

# The Parma Watchdog Library

## User's Manual\*

(version 0.7)

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## 3 Class Index

### 3.1 Class Hierarchy

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

<b>Parma_Watchdog_Library::Doubly_Linked_Object</b>	<b>17</b>
<b>Parma_Watchdog_Library::EList&lt; T &gt;</b>	<b>18</b>
<b>Parma_Watchdog_Library::Pending_Element</b>	<b>22</b>
<b>Parma_Watchdog_Library::EList_Iterator&lt; T &gt;</b>	<b>19</b>
<b>Parma_Watchdog_Library::Handler</b>	<b>20</b>
<b>Parma_Watchdog_Library::Handler_Flag&lt; Flag_Base, Flag &gt;</b>	<b>21</b>
<b>Parma_Watchdog_Library::Handler_Function</b>	<b>22</b>
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## 4 Class Index

### 4.1 Class List

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

<b>Parma_Watchdog_Library::Doubly_Linked_Object</b> (A (base) class for doubly linked objects )	<b>17</b>
<b>Parma_Watchdog_Library::EList&lt; T &gt;</b> (A simple kind of embedded list (i.e., a doubly linked objects where the links are embedded in the objects themselves) )	<b>18</b>

<a href="#">Parma_Watchdog_Library::EList_Iterator&lt; T &gt;</a> (A class providing iterators for embedded lists )	19
<a href="#">Parma_Watchdog_Library::Handler</a> (Abstract base class for handlers of the watchdog events )	20
<a href="#">Parma_Watchdog_Library::Handler_Flag&lt; Flag_Base, Flag &gt;</a> (A kind of <a href="#">Handler</a> that installs a flag onto a flag-holder )	21
<a href="#">Parma_Watchdog_Library::Handler_Function</a> (A kind of <a href="#">Handler</a> calling a given function )	22
<a href="#">Parma_Watchdog_Library::Pending_Element</a> (A class for pending watchdog events with embedded links )	22
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<a href="#">Parma_Watchdog_Library::Time</a> (A class for representing and manipulating positive time intervals )	24
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## 5 Class Documentation

### 5.1 Parma\_Watchdog\_Library::Doubly\_Linked\_Object Class Reference

A (base) class for doubly linked objects.

```
#include <pwl.hh>
```

Inherited by [Parma\\_Watchdog\\_Library::EList< Parma\\_Watchdog\\_Library::Pending\\_Element >](#)[private], [Parma\\_Watchdog\\_Library::EList< T >](#)[private], and [Parma\\_Watchdog\\_Library::Pending\\_Element](#).

#### Public Member Functions

- [Doubly\\_Linked\\_Object](#) ()  
*Default constructor.*
- [Doubly\\_Linked\\_Object](#) ([Doubly\\_Linked\\_Object](#) \*f, [Doubly\\_Linked\\_Object](#) \*b)  
*Creates a chain element with forward link f and backward link b.*
- void [insert\\_before](#) ([Doubly\\_Linked\\_Object](#) &y)  
*Inserts y before \*this.*
- void [insert\\_after](#) ([Doubly\\_Linked\\_Object](#) &y)  
*Inserts y after \*this.*
- [Doubly\\_Linked\\_Object](#) \* [erase](#) ()  
*Erases \*this from the chain and returns a pointer to the next element.*
- [~Doubly\\_Linked\\_Object](#) ()

*Erases \*this from the chain.*

### 5.1.1 Detailed Description

A (base) class for doubly linked objects.

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

- pwl.hh

## 5.2 Parma\_Watchdog\_Library::EList< T > Class Template Reference

A simple kind of embedded list (i.e., a doubly linked objects where the links are embedded in the objects themselves).

```
#include <pwl.hh>
```

Inherits [Parma\\_Watchdog\\_Library::Doubly\\_Linked\\_Object](#).

### Public Types

- typedef [EList\\_Iterator](#)< const T > [Const\\_Iterator](#)  
*A const iterator to traverse the list.*
- typedef [EList\\_Iterator](#)< T > [Iterator](#)  
*A non-const iterator to traverse the list.*

### Public Member Functions

- [EList](#) ()  
*Constructs an empty list.*
- [~EList](#) ()  
*Destructs the list and all the elements in it.*
- void [push\\_front](#) (T &obj)  
*Pushes obj to the front of the list.*
- void [push\\_back](#) (T &obj)  
*Pushes obj to the back of the list.*
- [Iterator](#) [insert](#) ([Iterator](#) position, T &obj)  
*Inserts obj just before position and returns an iterator that points to the inserted object.*
- [Iterator](#) [erase](#) ([Iterator](#) position)  
*Removes the element pointed to by position, returning an iterator pointing to the next element, if any, or [end\(\)](#), otherwise.*
- bool [empty](#) () const

Returns `true` if and only if the list is empty.

- [Iterator begin \(\)](#)  
Returns an iterator pointing to the beginning of the list.
- [Iterator end \(\)](#)  
Returns an iterator pointing one past the last element in the list.
- [Const\\_Iterator begin \(\) const](#)  
Returns a const iterator pointing to the beginning of the list.
- [Const\\_Iterator end \(\) const](#)  
Returns a const iterator pointing one past the last element in the list.
- `bool OK () const`  
Checks if all the invariants are satisfied.

### 5.2.1 Detailed Description

**template<typename T> class Parma\_Watchdog\_Library::EList< T >**

A simple kind of embedded list (i.e., a doubly linked objects where the links are embedded in the objects themselves).

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

- `pwl.hh`

## 5.3 Parma\_Watchdog\_Library::EList\_Iterator< T > Class Template Reference

A class providing iterators for embedded lists.

```
#include <pwl.hh>
```

### Public Member Functions

- [EList\\_Iterator \(\)](#)  
Constructs an iterator pointing to nothing.
- [EList\\_Iterator \(Doubly\\_Linked\\_Object \\*p\)](#)  
Constructs an iterator pointing to `p`.
- [EList\\_Iterator & operator= \(Doubly\\_Linked\\_Object \\*p\)](#)  
Changes `*this` so that it points to `p`.
- `T * operator → ()`  
Indirect member selector.
- `T & operator* ()`

*Dereference operator.*

- [EList\\_Iterator](#) & [operator++](#) ()

*Preincrement operator.*

- [EList\\_Iterator](#) [operator++](#) (int)

*Postincrement operator.*

- [EList\\_Iterator](#) & [operator--](#) ()

*Predecrement operator.*

- [EList\\_Iterator](#) [operator--](#) (int)

*Postdecrement operator.*

## Friends

- bool [operator==](#) (const [EList\\_Iterator](#) &x, const [EList\\_Iterator](#) &y)

*Returns true if and only if x and y are equal.*

- bool [operator!=](#) (const [EList\\_Iterator](#) &x, const [EList\\_Iterator](#) &y)

*Returns true if and only if x and y are different.*

## 5.3.1 Detailed Description

**template<typename T> class Parma\_Watchdog\_Library::EList\_Iterator< T >**

A class providing iterators for embedded lists.

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

- pwl.hh

## 5.4 Parma\_Watchdog\_Library::Handler Class Reference

Abstract base class for handlers of the watchdog events.

```
#include <pwl.hh>
```

Inherited by [Parma\\_Watchdog\\_Library::Handler\\_Flag< Flag\\_Base, Flag >](#)[virtual], and [Parma\\_Watchdog\\_Library::Handler\\_Function](#)[virtual].

## Public Member Functions

- virtual void [act](#) () const =0

*Does the job.*

- virtual [~Handler](#) ()

*Virtual destructor.*

### 5.4.1 Detailed Description

Abstract base class for handlers of the watchdog events.

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

- pwl.hh

## 5.5 Parma\_Watchdog\_Library::Handler\_Flag< Flag\_Base, Flag > Class Template Reference

A kind of [Handler](#) that installs a flag onto a flag-holder.

```
#include <pwl.hh>
```

Inherits [Parma\\_Watchdog\\_Library::Handler](#).

### Public Member Functions

- [Handler\\_Flag](#) (const `Flag_Base *volatile &holder`, `Flag &flag`)  
*Constructor with a given function.*
- void [act](#) () const

### 5.5.1 Detailed Description

**template<typename Flag\_Base, typename Flag> class Parma\_Watchdog\_Library::Handler\_Flag< Flag\_Base, Flag >**

A kind of [Handler](#) that installs a flag onto a flag-holder.

The template class `Handler_Flag<Flag_Base, Flag>` is an handler whose job is to install a flag onto an *holder* for the flag. The flag is of type `Flag` and the holder is a (volatile) pointer to `Flag_Base`. Installing the flag onto the holder means making the holder point to the flag, so that it must be possible to assign a value of type `Flag*` to an entity of type `Flag_Base*`. The class `Flag` must provide the method

```
int priority() const
```

returning an integer priority associated to the flag.

The handler will install its flag onto the holder only if the holder is empty, namely, it is the null pointer, or if the holder holds a flag of strictly lower priority.

### 5.5.2 Member Function Documentation

**5.5.2.1 template<typename Flag\_Base , typename Flag > void Parma\_Watchdog\_Library::Handler\_Flag< Flag\_Base, Flag >::act () const** [inline, virtual]

Does its job: installs the flag onto the holder, if a flag with an higher priority has not already been installed.

Implements [Parma\\_Watchdog\\_Library::Handler](#).

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

- pwl.hh

## 5.6 Parma\_Watchdog\_Library::Handler\_Function Class Reference

A kind of [Handler](#) calling a given function.

```
#include <pwl.hh>
```

Inherits [Parma\\_Watchdog\\_Library::Handler](#).

### Public Member Functions

- [Handler\\_Function](#) (void(\*function)())  
*Constructor with a given function.*
- void [act](#) () const  
*Does its job: calls the embedded function.*

### 5.6.1 Detailed Description

A kind of [Handler](#) calling a given function.

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

- pwl.hh

## 5.7 Parma\_Watchdog\_Library::Pending\_Element Class Reference

A class for pending watchdog events with embedded links.

```
#include <pwl.hh>
```

Inherits [Parma\\_Watchdog\\_Library::Doubly\\_Linked\\_Object](#).

### Public Member Functions

- [Pending\\_Element](#) (const [Time](#) &deadline, const [Handler](#) &handler, bool &expired\_flag)  
*Constructs an element with the given attributes.*
- void [assign](#) (const [Time](#) &deadline, const [Handler](#) &handler, bool &expired\_flag)  
*Modifies \*this so that it has the given attributes.*
- const [Time](#) & [deadline](#) () const  
*Returns the deadline of the event.*
- const [Handler](#) & [handler](#) () const  
*Returns the handler associated to the event.*
- bool & [expired\\_flag](#) () const  
*Returns a reference to the "event-expired" flag.*
- bool [OK](#) () const  
*Checks if all the invariants are satisfied.*

### 5.7.1 Detailed Description

A class for pending watchdog events with embedded links.

Each pending watchdog event is characterized by a deadline (a positive time interval), an associated handler that will be invoked upon event expiration, and a Boolean flag that indicates whether the event has already expired or not.

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

- pwl.hh

## 5.8 Parma\_Watchdog\_Library::Pending\_List Class Reference

An ordered list for recording pending watchdog events.

```
#include <pwl.hh>
```

### Public Types

- typedef [EList](#)< [Pending\\_Element](#) >::Iterator Iterator  
*A non-const iterator to traverse the list.*

### Public Member Functions

- [Pending\\_List](#) ()  
*Constructs an empty list.*
- [~Pending\\_List](#) ()  
*Destructor.*
- [Iterator insert](#) (const [Time](#) &deadline, const [Handler](#) &handler, bool &expired\_flag)  
*Inserts a new [Pending\\_Element](#) object with the given attributes.*
- [Iterator erase](#) ([Iterator](#) position)  
*Removes the element pointed to by `position`, returning an iterator pointing to the next element, if any, or `end()`, otherwise.*
- bool [empty](#) () const  
*Returns `true` if and only if the list is empty.*
- [Iterator begin](#) ()  
*Returns an iterator pointing to the beginning of the list.*
- [Iterator end](#) ()  
*Returns an iterator pointing one past the last element in the list.*
- bool [OK](#) () const  
*Checks if all the invariants are satisfied.*



### 5.8.1 Detailed Description

An ordered list for recording pending watchdog events.

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

- pwl.hh

## 5.9 Parma\_Watchdog\_Library::Time Class Reference

A class for representing and manipulating positive time intervals.

```
#include <pwl.hh>
```

### Public Member Functions

- [Time](#) ()  
*Zero seconds.*
- [Time](#) (unsigned long hundredths\_of\_a\_second)  
*Constructor taking a number of hundredths of a second.*
- [Time](#) (unsigned long s, unsigned long m)  
*Constructor with seconds and microseconds.*
- unsigned long [seconds](#) () const  
*Returns the number of whole seconds contained in the represented time interval.*
- unsigned long [microseconds](#) () const  
*Returns the number of microseconds that, when added to the number of seconds returned by [seconds\(\)](#), give the represent time interval.*
- [Time](#) & [operator+=](#) (const [Time](#) &y)  
*Adds y to \*this.*
- [Time](#) & [operator-=](#) (const [Time](#) &y)  
*Subtracts y from \*this; if \*this is shorter than y, \*this is set to the null interval.*
- bool [OK](#) () const  
*Checks if all the invariants are satisfied.*

### 5.9.1 Detailed Description

A class for representing and manipulating positive time intervals.

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

- pwl.hh

## 5.10 Parma\_Watchdog\_Library::Watchdog Class Reference

A watchdog timer.

```
#include <pwl.hh>
```

### 5.10.1 Detailed Description

A watchdog timer.

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

- pwl.hh

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