# SPEC CPU®2017 Integer Rate Result

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## GIGA-BYTE TECHNOLOGY CO., LTD.

(Test Sponsor: Giga Computing Technology Co., Ltd.)

R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

$SPECrate®2017\_int\_base = 3100$

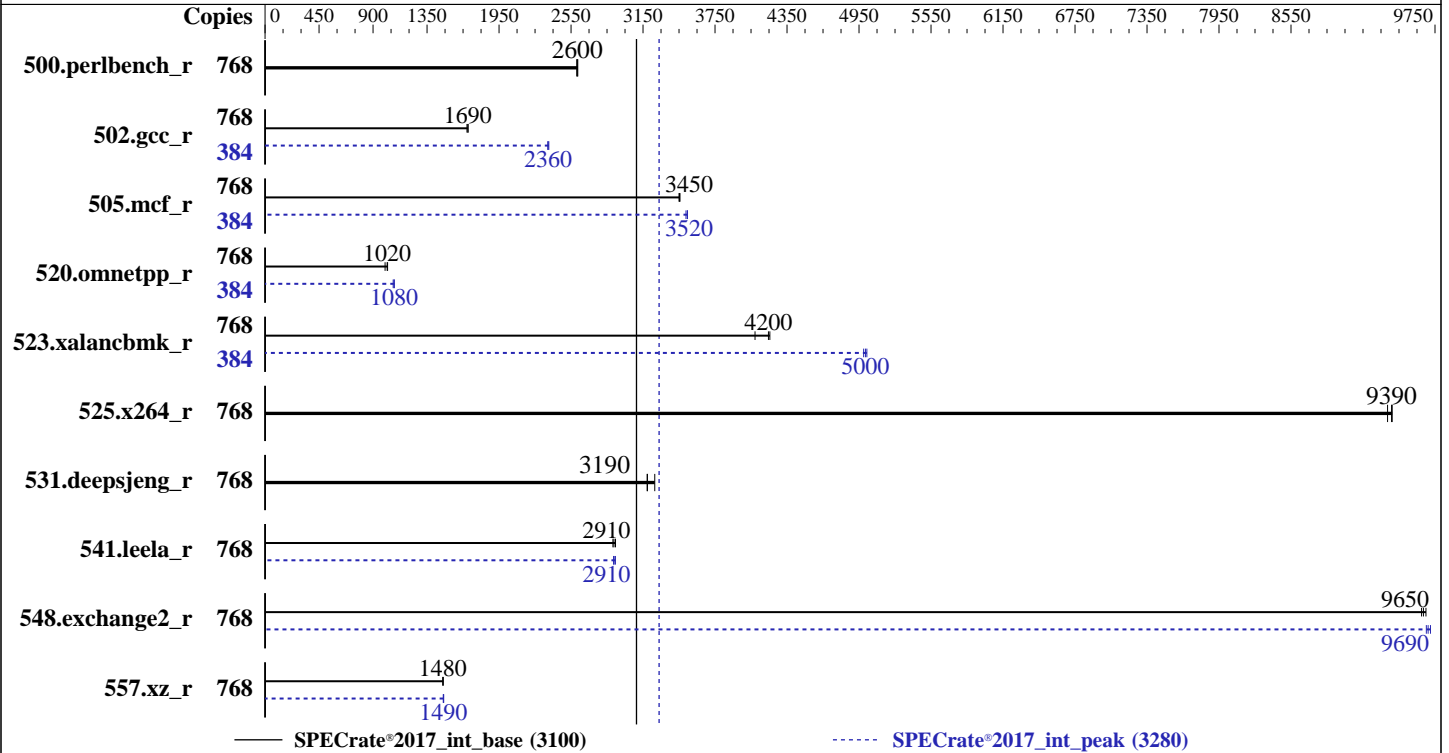$SPECrate®2017\_int\_peak = 3280$

**CPU2017 License:** 9082

**Test Sponsor:** Giga Computing Technology Co., Ltd.

**Tested by:** Giga Computing Technology Co., Ltd.

**Test Date:** Oct-2024

**Hardware Availability:** Oct-2024

**Software Availability:** Oct-2024

| Benchmark | Copies | Base | Peak |
|---|---|---|---|
| 500.perlbench_r | 768 | 2600 | |
| 502.gcc_r | 768 / 384 | 1690 | 2360 |
| 505.mcf_r | 768 / 384 | 3450 | 3520 |
| 520.omnetpp_r | 768 / 384 | 1020 | 1080 |
| 523.xalancbmk_r | 768 / 384 | 4200 | 5000 |
| 525.x264_r | 768 | 9390 | |
| 531.deepsjeng_r | 768 | 3190 | |
| 541.leela_r | 768 | 2910 | 2910 |
| 548.exchange2_r | 768 | 9650 | 9690 |
| 557.xz_r | 768 | 1480 | 1490 |

SPECrate®2017_int_base (3100) ----- SPECrate®2017_int_peak (3280)

## Hardware

CPU Name: AMD EPYC 9965
 Max MHz: 3700
 Nominal: 2250
Enabled: 384 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 384 MB I+D on chip per chip, 32 MB shared / 16 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-6400B-R, running at 6000)

Storage: 1 x 3.5TB SSD
Other: CPU Cooling: Air

## Software

OS: Ubuntu 22.04.03 LTS
 5.15.0-119-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version R03_F19 released Oct-2024
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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| | | |
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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 768 | **470** | **2600** | 471 | 2600 | 469 | 2610 | 768 | **470** | **2600** | 471 | 2600 | 469 | 2610 |
| 502.gcc_r | 768 | **643** | **1690** | 646 | 1680 | 643 | 1690 | 384 | **231** | **2360** | 231 | 2360 | 230 | 2360 |
| 505.mcf_r | 768 | 360 | 3450 | **359** | **3450** | 359 | 3460 | 384 | 177 | 3510 | 176 | 3520 | **176** | **3520** |
| 520.omnetpp_r | 768 | 987 | 1020 | 1007 | 1000 | **990** | **1020** | 384 | 468 | 1080 | **468** | **1080** | 472 | 1070 |
| 523.xalancbmk_r | 768 | **193** | **4200** | 199 | 4080 | 193 | 4210 | 384 | 81.3 | 4990 | 80.9 | 5020 | **81.0** | **5000** |
| 525.x264_r | 768 | **143** | **9390** | 143 | 9390 | 144 | 9350 | 768 | **143** | **9390** | 143 | 9390 | 144 | 9350 |
| 531.deepsjeng_r | 768 | **276** | **3190** | 271 | 3250 | 276 | 3180 | 768 | **276** | **3190** | 271 | 3250 | 276 | 3180 |
| 541.leela_r | 768 | 435 | 2920 | 439 | 2900 | **437** | **2910** | 768 | 436 | 2920 | 438 | 2900 | **437** | **2910** |
| 548.exchange2_r | 768 | 208 | 9670 | 209 | 9640 | **208** | **9650** | 768 | 208 | 9680 | 207 | 9710 | **208** | **9690** |
| 557.xz_r | 768 | 560 | 1480 | **559** | **1480** | 559 | 1480 | 768 | 559 | 1490 | 557 | 1490 | **557** | **1490** |
| **SPECrate®2017_int_base =** | **3100** | | | | | | | | | | | | | |
| **SPECrate®2017_int_peak =** | **3280** | | | | | | | | | | | | | |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

## Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

## Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations:
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

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## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/root/new_RC1298c/amd_rate_aocc500_znver5_A_lib/lib:/root/new_RC1298c/amd_rate_aocc500_znver5_A_lib/l
    ib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:always"
```

## General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

## Platform Notes

```
BIOS Settings:
Power Policy Quick Settings = Best Performance
TDP Control = Manual
TDP = 500
PPT Control = Manual
PPT = 500
SMT Mode = Enabled

 Sysinfo program /root/new_RC1298c/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on mz93-fs1 Fri Oct  4 18:25:30 2024

 SUT (System Under Test) info as seen by some common utilities.

 -----------------------------------------------------------
 Table of contents
 -----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.9)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
```

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## Platform Notes (Continued)

```
  18. /sys/kernel/mm/transparent_hugepage/khugepaged
  19. OS release
  20. Disk information
  21. /sys/devices/virtual/dmi/id
  22. dmidecode
  23. BIOS
  -------------------------------------------------------------

  -------------------------------------------------------------
  1. uname -a
    Linux mz93-fs1 5.15.0-119-generic #129-Ubuntu SMP Fri Aug 2 19:25:20 UTC 2024 x86_64 x86_64 x86_64
    GNU/Linux

  -------------------------------------------------------------
  2. w
     18:25:30 up 1 day,  6:23,  1 user,  load average: 0.37, 31.55, 223.10
    USER     TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -               Thu12   42.00s  1.47s  0.42s /bin/bash ./amd_rate_aocc500_znver5_A1.sh

  -------------------------------------------------------------
  3. Username
    From environment variable $USER:  root

  -------------------------------------------------------------
  4. ulimit -a
    time(seconds)        unlimited
    file(blocks)         unlimited
    data(kbytes)         unlimited
    stack(kbytes)        unlimited
    coredump(blocks)     0
    memory(kbytes)       unlimited
    locked memory(kbytes) 2097152
    process              6189511
    nofiles              1024
    vmemory(kbytes)      unlimited
    locks                unlimited
    rtprio               0

  -------------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init
   /bin/login -f
   -bash
   python3 ./run_amd_rate_aocc500_znver5_A1.py
   /bin/bash ./amd_rate_aocc500_znver5_A1.sh
   runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intrate
   runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
     --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
     $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /root/new_RC1298c

  -------------------------------------------------------------
  6. /proc/cpuinfo
     model name      : AMD EPYC 9965 192-Core Processor
     vendor_id       : AuthenticAMD
     cpu family      : 26
     model           : 17
     stepping        : 0
     microcode       : 0xb101021
```

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## Platform Notes (Continued)

```
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 192 4K pages
    cpu cores        : 192
    siblings         : 384
    2 physical ids (chips)
    768 processors (hardware threads)
    physical id 0: core ids 0-191
    physical id 1: core ids 0-191
    physical id 0: apicids 0-383
    physical id 1: apicids 512-895
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.


    ------------------------------------------------------------
    7. lscpu

    From lscpu from util-linux 2.37.2:
      Architecture:           x86_64
      CPU op-mode(s):         32-bit, 64-bit
      Address sizes:          52 bits physical, 57 bits virtual
      Byte Order:             Little Endian
      CPU(s):                 768
      On-line CPU(s) list:    0-767
      Vendor ID:              AuthenticAMD
      Model name:             AMD EPYC 9965 192-Core Processor
      CPU family:             26
      Model:                  17
      Thread(s) per core:     2
      Core(s) per socket:     192
      Socket(s):              2
      Stepping:               0
      Frequency boost:        enabled
      CPU max MHz:            3700.1951
      CPU min MHz:            1500.0000
      BogoMIPS:               4500.13
      Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                              pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                              rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
                              aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1
                              sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                              cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                              osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
                              perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd
                              mba ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust bmi1
                              avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx
                              smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl
                              xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                              cqm_mbm_local avx_vnni avx512_bf16 clzero irperf xsaveerptr rdpru
                              wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                              vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                              v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke
                              avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                              avx512_vpopcntdq la57 rdpid bus_lock_detect movdiri movdir64b
                              overflow_recov succor smca fsrm avx512_vp2intersect flush_l1d
      Virtualization:         AMD-V
      L1d cache:              18 MiB (384 instances)
      L1i cache:              12 MiB (384 instances)
      L2 cache:               384 MiB (384 instances)
      L3 cache:               768 MiB (24 instances)
      NUMA node(s):           24
```

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## Platform Notes (Continued)

```
  NUMA node0 CPU(s):                    0-15,384-399
  NUMA node1 CPU(s):                    16-31,400-415
  NUMA node2 CPU(s):                    32-47,416-431
  NUMA node3 CPU(s):                    48-63,432-447
  NUMA node4 CPU(s):                    64-79,448-463
  NUMA node5 CPU(s):                    80-95,464-479
  NUMA node6 CPU(s):                    96-111,480-495
  NUMA node7 CPU(s):                    112-127,496-511
  NUMA node8 CPU(s):                    128-143,512-527
  NUMA node9 CPU(s):                    144-159,528-543
  NUMA node10 CPU(s):                   160-175,544-559
  NUMA node11 CPU(s):                   176-191,560-575
  NUMA node12 CPU(s):                   192-207,576-591
  NUMA node13 CPU(s):                   208-223,592-607
  NUMA node14 CPU(s):                   224-239,608-623
  NUMA node15 CPU(s):                   240-255,624-639
  NUMA node16 CPU(s):                   256-271,640-655
  NUMA node17 CPU(s):                   272-287,656-671
  NUMA node18 CPU(s):                   288-303,672-687
  NUMA node19 CPU(s):                   304-319,688-703
  NUMA node20 CPU(s):                   320-335,704-719
  NUMA node21 CPU(s):                   336-351,720-735
  NUMA node22 CPU(s):                   352-367,736-751
  NUMA node23 CPU(s):                   368-383,752-767
  Vulnerability Gather data sampling:   Not affected
  Vulnerability Itlb multihit:          Not affected
  Vulnerability L1tf:                   Not affected
  Vulnerability Mds:                    Not affected
  Vulnerability Meltdown:               Not affected
  Vulnerability Mmio stale data:        Not affected
  Vulnerability Reg file data sampling: Not affected
  Vulnerability Retbleed:               Not affected
  Vulnerability Spec rstack overflow:   Not affected
  Vulnerability Spec store bypass:      Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:             Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:             Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                        always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
  Vulnerability Srbds:                  Not affected
  Vulnerability Tsx async abort:        Not affected

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d      48K      18M  12 Data            1    64       1           64
      L1i      32K      12M   8 Instruction     1    64       1           64
      L2        1M     384M  16 Unified         2  1024       1           64
      L3       32M     768M  16 Unified         3 32768       1           64

  ----------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 24 nodes (0-23)
    node 0 cpus: 0-15,384-399
    node 0 size: 64016 MB
    node 0 free: 63305 MB
    node 1 cpus: 16-31,400-415
    node 1 size: 64504 MB
    node 1 free: 63998 MB
    node 2 cpus: 32-47,416-431
    node 2 size: 64504 MB
    node 2 free: 63936 MB
```

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## Platform Notes (Continued)

```
        node 3 cpus: 48-63,432-447
        node 3 size: 64504 MB
        node 3 free: 63999 MB
        node 4 cpus: 64-79,448-463
        node 4 size: 64504 MB
        node 4 free: 63986 MB
        node 5 cpus: 80-95,464-479
        node 5 size: 64504 MB
        node 5 free: 64004 MB
        node 6 cpus: 96-111,480-495
        node 6 size: 64504 MB
        node 6 free: 64003 MB
        node 7 cpus: 112-127,496-511
        node 7 size: 64504 MB
        node 7 free: 64006 MB
        node 8 cpus: 128-143,512-527
        node 8 size: 64504 MB
        node 8 free: 64005 MB
        node 9 cpus: 144-159,528-543
        node 9 size: 64504 MB
        node 9 free: 63981 MB
        node 10 cpus: 160-175,544-559
        node 10 size: 64504 MB
        node 10 free: 64015 MB
        node 11 cpus: 176-191,560-575
        node 11 size: 64504 MB
        node 11 free: 64033 MB
        node 12 cpus: 192-207,576-591
        node 12 size: 64504 MB
        node 12 free: 63985 MB
        node 13 cpus: 208-223,592-607
        node 13 size: 64504 MB
        node 13 free: 63839 MB
        node 14 cpus: 224-239,608-623
        node 14 size: 64504 MB
        node 14 free: 63959 MB
        node 15 cpus: 240-255,624-639
        node 15 size: 64504 MB
        node 15 free: 64025 MB
        node 16 cpus: 256-271,640-655
        node 16 size: 64504 MB
        node 16 free: 64000 MB
        node 17 cpus: 272-287,656-671
        node 17 size: 64504 MB
        node 17 free: 64003 MB
        node 18 cpus: 288-303,672-687
        node 18 size: 64504 MB
        node 18 free: 64000 MB
        node 19 cpus: 304-319,688-703
        node 19 size: 64504 MB
        node 19 free: 64028 MB
        node 20 cpus: 320-335,704-719
        node 20 size: 64504 MB
        node 20 free: 63974 MB
        node 21 cpus: 336-351,720-735
        node 21 size: 64504 MB
        node 21 free: 63989 MB
        node 22 cpus: 352-367,736-751
        node 22 size: 64504 MB
        node 22 free: 63992 MB
```

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## Platform Notes (Continued)

```
   node 23 cpus: 368-383,752-767
   node 23 size: 64386 MB
   node 23 free: 63848 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23
     0:  10  11  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     1:  11  10  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     2:  11  11  10  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     3:  12  12  12  10  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     4:  12  12  12  11  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     5:  12  12  12  11  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     6:  12  12  12  12  12  12  10  11  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     7:  12  12  12  12  12  12  11  10  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     8:  12  12  12  12  12  12  11  11  10  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     9:  12  12  12  12  12  12  12  12  12  10  11  11  32  32  32  32  32  32  32  32  32  32  32  32
    10:  12  12  12  12  12  12  12  12  12  11  10  11  32  32  32  32  32  32  32  32  32  32  32  32
    11:  12  12  12  12  12  12  12  12  12  11  11  10  32  32  32  32  32  32  32  32  32  32  32  32
    12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  12  12  12  12  12  12  12  12  12
    13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  12  12  12  12  12  12  12  12  12
    14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  12  12  12  12  12  12  12  12  12
    15:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  10  11  11  12  12  12  12  12  12
    16:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  10  11  12  12  12  12  12  12
    17:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  11  10  12  12  12  12  12  12
    18:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11  11  12  12  12
    19:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10  11  12  12  12
    20:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11  10  12  12  12
    21:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  10  11  11
    22:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  10  11
    23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  11  10


   ----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:      1584631928 kB


   ----------------------------------------------------------------
10. who -r
   run-level 3 Oct 3 12:04


   ----------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.9)
   Default Target  Status
   multi-user      degraded


   ----------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                             LOAD   ACTIVE SUB    DESCRIPTION
   * fwupd-refresh.service            loaded failed failed Refresh fwupd metadata and update motd
   * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured


   ----------------------------------------------------------------
13. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                   cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                   grub-common grub-initrd-fallback irqbalance keyboard-setup lvm2-monitor lxd-agent
                   multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db
                   setvtrgb snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                   systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                   unattended-upgrades vgauth
   enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
```

**(Continued on next page)**

GIGA-BYTE TECHNOLOGY CO., LTD.

(Test Sponsor: Giga Computing Technology Co., Ltd.)

R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

SPECrate®2017_int_peak = 3280

| **CPU2017 License:** 9082 | | **Test Date:** | Oct-2024 |
|---|---|---|---|
| **Test Sponsor:** | Giga Computing Technology Co., Ltd. | **Hardware Availability:** | Oct-2024 |
| **Tested by:** | Giga Computing Technology Co., Ltd. | **Software Availability:** | Oct-2024 |

## Platform Notes (Continued)

```
   disabled          console-getty debug-shell ipmievd iscsid nftables rsync serial-getty@
                     systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync upower
   generated         apport openipmi
   indirect          uuidd
   masked            cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                     x11-common


  ----------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.15.0-119-generic
   root=UUID=1380e2bd-2201-4a69-aee3-09a8eb63e291
   ro


  ----------------------------------------------------------
  15. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.25 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes
       Boost States: 0
       Total States: 3
       Pstate-P0:  38800MHz


  ----------------------------------------------------------
  16. sysctl
   kernel.numa_balancing              1
   kernel.randomize_va_space          0
   vm.compaction_proactiveness        20
   vm.dirty_background_bytes          0
   vm.dirty_background_ratio          10
   vm.dirty_bytes                     0
   vm.dirty_expire_centisecs          3000
   vm.dirty_ratio                     8
   vm.dirty_writeback_centisecs       500
   vm.dirtytime_expire_seconds        43200
   vm.extfrag_threshold               500
   vm.min_unmapped_ratio              1
   vm.nr_hugepages                    0
   vm.nr_hugepages_mempolicy          0
   vm.nr_overcommit_hugepages         0
   vm.swappiness                      1
   vm.watermark_boost_factor          15000
   vm.watermark_scale_factor          10
   vm.zone_reclaim_mode               1


  ----------------------------------------------------------
  17. /sys/kernel/mm/transparent_hugepage
   defrag          [always] defer defer+madvise madvise never
   enabled         [always] madvise never
   hpage_pmd_size  2097152
   shmem_enabled   always within_size advise [never] deny force


  ----------------------------------------------------------
  18. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs   60000
   defrag                  1
```

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GIGA-BYTE TECHNOLOGY CO., LTD.
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R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

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**CPU2017 License:** 9082
**Test Sponsor:** Giga Computing Technology Co., Ltd.
**Tested by:** Giga Computing Technology Co., Ltd.

**Test Date:** Oct-2024
**Hardware Availability:** Oct-2024
**Software Availability:** Oct-2024

## Platform Notes (Continued)

```
    max_ptes_none            511
    max_ptes_shared          256
    max_ptes_swap             64
    pages_to_scan           4096
    scan_sleep_millisecs   10000


    ----------------------------------------------------------------
    19. OS release
      From /etc/*-release /etc/*-version
      os-release Ubuntu 22.04.3 LTS

    ----------------------------------------------------------------
    20. Disk information
    SPEC is set to: /root/new_RC1298c
      Filesystem    Type  Size  Used Avail Use% Mounted on
      /dev/nvme0n1p2 ext4  3.5T  397G  2.9T  12% /

    ----------------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:        Giga Computing
        Product:       R183-Z93-LAJ1-000
        Product Family: Server
        Serial:        01234567890123456789AB

    ----------------------------------------------------------------
    22. dmidecode
      Additional information from dmidecode 3.3 follows.  WARNING: Use caution when you interpret this section.
      The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
      determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
      "DMTF SMBIOS" standard.
      Memory:
        24x Samsung M321R8GA0EB2-CCPWC 64 GB 2 rank 6400, configured at 6000



    ----------------------------------------------------------------
    23. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        GIGABYTE
      BIOS Version:       R03_F19
      BIOS Date:          10/01/2024
      BIOS Revision:      5.35
```

## Compiler Version Notes

```
==============================================================================================
C      | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C      | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
       | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
```

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## GIGA-BYTE TECHNOLOGY CO., LTD.
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R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

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**CPU2017 License:** 9082

**Test Sponsor:** Giga Computing Technology Co., Ltd.

**Tested by:** Giga Computing Technology Co., Ltd.

**Test Date:** Oct-2024

**Hardware Availability:** Oct-2024

**Software Availability:** Oct-2024

## Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------

==============================================================================
C        | 502.gcc_r(peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------

==============================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------

==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
         | 541.leela_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------

==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

# SPEC CPU®2017 Integer Rate Result

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## GIGA-BYTE TECHNOLOGY CO., LTD.
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R183-Z93-LAJ1-000

(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

SPECrate®2017_int_peak = 3280

**CPU2017 License:** 9082      **Test Date:** Oct-2024

**Test Sponsor:** Giga Computing Technology Co., Ltd.      **Hardware Availability:** Oct-2024

**Tested by:** Giga Computing Technology Co., Ltd.      **Software Availability:** Oct-2024

# Base Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

# Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-Wl,-mllvm -Wl,-extra-inliner -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc-ext -ldl
```

C++ benchmarks:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -fno-PIE -no-pie
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang -lamdalloc-ext
-ldl
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto
-fepilog-vectorization-of-inductions -mllvm -optimize-strided-mem-cost
-floop-transform -mllvm -unroll-aggressive -mllvm -unroll-threshold=500
-lamdlibm -lflang -lamdalloc -ldl
```

**GIGA-BYTE TECHNOLOGY CO., LTD.**
(Test Sponsor: Giga Computing Technology Co., Ltd.)

R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

SPECrate®2017_int_peak = 3280

| | | | |
|---|---|---|---|
| **CPU2017 License:** 9082 | | **Test Date:** | Oct-2024 |
| **Test Sponsor:** | Giga Computing Technology Co., Ltd. | **Hardware Availability:** | Oct-2024 |
| **Tested by:** | Giga Computing Technology Co., Ltd. | **Software Availability:** | Oct-2024 |

# Base Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

# Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

# Peak Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

# Peak Optimization Flags

C benchmarks:

500.perlbench_r: `basepeak = yes`

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R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

SPECrate®2017_int_peak = 3280

**CPU2017 License:** 9082

**Test Sponsor:** Giga Computing Technology Co., Ltd.

**Tested by:** Giga Computing Technology Co., Ltd.

**Test Date:** Oct-2024

**Hardware Availability:** Oct-2024

**Software Availability:** Oct-2024

# Peak Optimization Flags (Continued)

```
502.gcc_r: -m32 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner
-z muldefs -Ofast -march=znver5 -fveclib=AMDLIBM
-ffast-math -fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline
-lamdalloc
```

```
505.mcf_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl
```

```
525.x264_r: basepeak = yes
```

```
557.xz_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner
-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl
```

C++ benchmarks:

```
520.omnetpp_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -fno-PIE
-no-pie -fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lamdalloc-ext
-ldl
```

```
523.xalancbmk_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
```

**(Continued on next page)**

## GIGA-BYTE TECHNOLOGY CO., LTD.
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R183-Z93-LAJ1-000
(2.25 GHz, AMD EPYC 9965)

SPECrate®2017_int_base = 3100

SPECrate®2017_int_peak = 3280

| **CPU2017 License:** 9082 | | **Test Date:** | Oct-2024 |
|---|---|---|---|
| **Test Sponsor:** | Giga Computing Technology Co., Ltd. | **Hardware Availability:** | Oct-2024 |
| **Tested by:** | Giga Computing Technology Co., Ltd. | **Software Availability:** | Oct-2024 |

# Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang
-lamdalloc-ext -ldl
```

531.deepsjeng_r: basepeak = yes

541.leela_r: -m64 -std=c++14
```
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -fno-PIE
-no-pie -fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang
-lamdalloc-ext -ldl
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -flto -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc -ldl
```

# Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

502.gcc_r: -L/usr/lib32 -Wno-unused-command-line-argument
```
-L/home/work/cpu2017/v119/aocc5/1316/amd_rate_aocc500_znver5_A_lib/lib32
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

**(Continued on next page)**

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R183-Z93-LAJ1-000
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**CPU2017 License:** 9082
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**Tested by:** Giga Computing Technology Co., Ltd.

**Test Date:** Oct-2024
**Hardware Availability:** Oct-2024
**Software Availability:** Oct-2024

# Peak Other Flags (Continued)

Fortran benchmarks:

`-Wno-unused-command-line-argument`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.00.html`
`http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.0-Turin.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.00.xml`
`http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.0-Turin.xml`

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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