Application brief

EXCELON™ Ultra F-RAM memory

Performance, reliability, and instant nonvolatility in low-pin-count memory

Industrial systems require memories to continuously log and instantly capture system state information and sensor data in the event of power loss. Next-generation factory automation and control systems will add to compute and storage demands, especially on the edge of the network. Harsh operating environments and demanding requirements for cycling endurance and data retention require the most-robust performance possible, while supporting efficient low-pin-count, high-speed interfaces. EXCELON™ Ultra mission-critical memories support a 108 MHz low-pin-count QSPI interface with 100 trillion cycle write endurance, fast writes and instant nonvolatility.

EXCELON™ F-RAM advantages

EXCELON™ F-RAM memories combine nonvolatile data storage with the fast speed of RAM. F-RAM has three distinct advantages over traditional nonvolatile memories:

- Fast write speed with NoWrite delay
- Virtually unlimited endurance
- Industry's most energy-efficient NVRAM

EXCELON™ F-RAM operates with the same host processor interfaces and timing as other memories such as SRAM, EEPROM, and serial Flash, but takes advantage of its fast write speed to eliminate write delays due to "soak time" or page/sector buffering required of other technologies. Instant writes eliminate "data at risk" resulting from unexpected power loss.

Applications

Infineon's EXCELON™ Ultra F-RAM is an ideal solution for a variety of industrial applications, including:

- Industrial automation
- Data logging
- Point-of-sale
- Programmable logic controllers
- Test and measurement
- Motor controls
- Smart meters

Key features

High performance

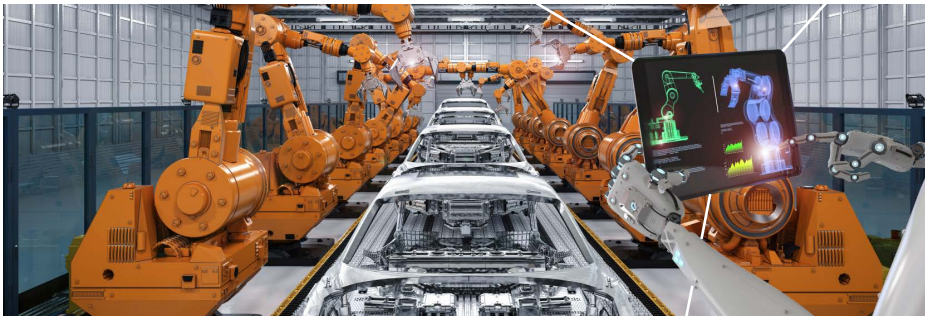
- 50 MHz SPI and 108 MHz SDR QSPI interfaces
- NoWrite delay
- 10 mA active current @ 108 MHz SPI SDR
- True RAM performance; no data polling before writes

Reliable

- 100 trillion (10^{14}) cycle endurance
- No wear-leveling required
- 100+ year data retention
- No battery or capacitor required
- Instant nonvolatility

Additional product features

- -40 to +85°C industrial grade
- Hardware protection with write protect pin
- Software block protection
- Embedded ECC



www.infineon.com/EXCELON

Industrial automation systems

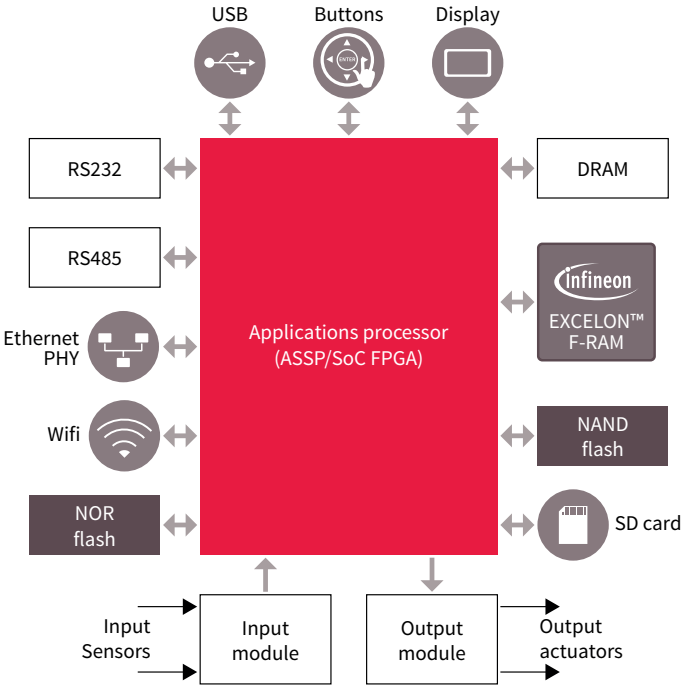
Problem

My factory automation systems require high-performance, reliable data-logging memories at control-level in case of power disruption. Industrial IoT sensors collecting data at field-level need to continuously log it either in a nonvolatile RAM (NVRAM), or in a volatile RAM first, and then transfer to a nonvolatile memory (NVM) on power disruption. Systems that transfer the data logs from the volatile RAM to a NVM require high write throughput to complete the transfer using a limited backup power source, ensuring every sample is secure reliably stored. These systems need to operate in harsh, high-temperature environments and last 20 years.

Solution

EXCELON™ Ultra offers a low pin-count, 108-MHz QSPI interface to meet performance requirements with NoDelay writes to instantly and reliably capture data on power loss. Reliability is assured with 100-trillion write cycles at 85°C.

Block diagram



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