,
    BUInt minute = 0,
    BUInt second = 0 )
```

Set the date and time.

7.95.3.4 getDate()

```
void BTime::getDate (
    BUInt & year,
    BUInt & month,
    BUInt & day ) const
```

Return the date information.

7.95.3.5 getTime()

```
void BTime::getTime (
    BUInt & hour,
    BUInt & minute,
    BUInt & second ) const
```

Return the time information.

7.95.3.6 getSeconds()

```
BUInt32 BTime::getSeconds ( ) const
```

Return the number of seconds.

7.95.3.7 isSet()

```
int BTime::isSet ( ) const [inline]
```

Check if set.

7.95.3.8 isLeapYear()

```
int BTime::isLeapYear ( )
```

Returns if a leap year.

7.95.3.9 addSeconds()

```
void BTime::addSeconds (
    int seconds )
```

Add the given number of seconds.

7.95.3.10 getString()

```
BString BTime::getString (
    BString format = "iso" ) const
```

Gets the date/time in string format.

7.95.3.11 setString()

```
BError BTime::setString (
    const BString dateTime )
```

Sets the date/time from string format.

7.95.3.12 utcToLocal()

```
BTime BTime::utcToLocal ( ) const
```

Converts a UTC time to a local time.

7.95.3.13 localToUtc()

```
BTime BTime::localToUtc ( ) const
```

Converts a local time to UTC time.

7.95.3.14 getStringLocal()

```
BString BTime::getStringLocal (
    BString format = "iso" ) const
```

Gets the date/time in string format.

7.95.3.15 setStringLocal()

```
BError BTime::setStringLocal (
    const BString dateTime )
```

Sets the date/time from string format.

7.95.3.16 operator==(

```
int BTime::operator== (
    const BTime & time ) const [inline]
```

7.95.3.17 operator!=(

```
int BTime::operator!= (
    const BTime & time ) const [inline]
```

7.95.3.18 operator>(

```
int BTime::operator> (
    const BTime & time ) const [inline]
```

7.95.3.19 operator>=(

```
int BTime::operator>= (
    const BTime & time ) const [inline]
```

7.95.3.20 operator<(

```
int BTime::operator< (
    const BTime & time ) const [inline]
```

7.95.3.21 operator<=()

```
int BTime::operator<= (
    const BTime & time ) const [inline]
```

7.95.3.22 operator+()

```
BTime BTime::operator+ (
    int seconds ) const [inline]
```

7.95.3.23 operator+=()

```
BTime & BTime::operator+= (
    int seconds ) [inline]
```

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

- [BTime.h](#)
- [BTime.cpp](#)

7.96 BTimer Class Reference

Stopwatch style timer.

```
#include <BTimer.h>
```

Public Member Functions

- [BTimer](#) ()
- [~BTimer](#) ()
- void [start](#) ()
Start timer.
- void [stop](#) ()
Stop timer.
- void [clear](#) ()
Clear timer.
- double [getElapsedTime](#) ()
Returns the elapsed time from the last start.
- void [add](#) (BTimer &timer)
Add two timers.
- double [average](#) ()
Average time is duration between [start\(\)](#) and [stop\(\)](#) / number of stops.
- double [peak](#) ()
Peak time.

7.96.1 Detailed Description

Stopwatch style timer.

7.96.2 Constructor & Destructor Documentation

7.96.2.1 BTimer()

```
BTimer::BTimer ( )
```

7.96.2.2 ~BTimer()

```
BTimer::~~BTimer ( )
```

7.96.3 Member Function Documentation

7.96.3.1 start()

```
void BTimer::start ( )
```

Start timer.

7.96.3.2 stop()

```
void BTimer::stop ( )
```

Stop timer.

7.96.3.3 clear()

```
void BTimer::clear ( )
```

Clear timer.

7.96.3.4 getElapsedTime()

```
double BTimer::getElapsedTime ( )
```

Returns the elapsed time from the last start.

7.96.3.5 add()

```
void BTimer::add (
    BTimer & timer )
```

Add two timers.

7.96.3.6 average()

```
double BTimer::average ( )
```

Average time is duration between [start\(\)](#) and [stop\(\)](#) / number of stops.

7.96.3.7 peak()

```
double BTimer::peak ( )
```

Peak time.

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

- [BTimer.h](#)
- [BTimer.cpp](#)

7.97 BTimeStamp Class Reference

A date and time storage class with microsecond resolution.

```
#include <BTimeStamp.h>
```

Public Member Functions

- [BTimeStamp](#) ()
- [BTimeStamp](#) (int [year](#), int [month](#)=1, int [day](#)=1, int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int [microsecond](#)=0)
- [BTimeStamp](#) (const [BString](#) str)
- [~BTimeStamp](#) ()
- void [clear](#) ()
Clear the date/time.
- void [setFirst](#) ()
Set the first date available.
- void [setLast](#) ()
Set the last date available.
- void [set](#) (time_t time, int [microSeconds](#))
Set time using Unix time (seconds from 1970-01-01)
- void [set](#) (int [year](#)=0, int [month](#)=1, int [day](#)=1, int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int [microsecond](#)=0)
- void [set](#) (const [BTimeStampMs](#) &timeStamp)
Set the timeStamp to given MS time stamp.
- void [setYDay](#) (int [year](#)=0, int [yday](#)=0, int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int [microsecond](#)=0)
- void [setTime](#) (int [hour](#)=0, int [minute](#)=0, int [second](#)=0, int [microsecond](#)=0)
- void [setNow](#) ()
Set the timeStamp to now.
- int [year](#) () const
- int [yday](#) () const
- int [month](#) () const
- int [day](#) () const
- int [hour](#) () const
- int [minute](#) () const
- int [second](#) () const
- int [microSecond](#) () const
- void [getDate](#) (int &[year](#), int &mon, int &[day](#)) const
- [BString](#) [getString](#) ([BString](#) separator="T") const
Get the time as an ISO date/time string.
- [BError](#) [setString](#) (const [BString](#) dateTime)
Set the time from an ISO date/time.
- [BString](#) [getStringNoMs](#) ([BString](#) separator="T") const
Get the time as an ISO date/time string without microseconds.
- [BString](#) [getStringFormatted](#) ([BString](#) format) const
Gets the time in a string form as per the format. Format syntax as per strftime()
- void [addMilliSeconds](#) (int [milliSeconds](#))
Add the given number of milli seconds. This should be less than a year.
- void [addMicroSeconds](#) (int64_t [microSeconds](#))
Add the given number of micro seconds. This should be less than a year.
- void [addSeconds](#) (int [seconds](#))
Add the given number of seconds. This should be less than a year.
- uint32_t [getYearSeconds](#) () const
Get number of seconds within the year.
- uint64_t [getYearMicroSeconds](#) () const
Get number of micro seconds within the year.
- int [isSet](#) () const
- int [compare](#) (const [BTimeStamp](#) &timeStamp) const
Compare two dates.
- [operator BString](#) () const

- [BTimeStamp](#) & [operator=](#) (const [BTimeStampMs](#) &timeStamp)
- int [operator==](#) (const [BTimeStamp](#) &timeStamp) const
- int [operator!=](#) (const [BTimeStamp](#) &timeStamp) const
- int [operator>](#) (const [BTimeStamp](#) &timeStamp) const
- int [operator>=](#) (const [BTimeStamp](#) &timeStamp) const
- int [operator<](#) (const [BTimeStamp](#) &timeStamp) const
- int [operator<=](#) (const [BTimeStamp](#) &timeStamp) const

Static Public Member Functions

- static int [isLeap](#) (int [year](#))
- static [BInt64 difference](#) ([BTimeStamp](#) t2, [BTimeStamp](#) t1)

Public Attributes

- [BUInt16 oyear](#)
Year (0 .. 65535)
- [BUInt16 oyday](#)
Day in year (0 .. 365)
- [BUInt8 ohour](#)
Hour (0 .. 23)
- [BUInt8 ominute](#)
Minute (0 .. 59)
- [BUInt8 osecond](#)
Second (0 .. 59)
- [BUInt8 ospare](#)
Padding.
- [BUInt32 omicroSecond](#)
MicroSecond (0 .. 999999)

7.97.1 Detailed Description

A date and time storage class with microsecond resolution.

7.97.2 Constructor & Destructor Documentation

7.97.2.1 BTimeStamp() [1/3]

```
BTimeStamp::BTimeStamp ( )
```

7.97.2.2 BTimeStamp() [2/3]

```
BTimeStamp::BTimeStamp (
    int year,
    int month = 1,
    int day = 1,
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.97.2.3 BTimeStamp() [3/3]

```
BTimeStamp::BTimeStamp (
    const BString str )
```

7.97.2.4 ~BTimeStamp()

```
BTimeStamp::~~BTimeStamp ( )
```

7.97.3 Member Function Documentation

7.97.3.1 clear()

```
void BTimeStamp::clear ( )
```

Clear the date/time.

7.97.3.2 setFirst()

```
void BTimeStamp::setFirst ( )
```

Set the first date available.

7.97.3.3 setLast()

```
void BTimeStamp::setLast ( )
```

Set the last date available.

7.97.3.4 set() [1/3]

```
void BTimeStamp::set (
    time_t time,
    int microseconds )
```

Set time using Unix time (seconds from 1970-01-01)

7.97.3.5 set() [2/3]

```
void BTimeStamp::set (
    int year = 0,
    int month = 1,
    int day = 1,
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.97.3.6 set() [3/3]

```
void BTimeStamp::set (
    const BTimeStampMs & timeStamp )
```

Set the timeStamp to given MS time stamp.

7.97.3.7 setYDay()

```
void BTimeStamp::setYDay (
    int year = 0,
    int yday = 0,
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.97.3.8 setTime()

```
void BTimeStamp::setTime (
    int hour = 0,
    int minute = 0,
    int second = 0,
    int microsecond = 0 )
```

7.97.3.9 setNow()

```
void BTimeStamp::setNow ( )
```

Set the timeStamp to now.

7.97.3.10 year()

```
int BTimeStamp::year ( ) const
```

7.97.3.11 yday()

```
int BTimeStamp::yday ( ) const
```

7.97.3.12 month()

```
int BTimeStamp::month ( ) const
```

7.97.3.13 day()

```
int BTimeStamp::day ( ) const
```

7.97.3.14 hour()

```
int BTimeStamp::hour ( ) const
```

7.97.3.15 minute()

```
int BTimeStamp::minute ( ) const
```

7.97.3.16 second()

```
int BTimeStamp::second ( ) const
```

7.97.3.17 microSecond()

```
int BTimeStamp::microSecond ( ) const
```

7.97.3.18 getDate()

```
void BTimeStamp::getDate (
    int & year,
    int & mon,
    int & day ) const
```

7.97.3.19 getString()

```
BString BTimeStamp::getString (
    BString separator = "T" ) const
```

Get the time as an ISO date/time string.

7.97.3.20 setString()

```
BError BTimeStamp::setString (
    const BString dateTime )
```

Set the time from an ISO date/time.

This accepts a string and parses for a supported datetime format string. The function will return an error if it cannot parse a datetime string or if one of the parsed fields is out of range. The conversion supports a fractional second resolution of 1 microsecond rounding the fractional value given to this. Supported formats include: ISO: YYYY-MM-DD[TJHH:MM:SS.FS, UK: YYYY/MM/DD[TJHH:MM:SS.FS, UK: YY/MM/DD[TJHH:MM:SS.FS, HH:MM:SS.FS and YYYYDDD[TJHH:MM:SS.FS.

7.97.3.21 getStringNoMs()

```
BString BTimeStamp::getStringNoMs (
    BString separator = "T" ) const
```

Get the time as an ISO date/time string without microseconds.

7.97.3.22 getStringFormatted()

```
BString BTimeStamp::getStringFormatted (
    BString format ) const
```

Gets the time in a string form as per the format. Format syntax as per strftime()

7.97.3.23 addMilliseconds()

```
void BTimeStamp::addMilliseconds (
    int milliseconds )
```

Add the given number of milli seconds. This should be less than a year.

7.97.3.24 addMicroSeconds()

```
void BTimeStamp::addMicroSeconds (
    int64_t microseconds )
```

Add the given number of micro seconds. This should be less than a year.

7.97.3.25 addSeconds()

```
void BTimeStamp::addSeconds (
    int seconds )
```

Add the given number of seconds. This should be less than a year.

7.97.3.26 getYearSeconds()

```
uint32_t BTimeStamp::getYearSeconds ( ) const
```

Get number of seconds within the year.

7.97.3.27 getYearMicroSeconds()

```
uint64_t BTimeStamp::getYearMicroSeconds ( ) const
```

Get number of micro seconds within the year.

7.97.3.28 isSet()

```
int BTimeStamp::isSet ( ) const [inline]
```

7.97.3.29 compare()

```
int BTimeStamp::compare (
    const BTimeStamp & timeStamp ) const
```

Compare two dates.

7.97.3.30 operator BString()

```
BTimeStamp::operator BString ( ) const [inline]
```

7.97.3.31 operator=()

```
BTimeStamp & BTimeStamp::operator= (
    const BTimeStampMs & timeStamp ) [inline]
```

7.97.3.32 operator==(())

```
int BTimeStamp::operator== (
    const BTimeStamp & timeStamp ) const [inline]
```

7.97.3.33 operator!=(())

```
int BTimeStamp::operator!= (
    const BTimeStamp & timeStamp ) const [inline]
```

7.97.3.34 operator>()

```
int BTimeStamp::operator> (
    const BTimeStamp & timeStamp ) const    [inline]
```

7.97.3.35 operator>=()

```
int BTimeStamp::operator>= (
    const BTimeStamp & timeStamp ) const    [inline]
```

7.97.3.36 operator<()

```
int BTimeStamp::operator< (
    const BTimeStamp & timeStamp ) const    [inline]
```

7.97.3.37 operator<=()

```
int BTimeStamp::operator<= (
    const BTimeStamp & timeStamp ) const    [inline]
```

7.97.3.38 isLeap()

```
int BTimeStamp::isLeap (
    int year )    [static]
```

7.97.3.39 difference()

```
BInt64 BTimeStamp::difference (
    BTimeStamp t2,
    BTimeStamp t1 )    [static]
```

7.97.4 Member Data Documentation

7.97.4.1 oyear

`BUInt16 BTimeStamp::oyear`

Year (0 .. 65535)

7.97.4.2 oyday

`BUInt16 BTimeStamp::oyday`

Day in year (0 .. 365)

7.97.4.3 ohour

`BUInt8 BTimeStamp::ohour`

Hour (0 .. 23)

7.97.4.4 ominute

`BUInt8 BTimeStamp::ominute`

Minute (0 .. 59)

7.97.4.5 osecond

`BUInt8 BTimeStamp::osecond`

Second (0 .. 59)

7.97.4.6 ospare

`BUInt8 BTimeStamp::ospare`

Padding.

7.97.4.7 omicroSecond

`BUInt32 BTimeStamp::omicroSecond`

MicroSecond (0 .. 999999)

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

- [BTimeStamp.h](#)
- [BTimeStamp.cpp](#)

7.98 BTimeStampMs Class Reference

A date and time storage class with millisecond resolution and an extra field to indicate a particular sampleNumber it refers to.

```
#include <BTimeStampMs.h>
```

Public Member Functions

- [BTimeStampMs](#) (BString str="")
- [~BTimeStampMs](#) ()
- void [clear](#) ()
Clear the date/time.
- void [setNow](#) ()
Set the timeStamp to now.
- void [setFirst](#) ()
Set the first date available.
- void [setLast](#) ()
Set the last date available.
- void [set](#) (time_t time, int milliseconds=0)
Set time using Unix time (seconds from 1970-01-01)
- void [setYDay](#) (int year=0, int yday=0, int hour=0, int minute=0, int second=0, int milliSecond=0)
- void [setTime](#) (int hour=0, int minute=0, int second=0, int milliSecond=0)
- [BTimeStampMs](#) & [addMilliseconds](#) (int milliseconds)
Add the given number of milli seconds. This should be less than a year.
- [BTimeStampMs](#) & [subMilliseconds](#) (int milliseconds)
Add the given number of milli seconds. This should be less than a year.
- [BTimeStampMs](#) & [addSeconds](#) (int seconds)
Add the given number of seconds. This should be less than a year.
- [BTimeStampMs](#) & [subSeconds](#) (int seconds)
Subtract the given number of seconds. This should be less than a year.
- uint32_t [getYearSeconds](#) ()
Get number of seconds within the year.
- uint64_t [getYearMilliseconds](#) ()
Get number of seconds within the year.
- BString [getString](#) (BString separator="T")
Get the time as an ISO date/time string.
- BString [getStringNoMs](#) (BString separator="T")

- Get the time as an ISO date/time string with no ms.*

 - [BError setString](#) ([BString](#) dateTime)

Set the time from an ISO date/time.
- [BString getDurationString](#) ([BString](#) separator="T")

Get the time as an ISO date/time string but with month's and days starting from 0.
- [BString getDurationStringNoMs](#) ([BString](#) separator="T")

Get the time as an ISO date/time string but with month's and days starting from 0 with no ms.
- [BError setDurationString](#) ([BString](#) dateTime)

Set the time from an ISO date/time string but with month's and days starting from 0.
- [BString getStringRaw](#) ()
- void [getDate](#) (int &year, int &mon, int &day)

Get the year, month and day.
- int [compare](#) (const [BTimeStampMs](#) &timeStamp)

Compare two dates.
- int [operator>](#) (const [BTimeStampMs](#) &timeStamp)
- int [operator>=](#) (const [BTimeStampMs](#) &timeStamp)
- int [operator<](#) (const [BTimeStampMs](#) &timeStamp)
- int [operator<=](#) (const [BTimeStampMs](#) &timeStamp)

Static Public Member Functions

- static int [isLeap](#) (int year)
- static [BUInt64](#) [difference](#) ([BTimeStampMs](#) t2, [BTimeStampMs](#) t1)

Public Attributes

- uint16_t [year](#)
Year (2000 .. 3000)
- uint16_t [yday](#)
Day in year (0 .. 365)
- uint16_t [hour](#)
Hour (0 .. 23)
- uint16_t [minute](#)
Minute (0 .. 59)
- uint16_t [second](#)
Second (0 .. 59)
- uint16_t [milliSecond](#)
MilliSecond (0 .. 999)
- int32_t [sampleNumber](#)
The sample number this time refers to.

7.98.1 Detailed Description

A date and time storage class with millisecond resolution and an extra field to indicate a particular sampleNumber it refers to.

7.98.2 Constructor & Destructor Documentation

7.98.2.1 BTimeStampMs()

```
BTimeStampMs::BTimeStampMs (
    BString str = "" )
```

7.98.2.2 ~BTimeStampMs()

```
BTimeStampMs::~~BTimeStampMs ( )
```

7.98.3 Member Function Documentation

7.98.3.1 clear()

```
void BTimeStampMs::clear ( )
```

Clear the date/time.

7.98.3.2 setNow()

```
void BTimeStampMs::setNow ( )
```

Set the timeStamp to now.

7.98.3.3 setFirst()

```
void BTimeStampMs::setFirst ( )
```

Set the first date available.

7.98.3.4 setLast()

```
void BTimeStampMs::setLast ( )
```

Set the last date available.

7.98.3.5 set()

```
void BTimeStampMs::set (
    time_t time,
    int milliseconds = 0 )
```

Set time using Unix time (seconds from 1970-01-01)

7.98.3.6 setYDay()

```
void BTimeStampMs::setYDay (
    int year = 0,
    int yday = 0,
    int hour = 0,
    int minute = 0,
    int second = 0,
    int milliSecond = 0 )
```

7.98.3.7 setTime()

```
void BTimeStampMs::setTime (
    int hour = 0,
    int minute = 0,
    int second = 0,
    int milliSecond = 0 )
```

7.98.3.8 addMilliseconds()

```
BTimeStampMs & BTimeStampMs::addMilliseconds (
    int milliseconds )
```

Add the given number of milli seconds. This should be less that a year.

7.98.3.9 subMilliseconds()

```
BTimeStampMs & BTimeStampMs::subMilliseconds (
    int milliseconds )
```

Add the given number of milli seconds. This should be less that a year.

7.98.3.10 addSeconds()

```
BTimeStamp & BTimeStamp::addSeconds (
    int seconds )
```

Add the given number of seconds. This should be less than a year.

7.98.3.11 subSeconds()

```
BTimeStamp & BTimeStamp::subSeconds (
    int seconds )
```

Subtract the given number of seconds. This should be less than a year.

7.98.3.12 getYearSeconds()

```
uint32_t BTimeStamp::getYearSeconds ( )
```

Get number of seconds within the year.

7.98.3.13 getYearMilliSeconds()

```
uint64_t BTimeStamp::getYearMilliSeconds ( )
```

Get number of seconds within the year.

7.98.3.14 getString()

```
BString BTimeStamp::getString (
    BString separator = "T" )
```

Get the time as an ISO date/time string.

7.98.3.15 getStringNoMs()

```
BString BTimeStamp::getStringNoMs (
    BString separator = "T" )
```

Get the time as an ISO date/time string with no ms.

7.98.3.16 setString()

```
BError BTimeStampMs::setString (
    BString dateTime )
```

Set the time from an ISO date/time.

This accepts a string and parses for a supported datetime format string. The function will return an error if it cannot parse a datetime string or if one of the parsed fields is out of range. The conversion supports a fractional second resolution of 1 millisecond resolution rounding the fractional value given to this. Supported formats include: ISO: YYYY-MM-DD[T]HH:MM:SS.FS.

7.98.3.17 getDurationString()

```
BString BTimeStampMs::getDurationString (
    BString separator = "T" )
```

Get the time as an ISO date/time string but with month's and days starting from 0.

7.98.3.18 getDurationStringNoMs()

```
BString BTimeStampMs::getDurationStringNoMs (
    BString separator = "T" )
```

Get the time as an ISO date/time string but with month's and days starting from 0 with no ms.

7.98.3.19 setDurationString()

```
BError BTimeStampMs::setDurationString (
    BString dateTime )
```

Set the time from an ISO date/time string but with month's and days starting from 0.

7.98.3.20 getStringRaw()

```
BString BTimeStampMs::getStringRaw ( )
```

7.98.3.21 getDate()

```
void BTimeStampMs::getDate (
    int & year,
    int & mon,
    int & day )
```

Get the year, month and day.

7.98.3.22 compare()

```
int BTimeStampMs::compare (
    const BTimeStamp & timeStamp )
```

Compare two dates.

7.98.3.23 operator>()

```
int BTimeStampMs::operator> (
    const BTimeStamp & timeStamp ) [inline]
```

7.98.3.24 operator>=()

```
int BTimeStampMs::operator>= (
    const BTimeStamp & timeStamp ) [inline]
```

7.98.3.25 operator<()

```
int BTimeStampMs::operator< (
    const BTimeStamp & timeStamp ) [inline]
```

7.98.3.26 operator<=()

```
int BTimeStampMs::operator<= (
    const BTimeStamp & timeStamp ) [inline]
```

7.98.3.27 isLeap()

```
int BTimeStampMs::isLeap (
    int year ) [static]
```

7.98.3.28 difference()

```
BUInt64 BTimeStampMs::difference (
    BTimeStampMs t2,
    BTimeStampMs t1 ) [static]
```

7.98.4 Member Data Documentation

7.98.4.1 year

```
uint16_t BTimeStampMs::year
```

Year (2000 .. 3000)

7.98.4.2 yday

```
uint16_t BTimeStampMs::yday
```

Day in year (0 .. 365)

7.98.4.3 hour

```
uint16_t BTimeStampMs::hour
```

Hour (0 .. 23)

7.98.4.4 minute

```
uint16_t BTimeStampMs::minute
```

Minute (0 .. 59)

7.98.4.5 second

```
uint16_t BTimeStampMs::second
```

Second (0 .. 59)

7.98.4.6 milliSecond

```
uint16_t BTimeStampMs::milliSecond
```

MilliSecond (0 .. 999)

7.98.4.7 sampleNumber

```
int32_t BTimeStampMs::sampleNumber
```

The sample number this time refers to.

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

- [BTimeStampMs.h](#)
- [BTimeStampMs.cpp](#)

7.99 BTimeUs Class Reference

Time storage as an unsigned 64bit value to TAI standard.

```
#include <BTimeUs.h>
```

Public Member Functions

- [BTimeUs](#) ([BUInt64](#) t=0)
- [BTimeUs](#) ([BTime](#) t)
- void [set](#) ([BUInt64](#) microSeconds)
Set the time to TAI us.
- void [set](#) ([BUInt](#) year, [BUInt](#) month, [BUInt](#) day, [BUInt](#) hour=0, [BUInt](#) minute=0, [BUInt](#) second=0, [BUInt](#) micro↔
Second=0)
Set the date and time from UTC.
- void [setYearDay](#) ([BUInt](#) year, [BUInt](#) yearDay, [BUInt](#) hour=0, [BUInt](#) minute=0, [BUInt](#) second=0, [BUInt](#) micro↔
Second=0)
Set the date and time from UTC.
- void [getDate](#) ([BUInt](#) &year, [BUInt](#) &month, [BUInt](#) &day) const
Return the date information UTC.
- void [getTime](#) ([BUInt](#) &hour, [BUInt](#) &minute, [BUInt](#) &second) const

- *Return the time information UTC.*
- BUInt64 getSeconds () const
 - *Return the number of seconds TAI.*
- BUInt64 getMicroSeconds () const
 - *Return the number of micro seconds TAI.*
- int isSet () const
 - *Check if set.*
- int isLeapYear ()
 - *Returns if a leap year.*
- void addSeconds (BInt64 seconds)
 - *Add the given number of seconds.*
- void addMicroSeconds (BInt64 microSeconds)
 - *Add the given number of seconds.*
- BString getString (BString format="isoT") const
 - *Gets the date/time in string format.*
- BString getStringUs (BString format="isoT") const
 - *Gets the date/time in string format.*
- BError setString (const BString dateTime)
 - *Sets the date/time from string format.*
- operator BTime () const
- int operator== (const BTimeUs &time) const
- int operator!= (const BTimeUs &time) const
- int operator> (const BTimeUs &time) const
- int operator>= (const BTimeUs &time) const
- int operator< (const BTimeUs &time) const
- int operator<= (const BTimeUs &time) const
- BTimeUs operator+ (BInt64 microSeconds) const
- BTimeUs & operator+= (BInt64 microSeconds)

7.99.1 Detailed Description

Time storage as an unsigned 64bit value to TAI standard.

7.99.2 Constructor & Destructor Documentation

7.99.2.1 BTimeUs() [1/2]

```
BTimeUs::BTimeUs (
    BUInt64 t = 0 )
```

7.99.2.2 BTimeUs() [2/2]

```
BTimeUs::BTimeUs (
    BTime t )
```

7.99.3 Member Function Documentation

7.99.3.1 set() [1/2]

```
void BTimeUs::set (
    BUInt64 microseconds )
```

Set the time to TAI us.

7.99.3.2 set() [2/2]

```
void BTimeUs::set (
    BUInt year,
    BUInt month,
    BUInt day,
    BUInt hour = 0,
    BUInt minute = 0,
    BUInt second = 0,
    BUInt microSecond = 0 )
```

Set the date and time from UTC.

7.99.3.3 setYearDay()

```
void BTimeUs::setYearDay (
    BUInt year,
    BUInt yearDay,
    BUInt hour = 0,
    BUInt minute = 0,
    BUInt second = 0,
    BUInt microSecond = 0 )
```

Set the date and time from UTC.

7.99.3.4 getDate()

```
void BTimeUs::getDate (
    BUInt & year,
    BUInt & month,
    BUInt & day ) const
```

Return the date information UTC.

7.99.3.5 getTime()

```
void BTimeUs::getTime (
    BUInt & hour,
    BUInt & minute,
    BUInt & second ) const
```

Return the time information UTC.

7.99.3.6 getSeconds()

```
BUInt64 BTimeUs::getSeconds ( ) const
```

Return the number of seconds TAI.

7.99.3.7 getMicroSeconds()

```
BUInt64 BTimeUs::getMicroSeconds ( ) const
```

Return the number of micro seconds TAI.

7.99.3.8 isSet()

```
int BTimeUs::isSet ( ) const [inline]
```

Check if set.

7.99.3.9 isLeapYear()

```
int BTimeUs::isLeapYear ( )
```

Returns if a leap year.

7.99.3.10 addSeconds()

```
void BTimeUs::addSeconds (
    BInt64 seconds )
```

Add the given number of seconds.

7.99.3.11 addMicroSeconds()

```
void BTimeUs::addMicroSeconds (
    BInt64 microSeconds )
```

Add the given number of seconds.

7.99.3.12 getString()

```
BString BTimeUs::getString (
    BString format = "isoT" ) const
```

Gets the date/time in string format.

7.99.3.13 getStringUs()

```
BString BTimeUs::getStringUs (
    BString format = "isoT" ) const
```

Gets the date/time in string format.

7.99.3.14 setString()

```
BError BTimeUs::setString (
    const BString dateTime )
```

Sets the date/time from string format.

7.99.3.15 operator BTime()

```
BTimeUs::operator BTime ( ) const [inline]
```

7.99.3.16 operator==()

```
int BTimeUs::operator==(
    const BTimeUs & time ) const [inline]
```

7.99.3.17 operator"!="()

```
int BTimeUs::operator!= (
    const BTimeUs & time ) const [inline]
```

7.99.3.18 operator>()

```
int BTimeUs::operator> (
    const BTimeUs & time ) const [inline]
```

7.99.3.19 operator>=()

```
int BTimeUs::operator>= (
    const BTimeUs & time ) const [inline]
```

7.99.3.20 operator<()

```
int BTimeUs::operator< (
    const BTimeUs & time ) const [inline]
```

7.99.3.21 operator<=()

```
int BTimeUs::operator<= (
    const BTimeUs & time ) const [inline]
```

7.99.3.22 operator+()

```
BTimeUs BTimeUs::operator+ (
    BInt64 microSeconds ) const [inline]
```

7.99.3.23 operator+=()

```
BTimeUs & BTimeUs::operator+= (
    BInt64 microSeconds ) [inline]
```

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

- [BTimeUs.h](#)
- [BTimeUs.cpp](#)

7.100 BUrl Class Reference

Access to a Url.

```
#include <BUrl.h>
```

Public Member Functions

- [BUrl\(\)](#)
- [~BUrl\(\)](#)
- [BError readString](#) ([BString](#) url, [BString](#) &str)
Reads URL.

7.100.1 Detailed Description

Access to a Url.

7.100.2 Constructor & Destructor Documentation

7.100.2.1 BUrl()

```
BUrl::BUrl ( )
```

7.100.2.2 ~BUrl()

```
BUrl::~~BUrl ( )
```

7.100.3 Member Function Documentation

7.100.3.1 readString()

```
BError BUrl::readString (  
    BString url,  
    BString & str )
```

Reads URL.

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

- [BUrl.h](#)
- [BUrl.cpp](#)

Chapter 8

File Documentation

8.1 BArray.h File Reference

```
#include <BTypes.h>
#include <vector>
#include <algorithm>
```

Classes

- class [BArray< T >](#)
Template based Array class.

Macros

- #define [BArrayLoop](#)(list, i) for([BUInt](#) i = 0; i < [list.number\(\)](#); i++)

8.1.1 Macro Definition Documentation

8.1.1.1 BArrayLoop

```
#define BArrayLoop(  
    list,  
    i ) for(BUInt i = 0; i < list.number\(\); i++)
```

8.2 BArray.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BArray.h      BEAM Array
3  *  T.Barnaby,   BEAM Ltd,   2007-02-06
4  *  Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  *  For license see LICENSE.txt at the root of the beamlib source tree.
8  */
15 #ifndef BArray_H
16 #define BArray_H    1
17
18 #include <BTypes.h>
19 #include <vector>
20 #include <algorithm>
21
22 template <class T> class BArray : public std::vector<T> {
23 public:
24     typedef int (*SortFunc)(T& a, T& b);
25
26     BArray() : std::vector<T>() {}
27     BArray(BSize size, T value = T()) : std::vector<T>(size, value) {}
28     BArray(const BArray& array) : std::vector<T>(array) {}
29
30 #ifdef OLD_GXX
31     T* data() {
32         return &(*std::vector<T>::begin());
33     }
34 #endif
35     BUInt number() const { return std::vector<T>::size(); }
36     void append(const T& value) { std::vector<T>::insert(std::vector<T>::end(), value); }
37     void append(const BArray<T>& array);
38     void insert(BUInt pos, const T& value) { std::vector<T>::insert(typename
std::vector<T>::iterator(this->_M_impl._M_start + pos), value); }
39     void del(BUInt pos, BUInt num = 1) { std::vector<T>::erase(std::vector<T>::begin() + pos,
std::vector<T>::begin() + pos + num); }
40     T& rear() { return std::vector<T>::back(); }
41 // void sort(SortFunc func) { std::sort(std::vector<T>::begin(), std::vector<T>::end(), func); }
42     void sort() { std::sort(std::vector<T>::begin(), std::vector<T>::end()); }
43 private:
44 };
45
46 template <class T> void BArray<T>::append(const BArray<T>& array) {
47     BUInt l = BArray<T>::size();
48     BUInt i;
49
50     BArray<T>::resize(l + array.size());
51     for(i = 0; i < array.size(); i++) {
52         BArray<T>::data()[l + i] = array[i];
53     }
54 }
55
56 // Macros
57 #define BArrayLoop(list, i) for(BUInt i = 0; i < list.number(); i++)
58
59 #endif

```

8.3 BAtomic.h File Reference

```
#include <BTypes.h>
```

Classes

- class [BAtomic< Type >](#)
BAtomic class increments/decrements different integer types.

Typedefs

- typedef [BAtomic](#)< [BInt32](#) > [BAtomicInt32](#)
- typedef [BAtomic](#)< [BInt64](#) > [BAtomicInt64](#)
- typedef [BAtomic](#)< [BUInt32](#) > [BAtomicUInt32](#)
- typedef [BAtomic](#)< [BUInt64](#) > [BAtomicUInt64](#)

8.3.1 Typedef Documentation

8.3.1.1 BAtomicInt32

```
typedef BAtomic<BInt32> BAtomicInt32
```

8.3.1.2 BAtomicInt64

```
typedef BAtomic<BInt64> BAtomicInt64
```

8.3.1.3 BAtomicUInt32

```
typedef BAtomic<BUInt32> BAtomicUInt32
```

8.3.1.4 BAtomicUInt64

```
typedef BAtomic<BUInt64> BAtomicUInt64
```

8.4 BAtomic.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BAtomic.h   BAtomic   Atomic variables
3  * T.Barnaby,  BEAM Ltd,   2010-10-07
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BAtomic_H
10 #define BAtomic_H   1
11
12 #include <BTypes.h>
13
14 template <class Type> class BAtomic {
15 public:
16     BAtomic(Type value = 0) : ovalue(value){}
17
18     Type      getValue() const {
19         return __sync_fetch_and_add(&ovalue, 0);
20     }
21     Type      add(long value){
22         return __sync_add_and_fetch(&ovalue, value);
23     }
24     Type      operator++(int){
25         return __sync_fetch_and_add(&ovalue, 1);
26     }
27     Type      operator++(){
28         return __sync_add_and_fetch(&ovalue, 1);
29     }
30     Type      operator--(int){
31         return __sync_fetch_and_add(&ovalue, -1);
32     }
33     Type      operator--(){
34         return __sync_add_and_fetch(&ovalue, -1);
35     }
36     operator Type() const {
37         return getValue();
38     }
39 private:
40     mutable Type    ovalue;
41 };
42
43
44 typedef BAtomic<BInt32>      BAtomicInt32;
45 typedef BAtomic<BInt64>      BAtomicInt64;
46 typedef BAtomic<BUInt32>      BAtomicUInt32;
47 typedef BAtomic<BUInt64>      BAtomicUInt64;
48
49 #endif

```

8.5 BAtomicCount.h File Reference

```
#include <bits/atomicity.h>
```

Classes

- class [BAtomicCount](#)
BAtomicCount class.

8.6 BAtomicCount.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BAtomicCount.h   BAtomicCount Atomic Counter

```

```

3  * T.Barnaby, BEAM Ltd, 2008-06-17
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9  #ifndef BAtomicCount_H
10 #define BAtomicCount_H 1
11
12 #if TARGET_vdc
13 class BAtomicCount {
14 public:
15     BAtomicCount(long value = 0) : ovalue(value){}
16
17     long      getValue() const {
18         return __sync_fetch_and_add(&ovalue, 0);
19     }
20     long      add(long value){
21         return __sync_fetch_and_add(&ovalue, value) + value;
22     }
23     long      operator++(int){
24         return __sync_fetch_and_add(&ovalue, 1);
25     }
26     long      operator++(){
27         return __sync_fetch_and_add(&ovalue, 1) + 1;
28     }
29     long      operator--(int){
30         return __sync_fetch_and_add(&ovalue, -1);
31     }
32     long      operator--(){
33         return __sync_fetch_and_add(&ovalue, -1) - 1;
34     }
35     operator long() const {
36         return getValue();
37     }
38 private:
39     mutable long    ovalue;
40 };
41 #else
42 #if __GNUC__ >= 5 || __GNUC_MINOR__ >= 4
43 #include <ext/atomicity.h>
44 #else
45 #include <bits/atomicity.h>
46 #endif
47
48 class BAtomicCount {
49 public:
50     BAtomicCount(long value = 0) : ovalue(value){}
51
52     long      getValue() const {
53         return __gnu_cxx::__exchange_and_add(&ovalue, 0);
54     }
55     long      add(long value){
56         return __gnu_cxx::__exchange_and_add(&ovalue, value) + value;
57     }
58     long      operator++(int){
59         return __gnu_cxx::__exchange_and_add(&ovalue, 1);
60     }
61     long      operator++(){
62         return __gnu_cxx::__exchange_and_add(&ovalue, 1) + 1;
63     }
64     long      operator--(int){
65         return __gnu_cxx::__exchange_and_add(&ovalue, -1);
66     }
67     long      operator--(){
68         return __gnu_cxx::__exchange_and_add(&ovalue, -1) - 1;
69     }
70     operator long() const {
71         return getValue();
72     }
73 private:
74     mutable _Atomic_word    ovalue;
75 };
76 #endif
77
78 #endif
79
80 #endif

```

8.7 BBuffer.cpp File Reference

```

#include <stdlib.h>
#include <memory.h>

```

```
#include <BBuffer.h>
#include <BEndian.h>
#include <BTimeStamp.h>
#include <BComplex.h>
```

Variables

- const int [roundSize](#) = 256

8.7.1 Variable Documentation

8.7.1.1 roundSize

```
const int roundSize = 256
```

8.8 BBuffer.h File Reference

```
#include <BTypes.h>
#include <BString.h>
#include <BError.h>
#include <BComplex.h>
#include <BEndian.h>
```

Classes

- class [BBuffer](#)
Create and manipulate a variable sized byte data buffer.
- class [BBufferStore](#)
Create and manipulate a variable sized byte data buffer. Has functions to store and retrieve basic and extended types/classes in the binary buffer.

Macros

- #define [BBigEndian](#) 0

8.8.1 Macro Definition Documentation

8.8.1.1 BBigEndian

```
#define BBigEndian 0
```

8.9 BBuffer.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BBuffer.h   Buffer Class
3  * T.Barnaby,  BEAM Ltd,   27/2/94
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BBUFFER_H
10 #define BBUFFER_H    1
11
12 #include <BTypes.h>
13 #include <BString.h>
14 #include <BError.h>
15 #include <BComplex.h>
16 #include <BEndian.h>
17
18 #if IS_BIG_ENDIAN
19 #define BBigEndian 1
20 #else
21 #define BBigEndian 0
22 #endif
23
24 class BTimeStamp;
25
26 class BBuffer {
27 public:
28     BBuffer(BUInt size = 0);
29     ~BBuffer();
30
31     int      setSize(BUInt32 size);
32     int      setData(const void* data, BUInt32 size);
33     int      writeData(BUInt32 pos, const void* data, BUInt32 size);
34
35     char*     data();
36     BUInt32   size();
37
38     int      resize(BUInt32 size){ return setSize(size); }
39 protected:
40     BUInt32   odataSize;
41     char*     odata;
42     BUInt32   osize;
43 };
44
45 class BBufferStore : public BBuffer{
46 public:
47     BBufferStore(BUInt size = 0, int swapBytes = BBigEndian);
48     ~BBufferStore();
49
50     BUInt32   getPos();
51     void      setPos(BUInt32 pos);
52
53     BString    getHexString();
54     void      setHexString(BString s);
55
56     int      push(BInt8 v);
57     int      push(BUInt8 v);
58     int      push(BInt16 v);
59     int      push(BUInt16 v);
60     int      push(BInt32 v);
61     int      push(BUInt32 v);
62     int      push(BInt64 v);
63     int      push(BUInt64 v);
64     int      push(BFloat32 v);
65     int      push(BFloat64 v);
66     int      push(const BString& v);
67     int      push(const BError& v);
68     int      push(const BTimeStamp& v);
69     int      push(const BComplex& v);
70     int      push(BUInt32 nBytes, const void* data, const char* swapType = "1");
71
72     int      pop(BInt8& v);
73
74 }
```

```

75     int      pop(BUInt8& v);
76     int      pop(BInt16& v);
77     int      pop(BUInt16& v);
78     int      pop(BInt32& v);
79     int      pop(BUInt32& v);
80     int      pop(BInt64& v);
81     int      pop(BUInt64& v);
82     int      pop(BFloat32& v);
83     int      pop(BFloat64& v);
84     int      pop(BString& v);
85     int      pop(BError& v);
86     int      pop(BTimeStamp& v);
87     int      pop(BComplex& v);
88     int      pop(BUInt32 nBytes, void* data, const char* swapType = "1");
89
90 protected:
91     BUInt32   opos;
92     int       oswapBytes;
93 };
94
95 #endif

```

8.10 BComms.cpp File Reference

```
#include <BComms.h>
```

8.11 BComms.h File Reference

```

#include <BTypes.h>
#include <BEvent.h>
#include <BError.h>

```

Classes

- class [BComms](#)

A base class for communications classes having a generic API.

8.12 BComms.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BComms.h      BComms class
3  *   T.Barnaby,   Beam Ltd,   2012-11-12
4  *   Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9  #ifndef BComms_h
10 #define BComms_h
11
12 #include <BTypes.h>
13 #include <BEvent.h>
14 #include <BError.h>
15
16 class BComms {
17 public:
18     enum Flush      { FlushRead, FlushWrite, FlushReadWrite };
19
20     BComms();
21

```

```

22     virtual          ~BComms();
23
24     virtual BError    init();
25     virtual void      close();
26
27     virtual const char* name();
28     virtual BUInt32    byteRate();
29
30     virtual BError    setPacketMode(Bool packetMode);
31     virtual Bool      packetMode();
32     virtual BError    setTimeout(BTimeout timeoutUs);
33
34     virtual BError    connect(const char* resource);
35     virtual Bool      isConnected();
36     virtual BError    disconnect();
37
38     virtual void      flush(Flush flush);
39
40     virtual BUInt      writeAvailable();
41     virtual BError    write(const void* data, BUInt32 nBytes, BUInt32& nTrans) = 0;
42     virtual BError    writeChunks(const BDataChunk* chunks, BUInt nChunks, BUInt32& nTrans);
43
44     virtual BUInt      readAvailable();
45     virtual BError    read(void* data, BUInt32 num, BUInt32& nTrans) = 0;
46
47     virtual BError    wait(BUInt32 eventSet, BTimeout timeoutUs = BTimeoutForever, BUInt32 num = 1);
48     virtual void      eventQueue(BEventQueue* eventQueue, BUInt32 event, BUInt32 eventSet, BUInt num =
49     1);
50     virtual void      eventEnable(Bool on);
51 protected:
52     Bool              oconnected;
53     Bool              opacketMode;
54     BTimeout          otimeout;
55     BEventQueue*      oequeue;
56     Bool              oequeueEnabled;
57     BUInt32           oequeueEvent;
58     BUInt32           oequeueEventSet;
59     BUInt              oequeueNum;
60 };
61 #endif

```

8.13 BComplex.h File Reference

```

#include <BTypes.h>
#include <complex>
#include <algorithm>

```

Typedefs

- typedef std::complex< BFloat64 > BComplex
This is a complex number using BFloat64 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.
- typedef std::complex< BFloat32 > BComplex32
This is a complex number using BFloat32 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.
- typedef std::complex< BFloat64 > BComplex64
This is a complex number using BFloat64 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.

8.13.1 Typedef Documentation

8.13.1.1 BComplex

```
typedef std::complex<BFloat64> BComplex
```

This is a complex number using BFloat64 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.

8.13.1.2 BComplex32

```
typedef std::complex<BFloat32> BComplex32
```

This is a complex number using BFloat32 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.

8.13.1.3 BComplex64

```
typedef std::complex<BFloat64> BComplex64
```

This is a complex number using BFloat64 sized parameters. It is based on the Standard C++ library complex class and has all of the functionality of that class.

8.14 BComplex.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BComplex.h BEAM Array
3  * T.Barnaby, BEAM Ltd, 2009-09-10
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BComplex_H
10 #define BComplex_H 1
11
12 #include <BTypes.h>
13 #include <complex>
14 #include <algorithm>
15
17 typedef std::complex<BFloat64> BComplex;
18
20 typedef std::complex<BFloat32> BComplex32;
21
23 typedef std::complex<BFloat64> BComplex64;
24
25 #endif
```

8.15 BCond.cpp File Reference

```
#include <BCond.h>
#include <sys/time.h>
#include <stdio.h>
```


8.16 BCond.h File Reference

```
#include <pthread.h>
```

Classes

- class [BCond](#)

Thread safe conditional variable.

8.17 BCond.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BCond.h      BCond Classes
3  * T.Barnaby,   BEAM Ltd,   15/11/02
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BCOND_H
10 #define BCOND_H 1
11
12 #include <pthread.h>
13
14 class BCond {
15 public:
16     BCond();
17     ~BCond();
18
19     int    signal();          // Signal the condition. Unblock all threads waiting on condition
20     int    wait();           // Wait for condition
21     int    timedWait(int timeoutUs); // Wait for the condition, with timeout
22 private:
23     pthread_mutex_t omutex;
24     pthread_cond_t  ocond;
25 };
26
27
28 #endif
```

8.18 BCondInt.cpp File Reference

```
#include <BCondInt.h>
#include <sys/time.h>
#include <stdio.h>
#include <errno.h>
```

Functions

- static struct timespec [getTimeout](#) (uint32_t timeoutUs)

8.18.1 Function Documentation

8.18.1.1 setTimeout()

```
static struct timespec setTimeout (
    uint32_t timeoutUs ) [static]
```

8.19 BCondInt.h File Reference

```
#include <BTypes.h>
#include <pthread.h>
```

Classes

- class [BCondInt](#)
Thread conditional value.
- class [BCondValue](#)
Thread conditional value.
- class [BCondBool](#)
Thread conditional boolean.
- class [BCondWrap](#)
Thread conditional unsigned 32 bit integer value that can wrap around.
- class [BCondResource](#)
Resource lock.

8.20 BCondInt.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BCondInt.h BCondInt Class
3  * T.Barnaby, BEAM Ltd, 10/12/02
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BCONDINT_H
10 #define BCONDINT_H 1
11
12 #include <BTypes.h>
13 #include <pthread.h>
14
15 class BCondInt {
16 public:
17     BCondInt ();
18     ~BCondInt ();
19
20     void      setValue(BInt value);
21     BInt      value() const;
22
23     BInt      increment(BInt v = 1);
24     BInt      decrement(BInt v = 1);
25
26     Bool      waitMoreThanOrEqual(BInt v, Bool decrement = 0, BTimeout timeoutUs = BTimeoutForever);
27     Bool      waitLessThanOrEqual(BInt v, Bool increment = 0, BTimeout timeoutUs = BTimeoutForever);
28     Bool      waitLessThan(BInt v, BTimeout timeoutUs = BTimeoutForever);
29
30     void      operator+=(int v);
31     void      operator-=(int v);
32     void      operator++(int);
33     void      operator--(int);
34
35 }
```

```

36 private:
37     pthread_mutex_t omutex;
38     pthread_cond_t ocond;
39     BInt          ovalue;
40 };
41
42 inline void BCondInt::operator+=(BInt v){
43     increment(v);
44 }
45
46 inline void BCondInt::operator-=(BInt v){
47     decrement(v);
48 }
49
50 inline void BCondInt::operator++(int){
51     increment(1);
52 }
53
54 inline void BCondInt::operator--(int){
55     decrement(1);
56 }
57
58
59
60 class BCondValue {
61 public:
62     BCondValue();
63     ~BCondValue();
64
65     void      setValue(int value);
66     int       value();
67
68     int       increment(int v = 1);
69     int       decrement(int v = 1);
70
71     int       waitMoreThanOrEqual(int v, int decrement = 0, int timeoutUs = 0);
72     int       waitLessThanOrEqual(int v, int increment = 0, int timeoutUs = 0);
73     int       waitLessThan(int v, int timeoutUs = 0);
74
75     void      operator+=(int v);
76     void      operator-=(int v);
77     void      operator++(int);
78     void      operator--(int);
79 private:
80     pthread_mutex_t omutex;
81     pthread_cond_t ocond;
82     int            ovalue;
83 };
84
85 inline void BCondValue::operator+=(int v){
86     increment(v);
87 }
88
89 inline void BCondValue::operator-=(int v){
90     decrement(v);
91 }
92
93 inline void BCondValue::operator++(int){
94     increment(1);
95 }
96
97 inline void BCondValue::operator--(int){
98     decrement(1);
99 }
100
101
102 class BCondBool {
103 public:
104     BCondBool();
105     ~BCondBool();
106
107     int     set();
108     int     clear();
109     int     value();
110     int     wait();
111     int     timedWait(int timeoutUs);
112
113     operator int(){ return value(); }
114 private:
115     pthread_mutex_t omutex;
116     pthread_cond_t ocond;
117     int            ovalue;
118 };
119
120
121 class BCondWrap {
122 public:
123     BCondWrap();
124     ~BCondWrap();
125

```

```

126     void          setValue(uint32_t value);
127     uint32_t      value();
128
129     uint32_t      increment(uint32_t v = 1);
130     uint32_t      decrement(uint32_t v = 1);
131
132     int           waitMoreThanOrEqual(uint32_t v, uint32_t decrement = 0, uint32_t timeOutUs = 0);
133     int           waitLessThanOrEqual(uint32_t v, uint32_t increment = 0, uint32_t timeOutUs = 0);
134     int           waitLessThan(uint32_t v, uint32_t timeOutUs = 0);
135
136     void          operator+=(int v);
137     void          operator-=(int v);
138     void          operator++(int);
139     void          operator--(int);
140 private:
141     int           diff(uint32_t v);
142
143     pthread_mutex_t omutex;
144     pthread_cond_t ocond;
145     uint32_t       ovalue;
146 };
147
148 inline void BCondWrap::operator+=(int v){
149     increment(v);
150 }
151
152 inline void BCondWrap::operator-=(int v){
153     decrement(v);
154 }
155
156 inline void BCondWrap::operator++(int){
157     increment(1);
158 }
159
160 inline void BCondWrap::operator--(int){
161     decrement(1);
162 }
163
164 class BCondResource {
165 public:
166     BCondResource();
167     ~BCondResource();
168
169     int     lock(uint32_t timeOutUs = 0);
170     int     unlock();
171
172     int     start(uint32_t timeOutUs = 0);
173     int     end();
174
175     int     locked();
176     int     inUse();
177 private:
178     pthread_mutex_t omutex;
179     pthread_cond_t ocond;
180     int     olock;
181     int     ouse;
182 };
183
184
185 #endif

```

8.21 BConfig.cpp File Reference

```

#include <BConfig.h>
#include <string.h>

```

8.22 BConfig.h File Reference

```

#include <BDict.h>
#include <BFile.h>
#include <BMutex.h>

```

Classes

- class [BConfig](#)

This class implements the configuration file access.

8.23 BConfig.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BConfig.h   Config File Access
3  *   T.Barnaby,  BEAM Ltd,   2009-01-28
4  *   Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9  #ifndef BConfig_H
10 #define BConfig_H
11
12 #include <BDict.h>
13 #include <BFile.h>
14 #include <BMutex.h>
15
16 class BConfig : public BDictString {
17 public:
18     BError      open(BString fileName, BString mode = "r");
19     void        close();
20     BError      read();
21     BError      write();
22
23     BString      findValue(BString name);
24     BString      fileName();
25
26 private:
27     BMutex      olock;
28     BString      ofileName;
29     BFile        ofile;
30 };
31 #endif

```

8.24 BCrc16.cpp File Reference

```
#include <BCrc16.h>
```

Functions

- [BUInt16 bcrc16](#) (void *buf, [BUInt16](#) len)

A 16bit CRC generator.

Variables

- static const [BUInt8 table_crc_hi](#) []
- static const [BUInt8 table_crc_lo](#) []

8.24.1 Function Documentation

8.24.1.1 bcrc16()

```
BUInt16 bcrc16 (
    void * buf,
    BUInt16 len )
```

A 16bit CRC generator.

8.24.2 Variable Documentation

8.24.2.1 table_crc_hi

```
const BUInt8 table_crc_hi[] [static]
```

Initial value:

```
= {
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40
}
```

8.24.2.2 table_crc_lo

```
const BUInt8 table_crc_lo[] [static]
```

Initial value:

```
= {
    0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06,
    0x07, 0xC7, 0x05, 0xC5, 0xC4, 0x04, 0xCC, 0x0C, 0x0D, 0xCD,
    0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09,
    0x08, 0xC8, 0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1A,
    0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC, 0x14, 0xD4,
    0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3,
    0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3,
    0xF2, 0x32, 0x36, 0xF6, 0xF7, 0x37, 0xF5, 0x35, 0x34, 0xF4,
    0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A,
    0x3B, 0xFB, 0x39, 0xF9, 0xFB, 0x38, 0x28, 0xE8, 0xE9, 0x29,
    0xEB, 0x2B, 0x2A, 0xEA, 0xEE, 0x2E, 0x2F, 0xEF, 0x2D, 0xED,
    0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26,
```

```

0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60,
0x61, 0xA1, 0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67,
0xA5, 0x65, 0x64, 0xA4, 0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F,
0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68,
0x78, 0xB8, 0xB9, 0x79, 0xBB, 0x7B, 0x7A, 0xBA, 0xBE, 0x7E,
0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5,
0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71,
0x70, 0xB0, 0x50, 0x90, 0x91, 0x51, 0x93, 0x53, 0x52, 0x92,
0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C,
0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B,
0x99, 0x59, 0x58, 0x98, 0x88, 0x48, 0x49, 0x89, 0x4B, 0x8B,
0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42,
0x43, 0x83, 0x41, 0x81, 0x80, 0x40
}

```

8.25 BCrc16.h File Reference

```
#include <BTypes.h>
```

Functions

- [BUInt16 bcrc16](#) (void *buf, BUInt16 len)
A 16bit CRC generator.

8.25.1 Function Documentation

8.25.1.1 bcrc16()

```
BUInt16 bcrc16 (
    void * buf,
    BUInt16 len )
```

A 16bit CRC generator.

8.26 BCrc16.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BCrc16.h          Checksum 16 bit
3  * T.Barnaby, BEAM Ltd, 2014-07-22
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BCrc16_H
10 #define BCrc16_H
11
12 #include <BTypes.h>
13
14 BUInt16 bcrc16(void* buf, BUInt16 len);
15
16
17 #endif

```

8.27 BCrc32.cpp File Reference

```
#include <BCrc32.h>
```

Functions

- [BUInt32 bcrc32](#) ([BUInt32](#) crc, const void *buf, [BUInt32](#) len)
A 32bit CRC generator.

Variables

- static [BUInt32 crc32_tab](#) []

8.27.1 Function Documentation

8.27.1.1 bcrc32()

```
BUInt32 bcrc32 (  
    BUInt32  crc,  
    const void * buf,  
    BUInt32  len )
```

A 32bit CRC generator.

8.27.2 Variable Documentation

8.27.2.1 crc32_tab

```
BUInt32 crc32_tab[]  [static]
```

8.28 BCrc32.h File Reference

```
#include <BTypes.h>
```

Functions

- [BUInt32 bcrc32](#) ([BUInt32](#) crc, const void *buf, [BUInt32](#) len)
A 32bit CRC generator.

8.28.1 Function Documentation

8.28.1.1 bcrc32()

```
BUInt32 bcrc32 (
    BUInt32 crc,
    const void * buf,
    BUInt32 len )
```

A 32bit CRC generator.

8.29 BCrc32.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BCrc32.h          Checksum 32 bit
3  * T.Barnaby, BEAM Ltd, 2017-11-14
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BCrc32_H
10 #define BCrc32_H
11
12 #include <BTypes.h>
13
14 BUInt32 bcrc32(BUInt32 crc, const void* buf, BUInt32 len);
15
16
17 #endif
```

8.30 BDate.cpp File Reference

```
#include <BDate.h>
#include <sys/time.h>
```

Functions

- void [toBString](#) (BDate &v, BString &s)
- void [fromBString](#) (BString &s, BDate &v)

Variables

- static int [mon_yday](#) [2][13]

8.30.1 Function Documentation

8.30.1.1 toBString()

```
void toBString (
    BDate & v,
    BString & s )
```

8.30.1.2 fromBString()

```
void fromBString (
    BString & s,
    BDate & v )
```

8.30.2 Variable Documentation

8.30.2.1 mon_yday

```
int mon_yday[2][13] [static]
```

Initial value:

```
= {
    { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334, 365 },
    { 0, 31, 60, 91, 121, 152, 182, 213, 244, 274, 305, 335, 366 }
}
```

8.31 BDate.h File Reference

```
#include <stdint.h>
#include <BError.h>
```

Classes

- class [BDate](#)

This class store a UTC calendar date as a year and a year's day.

Functions

- void [toBString](#) ([BDate](#) &v, [BString](#) &s)
- void [fromBString](#) ([BString](#) &s, [BDate](#) &v)

8.31.1 Function Documentation

8.31.1.1 toBString()

```
void toBString (
    BDate & v,
    BString & s )
```

8.31.1.2 fromBString()

```
void fromBString (
    BString & s,
    BDate & v )
```

8.32 BDate.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BDate.h      Date class
3  * T.Barnaby,  BEAM Ltd,   2009-08-14
4  * Copyright (c) 2012 All Right Reserved, Beam Ltd, http://www.beam.ltd.uk
5  *****/
6  *
7  * For license see LICENSE.txt at the root of the beamlib source tree.
8  */
9 #ifndef BDate_H
10 #define BDate_H 1
11
12 #include <stdint.h>
13 #include <BError.h>
14
15 class BDate {
16 public:
17     BDate(int year = 0, int month = 1, int day = 1);
18     BDate(BString str);
19     ~BDate();
20
21     void clear();
22     void setFirst();
23     void setLast();
24
25     void set(time_t time);
26     void set(int year = 0, int month = 1, int day = 1);
27     void setYDay(int year = 0, int yday = 0);
28     void setNow();
29
30     int year();
31     int yday();
32     int month();
33     int day();
34
35     void getDate(int& year, int& mon, int& day);
36
37     BString getString();
38     BString getStringFormatted(BString format);
39     BError  setString(BString str);
40
41     int isSet(){ return oyear != 0; }
42     int compare(const BDate& date) const;
43
44     operator BString(){ return getString(); }
45
46     int operator==(const BDate& date) const { return (compare(date) == 0); }
```

```

48     int         operator!=(const BDate& date) const { return (compare(date) != 0); }
49     int         operator>(const BDate& date) const { return (compare(date) > 0); }
50     int         operator>=(const BDate& date) const { return (compare(date) >= 0); }
51     int         operator<(const BDate& date) const { return (compare(date) < 0); }
52     int         operator<=(const BDate& date) const { return (compare(date) <= 0); }
53
54     static int   isLeap(int year);
55     static int   daysInMonth(int year, int month);
56
57 public:
58     uint16_t     oyear;
59     uint16_t     oyday;
60 };
61
62 // String conversion functions
63 void toBString(BDate& v, BString& s);
64 void fromBString(BString& s, BDate& v);
65
66 #endif

```

8.33 BDebug.cpp File Reference

```

#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/time.h>
#include <stdarg.h>
#include <fcntl.h>
#include <ctype.h>
#include <BDebug.h>

```

Functions

- void `bhd8` (const void *`data`, unsigned int `n`)
Software debug functions.
- void `bhd8a` (const void *`data`, unsigned int `n`)
- void `bhda8` (const void *`data`, unsigned int `n`)
- void `bhd32` (const void *`data`, unsigned int `n`)
- void `bhda32` (const void *`data`, unsigned int `n`)
- double `getTime` ()
- void `setDebug` (int `d`)
- void `fprintf` (int `log`, const char *`fmt`,...)

Variables

- int `bdebug`

8.33.1 Function Documentation

8.33.1.1 bhd8()

```
void bhd8 (
    const void * data,
    unsigned int n )
```

Software debug functions.

8.33.1.2 bhd8a()

```
void bhd8a (
    const void * data,
    unsigned int n )
```

8.33.1.3 bhda8()

```
void bhda8 (
    const void * data,
    unsigned int n )
```

8.33.1.4 bhd32()

```
void bhd32 (
    const void * data,
    unsigned int n )
```

8.33.1.5 bhda32()

```
void bhda32 (
    const void * data,
    unsigned int n )
```

8.33.1.6 getTime()

```
double getTime ( )
```

8.33.1.7 `setDebug()`

```
void setDebug (
    int d )
```

8.33.1.8 `tprintf()`

```
void tprintf (
    int log,
    const char * fmt,
    ... )
```

8.33.2 Variable Documentation

8.33.2.1 `bdebug`

```
int bdebug
```

8.34 BDebug.h File Reference

```
#include <stdio.h>
#include <time.h>
#include <syslog.h>
```

Classes

- class [BDebugBacktrace](#)
Backtrace on crash class.

Macros

- #define [BDebug_STD](#) 0x000001
- #define [dprintf](#)(level, fmt, a...)
General debug functions.
- #define [nprintf](#)(fmt, a...) syslog(LOG_NOTICE, fmt, ##a)
Warnings and errors logging.
- #define [wprintf](#)(fmt, a...) syslog(LOG_WARNING, fmt, ##a)
- #define [eprintf](#)(fmt, a...) syslog(LOG_ERR, fmt, ##a)
- #define [dl1printf](#)(fmt, a...)
- #define [dl2printf](#)(fmt, a...)
- #define [dl3printf](#)(fmt, a...)
- #define [dl4printf](#)(fmt, a...)

Functions

- void `bhd8` (const void *`data`, unsigned int `n`)
Software debug functions.
- void `bhd8a` (const void *`data`, unsigned int `n`)
- void `bhda8` (const void *`data`, unsigned int `n`)
- void `bhd32` (const void *`data`, unsigned int `n`)
- void `bhds32` (const void *`data`, unsigned int `n`)
- double `getTime` ()
- void `setDebug` (int `debug`)
- void `tprintf` (int `log`, const char *`fmt`,...)
- pid_t `bgettid` ()

Variables

- int `bdebug`

8.34.1 Macro Definition Documentation

8.34.1.1 BDebug_STD

```
#define BDebug_STD 0x000001
```

8.34.1.2 dprintf

```
#define dprintf(  
    level,  
    fmt,  
    a... )
```

General debug functions.

8.34.1.3 nprintf

```
#define nprintf(  
    fmt,  
    a... ) syslog(LOG_NOTICE, fmt, ##a)
```

Warnings and errors logging.

8.34.1.4 wprintf

```
#define wprintf(  
    fmt,  
    a... ) syslog(LOG_WARNING, fmt, ##a)
```

8.34.1.5 eprintf

```
#define eprintf(  
    fmt,  
    a... ) syslog(LOG_ERR, fmt, ##a)
```

8.34.1.6 dl1printf

```
#define dl1printf(  
    fmt,  
    a... )
```

8.34.1.7 dl2printf

```
#define dl2printf(  
    fmt,  
    a... )
```

8.34.1.8 dl3printf

```
#define dl3printf(  
    fmt,  
    a... )
```

8.34.1.9 dl4printf

```
#define dl4printf(  
    fmt,  
    a... )
```


8.34.2 Function Documentation

8.34.2.1 bhd8()

```
void bhd8 (
    const void * data,
    unsigned int n )
```

Software debug functions.

8.34.2.2 bhd8a()

```
void bhd8a (
    const void * data,
    unsigned int n )
```

8.34.2.3 bhda8()

```
void bhda8 (
    const void * data,
    unsigned int n )
```

8.34.2.4 bhd32()

```
void bhd32 (
    const void * data,
    unsigned int n )
```

8.34.2.5 bhds32()

```
void bhds32 (
    const void * data,
    unsigned int n )
```

8.34.2.6 getTime()

```
double getTime ( )
```

8.34.2.7 setDebug()

```
void setDebug (
    int debug )
```

8.34.2.8 tprintf()

```
void tprintf (
    int log,
    const char * fmt,
    ... )
```

8.34.2.9 bgettid()

```
pid_t bgettid ( )
```

8.34.3 Variable Documentation

8.34.3.1 bdebug

```
int bdebug [extern]
```

8.35 BDebug.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BDebug.h      Debug information and routines
3  * T.Barnaby,   BEAM Ltd,   2009-01-05
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BDebug_H
9 #define BDebug_H
10
11 #include <stdio.h>
12 #include <time.h>
13
14 #define BDebug_STD      0x000001
15
16 extern int  bdebug;
17
18 void bhd8(const void* data, unsigned int n);
19 void bhd8a(const void* data, unsigned int n);
20 void bhda8(const void* data, unsigned int n);
21 void bhd32(const void* data, unsigned int n);
22 void bhds32(const void* data, unsigned int n);
23 double getTime();
24 void setDebug(int debug);
25 void tprintf(int log, const char* fmt, ...);
26
27 pid_t bgettid();
28
29 #if BDEBUG
30 #define dprintf(level, fmt, a...)    if((level) & bdebug) tprintf(1, fmt, ##a);
31 #else
32 #define dprintf(level, fmt, a...)
33 #endif
34
35 #if !TARGET_win32 && !TARGET_win64
36 #include <syslog.h>
37
38 #if BDEBUG
39 #define nprintf(fmt, a...) { syslog(LOG_NOTICE, fmt, ##a); tprintf(0, fmt, ##a); }
40 #define wprintf(fmt, a...) { syslog(LOG_WARNING, fmt, ##a); tprintf(0, fmt, ##a); }
41 #define eprintf(fmt, a...) { syslog(LOG_ERR, fmt, ##a); tprintf(0, fmt, ##a); }
42 #else
43 #define nprintf(fmt, a...)    syslog(LOG_NOTICE, fmt, ##a)
44 #define wprintf(fmt, a...)    syslog(LOG_WARNING, fmt, ##a)
45 #define eprintf(fmt, a...)    syslog(LOG_ERR, fmt, ##a)
46 #endif
47 #endif
48
49 #if BDEBUGL1
50 #define dllprintf(fmt, a...)    printf(fmt, ##a);
51 #else
52 #define dllprintf(fmt, a...)
53 #endif
54
55 #if BDEBUGL2
56 #define dl2printf(fmt, a...)    printf(fmt, ##a);
57 #else
58 #define dl2printf(fmt, a...)
59 #endif
60
61 #if BDEBUGL3
62 #define dl3printf(fmt, a...)    printf(fmt, ##a);
63 #else
64 #define dl3printf(fmt, a...)
65 #endif
66
67 #if BDEBUGL4
68 #define dl4printf(fmt, a...)    printf(fmt, ##a);
69 #else
70 #define dl4printf(fmt, a...)
71 #endif
72
73 class BDebugBacktrace {
74 public:
75     BDebugBacktrace();
76     ~BDebugBacktrace();
77
78     void dumpBacktraceStdout(char* comment);
79     int  dumpBacktraceFile(char* fileName, char* comment);
80     void dumpBacktraceSyslog(char* comment);
81     void dumpBacktrace(char* strBuf, int strBufLen, char* comment);
82 private:

```

```
87 };  
88  
89 #endif
```

8.36 BDict.cpp File Reference

```
#include <BDict.h>
```

Functions

- void [toBString](#) (const [BDictString](#) &v, [BString](#) &s)
- void [fromBString](#) (const [BString](#) &str, [BDictString](#) &v)
- [BString](#) [bdictStringToString](#) (const [BDictString](#) &dict)

8.36.1 Function Documentation

8.36.1.1 toBString()

```
void toBString (  
    const BDictString & v,  
    BString & s )
```

8.36.1.2 fromBString()

```
void fromBString (  
    const BString & str,  
    BDictString & v )
```

8.36.1.3 bdictStringToString()

```
BString bdictStringToString (  
    const BDictString & dict )
```

8.37 BDict.h File Reference

```
#include <BNameValue.h>
```

Classes

- class [BDictItem< Type >](#)
Template based Dictionary classes item.
- class [BDict< Type >](#)
Dictionary list class using templates.

Typedefs

- typedef [BDict< BString >](#) [BDictString](#)

Functions

- void [toBString](#) (const [BDictString](#) &v, [BString](#) &s)
- void [fromBString](#) (const [BString](#) &s, [BDictString](#) &v)
- [BString](#) [bdictStringToString](#) (const [BDictString](#) &dict)

8.37.1 Typedef Documentation

8.37.1.1 BDictString

```
typedef BDict<BString> BDictString
```

8.37.2 Function Documentation

8.37.2.1 toBString()

```
void toBString (
    const BDictString & v,
    BString & s )
```

8.37.2.2 fromBString()

```
void fromBString (
    const BString & s,
    BDictString & v )
```

8.37.2.3 bdictStringToString()

```
BString bdictStringToString (
    const BDictString & dict )
```

8.38 BDict.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BDict.h BEAM Dictionary class
3  * T.Barnaby, BEAM Ltd, 2008-05-21
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BDICT_H
9 #define BDICT_H 1
10
11 #include <BNameValue.h>
12
13 template <class Type> class BDictItem {
14 public:
15     BDictItem(BString k = "", Type v = Type()) : key(k), value(v){}
16     BString key;
17     Type value;
18
19 // BDictItem<Type> operator=(BDictItem<Type>& item){ key = item.key; value = item.value; return *this; }
20 };
21
22 template <class Type> class BDict : public BList<BDictItem<Type> > {
23 public:
24     typedef BIter iterator;
25
26     BDict(int hashSize = 100);
27     BDict(const BDict<Type>& dict);
28
29     int hasKey(const BString& k) const;
30     BString key(const BIter& i) const;
31     void clear();
32     void insert(BIter& i, const BDictItem<Type>& item);
33     void append(const BDictItem<Type>& item);
34     void append(const BDict<Type>& dict);
35     void del(const BString& k);
36     void del(BIter& i);
37     BIter find(const BString& k) const;
38
39     Type& operator[] (const BString& i);
40     const Type& operator[] (const BString& i) const;
41     Type& operator[] (const BIter& i);
42     const Type& operator[] (const BIter& i) const;
43     Type& operator[] (int i);
44     const Type& operator[] (int i) const;
45     BDict<Type> operator+(const BDict<Type>& dict) const;
46     BDict<Type>& operator=(const BDict<Type>& dict);
47
48     void hashPrint();
49 private:
50     void hashAdd(const BString& k, BIter iter);
51     void hashDelete(const BString& k, BIter iter);
52     int hashFind(const BString& k, BIter iter) const;
53
54     int ohashSize;
55     BArray<BList<BIter> > ohashLists;
56 };
57
58 typedef BDict<BString> BDictString;
59
60 void toBString(const BDictString& v, BString& s);
61 void fromBString(const BString& s, BDictString& v);
62 BString bdictStringToString(const BDictString& dict);
63
64 template <class Type> BDict<Type>::BDict(int hashSize){
65     ohashSize = hashSize;
66     ohashLists.resize(ohashSize);
67 }
68
69 template <class Type> BDict<Type>::BDict(const BDict<Type>& dict) : BList<BDictItem<Type> >(){
70     ohashSize = dict.ohashSize;
71     ohashLists.resize(ohashSize);
72 }
```

```

74     this->append(dict);
75 }
76
77 template <class Type> int BDict<Type>::hasKey(const BString& k) const {
78     BIter i = this->find(k);
79     return !this->isEnd(i);
80 }
81
82 template <class Type> BString BDict<Type>::key(const BIter& i) const {
83     return this->get(i).key;
84 }
85
86 template <class Type> void BDict<Type>::clear(){
87     BUInt i;
88
89     BList<BDictItem<Type> >::clear();
90     for(i = 0; i < ohashLists.size(); i++){
91         ohashLists[i].clear();
92     }
93 }
94
95 template <class Type> void BDict<Type>::insert(BIter& i, const BDictItem<Type>& item){
96     BList<BDictItem<Type> >::insert(i, item);
97     hashAdd(item.key, i);
98 }
99
100 template <class Type> void BDict<Type>::append(const BDictItem<Type>& item){
101     BList<BDictItem<Type> >::append(item);
102 }
103
104 template <class Type> void BDict<Type>::append(const BDict<Type>& dict){
105     BList<BDictItem<Type> >::append(dict);
106 }
107
108 template <class Type> void BDict<Type>::del(const BString& k){
109     BIter i = find(k);
110
111     if(!this->isEnd(i)){
112         hashDelete(k, i);
113         BList<BDictItem<Type> >::del(i);
114     }
115 }
116
117 template <class Type> void BDict<Type>::del(BIter& i){
118     BList<BDictItem<Type> >::del(i);
119 }
120
121 template <class Type> BIter BDict<Type>::find(const BString& k) const {
122     BIter i;
123
124     #ifdef ZAP
125     for(this->start(i); !this->isEnd(i); this->next(i)){
126         if(this->get(i).key == k)
127             return i;
128     }
129     return this->onodes;
130 #else
131     if(hashFind(k, i))
132         return i;
133     else
134         return this->onodes;
135 #endif
136 }
137
138 template <class Type> Type& BDict<Type>::operator[] (const BString& k) {
139     BIter i = this->find(k);
140
141     if(this->isEnd(i)){
142         this->append(BDictItem<Type>(k));
143         i = this->end();
144     }
145
146     return this->get(i).value;
147 }
148
149 template <class Type> const Type& BDict<Type>::operator[] (const BString& k) const {
150     BIter i = this->find(k);
151
152     if(this->isEnd(i)){
153         fprintf(stderr, "BDict over range\n");
154         exit(1);
155     }
156
157     return this->get(i).value;
158 }
159
160 template <class Type> Type& BDict<Type>::operator[] (const BIter& i) {

```

```

161     return this->get(i).value;
162 }
163
164 template <class Type> const Type& BDict<Type>::operator[](const BIter& i) const {
165     return this->get(i).value;
166 }
167
168 template <class Type> Type& BDict<Type>::operator[](int i) {
169     return BList<BDictItem<Type> >::operator[] (i).value;
170 }
171
172 template <class Type> const Type& BDict<Type>::operator[](int i) const {
173     return BList<BDictItem<Type> >::operator[] (i).value;
174 }
175
176 template <class Type> BDict<Type> BDict<Type>::operator+(const BDict<Type>& dict) const {
177     BDict<Type> r = *this;
178     BIter i;
179
180     for(dict.start(i); !dict.isEnd(i); dict.next(i)){
181         r.append(this->get(i));
182     }
183     return r;
184 }
185
186 template <class Type> BDict<Type>& BDict<Type>::operator=(const BDict<Type>& dict){
187     BIter i;
188
189     if(this != &dict){
190         this->clear();
191         for(dict.start(i); !dict.isEnd(i); dict.next(i)){
192             append(this->get(i));
193         }
194     }
195
196     return *this;
197 }
198
199 template <class Type> void BDict<Type>::hashAdd(const BString& k, BIter iter){
200     BUInt pos;
201
202     pos = k.hash() % ohashSize;
203     ohashLists[pos].append(iter);
204 }
205
206 template <class Type> void BDict<Type>::hashDelete(const BString& k, BIter iter){
207     BUInt pos;
208     BIter i;
209
210     pos = k.hash() % ohashSize;
211     for(ohashLists[pos].start(i); !ohashLists[pos].isEnd(i); ohashLists[pos].next(i)){
212         if(ohashLists[pos][i] == iter){
213             ohashLists[pos].del(i);
214             break;
215         }
216     }
217 }
218
219 template <class Type> int BDict<Type>::hashFind(const BString& k, BIter& iter) const {
220     BUInt pos;
221     BIter i;
222
223     pos = k.hash() % ohashSize;
224     for(ohashLists[pos].start(i); !ohashLists[pos].isEnd(i); ohashLists[pos].next(i)){
225         if(key(ohashLists[pos][i]) == k){
226             iter = ohashLists[pos][i];
227             return 1;
228         }
229     }
230     return 0;
231 }
232
233 template <class Type> void BDict<Type>::hashPrint(){
234     BUInt i;
235     BUInt n = 0;
236
237     for(i = 0; i < ohashLists.size(); i++){
238         n += ohashLists[i].number();
239         // printf("Number: %d: %d\n", i, ohashLists[i].number());
240     }
241     printf("ListSize: %d HashSize: %d\n", BList<BDictItem<Type> >::number(), n);
242 }
243
244 #endif

```


8.39 BDictMap.h File Reference

```
#include <BString.h>
#include <map>
```

Classes

- class [BDictMap< Value >](#)
Mapped Dictionary class.

Typedefs

- typedef [BDictMap< BString >](#) [BDictMapString](#)

8.39.1 Typedef Documentation

8.39.1.1 BDictMapString

```
typedef BDictMap<BString> BDictMapString
```

8.40 BDictMap.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BDictMap.h BEAM Dictionary class
3  * T.Barnaby, BEAM Ltd, 2008-05-21
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
12 #ifndef BDictMap_H
13 #define BDictMap_H 1
14
15 #include <BString.h>
16 #include <map>
17
18 template <typename Value> class BDictMap : private std::map<BString, Value> {
19 public:
20     typedef typename BDictMap<Value>::iterator iterator;
21
22     void clear() { std::map<BString, Value>::clear(); }
23     int hasKey(const BString& k) { return std::map<BString, Value>::count(k); }
24     BString key(iterator& i) { return i->first; }
25     unsigned int size() { return std::map<BString, Value>::size(); }
26     void start(iterator& i) { i = std::map<BString, Value>::begin(); }
27     int isEnd(iterator& i) { return (i == std::map<BString, Value>::end()); }
28     void next(iterator& i) { ++i; }
29     void del(const iterator& i) { std::map<BString, Value>::erase(i); }
30     void del(const BString& k) { std::map<BString, Value>::erase(k); }
31     Value& operator[] (iterator& i) { return i->second; }
32     Value& operator[] (const BString& i) { return std::map<BString, Value>::operator[] (i); }
33 private:
34 };
35
36
37 typedef BDictMap<BString> BDictMapString;
38
39 #endif
```

8.41 BDir.cpp File Reference

```
#include <BDir.h>
#include <dirent.h>
#include <stdlib.h>
#include <errno.h>
#include <string.h>
```

Functions

- static int [wild](#) (const dirent *e)

Variables

- static [BString](#) [wildString](#)

8.41.1 Function Documentation

8.41.1.1 wild()

```
static int wild (
    const dirent * e ) [static]
```

8.41.2 Variable Documentation

8.41.2.1 wildString

```
BString wildString [static]
```

8.42 BDir.h File Reference

```
#include <BList.h>
#include <BString.h>
#include <BError.h>
#include <sys/stat.h>
```

Classes

- class [BDir](#)

File system directory class.

8.43 BDir.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BDir.h       BEAM Dir access class
3  *   T.Barnaby,   BEAM Ltd,   8/10/96
4  *   Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *   For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BDIR_H
9  #define BDIR_H 1
10
11 #include <BList.h>
12 #include <BString.h>
13 #include <BError.h>
14 #include <sys/stat.h>
15
16 #ifndef __Lynx__
17 #else
18 typedef unsigned long long ino64_t;
19 typedef long long off64_t;
20 typedef unsigned long blksize_t;
21 typedef unsigned long long blkcnt64_t;
22
23 struct stat64 {
24     dev_t st_dev;
25     ino64_t st_ino;
26     mode_t st_mode;
27     nlink_t st_nlink;
28     uid_t st_uid;
29     gid_t st_gid;
30     dev_t st_rdev;
31     off64_t st_size;
32     time_t st_atime;
33     time_t st_mtime;
34     time_t st_ctime;
35     blksize_t st_blksize;
36     blkcnt64_t st_blocks;
37     mode_t st_attr;
38 };
39 #endif
40
41 class BDir : public BList<struct dirent*> {
42 public:
43     BDir();
44     BDir(BString name);
45     ~BDir();
46
47     BError open(BString name);
48     BError error();
49     BError read();
50     void clear();
51
52     void setWild(BString wild);
53     void setSort(int on);
54
55     BString entryName(BIter i);
56     struct stat entryStat(BIter i);
57     struct stat64 entryStat64(BIter i);
58 private:
59     BError oerror;
60     BString odirname;
61     BString owild;
62     int osort;
63 };
64
65 #endif

```

8.44 BDuration.cpp File Reference

```
#include <BDuration.h>
#include <sys/time.h>
```

8.45 BDuration.h File Reference

```
#include <stdint.h>
#include <BError.h>
```

Classes

- class [BDuration](#)

Stores and manipulates a time to the nearest microsecond and a maximum of 24 hours.

8.46 BDuration.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BDuration.h A time duration class
3  * T.Barnaby, BEAM Ltd, 2010-02-11
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BDURATION_H
9 #define BDURATION_H 1
10
11 #include <stdint.h>
12 #include <BError.h>
13
14 class BDuration {
15 public:
16     BDuration(int hour = 0, int minute = 0, int second = 0, int microsecond = 0);
17     BDuration(BString str);
18     ~BDuration();
19
20     void clear();
21
22     void set(int hour = 0, int minute = 0, int second = 0, int microsecond = 0);
23
24     void addMilliSeconds(int64_t milliSeconds);
25     void addMicroSeconds(int64_t microSeconds);
26     void addSeconds(int seconds);
27     uint32_t getSeconds();
28     uint64_t getMicroSeconds();
29
30     int hour();
31     int minute();
32     int second();
33     int microSecond();
34
35     BString getString();
36     BError setString(BString time);
37
38 private:
39     uint8_t ohour;
40     uint8_t ominute;
41     uint8_t osecond;
42     uint8_t ospare;
43     uint32_t omicroSecond;
44 };
45
46 #endif
```

8.47 BEndian.cpp File Reference

```
#include <BEndian.h>
#include <memory.h>
```

Functions

- void [bswap_copy](#) (int swap, const void *src, void *dst, [BUInt32](#) nBytes, const char *swapType)

8.47.1 Function Documentation

8.47.1.1 bswap_copy()

```
void bswap_copy (
    int swap,
    const void * src,
    void * dst,
    BUInt32 nBytes,
    const char * swapType )
```

8.48 BEndian.h File Reference

```
#include <BTypes.h>
#include <byteswap.h>
```

Macros

- #define [htobe16](#)(x) __bswap_16 (x)
- #define [htole16](#)(x) (x)
- #define [be16toh](#)(x) __bswap_16 (x)
- #define [le16toh](#)(x) (x)
- #define [htobe32](#)(x) __bswap_32 (x)
- #define [htole32](#)(x) (x)
- #define [be32toh](#)(x) __bswap_32 (x)
- #define [le32toh](#)(x) (x)
- #define [htobe64](#)(x) __bswap_64 (x)
- #define [htole64](#)(x) (x)
- #define [be64toh](#)(x) __bswap_64 (x)
- #define [le64toh](#)(x) (x)

Functions

- void [bswap_p8](#) (const void *s, void *d)
- void [bswap_p16](#) (const void *s, void *d)
- void [bswap_p32](#) (const void *s, void *d)
- void [bswap_p64](#) (const void *s, void *d)
- void [bswap_copy](#) (int swap, const void *src, void *dst, [BUInt32](#) nBytes, const char *swapType)
- uint16_t [htole](#) (uint16_t v)
- int16_t [htole](#) (int16_t v)
- uint32_t [htole](#) (uint32_t v)
- int32_t [htole](#) (int32_t v)
- uint64_t [htole](#) (uint64_t v)
- int64_t [htole](#) (int64_t v)
- double [htole](#) (double v)
- float [htole](#) (float v)
- uint16_t [htobe](#) (uint16_t v)
- int16_t [htobe](#) (int16_t v)
- uint32_t [htobe](#) (uint32_t v)
- int32_t [htobe](#) (int32_t v)
- uint64_t [htobe](#) (uint64_t v)
- int64_t [htobe](#) (int64_t v)
- double [htobe](#) (double v)
- float [htobe](#) (float v)
- uint16_t [letoh](#) (uint16_t v)
- int16_t [letoh](#) (int16_t v)
- uint32_t [letoh](#) (uint32_t v)
- int32_t [letoh](#) (int32_t v)
- uint64_t [letoh](#) (uint64_t v)
- int64_t [letoh](#) (int64_t v)
- double [letoh](#) (double v)
- float [letoh](#) (float v)
- uint16_t [betoh](#) (uint16_t v)
- int16_t [betoh](#) (int16_t v)
- uint32_t [betoh](#) (uint32_t v)
- int32_t [betoh](#) (int32_t v)
- uint64_t [betoh](#) (uint64_t v)
- int64_t [betoh](#) (int64_t v)
- double [betoh](#) (double v)
- float [betoh](#) (float v)

8.48.1 Macro Definition Documentation

8.48.1.1 htobe16

```
#define htobe16(  
    x ) __bswap_16 (x)
```

8.48.1.2 htole16

```
#define htole16(  
    x ) (x)
```

8.48.1.3 be16toh

```
#define be16toh(  
    x ) __bswap_16 (x)
```

8.48.1.4 le16toh

```
#define le16toh(  
    x ) (x)
```

8.48.1.5 htobe32

```
#define htobe32(  
    x ) __bswap_32 (x)
```

8.48.1.6 htole32

```
#define htole32(  
    x ) (x)
```

8.48.1.7 be32toh

```
#define be32toh(  
    x ) __bswap_32 (x)
```

8.48.1.8 le32toh

```
#define le32toh(  
    x ) (x)
```

8.48.1.9 htobe64

```
#define htobe64(  
    x ) __bswap_64 (x)
```

8.48.1.10 htole64

```
#define htole64(  
    x ) (x)
```

8.48.1.11 be64toh

```
#define be64toh(  
    x ) __bswap_64 (x)
```

8.48.1.12 le64toh

```
#define le64toh(  
    x ) (x)
```

8.48.2 Function Documentation

8.48.2.1 bswap_p8()

```
void bswap_p8 (  
    const void * s,  
    void * d ) [inline]
```

8.48.2.2 bswap_p16()

```
void bswap_p16 (  
    const void * s,  
    void * d ) [inline]
```


8.48.2.3 bswap_p32()

```
void bswap_p32 (
    const void * s,
    void * d ) [inline]
```

8.48.2.4 bswap_p64()

```
void bswap_p64 (
    const void * s,
    void * d ) [inline]
```

8.48.2.5 bswap_copy()

```
void bswap_copy (
    int swap,
    const void * src,
    void * dst,
    BUInt32 nBytes,
    const char * swapType )
```

8.48.2.6 htobe() [1/8]

```
uint16_t htobe (
    uint16_t v ) [inline]
```

8.48.2.7 htobe() [2/8]

```
uint16_t htobe (
    uint16_t v ) [inline]
```

8.48.2.8 htobe() [3/8]

```
uint32_t htobe (
    uint32_t v ) [inline]
```

8.48.2.9 htole() [4/8]

```
int32_t htole (
    int32_t v ) [inline]
```

8.48.2.10 htole() [5/8]

```
uint64_t htole (
    uint64_t v ) [inline]
```

8.48.2.11 htole() [6/8]

```
int64_t htole (
    int64_t v ) [inline]
```

8.48.2.12 htole() [7/8]

```
double htole (
    double v ) [inline]
```

8.48.2.13 htole() [8/8]

```
float htole (
    float v ) [inline]
```

8.48.2.14 htobe() [1/8]

```
uint16_t htobe (
    uint16_t v ) [inline]
```

8.48.2.15 htobe() [2/8]

```
int16_t htobe (
    int16_t v ) [inline]
```

8.48.2.16 htobe() [3/8]

```
uint32_t htobe (
    uint32_t v ) [inline]
```

8.48.2.17 htobe() [4/8]

```
int32_t htobe (
    int32_t v ) [inline]
```

8.48.2.18 htobe() [5/8]

```
uint64_t htobe (
    uint64_t v ) [inline]
```

8.48.2.19 htobe() [6/8]

```
int64_t htobe (
    int64_t v ) [inline]
```

8.48.2.20 htobe() [7/8]

```
double htobe (
    double v ) [inline]
```

8.48.2.21 htobe() [8/8]

```
float htobe (
    float v ) [inline]
```

8.48.2.22 letoh() [1/8]

```
uint16_t letoh (
    uint16_t v ) [inline]
```

8.48.2.23 letoh() [2/8]

```
int16_t letoh (
    int16_t v ) [inline]
```

8.48.2.24 letoh() [3/8]

```
uint32_t letoh (
    uint32_t v ) [inline]
```

8.48.2.25 letoh() [4/8]

```
int32_t letoh (
    int32_t v ) [inline]
```

8.48.2.26 letoh() [5/8]

```
uint64_t letoh (
    uint64_t v ) [inline]
```

8.48.2.27 letoh() [6/8]

```
int64_t letoh (
    int64_t v ) [inline]
```

8.48.2.28 letoh() [7/8]

```
double letoh (
    double v ) [inline]
```

8.48.2.29 letoh() [8/8]

```
float letoh (
    float v ) [inline]
```

8.48.2.30 betoh() [1/8]

```
uint16_t betoh (  
    uint16_t v )    [inline]
```

8.48.2.31 betoh() [2/8]

```
int16_t betoh (  
    int16_t v )    [inline]
```

8.48.2.32 betoh() [3/8]

```
uint32_t betoh (  
    uint32_t v )    [inline]
```

8.48.2.33 betoh() [4/8]

```
int32_t betoh (  
    int32_t v )    [inline]
```

8.48.2.34 betoh() [5/8]

```
uint64_t betoh (  
    uint64_t v )    [inline]
```

8.48.2.35 betoh() [6/8]

```
int64_t betoh (  
    int64_t v )    [inline]
```

8.48.2.36 betoh() [7/8]

```
double betoh (  
    double v )    [inline]
```

8.48.2.37 betoh() [8/8]

```
float betoh (
    float v ) [inline]
```

8.49 BEndian.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BEndian.h   Byte swap fubctions
3  * T.Barnaby,  BEAM Ltd,   2009-12-18
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BEndian_H
9 #define BEndian_H   1
10
11 #include <BTypes.h>
12
13 #if TARGET_win32 || TARGET_win64
14 #define __BYTE_ORDER __LITTLE_ENDIAN
15 inline uint16_t __bswap_16(uint16_t v){
16     uint16_t    r;
17     const char* sp = (const char*)&v;
18     char*        dp = (char*)&r;
19
20     dp[1] = sp[0];
21     dp[0] = sp[1];
22
23     return r;
24 }
25 inline uint32_t __bswap_32(uint32_t v){
26     uint32_t    r;
27     const char* sp = (const char*)&v;
28     char*        dp = (char*)&r;
29
30     dp[3] = sp[0];
31     dp[2] = sp[1];
32     dp[1] = sp[2];
33     dp[0] = sp[3];
34
35     return r;
36 }
37 inline uint64_t __bswap_64(uint64_t v){
38     uint64_t    r;
39     const char* sp = (const char*)&v;
40     char*        dp = (char*)&r;
41
42     dp[7] = sp[0];
43     dp[6] = sp[1];
44     dp[5] = sp[2];
45     dp[4] = sp[3];
46     dp[3] = sp[4];
47     dp[2] = sp[5];
48     dp[1] = sp[6];
49     dp[0] = sp[7];
50
51     return r;
52 }
53 #else
54 #include <byteswap.h>
55 #endif
56
57
58 #ifndef htobe16
59 # if __BYTE_ORDER == __LITTLE_ENDIAN
60 #  define htobe16(x) __bswap_16 (x)
61 #  define htole16(x) (x)
62 #  define be16toh(x) __bswap_16 (x)
63 #  define le16toh(x) (x)
64 #
65 #  define htobe32(x) __bswap_32 (x)
66 #  define htole32(x) (x)
67 #  define be32toh(x) __bswap_32 (x)
68 #  define le32toh(x) (x)
69 #
70 #  define htobe64(x) __bswap_64 (x)
71 #  define htole64(x) (x)
```

```

72 # define be64toh(x) __bswap_64 (x)
73 # define le64toh(x) (x)
74 # else
75 # define htobe16(x) (x)
76 # define htole16(x) __bswap_16 (x)
77 # define be16toh(x) (x)
78 # define le16toh(x) __bswap_16 (x)
79
80 # define htobe32(x) (x)
81 # define htole32(x) __bswap_32 (x)
82 # define be32toh(x) (x)
83 # define le32toh(x) __bswap_32 (x)
84
85 # define htobe64(x) (x)
86 # define htole64(x) __bswap_64 (x)
87 # define be64toh(x) (x)
88 # define le64toh(x) __bswap_64 (x)
89 # endif
90 #endif
91
92 inline void bswap_p8(const void* s, void* d){
93     const char* sp = (const char*)s;
94     char* dp = (char*)d;
95
96     *dp = *sp;
97 }
98
99 inline void bswap_p16(const void* s, void* d){
100     const char* sp = (const char*)s;
101     char* dp = (char*)d;
102
103     dp[1] = sp[0];
104     dp[0] = sp[1];
105 }
106
107 inline void bswap_p32(const void* s, void* d){
108     const char* sp = (const char*)s;
109     char* dp = (char*)d;
110
111     dp[3] = sp[0];
112     dp[2] = sp[1];
113     dp[1] = sp[2];
114     dp[0] = sp[3];
115 }
116
117 inline void bswap_p64(const void* s, void* d){
118     const char* sp = (const char*)s;
119     char* dp = (char*)d;
120
121     dp[7] = sp[0];
122     dp[6] = sp[1];
123     dp[5] = sp[2];
124     dp[4] = sp[3];
125     dp[3] = sp[4];
126     dp[2] = sp[5];
127     dp[1] = sp[6];
128     dp[0] = sp[7];
129 }
130
131 void bswap_copy(int swap, const void* src, void* dst, BUInt32 nBytes, const char* swapType);
132
133
134 inline uint16_t htole(uint16_t v){
135     return htole16(v);
136 }
137
138 inline int16_t htole(int16_t v){
139     return htole16(v);
140 }
141
142 inline uint32_t htole(uint32_t v){
143     return htole32(v);
144 }
145
146 inline int32_t htole(int32_t v){
147     return htole32(v);
148 }
149
150 inline uint64_t htole(uint64_t v){
151     return htole64(v);
152 }
153
154 inline int64_t htole(int64_t v){
155     return htole64(v);
156 }
157
158 inline double htole(double v){

```

```
159     union {
160         int64_t i;
161         double d;
162     } t;
163
164     t.d = v;
165     t.i = htogle64(t.i);
166
167     return t.d;
168 }
169
170 inline float htogle(float v) {
171     union {
172         int32_t i;
173         float d;
174     } t;
175
176     t.d = v;
177     t.i = htogle32(t.i);
178
179     return t.d;
180 }
181
182 inline uint16_t htogle(uint16_t v) {
183     return htogle16(v);
184 }
185
186 inline int16_t htogle(int16_t v) {
187     return htogle16(v);
188 }
189
190 inline uint32_t htogle(uint32_t v) {
191     return htogle32(v);
192 }
193
194 inline int32_t htogle(int32_t v) {
195     return htogle32(v);
196 }
197
198 inline uint64_t htogle(uint64_t v) {
199     return htogle64(v);
200 }
201
202 inline int64_t htogle(int64_t v) {
203     return htogle64(v);
204 }
205
206 inline double htogle(double v) {
207     union {
208         int64_t i;
209         double d;
210     } t;
211
212     t.d = v;
213     t.i = htogle64(t.i);
214
215     return t.d;
216 }
217
218 inline float htogle(float v) {
219     union {
220         int32_t i;
221         float d;
222     } t;
223
224     t.d = v;
225     t.i = htogle32(t.i);
226
227     return t.d;
228 }
229
230
231 inline uint16_t letoh(uint16_t v) {
232     return lel6toh(v);
233 }
234
235 inline int16_t letoh(int16_t v) {
236     return lel6toh(v);
237 }
238
239 inline uint32_t letoh(uint32_t v) {
240     return le32toh(v);
241 }
242
243 inline int32_t letoh(int32_t v) {
244     return le32toh(v);
245 }
```



```
246
247 inline uint64_t letoh(uint64_t v){
248     return le64toh(v);
249 }
250
251 inline int64_t letoh(int64_t v){
252     return le64toh(v);
253 }
254
255 inline double letoh(double v){
256     union {
257         int64_t i;
258         double d;
259     } t;
260
261     t.d = v;
262     t.i = le64toh(t.i);
263
264     return t.d;
265 }
266
267 inline float letoh(float v){
268     union {
269         int32_t i;
270         float d;
271     } t;
272
273     t.d = v;
274     t.i = le32toh(t.i);
275
276     return t.d;
277 }
278
279
280 inline uint16_t betoh(uint16_t v){
281     return be16toh(v);
282 }
283
284 inline int16_t betoh(int16_t v){
285     return be16toh(v);
286 }
287
288 inline uint32_t betoh(uint32_t v){
289     return be32toh(v);
290 }
291
292 inline int32_t betoh(int32_t v){
293     return be32toh(v);
294 }
295
296 inline uint64_t betoh(uint64_t v){
297     return be64toh(v);
298 }
299
300 inline int64_t betoh(int64_t v){
301     return be64toh(v);
302 }
303
304 inline double betoh(double v){
305     union {
306         int64_t i;
307         double d;
308     } t;
309
310     t.d = v;
311     t.i = be64toh(t.i);
312
313     return t.d;
314 }
315
316 inline float betoh(float v){
317     union {
318         int32_t i;
319         float d;
320     } t;
321
322     t.d = v;
323     t.i = be32toh(t.i);
324
325     return t.d;
326 }
327
328 #endif
```

8.50 BEntry.cpp File Reference

```
#include <ctype.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>
#include <fcntl.h>
#include <errno.h>
#include <BEntry.h>
```

8.51 BEntry.h File Reference

```
#include <BList.h>
#include <BString.h>
```

Classes

- class [BEntry](#)
Manipulate a name value pair.
- class [BEntryList](#)
List of Entries. Where each entry is a name value pair.
- class [BEntryFile](#)
A file based list of string name/value pairs.

8.52 BEntry.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BEntry.hh Database entry system
3  * T.Barnaby, BEAM Ltd, 10/5/93
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BENTRY_H
9 #define BENTRY_H
10
11 #include <BList.h>
12 #include <BString.h>
13
14 class BEntry {
15 public:
16     BEntry();
17     BEntry(BString name, BString value);
18     BEntry(BString line);
19     BString getName();
20     BString getValue();
21     void setLine(BString line);
22     void setName(BString name);
23     void setValue(BString value);
24     BString line();
25     void print();
26 private:
27     BString oname;
28     BString ovalue;
29 };
30
31
32
33 class BEntryList : public BList<BEntry> {
```

```

35 public:
36     BEntryList();
37     int      isSet(BString name);
38     BEntry*  find(BString name);
39     BString  findValue(BString name);
40     int      setValue(BString name, BString value);
41     int      setValueRaw(BString name, BString value);
42     void     deleteEntry(BString name);
43
44     void     print();
45     BString  getString();
46
47     // Override these functions as we cache olastPos
48     void     insert(BIter& i, const BEntry& item);
49     void     del(BIter& i);
50     void     clear();
51     BEntryList& operator=(const BEntryList& l);
52
53 private:
54     BIter    olastPos;    // Last position speed up
55 };
56
57 class BEntryFile : public BEntryList {
58 public:
59     BEntryFile();
60     BEntryFile(BString filename);
61     ~BEntryFile();
62
63     int      open(BString filename);
64     int      read();
65     int      write();
66     int      writeList(BEntryList& l);
67     void     clear();
68     BString  filename();
69 private:
70     BString  ofilename;
71     BString  ocomments;
72 };
73
74 #endif

```

8.53 BError.cpp File Reference

```
#include <BError.h>
```

8.54 BError.h File Reference

```
#include <BString.h>
```

Classes

- class [BError](#)

Error return class. This class is used to return the error status from a function. It encapsulates an integer error number and a string.

Enumerations

- enum [BErrorNum](#) {
[ErrorOk](#) = 0 , [ErrorMisc](#) = 1 , [ErrorWarning](#) = 2 , [ErrorParam](#) = 3 ,
[ErrorTimeout](#) = 4 , [ErrorNotAvailable](#) = 5 , [ErrorData](#) = 6 , [ErrorChecksum](#) = 7 ,
[ErrorOverrun](#) = 8 , [ErrorUnderrun](#) = 9 , [ErrorInit](#) = 10 , [ErrorConfig](#) = 11 ,
[ErrorNotImplemented](#) = 12 , [ErrorResourceLimit](#) = 13 , [ErrorEndOfFile](#) = 14 , [ErrorFile](#) = 15 ,
[ErrorFormat](#) = 16 , [ErrorComms](#) = 17 , [ErrorAccessDenied](#) = 18 , [ErrorNoData](#) = 19 ,
[ErrorEndOfData](#) = 20 , [ErrorDataPresent](#) = 21 , [ErrorDataTruncated](#) = 22 , [ErrorApiVersion](#) = 23 ,
[ErrorSignal](#) = 24 , [ErrorAppBase](#) = 64 , [ErrorUserBase](#) = 96 }

8.54.1 Enumeration Type Documentation

8.54.1.1 BErrorNum

enum `BErrorNum`

Enumerator

ErrorOk	
ErrorMisc	
ErrorWarning	
ErrorParam	
ErrorTimeout	
ErrorNotAvailable	
ErrorData	
ErrorChecksum	
ErrorOverrun	
ErrorUnderrun	
ErrorInit	
ErrorConfig	
ErrorNotImplemented	
ErrorResourceLimit	
ErrorEndOfFile	
ErrorFile	
ErrorFormat	
ErrorComms	
ErrorAccessDenied	
ErrorNoData	
ErrorEndOfData	
ErrorDataPresent	
ErrorDataTruncated	
ErrorApiVersion	
ErrorSignal	
ErrorAppBase	
ErrorUserBase	

8.55 BError.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BError.h      BError Class
3  * T.Barnaby,   BEAM Ltd,   21/3/00
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
17 #ifndef BERROR_H
18 #define BERROR_H    1
19
20 #include <BString.h>

```

```

21
22 enum BErrorNum {
23     ErrorOk = 0, ErrorMisc = 1, ErrorWarning = 2, ErrorParam = 3, ErrorTimeout = 4,
24     ErrorNotAvailable = 5, ErrorData = 6, ErrorChecksum = 7, ErrorOverrun = 8, ErrorUnderrun = 9,
25     ErrorInit = 10, ErrorConfig = 11, ErrorNotImplemented = 12, ErrorResourceLimit = 13,
26     ErrorEndOfFile = 14, ErrorFile = 15, ErrorFormat = 16, ErrorComms = 17, ErrorAccessDenied = 18,
27     ErrorNoData = 19, ErrorEndOfData = 20, ErrorDataPresent = 21, ErrorDataTruncated = 22,
28     ErrorApiVersion = 23, ErrorSignal = 24,
29     ErrorAppBase = 64, ErrorUserBase = 96 };
30
31 class BError {
32 public:
33     BError(int errNo = ErrorOk, BString errStr = "");
34     BError(BString errStr);
35
36     BError      copy();
37
38     BError&      set(int errNo, BString errStr = "");
39     BError&      clear();
40     BError&      setError(BString errStr = "");
41
42
43     BString      getString() const;
44     int          getNumber() const;
45
46     int          num() const;
47     const char*  str() const;
48
49     // Old functions
50     int          getErrorNo() const;
51
52     operator int() const;
53 private:
54     int          oerrNo;
55     BString      oerrStr;
56
57 };
58
59 inline BError::operator int () const {
60     return oerrNo;
61 }
62
63 #endif

```

8.56 BErrorTime.cpp File Reference

```
#include <BErrorTime.h>
```

8.57 BErrorTime.h File Reference

```
#include <BString.h>
#include <BTimeStamp.h>
```

Classes

- class [BErrorTime](#)
Error return class with time field.

8.58 BErrorTime.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BErrorTime.h      BErrorTime Class
3  * T.Barnaby, BEAM Ltd, 2010-05-26
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BErrorTime_H
9 #define BErrorTime_H    1
10
11 #include <BString.h>
12 #include <BTimeStamp.h>
13
14 class BErrorTime {
15 public:
16     enum          Type { None = 0, Error = 1 };
17
18     BErrorTime(int errNo = None, BTimeStamp errTime = BTimeStamp(), BString errStr = "");
19
20     BErrorTime&    set(int errNo, BTimeStamp errTime = BTimeStamp(), BString errStr = "");
21     BErrorTime&    clear();
22     int            getErrorNo() const;
23     BTimeStamp      getTime() const;
24     BString         getString() const;
25
26     BErrorTime     copy();
27     operator int() const;
28
29 private:
30     int            oerrNo;
31     BTimeStamp      oerrTime;
32     BString         oerrStr;
33 };
34
35
36 #endif
```

8.59 BEvent.cpp File Reference

```
#include <BEvent.h>
#include <BPoll.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/ioctl.h>
```

8.60 BEvent.h File Reference

```
#include <BTypes.h>
#include <BQueue.h>
```

Classes

- class [BEvent](#)

An event description class.

- class [BEventPipe](#)

This class provides an interface for sending simple integer events via a pipe file descriptor.

Typedefs

- typedef `BQueue<BEvent>` `BEventQueue`

This class provides an interface for sending simple integer events via a `BQueue`.

8.60.1 Typedef Documentation

8.60.1.1 BEventQueue

typedef `BQueue<BEvent>` `BEventQueue`

This class provides an interface for sending simple integer events via a `BQueue`.

8.61 BEvent.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BEvent.h      Event class
3  *  T.Barnaby,   BEAM Ltd,   2005-07-08
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BEvent_H
9  #define BEvent_H    1
10
11 #include <BTypes.h>
12 #include <BQueue.h>
13
14 class BEvent {
15 public:
16     BEvent(BUInt32 type = BEventTypeNone, BUInt32 arg = 0);
17
18     BUInt32    type();
19     BUInt32    arg();
20
21 private:
22     BUInt32    otype;
23     BUInt32    oarg;
24 };
25
26 typedef BQueue<BEvent>    BEventQueue;
27
28 class BEventPipe {
29 public:
30     BEventPipe();
31     ~BEventPipe();
32
33     void        clear();
34     int         getFd();
35
36     BUInt       writeAvailable() const;
37     BError      write(const BEvent& event, BTimeout timeout = BTimeoutForever);
38
39     BUInt       readAvailable() const;
40     BError      read(BEvent& event, BTimeout timeout = BTimeoutForever);
41
42 private:
43     int         ofds[2];
44 };
45 #endif

```

8.62 BEvent1.cpp File Reference

```
#include <stdlib.h>
#include <unistd.h>
#include <errno.h>
#include <BEvent1.h>
#include <BPoll.h>
```

8.63 BEvent1.h File Reference

```
#include <stdint.h>
#include <BError.h>
```

Classes

- class [BEvent1](#)
This class provides a base class for all event objects that can be sent over the events interface.
- class [BEvent1Error](#)
This class provides a class to send a [BError](#) event.
- class [BEvent1Pipe](#)
This class provides a base interface for sending events via a pipe. This allows threads to send events that can be picked up by the poll system call.
- class [BEvent1Int](#)
This class provides an interface for sending simple integer events via a file descriptor. This allows threads to send events that can be picked up by the poll system call.

Enumerations

- enum [BEvent1Type](#) { [BEvent1TypeNone](#) , [BEvent1TypeInt](#) , [BEvent1TypeError](#) }

8.63.1 Enumeration Type Documentation

8.63.1.1 BEvent1Type

```
enum BEvent1Type
```

Enumerator

BEvent1TypeNone	
BEvent1TypeInt	
BEvent1TypeError	

8.64 BEvent1.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BEvent1.h   File Event class
3  *  T.Barnaby,  BEAM Ltd,   2005-07-08
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BEvent1_H
9  #define BEvent1_H   1
10
11 #include <stdint.h>
12 #include <BError.h>
13
14 enum BEvent1Type { BEvent1TypeNone, BEvent1TypeInt, BEvent1TypeError };
15
16 class BEvent1 {
17 public:
18     BEvent1(uint32_t type);
19     virtual ~BEvent1();
20     uint32_t   getType();
21
22     // Implementation functions
23     virtual BError   getBinary(void* data, uint32_t& size);
24     virtual BError   setBinary(void* data, uint32_t& size);
25 private:
26     uint32_t   otype;
27 };
28
29 class BEvent1Error : public BError, public BEvent1 {
30 public:
31     BEvent1Error(int errNo = ErrorOk, BString errStr = "");
32     BError   getBinary(void* data, uint32_t& size);
33     BError   setBinary(void* data, uint32_t& size);
34 private:
35 };
36
37 class BEvent1Pipe {
38 public:
39     BEvent1Pipe();
40     ~BEvent1Pipe();
41
42     void   clear();
43     BError sendEvent(BEvent1* event);
44     BError getEvent(BEvent1* event, int timeOutUs = -1);
45
46     int   getReceiveFd();
47 private:
48     int   ofds[2];
49 };
50
51 class BEvent1Int {
52 public:
53     BEvent1Int();
54     ~BEvent1Int();
55
56     void   clear();
57     BError sendEvent(int event);
58     BError getEvent(int& event, int timeOutUs = -1);
59
60     int   getFd();
61 private:
62     int   ofds[2];
63 };
64
65 #endif

```

8.65 BFifo.h File Reference

```

#include <BTypes.h>
#include <BError.h>
#include <BFifo.inc>

```

Classes

- class [BFifo< Type >](#)

A template first in first out data buffer to store any object types.

8.66 BFifo.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BFifo.h      BFifo class
3  *  T.Barnaby, Beam Ltd, 2013-05-03
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  *
8  */
18 #ifndef BFifo_h
19 #define BFifo_h
20
21 #include <BTypes.h>
22 #include <BError.h>
23
24 template <class Type> class BFifo {
25 public:
26     BFifo(BUInt size);
27     ~BFifo();
28
29     void clear();
30
31     BUInt size();
32     BError resize(BUInt size);
33     BError rebase();
34
35     BUInt writeAvailable();
36     BUInt writeAvailableChunk();
37     BError write(const Type v);
38     BError write(const Type* data, BUInt num);
39
40     Type* writeData();
41     Type* writeData(BUInt& num);
42     void writeDone(BUInt num);
43     void writeBackup(BUInt num);
44
45     BUInt readAvailable();
46     BUInt readAvailableChunk();
47     Type read();
48     BError read(Type* data, BUInt num);
49
50     Type* readData();
51     Type* readData(BUInt& num);
52     void readDone(BUInt num);
53
54     Type readPos(BUInt pos);
55     void writePos(BUInt pos, const Type& v);
56     Type& operator[] (int pos);
57
58 protected:
59     BUInt osize;
60     Type* odata;
61     volatile BUInt owritePos;
62     volatile BUInt oreadPos;
63 };
64
65 #include <BFifo.inc>
66 #endif

```

8.67 BFifo.inc File Reference

8.68 BFifoCirc.cpp File Reference

```

#include <BFifoCirc.h>
#include <fcntl.h>

```

```
#include <errno.h>
#include <sys/mman.h>
```

Macros

- #define [dprintf](#)(fmt, a...)

8.68.1 Macro Definition Documentation

8.68.1.1 dprintf

```
#define dprintf(
    fmt,
    a... )
```

8.69 BFifoCirc.h File Reference

```
#include <stdint.h>
#include <BError.h>
#include <BCondInt.h>
#include <BMutex.h>
#include <BFifoCirc.inc>
```

Classes

- class [BFifoCircPos](#)
This class implements a pointer into the Fifo's circular buffer.
- class [BFifoCirc< Type >](#)
This class implements a thread safe FIFO buffer using a binary sized circular memory.

8.70 BFifoCirc.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BFifoCirc.h      FIFO Buffer Class
3  * T.Barnaby, BEAM Ltd, 2006-02-22
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
18 #ifndef BFifoCirc_H
19 #define BFifoCirc_H 1
20
21 #include <stdint.h>
22 #include <BError.h>
23 #include <BCondInt.h>
24 #include <BMutex.h>
```

```

25
26 class BFifoCircPos {
27 public:
28     BFifoCircPos(uint32_t size);
29     void        setSize(uint32_t size);
30
31     void        set(uint32_t pos);
32     uint32_t    pos();
33
34     void        increment(uint32_t numFifoSamples);
35     uint32_t    difference(const BFifoCircPos& pos);
36
37     operator int();
38     void        operator+=(uint32_t numFifoSamples);
39     int         operator==(const BFifoCircPos& pos);
40     int         operator!=(const BFifoCircPos& pos);
41 private:
42     uint32_t    osize;
43     uint32_t    opos;
44 };
45
46 template <class Type> class BFifoCirc {
47 public:
48     enum        { defaultSize = 1024 };
49
50     BFifoCirc(uint32_t size = defaultSize);
51     ~BFifoCirc();
52
53     uint32_t    size();
54     void        clear();
55
56     // Data write functions
57     uint32_t    writeAvailable();
58     BError      writeWaitAvailable(uint32_t numFifoSamples);
59
60     BError      write(const Type* data, uint32_t numFifoSamples);
61
62     Type*       writeData();
63     void        writeDone(uint32_t numFifoSamples);
64
65     // Data read functions
66     uint32_t    readAvailable();
67     BError      readWaitAvailable(uint32_t numFifoSamples);
68
69     BError      read(Type* data, uint32_t numFifoSamples);
70
71     Type*       readData();
72     BError      readDone(uint32_t numFifoSamples);
73
74     Type&       operator[](int pos);
75
76 protected:
77     // Functions for internal use
78     BError      mapCircularBuffer(uint32_t size);
79     void        unmapCircularBuffer();
80
81     BMutex      olock;
82     uint32_t    ovmSize;
83     uint32_t    osize;
84     Type*       odata;
85     BFifoCircPos owritePos;
86     BCondValue  owriteNumFifoSamples;
87     BFifoCircPos oreadPos;
88 };
89
90 #include <BFifoCirc.inc>
91
92 #endif

```

8.71 BFifoCirc.inc File Reference

8.72 BFile.cpp File Reference

```

#include <stdarg.h>
#include <BFile.h>
#include <sys/stat.h>
#include <string.h>

```

```
#include <fcntl.h>
#include <errno.h>
#include <unistd.h>
#include <BDir.h>
#include <BDebug.h>
```

Macros

- `#define BDEBUGL1 0`
- `#define STRBUF 10240`

Functions

- `BError bcopyFile (BString source, BString dest)`
Copy a file.
- `BError bcopyDir (BString source, BString dest)`
Copy complete directory.

8.72.1 Macro Definition Documentation

8.72.1.1 BDEBUGL1

```
#define BDEBUGL1 0
```

8.72.1.2 STRBUF

```
#define STRBUF 10240
```

8.72.2 Function Documentation

8.72.2.1 bcopyFile()

```
BError bcopyFile (
    BString source,
    BString dest )
```

Copy a file.

8.72.2.2 bcopyDir()

```
BError bcopyDir (
    BString source,
    BString dest )
```

Copy complete directory.

8.73 BFile.h File Reference

```
#include <stdio.h>
#include <BTypes.h>
#include <BString.h>
#include <BError.h>
```

Classes

- class [BFile](#)
File operations class.

Functions

- [BError bcopyFile](#) ([BString](#) source, [BString](#) dest)
Copy a file.
- [BError bcopyDir](#) ([BString](#) source, [BString](#) dest)
Copy complete directory.

8.73.1 Function Documentation

8.73.1.1 bcopyFile()

```
BError bcopyFile (
    BString source,
    BString dest )
```

Copy a file.

8.73.1.2 bcopyDir()

```
BError bcopyDir (
    BString source,
    BString dest )
```

Copy complete directory.

8.74 BFile.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BFile.h      BEAM BFile access class
3  * T.Barnaby,  BEAM Ltd,   27/11/95
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BFILE_H
9 #define BFILE_H 1
10
11 #include <stdio.h>
12 #include <BTypes.h>
13 #include <BString.h>
14 #include <BError.h>
15
16 class BFile {
17 public:
18     BFile();
19     BFile(const BFile& file);
20     ~BFile();
21
22     BError      open(BString name, BString mode);
23     BError*     open(FILE* file);
24     BError      open(int fd, BString mode);
25     BError      openTemp(BString name, BString mode);
26     BError      close();
27
28     int         isOpen();
29     int         isEnd();
30     FILE*       getFd();
31     BUInt64     length();
32     int         setVBuf(char* buf, int mode, size_t size);
33
34     int         read(void* buf, int nbytes);
35     int         readString(BString& str);
36     char*       fgets(char* buf, size_t size);
37
38     int         write(const void* buf, int nbytes);
39     int         writeString(const BString& str);
40
41     int         seek(BUInt64 pos);
42     BUInt64     position();
43
44     int         printf(const char* fmt, ...);
45
46     BError      truncate();
47     BError      flush();
48     BString     fileName();
49
50     BFile&      operator=(const BFile& file);
51 private:
52     FILE*       ofile;
53     BString     ofileName;
54     BString     omode;
55 };
56
57 BError bcopyFile(BString source, BString dest);
58 BError bcopyDir(BString source, BString dest);
59
60 #endif

```

8.75 BFileCsv.cpp File Reference

```

#include <BFileCsv.h>
#include <errno.h>

```

8.76 BFileCsv.h File Reference

```

#include <BFile.h>

```

Classes

- class [BFileCsv](#)

A class to read and write CSV formatted files.

8.77 BFileCsv.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BFileCsv.h BEAM CSV access class
3  * T.Barnaby, BEAM Ltd, 2012-01-10
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BFile_H
9 #define BFile_H 1
10
11 #include <BFile.h>
12
13 class BFileCsv : public BFile {
14 public:
15     BFileCsv(char separator = ';');
16
17     BError readCsv(BStringList& csvList);
18     BError writeCsv(BStringList& csvList);
19 private:
20     char oseparator;
21 };
22
23
24 #endif

```

8.78 BFileData.cpp File Reference

```

#include <BFileCsv.h>
#include <BFileData.h>
#include <errno.h>

```

8.79 BFileData.h File Reference

```

#include <BError.h>

```

Classes

- class [BFileData](#)

A class to implement a data storage file.

8.80 BFileData.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BFileData.h BEAM Data access class
3  * T.Barnaby, BEAM Ltd, 2012-01-10
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BFileData_H
9 #define BFileData_H 1
10
11 #include <BError.h>
12
13 class BFileData : public BList<BStringList> {
14 public:
15     BError open(BString filename);
16
17     BError getNextId(int& id);
18     BError find(int id, BStringList& csvList);
19     BError write(int id, BStringList& csvList);
20     BError del(int id);
21
22 private:
23     BError read();
24     BError write();
25     BString ofilename;
26 };
27
28 #endif
```

8.81 BFirmware.h File Reference

```
#include <BTypes.h>
```

Classes

- struct [BFirmwareFileHeader](#)
- struct [BFirmwareSegHeader](#)
- struct [BFirmwareInfo](#)

Typedefs

- typedef [BFirmwareFileHeader](#) [BFirmwareFirmwareHeader](#)

Functions

- struct [BFirmwareFileHeader](#) [__attribute__\(\(packed\)\)](#)
- int [bfirmwareValid](#) ([BUInt32](#) baseAddress, [BUInt](#) type, [Bool](#) checkChecksum, char *version=0)
- void [bfirmwareBoot](#) ([BUInt32](#) baseAddress)

Variables

- const BUInt32 BFirmwareMagic = 0x01414542
- const BUInt32 BFirmwareTypeFile = 1
- const BUInt32 BFirmwareTypeFirmware = 2
- const BUInt32 BFirmwareTypeSegment = 3
- const BUInt32 BFirmwareFormatRaw = 0
- const BUInt32 BFirmwareFormatGzip = 1
- const BUInt32 BFirmwarePlatformBMeasure125 = 33
- const BUInt32 BFirmwarePlatformBMeasure125Cpu = 34
- const BUInt32 BFirmwarePlatformBMeasure125Fpga = 35
- const BUInt32 BFirmwarePlatformBMeasure125Wifi = 36
- const BUInt32 BFirmwarePlatformBMeasure125Boot = 37
- BUInt32 magic
- BUInt32 itemType
- BUInt32 fileLength
- BUInt32 checksum
- BUInt32 platform
- BUInt32 format
- BUInt32 numSegments
- BUInt32 startAddress
- BUInt8 ver0
- BUInt8 ver1
- BUInt8 ver2
- BUInt8 ver3
- BUInt32 special [7]
- BUInt32 dataLength
- BUInt32 address
- BUInt32 length
- const BUInt32 BFirmwareInfoMagic = 0xBBEEAA00
- const BUInt8 BFirmwareInfoEncrypt1 = 0x40
- struct BFirmwareInfo __attribute__

8.81.1 Typedef Documentation

8.81.1.1 BFirmwareFirmwareHeader

```
typedef BFirmwareFileHeader BFirmwareFirmwareHeader
```

8.81.2 Function Documentation

8.81.2.1 __attribute__()

```
struct BFirmwareFileHeader __attribute__ (
    (packed) )
```

8.81.2.2 bfirmwareValid()

```
int bfirmwareValid (
    BUInt32 baseAddress,
    BUInt type,
    Bool checkChecksum,
    char * version = 0 )
```

8.81.2.3 bfirmwareBoot()

```
void bfirmwareBoot (
    BUInt32 baseAddress )
```

8.81.3 Variable Documentation

8.81.3.1 BFirmwareMagic

```
const BUInt32 BFirmwareMagic = 0x01414542
```

8.81.3.2 BFirmwareTypeFile

```
const BUInt32 BFirmwareTypeFile = 1
```

8.81.3.3 BFirmwareTypeFirmware

```
const BUInt32 BFirmwareTypeFirmware = 2
```

8.81.3.4 BFirmwareTypeSegment

```
const BUInt32 BFirmwareTypeSegment = 3
```

8.81.3.5 BFirmwareFormatRaw

```
const BUInt32 BFirmwareFormatRaw = 0
```

8.81.3.6 BFirmwareFormatGzip

```
const BUInt32 BFirmwareFormatGzip = 1
```

8.81.3.7 BFirmwarePlatformBMeasure125

```
const BUInt32 BFirmwarePlatformBMeasure125 = 33
```

8.81.3.8 BFirmwarePlatformBMeasure125Cpu

```
const BUInt32 BFirmwarePlatformBMeasure125Cpu = 34
```

8.81.3.9 BFirmwarePlatformBMeasure125Fpga

```
const BUInt32 BFirmwarePlatformBMeasure125Fpga = 35
```

8.81.3.10 BFirmwarePlatformBMeasure125Wifi

```
const BUInt32 BFirmwarePlatformBMeasure125Wifi = 36
```

8.81.3.11 BFirmwarePlatformBMeasure125Boot

```
const BUInt32 BFirmwarePlatformBMeasure125Boot = 37
```

8.81.3.12 magic

```
BUInt32 magic
```

8.81.3.13 itemType

`BUInt32` itemType

8.81.3.14 fileLength

`BUInt32` fileLength

8.81.3.15 checksum

`BUInt32` checksum

8.81.3.16 platform

`BUInt32` platform

8.81.3.17 format

`BUInt32` format

8.81.3.18 numSegments

`BUInt32` numSegments

8.81.3.19 startAddress

`BUInt32` startAddress

8.81.3.20 ver0

`BUInt8` ver0

8.81.3.21 ver1

`BUInt8 ver1`

8.81.3.22 ver2

`BUInt8 ver2`

8.81.3.23 ver3

`BUInt8 ver3`

8.81.3.24 special

`BUInt32 special`

8.81.3.25 dataLength

`BUInt32 dataLength`

8.81.3.26 address

`BUInt32 address`

8.81.3.27 length

`BUInt32 length`

8.81.3.28 BFirmwareInfoMagic

`const BUInt32 BFirmwareInfoMagic = 0xBBEEAA00`

8.81.3.29 BFirmwareInfoEncrypt1

```
const BUInt8 BFirmwareInfoEncrypt1 = 0x40
```

8.81.3.30 __attribute__

```
struct BoapMc1Error __attribute__
```

8.82 BFirmware.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BFirmware.h BFirmware info
3  * T.Barnaby, Beam Ltd, 2019-01-28
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  *
8  */
9 #ifndef BFirmware_h
10 #define BFirmware_h
11
12 #include <BTypes.h>
13
14 // Beam firmware files
15 const BUInt32 BFirmwareMagic = 0x01414542;
16
17 const BUInt32 BFirmwareTypeFile = 1;
18 const BUInt32 BFirmwareTypeFirmware = 2;
19 const BUInt32 BFirmwareTypeSegment = 3;
20
21 const BUInt32 BFirmwareFormatRaw = 0;
22 const BUInt32 BFirmwareFormatGzip = 1;
23
24 const BUInt32 BFirmwarePlatformBMeasure125 = 33;
25 const BUInt32 BFirmwarePlatformBMeasure125Cpu = 34;
26 const BUInt32 BFirmwarePlatformBMeasure125Fpga = 35;
27 const BUInt32 BFirmwarePlatformBMeasure125Wifi = 36;
28 const BUInt32 BFirmwarePlatformBMeasure125Boot = 37;
29
30 struct BFirmwareFileHeader {
31     BUInt32 magic;
32     BUInt32 itemType;
33     BUInt32 fileLength;
34     BUInt32 checksum;
35     BUInt32 platform;
36     BUInt32 format;
37     BUInt32 numSegments;
38     BUInt32 startAddress;
39     BUInt8 ver0;
40     BUInt8 ver1;
41     BUInt8 ver2;
42     BUInt8 ver3;
43     BUInt32 special[7];
44 } __attribute__((packed));
45
46 typedef BFirmwareFileHeader BFirmwareFirmwareHeader;
47
48 struct BFirmwareSegHeader {
49     BUInt32 magic;
50     BUInt32 itemType;
51     BUInt32 fileLength;
52     BUInt32 checksum;
53     BUInt32 platform;
54     BUInt32 format;
55     BUInt32 dataLength;
56     BUInt32 address;
57     BUInt32 length;
58     BUInt32 special[7];
59 } __attribute__((packed));
60
61
```

```

62 /*****
63  * Old Armsys afirm firmware format
64  *****/
65 */
66 const BUInt32   BFirmwareInfoMagic      = 0xBBEEAA00;
67 const BUInt8    BFirmwareInfoEncrypt1   = 0x40;
68
69 struct BFirmwareInfo {
70     BUInt32  magic;
71     BUInt32  length;
72     BUInt32  checksum;
73     BUInt8   type;
74     BUInt8   ver0;
75     BUInt8   ver1;
76     BUInt8   ver2;
77 };
78
79 // Checks if there is a valid BFirmware application present in the CPU and returns the version if not
80 int  bfirmwareValid(BUInt32 baseAddress, BUInt type, Bool checkChecksum, char* version = 0);
81 void bfirmwareBoot(BUInt32 baseAddress);
82
83 #endif

```

8.83 BList.h File Reference

```
#include <BList_func.h>
```

Classes

- class [BNode](#)
A *BList* entry's node.
- class [BIter](#)
Iterator for *BLists*.
- class [BList< T >](#)
Template based list class.
- class [BList< T >::Node](#)
A *BList* internal *Node*.

Macros

- #define [BListLoop](#)(list, i) for([BIter](#) i = list.begin(); !list.isEnd(i); list.next(i))

8.83.1 Macro Definition Documentation

8.83.1.1 BListLoop

```

#define BListLoop(
    list,
    i ) for(BIter i = list.begin(); !list.isEnd(i); list.next(i))

```


8.84 BList.h

[Go to the documentation of this file.](#)

```

1  /*****
2  * BList.h      BEAM List
3  * T.Barnaby,  BEAM Ltd,   4/8/00
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BLIST_H
9  #define BLIST_H 1
10
11
12 class BNode {
13 public:
14     BNode() : next(0), prev(0){}
15     BNode* next;
16     BNode* prev;
17 };
18
19
20 class BIter {
21 public:
22     BIter(BNode* i = 0) { oi = i; }
23     operator BNode* () { return oi; }
24     int operator==(const BIter& i) { return (i.oi == oi); }
25     int valid() { return (oi != 0); }
26 private:
27     BNode* oi;
28 };
29
30
31 template <class T> class BList {
32 public:
33     class Node : public BNode {
34     public:
35         Node(const T& i) : item(i){}
36         T item;
37     };
38     typedef int (*SortFunc)(T& a, T& b);
39
40     // Constructors
41     BList();
42     BList(const BList<T>& l);
43     virtual ~BList();
44
45     // Navigation
46     void start(BIter& i) const;
47     BIter begin() const;
48     BIter end() const;
49     BIter end(BIter& i) const;
50     void next(BIter& i) const;
51     void prev(BIter& i);
52     BIter goTo(int pos) const;
53     int position(BIter i);
54
55     // Information
56     unsigned int number() const;
57     unsigned int size() const;
58     int isStart(BIter& i) const;
59     int isEnd(BIter& i) const;
60
61     // Get items
62     T& front();
63     T& rear();
64     T& get(BIter i);
65     const T& get(BIter i) const;
66
67     // Insert items
68     void append(const T& item);
69     virtual void insert(BIter& i, const T& item);
70     void insertAfter(BIter& i, const T& item);
71
72     // Delete items
73     virtual void clear();
74     virtual void del(BIter& i);
75     void deleteLast();
76     void deleteFirst();
77
78     // Stack
79     void push(const T& i);
80     T pop();
81
82     // Queue
83     void queueAdd(const T& i);
84     T queueGet();
85
86

```

```

87 // Misc
88 void append(const BList<T>& l);
89 int has(const T& i) const;
90 void swap(BIter i1, BIter i2);
91 void sort();
92 void sort(SortFunc func);
93
94 // Operator functions
95 BList<T>& operator=(const BList<T>& l);
96 T& operator[](int i);
97 const T& operator[](int i) const;
98 T& operator[](BIter i);
99 const T& operator[](const BIter& i) const;
100 BList<T> operator+(const BList<T>& l) const;
101
102 protected:
103 virtual Node* nodeGet(BIter i);
104 virtual const Node* nodeGet(BIter i) const;
105 virtual Node* nodeCreate(const T& item);
106 Node* onodes;
107 unsigned int olength;
108
109 private:
110 virtual Node* nodeCreate();
111 };
112
113 #include <BList_func.h>
114
115 // Macros
116 #define BListLoop(list, i) for(BIter i = list.begin(); !list.isEnd(i); list.next(i))
117
118 #endif

```

8.85 BList_func.h File Reference

```

#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <memory.h>

```

8.86 BList_func.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BList_func.h   BEAM List implementation based upong stdc++ lists
3  * T.Barnaby,   BEAM Ltd,   4/8/00
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7
8 #include <stdlib.h>
9 #include <stdio.h>
10 #include <string.h>
11 #include <memory.h>
12
13 template <class T> BList<T>::BList() {
14     onodes = nodeCreate();
15     onodes->next = onodes;
16     onodes->prev = onodes;
17     olength = 0;
18 }
19
20 template <class T> BList<T>::BList(const BList<T>& l) {
21     onodes = nodeCreate();
22     onodes->next = onodes;
23     onodes->prev = onodes;
24     olength = 0;
25     append((BList<T>&)l);
26 }
27
28 template <class T> BList<T>::~~BList() {
29     clear();

```

```

40     delete [] (char*)onodes;
41 }
42
43 template <class T> void BList<T>::start(BIter& i) const {
44     i = onodes->next;
45 }
46
47 template <class T> BIter BList<T>::begin() const {
48     return onodes->next;
49 }
50
51 template <class T> BIter BList<T>::end() const {
52     return onodes->prev;
53 }
54
55 template <class T> BIter BList<T>::end(BIter& i) const {
56     i = onodes->prev;
57     return onodes->prev;
58 }
59
60 template <class T> void BList<T>::next(BIter& i) const {
61     BNode* n = i;
62
63     if (n != onodes)
64         n = n->next;
65     i = n;
66 }
67
68 template <class T> void BList<T>::prev(BIter& i) {
69     BNode* n = i;
70
71     if (n != onodes)
72         n = n->prev;
73     i = n;
74 }
75
76 template <class T> BIter BList<T>::goTo(int pos) const {
77     BIter i;
78     int c;
79
80     for(i = begin(), c = 0; (c < pos) && !isEnd(i); next(i), c++);
81     return i;
82 }
83
84 template <class T> int BList<T>::position(BIter i) {
85     BIter ii;
86     int c;
87
88     for(ii = begin(), c = 0; !isEnd(ii); next(ii), c++){
89         if(ii == i)
90             return c;
91     }
92     return -1;
93 }
94
95 template <class T> unsigned int BList<T>::number() const {
96     return olength;
97 }
98
99 template <class T> unsigned int BList<T>::size() const {
100     return number();
101 }
102
103 template <class T> int BList<T>::isStart(BIter& i) const {
104     Node* n = (Node*) (BNode*)i;
105
106     return (n == onodes->next);
107 }
108
109 template <class T> int BList<T>::isEnd(BIter& i) const {
110     Node* n = (Node*) (BNode*)i;
111
112     return (n == onodes);
113 }
114
115 template <class T> void BList<T>::clear(){
116     BIter i;
117
118     for(start(i); !isEnd(i); )
119         del(i);
120 }
121
122 template <class T> T& BList<T>::front() {
123     return get(begin());
124 }
125
126 template <class T> T& BList<T>::rear(){

```

```

127     return get(end());
128 }
129
130 template <class T> T& BList<T>::get(BIter i){
131     return nodeGet(i)->item;
132 }
133
134 template <class T> const T& BList<T>::get(BIter i) const {
135     return nodeGet(i)->item;
136 }
137
138 template <class T> void BList<T>::append(const T& item){
139     BIter i = end();
140
141     insertAfter(i, item);
142 }
143
144 template <class T> void BList<T>::insert(BIter& i, const T& item){
145     Node* c = (Node*)(BNode*)i;
146     Node* n = nodeCreate(item);
147
148     n->next = c;
149     n->prev = c->prev;
150     c->prev->next = n;
151     c->prev = n;
152     olength++;
153     i = n;
154 }
155
156 template <class T> void BList<T>::insertAfter(BIter& i, const T& item){
157     next(i);
158     insert(i, item);
159 }
160
161 template <class T> void BList<T>::del(BIter& i){
162     Node* n = (Node*)(BNode*)i;
163
164     if(olength){
165         i = n->next;
166         n->prev->next = n->next;
167         n->next->prev = n->prev;
168         delete n;
169         olength--;
170     }
171 }
172
173 template <class T> void BList<T>::deleteLast(){
174     BIter i = end();
175
176     del(i);
177 }
178
179 template <class T> void BList<T>::deleteFirst(){
180     BIter i = begin();
181     del(i);
182 }
183
184 template <class T> void BList<T>::push(const T& item){
185     append(item);
186 }
187
188 template <class T> T BList<T>::pop(){
189     T t = rear();
190
191     deleteLast();
192     return t;
193 }
194
195 template <class T> void BList<T>::queueAdd(const T& i){
196     append(i);
197 }
198
199 template <class T> T BList<T>::queueGet(){
200     T t = front();
201
202     deleteFirst();
203     return t;
204 }
205
206 template <class T> void BList<T>::append(const BList<T>& l){
207     BIter i;
208
209     for(l.start(i); !l.isEnd(i); l.next(i)){
210         append(l.get(i));
211     }
212 }
213

```

```

214 template <class T> int BList<T>::has(const T& v) const {
215     BIter i;
216
217     for(start(i); !isEnd(i); next(i)){
218         if(get(i) == v)
219             return 1;
220     }
221     return 0;
222 }
223
224 template <class T> void BList<T>::swap(BIter i1, BIter i2){
225     BNode* n1 = (BNode*)i1;
226     BNode* n2 = (BNode*)i2;
227     BNode* n1p = n1->prev;
228     BNode* n1n = n1->next;
229     BNode* n2p = n2->prev;
230     BNode* n2n = n2->next;
231
232     if(n1->next == n2){
233         n1p->next = n2;
234         n2n->prev = n1;
235
236         n1->prev = n2;
237         n2->prev = n1p;
238         n1->next = n2n;
239         n2->next = n1;
240     }
241     else if(n1->prev == n2){
242         n2p->next = n1;
243         n1n->prev = n2;
244
245         n1->prev = n2p;
246         n2->prev = n1;
247         n1->next = n2n;
248         n2->next = n1n;
249     }
250     else {
251         n1p->next = n2;
252         n1n->prev = n2;
253         n2p->next = n1;
254         n2n->prev = n1;
255
256         n1->prev = n2p;
257         n2->prev = n1p;
258         n1->next = n2n;
259         n2->next = n1n;
260     }
261 }
262
263 template <class T> void BList<T>::sort(){
264     BIter i;
265     BIter s;
266     int n = number();
267     int c;
268
269     while(n){
270         for(c = n - 1, i = begin(); c > 0; c--, next(i)){
271             s = i;
272             next(s);
273             if(get(i) > get(s)){
274                 swap(i, s);
275                 i = s;
276             }
277         }
278         n--;
279     }
280 }
281
282 template <class T> void BList<T>::sort(SortFunc func){
283     BIter i;
284     BIter s;
285     int n = number();
286     int c;
287
288     while(n){
289         for(c = n - 1, i = begin(); c > 0; c--, next(i)){
290             s = i;
291             next(s);
292             if(func(get(i), get(s)) > 0){
293                 swap(i, s);
294                 i = s;
295             }
296         }
297         n--;
298     }
299 }
300

```

```

301 template <class T> T& BList<T>::operator[] (BIter i){
302     return get(i);
303 }
304
305 template <class T> const T& BList<T>::operator[] (const BIter& i) const {
306     return get(i);
307 }
308
309 template <class T> T& BList<T>::operator[] (int i){
310     BIter ii;
311
312     if((ii = goTo(i))){
313         return get(ii);
314     }
315     else {
316         fprintf(stderr, "BList over range\n");
317         exit(1);
318     }
319 }
320
321 template <class T> const T& BList<T>::operator[] (int i) const {
322     BIter ii;
323
324     if((ii = goTo(i))){
325         return get(ii);
326     }
327     else {
328         fprintf(stderr, "BList over range\n");
329         exit(1);
330     }
331 }
332
333 template <class T> BList<T>& BList<T>::operator=(const BList<T>& l){
334     BIter i;
335
336     if(this != &l){
337         clear();
338         for(l.start(i); !l.isEnd(i); l.next(i)){
339             append(l[i]);
340         }
341     }
342
343     return *this;
344 }
345
346 template <class T> BList<T> BList<T>::operator+(const BList<T>& l) const {
347     BList<T> rl = *this;
348     BIter i;
349
350     for(l.start(i); !l.isEnd(i); l.next(i)){
351         rl.append(l[i]);
352     }
353     return rl;
354 }
355
356 template <class T> typename BList<T>::Node* BList<T>::nodeGet (BIter i){
357     return (Node*)(BNode*)i;
358 }
359
360 template <class T> const typename BList<T>::Node* BList<T>::nodeGet (BIter i) const{
361     return (Node*)(BNode*)i;
362 }
363
364 template <class T> typename BList<T>::Node* BList<T>::nodeCreate(const T& item){
365     return new Node(item);
366 }
367 template <class T> typename BList<T>::Node* BList<T>::nodeCreate(){
368     Node* n;
369
370     n = (Node*)new char [ sizeof(Node) ];
371     // WARNING: This is not ideal. However only used for the list start/end Node where the object is not
    valid anyway.
372     memset((void*)n, 0, sizeof(Node));
373     return n;
374 }

```

8.87 BMutex.cpp File Reference

```
#include <BMutex.h>
```

Macros

- `#define MDEBUG 0`

8.87.1 Macro Definition Documentation

8.87.1.1 MDEBUG

```
#define MDEBUG 0
```

8.88 BMutex.h File Reference

```
#include <pthread.h>
```

Classes

- class [BMutex](#)
Mutex class. Note these are recursive Mutexes and so you need to make sure the number of unlocks equals the number of locks.
- class [BMutexLock](#)
Mutex class that removes the lock on deletion and so is useful to lock data in a function call.

8.89 BMutex.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BMutex.h          BMutex Classes
3  * T.Barnaby, BEAM Ltd, 1/11/02
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BMUTEX_H
9  #define BMUTEX_H    1
10
11 #include <pthread.h>
12
13 class BMutex {
14 public:
15     enum Type { Normal, Recursive };
16
17     BMutex(Type type = Normal);
18     BMutex(const BMutex& mutex);
19     ~BMutex();
20
21     int lock();
22     int timedLock(int timeoutUs);
23     int unlock();
24     int tryLock();
25
26     BMutex& operator=(const BMutex& mutex);
27 private:
28     pthread_mutex_t omutex;
29 };
30
31 class BMutexLock {
32 public:
33     BMutexLock(BMutex& lock, int doLock = 0) : olock(lock) { if(doLock) olock.lock(); }
34     ~BMutexLock() { olock.unlock(); }
35     int lock() { return olock.lock(); }
36     int unlock() { return olock.unlock(); }
37 private:
38     BMutex& olock;
39 };
40 #endif
```

8.90 BMySQL.cpp File Reference

```
#include <stdlib.h>
#include <string.h>
#include <BMySQL.h>
```

8.91 BMySQL.h File Reference

```
#include <BTypes.h>
#include <BError.h>
#include <BDict.h>
#include <BMutex.h>
#include <mysql/mysql.h>
```

Classes

- class [BMySQL](#)

A class to provide access to a MySQL database.

8.92 BMySQL.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BMySQL.h    BDS Database Access Object
3  * T.Barnaby,  BEAM Ltd,    2008-05-20
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BMySQL_H
9  #define BMySQL_H    1
10
11  #include <BTypes.h>
12  #include <BError.h>
13  #include <BDict.h>
14  #include <BMutex.h>
15  #include <mysql/mysql.h>
16
17  class BMySQL {
18  public:
19      BMySQL();
20      ~BMySQL();
21
22      BError    open(BString hostName, BString dataBase, BString userName, BString password);
23      void      close();
24
25      BError    get(BString table, BString where, BDictString& fields);
26      BError    insert(BString table, BDictString fields, BUInt32* id = 0);
27      BError    update(BString table, BUInt32 id, BDictString fields);
28      BError    del(BString table, BUInt32 id);
29      BError    flush();
30
31      BString    escapeString(BString str);
32
33      // Low level routines
34      BError    query(BString cmd, BList<BDictString>& result);
35      MYSQL&    db();
36      void      setDebug(int debug);
37  private:
38      MYSQL      odb;
39      int        oopened;
40      int        odebug;
41      BMutex     olock;
42      static BMutex  olock;    // All BMySQL instances share this
43  };
44
45  #endif
```


8.93 BNameValue.h File Reference

```
#include <BList.h>
#include <BString.h>
```

Classes

- class [BNameValue< T >](#)
A simple, templated, name/value pair.
- class [BNameValueList< T >](#)
A simple, templated, name/value pair list.

8.94 BNameValue.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BNameValue.h      Beam Name Value Object
3  * T.Barnaby, BEAM Ltd, 16/8/00
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BNAMEVALUE_H
9  #define BNAMEVALUE_H    1
10
11  #include    <BList.h>
12  #include    <BString.h>
13
14  template <class T> class BNameValue {
15 public:
16     BNameValue() {
17     }
18     BNameValue(BString name, const T& value){
19         oname = name;
20         ovalue = value;
21     }
22
23     BString    getName(){ return oname; }
24     T&         getValue(){ return ovalue; }
25 private:
26     BString    oname;
27     T          ovalue;
28 };
29
30
31 template <class T> class BNameValueList : public BList< BNameValue<T> > {
32 public:
33     T*         find(BString name){
34         for(BIter i = this->begin(); !this->isEnd(i); this->next(i)){
35             if(this->get(i).getName() == name)
36                 return &this->get(i).getValue();
37         }
38         return 0;
39     }
40     BIter       findPos(BString name){
41         for(BIter i = this->begin(); !this->isEnd(i); this->next(i)){
42             if(this->get(i).getName() == name)
43                 return i;
44         }
45         return this->onodes;
46     }
47 };
48
49 #endif
```

8.95 Boap.cpp File Reference

```
#include <stdlib.h>
#include <stdio.h>
#include <errno.h>
#include <unistd.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netinet/tcp.h>
#include <Boap.h>
#include <byteswap.h>
#include <BoapnsD.h>
#include <BoapnsC.h>
```

Macros

- #define [DEBUG](#) 0
- #define [APIVERSION_TEST](#) 1
- #define [dprintf](#)(fmt, a...)
- #define [IS_BIG_ENDIAN](#) 1

Variables

- const int [boapPort](#) = 12000
The default BOAP connection port.

8.95.1 Macro Definition Documentation

8.95.1.1 DEBUG

```
#define DEBUG 0
```

8.95.1.2 APIVERSION_TEST

```
#define APIVERSION_TEST 1
```

8.95.1.3 dprintf

```
#define dprintf(  
    fmt,  
    a... )
```

8.95.1.4 IS_BIG_ENDIAN

```
#define IS_BIG_ENDIAN 1
```

8.95.2 Variable Documentation

8.95.2.1 boapPort

```
const int boapPort = 12000
```

The default BOAP connection port.

8.96 Boap.h File Reference

```
#include <stdint.h>
#include <BTypes.h>
#include <BPoll.h>
#include <BSocket.h>
#include <BThread.h>
#include <BError.h>
#include <BEvent1.h>
#include <BMutex.h>
#include <BTimeStamp.h>
#include <BBuffer.h>
```

Classes

- struct [BoapPacketHead](#)
Boap packet header.
- class [BoapPacket](#)
Boap packet.
- class [BoapClientObject](#)
Base for all Boap client objects.
- class [BoapSignalObject](#)
A Boap object to send signals using an RPC mechanism.
- class [BoapServiceEntry](#)
Boap server single service entry.
- class [BoapServerConnection](#)
Boap server connection.
- class [BoapServer](#)
Boap server.
- class [BoapFuncEntry](#)
Boap service function.
- class [BoapServiceObject](#)
Boap service object.

Namespaces

- namespace [Boapns](#)

Typedefs

- typedef [BUInt32](#) [BoapService](#)
- typedef [BError](#)([BoapServiceObject::*](#) [BoapFunc](#)) ([BoapServerConnection](#) *conn, [BoapPacket](#) &rx, [BoapPacket](#) &tx)

Enumerations

- enum [BoapType](#) {
 [BoapTypeRpc](#) , [BoapTypeRpcReply](#) , [BoapTypeSignal](#) , [BoapTypeRpcError](#) ,
 [BoapTypeRpc](#) , [BoapTypeSignal](#) }
- enum [BoapPriority](#) { [BoapPriorityLow](#) , [BoapPriorityNormal](#) , [BoapPriorityHigh](#) }

Variables

- const [BUInt32](#) [BoapMagic](#) = 0x424F4100

8.96.1 Typedef Documentation

8.96.1.1 BoapService

```
typedef BUInt32 BoapService
```

8.96.1.2 BoapFunc

```
typedef BError(BoapServiceObject::\* BoapFunc) (BoapServerConnection *conn, BoapPacket &rx,  
BoapPacket &tx)
```

8.96.2 Enumeration Type Documentation

8.96.2.1 BoapType

```
enum BoapType
```

Enumerator

BoapTypeRpc	
BoapTypeRpcReply	
BoapTypeSignal	
BoapTypeRpcError	
BoapTypeRpc	
BoapTypeSignal	

8.96.2.2 BoapPriority

```
enum BoapPriority
```

Enumerator

BoapPriorityLow	
BoapPriorityNormal	
BoapPriorityHigh	

8.96.3 Variable Documentation

8.96.3.1 BoapMagic

```
const BUInt32 BoapMagic = 0x424F4100
```

8.97 Boap.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * Boap.h Boap RPC protocol
3  * T.Barnaby, BEAM Ltd, 8/5/03
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef Boap_HH
9 #define Boap_HH
10
11 #include <stdint.h>
12 #include <BTypes.h>
13 #include <BPoll.h>
14 #include <BSocket.h>
15 #include <BThread.h>
16 #include <BError.h>
17 #include <BEvent1.h>
18 #include <BMutex.h>
19 #include <BTimeStamp.h>
20 #include <BBuffer.h>
21

```

```

22 // Main BOAP Types
23 const BUInt32      BoapMagic = 0x424F4100;
24 enum BoapType      { BoapTypeRpc, BoapTypeRpcReply, BoapTypeSignal, BoapTypeRpcError };
25 typedef BUInt32    BoapService;
26 enum BoapPriority   { BoapPriorityLow, BoapPriorityNormal, BoapPriorityHigh };
27
28 struct BoapPacketHead {
29     BUInt32      type;
30     BUInt32      length;
31     BUInt32      service;
32     BUInt32      cmd;
33 };
34
35 class BoapPacket : public BBufferStore {
36 public:
37     BoapPacket();
38     ~BoapPacket();
39
40     BUInt32      getCmd();
41
42     int          peekHead(BoapPacketHead& head);
43     int          pushHead(BoapPacketHead& head);
44     int          popHead(BoapPacketHead& head);
45     void         updateHead();
46 };
47
48 /*****
49  * Main Client communications classes
50  *****/
51
52 class BoapClientObject : public BSocket {
53 public:
54     BoapClientObject(BString name = "");
55     virtual ~BoapClientObject();
56
57     BUInt32      apiVersion();
58     BError       connectService(BString name);
59     BError       disconnectService();
60     BString      getServiceName();
61
62     BError       ping(BUInt32& apiVersion);
63     BError       setConnectionPriority(BoapPriority priority);
64     void         setMaxLength(BUInt32 maxLength);
65     void         setTimeout(int timeout);
66
67 protected:
68     BError       pingLocked(BUInt32& apiVersion);
69     BError       checkApiVersion();
70     BError       performCall(BoapPacket& tx, BoapPacket& rx);
71     BError       performSend(BoapPacket& tx);
72     BError       performRecv(BoapPacket& rx);
73     virtual BError handleReconnect(BError err);
74
75     BString      oname;
76     BUInt32      oapiVersion;
77     BoapPriority  opriority;
78     BoapService  oservice;
79     int          oconnected;
80     BUInt32      omaxLength;
81     BoapPacket   otx;
82     BoapPacket   orx;
83     BMutex       olock;
84     int          otimeout;
85     int          oreconnect;
86 };
87
88 class BoapSignalObject : public BSocket {
89 public:
90     BoapSignalObject();
91
92 protected:
93     BError       performSend(BoapPacket& tx);          // Performs a send to the named service
94     BoapPacket   otx;
95     BoapPacket   orx;
96 };
97
98 /*****
99  * Main Server communications class
100  *****/
101
102 class BoapServiceObject;
103 class BoapServiceEntry {

```

```

114 public:
115     BoapServiceEntry(BoapService service = 0, BoapServiceObject* object = 0){
116         oservice = service;
117         oobject = object;
118     }
119     BoapService      oservice;
120     BoapServiceObject* oobject;
121 };
122
123 class BoapServer;
124
125 class BoapServerConnection : public BThread {
126 public:
127     BoapServerConnection(BoapServer& boapServer, int fd);
128     virtual ~BoapServerConnection();
129
130     virtual BError      init();
131     virtual BError      process();
132     virtual BSocket&    getSocket();
133     virtual void        setMaxLength(BUInt32 maxLength);
134     virtual BError      getHead(BoapPacketHead& head);
135     virtual BError      validate();
136
137 private:
138     void*                function();
139
140     BoapServer&          oboapServer;
141     BSocket              osocket;
142     BoapPacket           orx;
143     BoapPacket           otx;
144     BUInt32              omaxLength;
145 };
146
147 namespace Boapns {
148 class Boapns;
149 }
150
151 class BoapServer : public BThread {
152 public:
153     enum { NOTHREADS=0, THREADED=1 };
154     BoapServer();
155     virtual ~BoapServer();
156     virtual BError      init(BString boapNsHost = "", int port = 0, int threaded = 0, int isBoapns
157 = 0);
158     virtual BError      run(int inThread = 0);
159     virtual BError      process(BoapServerConnection* conn, BoapPacket& rx, BoapPacket& tx);
160     virtual BError      processEvent(BoapPacket& rx);
161
162     // Support routines
163     virtual BError      addObject(BoapServiceObject* object);
164     virtual BError      sendEvent(BoapPacket& tx);
165     virtual BError      processEvent(int fd);
166     virtual void        clientGone(BoapServerConnection* client);
167     BSocket&            getSocket();
168     BSocket&            getEventSocket();
169     BString             getHostName();
170     int                 getConnectionsNumber();
171     void                closeConnections();
172
173     // Override functions
174     virtual BoapServerConnection* newConnection(int fd, BSocketAddressINET address);
175
176 protected:
177     void*                function();
178
179     BMutex               olock;
180     int                  othreaded;
181     int                  oisBoapns;
182     Boapns::Boapns*      oboapns;
183     BList<BoapServerConnection*> oclients;
184     BEventInt            oclientGoneEvent;
185     BList<BoapServiceEntry> oservices;
186     BPoll                opoll;
187     BSocket              onet;
188     BSocket              onetEvent;
189     BSocketAddressINET   onetEventAddress;
190     BString              ohostName;
191
192 public:
193     BUInt64              onumOperations;
194 };
195
196
197
198 /*****
199  * Base for all Server Objects
200  *****/
201

```

```

202 class BoapServiceObject;
203
204 typedef BError (BoapServiceObject::*BoapFunc) (BoapServerConnection* conn, BoapPacket& rx, BoapPacket&
        tx);
205
206 class BoapFuncEntry {
207 public:
208     BoapFuncEntry(int cmd, BoapFunc func);
209     BUInt32      ocmd;
210     BoapFunc     ofunc;
211 };
212
213 class BoapServiceObject {
214 public:
215     BoapServiceObject(BoapServer& server, BString name = "");
216     virtual ~BoapServiceObject();
217
218     BError      setName(BString name);
219
220     BError      sendEvent(BString signalName, BInt32 arg);
221     virtual BError      processEvent(BString objectName, BString name, BInt32 arg);
222
223     BString      name();
224     BUInt32      apiVersion();
225     BError      doPing(BoapServerConnection* conn, BoapPacket& rx, BoapPacket& tx);
226     BError      doConnectionPriority(BoapServerConnection* conn, BoapPacket& rx, BoapPacket& tx);
227     BError      process(BoapServerConnection* conn, BoapPacket& rx, BoapPacket& tx);
228     virtual BError      processEvent(BoapPacket& rx);
229 protected:
230     BError      sendEvent(BoapPacket& tx);
231
232     BoapServer&  oserver;
233     BString      oname;
234     BUInt32      oapiVersion;
235     BList<BoapFuncEntry> ofuncList;
236 };
237 #endif

```

8.98 BoapMc.cpp File Reference

```

#include <BoapMc.h>
#include <BCrc16.h>
#include <stdlib.h>
#include <string.h>
#include <stdio.h>

```

Macros

- #define `DEBUG_LOCAL` 0
- #define `DEBUG_LOCAL1` 0
- #define `dlprintf`(fmt, a...)
- #define `dl1printf`(fmt, a...)

8.98.1 Macro Definition Documentation

8.98.1.1 `DEBUG_LOCAL`

```
#define DEBUG_LOCAL 0
```


8.98.1.2 DEBUG_LOCAL1

```
#define DEBUG_LOCAL1 0
```

8.98.1.3 dlprintf

```
#define dlprintf(  
    fmt,  
    a... )
```

8.98.1.4 dl1printf

```
#define dl1printf(  
    fmt,  
    a... )
```

8.99 BoapMc.h File Reference

```
#include <BTypes.h>  
#include <BMutex.h>  
#include <BSemaphore.h>  
#include <BQueue.h>  
#include <BFifo.h>  
#include <BComms.h>
```

Classes

- struct [BoapMcPacketHead](#)
- class [BoapMcPacket](#)
- class [BoapMcClientObject](#)
- class [BoapMcSignalObject](#)
- class [BoapMcServiceObject](#)
- class [BoapMcComms](#)

Enumerations

- enum [BoapMcType](#) { [BoapMcTypeRequest](#) = 0x00 , [BoapMcTypeReply](#) = 0x80 }

Functions

- struct [BoapMcPacketHead](#) [__attribute__](#) ((aligned(8), packed))

Variables

- BUInt8 length
- BUInt8 addressTo
- BUInt8 addressFrom
- BUInt8 cmd
- BUInt16 error
- BUInt16 checksum
- class BoapMcPacket __attribute__

8.99.1 Enumeration Type Documentation

8.99.1.1 BoapMcType

enum BoapMcType

Enumerator

BoapMcTypeRequest	
BoapMcTypeReply	

8.99.2 Function Documentation

8.99.2.1 __attribute__()

```
struct BoapMcPacketHead __attribute__ (  
    (aligned(8), packed) )
```

8.99.3 Variable Documentation

8.99.3.1 length

BUInt8 length

8.99.3.2 addressTo

`BUInt8` addressTo

8.99.3.3 addressFrom

`BUInt8` addressFrom

8.99.3.4 cmd

`BUInt8` cmd

8.99.3.5 error

`BUInt16` error

8.99.3.6 checksum

`BUInt16` checksum

8.99.3.7 __attribute__

class `BoapMcPacket` __attribute__

8.100 BoapMc.h

[Go to the documentation of this file.](#)

```

1  /*****
2  * BoapMc.h      BoapMc RPC protocol
3  * T.Barnaby,   BEAM Ltd,   2012-11-14
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BoapMc_HH
9  #define BoapMc_HH
10
11 #include <BTypes.h>
12 #include <BMutex.h>
13 #include <BSemaphore.h>
14 #include <BQueue.h>
15 #include <BFifo.h>
16 #include <BComms.h>
17
18 // Main BOAP Types
19 enum BoapMcType { BoapMcTypeRequest = 0x00, BoapMcTypeReply = 0x80 };
20
21 // BoapMc packet header
22 struct BoapMcPacketHead {
23     BUInt8      length;
24     BUInt8      addressTo;
25     BUInt8      addressFrom;
26     BUInt8      cmd;
27     BUInt16     error;
28     BUInt16     checksum;
29 } __attribute__((aligned(8),packed)));
30
31 // BoapMc packet
32 class BoapMcPacket {
33 public:
34     BoapMcPacketHead    head;
35     char                 data[256 - sizeof(BoapMcPacketHead)];
36 };
37
38 /*****
39 * Base for all client interface objects
40 *****/
41 */
42 class BoapMcClientObject {
43 public:
44     BoapMcClientObject (BComms& comms);
45     virtual ~BoapMcClientObject ();
46
47     void      setAddress (BUInt8 addressTo, BUInt8 addressFrom);
48     BUInt32   getApiVersion ();
49
50 protected:
51     BError    performCall ();
52     BError    performSend ();
53     BError    performRecv ();
54
55     BUInt32   oapiVersion;
56     BComms&   ocomms;
57     BUInt8    oaddressTo;
58     BUInt8    oaddressFrom;
59     BoapMcPacket    opacket;
60 };
61
62 class BoapMcSignalObject {
63 public:
64     BoapMcSignalObject (BComms& comms);
65
66 protected:
67     BError    performSend(BoapMcPacket& tx);           // Performs a send to the named service
68     BComms&   ocomms;
69 };
70
71
72 /*****
73 * Base for server communications objects
74 *****/
75 */
76 class BoapMcServiceObject {
77 public:
78     BoapMcServiceObject ();
79     virtual ~BoapMcServiceObject ();
80
81     virtual BError    process(BoapMcPacket& rx, BoapMcPacket& tx);
82     virtual BError    processEvent(BoapMcPacket& rx);

```

```

83 protected:
84     BError      sendEvent(BoapMcPacket& tx);
85     BUInt32     oapiVersion;
86 };
87
88 /*****
89  * Base for bidirectional communications objects
90  *****/
91 */
92 class BoapMcComms {
93 public:
94     BoapMcComms(Bool threaded = 0, BUInt rxQueueSize = 4);
95     virtual      ~BoapMcComms();
96
97     void         setCommsMode(Bool slave, BUInt txQueueSize);
98     void         setComms(BComms& comms);
99     void         setComms(BComms* comms);
100    void         setAddress(BUInt8 addressTo, BUInt8 addressFrom);
101    BUInt32       getApiVersion();
102    BUInt32       setTimeout(BUInt32 timeoutUs);
103
104    virtual BError processRx(BTimeout timeoutUs = BTimeoutForever);
105    virtual BError processRequests(BTimeout timeoutUs = BTimeoutForever);
106    virtual BError processRequest(BTimeout timeoutUs = BTimeoutForever);
107    virtual BError processPacket(BoapMcPacket& rx, BoapMcPacket& tx);
108
109 protected:
110     // Communications functions
111     BError      performCall();
112     BError      performSend();
113
114     BError      packetSend(BoapMcPacket& packet);
115     BError      packetRecv(BoapMcPacket& packet);
116
117     Bool        othreaded;
118     BMutex      olockCall;
119     BMutex      olockTx;
120     BComms*     ocomms;
121     BUInt32     oapiVersion;
122     Bool        oslave;
123     BUInt32     otimeout;
124     BUInt8      oaddressTo;
125     BUInt8      oaddressFrom;
126     BoapMcPacket opacket;
127     BoapMcPacket opacketTx;
128     BoapMcPacket opacketRx;
129     BSemaphore  opacketRxSema;
130     BoapMcPacket opacketReqTx;
131     BoapMcPacket opacketReqRx;
132     BQueue<BoapMcPacket> opacketReqQueue;
133
134     BFifo<BoapMcPacket> opacketTxQueue;
135     BSemaphoreCount opacketTxQueueWriteNum;
136     BSemaphore  opacketTxSema;
137 };
138
139
140 #endif

```

8.101 BoapMc1.cpp File Reference

```

#include <BoapMc1.h>
#include <BSys.h>
#include <BCrc32.h>
#include <stdlib.h>
#include <string.h>
#include <stdio.h>
#include <BDebug.h>

```

Macros

- #define BDEBUGL1 0
- #define BDEBUGL2 0

8.101.1 Macro Definition Documentation

8.101.1.1 BDEBUGL1

```
#define BDEBUGL1 0
```

8.101.1.2 BDEBUGL2

```
#define BDEBUGL2 0
```

8.102 BoapMc1.h File Reference

```
#include <BTypes.h>
#include <BMutex.h>
#include <BSemaphore.h>
#include <BQueue.h>
#include <BFifo.h>
#include <BComms.h>
```

Classes

- struct [BoapMc1PacketHead](#)
- class [BoapMc1Packet](#)
- struct [BoapMc1Error](#)
- class [BoapMc1Comms](#)

Enumerations

- enum [BoapMc1Type](#) { [BoapMc1TypeRequest](#) = 0x0000 , [BoapMc1TypeReply](#) = 0x8000 }

Functions

- struct [BoapMc1PacketHead](#) [__attribute__](#)((aligned(8), packed))
- [BUInt32](#) [boapMc1CommsRoundupLen](#) ([BUInt32](#) len)

Variables

- const [BUInt16 BoapMc1Magic](#) = 0x5542
- [BUInt16 magic](#)
Packet magic pattern.
- [BUInt16 length](#)
Total packet length including the header.
- [BUInt16 addressTo](#)
Address to send to.
- [BUInt16 addressFrom](#)
Address packet is from.
- [BUInt16 cmd](#)
The RPC command or reply number.
- [BInt16 error](#)
Error number.
- [BUInt32 checksum](#)
Packet checksum, when used.
- [BoapMc1PacketHead head](#)
- char [data](#) [8]
- [BInt16 number](#)
The error number.
- char [string](#) [32]
The error string.
- class [BoapMc1Comms __attribute__](#)

8.102.1 Enumeration Type Documentation

8.102.1.1 BoapMc1Type

enum [BoapMc1Type](#)

Enumerator

BoapMc1TypeRequest	
BoapMc1TypeReply	

8.102.2 Function Documentation

8.102.2.1 __attribute__()

```
struct BoapMc1PacketHead __attribute__ (
    (aligned(8), packed) )
```

8.102.2.2 boapMc1CommsRoundupLen()

```
BUInt32 boapMc1CommsRoundupLen (
    BUInt32 len ) [inline]
```

8.102.3 Variable Documentation

8.102.3.1 BoapMc1Magic

```
const BUInt16 BoapMc1Magic = 0x5542
```

8.102.3.2 magic

```
BUInt16 magic
```

Packet magic pattern.

8.102.3.3 length

```
BUInt16 length
```

Total packet length including the header.

8.102.3.4 addressTo

```
BUInt16 addressTo
```

Address to send to.

8.102.3.5 addressFrom

```
BUInt16 addressFrom
```

Address packet is from.

8.102.3.6 cmd

`BUInt16 cmd`

The RPC command or reply number.

8.102.3.7 error

`BInt16 error`

Error number.

8.102.3.8 checksum

`BUInt32 checksum`

Packet checksum, when used.

8.102.3.9 head

`BoapMc1PacketHead head`

8.102.3.10 data

`char data[8]`

8.102.3.11 number

`BInt16 number`

The error number.

8.102.3.12 string

```
char string[32]
```

The error string.

8.102.3.13 __attribute__

```
class BoapMc1Comms __attribute__
```

8.103 BoapMc1.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BoapMc1.h   BoapMc1 RPC protocol
3  * T.Barnaby,  BEAM Ltd,   2018-06-21
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BoapMc1_h
9  #define BoapMc1_h
10
11  #include <BTypes.h>
12  #include <BMutex.h>
13  #include <BSemaphore.h>
14  #include <BQueue.h>
15  #include <BFifo.h>
16  #include <BComms.h>
17
18  // Main BOAP Types
19  const BUInt16   BoapMc1Magic   = 0x5542;
20  enum BoapMc1Type { BoapMc1TypeRequest = 0x0000, BoapMc1TypeReply = 0x8000 };
21
22  // BoapMc1 packet header
23  struct BoapMc1PacketHead {
24      BUInt16      magic;
25      BUInt16      length;
26      BUInt16      addressTo;
27      BUInt16      addressFrom;
28      BUInt16      cmd;
29      BInt16       error;
30      BUInt32      checksum;
31  } __attribute__((aligned(8),packed));
32
33  // BoapMc1 packet
34  class BoapMc1Packet {
35  public:
36      BoapMc1PacketHead head;
37      char               data[8];
38  } __attribute__((aligned(8),packed));
39
40  struct BoapMc1Error {
41      BInt16      number;
42      char        string[32];
43  } __attribute__((aligned(8),packed));
44
45  inline BUInt32 boapMc1CommsRoundupLen(BUInt32 len){
46      return ((len + 3) & ~3);
47  }
48
49  /*****
50  * Base for bidirectional communications objects
51  *****/
52  */
53
54  class BoapMc1Comms {
55  public:
56      BoapMc1Comms(Bool threaded = 0, BUInt reqSize = 512);
57      virtual      ~BoapMc1Comms();
58  }
```

```

59     void            setCommsMode(Bool halfDuplex);
60     void            setComms(BComms& comms);
61     void            setComms(BComms* comms);
62     void            setAddress(BUInt16 addressTo, BUInt16 addressFrom);
63     BUInt32         getApiVersion();
64     BUInt32         setTimeout(BUInt32 timeoutUs);
65
66     virtual BError   validate();
67     BoapMclPacket*  packetRx();
68
69     virtual BError   processRx();
70
71 protected:
72     // Communications functions
73     virtual BError   processRequests();
74     virtual BError   processRequest();
75
76     BError           packetTx(BDataChunk* chunks, BUInt nChunks, BUInt16 waitCmdReply);
77
78 #ifdef ZAP_IDEAS
79     BError           packetRxWait(BUInt num, char** data);
80     BError           packetRxWait(BUInt16 cmd);
81 #endif
82
83     BError           packetRxData(void* data, BUInt nBytes);
84     BError           packetRxEnd();
85
86     Bool             othreaded;
87     BUInt32          oreqSize;
88     BMutex           olockCall;
89     BMutex           olockTx;
90     BComms*          ocomms;
91     BUInt32          oapiVersion;
92     Bool             ohalfDuplex;
93     BUInt32          otimeout;
94     BUInt16          oaddressTo;
95     BUInt16          oaddressFrom;
96
97     BoapMclPacket    opacketRxBase;
98     BoapMclPacket*   opacketRx;
99     BoapMclPacket    opacketTxBase;
100    BoapMclPacket*   opacketTx;
101    BUInt            opacketRpcCmd;
102    BSemaphore        opacketRpcSema;
103    BSemaphore        opacketRpcDoneSema;
104    BoapMclError      oerror;
105 };
106
107
108 #endif

```

8.104 BoapnsC.cpp File Reference

```
#include <BoapnsC.h>
```

Namespaces

- namespace [Boapns](#)

8.105 BoapnsC.h File Reference

```

#include <stdlib.h>
#include <stdint.h>
#include <Boap.h>
#include <BString.h>
#include <BList.h>
#include <BArray.h>
#include <BoapnsD.h>

```

Classes

- class [Boapns::Boapns](#)

Namespaces

- namespace [Boapns](#)

Variables

- const [BUInt32 Boapns::apiVersion](#) = 0

8.106 BoapnsC.h

[Go to the documentation of this file.](#)

```

1 /*****
2  *   BoapnsC.h   Produced by Bidl
3  *****/
4  */
5
6 #ifndef BOAPNSC_H
7 #define BOAPNSC_H 1
8
9 #include <stdlib.h>
10 #include <stdint.h>
11 #include <Boap.h>
12 #include <BString.h>
13 #include <BList.h>
14 #include <BArray.h>
15 #include <BoapnsD.h>
16
17
18 namespace Boapns {
19     const BUInt32 apiVersion = 0;
20
21     class Boapns : public BoapClientObject {
22     public:
23         Boapns(BString name = "");
24         BError getVersion(BString& version);
25         BError getEntryList(BList<BoapEntry> &entryList);
26         BError getEntry(BString name, BoapEntry& entry);
27         BError addEntry(BoapEntry entry);
28         BError delEntry(BString name);
29         BError getNewName(BString& name);
30     private:
31     };
32 }
33 #endif

```

8.107 BoapnsD.cpp File Reference

```
#include <BoapnsD.h>
```

Namespaces

- namespace [Boapns](#)

8.108 BoapnsD.h File Reference

BOAP data class definitions for: [Boapns](#).

```
#include <Boap.h>
#include <BObj.h>
#include <BDate.h>
#include <BTimeStamp.h>
#include <BComplex.h>
#include <BList.h>
#include <BArray.h>
```

Classes

- class [Boapns::BoapEntry](#)

Namespaces

- namespace [Boapns](#)

8.108.1 Detailed Description

BOAP data class definitions for: [Boapns](#).

Date

2022-11-30T14:15:59

The classes in here have been defined by a BOAP *.bidl file and define classes able to be communicated across a BOAP link

8.109 BoapnsD.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BoapnsD.h   Produced by Bidl
3  *****/
4 */
10
11 #ifndef BOAPNSD_H
12 #define BOAPNSD_H 1
13
14 #include <Boap.h>
15 #include <BObj.h>
16 #include <BDate.h>
17 #include <BTimeStamp.h>
18 #include <BComplex.h>
19 #include <BList.h>
20 #include <BArray.h>
21
22 namespace Boapns {
23     class BoapEntry {
24     public:
25         BoapEntry(BString name = BString(), BString hostName = BString(), BList<BString > addressList =
BList<BString >(), BUInt32 port = 0, BUInt32 service = 0);
26     public:
27         BString name;
28         BString hostName;
29         BList<BString > addressList;
30         BUInt32 port;
31         BUInt32 service;
32     };
33
34 }
35
36 #endif
```

8.110 BoapSimple.cc File Reference

```
#include <stdlib.h>
#include <stdio.h>
#include <errno.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <Boap.h>
#include <BoapnsD.h>
#include <BoapnsC.h>
```

Macros

- #define `DEBUG` 0
- #define `dprintf`(fmt, a...)

Variables

- const int `roundSize` = 256

8.110.1 Macro Definition Documentation

8.110.1.1 `DEBUG`

```
#define DEBUG 0
```

8.110.1.2 `dprintf`

```
#define dprintf(  
    fmt,  
    a... )
```

8.110.2 Variable Documentation

8.110.2.1 `roundSize`

```
const int roundSize = 256
```

8.111 BoapSimple.h File Reference

```
#include <stdint.h>
#include <BPoll.h>
#include <BSocket.h>
#include <BError.h>
```

Classes

- struct [BoapPacketHead](#)
Boap packet header.
- class [BoapPacket](#)
Boap packet.
- class [BoapClientObject](#)
Base for all Boap client objects.
- class [BoapSignalObject](#)
A Boap object to send signals using an RPC mechanism.
- class [BoapServiceEntry](#)
Boap server single service entry.
- class [BoapServer](#)
Boap server.
- class [BoapFuncEntry](#)
Boap service function.
- class [BoapServiceObject](#)
Boap service object.

Typedefs

- typedef int8_t [Int8](#)
- typedef uint8_t [UInt8](#)
- typedef int16_t [Int16](#)
- typedef uint16_t [UInt16](#)
- typedef int32_t [Int32](#)
- typedef uint32_t [UInt32](#)
- typedef double [Double](#)
- typedef uint32_t [BoapService](#)
- typedef [BError](#)(BoapServiceObject::* [BoapFunc](#)) ([BoapPacket](#) &rx, [BoapPacket](#) &tx)

Enumerations

- enum [BoapType](#) {
 [BoapTypeRpc](#) , [BoapTypeRpcReply](#) , [BoapTypeSignal](#) , [BoapTypeRpcError](#) ,
 [BoapTypeRpc](#) , [BoapTypeSignal](#) }

8.111.1 Typedef Documentation

8.111.1.1 Int8

```
typedef int8_t Int8
```

8.111.1.2 UInt8

```
typedef uint8_t UInt8
```

8.111.1.3 Int16

```
typedef int16_t Int16
```

8.111.1.4 UInt16

```
typedef uint16_t UInt16
```

8.111.1.5 Int32

```
typedef int32_t Int32
```

8.111.1.6 UInt32

```
typedef uint32_t UInt32
```

8.111.1.7 Double

```
typedef double Double
```

8.111.1.8 BoapService

```
typedef uint32_t BoapService
```


8.111.1.9 BoapFunc

```
typedef BError (BoapServiceObject::* BoapFunc) (BoapPacket &rx, BoapPacket &tx)
```

8.111.2 Enumeration Type Documentation

8.111.2.1 BoapType

```
enum BoapType
```

Enumerator

BoapTypeRpc	
BoapTypeRpcReply	
BoapTypeSignal	
BoapTypeRpcError	
BoapTypeRpc	
BoapTypeSignal	

8.112 BoapSimple.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * Boap.h Boap RPC protocol
3  * T.Barnaby, BEAM Ltd, 8/5/03
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 /*
8 #ifndef Boap_HH
9 #define Boap_HH
10
11 #include <stdint.h>
12 #include <BPoll.h>
13 #include <BSocket.h>
14 #include <BError.h>
15
16 // Main BOAP Types
17 typedef int8_t      Int8;
18 typedef uint8_t     UInt8;
19 typedef int16_t     Int16;
20 typedef uint16_t    UInt16;
21 typedef int32_t     Int32;
22 typedef uint32_t    UInt32;
23 typedef double      Double;
24 typedef uint32_t    BoapService;
25 enum BoapType { BoapTypeRpc, BoapTypeSignal };
26
27 // Boap packet header
28 struct BoapPacketHead {
29     UInt32    length;
30     BoapType  type;
31     BoapService service;
32     UInt32    cmd;
33     UInt32    reserved[12];
34 };
35
36 // Boap packet
37 class BoapPacket {
```

```

38 public:
39     BoapPacket();
40     ~BoapPacket();
41
42     int     resize(int size);
43     BError  setData(void* data, int nbytes);
44     int     nbytes();
45     char*   data();
46
47     int     pushHead(BoapPacketHead& head);
48     int     push(Int8 v);
49     int     push(UInt8 v);
50     int     push(Int16 v);
51     int     push(UInt16 v);
52     int     push(Int32 v);
53     int     push(UInt32 v);
54     int     push(BString& v);
55     int     push(Double v);
56     int     push(BError& v);
57     int     push(UInt32 nBytes, const void* data);
58
59     int     popHead(BoapPacketHead& head);
60     int     pop(Int8& v);
61     int     pop(UInt8& v);
62     int     pop(Int16& v);
63     int     pop(UInt16& v);
64     int     pop(Int32& v);
65     int     pop(UInt32& v);
66     int     pop(BString& v);
67     int     pop(Double& v);
68     int     pop(BError& v);
69     int     pop(UInt32 nBytes, void* data);
70 private:
71     void     updateLen();
72     int     osize;
73     int     onbytes;
74     char*   odata;
75     int     opos;
76
77 };
78
79 /*****
80  * Main Client communications classes
81  *****/
82
83 /*****
84  * Base for all Client Objects
85  *****/
86
87 */
88 class BoapClientObject : public BSocket {
89 public:
90     BoapClientObject(BString name);
91
92     BError    connectService(BString name);
93 protected:
94     BError    performSend(BoapPacket& tx);           // Performs a send to the named service
95     BError    performRecv(BoapPacket& rx);           // Performs a receive
96     BError    performCall(BoapPacket& tx, BoapPacket& rx); // Performs a RPC call to the named
97     service
98     BString    oname;
99     BoapService oservice;
100     int        oconnected;
101     BoapPacket otx;
102     BoapPacket orx;
103 };
104
105 class BoapSignalObject : public BSocket {
106 public:
107     BoapSignalObject();
108
109 protected:
110     BError    performSend(BoapPacket& tx);           // Performs a send to the named service
111     BoapPacket otx;
112     BoapPacket orx;
113 };
114
115
116 /*****
117  * Main Server communications class
118  *****/
119 */
120 class BoapServiceObject;
121
122 class BoapServiceEntry {
123 public:

```

```

124         BoapServiceEntry(BoapService service = 0, BoapServiceObject* object = 0){
125             oservice = service;
126             oobject = object;
127         }
128         BoapService oservice;
129         BoapServiceObject* oobject;
130     };
131
132     class BoapServer {
133     public:
134         BoapServer();
135         BError init(int boapNs = 0);
136         BError run();
137
138         BError processEvent(BoapPacket& rx);
139
140         // Support routines
141         BError addObject(BoapServiceObject* object);
142         BError process(int fd);
143         BError sendEvent(BoapPacket& tx);
144         BSocket& getSocket();
145         BSocket& getEventSocket();
146         BError processEvent(int fd);
147         BString getHostName();
148     private:
149         int oboapNs;
150         BoapPacket orx;
151         BoapPacket otx;
152         BList<BoapServiceEntry> oservices;
153         BPoll opoll;
154         BSocket onet;
155         BSocket onetEvent;
156         BSocketAddress_INET onetEventAddress;
157         BString ohostName;
158     };
159
160     /*****
161     * Base for all Server Objects
162     *****/
163     */
164     class BoapServiceObject;
165
166     typedef BError (BoapServiceObject::*BoapFunc)(BoapPacket& rx, BoapPacket& tx);
167
168     class BoapFuncEntry {
169     public:
170         BoapFuncEntry(int cmd, BoapFunc func);
171         UInt32 ocmd;
172         BoapFunc ofunc;
173     };
174
175     class BoapServiceObject {
176     public:
177         BoapServiceObject(BoapServer& server, BString name);
178         virtual ~BoapServiceObject();
179
180         BError sendEvent(BString signalName, Int32 arg);
181         virtual BError processEvent(BString objectName, BString name, Int32 arg);
182
183         BString name();
184         BError process(BoapPacket& rx, BoapPacket& tx);
185         virtual BError processEvent(BoapPacket& rx);
186     protected:
187         BError sendEvent(BoapPacket& tx);
188
189         BoapServer& oserver;
190         BString oname;
191         BList<BoapFuncEntry> ofuncList;
192     };
193 #endif

```

8.113 BObj.cpp File Reference

```
#include <BObj.h>
```

8.114 BObj.h File Reference

```
#include <BTypes.h>
#include <BDict.h>
#include <BString.h>
#include <BError.h>
```

Classes

- class [BObj](#)

A generic object base class that has runtime definable data feilds.

8.115 BObj.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BObj.h      Beam Object
3  * T.Barnaby,  BEAM Ltd,   2008-06-04
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BObj_H
9 #define BObj_H 1
10
11 #include <BTypes.h>
12 #include <BDict.h>
13 #include <BString.h>
14 #include <BError.h>
15
16 class BObj {
17 public:
18     BObj();
19     virtual ~BObj();
20
21     // member interface
22     virtual const char* getType() const;
23     virtual const BObjMember* getMembers() const;
24
25     // Old member interface
26     virtual BError getMembers(BDictString& members);
27     virtual BError getMember(BString name, BString& value);
28     virtual BError setMembers(BDictString& members);
29     virtual BError setMember(BString name, BString value);
30
31     // Debug functions
32     virtual void membersPrint() const;
33     virtual BString getDebugString();
34 };
35
36 #endif
```

8.116 BObjStringFormat.cpp File Reference

```
#include <BObjStringFormat.h>
#include <BTime.h>
#include <math.h>
```

Functions

- [BString toBString](#) ([BString](#) n, [Bool](#) v)
A set of functions to perform object to string and string to object for standard types and generic [BObj](#) classes.
- [BString toBString](#) ([BString](#) n, [BInt8](#) v)
- [BString toBString](#) ([BString](#) n, [BUInt8](#) v)
- [BString toBString](#) ([BString](#) n, [BInt16](#) v)
- [BString toBString](#) ([BString](#) n, [BUInt16](#) v)
- [BString toBString](#) ([BString](#) n, [BInt32](#) v)
- [BString toBString](#) ([BString](#) n, [BUInt32](#) v)
- [BString toBString](#) ([BString](#) n, [BInt64](#) v)
- [BString toBString](#) ([BString](#) n, [BUInt64](#) v)
- [BString toBString](#) ([BString](#) n, [BFloat32](#) v)
- [BString toBString](#) ([BString](#) n, [BFloat64](#) v)
- [BString toBString](#) ([BString](#) n, [BChar](#) v)
- [BString toBString](#) ([BString](#) n, const [BChar](#) *v)
- [BString toBString](#) ([BString](#) n, [BString](#) v)
- [BString toBString](#) ([BString](#) n, [BError](#) v)
- [BString toBString](#) ([BString](#) n, [BTime](#) v)
- [BString toBString](#) ([BString](#) name, const [BObjMember](#) *m, const void *obj, [BStringList](#) ignoreFields)
- [BString toBString](#) ([BString](#) n, [BObj](#) &obj)
- [BString toBStringJson](#) ([BString](#) n, [Bool](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BInt8](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BUInt8](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BInt16](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BUInt16](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BInt32](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BUInt32](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BInt64](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BUInt64](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BFloat32](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BFloat64](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BChar](#) v)
- [BString toBStringJson](#) ([BString](#) n, const [BChar](#) *v)
- [BString toBStringJson](#) ([BString](#) n, [BString](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BError](#) v)
- [BString toBStringJson](#) ([BString](#) n, [BTime](#) v)
- [BString toBStringJson](#) ([BString](#) n, const [BObjMember](#) *m, const void *obj, [BStringList](#) ignoreFields)
- [BString toBStringJson](#) ([BString](#) n, [BObj](#) &obj)
- [BError toBDictStringFromJson](#) ([BString](#) json, [BDictString](#) &ds)

8.116.1 Function Documentation

8.116.1.1 toBString() [1/18]

```
BString toBString (
    BString n,
    Bool v )
```

A set of functions to perform object to string and string to object for standard types and generic [BObj](#) classes.

8.116.1.2 toBString() [2/18]

```
BString toBString (  
    BString n,  
    BInt8 v )
```

8.116.1.3 toBString() [3/18]

```
BString toBString (  
    BString n,  
    BUInt8 v )
```

8.116.1.4 toBString() [4/18]

```
BString toBString (  
    BString n,  
    BInt16 v )
```

8.116.1.5 toBString() [5/18]

```
BString toBString (  
    BString n,  
    BUInt16 v )
```

8.116.1.6 toBString() [6/18]

```
BString toBString (  
    BString n,  
    BInt32 v )
```

8.116.1.7 toBString() [7/18]

```
BString toBString (  
    BString n,  
    BUInt32 v )
```

8.116.1.8 toBString() [8/18]

```
BString toBString (  
    BString n,  
    BInt64 v )
```

8.116.1.9 toBString() [9/18]

```
BString toBString (  
    BString n,  
    BUInt64 v )
```

8.116.1.10 toBString() [10/18]

```
BString toBString (  
    BString n,  
    BFloat32 v )
```

8.116.1.11 toBString() [11/18]

```
BString toBString (  
    BString n,  
    BFloat64 v )
```

8.116.1.12 toBString() [12/18]

```
BString toBString (  
    BString n,  
    BChar v )
```

8.116.1.13 toBString() [13/18]

```
BString toBString (  
    BString n,  
    const BChar * v )
```

8.116.1.14 toBString() [14/18]

```
BString toBString (
    BString n,
    BString v )
```

8.116.1.15 toBString() [15/18]

```
BString toBString (
    BString n,
    BError v )
```

8.116.1.16 toBString() [16/18]

```
BString toBString (
    BString n,
    BTime v )
```

8.116.1.17 toBString() [17/18]

```
BString toBString (
    BString name,
    const BObjMember * m,
    const void * obj,
    BStringList ignoreFields )
```

8.116.1.18 toBString() [18/18]

```
BString toBString (
    BString n,
    BObj & obj )
```

8.116.1.19 toBStringJson() [1/18]

```
BString toBStringJson (
    BString n,
    Bool v )
```


8.116.1.20 toBStringJson() [2/18]

```
BString toBStringJson (
    BString n,
    BInt8 v )
```

8.116.1.21 toBStringJson() [3/18]

```
BString toBStringJson (
    BString n,
    BUInt8 v )
```

8.116.1.22 toBStringJson() [4/18]

```
BString toBStringJson (
    BString n,
    BInt16 v )
```

8.116.1.23 toBStringJson() [5/18]

```
BString toBStringJson (
    BString n,
    BUInt16 v )
```

8.116.1.24 toBStringJson() [6/18]

```
BString toBStringJson (
    BString n,
    BInt32 v )
```

8.116.1.25 toBStringJson() [7/18]

```
BString toBStringJson (
    BString n,
    BUInt32 v )
```

8.116.1.26 toBStringJson() [8/18]

```
BString toBStringJson (
    BString n,
    BInt64 v )
```

8.116.1.27 toBStringJson() [9/18]

```
BString toBStringJson (
    BString n,
    BUInt64 v )
```

8.116.1.28 toBStringJson() [10/18]

```
BString toBStringJson (
    BString n,
    BFloat32 v )
```

8.116.1.29 toBStringJson() [11/18]

```
BString toBStringJson (
    BString n,
    BFloat64 v )
```

8.116.1.30 toBStringJson() [12/18]

```
BString toBStringJson (
    BString n,
    BChar v )
```

8.116.1.31 toBStringJson() [13/18]

```
BString toBStringJson (
    BString n,
    const BChar * v )
```

8.116.1.32 toBStringJson() [14/18]

```
BString toBStringJson (
    BString n,
    BString v )
```

8.116.1.33 toBStringJson() [15/18]

```
BString toBStringJson (
    BString n,
    BError v )
```

8.116.1.34 toBStringJson() [16/18]

```
BString toBStringJson (
    BString n,
    BTime v )
```

8.116.1.35 toBStringJson() [17/18]

```
BString toBStringJson (
    BString n,
    const BObjMember * m,
    const void * obj,
    BStringList ignoreFields )
```

8.116.1.36 toBStringJson() [18/18]

```
BString toBStringJson (
    BString n,
    BObj & obj )
```

8.116.1.37 toBDictStringFromJson()

```
BError toBDictStringFromJson (
    BString json,
    BDictString & ds )
```

8.117 BObjStringFormat.h File Reference

```
#include <BObj.h>
#include <BString.h>
#include <BTime.h>
```

Functions

- [BString toBString](#) ([BString](#) name, [Bool](#) value)

A set of functions to perform object to string and string to object for standard types and generic [BObj](#) classes.
- [BString toBString](#) ([BString](#) name, [BInt8](#) value)
- [BString toBString](#) ([BString](#) name, [BUInt8](#) value)
- [BString toBString](#) ([BString](#) name, [BInt16](#) value)
- [BString toBString](#) ([BString](#) name, [BUInt16](#) value)
- [BString toBString](#) ([BString](#) name, [BInt32](#) value)
- [BString toBString](#) ([BString](#) name, [BUInt32](#) value)
- [BString toBString](#) ([BString](#) name, [BInt64](#) value)
- [BString toBString](#) ([BString](#) name, [BUInt64](#) value)
- [BString toBString](#) ([BString](#) name, [BFloat32](#) value)
- [BString toBString](#) ([BString](#) name, [BFloat64](#) value)
- [BString toBString](#) ([BString](#) name, [BChar](#) value)
- [BString toBString](#) ([BString](#) name, const [BChar](#) *value)
- [BString toBString](#) ([BString](#) name, [BString](#) value)
- [BString toBString](#) ([BString](#) name, [BError](#) value)
- [BString toBString](#) ([BString](#) name, [BTime](#) time)
- [BString toBString](#) ([BString](#) name, const [BObjMember](#) *members, const void *obj, [BStringList](#) ignore↵
Fields=[BStringList](#)())
- [BString toBString](#) ([BString](#) name, [BObj](#) &obj)
- [BString toBStringJson](#) ([BString](#) name, [Bool](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BInt8](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BUInt8](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BInt16](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BUInt16](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BInt32](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BUInt32](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BInt64](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BUInt64](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BFloat32](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BFloat64](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BChar](#) value)
- [BString toBStringJson](#) ([BString](#) name, const [BChar](#) *value)
- [BString toBStringJson](#) ([BString](#) name, [BString](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BError](#) value)
- [BString toBStringJson](#) ([BString](#) name, [BTime](#) time)
- [BString toBStringJson](#) ([BString](#) name, const [BObjMember](#) *members, const void *obj, [BStringList](#) ignore↵
Fields=[BStringList](#)())
- [BString toBStringJson](#) ([BString](#) name, [BObj](#) &obj)
- [BError toBDictStringFromJson](#) ([BString](#) json, [BDictString](#) &ds)
- [BString base64_encode](#) (void *data, [BUInt](#) len)
- [BError base64_decode](#) ([BString](#) strIn, [BString](#) &strOut)

8.117.1 Function Documentation

8.117.1.1 toBString() [1/18]

```
BString toBString (
    BString name,
    Bool value )
```

A set of functions to perform object to string and string to object for standard types and generic [BObj](#) classes.

8.117.1.2 toBString() [2/18]

```
BString toBString (
    BString name,
    BInt8 value )
```

8.117.1.3 toBString() [3/18]

```
BString toBString (
    BString name,
    BUInt8 value )
```

8.117.1.4 toBString() [4/18]

```
BString toBString (
    BString name,
    BInt16 value )
```

8.117.1.5 toBString() [5/18]

```
BString toBString (
    BString name,
    BUInt16 value )
```

8.117.1.6 toBString() [6/18]

```
BString toBString (
    BString name,
    BInt32 value )
```

8.117.1.7 toBString() [7/18]

```
BString toBString (
    BString name,
    BUInt32 value )
```

8.117.1.8 toBString() [8/18]

```
BString toBString (
    BString name,
    BInt64 value )
```

8.117.1.9 toBString() [9/18]

```
BString toBString (
    BString name,
    BUInt64 value )
```

8.117.1.10 toBString() [10/18]

```
BString toBString (
    BString name,
    BFloat32 value )
```

8.117.1.11 toBString() [11/18]

```
BString toBString (
    BString name,
    BFloat64 value )
```

8.117.1.12 toBString() [12/18]

```
BString toBString (
    BString name,
    BChar value )
```

8.117.1.13 toBString() [13/18]

```
BString toBString (
    BString name,
    const BChar * value )
```

8.117.1.14 toBString() [14/18]

```
BString toBString (
    BString name,
    BString value )
```

8.117.1.15 toBString() [15/18]

```
BString toBString (
    BString name,
    BError value )
```

8.117.1.16 toBString() [16/18]

```
BString toBString (
    BString name,
    BTime time )
```

8.117.1.17 toBString() [17/18]

```
BString toBString (
    BString name,
    const BObjMember * members,
    const void * obj,
    BStringList ignoreFields = BStringList() )
```

8.117.1.18 toBString() [18/18]

```
BString toBString (
    BString name,
    BObj & obj )
```

8.117.1.19 toBStringJson() [1/18]

```
BString toBStringJson (
    BString name,
    Bool value )
```

8.117.1.20 toBStringJson() [2/18]

```
BString toBStringJson (
    BString name,
    BInt8 value )
```

8.117.1.21 toBStringJson() [3/18]

```
BString toBStringJson (
    BString name,
    BUInt8 value )
```

8.117.1.22 toBStringJson() [4/18]

```
BString toBStringJson (
    BString name,
    BInt16 value )
```

8.117.1.23 toBStringJson() [5/18]

```
BString toBStringJson (
    BString name,
    BUInt16 value )
```


8.117.1.24 toBStringJson() [6/18]

```
BString toBStringJson (
    BString name,
    BInt32 value )
```

8.117.1.25 toBStringJson() [7/18]

```
BString toBStringJson (
    BString name,
    BUInt32 value )
```

8.117.1.26 toBStringJson() [8/18]

```
BString toBStringJson (
    BString name,
    BInt64 value )
```

8.117.1.27 toBStringJson() [9/18]

```
BString toBStringJson (
    BString name,
    BUInt64 value )
```

8.117.1.28 toBStringJson() [10/18]

```
BString toBStringJson (
    BString name,
    BFloat32 value )
```

8.117.1.29 toBStringJson() [11/18]

```
BString toBStringJson (
    BString name,
    BFloat64 value )
```

8.117.1.30 toBStringJson() [12/18]

```
BString toBStringJson (
    BString name,
    BChar value )
```

8.117.1.31 toBStringJson() [13/18]

```
BString toBStringJson (
    BString name,
    const BChar * value )
```

8.117.1.32 toBStringJson() [14/18]

```
BString toBStringJson (
    BString name,
    BString value )
```

8.117.1.33 toBStringJson() [15/18]

```
BString toBStringJson (
    BString name,
    BError value )
```

8.117.1.34 toBStringJson() [16/18]

```
BString toBStringJson (
    BString name,
    BTime time )
```

8.117.1.35 toBStringJson() [17/18]

```
BString toBStringJson (
    BString name,
    const BObjMember * members,
    const void * obj,
    BStringList ignoreFields = BStringList() )
```

8.117.1.36 toBStringJson() [18/18]

```
BString toBStringJson (
    BString name,
    BObj & obj )
```

8.117.1.37 toBDictStringFromJson()

```
BError toBDictStringFromJson (
    BString json,
    BDictString & ds )
```

8.117.1.38 base64_encode()

```
BString base64_encode (
    void * data,
    BUInt len )
```

8.117.1.39 base64_decode()

```
BError base64_decode (
    BString strIn,
    BString & strOut )
```

8.118 BObjStringFormat.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BObjStringFormat.h Beam Object to/from strings
3  * T.Barnaby, BEAM Ltd, 2016-09-27
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7
8  * Convert data objects to and from various string formats.
9  */
10 #ifndef BObjStringFormat_H
11 #define BObjStringFormat_H 1
12
13 #include <BObj.h>
14 #include <BString.h>
15 #include <BTime.h>
16
17 BString toBString(BString name, Bool value);
18 BString toBString(BString name, BInt8 value);
19 BString toBString(BString name, BInt16 value);
20 BString toBString(BString name, BInt32 value);
21 BString toBString(BString name, BInt64 value);
22 BString toBString(BString name, BUInt8 value);
23 BString toBString(BString name, BUInt16 value);
24 BString toBString(BString name, BUInt32 value);
25 BString toBString(BString name, BUInt64 value);
26 BString toBString(BString name, BFloat32 value);
27 BString toBString(BString name, BFloat64 value);
```

```

28 BString toBString(BString name, BFloat64 value);
29 BString toBString(BString name, BChar value);
30 BString toBString(BString name, const BChar* value);
31 BString toBString(BString name, BString value);
32 BString toBString(BString name, BError value);
33 BString toBString(BString name, BTime time);
34
35 BString toBString(BString name, const BObjMember* members, const void* obj, BStringList ignoreFields =
    BStringList());
36 BString toBString(BString name, BObj& obj);
37
38 BString toBStringJson(BString name, Bool value);
39 BString toBStringJson(BString name, BInt8 value);
40 BString toBStringJson(BString name, BUInt8 value);
41 BString toBStringJson(BString name, BInt16 value);
42 BString toBStringJson(BString name, BUInt16 value);
43 BString toBStringJson(BString name, BInt32 value);
44 BString toBStringJson(BString name, BUInt32 value);
45 BString toBStringJson(BString name, BInt64 value);
46 BString toBStringJson(BString name, BUInt64 value);
47 BString toBStringJson(BString name, BFloat32 value);
48 BString toBStringJson(BString name, BFloat64 value);
49 BString toBStringJson(BString name, BChar value);
50 BString toBStringJson(BString name, const BChar* value);
51 BString toBStringJson(BString name, BString value);
52 BString toBStringJson(BString name, BError value);
53 BString toBStringJson(BString name, BTime time);
54
55 BString toBStringJson(BString name, const BObjMember* members, const void* obj, BStringList ignoreFields
    = BStringList());
56 BString toBStringJson(BString name, BObj& obj);
57
58 BError toBDictStringFromJson(BString json, BDictString& ds);
59
60 BString base64_encode(void* data, BUInt len);
61 BError base64_decode(BString strIn, BString& strOut);
62
63 #endif

```

8.119 BPoll.cpp File Reference

```

#include <stdlib.h>
#include <unistd.h>
#include <errno.h>
#include <BPoll.h>

```

8.120 BPoll.h File Reference

```

#include <BList.h>
#include <BError.h>
#include <sys/poll.h>

```

Classes

- class [BPoll](#)

This class provides an interface for polling a number of file descriptors. It uses round robin polling.

8.121 BPoll.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BPoll.h      File poll class
3  *  T.Barnaby,  BEAM Ltd,  01/4/05
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BPOLL_H
9  #define BPOLL_H 1
10
11 #include <BList.h>
12 #include <BError.h>
13
14 #if TARGET_win32 || TARGET_win64
15 // #undef _WIN32_WINNT
16 // #define _WIN32_WINNT  WindowsVista
17 #include <winsock2.h>
18
19 #ifdef ZAP
20 #define POLLRDNORM 0x0100
21 #define POLLRDBAND 0x0200
22 #define POLLIN    (POLLRDNORM | POLLRDBAND)
23 #define POLLPRI   0x0400
24
25 #define POLLWRNORM 0x0010
26 #define POLLOUT    (POLLWRNORM)
27 #define POLLWRBAND 0x0020
28
29 #define POLLERR    0x0001
30 #define POLLHUP    0x0002
31 #define POLLNVAL   0x0004
32
33 struct pollfd {
34     int    fd; /* File descriptor to poll. */
35     short int  events; /* Types of events poller cares about. */
36     short int  revents; /* Types of events that actually occurred. */
37 };
38 #endif
39
40 #define NFDBITS    (8 * sizeof(int))
41
42 #else
43 #include <sys/poll.h>
44 #endif
45
46 class BPoll {
47 public:
48     typedef struct pollfd PollFd;
49
50     BPoll();
51     ~BPoll();
52
53     void    append(int fd, int events = POLLIN|POLLERR|POLLHUP|POLLNVAL);
54     void    delFd(int fd);
55
56     BError  doPoll(int& fd, int timeoutUs = -1);
57     BError  doPollEvents(int& fd, int& events, int timeoutUs = -1);
58
59     int     getPollFdsNum();
60     PollFd* getPollFds();
61     void    clear();
62 private:
63     int     nextFd(int i);
64
65     int     ofdsNum;
66     PollFd* ofds;
67     int     ofdsNext;
68 };
69
70 #endif

```

8.122 BProc.cpp File Reference

```

#include <BProc.h>
#include <unistd.h>

```

```
#include <errno.h>
#include <sys/wait.h>
#include <BDebug.h>
```

Macros

- `#define BDEBUGL1 0`

8.122.1 Macro Definition Documentation

8.122.1.1 BDEBUGL1

```
#define BDEBUGL1 0
```

8.123 BProc.h File Reference

```
#include <BError.h>
#include <signal.h>
```

Classes

- class `BProc`
Implements system process manager.

8.124 BProc.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BProc.h BProc class
3  * T.Barnaby, Beam Ltd, 2015-01-01
4  * Copyright (c) 2015 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 *
8 */
32 #ifndef BProc_h
33 #define BProc_h
34
35 #include <BError.h>
36 #include <signal.h>
37
38 class BProc {
39 public:
40     BProc();
41     ~BProc();
42
43     BError usePipes(Bool fileIn, Bool fileOut, Bool fileErr);
44     BError runForeground(BString cmd, BStringList argList = BStringList(), int* status = 0, int
        timeoutMs = -1);
45     BError runBackground(BString cmd, BStringList argList = BStringList());
```

```

47
48     int         getPid();
49     int         getFd(int cmdFd);
50     BError      wait(int& status, int timeoutMs = -1);
51     BError      kill(int sig = SIGTERM);
52     void        finish();
53
54 private:
55     BError      run(BString cmd, BStringList argList, Bool background, int* status, int timeoutMs);
56     BError      pipesOpen();
57     void        pipesCleanup();
58
59     int         opid;
60     Bool        oioFiles[3];
61     int         opipeIn[2];
62     int         opipeOut[2];
63     int         opipeErr[2];
64     int         ochildErrno;
65 };
66 #endif

```

8.125 BQueue.h File Reference

```

#include <BTypes.h>
#include <BError.h>
#include <BList.h>
#include <BMutex.h>
#include <BCondInt.h>

```

Classes

- class [BQueue< T >](#)

Provides a thread save queue of objects that can be used to communicate between threads.

Typedefs

- typedef [BQueue< BInt32 >](#) [BQueueInt](#)

8.125.1 Typedef Documentation

8.125.1.1 BQueueInt

```
typedef BQueue<BInt32> BQueueInt
```

8.126 BQueue.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BQueue.h      Queue Classes
3  * T.Barnaby, BEAM Ltd, 2014-07-23
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  *
8  * Simple thread safe queue.
9  */
10 #ifndef BQueue_h
11 #define BQueue_h 1
12
13 #include <BTypes.h>
14 #include <BError.h>
15 #include <BList.h>
16 #include <BMutex.h>
17 #include <BCondInt.h>
18
19 template <class T> class BQueue : private BList<T>{
20 public:
21     BQueue(BUInt size);
22     ~BQueue();
23
24     void clear();
25
26     BUInt writeAvailable() const;
27     BError write(const T& v, BTimeout timeout = BTimeoutForever);
28
29     BUInt readAvailable() const;
30     BError read(T& v, BTimeout timeout = BTimeoutForever);
31 private:
32     BMutex olock;
33     BUInt osize;
34     BCondInt onumber;
35 };
36
37 // BQueueInt class
38 typedef BQueue<BInt32> BQueueInt;
39
40 // BQueue class implementation
41 template <class T> BQueue<T>::BQueue(BUInt size){
42     osize = size;
43 }
44
45 template <class T> BQueue<T>::~BQueue(){
46 }
47
48 template <class T> void BQueue<T>::clear(){
49     olock.lock();
50     BList<T>::clear();
51     olock.unlock();
52 }
53
54 template <class T> BUInt BQueue<T>::writeAvailable() const{
55     return osize - onumber.value();
56 }
57
58 template <class T> BUInt BQueue<T>::readAvailable() const{
59     return onumber.value();
60 }
61
62 template <class T> BError BQueue<T>::write(const T& v, BTimeout timeout){
63     BError err;
64
65     if(!onumber.waitLessThanOrEqual(osize - 1, 0, timeout))
66         return err.set(ErrorTimeout, "Timeout");
67
68     olock.lock();
69     BList<T>::queueAdd(v);
70     olock.unlock();
71     onumber.increment();
72
73     return err;
74 }
75
76 template <class T> BError BQueue<T>::read(T& v, BTimeout timeout){
77     BError err;
78
79     if(!onumber.waitMoreThanOrEqual(1, 1, timeout))
80         return err.set(ErrorTimeout, "Timeout");
81
82     return err;
83 }

```



```
84     olock.lock();
85     v = BList<T>::queueGet();
86     olock.unlock();
87
88     return err;
89 }
90
91 #endif
```

8.127 BRefData.cpp File Reference

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <BRefData.h>
```

Macros

- #define [CHUNK](#) 16

8.127.1 Macro Definition Documentation

8.127.1.1 [CHUNK](#)

```
#define CHUNK 16
```

8.128 BRefData.h File Reference

```
#include <BAAtomicCount.h>
```

Classes

- class [BRefData](#)

A pointer to a variable sized data area with reference counting so the data areas can be shared.

8.129 BRefData.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BRefData.h  Referenced data storage
3  *  T.Barnaby,  Beam Ltd,   6/10/94
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
14 #ifndef BREFDATA_H
15 #define BREFDATA_H 1
16
17 #include <BAAtomicCount.h>
18
19 class BRefData {
20 public:
21     BRefData();
22     BRefData(int len);
23     BRefData(const BRefData& refData);
24     ~BRefData();
25
26     BRefData* copy();
27     BRefData* addRef();
28     int deleteRef();
29
30     char* data(){ return (char*)odata; }
31     int len(){ return olen; }
32
33     BRefData& operator=(const BRefData& refData);
34
35     void setLen(int len);
36
37 private:
38     BAAtomicCount orefCount;
39     int olen;
40     void* odata;
41 };
42
43 #endif

```

8.130 BRtc.cpp File Reference

```

#include <BRtc.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <errno.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/ioctl.h>
#include <linux/rtc.h>

```

8.131 BRtc.h File Reference

```

#include <BError.h>
#include <BThread.h>
#include <BCond.h>

```

Classes

- class [BRtc](#)

Realtime clock for access to the systems real time battery backed up time hardware.

- class [BRtcThreaded](#)

A thread safe class to access to the systems real time battery backed up time hardware.

8.132 BRtc.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BRtc.h       Real Time Clock interface
3  *   T.Barnaby,   BEAM Ltd,   19/5/04
4  *   Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *   For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BRTC_H
9  #define BRTC_H
10
11 #include <BError.h>
12 #include <BThread.h>
13 #include <BCond.h>
14
15 class BRtc {
16 public:
17     BRtc();
18     ~BRtc();
19
20     BError      init(int rate);
21     void        wait(int delayUs);
22 private:
23     int         ofd;
24     int         orate;
25 };
26
27 class BRtcThreaded : private BThread {
28 public:
29     BRtcThreaded();
30     ~BRtcThreaded();
31
32     BError      init(int rate);
33     void        wait(int delayUs);
34 private:
35     void*       function();
36     BRtc        ortc;
37     int         orate;
38     BCond       ocond;
39 };
40 #endif

```

8.133 BRWLock.cpp File Reference

```
#include <BRWLock.h>
```

8.134 BRWLock.h File Reference

```
#include <pthread.h>
```

Classes

- class [BRWLock](#)

Thread read-write lock.

8.135 BRWLock.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *  BRWLock.h  BRWLock Classes
3  *  T.Barnaby,  BEAM Ltd,   3/07/03
4  *  Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *  For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BRWLOCK_H
9  #define BRWLOCK_H  1
10
11 #include <pthread.h>
12
13 class BRWLock {
14 public:
15     BRWLock();
16     BRWLock(const BRWLock& rwlock);
17     ~BRWLock();
18
19     int    rdLock();
20     int    tryRdLock();
21     int    wrLock();
22     int    tryWrLock();
23     int    unlock();
24
25     BRWLock& operator=(const BRWLock& rwlock);
26 private:
27     pthread_rwlock_t    olock;
28 };
29
30 #endif

```

8.136 BSema.cpp File Reference

```

#include <BSema.h>
#include <errno.h>
#include <sys/time.h>

```

8.137 BSema.h File Reference

```

#include <sys/types.h>
#include <semaphore.h>

```

Classes

- class [BSema](#)

Sempahore class.

8.138 BSema.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BSema.h      BSema Classes
3  * T.Barnaby, BEAM Ltd, 6/11/02
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BSEMA_H
9 #define BSEMA_H 1
10
11 #include <sys/types.h>
12 #include <semaphore.h>
13
14 class BSema {
15 public:
16     BSema(int value = 0);
17     BSema(const BSema& sema);
18     ~BSema();
19
20     int post();
21     int wait();
22     int timedWait(int timeUs);
23     int tryWait();
24     int getValue() const;
25
26     BSema& operator=(const BSema& sema);
27 private:
28     sem_t osema;
29 };
30
31 #endif
```

8.139 BSemaphore.cpp File Reference

```
#include <BSemaphore.h>
#include <sys/time.h>
```

8.140 BSemaphore.h File Reference

```
#include <BTypes.h>
#include <BMutex.h>
#include <semaphore.h>
```

Classes

- class [BSemaphore](#)
Base Semaphore class.
- class [BSemaphoreBool](#)
Boolean semaphore.
- class [BSemaphoreCount](#)
Integer counting semaphore.

8.141 BSemaphore.h

[Go to the documentation of this file.](#)

```

1  /*****
2  * BSemaphore.h Semaphore Classes
3  * T.Barnaby, BEAM Ltd, 2012-11-17
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BSemaphore_h
9  #define BSemaphore_h 1
10
11 #include <BTypes.h>
12 #include <BMutex.h>
13 #include <semaphore.h>
14
15 class BSemaphore {
16 public:
17     BSemaphore();
18     BSemaphore(const BSemaphore& semaphore);
19     ~BSemaphore();
20
21     Bool wait(BTimeout timeoutUs = BTimeoutForever);
22     void set();
23
24     int getValue() const;
25     BSemaphore& operator=(const BSemaphore& semaphore);
26
27 private:
28     sem_t osema;
29 };
30
31 class BSemaphoreBool {
32 public:
33     BSemaphoreBool();
34     BSemaphoreBool(const BSemaphoreBool& semaphore);
35     ~BSemaphoreBool();
36
37     void set(Bool on = 1);
38     void clear();
39     Bool wait(Bool v = 1, BTimeout timeoutUs = BTimeoutForever);
40     Bool value();
41
42     operator int();
43     operator==(Bool on);
44     BSemaphoreBool& operator=(Bool on);
45
46 private:
47     BSemaphore osema;
48     volatile Bool ovalue;
49 };
50
51 class BSemaphoreCount {
52 public:
53     BSemaphoreCount();
54     BSemaphoreCount(const BSemaphoreCount& semaphore);
55     ~BSemaphoreCount();
56
57     void setValue(BUInt v);
58     void add(int v = 1);
59     Bool wait(BUInt v = 1, BTimeout timeoutUs = BTimeoutForever);
60     Bool take(BUInt v = 1, BTimeout timeoutUs = BTimeoutForever);
61
62     BUInt value();
63
64     BSemaphoreCount& operator=(const BSemaphoreCount& semaphore);
65
66 private:
67     BMutex olock;
68     BSemaphore osema;
69     volatile BUInt ovalue;
70 };
71 #endif

```

8.142 BSocket.cpp File Reference

```

#include <stdlib.h>
#include <unistd.h>

```

```
#include <stdio.h>
#include <errno.h>
#include <sys/types.h>
#include <BSocket.h>
#include <sys/ioctl.h>
#include <sys/socket.h>
#include <arpa/inet.h>
#include <netdb.h>
#include <net/if.h>
```

Macros

- #define [IP_MTU](#) 14

8.142.1 Macro Definition Documentation

8.142.1.1 IP_MTU

```
#define IP_MTU 14
```

8.143 BSocket.h File Reference

```
#include <BString.h>
#include <BError.h>
#include <BTypes.h>
#include <stdint.h>
#include <sys/types.h>
#include <netinet/in.h>
```

Classes

- class [BSocketAddress](#)
Socket Address.
- class [BSocketAddressINET](#)
IPV4 aware socket address.
- class [BSocket](#)
A network communications socket.

Macros

- #define [SOL_IP](#) 0
- #define [SO_PRIORITY](#) 12
- #define [MSG_NOSIGNAL](#) 0

8.143.1 Macro Definition Documentation

8.143.1.1 SOL_IP

```
#define SOL_IP 0
```

8.143.1.2 SO_PRIORITY

```
#define SO_PRIORITY 12
```

8.143.1.3 MSG_NOSIGNAL

```
#define MSG_NOSIGNAL 0
```

8.144 BSocket.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BSocket.h   BSocket Access Classes
3  * T.Barnaby,  BEAM Ltd,   1/4/05
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BSOCKET_H
9 #define BSOCKET_H   1
10
11 #include <BString.h>
12 #include <BError.h>
13 #include <BTypes.h>
14 #include <stdint.h>
15 #include <sys/types.h>
16
17 #if TARGET_win32 || TARGET_win64
18 #include <winsock2.h>
19 #else
20 #ifdef __linux__
21 #include <sys/prctl.h>
22 #else
23 #include <netinet/in.h>
24 #define SOL_IP 0
25 #define SO_PRIORITY 12
26 #define MSG_NOSIGNAL 0
27 #endif
28 #endif
29
30 class BSocketAddress {
31 public:
32     typedef struct sockaddr SockAddr;
33
34     BSocketAddress();
35     BSocketAddress(const BSocketAddress& add);
36     BSocketAddress(SockAddr* address, int len);
37     ~BSocketAddress();
38
39     BError          set(SockAddr* address, int len);
40
41     const SockAddr* raw() const;
```



```

43     int         len() const;
44
45     BString      getString() const;
46
47     // Operator functions
48     BSocketAddress& operator=(const BSocketAddress& add);
49     operator const SockAddr*() const { return raw(); }
50     int         operator==(const BSocketAddress& add) const;
51     int         operator!=(const BSocketAddress& add) const;
52 private:
53     int         olen;
54     SockAddr*   oaddress;
55 };
56
57 class BSocketAddressINET : public BSocketAddress {
58 public:
59     typedef struct sockaddr_in SockAddrIP;
60
61     BError      set(BString hostName, uint32_t port);
62     BError      set(uint32_t address, uint32_t port);
63     BError      set(BString hostName, BString service, BString type);
64
65     void        setPort(uint32_t port);
66     uint32_t    address();
67     uint32_t    port();
68
69     BString      getString();
70
71     // Some useful generic system functions
72     static BString      getHostName();
73     static BList<uint32_t> getIpAddresses();
74     static BList<BString> getIpAddressList();
75     static BList<BString> getIpAddressListAll();
76 };
77
78 class BSocket {
79 public:
80     enum NType { STREAM, DGRAM };
81     enum Priority { PriorityLow, PriorityNormal, PriorityHigh };
82
83     BSocket();
84     BSocket(int fd);
85     BSocket(NType type);
86     BSocket(int domain, int type, int protocol);
87     ~BSocket();
88
89     BError      init(int domain, int type, int protocol);
90     BError      init(NType type);
91     void        setFd(int fd);
92     int         getFd();
93
94     // Main functions
95     BError      bind(const BSocketAddress& add);
96     BError      connect(const BSocketAddress& add);
97     BError      shutdown(int how);
98     BError      close();
99     BError      listen(int backlog = 5);
100    BError      accept(int& fd);
101    BError      accept(int& fd, BSocketAddress& address);
102
103    // Main data transfer functions
104    BError      send(const void* buf, BSize nbytes, BSize& nbytesSent, int flags = 0);
105    BError      sendTo(const BSocketAddress& address, const void* buf, BSize nbytes, BSize&
nbytesSent, int flags = 0);
106    BError      sendChunks(const BDataChunk* chunks, BSize nChunks, BSize& nbytesSent, int flags = 0);
107    BError      rcv(void* buf, BSize maxbytes, BSize& nbytesRecv, int flags = 0);
108    BError      rcvFrom(BSocketAddress& address, void* buf, BSize maxbytes, BSize& nbytesRecv, int
flags = 0);
109    BError      rcvWithTimeout(void* buf, BSize maxbytes, BSize& nbytesRecv, int timeout, int flags =
0);
110    BError      rcvFromWithTimeout(BSocketAddress& address, void* buf, BSize maxbytes, BSize&
nbytesRecv, int timeout, int flags = 0);
111
112    BUInt      rcvAvailable();
113
114    // Configuration functions
115    BError      setSockOpt(int level, int optname, void* optval, unsigned int optlen);
116    BError      getSockOpt(int level, int optname, void* optval, unsigned int* optlen);
117    BError      setReuseAddress(int on);
118    BError      setBroadcast(int on);
119    BError      setPriority(Priority priority);
120
121    BError      getMTU(uint32_t& mtu);
122    BError      getAddress(BSocketAddress& address);
123
124 private:
125     int         osocket;

```

```
128 };
129 #endif
```

8.145 BSpi.cpp File Reference

```
#include <BSpi.h>
#include <fcntl.h>
#include <errno.h>
#include <sys/ioctl.h>
#include <linux/spi/spidev.h>
```

8.146 BSpi.h File Reference

```
#include <BTypes.h>
#include <BError.h>
```

Classes

- class [BSpi](#)
BSpi class for accessing SPI hardware devices.

8.147 BSpi.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BSpi.h BSpi class
3  * T.Barnaby, Beam Ltd, 2012-11-12
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8 #ifndef BSpi_h
9 #define BSpi_h
10
11 #include <BTypes.h>
12 #include <BError.h>
13
14 class BSpi {
15 public:
16     enum Mode { Mode0 = 0, Mode1 = 1, Mode2 = 2, Mode3 = 3 };
17
18     BSpi();
19     BError init(BString devName, BUInt speed = 1000000, Mode mode = Mode1, Bool csActive = 0);
20     BError transact(BUInt8 dev, void* txBuf, int txLen, int pad, void* rxBuf, int rxLen);
21 private:
22     BString odevName;
23     int odev;
24 };
25 #endif
```

8.148 BString.cpp File Reference

```
#include <stdarg.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <ctype.h>
#include <BString.h>
#include <BError.h>
#include <signal.h>
#include <regex.h>
```

Macros

- #define [STRIP](#) 0x7f
- #define [MINUS](#) '-'

Functions

- static int [gmatch](#) (const char *s, const char *p)
- std::ostream & [operator<<](#) (std::ostream &o, [BString](#) &s)
- std::istream & [operator>>](#) (std::istream &i, [BString](#) &s)
- int [bstringListinList](#) ([BStringList](#) &list, [BString](#) s)
- [BString](#) [blistToString](#) (const [BStringList](#) &list)
 - Convert a string list to a comma separated string.
- [BStringList](#) [bstringToList](#) ([BString](#) str, int stripSpaces)
 - Convert a comma separated string to a string list.
- [BStringList](#) [charToList](#) (const char **str)
- [BString](#) [barrayToString](#) (const [BStringArray](#) &list)
 - Convert a string array to a comma separated string.
- [BStringArray](#) [bstringToArray](#) ([BString](#) str, int stripSpaces)
 - Convert a comma separated string to a string array.
- [BStringArray](#) [charToArray](#) (const char **str)
- void [toBString](#) ([BString](#) &v, [BString](#) &s)
- void [toBString](#) ([BStringList](#) &v, [BString](#) &s)
- void [toBString](#) ([BInt32](#) &v, [BString](#) &s)
- void [toBString](#) ([BUInt32](#) &v, [BString](#) &s)
- void [toBString](#) ([BUInt64](#) &v, [BString](#) &s)
- void [toBString](#) ([BFloat64](#) &v, [BString](#) &s)
- void [fromBString](#) ([BString](#) &s, [BString](#) &v)
- void [fromBString](#) ([BString](#) &s, [BStringList](#) &v)
- void [fromBString](#) ([BString](#) &s, [BInt32](#) &v)
- void [fromBString](#) ([BString](#) &s, [BUInt32](#) &v)
- void [fromBString](#) ([BString](#) &s, [BUInt64](#) &v)
- void [fromBString](#) ([BString](#) &s, [BFloat64](#) &v)
- const char * [intToString](#) (char *str, [BUInt](#) strLen, int value, int base)
- const char * [int64ToString](#) (char *str, [BUInt](#) strLen, [BInt64](#) value, int base)
- const char * [floatToString](#) (char *str, [BUInt](#) strLen, [BFloat32](#) f, [BUInt](#) precision)
- char * [bstrncpy](#) (char *dest, const char *src, size_t n)
- char * [bstrtrim](#) (char *str)

Variables

- static const [BUInt8](#) [base64_decode_table](#) []

8.148.1 Macro Definition Documentation

8.148.1.1 STRIP

```
#define STRIP 0x7f
```

8.148.1.2 MINUS

```
#define MINUS '-'
```

8.148.2 Function Documentation

8.148.2.1 gmatch()

```
static int gmatch (  
    const char * s,  
    const char * p ) [static]
```

8.148.2.2 operator<<()

```
std::ostream & operator<< (  
    std::ostream & o,  
    BString & s )
```

8.148.2.3 operator>>()

```
std::istream & operator>> (  
    std::istream & i,  
    BString & s )
```

8.148.2.4 bstringListinList()

```
int bstringListinList (
    BStringList & list,
    BString s )
```

8.148.2.5 blistToString()

```
BString blistToString (
    const BStringList & list )
```

Convert a string list to a comma separated string.

8.148.2.6 bstringToList()

```
BStringList bstringToList (
    BString str,
    int stripSpaces )
```

Convert a comma separated string to a string list.

8.148.2.7 charToList()

```
BStringList charToList (
    const char ** str )
```

8.148.2.8 barrayToString()

```
BString barrayToString (
    const BStringArray & list )
```

Convert a string array to a comma separated string.

8.148.2.9 bstringToArray()

```
BStringArray bstringToArray (
    BString str,
    int stripSpaces )
```

Convert a comma separated string to a string array.

8.148.2.10 charToArray()

```
BStringArray charToArray (
    const char ** str )
```

8.148.2.11 toBString() [1/6]

```
void toBString (
    BString & v,
    BString & s )
```

8.148.2.12 toBString() [2/6]

```
void toBString (
    BStringList & v,
    BString & s )
```

8.148.2.13 toBString() [3/6]

```
void toBString (
    BInt32 & v,
    BString & s )
```

8.148.2.14 toBString() [4/6]

```
void toBString (
    BUInt32 & v,
    BString & s )
```

8.148.2.15 toBString() [5/6]

```
void toBString (
    BUInt64 & v,
    BString & s )
```

8.148.2.16 toBString() [6/6]

```
void toBString (
    BFloat64 & v,
    BString & s )
```

8.148.2.17 fromBString() [1/6]

```
void fromBString (
    BString & s,
    BString & v )
```

8.148.2.18 fromBString() [2/6]

```
void fromBString (
    BString & s,
    BStringList & v )
```

8.148.2.19 fromBString() [3/6]

```
void fromBString (
    BString & s,
    BInt32 & v )
```

8.148.2.20 fromBString() [4/6]

```
void fromBString (
    BString & s,
    BUInt32 & v )
```

8.148.2.21 fromBString() [5/6]

```
void fromBString (
    BString & s,
    BUInt64 & v )
```

8.148.2.22 fromBString() [6/6]

```
void fromBString (
    BString & s,
    BFloat64 & v )
```

8.148.2.23 intToString()

```
const char * intToString (
    char * str,
    BUInt strLen,
    int value,
    int base )
```

8.148.2.24 int64ToString()

```
const char * int64ToString (
    char * str,
    BUInt strLen,
    BInt64 value,
    int base )
```

8.148.2.25 floatToString()

```
const char * floatToString (
    char * str,
    BUInt strLen,
    BFloat32 f,
    BUInt precision )
```

8.148.2.26 bstrncpy()

```
char * bstrncpy (
    char * dest,
    const char * src,
    size_t n )
```

8.148.2.27 bstrtrim()

```
char * bstrtrim (
    char * str )
```


- [BString](#) [barrayToString](#) (const [BStringArray](#) &list)
Convert a string array to a comma separated string.
- [BStringArray](#) [bstringToArray](#) ([BString](#) str, int stripSpaces=0)
Convert a comma separated string to a string array.
- [BStringArray](#) [charToArray](#) (const char **str)
- void [toBString](#) ([BString](#) &v, [BString](#) &s)
- void [toBString](#) ([BStringList](#) &v, [BString](#) &s)
- void [toBString](#) ([BInt32](#) &v, [BString](#) &s)
- void [toBString](#) ([BUInt32](#) &v, [BString](#) &s)
- void [toBString](#) ([BUInt64](#) &v, [BString](#) &s)
- void [toBString](#) ([BFloat64](#) &v, [BString](#) &s)
- void [fromBString](#) ([BString](#) &s, [BString](#) &v)
- void [fromBString](#) ([BString](#) &s, [BStringList](#) &v)
- void [fromBString](#) ([BString](#) &s, [BInt32](#) &v)
- void [fromBString](#) ([BString](#) &s, [BUInt32](#) &v)
- void [fromBString](#) ([BString](#) &s, [BUInt64](#) &v)
- void [fromBString](#) ([BString](#) &s, [BFloat64](#) &v)
- char [from_hex](#) (char ch)
- char [to_hex](#) (char code)
- char * [bstrncpy](#) (char *dest, const char *src, size_t n)
- char * [bstrtrim](#) (char *str)
- const char * [intToString](#) (char *str, [BUInt](#) strLen, int value, int base=10)
- const char * [int64ToString](#) (char *str, [BUInt](#) strLen, [BInt64](#) value, int base=10)
- const char * [floatToString](#) (char *str, [BUInt](#) strLen, [BFloat32](#) f, [BUInt](#) precision)

8.149.1 Typedef Documentation

8.149.1.1 BStringList

```
typedef BList<BString> BStringList
```

8.149.1.2 BStringArray

```
typedef BArray<BString> BStringArray
```

8.149.2 Function Documentation

8.149.2.1 operator<<()

```
std::ostream & operator<< (
    std::ostream & o,
    BString & s )
```

8.149.2.2 operator>>()

```
std::istream & operator>> (
    std::istream & i,
    BString & s )
```

8.149.2.3 bstringListinList()

```
int bstringListinList (
    BStringList & l,
    BString s )
```

8.149.2.4 blistToString()

```
BString blistToString (
    const BStringList & list )
```

Convert a string list to a comma separated string.

8.149.2.5 bstringToList()

```
BStringList bstringToList (
    BString str,
    int stripSpaces = 0 )
```

Convert a comma separated string to a string list.

8.149.2.6 charToList()

```
BStringList charToList (
    const char ** str )
```

8.149.2.7 barrayToString()

```
BString barrayToString (
    const BStringArray & list )
```

Convert a string array to a comma separated string.

8.149.2.8 bstringToArray()

```
BStringArray bstringToArray (
    BString str,
    int stripSpaces = 0 )
```

Convert a comma separated string to a string array.

8.149.2.9 charToArray()

```
BStringArray charToArray (
    const char ** str )
```

8.149.2.10 toBString() [1/6]

```
void toBString (
    BString & v,
    BString & s )
```

8.149.2.11 toBString() [2/6]

```
void toBString (
    BStringList & v,
    BString & s )
```

8.149.2.12 toBString() [3/6]

```
void toBString (
    BInt32 & v,
    BString & s )
```

8.149.2.13 toBString() [4/6]

```
void toBString (
    BUInt32 & v,
    BString & s )
```

8.149.2.14 toBString() [5/6]

```
void toBString (
    BUInt64 & v,
    BString & s )
```

8.149.2.15 toBString() [6/6]

```
void toBString (
    BFloat64 & v,
    BString & s )
```

8.149.2.16 fromBString() [1/6]

```
void fromBString (
    BString & s,
    BString & v )
```

8.149.2.17 fromBString() [2/6]

```
void fromBString (
    BString & s,
    BStringList & v )
```

8.149.2.18 fromBString() [3/6]

```
void fromBString (
    BString & s,
    BInt32 & v )
```

8.149.2.19 fromBString() [4/6]

```
void fromBString (
    BString & s,
    BUInt32 & v )
```

8.149.2.20 fromBString() [5/6]

```
void fromBString (
    BString & s,
    BUInt64 & v )
```

8.149.2.21 fromBString() [6/6]

```
void fromBString (
    BString & s,
    BFloat64 & v )
```

8.149.2.22 from_hex()

```
char from_hex (
    char ch ) [inline]
```

8.149.2.23 to_hex()

```
char to_hex (
    char code ) [inline]
```

8.149.2.24 bstrncpy()

```
char * bstrncpy (
    char * dest,
    const char * src,
    size_t n )
```

8.149.2.25 bstrtrim()

```
char * bstrtrim (
    char * str )
```

8.149.2.26 intToString()

```
const char * intToString (
    char * str,
    BUInt strlen,
    int value,
    int base = 10 )
```

8.149.2.27 int64ToString()

```
const char * int64ToString (
    char * str,
    BUInt strlen,
    BInt64 value,
    int base = 10 )
```

8.149.2.28 floatToString()

```
const char * floatToString (
    char * str,
    BUInt strlen,
    BFloat32 f,
    BUInt precision )
```

8.150 BString.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BString.h    BString Handling
3  * T.Barnaby,   BEAM Ltd, 29/10/91
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BSTRING_H
9  #define BSTRING_H    1
10
11  #include    <BTypes.h>
12  #include    <BRefData.h>
13  #include    <BList.h>
14  #include    <BArray.h>
15  #include    <iostream>
16
17  class BError;
18
19  class BString {
20  public:
21      BString();
22      BString(const BString& string);
23      BString(const char* str);
24      BString(const char* str, unsigned int len);
25      BString(char ch);
26      BString(BInt v);
27      BString(BUInt v);
28      BString(BUInt64 v);
29      BString(double v);
30
31      ~BString();
```

```

33
34     static      BString convert(char ch);
35     static      BString convert(BInt value);
36     static      BString convert(BUInt value);
37     static      BString convert(double value, int eFormat = 0);
38     static      BString convert(BUInt64 value);
39     static      BString convertHex(BInt value);
40     static      BString convertHex(BUInt value);
41
42     BString      copy() const;
43
44     int          len() const;
45     const char*  retStr() const;
46     const char*  str() const;
47     char*        retStrDup() const;
48     int          retInt() const;
49     unsigned int  retUInt() const;
50     double       retDouble() const;
51     BFloat64     retFloat64() const;
52
53     int          compare(const BString& string) const;
54     int          compareWild(const BString& string) const;
55     int          compareWildExpression(const BString& string) const;
56     int          compareRegex(const BString& pattern, int ignoreCase = 0) const;
57     BString& truncate(int len);
58     BString& pad(int len);
59     void         clear();
60
61     BString& toUpper();
62     BString& toLower();
63     BString      lowerFirst();
64     void         removeNL();
65     BString      justify(int leftMargin, int width);
66     BString      fixedLen(int length, int rightJustify = 0);
67     BString      firstLine();
68     BString      translateChar(char ch, BString replace = " ");
69     BString      reverse() const;
70
71     BString      subString(int start, int len) const;
72     int          del(int start, int len);
73     int          insert(int start, BString str);
74     int          append(const BString& str);
75     BString      add(const BString& str) const;
76     BString& printf(const char* fmt, ...);
77
78     int          find(char ch) const;
79     int          find(BString str) const;
80     int          findReverse(char ch) const;
81
82     BString      csvEncode() const;
83     BString& csvDecode(const BString str);
84
85     BString      base64Encode() const;
86     BError       base64Decode(BString& str) const;
87
88
89     BList<BString> getTokenList(BString separators);
90     BList<BString> getTokenList(char separator);
91     BString      removeSeparators(BString separators);
92     BString      pullToken(BString terminators);
93     BString      pullSeparators(BString separators);
94     BString      pullWord();
95     BString      pullLine();
96     BList<BString> split(char splitChar);
97
98     // Filename operations
99     BString      dirname();
100    BString      filename();
101    BString      basename();
102    BString      extension();
103    BString      extensionFull();
104
105    // Misc functions
106    BUInt32      hash() const;
107    char&        get(int pos);
108    const char&  get(int pos) const;
109
110    /* Operator functions */
111    BString& operator=(const BString& string);
112    char&      operator[](int pos);
113
114    int         operator==(const BString& s) const{
115        return (compare(s) == 0);
116    }
117    int         operator==(const char* s) const{
118        return (compare(s) == 0);
119    }

```



```

120     int         operator>(const BString& s) const{
121         return (compare(s) > 0);
122     }
123     int         operator>(const char* s) const{
124         return (compare(s) > 0);
125     }
126     int         operator<(const BString& s) const{
127         return (compare(s) < 0);
128     }
129     int         operator<(const char* s) const{
130         return (compare(s) < 0);
131     }
132     int         operator>=(const BString& s) const{
133         return (compare(s) >= 0);
134     }
135     int         operator<=(const BString& s) const{
136         return (compare(s) <= 0);
137     }
138     int         operator!=(const BString& s) const{
139         return (compare(s) != 0);
140     }
141     int         operator!=(const char* s) const{
142         return (compare(s) != 0);
143     }
144     BString operator+(const BString& s) const {
145         return add(s);
146     }
147     BString operator+(const char* s) const {
148         return add(s);
149     }
150     BString operator+=(const BString& s){
151         *this = add(s);
152         return *this;
153     }
154     BString operator+=(const char* s){
155         *this = add(s);
156         return *this;
157     }
158
159     /* Special operators */
160     BString operator+(char ch) const {
161         return add(convert(ch));
162     }
163     BString operator+(BInt i) const {
164         return add(convert(i));
165     }
166     BString operator+(BUInt i) const {
167         return add(convert(i));
168     }
169     BString operator+(BUInt64 i) const {
170         return add(convert(i));
171     }
172     operator const char* () const {
173         return retStr();
174     }
175 #ifdef QSTRING_H
176     // QT support
177     BString(const QString& str){
178     #if QT_VERSION >= 0x040000
179         init(str.toLatin1());
180     #else
181         init(str);
182     #endif
183     }
184 #ifndef ZAP
185     operator QString (){ // QString support
186         return QString(retStr());
187     }
188 #endif
189 #endif
190
191     // For backwards compatibility
192     BString field(int field) const;
193     char** fields();
194
195 protected:
196     BRefData* ostr;
197
198 private:
199     void init(const char* str);
200     int inString(int pos) const;
201     int isSpace(char ch) const;
202 };
203
204 // std::Stream Functions
205 std::ostream& operator<<(std::ostream& o, BString& s);
206 std::istream& operator>>(std::istream& i, BString& s);

```

```

207
208 // List and array functions
209 typedef BList<BString>    BStringList;
210 typedef BArray<BString>   BStringArray;
211
212 int bstringListinList(BStringList& l, BString s);
213
214 BString blistToString(const BStringList& list);
215 BStringList bstringToList(BString str, int stripSpaces = 0);
216 BStringList charToList(const char** str);
217
218 BString barrayToString(const BStringArray& list);
219 BStringArray bstringToArray(BString str, int stripSpaces = 0);
220 BStringArray charToArray(const char** str);
221
222 // String conversion functions
223 void toBString(BString& v, BString& s);
224 void toBString(BStringList& v, BString& s);
225 void toBString(BInt32& v, BString& s);
226 void toBString(BUInt32& v, BString& s);
227 void toBString(BUInt64& v, BString& s);
228 void toBString(BFloat64& v, BString& s);
229 void fromBString(BString& s, BString& v);
230 void fromBString(BString& s, BStringList& v);
231 void fromBString(BString& s, BInt32& v);
232 void fromBString(BString& s, BUInt32& v);
233 void fromBString(BString& s, BUInt64& v);
234 void fromBString(BString& s, BFloat64& v);
235
236 // CString functions
237 inline char from_hex(char ch){
238     return isdigit(ch) ? ch - '0' : tolower(ch) - 'a' + 10;
239 }
240
241 inline char to_hex(char code){
242     static char hex[] = "0123456789abcdef";
243     return hex[code & 15];
244 }
245
246 char* bstrncpy(char* dest, const char* src, size_t n);
247 char* bstrtrim(char* str);
248 const char* intToString(char* str, BUInt strLen, int value, int base = 10);
249 const char* int64ToString(char* str, BUInt strLen, BInt64 value, int base = 10);
250 const char* floatToString(char* str, BUInt strLen, BFloat32 f, BUInt precision);
251
252 #endif

```

8.151 BStringLocked.h File Reference

```

#include <BString.h>
#include <BMutex.h>

```

Classes

- class [BStringMutex](#)
Thread locked string internal mutex.
- class [BStringLocked](#)
Provides a basic thread locked string.

8.152 BStringLocked.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BStringLocked.h      Threaded BString Handling
3  * T.Barnaby, BEAM Ltd, 2008-06-17
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.

```

```

6  ****
7  */
8  #ifndef BStringLocked_H
9  #define BStringLocked_H 1
10
11 #include <BString.h>
12 #include <BMutex.h>
13
14 class BStringMutex : public BMutex {
15 public:
16     BStringMutex() : BMutex(BMutex::Recursive){}
17 };
18
19 class BStringLocked {
20 public:
21     BStringLocked() {}
22     BStringLocked(const BStringLocked& s) : ostr(s.ostr){}
23     BStringLocked(const BString& s) : ostr(s){}
24
25     int len() const { BMutexLock l(oLock); return ostr.len(); }
26
27 public:
28     operator BString() const { BMutexLock l(oLock); return ostr; }
29
30     BStringLocked operator+(const BStringLocked& s) const { BMutexLock l(oLock); BMutexLock ll(s.oLock);
31         ostr.append(s.ostr); return *this; }
32     BStringLocked& operator=(const BStringLocked& s) { BMutexLock l(oLock); BMutexLock ll(s.oLock);
33         ostr = s.ostr; return *this; }
34
35 private:
36     mutable BStringMutex oLock;
37     BString ostr;
38 };
39
40 #endif

```

8.153 BSys.cpp File Reference

```

#include <BSys.h>
#include <time.h>

```

Functions

- void [delayUs](#) (BUInt us)
Will delay for given time in us, if tasks running task will sleep.
- void [delayMs](#) (BUInt ms)
Will delay for given time in ms, if tasks running task will sleep.

8.153.1 Function Documentation

8.153.1.1 delayUs()

```

void delayUs (
    BUInt us )

```

Will delay for given time in us, if tasks running task will sleep.

8.153.1.2 delayMs()

```
void delayMs (
    BUInt ms )
```

Will delay for given time in ms, if tasks running task will sleep.

8.154 BSys.h File Reference

```
#include <BTypes.h>
```

Functions

- void `delayUs` (`BUInt` us)
Will delay for given time in us, if tasks running task will sleep.
- void `delayMs` (`BUInt` ms)
Will delay for given time in ms, if tasks running task will sleep.

8.154.1 Function Documentation

8.154.1.1 delayUs()

```
void delayUs (
    BUInt us )
```

Will delay for given time in us, if tasks running task will sleep.

8.154.1.2 delayMs()

```
void delayMs (
    BUInt ms )
```

Will delay for given time in ms, if tasks running task will sleep.

8.155 BSys.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BSys.h      BSys system class
3  * T.Barnaby, Beam Ltd, 2018-10-22
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  *
8  * Core system class.
9  */
10 #ifndef BSys_h
11 #define BSys_h
12
13 #include <BTypes.h>
14
15 extern "C" {
16 extern void    delayUs(BUInt us);
17 extern void    delayMs(BUInt ms);
18 }
19
20 #endif
```

8.156 BTable.cpp File Reference

```
#include <BTable.h>
```

8.157 BTable.h File Reference

```
#include <BArray.h>
#include <BString.h>
```

Classes

- class [BTable](#)
A simple string based table structure.

8.158 BTable.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BTable.h    Simple table of data with CSV output
3  * T.Barnaby, BEAM Ltd, 2009-02-10
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8 #ifndef BTable_H
9 #define BTable_H
10
11 #include <BArray.h>
12 #include <BString.h>
13
14 class BTable {
15 public:
16     BTable();
17     ~BTable();
18 }
```

```

19
20     void                clear();
21     void                setTitle(BArray<BString> title);
22     void                addRow(BArray<BString> data);
23
24     BString             getString();
25     void                print(FILE* file = stdout);
26
27 private:
28     void                calculateWidths();
29     BString             lineString(BArray<BString> line, int comment = 0);
30
31     BArray<BString>     otitle;
32     BList<BArray<BString> > odata;
33     BArray<int>         ocolumnWidths;
34 };
35
36 #endif

```

8.159 BTask.cpp File Reference

```

#include <BTask.h>
#include <unistd.h>
#include <errno.h>
#include <sys/types.h>

```

8.160 BTask.h File Reference

```

#include <BError.h>
#include <pthread.h>

```

Classes

- class [BTask](#)
Implements a thread of execution.

8.161 BTask.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BTask.h BTask class
3  * T.Barnaby, Beam Ltd, 2012-11-12
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7
8 * Stack size of 0 assumes system will grow using MMU.
9 * Task priorities can be set from 0 to 4 inclusive. Basic default and idle priority is 0.
10 */
11 #ifndef BTask_h
12 #define BTask_h
13
14 #include <BError.h>
15 #include <pthread.h>
16
17 class BTask {
18 public:
19     BTask(const char* name = "", BUInt stackSize = 0, BUInt priority = 1);
20     virtual ~BTask();

```

```

22
23     void          init(const char* name, BUInt stackSize = 0, BUInt priority = 1);
24     BError        start();
25     void          stop();
26     void          waitForCompletion();
27
28     // Task manipulation
29     int           setPriority(BUInt priority);
30
31     // Task operation
32     virtual void  run();
33
34 protected:
35     static void*  taskFunc(void*);
36
37     const char*  oname;
38     BUInt        ostackSize;
39     BUInt        opolicy;
40     BUInt        opriority;
41     pthread_t    othread;
42     Bool         orunning;
43 };
44 #endif

```

8.162 BThread.cpp File Reference

```

#include <BThread.h>
#include <unistd.h>
#include <errno.h>
#include <sys/types.h>

```

8.163 BThread.h File Reference

```

#include <pthread.h>

```

Classes

- class [BThread](#)
Implements a program execution thread.

8.164 BThread.h

[Go to the documentation of this file.](#)

```

1 /*****
2  * BThread.h  BThread Classes
3  * T.Barnaby, BEAM Ltd, 31/3/00
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BTHREAD_H
9 #define BTHREAD_H 1
10
11 #include <pthread.h>
12
13 class BThread {
14 public:
15     BThread();
16     virtual ~BThread();
17
18

```

```

19 // Prior to start setup
20 int      setInitPriority(int policy, int priority);
21 int      setInitStackSize(size_t stackSize);
22
23 int      start();
24 void*    result();
25 int      running();
26
27 int      setPriority(int policy, int priority);
28 int      cancel();
29 void*    waitForCompletion();
30 pthread_t getThread();
31
32 virtual void* function();
33 private:
34 static void* startFunc(void*);
35
36 pthread_t  othread;
37 size_t     ostackSize;
38 int        opolicy;
39 int        opriority;
40 int        orunning;
41 void*      oresult;
42 };
43
44 #endif

```

8.165 BTime.cpp File Reference

```
#include <BTime.h>
```

Functions

- static bool [yearIsLeap](#) ([BUInt16](#) year)
- static [BUInt16](#) [yearDays](#) ([BUInt16](#) year)

Variables

- static [BUInt16](#) [monDays](#) [2][13]

8.165.1 Function Documentation

8.165.1.1 [yearIsLeap\(\)](#)

```
static bool yearIsLeap (
    BUInt16 year ) [inline], [static]
```

8.165.1.2 [yearDays\(\)](#)

```
static BUInt16 yearDays (
    BUInt16 year ) [inline], [static]
```


8.165.2 Variable Documentation

8.165.2.1 monDays

```
BUInt16 monDays[2][13] [static]
```

Initial value:

```
= {
    { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334, 365 },
    { 0, 31, 60, 91, 121, 152, 182, 213, 244, 274, 305, 335, 366 }
}
```

8.166 BTime.h File Reference

```
#include <BTypes.h>
#include <BError.h>
#include <BString.h>
```

Classes

- class [BTime](#)

Implements a simple date/time class. Stores the date/time as a number of seconds since Unix epoch 1970-01-02T00:00:00.

8.167 BTime.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BTime.h BTime functions
3  * T.Barnaby, Beam Ltd, 2012-11-12
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 *
8 */
9
10 #ifndef BTime_h
11 #define BTime_h
12
13 #include <BTypes.h>
14 #include <BError.h>
15 #include <BString.h>
16
17 class BTime {
18 public:
19     BTime(BUInt32 t = 0);
20
21     void set(BUInt32 seconds);
22     void set(BUInt year, BUInt month, BUInt day, BUInt hour = 0, BUInt minute = 0, BUInt second = 0);
23     void setYearDay(BUInt year, BUInt yearDay, BUInt hour = 0, BUInt minute = 0, BUInt second = 0);
24
25     void getDate(BUInt& year, BUInt& month, BUInt& day) const;
26     void getTime(BUInt& hour, BUInt& minute, BUInt& second) const;
27     BUInt32 getSeconds() const;
28
29     int isSet() const{ return otime != 0; }
30     int isLeapYear();
31 }
```

```

41     void            addSeconds(int seconds);
42
43     BString         getString(BString format = "iso") const;
44     BError          setString(const BString dateTime);
45
46     BTime           utcToLocal() const;
47     BTime           localToUtc() const;
48     BString         getStringLocal(BString format = "iso") const;
49     BError          setStringLocal(const BString dateTime);
50
51     // Operator functions
52     int             operator==(const BTime& time) const { return (otime == time.otime); }
53     int             operator!=(const BTime& time) const { return (otime != time.otime); }
54     int             operator>(const BTime& time) const { return (otime > time.otime); }
55     int             operator>=(const BTime& time) const { return (otime >= time.otime); }
56     int             operator<(const BTime& time) const { return (otime < time.otime); }
57     int             operator<=(const BTime& time) const { return (otime <= time.otime); }
58     BTime           operator+(int seconds) const { return BTime(getSeconds() + seconds); }
59     BTime&          operator+=(int seconds){ addSeconds(seconds); return *this; }
60
61 private:
62     BUInt32         otime;
63 };
64
65 #endif

```

8.168 BTimer.cpp File Reference

```

#include <BTimer.h>
#include <sys/time.h>

```

8.169 BTimer.h File Reference

```

#include <BMutex.h>

```

Classes

- class [BTimer](#)
Stopwatch style timer.

8.170 BTimer.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BTimer.h           Quantel Quentin BTimers
3  *   T.Barnaby, BEAM Ltd, 3/2/04
4  *   Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *   For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BTIMER_H
9  #define BTIMER_H
10
11 #include <BMutex.h>
12
13 class BTimer {
14 public:
15     BTimer();
16     ~BTimer();
17
18     void    start();
19

```

```

20     void          stop();
21     void          clear();
22     double        getElapsedTime();
23
24     // Overall operations
25     void          add(BTimer& timer);
26
27     // Statistics
28     double        average();
29     double        peak();
30 private:
31     static double  getTime();
32
33     BMutex        olock;
34     unsigned int   onum;
35     double         ostartTime;
36     double         oendTime;
37     double         oaverage;
38     double         opeak;
39 };
40 #endif

```

8.171 BTimeStamp.cpp File Reference

```

#include <BTimeStamp.h>
#include <BTimeStampMs.h>
#include <math.h>
#include <sys/time.h>

```

Functions

- void [toBString](#) (BTimeStamp &v, BString &s)
- void [fromBString](#) (BString &s, BTimeStamp &v)

Variables

- static int [mon_yday](#) [2][13]

8.171.1 Function Documentation

8.171.1.1 toBString()

```

void toBString (
    BTimeStamp & v,
    BString & s )

```

8.171.1.2 fromBString()

```

void fromBString (
    BString & s,
    BTimeStamp & v )

```

8.171.2 Variable Documentation

8.171.2.1 mon_yday

```
int mon_yday[2][13]  [static]
```

Initial value:

```
= {  
    { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334, 365 },  
    { 0, 31, 60, 91, 121, 152, 182, 213, 244, 274, 305, 335, 366 }  
}
```

8.172 BTimeStamp.h File Reference

```
#include <stdint.h>  
#include <BError.h>
```

Classes

- class [BTimeStamp](#)
A date and time storage class with microsecond resolution.

Functions

- void [toBString](#) ([BTimeStamp](#) &v, [BString](#) &s)
- void [fromBString](#) ([BString](#) &s, [BTimeStamp](#) &v)

8.172.1 Function Documentation

8.172.1.1 toBString()

```
void toBString (  
    BTimeStamp & v,  
    BString & s )
```

8.172.1.2 fromBString()

```
void fromBString (  
    BString & s,  
    BTimeStamp & v )
```

8.173 BTimeStamp.h

[Go to the documentation of this file.](#)

```

1  /*****
2  * BTimeStamp.h      TimeStamp classes
3  * T.Barnaby, BEAM Ltd, 2008-06-26
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BTimeStamp_H
9  #define BTimeStamp_H    1
10
11 #include <stdint.h>
12 #include <BError.h>
13
14 class BTimeStampMs;
15
16 class BTimeStamp {
17 public:
18     BTimeStamp();
19     BTimeStamp(int year, int month = 1, int day = 1, int hour = 0, int minute = 0, int second =
20         0, int microsecond = 0);
21     BTimeStamp(const BString str);
22     ~BTimeStamp();
23
24     void        clear();
25     void        setFirst();
26     void        setLast();
27
28     void        set(time_t time, int microSeconds);
29     void        set(int year = 0, int month = 1, int day = 1, int hour = 0, int minute = 0, int second =
30         0, int microsecond = 0);
31     void        set(const BTimeStampMs& timeStamp);
32     void        setYDay(int year = 0, int yday = 0, int hour = 0, int minute = 0, int second = 0, int
33         microsecond = 0);
34     void        setTime(int hour = 0, int minute = 0, int second = 0, int microsecond = 0);
35     void        setNow();
36
37     int         year() const;
38     int         yday() const;
39     int         month() const;
40     int         day() const;
41     int         hour() const;
42     int         minute() const;
43     int         second() const;
44     int         microSecond() const;
45
46     void        getDate(int& year, int& mon, int& day) const;
47
48     BString     getString(BString separator = "T") const;
49     BError      setString(const BString dateTime);
50     BString     getStringNoMs(BString separator = "T") const;
51     BString     getStringFormatted(BString format) const;
52
53     void        addMilliseconds(int milliseconds);
54     void        addMicroSeconds(int64_t microSeconds);
55     void        addSeconds(int seconds);
56     uint32_t    getYearSeconds() const;
57     uint64_t    getYearMicroSeconds() const;
58
59     int         isSet() const { return oyear != 0; }
60     int         compare(const BTimeStamp& timeStamp) const;
61
62     operator BString() const { return getString(); }
63     BTimeStamp& operator=(const BTimeStampMs& timeStamp) { set(timeStamp); return *this; }
64
65     int         operator==(const BTimeStamp& timeStamp) const { return (compare(timeStamp) == 0); }
66     int         operator!=(const BTimeStamp& timeStamp) const { return (compare(timeStamp) != 0); }
67     int         operator>(const BTimeStamp& timeStamp) const { return (compare(timeStamp) > 0); }
68     int         operator>=(const BTimeStamp& timeStamp) const { return (compare(timeStamp) >= 0); }
69     int         operator<(const BTimeStamp& timeStamp) const { return (compare(timeStamp) < 0); }
70     int         operator<=(const BTimeStamp& timeStamp) const { return (compare(timeStamp) <= 0); }
71
72     static int  isLeap(int year);
73     static BInt64 difference(BTimeStamp t2, BTimeStamp t1);
74
75 public:
76     BUInt16    oyear;
77     BUInt16    oyday;
78     BUInt8     ohour;
79     BUInt8     ominute;
80     BUInt8     osecond;
81     BUInt8     ospare;
82     BUInt32    omicroSecond;

```

```
81 };
82
83 // String conversion functions
84 void toBString(BTimeStamp& v, BString& s);
85 void fromBString(BString& s, BTimeStamp& v);
86
87 #endif
```

8.174 BTimeStampMs.cpp File Reference

```
#include <BTimeStampMs.h>
#include <math.h>
#include <sys/time.h>
```

Variables

- static int [mon_yday](#) [2][13]

8.174.1 Variable Documentation

8.174.1.1 mon_yday

```
int mon_yday[2][13] [static]
```

Initial value:

```
= {
    { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334, 365 },
    { 0, 31, 60, 91, 121, 152, 182, 213, 244, 274, 305, 335, 366 }
}
```

8.175 BTimeStampMs.h File Reference

```
#include <stdint.h>
#include <BError.h>
```

Classes

- class [BTimeStampMs](#)

A date and time storage class with millisecond resolution and an extra field to indicate a particular sampleNumber it refers to.

8.176 BTimeStampMs.h

[Go to the documentation of this file.](#)

```

1  /*****
2  * BTimeStampMs.h TimeStamp classes
3  * T.Barnaby, BEAM Ltd, 2005-10-20
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BTimeStampMs_H
9  #define BTimeStampMs_H 1
10
11 #include <stdint.h>
12 #include <BError.h>
13
14 class BTimeStampMs {
15 public:
16     BTimeStampMs(BString str = "");
17     ~BTimeStampMs();
18
19     void clear();
20
21     void setNow();
22     void setFirst();
23     void setLast();
24
25     void set(time_t time, int milliseconds = 0);
26     void setYDay(int year = 0, int yday = 0, int hour = 0, int minute = 0, int second = 0, int
27         milliSecond = 0);
28     void setTime(int hour = 0, int minute = 0, int second = 0, int milliSecond = 0);
29
30     BTimeStampMs& addMilliseconds(int milliseconds);
31     BTimeStampMs& subMilliseconds(int milliseconds);
32     BTimeStampMs& addSeconds(int seconds);
33     BTimeStampMs& subSeconds(int seconds);
34     uint32_t getYearSeconds();
35     uint64_t getYearMilliseconds();
36
37     BString getString(BString separator = "T");
38     BString getStringNoMs(BString separator = "T");
39     BError setString(BString dateTime);
40
41     BString getDurationString(BString separator = "T");
42     BString getDurationStringNoMs(BString separator = "T");
43     BError setDurationString(BString dateTime);
44     BString getStringRaw();
45
46     void getDate(int& year, int& mon, int& day);
47     int compare(const BTimeStampMs& timeStamp);
48
49     int operator>(const BTimeStampMs& timeStamp){ return (compare(timeStamp) > 0); }
50     int operator>=(const BTimeStampMs& timeStamp){ return (compare(timeStamp) >= 0); }
51     int operator<(const BTimeStampMs& timeStamp){ return (compare(timeStamp) < 0); }
52     int operator<=(const BTimeStampMs& timeStamp){ return (compare(timeStamp) <= 0); }
53
54     static int isLeap(int year);
55     static BUInt64 difference(BTimeStampMs t2, BTimeStampMs t1);
56
57 public:
58     uint16_t year;
59     uint16_t yday;
60     uint16_t hour;
61     uint16_t minute;
62     uint16_t second;
63     uint16_t milliSecond;
64     int32_t sampleNumber;
65 private:
66 };
67
68 #endif

```

8.177 BTimeUs.cpp File Reference

```

#include <BTimeUs.h>
#include <stdio.h>

```

Functions

- static bool `yearIsLeap` (`BUInt16` year)
- static `BUInt16` `yearDays` (`BUInt16` year)

Variables

- static `BUInt16` `monDays` [2][13]

8.177.1 Function Documentation

8.177.1.1 `yearIsLeap()`

```
static bool yearIsLeap (  
    BUInt16 year ) [inline], [static]
```

8.177.1.2 `yearDays()`

```
static BUInt16 yearDays (  
    BUInt16 year ) [inline], [static]
```

8.177.2 Variable Documentation

8.177.2.1 `monDays`

```
BUInt16 monDays[2][13] [static]
```

Initial value:

```
= {  
    { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334, 365 },  
    { 0, 31, 60, 91, 121, 152, 182, 213, 244, 274, 305, 335, 366 }  
}
```

8.178 BTimeUs.h File Reference

```
#include <BTypes.h>  
#include <BError.h>  
#include <BString.h>  
#include <BTime.h>
```


Classes

- class [BTimeUs](#)

Time storage as an unsigned 64bit value to TAI standard.

8.179 BTimeUs.h

[Go to the documentation of this file.](#)

```

1  /*****
2  *   BTimeUs.h   BTimeUs functions
3  *   T.Barnaby, Beam Ltd, 2018-08-15
4  *   Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  *   For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  *
8  * Implements a microsecond accurate time class. Stores the time as a number of microseconds
9  * to the TAI standard with no leap seconds. 0 time is 1970-01-02T00:00:00.
10 * The class provides conversions between UTC time and TAI microsecond time (leap second handling)
11 *
12 * Uses some sepcial values.
13 * 0 - DateTime not set.
14 */
15 #ifndef BTimeUs_h
16 #define BTimeUs_h
17
18 #include <BTypes.h>
19 #include <BError.h>
20 #include <BString.h>
21 #include <BTime.h>
22
23
24 class BTimeUs {
25 public:
26     BTimeUs(BUInt64 t = 0);
27     BTimeUs(BTime t);
28
29     void set(BUInt64 microSeconds);
30     void set(BUInt year, BUInt month, BUInt day, BUInt hour = 0, BUInt minute = 0, BUInt second =
0, BUInt microSecond = 0);
31     void setYearDay(BUInt year, BUInt yearDay, BUInt hour = 0, BUInt minute = 0, BUInt second = 0,
BUInt microSecond = 0);
32
33     void getDate(BUInt& year, BUInt& month, BUInt& day) const;
34     void getTime(BUInt& hour, BUInt& minute, BUInt& second) const;
35     BUInt64 getSeconds() const;
36     BUInt64 getMicroSeconds() const;
37
38     int isSet() const { return otime != 0; }
39     int isLeapYear();
40     void addSeconds(BInt64 seconds);
41     void addMicroSeconds(BInt64 microSeconds);
42
43     BString getString(BString format = "isoT") const;
44     BString getStringUs(BString format = "isoT") const;
45     BError setString(const BString dateTime);
46
47     // Operator functions
48     operator BTime() const { return BTime(getSeconds()); }
49     int operator==(const BTimeUs& time) const { return (otime == time.otime); }
50     int operator!=(const BTimeUs& time) const { return (otime != time.otime); }
51     int operator>(const BTimeUs& time) const { return (otime > time.otime); }
52     int operator>=(const BTimeUs& time) const { return (otime >= time.otime); }
53     int operator<(const BTimeUs& time) const { return (otime < time.otime); }
54     int operator<=(const BTimeUs& time) const { return (otime <= time.otime); }
55     BTimeUs operator+(BInt64 microSeconds) const { return BTimeUs(otime + microSeconds); }
56     BTimeUs& operator+=(BInt64 microSeconds) { addMicroSeconds(microSeconds); return *this; }
57
58 private:
59     BUInt64 otime;
60 };
61
62 #endif

```

8.180 BTypes.cpp File Reference

```
#include <BTypes.h>
```

Variables

- [BUInt32 beamlibVersion](#) = [BeamlibVersion](#)

8.180.1 Variable Documentation

8.180.1.1 beamlibVersion

```
BUInt32 beamlibVersion = BeamlibVersion
```

8.181 BTypes.h File Reference

```
#include <stdint.h>
#include <sys/types.h>
#include <vector>
```

Classes

- class [BDataChunk](#)
A chunk of data allowing writes of multiple chunks of segmented data.
- struct [BObjMember](#)
A structure to define a member of a generic [BObj](#).

Macros

- `#define BeamlibVersion 0x030302`

Typedefs

- typedef bool [Bool](#)
- typedef int8_t [BInt8](#)
- typedef uint8_t [BUInt8](#)
- typedef int16_t [BInt16](#)
- typedef uint16_t [BUInt16](#)
- typedef int32_t [BInt32](#)
- typedef uint32_t [BUInt32](#)
- typedef int64_t [BInt64](#)
- typedef uint64_t [BUInt64](#)
- typedef float [BFloat32](#)
- typedef double [BFloat64](#)
- typedef char [BChar](#)
- typedef [BInt32](#) [BInt](#)
- typedef [BUInt32](#) [BUInt](#)
- typedef [BFloat32](#) [BFloat](#)
- typedef [BFloat64](#) [BDouble](#)
- typedef size_t [BSize](#)
- typedef std::vector< [BFloat32](#) > [BArrayFloat](#)
- typedef std::vector< [BFloat64](#) > [BArrayDouble](#)
- typedef [BUInt32](#) [BTimeout](#)

Enumerations

- enum [BEventType](#) {
[BEventTypeNone](#) , [BEventTypeError](#) , [BEventTypeRead](#) , [BEventTypeReadLine](#) ,
[BEventTypeWrite](#) , [BEventTypeConnect](#) , [BEventTypeDisconnect](#) , [BEventTypeClientConnect](#) ,
[BEventTypeClientDisconnect](#) }
- enum [BEventWaitSet](#) {
[BEventWaitNone](#) = 0x00 , [BEventWaitError](#) = 0x01 , [BEventWaitRead](#) = 0x02 , [BEventWaitReadLine](#) = 0x04
, [BEventWaitWrite](#) = 0x08 , [BEventWaitConnect](#) = 0x10 , [BEventWaitDisconnect](#) = 0x20 , [BEventWaitClientConnect](#)
= 0x40 ,
[BEventWaitClientDisconnect](#) = 0x80 , [BEventWaitAny](#) = 0xFFFFFFFF }
- enum [BType](#) {
[BTypeNone](#) , [BTypeBool](#) , [BTypeInt8](#) , [BTypeUInt8](#) ,
[BTypeInt16](#) , [BTypeUInt16](#) , [BTypeInt32](#) , [BTypeUInt32](#) ,
[BTypeInt64](#) , [BTypeUInt64](#) , [BTypeFloat32](#) , [BTypeFloat64](#) ,
[BTypeChar](#) , [BTypeString](#) , [BTypeError](#) , [BTypeTime](#) ,
[BTypeTimeUs](#) , [BTypeObj](#) = 100 }
- enum [BTypeComp](#) {
[BTypeCompSingle](#) , [BTypeCompArray](#) , [BTypeCompArrayFixed](#) , [BTypeCompList](#) ,
[BTypeCompDict](#) }

Functions

- [BTimeout timeoutTicks](#) ([BTimeout timeoutUs](#))
- void [byteSwap8](#) (void *d, void *s)
- void [byteSwap16](#) (void *d, void *s)
- void [byteSwap32](#) (void *d, void *s)
- void [byteSwap64](#) (void *d, void *s)

Variables

- const [BTimeout BTimeoutForever](#) = 0xFFFFFFFF

8.181.1 Macro Definition Documentation

8.181.1.1 BeamlibVersion

```
#define BeamlibVersion 0x030302
```

8.181.2 Typedef Documentation

8.181.2.1 Bool

```
typedef bool Bool
```

8.181.2.2 BInt8

```
typedef int8_t BInt8
```

8.181.2.3 BUInt8

```
typedef uint8_t BUInt8
```

8.181.2.4 BInt16

```
typedef int16_t BInt16
```

8.181.2.5 BUInt16

```
typedef uint16_t BUInt16
```

8.181.2.6 BInt32

```
typedef int32_t BInt32
```

8.181.2.7 BUInt32

```
typedef uint32_t BUInt32
```

8.181.2.8 BInt64

```
typedef int64_t BInt64
```

8.181.2.9 BUInt64

```
typedef uint64_t BUInt64
```

8.181.2.10 BFloat32

```
typedef float BFloat32
```

8.181.2.11 BFloat64

```
typedef double BFloat64
```

8.181.2.12 BChar

```
typedef char BChar
```

8.181.2.13 BInt

```
typedef BInt32 BInt
```

8.181.2.14 BUInt

```
typedef BUInt32 BUInt
```

8.181.2.15 BFloat

```
typedef BFloat32 BFloat
```

8.181.2.16 BDouble

```
typedef BFloat64 BDouble
```

8.181.2.17 BSize

```
typedef size_t BSize
```

8.181.2.18 BArrayFloat

```
typedef std::vector<BFloat32> BArrayFloat
```

8.181.2.19 BArrayDouble

```
typedef std::vector<BFloat64> BArrayDouble
```

8.181.2.20 BTimeout

```
typedef BUInt32 BTimeout
```

8.181.3 Enumeration Type Documentation

8.181.3.1 BEventType

```
enum BEventType
```

Enumerator

BEventTypeNone	
BEventTypeError	
BEventTypeRead	
BEventTypeReadLine	
BEventTypeWrite	
BEventTypeConnect	
BEventTypeDisconnect	
BEventTypeClientConnect	
BEventTypeClientDisconnect	

8.181.3.2 BEventWaitSet

enum [BEventWaitSet](#)

Enumerator

BEventWaitNone	
BEventWaitError	
BEventWaitRead	
BEventWaitReadLine	
BEventWaitWrite	
BEventWaitConnect	
BEventWaitDisconnect	
BEventWaitClientConnect	
BEventWaitClientDisconnect	
BEventWaitAny	

8.181.3.3 BType

enum [BType](#)

Enumerator

BTypeNone	
BTypeBool	
BTypeInt8	
BTypeUInt8	
BTypeInt16	
BTypeUInt16	
BTypeInt32	
BTypeUInt32	
BTypeInt64	
BTypeUInt64	
BTypeFloat32	
BTypeFloat64	
BTypeChar	
BTypeString	
BTypeError	
BTypeTime	
BTypeTimeUs	
BTypeObj	

8.181.3.4 BTypeComp

enum [BTypeComp](#)

Enumerator

BTypeCompSingle	
BTypeCompArray	
BTypeCompArrayFixed	
BTypeCompList	
BTypeCompDict	

8.181.4 Function Documentation

8.181.4.1 timeoutTicks()

```
BTimeout timeoutTicks (  
    BTimeout timeoutUs ) [inline]
```

8.181.4.2 byteSwap8()

```
void byteSwap8 (  
    void * d,  
    void * s ) [inline]
```

8.181.4.3 byteSwap16()

```
void byteSwap16 (  
    void * d,  
    void * s ) [inline]
```

8.181.4.4 byteSwap32()

```
void byteSwap32 (  
    void * d,  
    void * s ) [inline]
```


8.181.4.5 byteSwap64()

```
void byteSwap64 (
    void * d,
    void * s ) [inline]
```

8.181.5 Variable Documentation

8.181.5.1 BTimeoutForever

```
const BTimeout BTimeoutForever = 0xFFFFFFFF
```

8.182 BTypes.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BTypes.h    Basic Types
3  * T.Barnaby,  BEAM Ltd,   1/4/05
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7  */
8  #ifndef BTYPES_H
9  #define BTYPES_H    1
10
11  #include <stdint.h>
12  #include <sys/types.h>
13  #include <vector>
14
15  #define BeamlibVersion 0x030302
16
17  // The standard types
18  typedef bool          Bool;
19  typedef int8_t        BInt8;
20  typedef uint8_t       BUInt8;
21  typedef int16_t       BInt16;
22  typedef uint16_t      BUInt16;
23  typedef int32_t       BInt32;
24  typedef uint32_t      BUInt32;
25  typedef int64_t       BInt64;
26  typedef uint64_t      BUInt64;
27  typedef float         BFloat32;
28  typedef double        BFloat64;
29  typedef char          BChar;
30
31  // Generic
32  typedef BInt32         BInt;
33  typedef BUInt32        BUInt;
34  typedef BFloat32       BFloat;
35  typedef BFloat64       BDouble;
36  typedef size_t         BSize;
37  typedef std::vector<BFloat32> BArrayFloat;
38  typedef std::vector<BFloat64> BArrayDouble;
39
40  // Events
41  enum BEventType { BEventTypeNone, BEventTypeError, BEventTypeRead, BEventTypeReadLine,
42                  BEventTypeWrite, BEventTypeConnect, BEventTypeDisconnect, BEventTypeClientConnect,
43                  BEventTypeClientDisconnect };
44  enum BEventWaitSet { BEventWaitNone = 0x00, BEventWaitError = 0x01, BEventWaitRead = 0x02,
45                     BEventWaitReadLine = 0x04, BEventWaitWrite = 0x08, BEventWaitConnect = 0x10, BEventWaitDisconnect =
46                     0x20, BEventWaitClientConnect = 0x40, BEventWaitClientDisconnect = 0x80, BEventWaitAny = 0xFFFFFFFF
47                     };
48
49  // Timeouts
50  typedef BUInt32        BTimeout;
51  const BTimeout BTimeoutForever = 0xFFFFFFFF; // Forever timeout
```

```

48 // Convert timeout to system ticks. Note system tick rate hard coded as ms
49 inline BTimeout timeoutTicks(BTimeout timeoutUs){
50     if(timeoutUs == BTimeoutForever)
51         return timeoutUs;
52     else
53         return timeoutUs / 1000;
54 }
55
56 // Byte swap routines
57 inline void byteSwap8(void* d, void* s){
58     char* dp = (char*)d;
59     char* sp = (char*)s;
60
61     *dp = *sp;
62 }
63 inline void byteSwap16(void* d, void* s){
64     char* dp = (char*)d;
65     char* sp = (char*)s;
66
67     dp[1] = sp[0];
68     dp[0] = sp[1];
69 }
70 inline void byteSwap32(void* d, void* s){
71     char* dp = (char*)d;
72     char* sp = (char*)s;
73
74     dp[3] = sp[0];
75     dp[2] = sp[1];
76     dp[1] = sp[2];
77     dp[0] = sp[3];
78 }
79 inline void byteSwap64(void* d, void* s){
80     char* dp = (char*)d;
81     char* sp = (char*)s;
82
83     dp[7] = sp[0];
84     dp[6] = sp[1];
85     dp[5] = sp[2];
86     dp[4] = sp[3];
87     dp[3] = sp[4];
88     dp[2] = sp[5];
89     dp[1] = sp[6];
90     dp[0] = sp[7];
91 }
92
94 class BDataChunk {
95 public:
96     BDataChunk(void* data = 0, BUInt size = 0) : data(data), size(size){}
97     void* data;
98     BUInt size;
99 };
100
101 // BObj member information
102 enum BType { BTypeNone, BTypeBool, BTypeInt8, BTypeUInt8, BTypeInt16, BTypeUInt16, BTypeInt32,
              BTypeUInt32, BTypeInt64, BTypeUInt64, BTypeFloat32, BTypeFloat64, BTypeChar, BTypeString, BTypeError,
              BTypeTime, BTypeTimeUs, BTypeObj = 100 };
103 enum BTypeComp { BTypeCompSingle, BTypeCompArray, BTypeCompArrayFixed, BTypeCompList, BTypeCompDict };
104
106 struct BObjMember {
107     BType type;
108     BTypeComp typeComp;
109     BUInt16 dataOffset;
110     BUInt16 size;
111     const char* typeName;
112     const char* name;
113 };
114
115 #endif

```

8.183 BUrl.cpp File Reference

```

#include <stdio.h>
#include <stdlib.h>
#include <memory.h>
#include <BUrl.h>
#include <curl/curl.h>

```

8.184 BUrl.h File Reference

```
#include <stdio.h>
#include <BString.h>
#include <BError.h>
```

Classes

- class [BUrl](#)

Access to a Url.

8.185 BUrl.h

[Go to the documentation of this file.](#)

```
1 /*****
2  * BUrl.h      BEAM BUrl access class
3  * T.Barnaby, BEAM Ltd, 12/11/02
4  * Copyright (c) 2022 All Right Reserved, Beam Ltd, https://www.beam.ltd.uk
5  * For license see LICENSE.txt at the root of the beamlib source tree.
6  *****/
7 */
8 #ifndef BURL_H
9 #define BURL_H 1
10
11 #include <stdio.h>
12 #include <BString.h>
13 #include <BError.h>
14
15 class BUrl {
16 public:
17     BUrl();
18     ~BUrl();
19
20     BError readString(BString url, BString& str);
21 private:
22     static int oinit;
23     static size_t writeData(void* data, size_t size, size_t elSize, void* stream);
24     BString ores;
25 };
26
27 #endif
```

8.186 /src/bdev3/beamlib/doc/overview.dox File Reference

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