

Robust Item Identification with UCODE Nxm:

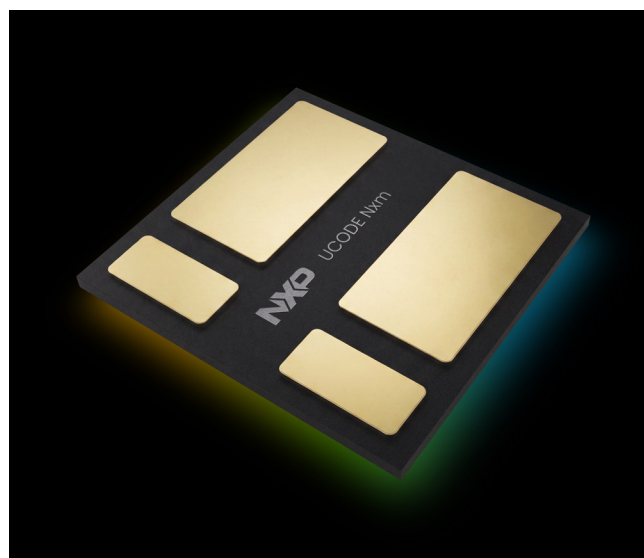
Powering industrial IoT and digital product passports with scalable memory and performance

Engineered for today's biggest item identification challenges, NXP's latest UCODE memory variant offers industry-leading performance with high-capacity electronic product code (EPC) and user-configurable memory.

Target applications

One tag chip, many jobs. Three user-configurable memory maps give [UCODE Nxm](#) up to 496 bits of EPC and up to 752 bits of user memory, backed by NXP's memory safeguard for data integrity and fully standards-based privacy controls.

- Digital product passport (DPP) embedded tags
- Industry 4.0 for complex process flows and advanced automation
- Smart manufacturing for tracking work-in-progress and production status
- Airline baggage tracking with local data storage
- Automotive manufacturing with standard-compliant memory configurations
- Supply chain management with memory space to record origins and current ownership
- Perishable goods tracking or extended-attribute data using GSI TDS 2.0 encoding
- Healthcare supply chains with on-chip memory for lot and expiry data
- Consumer interaction allowing embedded URLs



Key features

- Read sensitivity -24 dBm
- Write sensitivity -22 dBm
- Three user configurable memory options
 - 880 bits total shared memory
 - Up to 496 bits EPC memory
 - Up to 752 bits user memory
- Self-adjust
- Memory safeguard
- Standards-based privacy (“untraceable”)
- Brand identifier: an embedded unique ID dedicated to a single company

Key benefits

- Market-leading sensitivity for a memory product, paired with NXP's self-adjust, reaches longer read ranges and unlocks smaller tags in RAIN RFID applications
- User-configurable memory to match any use case without changing hardware.
- With smaller antennas and reconfigurable designs, UCODE Nxm paves the way to more sustainable product designs

UCODE Nxm pairs market-leading sensitivity and NXP self-adjust with hardware-free, user-configurable memory to deliver longer read ranges, smaller and more sustainable tag designs, and one chip that adapts to many RAIN RFID use cases.

Real-world impact

With an eye on modern industrial practices where accurate identification is essential, NXP built UCODE Nxm for the most demanding and diverse applications.

On the production line, designers can use UCODE Nxm to follow complex builds from first station to final test, recording component IDs to create a living history of each unit. With the sensitivity to read reliably in cluttered RF environments, the IC also enables automated tool management and checkout, so operators can keep tools accounted for and maintenance on schedule.

For inventory management, tags that use UCODE Nxm can make data available when cloud connectivity is unavailable. Because critical data resides on the tag itself, systems can still identify parts at their line-side locations. Scaled across the supply chain, the IC unlocks just-in-time flows by tagging parts for automatic proof of dispatch and automated receipts.

In pharmaceutical applications expiry dates and lot number can be stored on the tag and for DPP and consumer applications, using TDS 2.3, tags can store internet links; in aviation, high-on-tag memory lets systems carry routing and destination data through higher-throughput baggage systems.

Configurable memory, scalable designs

UCODE Nxm contains a total of 880 bits of memory space shared between the EPC and user memory banks. With sufficient capacity to store web addresses and other variable data, the IC enables designers to build products that consumers can interact with easily and intuitively.

The memory comes in three configurations, letting the same chip deliver for EPC-heavy applications such as automotive and airline (up to 496 bits) or more user-data-heavy ones such as industrial tracking (up to 752 bits). That flexibility translates to scalability. New applications are continually adopting identification technology, and UCODE Nxm offers a solution that suits any job from a single IC – no need for multiple product SKUs.

Trust and privacy, built in

With more memory capacity on the tag, designers need confidence that their data is accurate and private.

For data integrity, memory safeguard works in the background. An error correction code (ECC) algorithm continuously protects the full memory array, including the EPC, quietly correcting single-bit errors and flagging multi-bit errors before they spread. Meanwhile, a parity check guards the manufacturer-programmed tag identifier (TID) against tampering.

For privacy, UCODE Nxm implements the standards-based Untraceable feature. A short-read-range mode prevents unauthorized long-distance scanning, and sensitive fields can be concealed on demand, leaving only non-serialized, non-identifiable data visible to a casual reader.

The choice for sustainability

With greater sensitivity and longer range, UCODE Nxm lets tag designers shrink the antenna, reducing the use of aluminum and PET resin in every tag. For example, shrinking a typical antenna from 50 x 30 mm to 42 x 20 mm can reduce material use by up to 40% compared with earlier UCODE generations. When multiplied across millions of tags, those environmental savings have true impact.

Meanwhile, with space to record origin, ownership, and handling history, a UCODE Nxm tag makes products easier to recycle, resell, and reuse. And with greater supply chain visibility, manufacturers can better match production to genuine demand, reducing wasted material and shipping fuel.

UCODE NxM product details

Performance	Read sensitivity	-24 dBm
	Write sensitivity	-22 dBm
	Self-adjust	Yes
Memory	Flexible EPC/user memory (customer configurable)	880 bits total
	Configuration 1	EPC 128-bit/User 752-bit
	Configuration 2	EPC 256-bit/User 624-bit
	Configuration 3	EPC 496-bit/User 384-bit
	Pre-serialization (96-bit EPC)	Yes
	TID memory	96-bit
	Access password	32-bit
	Kill password	32-bit
	Permalock	Yes
	Lock (password)	Yes
	Endurance/data retention	100 000/20 y
Features	Untraceable (standards-based privacy)	Yes
	Memory safeguard	Yes
	Block write (32-bit)	Yes
Ambient	Temperature range	-40 to + 85 °C
Delivery type	Wafer diameter	12"
	Pad type	Large gold (Au) pads

Ordering information

Product	Part number	Type	Delivery form
UCODE NxM	SL3SI006FUD2/HBP	Wafer	Die on sawn 12" 120 µm wafer 10 µm polyimide spacer with large pads, plasma diced not applicable