Quantum

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COLLABORATORS

	TITLE : Quantum		
ACTION	*NAME*	*DATE*	*SIGNATURE*
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REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

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Chapter 1

Quantum

1.1   main

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                    ****************************************************
        ***  Quantum V1.1, © Mathias Karlsson 20 Oct 1997  ***
         **   Changes the quantum time slice in ExecBase   **
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                        Quantum © 1996,1997 Mathias Karlsson
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1.2   Distribution

```
DISTRIBUTION:

    I (Quantum) am freely distributable as long as the following conditions
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and terms are fulfilled:

    o   All my files in this archive must remain unmodified.

```
Quantum/Quantum              1092
Quantum/Quantum.info         3505
Quantum/Quantum12            6612
Quantum/Quantum.doc         13270
Quantum/Quantum.doc.info     1427
Quantum/Quantum.guide       15968
Quantum/Quantum.guide.info   2578
Quantum.info                 2273
Quantum.readme               1211
Quantum.readme.info          1427
```

    o   If any files are added to me, it must be obvious that
           they do not belong to the original distribution, and NO files
           may be added (or removed) to the Quantum directory!

           So called "BBS ads" may NEVER be added! I hate them!

    o   I MAY be repacked with LZX or other more efficient Amiga
           archivers, but my directory structure must remain intact.

           So called "BBS ads" may NEVER be added! I hate them!

    o   The copying is done on a non-commercial basis.
           A small fee to cover media costs etc. may be charged.

*READ >>> If you put me on a CD or coverdisks etc My Creator would
*THIS >>> appreciate a copy of the disk (magazine?),but it's not required.

    o   Aminet and Fred Fish can distribute me in any way they want.

    o   Copy me. I want to travel!

1.3 Purpose

PURPOSE:

    By changing the exec quantum time slice value you may in some cases
    get a 'snappier' computer and speed increases when multitasking, because
    the speed of exec taskswitching is increased.

    I, Quantum, can do that.

        Q: Why? How? And what is a quantum anyway?
        A: Read this document. Especially "How it works".

1.4 Requirements

REQUIREMENTS:

    Any Amiga. I use no memory after the exec quantum has been modified.

    I, Quantum, being highly sofisticated, requires OS2+, and can be started
    both from Workbench and CLI. I will just exit if run under OS1.x,
    printing "You need OS2+" or something.

    My low-life brother, Quantum12, runs on any Amiga, but is CLI-only, ha!

    We both prefer 68020+, and fastmem is recommended, but _not_ needed.

        Q: Why is "Quantum12" 5x larger than "Quantum"?
        A: Because My Creator wrote that version in 5 minutes and used
            standard stdio (printf() etc). Live with it. You should all
            have upgraded to OS2+ anyway. Your Amiga deserves it.

    I have been tested on these configurations:

    Amiga 500 KS2.04 with and without 68030
    Amiga 500 KS3.1 with and without 68030
    Amiga 1200 KS3.0 with and without 68030 + MMU
    Amiga 4000/040 KS3.1 running Enforcer etc.

    Quantum12 has been tested on My Creators old Amiga 500 running KS1.3

1.5 How It Works

HOW IT WORKS:

    First you must know how multitasking works on the Amiga.

    This info can be found in RKRM if anyone is interested, but
    here is a brief (well...) introduction:

 --*   *-*-*

    The Amiga's multitasking works by switching which task is currently
    using the CPU. Each task has a priority assigned to it. Exec will let
    the task with the highest priority use the CPU, but only if the task
    is _ready_ to run.

    A task can be in one of three states: 'ready', 'sleeping' or 'running.'

    A 'ready' task is not currently using the CPU, but is waiting to use
    the processor. Exec keeps and sorts a list of the 'ready' tasks so it
    easily can find the 'ready' task with the highest priority, and 'run' it.

    A 'sleeping' task is not currently 'running', and is waiting for some
    event (keypress, mouseclick etc) to happen, and then Exec will move the
    'sleeping' task into the list of 'ready' tasks.

    A 'running' task is currently using the CPU, and will remain the current
    task until one of three things occur:

o   A higher priority task becomes ready, so the OS preempts the current
    task and switches to the higher priority task.

o   The currently running task needs to wait for an event, so it goes to
    sleep and Exec switches to the highest priority task in Exec's ready
    list.

o   The currently running task has control of the CPU for at least a
    preset time period called a quantum and there is another task with
    equal priority ready to run. In this case, Exec will preempt the
    current task for the ready one with the same priority.

    This is known as time-slicing.

    When there is a group of tasks of equal priority on the top of the
    ready list, Exec will cycle through them, letting each one use
    the CPU for a quantum (a slice of time).

    This will result in a time-sequenced 'round robin' scheduling of
    all equal-priority tasks.

*NOTE   In KS1.3 (and probably 1.2 as well), there is a bug in Exec,
        that causes a taskswitch after each interrupt, even if the whole
        quantum isn't used. This mean that under certain conditions (well,
        pretty much most of the time...:) changing the quantum from 16 to 4
        or 255 or even 65535 or 1 won't make much (if any) difference.

        Well, who cares. It won't hurt either.

        Upgrade thy OS.

 --*   *-*-*

    Q: So. What's the problem with this?

    A: Well, if you have many time-consuming tasks running at the same
       priority the computer will feel sluggish and slow.

       Even if it is an Amiga. I try to speed things up.

Generally speaking, time-consuming and/or number-crunching programs
such as raytracers or compilers should be set to lower priority
to eliminate this problem, but some programs won't let you change
priorities (or screw up if you change them anyway) so I, Quantum,
may, in some cases, make the computer feel faster and more responsive.

The default quantum for OS2.04-3.1 is _4_, and for OS1.3 _16_ (I think).

Generally speaking, changing the quantum to a LOWER value will speed
up taskswitching and practical usage, in THEORY a HIGHER value may give
numbercrunching programs (raytracers etc) a (small) boost because fewer
taskswitchs are needed. Go ahead and experiment! (send me results!)

My Creator read somwhere that 68030/040s have no problem with a quantum
of 1 and tests made by myself and him on his 40MHz 030 supports
that theory.

Of course slower Amigas may benefit from me too.

I am the Greatest!

I do Magic!

I am Quantum!

Oh, did I mention I was humble too?

1.6 USAGE

                USAGE:

Quantum can be used from either Workbench or Shell but requires OS2+.
Quantum12, the version that runs on any Amiga, can only be started from
shell.

                ~~Shell~~~~

                Workbench~~

1.7 CLI_USAGE

    From CLI: I, Quantum, can be run with or without arguments.
                      If no arguments are given, the current value
                      of the exec quantum is printed.

                      1:> Quantum
                      Quantum 1.0 © Mathias Karlsson 1996
                      Quantum:4
                      1:>

                      And if you feed me a number I will try to change the
                      exec quantum to that value.

                      It can be any number from 1 (fastest) to 255 (slowest).
                      4 is default under OS2-3.

                      My Creator say it is possible to change the Quantum
                      to any value between 0 and 65535 ('UWORD'), but that
                      the need for so high numbers are (virtually) zer0.

                      1:> Quantum 2
                      Quantum 1.0 © Mathias Karlsson 1996
                      Quantum:2
                      1:>

                      If you want to run me every time you boot your computer,
                      and why wouldn't you, you can put me in your

s:startup-sequence or s:User-Startup.

Just add this line:

Quantum >nil: 1

anywhere in s:startup-sequence or s:User-Startup.

Adding me early to the startup-sequence made My Creators
(1min+) startup 5-10% faster.

Quantum12 works in the same way.

1.8 WB_USAGE

From WorkBench: Easy. Just dump me in sys:wbstartup. Or doubleclick me.
(only 'Quantum')
                      But first you may want to have a look at the tooltypes
                      in the Quantum icon. Select an icon and 'Information'
                      in the Workbench menu. You will find three tooltypes:

                      QUANTUM=1
                      (SHOW)
                      DONOTWAIT

                      QUANTUM=1 is of course the new exec quantum value.
                                 It can be any number from 1 (fastest)
                                 to 255 (slowest). 4 is default under OS2-3.

                      (SHOW)   If you remove the parentheses (=activates)
                                 a small requester will pop-up and show
                                 the current value of the exec quantum.

                      DONOTWAIT Tells Workbench not to wait for it in
                                 the WBStartup. Do not touch.

                      Quantum12, the Kickstart 1.2-1.3 version, can not
                      be run from Workbench, it will just exit, doing
                      nothing. Ha! Upgrade!

 *UGLY   Unfortunately, My Creator is not a painter, and
 *ICON   my icon look pretty ugly. I deserve better!

 *FAME   If you send My Creator a better looking icon I'm
 *AND   sure he'll include it in the next release!
 *GLORY   And give eternal fame and glory to _you_ of course:-)
                      If you send me a 'NewIcon' icon please send an
                      iff-picture too, My Creator doesn't have NewIcons
                      installed and seeing the icon before spreading it all
                      over the world would be nice...:)

1.9 Test

```
TESTING:

    TEST 1:
    (compiling a rather large c-source file, and having three other tasks
     busywaiting at the same priority. Stupid, but hey, this is a test...:)

    Quantum is:1
    12-> time dmake -a
    DMAKE Done.
    Execution time: 44.948498 s.

    Quantum is:4     [default OS2 & OS3]
    12-> time dmake -a
    DMAKE Done.
    Execution time: 116.703899 s.

    Quantum is:16    [default KS1.2 & 1.3]
    12-> time dmake -a
    DMAKE Done.
    Execution time: 189.556968 s.

    TEST 2:
    (having one other task busywait and testing 'dir c:' with 300+ files)

    Quantum is:1
    12-> timenil dir c:
    Execution time: 14.966172 s.

    Quantum is:4     [default OS2 & OS3]
    12-> timenil dir c:
    Execution time: 35.418734 s.

    Quantum is:16    [default KS1.2 & 1.3]
    12-> timenil dir c:
    Execution time: 49.001525 s.

    Well. My Creator didn't bother to make any more tests, but if you
    use me and make other interesting tests and/or get funny/interesting
    results from using me, go ahead, mail My Creator.

NOTE: If you are running Executive (GREAT program!) you can not do
    tests like this, because Executive will lower the priority of those
    Busy-Waiting or numbercrunching tasks.
    So, if you are using Executive and set a quantum of 1 you will
    not notice a big difference in performance, if any.
    But the computer may feel 'snappier'.

    The Queue-scheduler of Executive adjusts the quantum value BTW. Nice.
```

1.10 Acknowledgments

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ACKNOWLEDGMENTS:

    Icon for me (Quantum) is made by Frank Stohl and
```

severely modified by my creator.

Icon for the drawer is made by Martin Huttenloher.

Icon for documentation is made by Frank Bernard.

Dice C and Black's Editor ('BED') were used during development.

Music played while programming and writing docs:

```
Iron Maiden
  Kraftwerk
    Manowar
      Rob Hubbard, Galway, Whittaker, Daglish (PlaySID)
        ABBA
          Beethoven
            and more...
```

1.11 CONTACT

CONTACT:

        e-mail: md7karma@mdstud.chalmers.se

1.12 History

HISTORY:

        10 May 1996   V1.0, first public release.
        20 Oct 1997   V1.1, rewrote some parts of the code.

1.13 Disclaimer

DISCLAIMER:

I am a hack. I modify data in ExecBase! Viruskillers and system
testing software may report me! Mohahahahahahahaaaaa!!!

Some people say you should never ever never change anything in ExecBase.

Don't listen to them;-)

Changing quantum should not cause any problems on any Amiga running
KS1.2-3.1, and probably not in future versions either.

But you have been warned.

The SOURCE [4323 bytes], in Dice C, IS available upon request.

1.14   Final

FINAL WORDS:

```
Q: Why the h*ck is this documentation so LONG, it's a tiny program?
A: I don't know. You tell me. Probably My Creator was bored or
   on drugs or something when he wrote this monster documentation
   for a 1K program...

[Creators note: Both. Both.]

Q: Similar programs?
A: MultiSmooth which now also can be found on Aminet is a similar
   program but a bit more limited, it has no options.
```