MIFARE Plus® S/X

Fast, high-security contactless smart cards

The MIFARE Plus family of smart cards for transit automatic fare collection (AFC) is a direct drop-in replacement for MIFARE Classic providing an easy upgrade of existing infrastructures toward higher security and is fully backwards compatible with MIFARE Classic. Upgrading an AFC system based on MIFARE Classic to a higher security level has never been easier!

G+D MIFARE Plus cards provide seamless backward compatibility with MIFARE Classic, allowing parallel usage of both cards in existing system environments. This allows a gradual and seamless AFC system migration, easy card replacement, and minimal financial impact due to a change in fare media.

G+D provides the complete MIFARE Plus portfolio with all available security levels for various applications.

Security, privacy, compatibility, performance, and price are the main reasons why transit operators and ticket system integrators choose G+D MIFARE Plus cards for their AFC systems and passengers.

The G+D MIFARE card represents over 20 years of experience and continued product development.

To fit changing requirements, G+D also provides other MIFARE technologies. G+D is more than a card supplier: we take the complexity out of the process and provide guidance with a complete portfolio of products, technologies and services.

Profit from G+D 's many years of experience in delivering contactless smart card solutions to public transport systems worldwide.

Did you know …

that G+D is one of the top 3 transit cards suppliers.

Technical Data
MIFARE Plus S/X

MIFARE COMMUNICATION INTERFACE
- ISO/IEC 14443 Type A
- Contactless transmission of data, powered by the RF field (no battery needed)
- Up to 100 mm operating distance
- 13.56 MHz operating frequency
- Fast data transfer: 106 kbit/s – 848 kbit/s
- High data integrity: 16 bit CRC, parity, bit coding, bit counting, AES-based MACing method (Security Level 3)
- True anti-collision
- Less than 100 ms per typical ticketing transaction (including backup management)

MEMORY
- User definable access conditions for each memory block
- 10-year data retention
- 100,000 write cycles

MIFARE 2K PLUS S/X
2 kB, organized in 32 sectors of 4 blocks (one block consists of 16 bytes)

MIFARE 4K PLUS S/X
4 kB, organized in 32 sectors of 4 blocks and in 8 sectors of 16 blocks (one block consists of 16 bytes)

STANDARDS
- MIFARE communication protocol
- ISO/IEC 14443-1/-2/-3 Type A (Security Level 1, 2)
- ISO/IEC 14443-4, Type A
- (Security Level 3)
- ISO/IEC 7810
- ISO/IEC 10373

Security Levels

SECURITY LEVEL 0
Cards are pre-personalized by G+D with card master key, configuration key, level switching keys, MIFARE Classic CRYPTO1 and AES keys.

SECURITY LEVEL 1
These G+D MIFARE Plus cards are backward compatible with MIFARE Classic 1K or 4K cards and work seamlessly in existing MIFARE Classic infrastructure. Cards can be switched to Security Level 2 after successful authentication with Level 2 switching AES key.

SECURITY LEVEL 2 (MIFARE PLUS X ONLY)
Cards incorporate mandatory AES authentication and MIFARE Classic CRYPTO1 for data privacy. Cards can be switched to Security Level 3 after successful authentication with Level 3 switching AES key.

SECURITY LEVEL 3
Cards incorporate mandatory AES for authentication and private and confidential communication integrity. Proximity detection for G+D MIFARE Plus X only is provided as an optional feature.

MATERIALS AND FORM FACTORS
- PVC
- Composite materials PVC/PET
- G+D Crystal Card and other form factors

SECURITY FEATURES
- 7-byte unique identifier (UID) or 4-byte non-unique identifier (NUID) and random IDs
- Mutual three-pass authentication
- Two keys per sector (per application) to support multiapplication environment with key hierarchy
- Key storage for MIFARE Classic CRYPTO1, keys (2 x 48 bit per sector) or AES keys (2 x 128 bit sector)
- Open standard AES crypto for authentication, integrity, and encryption
- Multi-sector authentication, multi-block read and write
- Anti-tear function for writing AES keys

PRINTING AND PERSONALIZATION
- 4-color offset litho or screen printing
- Thermal transfer printing
- Matte or glossy surface finish
- Encoding
- Laser engraving
- Magnetic stripe
- Signature panel
- Serial numbering
- Barcoding
- Hologram

OPERATING CONDITIONS
- Temperature: -25°C to 50°C

Did you know…

that more than 50 million passengers use G+D's transit cards and tickets every day.