Georgios Markou Echtzeitverarbeitung 4
1)

```
#kernel=kernel-4.19.img
kernel=kernel-4.19-rt.img
#kernel=kernel.img
#initramfs initrd.gz

# For more options and information see
# http://rpf.io/configtxt
# Some settings may impact device functionality. See link above for details

# uncomment if you get no picture on HDMI for a default "safe" mode
#hdmi_safe=1

# uncomment this if your display has a black border of unused pixels visible
# and your display can output without overscan
disable_overscan=1

# uncomment the following to adjust overscan. Use positive numbers if console
# goes off screen, and negative if there is too much border
#overscan_left=16
#overscan_right=16
#overscan_top=16
#overscan_bottom=16

"/boot/config.txt" 92L, 2169B                          2,1        Anfang
```

Um den Real-Time Kernel zu verwenden muss die zweite Zeile auskommentiert und die erste einkommentiert werden (s. o.).

```
pi@raspberrypi:~$ uname -a
Linux raspberrypi 4.19.71-rt24+ #1 PREEMPT RT Tue Apr 5 13:36:43 CEST 2022 armv6l GNU/Linux
pi@raspberrypi:~$
```

Mit dem obigen Befehl sieht man dass jetzt der Real-Time Kernel verwendet wird.

2)
Das Programm cyclictest habe ich auf einem USB-Stick gespeichert und auf dem Raspberry-Pi kompiliert.
Die Parameter bedeuten folgendes (siehe manpage):

-p : „Set the priority of the first thread. The given priority is set to the first test thread. Each further thread gets a lower priority: Priority(Thread N) = max(Priority(Thread N-1) - 1, 0)"

-t : „Set the number of test threads (default is 1). Create NUM test threads. If NUM is not specified, NUM is set to the number of available CPUs. See -d, -i and -p for further information."

-n : „Use clock_nanosleep instead of posix interval timers. Setting this option runs the tests with clock_nanosleep instead of posix interval timers."

-l : „Set the number of loops. The default is 0 (endless). This option is useful for automated tests with a given number of test cycles. Cyclictest is stopped once the number of timer intervals has been reached."

Non-Real-Time ohne Last

```
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.24 0.33 0.23 1/93 1539

T: 0 ( 1535) P:80 I:1000 C:   9773 Min:      32 Act:    58 Avg:    47 Max:     113
T: 1 ( 1536) P:80 I:1500 C:   6737 Min:      33 Act:    50 Avg:    52 Max:     146
T: 2 ( 1537) P:80 I:2000 C:   5053 Min:      33 Act:    51 Avg:    49 Max:      98
T: 3 ( 1538) P:80 I:2500 C:   4042 Min:      34 Act:    51 Avg:    51 Max:     120
T: 4 ( 1539) P:80 I:3000 C:   3369 Min:      34 Act:    65 Avg:    52 Max:     113
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.26 0.33 0.23 1/92 1553

T: 0 ( 1549) P:80 I:1000 C:  10000 Min:      31 Act:    49 Avg:    49 Max:      97
T: 1 ( 1550) P:80 I:1500 C:   6732 Min:      33 Act:    59 Avg:    50 Max:     179
T: 2 ( 1551) P:80 I:2000 C:   5049 Min:      32 Act:    54 Avg:    49 Max:      89
T: 3 ( 1552) P:80 I:2500 C:   4039 Min:      32 Act:    47 Avg:    48 Max:     114
T: 4 ( 1553) P:80 I:3000 C:   3366 Min:      34 Act:    53 Avg:    48 Max:     117
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.16 0.30 0.22 1/92 1568

T: 0 ( 1563) P:80 I:1000 C:  10000 Min:      30 Act:    43 Avg:    48 Max:     106
T: 1 ( 1564) P:80 I:1500 C:   6731 Min:      32 Act:    63 Avg:    50 Max:     140
T: 2 ( 1565) P:80 I:2000 C:   5049 Min:      33 Act:    75 Avg:    49 Max:      97
T: 3 ( 1566) P:80 I:2500 C:   4039 Min:      31 Act:    63 Avg:    52 Max:     107
T: 4 ( 1567) P:80 I:3000 C:   3366 Min:      33 Act:    58 Avg:    50 Max:     118
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.08 0.26 0.21 1/92 1582

T: 0 ( 1578) P:80 I:1000 C:  10000 Min:      29 Act:    44 Avg:    48 Max:     106
T: 1 ( 1579) P:80 I:1500 C:   6730 Min:      33 Act:    58 Avg:    48 Max:     111
T: 2 ( 1580) P:80 I:2000 C:   5047 Min:      31 Act:    53 Avg:    52 Max:     112
T: 3 ( 1581) P:80 I:2500 C:   4038 Min:      33 Act:    61 Avg:    51 Max:     120
T: 4 ( 1582) P:80 I:3000 C:   3365 Min:      35 Act:    57 Avg:    50 Max:     109
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.55 0.36 0.24 1/92 1596

T: 0 ( 1592) P:80 I:1000 C:  10000 Min:      31 Act:    43 Avg:    47 Max:      93
T: 1 ( 1593) P:80 I:1500 C:   6733 Min:      31 Act:    67 Avg:    49 Max:     119
T: 2 ( 1594) P:80 I:2000 C:   5050 Min:      34 Act:    54 Avg:    51 Max:      98
T: 3 ( 1595) P:80 I:2500 C:   4040 Min:      34 Act:    46 Avg:    61 Max:     186
T: 4 ( 1596) P:80 I:3000 C:   3366 Min:      33 Act:    52 Avg:    51 Max:     110
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 1.12 0.49 0.29 1/93 1611

T: 0 ( 1606) P:80 I:1000 C:  10000 Min:      31 Act:   116 Avg:    56 Max:     156
T: 1 ( 1607) P:80 I:1500 C:   6736 Min:      32 Act:    50 Avg:    48 Max:     122
T: 2 ( 1608) P:80 I:2000 C:   5052 Min:      32 Act:    65 Avg:    48 Max:     124
T: 3 ( 1609) P:80 I:2500 C:   4041 Min:      31 Act:    50 Avg:    48 Max:     115
T: 4 ( 1610) P:80 I:3000 C:   3368 Min:      37 Act:    59 Avg:    54 Max:     120
pi@raspberrypi:~/rt-tests$
```

Non-Real-Time mit Last (md5sum /dev/zero):

```
pi@raspberrypi:~/rt-tests$ md5sum /dev/zero &
[1] 1617
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.43 0.41 0.28 2/95 1628

T: 0 ( 1624) P:80 I:1000 C:  10000 Min:     39 Act:    50 Avg:    69 Max:     176
T: 1 ( 1625) P:80 I:1500 C:   6756 Min:     38 Act:    64 Avg:    56 Max:     187
T: 2 ( 1626) P:80 I:2000 C:   5067 Min:     44 Act:    58 Avg:    61 Max:     111
T: 3 ( 1627) P:80 I:2500 C:   4053 Min:     37 Act:    65 Avg:    66 Max:     118
T: 4 ( 1628) P:80 I:3000 C:   3378 Min:     41 Act:    60 Avg:    57 Max:     125
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.84 0.50 0.31 2/95 1642

T: 0 ( 1638) P:80 I:1000 C:  10000 Min:     33 Act:    65 Avg:    60 Max:     114
T: 1 ( 1639) P:80 I:1500 C:   6754 Min:     40 Act:    60 Avg:    59 Max:     131
T: 2 ( 1640) P:80 I:2000 C:   5066 Min:     41 Act:    51 Avg:    52 Max:     116
T: 3 ( 1641) P:80 I:2500 C:   4052 Min:     38 Act:    56 Avg:    58 Max:     122
T: 4 ( 1642) P:80 I:3000 C:   3377 Min:     37 Act:    58 Avg:    60 Max:     126
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.95 0.54 0.33 2/95 1656

T: 0 ( 1652) P:80 I:1000 C:  10000 Min:     36 Act:    63 Avg:    58 Max:     123
T: 1 ( 1653) P:80 I:1500 C:   6756 Min:     40 Act:    50 Avg:    58 Max:     120
T: 2 ( 1654) P:80 I:2000 C:   5067 Min:     47 Act:    64 Avg:    63 Max:     130
T: 3 ( 1655) P:80 I:2500 C:   4054 Min:     38 Act:    66 Avg:    57 Max:     121
T: 4 ( 1656) P:80 I:3000 C:   3378 Min:     35 Act:    47 Avg:    52 Max:     101
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 1.25 0.63 0.36 2/95 1670

T: 0 ( 1666) P:80 I:1000 C:  10000 Min:     34 Act:    60 Avg:    58 Max:     133
T: 1 ( 1667) P:80 I:1500 C:   6754 Min:     40 Act:    65 Avg:    58 Max:     128
T: 2 ( 1668) P:80 I:2000 C:   5066 Min:     43 Act:    51 Avg:    61 Max:     115
T: 3 ( 1669) P:80 I:2500 C:   4053 Min:     37 Act:    70 Avg:    59 Max:     132
T: 4 ( 1670) P:80 I:3000 C:   3377 Min:     35 Act:    53 Avg:    55 Max:     115
pi@raspberrypi:~/rt-tests$ sudo ./cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 1.39 0.71 0.39 2/95 1684

T: 0 ( 1680) P:80 I:1000 C:  10000 Min:     35 Act:    48 Avg:    62 Max:     171
T: 1 ( 1681) P:80 I:1500 C:   6760 Min:     39 Act:    49 Avg:    64 Max:     200
T: 2 ( 1682) P:80 I:2000 C:   5070 Min:     42 Act:    53 Avg:    61 Max:     136
T: 3 ( 1683) P:80 I:2500 C:   4056 Min:     39 Act:    47 Avg:    57 Max:     123
T: 4 ( 1684) P:80 I:3000 C:   3380 Min:     35 Act:    58 Avg:    56 Max:     134
pi@raspberrypi:~/rt-tests$
```

Real-Time ohne Last:


```
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.28 0.19 0.08 2/80 1329

T: 0 ( 1325) P:80 I:1000 C:   10000 Min:    27 Act:    56 Avg:    40 Max:     146
T: 1 ( 1326) P:80 I:1500 C:    6667 Min:    27 Act:    73 Avg:    40 Max:     175
T: 2 ( 1327) P:80 I:2000 C:    5000 Min:    29 Act:    46 Avg:    41 Max:     212
T: 3 ( 1328) P:80 I:2500 C:    4000 Min:    28 Act:    50 Avg:    43 Max:     121
T: 4 ( 1329) P:80 I:3000 C:    3333 Min:    29 Act:    39 Avg:    41 Max:     226
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.22 0.18 0.08 1/79 1343

T: 0 ( 1339) P:80 I:1000 C:   10000 Min:    26 Act:    49 Avg:    39 Max:     116
T: 1 ( 1340) P:80 I:1500 C:    6669 Min:    28 Act:    83 Avg:    41 Max:     150
T: 2 ( 1341) P:80 I:2000 C:    5001 Min:    27 Act:    48 Avg:    41 Max:     180
T: 3 ( 1342) P:80 I:2500 C:    4001 Min:    28 Act:    41 Avg:    43 Max:     123
T: 4 ( 1343) P:80 I:3000 C:    3334 Min:    28 Act:    52 Avg:    41 Max:     154
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.18 0.17 0.07 1/79 1357

T: 0 ( 1353) P:80 I:1000 C:   10000 Min:    26 Act:    40 Avg:    42 Max:     159
T: 1 ( 1354) P:80 I:1500 C:    6670 Min:    28 Act:    36 Avg:    45 Max:     175
T: 2 ( 1355) P:80 I:2000 C:    5003 Min:    29 Act:    75 Avg:    41 Max:     142
T: 3 ( 1356) P:80 I:2500 C:    4002 Min:    28 Act:    42 Avg:    41 Max:     142
T: 4 ( 1357) P:80 I:3000 C:    3335 Min:    28 Act:    43 Avg:    44 Max:     193
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.15 0.16 0.07 1/79 1371

T: 0 ( 1367) P:80 I:1000 C:   10000 Min:    27 Act:    38 Avg:    40 Max:     145
T: 1 ( 1368) P:80 I:1500 C:    6670 Min:    27 Act:    55 Avg:    43 Max:     134
T: 2 ( 1369) P:80 I:2000 C:    5002 Min:    28 Act:    38 Avg:    47 Max:     182
T: 3 ( 1370) P:80 I:2500 C:    4002 Min:    28 Act:    37 Avg:    40 Max:     109
T: 4 ( 1371) P:80 I:3000 C:    3335 Min:    28 Act:    41 Avg:    42 Max:     163
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.12 0.16 0.07 2/80 1385

T: 0 ( 1381) P:80 I:1000 C:   10000 Min:    25 Act:    53 Avg:    40 Max:     151
T: 1 ( 1382) P:80 I:1500 C:    6667 Min:    28 Act:    54 Avg:    40 Max:     171
T: 2 ( 1383) P:80 I:2000 C:    5000 Min:    27 Act:    61 Avg:    38 Max:     113
T: 3 ( 1384) P:80 I:2500 C:    4000 Min:    27 Act:    37 Avg:    40 Max:     111
T: 4 ( 1385) P:80 I:3000 C:    3333 Min:    27 Act:    41 Avg:    44 Max:     135
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.10 0.15 0.07 1/79 1399

T: 0 ( 1395) P:80 I:1000 C:   10000 Min:    26 Act:    40 Avg:    40 Max:     197
T: 1 ( 1396) P:80 I:1500 C:    6673 Min:    27 Act:    77 Avg:    42 Max:     175
T: 2 ( 1397) P:80 I:2000 C:    5005 Min:    25 Act:    43 Avg:    42 Max:     155
T: 3 ( 1398) P:80 I:2500 C:    4004 Min:    28 Act:    49 Avg:    43 Max:     119
T: 4 ( 1399) P:80 I:3000 C:    3336 Min:    27 Act:    38 Avg:    39 Max:     109
root@raspberrypi:/home/pi/rt-tests#
```

Real-Time mit Last (md5sum /dev/zero):

```
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.32 0.18 0.09 2/80 1417

T: 0 ( 1413) P:80 I:1000 C:  10000 Min:      31 Act:   39 Avg:   48 Max:     183
T: 1 ( 1414) P:80 I:1500 C:   6683 Min:      36 Act:   75 Avg:   51 Max:     193
T: 2 ( 1415) P:80 I:2000 C:   5012 Min:      36 Act:   54 Avg:   54 Max:     216
T: 3 ( 1416) P:80 I:2500 C:   4009 Min:      34 Act:   57 Avg:   53 Max:     174
T: 4 ( 1417) P:80 I:3000 C:   3341 Min:      33 Act:   40 Avg:   48 Max:     181
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.57 0.24 0.11 2/81 1431

T: 0 ( 1427) P:80 I:1000 C:   9693 Min:      34 Act:   53 Avg:   49 Max:     128
T: 1 ( 1428) P:80 I:1500 C:   6684 Min:      35 Act:   40 Avg:   53 Max:     174
T: 2 ( 1429) P:80 I:2000 C:   5013 Min:      39 Act:   51 Avg:   54 Max:     165
T: 3 ( 1430) P:80 I:2500 C:   4010 Min:      35 Act:   45 Avg:   51 Max:     136
T: 4 ( 1431) P:80 I:3000 C:   3342 Min:      35 Act:   46 Avg:   55 Max:     161
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.67 0.28 0.12 2/80 1445

T: 0 ( 1441) P:80 I:1000 C:  10000 Min:      33 Act:   45 Avg:   52 Max:     134
T: 1 ( 1442) P:80 I:1500 C:   6698 Min:      35 Act:   92 Avg:   52 Max:     192
T: 2 ( 1443) P:80 I:2000 C:   5023 Min:      39 Act:   47 Avg:   52 Max:     118
T: 3 ( 1444) P:80 I:2500 C:   4019 Min:      34 Act:   76 Avg:   48 Max:     116
T: 4 ( 1445) P:80 I:3000 C:   3349 Min:      35 Act:   72 Avg:   60 Max:     166
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.82 0.33 0.14 2/81 1459

T: 0 ( 1455) P:80 I:1000 C:   9692 Min:      33 Act:   44 Avg:   53 Max:     166
T: 1 ( 1456) P:80 I:1500 C:   6684 Min:      36 Act:   43 Avg:   51 Max:     169
T: 2 ( 1457) P:80 I:2000 C:   5013 Min:      40 Act:   54 Avg:   53 Max:     117
T: 3 ( 1458) P:80 I:2500 C:   4010 Min:      34 Act:   49 Avg:   50 Max:     145
T: 4 ( 1459) P:80 I:3000 C:   3342 Min:      33 Act:   44 Avg:   55 Max:     158
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.85 0.36 0.15 2/76 1473

T: 0 ( 1469) P:80 I:1000 C:  10000 Min:      34 Act:   43 Avg:   51 Max:     131
T: 1 ( 1470) P:80 I:1500 C:   6681 Min:      37 Act:   58 Avg:   55 Max:     175
T: 2 ( 1471) P:80 I:2000 C:   5011 Min:      35 Act:   56 Avg:   54 Max:     116
T: 3 ( 1472) P:80 I:2500 C:   4009 Min:      34 Act:   71 Avg:   49 Max:     140
T: 4 ( 1473) P:80 I:3000 C:   3340 Min:      34 Act:   40 Avg:   57 Max:     157
root@raspberrypi:/home/pi/rt-tests# sudo cyclictest -p 80 -t 5 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 1.03 0.41 0.17 2/76 1487

T: 0 ( 1483) P:80 I:1000 C:  10000 Min:      32 Act:   66 Avg:   48 Max:     117
T: 1 ( 1484) P:80 I:1500 C:   6693 Min:      36 Act:   52 Avg:   51 Max:     165
T: 2 ( 1485) P:80 I:2000 C:   5020 Min:      37 Act:   49 Avg:   63 Max:     187
T: 3 ( 1486) P:80 I:2500 C:   4016 Min:      37 Act:   42 Avg:   51 Max:     117
T: 4 ( 1487) P:80 I:3000 C:   3346 Min:      35 Act:   52 Avg:   53 Max:     135
root@raspberrypi:/home/pi/rt-tests#
```

Eigener Computer (i5-4460 & 8 Gb Ram):

```
georgios@georgios-Lenovo-H50-50: ~/rt-tests

georgios@georgios-Lenovo-H50-50:~/rt-tests$ sudo cyclictest -p 80 -t 20 -n -l 10000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 1.19 1.03 1.35 2/804 6368

T: 0 ( 6347) P:80 I:1000 C:   10000 Min:      2 Act:   10 Avg:    5 Max:       47
T: 1 ( 6348) P:80 I:1500 C:    6673 Min:      2 Act:    4 Avg:    6 Max:       46
T: 2 ( 6349) P:80 I:2000 C:    5004 Min:      2 Act:    9 Avg:    7 Max:       77
T: 3 ( 6350) P:80 I:2500 C:    4003 Min:      2 Act:    4 Avg:    6 Max:       54
T: 4 ( 6351) P:80 I:3000 C:    3336 Min:      2 Act:    4 Avg:    5 Max:       41
T: 5 ( 6352) P:80 I:3500 C:    2859 Min:      2 Act:    4 Avg:    6 Max:       40
T: 6 ( 6353) P:80 I:4000 C:    2502 Min:      2 Act:    4 Avg:    6 Max:       31
T: 7 ( 6354) P:80 I:4500 C:    2224 Min:      2 Act:   11 Avg:    5 Max:       33
T: 8 ( 6355) P:80 I:5000 C:    2001 Min:      2 Act:    4 Avg:    5 Max:       26
T: 9 ( 6356) P:80 I:5500 C:    1819 Min:      2 Act:    9 Avg:    6 Max:       75
T:10 ( 6357) P:80 I:6000 C:    1668 Min:      2 Act:    4 Avg:    5 Max:       28
T:11 ( 6358) P:80 I:6500 C:    1539 Min:      2 Act:    5 Avg:    6 Max:       35
T:12 ( 6359) P:80 I:7000 C:    1429 Min:      2 Act:    5 Avg:    6 Max:       69
T:13 ( 6360) P:80 I:7500 C:    1334 Min:      2 Act:   11 Avg:    5 Max:       30
T:14 ( 6361) P:80 I:8000 C:    1251 Min:      2 Act:    4 Avg:    5 Max:       24
T:15 ( 6362) P:80 I:8500 C:    1177 Min:      2 Act:    5 Avg:    6 Max:       47
T:16 ( 6363) P:80 I:9000 C:    1112 Min:      2 Act:    4 Avg:    5 Max:       58
T:17 ( 6364) P:80 I:9500 C:    1053 Min:      2 Act:    6 Avg:    5 Max:       38
T:18 ( 6365) P:80 I:10000 C:   1000 Min:      2 Act:    8 Avg:    5 Max:       64
T:19 ( 6366) P:80 I:10500 C:    953 Min:      2 Act:    9 Avg:    5 Max:       42
georgios@georgios-Lenovo-H50-50:~/rt-tests$ sudo cyclictest -p 80 -t 20 -n -l 100000
# /dev/cpu_dma_latency set to 0us
policy: fifo: loadavg: 0.41 0.65 1.12 1/787 6409

T: 0 ( 6383) P:80 I:1000 C: 100000 Min:      2 Act:    8 Avg:    6 Max:      579
T: 1 ( 6384) P:80 I:1500 C:   66667 Min:      2 Act:    7 Avg:    6 Max:      101
T: 2 ( 6385) P:80 I:2000 C:   50000 Min:      2 Act:    8 Avg:    6 Max:      708
T: 3 ( 6386) P:80 I:2500 C:   40000 Min:      2 Act:    8 Avg:    6 Max:      159
T: 4 ( 6387) P:80 I:3000 C:   33333 Min:      2 Act:    3 Avg:    5 Max:       55
T: 5 ( 6388) P:80 I:3500 C:   28571 Min:      2 Act:    3 Avg:    5 Max:       80
T: 6 ( 6389) P:80 I:4000 C:   25000 Min:      2 Act:    7 Avg:    6 Max:      274
T: 7 ( 6390) P:80 I:4500 C:   22222 Min:      2 Act:    3 Avg:    5 Max:       75
T: 8 ( 6391) P:80 I:5000 C:   20000 Min:      2 Act:    8 Avg:    5 Max:       94
T: 9 ( 6392) P:80 I:5500 C:   18181 Min:      2 Act:    3 Avg:    6 Max:       73
T:10 ( 6393) P:80 I:6000 C:   16666 Min:      2 Act:    3 Avg:    5 Max:       55
T:11 ( 6394) P:80 I:6500 C:   15384 Min:      2 Act:    3 Avg:    6 Max:       39
T:12 ( 6395) P:80 I:7000 C:   14285 Min:      2 Act:    4 Avg:    5 Max:      410
T:13 ( 6396) P:80 I:7500 C:   13333 Min:      2 Act:    5 Avg:    5 Max:       52
T:14 ( 6397) P:80 I:8000 C:   12500 Min:      2 Act:    7 Avg:    6 Max:     1381
T:15 ( 6398) P:80 I:8500 C:   11764 Min:      2 Act:    6 Avg:    5 Max:       74
T:16 ( 6399) P:80 I:9000 C:   11111 Min:      2 Act:    6 Avg:    6 Max:      519
T:17 ( 6400) P:80 I:9500 C:   10526 Min:      2 Act:    3 Avg:    6 Max:      173
T:18 ( 6401) P:80 I:10000 C:  10000 Min:      2 Act:    8 Avg:    5 Max:       61
T:19 ( 6402) P:80 I:10500 C:   9523 Min:      2 Act:    4 Avg:    6 Max:       42
georgios@georgios-Lenovo-H50-50:~/rt-tests$
```