

Microsoft FAT by Tuxera— Technical specifications

General information



Supported operating systems	Android, Linux, QNX, FreeRTOS, SafeRTOS, Integrity, ThreadX <i>Available on a wide range of RTOS environments. Features and/or specifications may vary depending on the operating system.</i>
Hardware architectures	ARM, ARM64, Intel x86/x86_64 or compatible, MIPS, MIPS64, PowerPC, SH4, and more
Conformance	<ul style="list-style-type: none"> • Conforms to all Microsoft FAT12/16/32 versions including MS-DOS, Windows 95, XP, Vista, Windows 7, Windows 8, Windows 10 (Microsoft Interop Vendor Alliance), and Windows 11 • Conforms to SD Association (SDA) specifications. • Support for all flash-based storage types such as SD cards, eSD, CF cards, SSD, UFS, USB-connected storages, SATA, eSATA, FireWire, and eMMC • Support for APM, GPT, and MBR partition schemes
Capacity	<ul style="list-style-type: none"> • Maximum volume size: <ul style="list-style-type: none"> – 2 TiB with 512-byte sectors – 16 TiB with 4096-byte sectors • Maximum allocation block size = (sector size in bytes) x 128 • Maximum file size: 4 GiB - 1 byte • Maximum number of entries per directory: <ul style="list-style-type: none"> – FAT12: 4,068 for 8 KB clusters – FAT16: 65,460 for 32 KB clusters – FAT32: 268,173,300 for 32 KB clusters • Maximum filename length: 255 characters (16-bit) • Supported sector sizes: 512, 1024, 2048, and 4096 bytes

System requirements

Minimum system requirements	<ul style="list-style-type: none"> • 1 MiB of RAM • Processor: 25 MHz
Memory and CPU footprint	<ul style="list-style-type: none"> • Read-write: 40-60 KiB • Read-only: 25-35 KiB • CPU usage: 0-10%

Proprietary file system features

Power-safe/fail-safe	Volume consistency ensured if storage is removed, or power or battery is disconnected
Long file names (LFN)	Supported
Tuxera POSIX test suite	<p>Tuxera maintains POSIX File System Test Suite. The following system calls are tested:</p> <ul style="list-style-type: none"> • chmod: changes permission • chown: changes ownership • mkdir: creates directories • open: opens a file • rename: changes file name • rmdir: removes directories • truncate: decreases/increases file size • unlink: removes files

Performance and reliability

High performance	<ul style="list-style-type: none"> • Advanced algorithms and data structures ensure maximum I/O throughput, low CPU usage for small and large files, and achieve high IOPS for file operations. • Tunable settings. • Low power use, optimized for increased battery life. • When saving files to SD, SDHC, SDXC, or SDUC cards, full speed can be achieved. • Low data fragmentation • Zero-copy support (direct I/O)
Reliability	Rigorous quality assurance, wide deployment, and fault-tolerant design guarantee outstanding file system robustness.

Optional features

Tools	<ul style="list-style-type: none"> • mkfatfs: formats volumes • fatfsck: checks and repairs volumes • fatlabel: shows/sets volume label • fatdebug: collects debug images
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Get in touch to start your evaluation of Microsoft FAT by Tuxera: sales@tuxera.com