TUXERA Make it work.

RELIANCE
SENSE

The only purpose-built flash file system for structured data storage on NOR flash

Reliable persistent data storage for data logging applications

Embedded devices and digital sensors recording real-time or location-based data are the cornerstones of our "all things sensing" future. Increasing dependency on this data brings operational, financial, cost, and safety risks. Mitigate the storage challenges associated with data reliability, flash memory wear, hardware costs, and development time in your data logging applications.

Tuxera Reliance™ Sense is the only purpose-built file system enabling persistent, robust data storage for data-logging applications on embedded IoT sensors, wearables, and digital meter devices. This tiny, but sophisticated storage management software has a unique, database-like design that makes efficient use of NOR flash memory to reliably store well-defined, structured data.

A different approach to structured data storage

Data logging and metering applications continuously generate structured records and require the most recent data to always be available. When the memory is full, old data should be overwritten with more recent data. General-purpose file systems are not designed to handle such operations in an efficient manner. For example, they do not have any native cyclic buffer type of logic for storing records. Standard file systems allocate data dynamically, needing more flash operations to manage the data. This creates overhead and complexity specifically when storing structured data.

Our novel storage management software has a unique, database-like design that makes efficient use of the byte-addressable mode of NOR flash memory. The database is controlled and defined by you as the application developer. Reliance Sense simplifies the logging application, thanks to its advanced API for record management, including read, write, search, and even your own defined functions. This improves storage operations for data logging to maximize flash lifetime, reduce power consumption, and boost performance.

Key benefits of Tuxera Reliance™ Sense file system

Maximize flash lifetime
- Lowest flash wear by design
- Wear leveling for extended product life

Robust and deterministic
- Power fail-safe data storage
- Predictable data integrity
- Reliable system recovery every time

Accelerate time to market
- Easy to use API
- Simplified testing
- Reduced vendor supply chain risks thanks to extensive NOR part compatibility

Resource- and power-friendly
- Works with any RTOS or bare metal
- Minimal CPU usage
- Low ROM/RAM footprint

Tuxera Reliance Sense file system key features

User-defined structured database approach
- Circular design to suit continuous recording workloads
- Linear design for storing configuration data
- API for easy record handling: read, write, search, timestamp-based search
- Hooks for inserting data: integrity checks, checksum, or anything you require
- Simplified design of the logging application

Increased lifetime
- Reduced number of flash operations compared to other alternatives
- Uses NOR flash byte-addressable mode instead of writing complete pages
- Advanced wear leveling
- Simulation tool included for simplified lifetime testing and behavior modeling

Reliability and determinism
- Deterministic behavior in the event of unexpected reset
- Cost-saving "emergency write" function minimizes requirements toward on-board capacitor
- Long-term simulator tool validates power fail-safety, power interruption, and data/system integrity
- Fully MISRA-C compliant

Low footprint, portable
- Works with RTOSes, non-RTOS-based systems, or bare metal
- Compatible with any NOR flash part in byte-addressable mode
- Supports 8-/16-/32-bit microcontrollers and microprocessors
- Low RAM requirements: less than 15 KB of program memory, 1.5 KB of RAM
- Minimal power and memory consumption

Reliance Sense technical specifications

CATEGORY	FEATURES	
Overview		
	Best Suited for	Storing structured data in NOR Flash Media
	RAM	1.5 KB
	Code Size (ROM)	15 KB
	Coding standards	MISRA-C
	API set	Proprietary API
	Determinism	Predictable file system operations
	Special features	Database-like file system with API for record handling/database creation that can be defined as circular or linear
Power Fail-Safety		
	Power Fail-Safety	Yes - data integrity
	Mechanism	Proprietary implementation
Other capabilities		
	Encryption	Requires Tuxera CryptoCore
	Metadata CRC	Yes
	Wear leveling	Yes
	Byte addressable	NOR specific
Supported Hardware/Architecture and Operating Systems		
	Hardware/ Architecture	8-/16-/32-bit microcontrollers and microprocessors
	Bare Metal	Yes
	Real-time operating systems (RTOS)	Yes – FreeRTOS, SafeRTOS, INTEGRITY, MQX, ARM mbed, Azure RTOS and others.
	Portable to other OSes and RTOSes	Yes
Supported Media		
	NOR Flash	Yes
	NVRAM	Yes
Tools and documentation		
	Utilities and test suites	Simulation Tool
		Functional and fail-safety tests
		Import image for debugging
		API tool to build database
	Documentation	Reference manual
		Readme

Contact us about Reliance Sense at sales@tuxera.com

Find out more at: https://www.tuxera.com/products/tuxera-reliance-sense/