

# Technical Note PS520

## Time Manager Q&As

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## Time Manager and calculating >24-hour elapsed times

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I'm trying to use the Macintosh Time Manager to calculate elapsed times, but when I increase the delay time from \$4FFFFFF to \$5FFFFFF I get incorrect results. Why is this happening?

There seems to be an undocumented limitation of the Time Manager: it can't keep track of times longer than about a day, so it replaces them with the maximum time it supports. For Time Manager tasks, this isn't crippling; the task simply executes earlier than expected. When used for elapsed-time calculations, however, it's a bad thing; the Time Manager installs the task with the smaller time, and when you remove it, you see a smaller than expected remaining time. This makes it appear as if a large period of time has passed.

The value at which the Time Manager trims is approximately \$53A8FE5. The reason for this strange value is somewhat complex. The Time Manager uses a VIA timer to do its measurement. This timer runs at 783360 Hz, giving it a resolution of about 1.276 microseconds. However, the Macintosh could never actually provide this kind of accuracy, given its latencies and overhead. Also, this frequency would have given a 32-bit counter a range of only about 91 minutes. Therefore, the Time Manager actually throws away the low four bits of this counter, keeping a 32-bit counter with a resolution of 20.425 microseconds and a range of 24 hours, 22 minutes. This time is a lot larger than the maximum number of microseconds that can be measured, but is equal to 87,724,005 milliseconds, which is (ta-dahh!) \$53A8FE5. This is why you were overflowing the Time Manager's internal counter, causing your task to be clipped.

All should work well if you use times less than 24 hours. If you need to measure durations for times exceeding the Time Manager's limits, you can use a fixed-frequency task that executes every hour and increments an hour counter. To determine the fractional hours component of the time, you'd remove the task to determine how much longer till the next hour.

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