

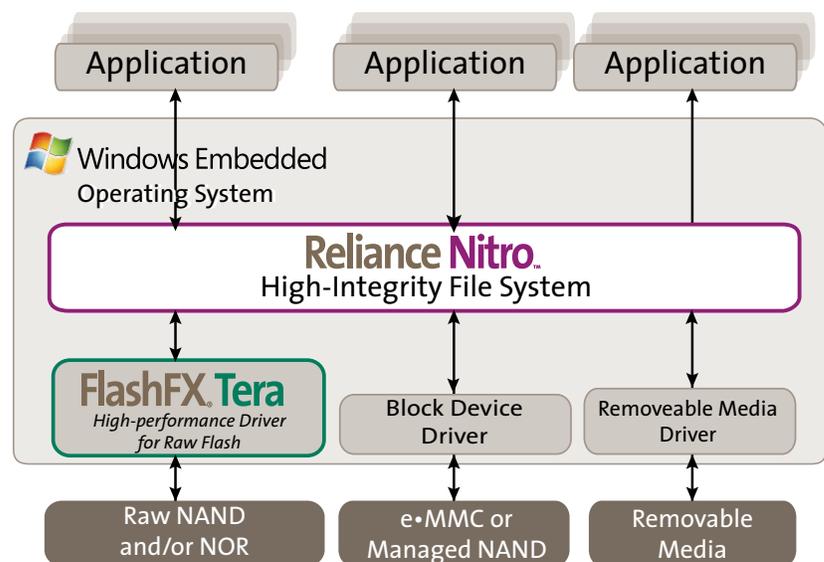
# Reliance Nitro™ 3.0

## High-Integrity Transactional File System for Windows Embedded

Datalight Reliance Nitro™ ensures rock-solid data reliability while providing the performance needed to create an optimal user experience. It is a transactional file system created specifically for embedded devices where power loss may occur, protecting critical system and user data from corruption. Reliance Nitro assures reliability of each metadata block with CRC32, and works with a broad array of storage media – including raw flash memory, e•MMC, RAM, hard disk, USB mass storage, STAT and PATA disk, and SD/MMC. Datalight works closely with the Windows Embedded community to ensure seamless integration. The speed of file and directory access is improved by several orders of magnitude while maintaining complete metadata and file data integrity. The unique combination of tree-based directory architecture, extent based design, and faster atomic transactions, improves performance for I/O throughput and metadata operations. Dynamic Transaction Point™ technology gives developers unprecedented control over the file system.

### Key Features

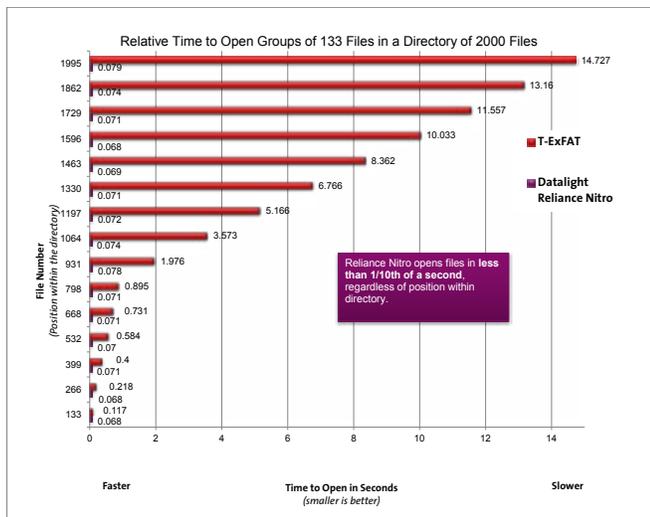
- Rock-solid reliability for metadata and user data
- Dynamic Transaction Point technology offers detailed control of performance vs. data-at-risk
- Extent-based file system for faster file operations
- Atomic transaction model protects user data and metadata from unexpected loss due to power failure
- ACID compliant
- Faster mount time than FAT for a typical use-case
- Full metadata CRC32
- Optional CRC32 on critical files
- Secure delete of data by file
- Replaces or coexists with other file systems
- Performance enhancing discard interface for NAND, NOR and e•MMC; Also supports HDD, RAM, Disk-on-chip, USB Mass Storage, SD/MMC, and e•MMC
- Tested with Windows Embedded Compact (CE) 5.0-7.0 and Windows Mobile 6.0-6.5



Feature	Reliance Nitro	Basic
User data is never over-written for complete protection against data corruption	✓	
Keeps data in known-good state for fast system reboot	✓	
Fast file operation performance	✓	
Configurable for control of data-at-risk	✓	Limited
Specifically designed for use with flash memory	✓	
Windows desktop driver available	✓	✓
File level secure delete	✓	
Metadata CRC32 for data validation	✓	
Optional CRC32 file data checks	✓	
Data exchangeability with any embedded operating system	✓	

Target Configuration	32-bit OS, any CPU, virtually any storage media, 70 KB RAM (typical)
Development System	Windows 32 host; 4 MB of disk space for Reliance Nitro
Supported Media	Flash memory, RAM, HDD, CF cards, USB Mass Storage, SD/MMC, and eMMC
RAM Memory Required	100 KB to 150 KB (nominal)
Media Volume Size	Each partition (or disk) can be scaled from 100 KB to 32 TB (terabytes)
Max File Size/Name Length	Available free space/1,024 UTF-8 bytes (or OS imposed limits)

## Improved File Operations for Better Responsiveness



The tree-based directory structure of Reliance Nitro enables much faster file operations than the basic file system, particularly when working with many small files. In a side-by-side test creating 1000 small files, then opening and deleting them (a use scenario similar to factory line test or provisioning), Reliance Nitro demonstrated improved operational performance. As the results demonstrate, raw throughput is not the only measurement that is important to file system performance. The way a system handles its metadata can be just as important.

## Faster Mount Times

In cases where power failure may occur, Reliance Nitro has a mount time advantage. There is no need to replay a journal or

perform any other file system checks; Reliance Nitro always keeps the disk in a known good state. This and other performance features give your customers noticeably faster mount times, especially where there is a random I/O penalty.

## Complete Reliability for a Better User Experience

The unprecedented control over the data-at-risk profile provided by Reliance Nitro Dynamic Transaction Point technology is well suited to today's devices with complex application suites, Run-time configuration let application's switch from file system event triggers to time-based transactions or operate in fully-manual mode. Written with flash-based media in mind, Reliance Nitro's copy-on-write model never overwrites live data, making the system fault tolerant, even after an uncontrolled system shutdown caused by power loss or component failure. Reliance Nitro maintains complete metadata and file data integrity while providing the performance needed to create an optimal user experience.

## Self-Diagnosis Speed Troubleshooting

Even the most well-designed systems can fall prey to component failure. Advanced instrumentation in Reliance Nitro enables fast, precise diagnosis of errors within the flash memory subsystem. Finding the source of these flash storage failures can be a time consuming part of the development

### Rock-Solid Reliability

"We've successfully completed our test of Reliance Nitro simulating 20 years of product life for our product with over 1.2 billion SQLite database write transactions. I wanted to thank you for the excellent support that you have given us during this selection process. You guys have an excellent product, wonderful engineers, and great support!"

-Engineering Manager,  
Smart Grid Monitoring Company



process, which can delay market availability of embedded devices for many weeks. At the heart of Datalight's newest file system diagnostics are full metadata and optional file data CRCs (Cyclic Redundancy Checks), which enable developers to continuously monitor data reliability in any embedded system. Unlike basic file systems such as TexFAT, Reliance Nitro is capable of monitoring both user data and metadata to detect inconsistencies and provide early warning of imminent flash failure.

## Better Design Flexibility

Every file system must balance the tradeoff between data-at-risk and maximum data throughput. Only the Dynamic Transaction Point technology found in Reliance Nitro gives device manufacturers total control to find the ideal balance for any use case. This capability makes field upgrades fail-safe, for example, enabling applications to update several files in an atomic fashion. When using other file systems, if a power interruption occurs before the update is complete, the application may not recover. This is easily accommodated with Reliance Nitro's run-time configurable transaction points.

### Dynamic Transaction Point Technology APIs Supported

In addition to APIs common to most file systems, Reliance Nitro supports these Dynamic Transaction Point™ APIs that provide compile time and run time control over transactions:

- Transact Now
- Get & Set Transaction Mode
- Get & Set Transaction Mask
- Get & Set Advanced Attribute
- Get & Set OEM Attribute
- Mount & Dismount
- Volume Format
- Volume Check
- Volume Info

#### Supports All POSIX APIs

*\*Operating system specific implementations for these APIs vary. Please refer to Developer's Guides and API References included with the SDK for the applicable operating system port or visit our website.*

## About Datalight

Datalight is the software expert for reliable data storage on devices. For over 30 years, Datalight has provided trusted solutions that have been deployed across all segments of the embedded industry—from cellphones to satellites to submarines. Our patented products have been proven to speed time to market for development platform and device manufacturers.

## Accessible Professional Support

Datalight's support for customers is well-known in the embedded industry. It's been said that customers come to Datalight for the great products and stay for the excellent technical support. Our technical support team has a strong commitment to making your devices work reliably, from testing to implementation. Our hard-earned reputation for great customer service means that Datalight regularly goes above and beyond to make sure your project performs flawlessly.

## Software Development Kit and Licensing

Reliance Nitro is licensed in ANSI C source and includes a comprehensive Developer's Guide, API reference, and validation utilities. Runtime distribution can be licensed per unit or per project. Consult your Datalight representative for options that apply to your project.