

**NAME**

**timeradd**, **timersub**, **timerclear**, **timerisset**, **timercmp**, **timespecadd**, **timespecsub**, **timespecclear**, **timespecisset**, **timespeccmp** - operations on timevals and timespecs

**SYNOPSIS**

```
#include <sys/time.h>
```

*void*

```
timeradd(struct timeval *a, struct timeval *b, struct timeval *res);
```

*void*

```
timersub(struct timeval *a, struct timeval *b, struct timeval *res);
```

*void*

```
timerclear(struct timeval *tvp);
```

*int*

```
timerisset(struct timeval *tvp);
```

*int*

```
timercmp(struct timeval *a, struct timeval *b, CMP);
```

*void*

```
timespecadd(struct timespec *a, struct timespec *b, struct timespec *res);
```

*void*

```
timespecsub(struct timespec *a, struct timespec *b, struct timespec *res);
```

*void*

```
timespecclear(struct timespec *ts);
```

*int*

```
timespecisset(struct timespec *ts);
```

*int*

```
timespeccmp(struct timespec *a, struct timespec *b, CMP);
```

**DESCRIPTION**

These macros are provided for manipulating *timeval* and *timespec* structures for use with the `clock_gettime(2)`, `clock_settime(2)`, `gettimeofday(2)` and `settimeofday(2)` calls. The *timeval* structure is

defined in `<sys/time.h>` as:

```
struct timeval {
    long    tv_sec;           /* seconds since Jan. 1, 1970 */
    long    tv_usec;        /* and microseconds */
};
```

And the `timespec` structure is defined in `<time.h>` as:

```
struct timespec {
    time_t tv_sec;           /* seconds */
    long   tv_nsec;        /* and nanoseconds */
};
```

**timeradd()** and **timespecadd()** add the time information stored in *a* to *b* and store the result in *res*. The results are simplified such that the value of *res->tv\_usec* or *res->tv\_nsec* is always less than 1 second.

**timersub()** and **timespecsub()** subtract the time information stored in *b* from *a* and store the result in *res*.

**timerclear()** and **timespecclear()** initialize their argument to midnight (0 hour) January 1st, 1970 (the Epoch).

**timerisset()** and **timespecisset()** return true if their argument is set to any time value other than the Epoch.

**timercmp()** and **timespeccmp()** compare *a* to *b* using the comparison operator given in *CMP*, and return the result of that comparison.

## SEE ALSO

`clock_gettime(2)`, `gettimeofday(2)`

## HISTORY

The **timeradd()** family of macros were imported from NetBSD 1.1, and appeared in FreeBSD 2.2.6. The **timespecadd()** family of macros were imported from NetBSD 1.3 into FreeBSD 3.0, though they were not exposed to userland until FreeBSD 12.0.