NXP IC solution for contactless limited-use applications

MIFARE Ultralight™

NXP MIFARE Ultralight is the perfect solution for system operators wanting to implement completely contactless automatic fare collection systems. Step-by-step, traditional low cost ticketing media are being replaced by disposable, non-reloadable contactless cards or tickets.

Key applications

▸ Limited-use tickets in public transport (e.g.: single trip tickets, multiple trip tickets, tourist weekend passes)
▸ Event ticketing (stadiums, exhibitions, leisure parks, etc.)

Key features

▸ Fully ISO / IEC 14443 A 1-3 compliant
▸ 106 kbit/s communication speed
▸ Anti-collision support
▸ Operating distance up to 10 cm
▸ 512 bits (64 bytes) EEPROM memory
▸ 32 bit one-time programmable (OTP) area
▸ 384 bit read / write area for user data
▸ Field programmable 'Read only' locking function per page
▸ Unique 7 bytes serial number
▸ Number of single write operations: 10.000
▸ MIFARE ™ SAM AV2 based security methods supported

Tickets based on NXP MIFARE Ultralight ICs can act as single trip tickets in public transportation networks, loyalty cards or even day passes at big events. They are the ideal replacement for conventional ticketing solutions such as paper tickets, magnetic-stripe tickets or coins.

As the usage of contactless proximity smart cards becomes more and more common, transport operators are beginning to switch to completely contactless solutions. The introduction of the new contactless MIFARE Ultralight IC for limited-use tickets will lead to a reduction of system installation and maintenance costs. Terminals will be less vulnerable to damages and mechanical failures caused by ticket jams. MIFARE Ultralight can easily be integrated into existing schemes and even standard paper ticket vending equipment can be upgraded.

In addition, this solution for low cost tickets helps transport operators to reduce fraud and the circulation of cash within the system.

As frequent travellers and commuters normally use a high end contactless smart card (e.g.: based on MIFARE DESFire ™) for their regular trips, MIFARE Ultralight enables occasional travellers to benefit from the same advantages. It significantly improves boarding times and helps to experience quicker travel and easier movement between buses, trains and other means of transportation.

The mechanical and electronical specifications of MIFARE Ultralight are tailored to meet the requirements of paper ticket manufacturers. Issuing smart paper tickets based on MIFARE Ultralight only requires a minor upgrade to standard Edmonson / Eurosize ticket vending terminals. This can be achieved by fitting a simple contactless reader for ticket initialization.

MIFARE Ultralight operates according to the ISO 14443A standard. Meaning cards or tickets based on MIFARE Ultralight can be used at a distance of up to 10 cm with true anti-collision properties and without the need for a battery. Last but not least, MIFARE Ultralight is fully compatible with all existing MIFARE infrastructures and can therefore be easily integrated in current transportation schemes.

MIFARE Pedigree

NXP MIFARE™ is the leading open architecture technology platform for contactless ticket, card and reader solutions. With more than 50 million reader core components and 5 billion smart card ICs sold, MIFARE is a proven and reliable technology and 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. All while reducing the total costs of operations.
In addition, MIFARE4Mobile™ guides the successful extension of the MIFARE technology platform into NFC enabled devices.

Product Features	MIFARE Ultralight
Memory	
EEPROM size [bits]	512
OTP area [bit]	32
Write Endurance [cycles]	10.000
Data Retention [yrs]	5
Organization	16 pages a 4 byte
RF-Interface	
Acc. to ISO/IEC 14443 A	ISO/IEC 14443 A 1-3
Baudrate [kbit/s]	106
Anti-collision	bit-wise
Security	
Unique Serial Number [byte]	7
Memory Overwrite Protection	yes, per page
Packaging	
Sawn Wafer 120µm on FFC (Au-Bumped) 17 pF	MF0ICU1001W/U7DL
Sawn Wafer 120µm on FFC (Au-Bumped) 50 pF	MF0ICU1101W/U7DL
Sawn Wafer 75µm on FFC (Au-Bumped) 17 pF	MF0ICU1001W/S7DL
Sawn Wafer 75µm on FFC (Au-Bumped) 50 pF	MF0ICU1101W/S7DL
MOA4 Module 17 pF	MF0MOA4U10/D

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