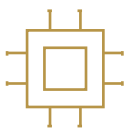# SK hynix
# Gold P31 SSD

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# Product Brief

## Breakthrough Technology

- The most innovative consumer SSD, sporting the latest technology from SK hynix
- The world's first 128-layer NAND flash-based consumer SSD

## Striking Performance

- Best-in-class read speeds of up to 3,500 MB/s and write speeds of up to 3,200 MB/s

## Ultimate Support & 5-year Warranty

- SK hynix 5-year warranty
- 1,000 hours of High Temperature Operating Life (HTOL) testing with Mean Time Between Failures (MTBF) reaching 1.5 million hours

*(July. 2021)*

# Gold P31 Series Product Specification

| Capacity | | 2TB | 1TB | 500GB |
|---|---|---|---|---|
| **Form Factor** | | M.2 2280 Single Side | | |
| **NAND Technology** | | 4D NAND | | |
| **Interface** | | PCIe NVMe Gen3, up to 4 lanes | | |
| **Sequential Performance** 1) 3) 4) | **Read** (up to) | 3,500 MB/s<br>3,500 MB/s (TLC) | 3,500 MB/s<br>3,500 MB/s (TLC) | 3,500 MB/s<br>3,500 MB/s (TLC) |
| | **Write** (up to) | 3,200 MB/s<br>1,700 MB/s (TLC) | 3,200 MB/s<br>1,700 MB/s (TLC) | 3,100 MB/s<br>950 MB/s (TLC) |
| **Random Performance** 2) 3) 5) | **Read** (up to) | 570K IOPS<br>500K IOPS (TLC) | 570K IOPS<br>500K IOPS (TLC) | 570K IOPS<br>500K IOPS (TLC) |
| | **Write** (up to) | 600K IOPS<br>370K IOPS (TLC) | 600K IOPS<br>370K IOPS (TLC) | 600K IOPS<br>220K IOPS (TLC) |
| **Latency** 6) | | Read | | Write |
| | | 90us | | 45us |
| **Power Consumption** 7) | | Active 8) | Idle(Slumber) | L1.2 |
| | | 6.3W | <50mW | <5mW |
| **Queue Support** | | - Support up to 256 queues<br>- Support up to 1,024 queue depth for each queue | | |
| **Temperature Range Operation** 9) | | - 0°C to 70°C<br>- Temperature Sensor (SMART Attributes Bytes 02:01h) | | |
| **Reliability** 10) | **MTBF** 11) | 1.5M hours | | |
| | **BER** 12) | 1 error in 1015 bits transferred | | |
| **Dimension** | | (22.00±0.15) x (80.00±0.15) x (Max. 2.23) mm | | |
| **Weight** | | Max 7.0g | | |
| **Voltage** | | 3.3V±5% | | |

## Notes

- May not be compatible with BIOS that supports Pyrite 1.0 and OPAL
- For cloning, use USB-PCIe M.2 adapter with JMicron JMS583, ASMedia ASM2362, or Realtek RTL9210.
- May not be compatible with Macbook Pro, Macbook Air

1) Measured using IOmeter1.1 with a queue depth (QD) of 32 and set to 128KiB alignment. (1MB/sec = 1,000,000 bytes/sec)

2) Measured using IOmeter1.1 with 4 threads, a queue depth (QD) of 32 each and set to 4KiB alignment.

3) IOmeter1.1 was used for measuring. Measurements are performed on 1GB of LBA range with a queue depth of 32 and 8 workers. System variations may affect results. (Test Pre-condition : Secure erase and NTFS format as a secondary drive)

4) Set to 128KiB alignment /1MB/sec = 1,000,000 bytes/sec was used in sequential performances.

5) Set to 4KiB alignment, 8 threads condition

6) Device measured by IOmeter1.1 with a queue depth of 1 workload and Read latency measured on random 4KiB transfers.

7) All numbers are average data measured out more than 3 times.

8) Active power is measured during execution of sequential write 128KB with a queue depth of 32.

9) Measured w/o condensation. Operating mode is measured by temperature sensor, SMART Attributes Bytes 02:01h.

10) The SSD incorporates advanced technology for defect and error management while using various combinations of hardware-based error correction algorithms and firmware-based static and dynamic wear-leveling algorithms.

11) 1.5M Mean Time Between Failures is estimated based on population. These statistics are not relevant to individual units.

12) Reliability Demonstration Test (RDT).

13) Bit error rate will not exceed one sector in the specified number of bits read. In the unlikely event of a read error, the SSD will report it as a read failure to the host; the sector in error will be considered corrupt and will not be returned to the host.