



# NXP IC solution for fast and easy development of contactless smart card systems

## MIFARE Plus

MIFARE Plus brings increased security to end-user solution providers together with a seamless upgrade of existing infrastructure and services with low cost procedures. This new MIFARE product is supported by card and reader manufacturers and solution developers, and is the only MIFARE Classic-compatible mainstream smart card IC featuring pre-issuance of cards prior to infrastructure changes.

### Key features

- ▶ 2 or 4 Kbytes EEPROM
- ▶ Simple fixed memory structure compatible with MIFARE Classic (MIFARE Mini, MIFARE 1k, MIFARE 4k)
- ▶ Memory structure as in MIFARE 4k (sectors, blocks)
- ▶ Unique serial number (4 or 7 byte)
- ▶ Multi-sector authentication
- ▶ Multi-block read
- ▶ Anti-tear function for writing AES keys
- ▶ Keys can be stored as MIFARE Classic keys (2 x 48 bit per sector) or AES keys (2 x 128 bit per sector)
- ▶ Access conditions freely configurable
- ▶ Number of single write operations: 200,000

### Features / benefits for card and reader makers

- ▶ Broad product portfolio providing an optimized price / performance ratio
- ▶ Low cost investment tools increasing ROI and speeding up market trials
- ▶ Easy-to-use and proven toolkits for fast project execution
- ▶ Multiple suppliers in the value chain reducing risk within supply chain management

- ▶ Reliability and robustness offering a higher quality of service
- ▶ Certification support guaranteeing compatibility

### Features / benefits for solution developers

- ▶ High speed between card and terminal especially important for time critical services
- ▶ Read range up to 10 cm increasing the convenience of touch-and-go experience
- ▶ Many companies with commercial products, enabling a broad and competitive supply chain
- ▶ Based on the international standard ISO / IEC 14443 A, ensuring a growing marketplace of solution developers and providers
- ▶ Card and reader compatibility across all generations leads to reduced infrastructure costs

### Features / benefits for end-user solution providers

- ▶ Open architecture platform which guarantees compatibility with current and future solutions
- ▶ Automatic data collection for better sales and marketing intelligence

- ▶ Absence of contact between card and reader leads to reduced wear and tear
- ▶ Reduced distribution costs and sales expenses
- ▶ Easy to maintain and support components
- ▶ Reducing maintenance costs
- ▶ Reduced cash handling leads to effective fraud prevention

### Key applications

- ▶ Public transportation
- ▶ Electronic toll collection
- ▶ Event ticketing
- ▶ Access management
- ▶ Car parking
- ▶ School and campus cards
- ▶ Employee cards
- ▶ Internet cafes
- ▶ Loyalty
- ▶ E-locks

### Security levels

- ▶ Level 1 = Full compatibility with MIFARE Classic
- ▶ Level 2 = AES for authentication, MIFARE Crypto for data
- ▶ Level 3 = AES for authentication, data encryption and relay attack detection
- ▶ Card operates in one level at any given time
- ▶ Card always switches upwards to a higher security level

### Migration planning

- ▶ Level 0 ICs are pre-personalized to switch through levels
- ▶ MIFARE Plus cards can be pre-issued in Level 1
- ▶ MIFARE Plus cards emulate MIFARE Classic cards
- ▶ No need to wait for reader infrastructure to be upgraded
- ▶ Software upgrade of reader infrastructure to Level 2 or 3
- ▶ MIFARE Plus card is 'unlocked' to Level 2 or 3
- ▶ Optional MIFARE SAM solution for highest security

### MIFARE pedigree

NXP MIFARE is the leading technology platform for contactless ticket, card and reader solutions. With more than 10 million reader core components, 1 billion cards and 800 million smart ticket ICs sold, MIFARE is a proven and reliable technology, which represents the largest installed base worldwide.

Compliant with the ISO / IEC 14443 A international standard, MIFARE ensures that today's infrastructure can easily be upgraded. It enables service providers to expand their transportation networks and to integrate additional services such as payment systems for taxi fares, cinema and theatre tickets, loyalty programs, access management and parking. And all while reducing the total costs of operations.

Product Features	MIFARE Plus 2K	MIFARE Plus 4K
<b>Memory</b>		
EEPROM size [byte]	2K	4K
Write Endurance [typical cycles]	200 000	200 000
Data Retention [yrs]	10	10
Organization	32 sectors with 4 blocks	32 sectors with 4 blocks 8 sectors with 16 blocks
<b>RF-Interface</b>		
Acc. to ISO 14443 A	ISO 14443	ISO 14443
Baudrate [kbit/s]	106 ... 848	106 ... 848
<b>Security</b>		
Unique Serial Number [byte]	7	7
Random Number Generator	yes	yes
Cryptography	AES (128 bit), CRYPTO1	AES (128 bit), CRYPTO1
<b>Packaging</b>		
Sawn Wafer type description	MF1PLUS6001DUD	MF1PLUS8001DUD
MOA4 Module type description	MF1PLUS6001DA4	MF1PLUS8001DA4

**MIFARE.net**

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