

PRODUCT BRIEF **NAS HARD DRIVES**



Product Highlights

- Available in capacities ranging from 2–22TB[1] with support for NAS systems with up to 24 bays
- Supports up to 300TB/yr[2] workload rate
- Enhanced reliability with 3D Active Balance™ Plus technology and error recovery controls with NASware™ 3.0 technology
- Extended drive testing to ensure each drive is tested for extended reliable operation
- 5-year limited warranty[3]

Desktop Drives vs. WD Red® Pro

It is important to choose a drive purpose-built for NAS with the features you need to help preserve your data and maintain optimum performance. Take the following into consideration when choosing a hard drive for your NAS:

- **Compatibility:** Unlike desktop drives, these drives are specifically tested for compatibility with NAS systems for optimum performance.
- **Reliability:** Desktop drives aren't typically designed for the demands of an always-on NAS environment. WD Red® Pro NAS hard drives are tested under tough conditions like you might experience in your environment.
- **Error Recovery Controls:** WD Red® Pro NAS hard drives are specifically designed with RAID error recovery control to help reduce failures within the NAS system.
- **Noise and Vibration Protection:** Designed to operate solo, desktop drives typically offer little or no protection from the noise and vibration present in a multi-drive system. WD Red® Pro drives are designed to thrive in multi-bay NAS system environments.

WD Red® Pro

Take Control of Rapidly Growing Data

Built for power users and medium-sized businesses struggling to manage rapidly growing amounts of data, WD Red® Pro drives are specifically designed for NAS systems with up to 24 bays. Engineered to handle high-intensity workloads in 24×7 environments, WD Red® Pro is ideal for archiving, protecting, and sharing data with a large number of users or multiple data-hungry applications. These drives add value to your business by enabling your employees to quickly share files, back up folders, and access data quickly and reliably in your NAS system.

Exclusive NASware™ 3.0 Technology

Our exclusive advanced firmware technology, NASware™ 3.0, enables seamless integration, robust data protection, and optimal performance for NAS systems operating under heavy demand. Built into every WD Red® Pro hard drive, NASware 3.0's advanced technology improves storage performance by increasing compatibility, integration, upgradeability, and reliability.

Built for Optimum NAS Compatibility

WD Red® Pro drives with NASware™ technology take the guesswork out of selecting a drive. Optimized for NAS systems, our unique algorithm balances performance and reliability in NAS and RAID environments. Simply put, a WD Red® Pro drive is one of the most compatible drives available for NAS enclosures. But don't take our word for it. WD Red® Pro drives are a reflection of extensive NAS partner technology engagement and compatibility-testing.

Larger NAS Bay Shock Protection

WD Red® Pro drives are equipped with a multi-axis shock sensor that automatically detects subtle shock events and dynamic fly height technology which adjusts each read-write function to compensate and protect the data. This combination of technology further protects the drives in larger 24-bay NAS environments and helps increase hard drive reliability.

3D Active Balance Plus

Our enhanced dual-plane balance control technology significantly improves the overall drive performance and reliability. Hard drives that are not properly balanced may cause excessive vibration and noise in a multi-drive system, reduce the hard drive life span, and degrade the performance over time.

Error Recovery Prevention

Built specifically for RAID and NAS environments, WD Red® Pro drives come equipped with error recovery controls as part of NASware™ 3.0 technology to help reduce drive fallout in RAID applications.

Extended Drive Testing

A NAS system that has up to 24 bays is very demanding on a hard drive with added vibration and heat. This is why every WD Red® Pro drive is shipped with extended thermal cycle burn-in testing to help ensure each drive is tested for extended reliable operation.

Boost Your NAS

WD Red® drives are available in capacities up to 22TB[1] utilizing the OptiNAND™ technology's capacity-enabling feature.

WD Red® Pro

Specifications

Model Number[4]	WD221KFGX	WD201KFGX	WD181KFGX	WD161KFGX	WD141KFGX	WD121KFBX
Formatted capacity[1]	22TB	20TB	18TB	16TB	14TB	12TB
Recording technology	CMR	CMR	CMR	CMR	CMR	CMR
Interface	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s
Form factor	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch
Native command queuing	Yes	Yes	Yes	Yes	Yes	Yes
OptiNAND™ technology	Yes	Yes	No	No	No	No
Advanced Format (AF)	Yes	Yes	Yes	Yes	Yes	Yes
RoHS compliant[5]	Yes	Yes	Yes	Yes	Yes	Yes
Performance						
Interface speed (max)	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s
Internal transfer rate[6]	265 MB/s	268 MB/s	272 MB/s	259 MB/s	255 MB/s	240 MB/s
Cache (MB)[1]	512	512	512	512	512	256
RPM	7200	7200	7200	7200	7200	7200
Reliability/Data Integrity						
Load/unload cycles[7]	600,000	600,000	600,000	600,000	600,000	600,000
Non-recoverable errors per bits read	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14
MTBF (hours)[8]	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Workload rate (TB/year)[2]	300	300	300	300	300	300
Limited warranty (years)[3]	5	5	5	5	5	5
Power Management[9]						
12VDC ±5% (A, peak)	1.70	1.80	1.80	1.80	1.85	1.80
5VDC ±5% (A, peak)						
Average power requirements (W)						
Read/Write	6.8	6.9	6.1	6.1	6.2	6.0
Idle	3.4	3.8	3.6	3.6	3.0	2.8
Standby and Sleep	1.2	1.6	0.9	0.9	0.8	0.6
Environmental Specifications						
Temperature (°C)						
Operating	0 to 65	0 to 65	0 to 65	0 to 65	0 to 65	0 to 65
Non-operating	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70
Shock (Gs)						
Operating, (2 ms, read/write)	40	30	30	30	30	30
Operating, (2 ms, read)	40	50	50	50	65	65
Non-operating (2 ms)	200	250	250	250	300	300
Acoustics (dBA)						
Idle	20	20	20	20	20	20
Seek (average)	32	32	36	36	36	36
Physical Dimensions						
Height (in./mm, max)	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1
Length (in./mm, max)	5.787/147	5.787/147	5.787/147	5.787/147	5.787/147	5.787/147
Width (in./mm, ± .01 in.)	4/101.6	4/101.6	4/101.6	4/101.6	4/101.6	4/101.6
Weight (lb/kg , ± 10%)	1.48/0.67	1.52/0.69	1.52/0.69	1.52/0.69	1.52/0.69	1.46/0.66

WD Red® Pro

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Specifications

Model Number[4]	WD102KFBX	WD101KFBX	WD8003FFBX	WD6003FFBX	WD4003FFBX	WD2002FFSX
Formatted capacity[1]	10TB	10TB	8TB	6TB	4TB	2TB
Recording technology	CMR	CMR	CMR	CMR	CMR	CMR
Interface	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s	SATA 6 Gb/s
Form factor	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch
Native command queuing	Yes	Yes	Yes	Yes	Yes	Yes
OptiNAND™ technology	No	No	No	No	No	No
Advanced Format (AF)	Yes	Yes	Yes	Yes	Yes	Yes
RoHS compliant[5]	Yes	Yes	Yes	Yes	Yes	Yes
Performance						
Interface speed (max)	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s	6 Gb/s
Internal transfer rate[6]	265 MB/s	240 MB/s	235 MB/s	238 MB/s	217 MB/s	164 MB/s
Cache (MB)[1]	256	256	256	256	256	64
RPM	7200	7200	7200	7200	7200	7200
Reliability/Data Integrity						
Load/unload cycles[7]	600,000	600,000	600,000	600,000	600,000	600,000
Non-recoverable errors per bits read	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14	<1 in 10^14
MTBF (hours)[8]	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Workload rate (TB/year)[2]	300	300	300	300	300	300
Limited warranty (years)[3]	5	5	5	5	5	5
Power Management[9]						
12VDC ±5% (A, peak)	1.75	1.80	2.08	1.79	1.79	1.90
5VDC ±5% (A, peak)						
Average power requirements (W)						
Read/Write	8.4	5.7	8.8	7.2	7.2	7.8
Idle	4.6	2.8	4.6	3.7	3.7	6.0
Standby and Sleep	0.5	0.5	0.7	0.4	0.4	1.4
Environmental Specifications						
Temperature (°C)						
Operating	0 to 65	0 to 65	0 to 65	0 to 65	0 to 65	0 to 65
Non-operating	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70	-40 to 70
Shock (Gs)						
Operating, (2 ms, read/write)	30	30	30	30	30	30
Operating, (2 ms, read)	65	65	65	65	65	65
Non-operating (2 ms)	250	300	300	300	300	300
Acoustics (dBA)						
Idle	34	20	29	29	29	29
Seek (average)	38	36	36	36	36	31
Physical Dimensions						
Height (in./mm, max)	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1	1.028/26.1
Length (in./mm, max)	5.787/147	5.787/147	5.787/147	5.787/147	5.787/147	5.787/147
Width (in./mm, ± .01 in.)	4/101.6	4/101.6	4/101.6	4/101.6	4/101.6	4/101.6
Weight (lb/kg , ± 10%)	1.65/0.75	1.43/0.65	1.58/0.72	1.58/0.72	1.58/0.72	1.58/0.72

[1] 1MB = 1 million bytes, 1GB = 1 billion bytes and 1TB = 1 trillion bytes. Actual user capacity may be less depending on operating environment.
[2] Workload Rate is defined as the amount of user data transferred to or from the hard drive. Workload Rate is annualized (TB transferred x (8760 / recorded power-on hours)). Workload Rate will vary depending on your hardware and software components and configurations.
[3] See http://support.wd.com/warranty for regionally specific warranty details.
[4] Not all products may be available in all regions of the world.
[5] This drive is in compliance with the European Union Directive 2011/65/EU and Directive (EU) 2015/863 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment.
[6] Up to stated speed. 1 MB/s = 1 million bytes per second. Based on internal testing; performance may vary depending upon host device, usage conditions, drive capacity, and other factors.
[7] Controlled unload at ambient condition.
[8] Projected values. When final, MTBF and AFR specifications are based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions, workload of 220TB/year and drive temperature of 40°C. Derating of MTBF and AFR will occur above these parameters, up to 300TB writes per year. MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.
[9] Power measurements at room-ambient temperature.

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