

timer

COLLABORATORS

	<i>TITLE :</i> timer		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
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REVISION HISTORY

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Chapter 1

timer

1.1 timer.doc

--background--	CmpTime()	SubTime()	TR_SETSYSTIME
AbortIO()	GetSysTime()	TR_ADDREQUEST	
AddTime()	ReadEClock()	TR_GETSYSTIME	

1.2 timer.device/--background--

TIMER REQUEST

A time request is a non standard IO Request. It has an IORequest followed by a timeval structure or an eclockval structure.

TIMEVAL

A timeval structure consists of two longwords. The first is the number of seconds, the latter is the fractional number of microseconds. The microseconds must always be "normalized" e.g. the longword must be between 0 and one million.

ECLOCKVAL

A eclockval structure consists of two longwords. The first is the high order 32 bits of a 64 bit number and the second is the the low order 32 bits. The 64 bit number is a count of "E" clock ticks. The "E" clock frequency is related to the master clock frequency of the machine and can be determined by calling the ReadEClock() library like call.

UNITS

The timer contains five units -- two designed to accurately measure short intervals, one that has little system overhead and is very stable over time, and two that work like an alarm clock.

UNIT_MICROHZ

This unit uses the programmable timers in the 8520s to keep track of its time. It has precision down to about 2 microseconds, but will drift as system load increases. The accuracy of this unit is the same as that of the master clock of the machine. This unit uses a timeval in its timerequest.

UNIT_VBLANK

This unit uses a strobe from the power supply to keep track of its time or the "E" clock on machines without power supply strobes. It is very stable over time, but only has a resolution of that of the vertical blank interrupt. This unit is very cheap to use, and should be used by those who are waiting for long periods of time (typically 1/2 second or more). This unit uses a timeval in its timerequest.

UNIT_ECLOCK

This unit is exactly the same as UNIT_MICROHZ except that it uses an eclockval instead of a timeval in its timerequest.

UNIT_WAITUNTIL

This unit waits until the systime is greater than or equal to the time in the timeval in the timerequest. This unit has the same resolution and accuracy as that of UNIT_VBLANK.

UNIT_WAITECLOCK

This unit waits until the E-Clock value as returned by ReadEClock() is greater than or equal to the eclockval in the timerequest. This unit has the same resolution and accuracy as that of UNIT_ECLOCK.

LIBRARY

In addition to the normal device calls, the timer also supports several direct, library like calls.

BUGS

In the V1.2/V1.3 release, the timer device has problems with very short time requests. When one of these is made, other timer requests may be finished inaccurately. A side effect is that AmigaDOS requests such as "Delay(0);" or "WaitForChar(x,0);" are unreliable.

1.3 timer.device/AbortIO

NAME

AbortIO -- Remove an existing timer request.

SYNOPSIS

```
error = AbortIO( timerequest )
D0          A1

LONG AbortIO( struct timerequest * );
```

FUNCTION

This is an exec.library call.

This routine removes a timerquest from the timer. It runs in the context of the caller.

INPUTS

timerequest - the timer request to be aborted

RETURNS

0 if the request was aborted, `io_Error` will also be set to `IOERR_ABORTED`.
-1 otherwise

NOTES

This function may be called from interrupts.

SEE ALSO

`exec.library/AbortIO()`

BUGS

1.4 timer.device/AddTime

NAME

AddTime -- Add one time request to another.

SYNOPSIS

```
AddTime( Dest, Source )
          A0      A1
```

```
void AddTime( struct timeval *, struct timeval *);
```

FUNCTION

This routine adds one `timeval` structure to another. The results are stored in the destination (`Dest + Source -> Dest`)

A0 and A1 will be left unchanged

INPUTS

`Dest`, `Source` -- pointers to `timeval` structures.

NOTES

This function may be called from interrupts.

SEE ALSO

`timer.device/CmpTime()`,
`timer.device/SubTime()`

BUGS

1.5 timer.device/CmpTime

NAME

CmpTime -- Compare two `timeval` structures.

SYNOPSIS

```
result = CmpTime( Dest, Source )
D0              A0      A1
```

```
LONG CmpTime( struct timeval *, struct timeval *);
```

FUNCTION

This routine compares timeval structures

A0 and A1 will be left unchanged

INPUTS

Dest, Source -- pointers to timeval structures.

RESULTS

result will be 0 if Dest has same time as source
 -1 if Dest has more time than source
 +1 if Dest has less time than source

NOTES

This function may be called from interrupts.

SEE ALSO

timer.device/AddTime(),
timer.device/SubTime()

BUGS

Older version of this document had the sense of the return codes wrong; the code hasn't changed but the document has.

1.6 timer.device/GetSysTime

NAME

GetSysTime -- Get the system time. (V36)

SYNOPSIS

GetSysTime(Dest)
 A0

void GetSysTime(struct timeval *);

FUNCTION

Ask the system what time it is. The system time starts off at zero at power on, but may be initialized via the TR_SETSYSTIME timer.device command.

System time is monotonocally increasing and guarenteed to be unique (except when the system time is set back).

A0 will be left unchanged.

This function is less expensive to use than the TR_GETSYSTIME IORquest.

INPUTS

Dest -- pointer to a timeval structure to hold the system time.

RESULTS

Dest -- the timeval structure will contain the system time.

NOTES

This function may be called from interrupts.

SEE ALSO

timer.device/TR_GETSYSTIME,
timer.device/TR_SETSYSTIME,

BUGS

1.7 timer.device/ReadEClock

NAME

ReadEClock -- Get the current value of the E-Clock. (V36)

SYNOPSIS

```
E_Freq = ReadEClock( Dest )
D0                      A0

ULONG ReadEClock ( struct EClockVal * );
```

FUNCTION

This routine calculates the current 64 bit value of the E-Clock and stores it in the destination EClockVal structure. The count rate of the E-Clock is also returned.

A0 will be left unchanged

This is a low overhead function designed so that very short intervals may be timed.

INPUTS

Dest -- pointer to an EClockVal structure.

RETURNS

Dest -- the EClockVal structure will contain the E-Clock time
E_Freq -- The count rate of the E-Clock (tics/sec).

NOTES

This function may be called from interrupts.

SEE ALSO

BUGS

1.8 timer.device/SubTime

NAME

SubTime -- Subtract one time request from another.

SYNOPSIS

```
SubTime( Dest, Source )
      A0      A1
```



```
void SubTime( struct timeval *, struct timeval *);
```

FUNCTION

This routine subtracts one timeval structure from another. The results are stored in the destination (Dest - Source -> Dest)

A0 and A1 will be left unchanged

INPUTS

Dest, Source -- pointers to timeval structures.

NOTES

This function may be called from interrupts.

SEE ALSO

timer.device/AddTime(),
timer.device/CmpTime()

BUGS

1.9 timer.device/TR_ADDREQUEST

NAME

TR_ADDREQUEST -- Submit a request to wait a period of time.

FUNCTION

Ask the timer to wait a specified amount of time before replying the timerequest.

The message may be forced to finish early with an AbortIO()/WaitIO() pair.

TIMER REQUEST

io_Message	mn_ReplyPort initialized
io_Device	preset by timer in OpenDevice
io_Unit	preset by timer in OpenDevice
io_Command	TR_ADDREQUEST
io_Flags	IOF_QUICK permitted (but ignored)
tr_time	a timeval structure specifying how long the device will wait before replying

RESULTS

tr_time will be zeroed

NOTES

This function may be called from interrupts.

Previous to 2.0, the tr_time field was documented as containing junk when the timerequest was returned.

SEE ALSO

timer.device/AbortIO(),
timer.device/TimeDelay(),

BUGS

1.10 timer.device/TR_GETSYSTIME

NAME

TR_GETSYSTIME -- get the system time.

FUNCTION

Ask the system what time it is. The system time starts off at zero at power on, but may be initialized via the TR_SETSYSTIME call.

System time is monotonically increasing, and guaranteed to be unique (except when the system time is set backwards).

TIMER REQUEST

io_Message	mn_ReplyPort initialized
io_Device	preset by timer in OpenDevice
io_Unit	preset by timer in OpenDevice
io_Command	TR_GETSYSTIME
io_Flags	IOF_QUICK permitted

RESULTS

tr_time	a timeval structure with the current system time
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NOTES

This function may be called from interrupts.

SEE ALSO

timer.device/TR_SETSYSTIME,
timer.device/GetSysTime(),

BUGS

1.11 timer.device/TR_SETSYSTIME

NAME

TR_SETSYSTIME -- Set the system time.

FUNCTION

Set the system idea of what time it is. The system starts out at time "zero" so it is safe to set it forward to the real time. However, care should be taken when setting the time backwards. System time is generally expected to monotonically increasing.

TIMER REQUEST

io_Message	mn_ReplyPort initialized
io_Device	preset by timer in OpenDevice
io_Unit	preset by timer in OpenDevice
io_Command	TR_GETSYSTIME

io_Flags	IOF_QUICK permitted
tr_time	a timeval structure with the current system time

RESULTS

tr_time	will contain junk
---------	-------------------

NOTES

This function may be called from interrupts.

SEE ALSO

timer.device/TR_GETSYSTIME, timer.device/GetSysTime(),

BUGS