USER MANUAL

mifare®

Demonstration System MFEV500

User Guide

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Philips
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PHILIPS

mifare®

MIFARE® is a contactless proximity smart card system with the appropriate read/write units to access MIFARE® cards. MIFARE®'s functionality is tailored to meet the requirements of a stored value card in public transport.
The MIFARE® card is a multiapplication smart card with the functionality of a processor card implemented with hard-wired logic.
Due to its multi-functionality the MIFARE® card can be used for up to 16 independent applications on a high security level.
The MIFARE® RWD Core Module (MCM) is the kernel of a MIFARE® read/write device. Its versatility allows a flexible and efficient application in different configuration and system devices such as bus terminals, metro gate controllers, handheld devices, booking office computers or even PCs.
The MCM consists of the radio frequency circuit and a VLSI-chip (MCM-ASIC) which are mounted on a PCB. The RF part of the circuitry is shielded by metal housing. It combines all basic functions in order to access the MIFARE® card. These functions include modulation, demodulation, RF signal generation, security management and anticollision. It interfaces with an antenna on the RF side and with a microprocessor via a parallel 8 bit µP bus interface on the logic side.

Demonstration system (abbreviation Demo-station)

The demo-station is based on standard products namely the MCM being used in the supplied RWD and MIFARE® cards. It allows you to

- give demonstrations and presentation of MIFARE® to your customers with the supplied demonstration software
- get familiar with MIFARE® in order to shorten the phase for system integration of products.
- start the system integration with MIFARE®
- develop application software based on the supplied libraries.

Installation Guide

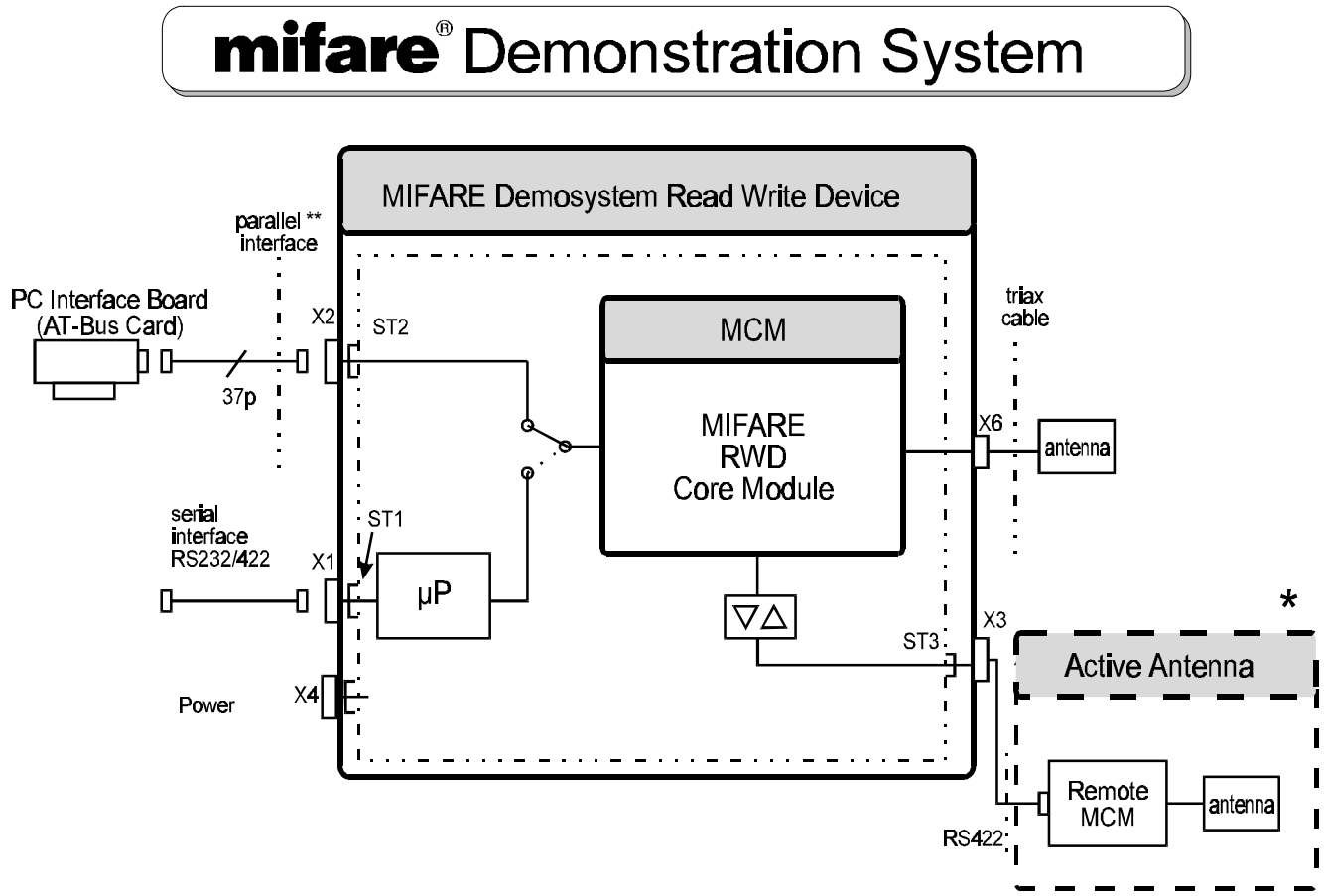
The MIFARE® demosystem operates by default on a serial RS232 interface with 115.200 baud. For proper operation there is an external power supply needed. To be able to work on the demonstration system, do the following:
Take the MIFARE® standard antenna and connect it to the antenna interface of the RWD-box. Take the serial interface cable with two 9pin female SUB-D connectors and connect it on the one side to the serial port of the PC and on the other side to the serial interface of the RWD-box. Connect the red connector of the power supply cable to +12 Volt, the black one to GND and put the cinch connector to the appropriate connector of the box.

Install the MIFARE® demonstration and evaluation software package and follow the instructions which may be found on the data carrier (floppy disk or CD),

Contents

1 Components

1.1 Overview



(*) Active Antenna is available as additional option.
(**) Parallel interface for service purposes only

1.2 Functionality

The Demonstration system can be used in two modes. The default mode is the serial mode.
Because of CE regulations the parallel interface is covered when sold in Europe and may be used for service purposes only.

serial mode: The demostation can be accessed via RS232 or RS422. An internal microprocessor is used in the demostation converting the serial bit protocol to the parallel MCM interface. Control is performed directly via the serial software library to one serial port of the PC. This port can be connected to the demo-station via the serial interface cable. In this mode power must be supplied externally;
The serial interface cable is 300 cm long.
The kit is jumpered to operate in the serial mode when delivered.

parallel mode: This mode restricts the cable length between PC and demo-station to approx. 20 cm because of the noise sensitivity of parallel bus cables.
Control is performed by using the parallel software library. It accesses the PC plug-in interface card which is connected to the demo-station with the parallel 37 pin flat cable. In this mode power is directly passed from the PC to the demo-station via the parallel interface cable;
The parallel interface cable is 20 cm long.
The kit is jumpered to operate in the serial mode when delivered.

(*) Optionally a special remote MCM may be connected to the demo-station building an „**Active Antenna**“ (can be ordered separately). This construction allows high distances between demo-station and R/W antenna. The standard antenna mounted within 50 cm from the demo-station and the Active Antenna may be used together and can be controlled with one PC program.

1.3 Hardware

The demo-station kit contains

- PC-Board for having access to a PC-AT µP bus. The PC acts as RWD (Read write device) processor.
- parallel interface cable[1]: 37 pin flat cable with Sub-D connectors.
- serial interface cable: 9 pin shielded cable with Sub-D connector
- power supply cable
- MIFARE® RWD box based on a standard MIFARE® RWD Core Module (MCM).
- Antenna (+cable)
- MF RD260 MIFARE® serial reader for short distances (MMM based)
- MF CM200 MIFARE® Micro Module (MMM)
- Standard MIFARE®1 cards in ISO thickness
- MIFARE® light cards in ISO thickness
- one MIFARE® wristwatch
- documentation set
- diskette (3 1/2“) or CD

Power supply: In parallel mode the units are supplied via the PC plug-in board. (12V and 5V);
In serial mode a 12V (300mA) external supply is necessary. In case of connecting an additional Active Antenna current consumption increases to approx. 500mA.

Jumper setting: is described in the document: MIFARE® demonstration system hardware and serial system.

Temperature range of the kit: 0° to 70°C
Temperature range of the cards: -20° to 50°

[1] for service purposes only

Requirements for the PC: 80386 or higher
control via plug-in board in 8 bit AT bus slot or
one standard serial interface port

Also the following points should be considered:

- The RWD unit is not shielded. Thus, it should not be operated in disturbed environment.
- Metal environment near the antenna may have an influence on the operating distance. Instructions on how to design antennas even for metal environment are provided by Technical customer training.
- No other cable than the supplied ones shall be used.

1.4 Software

The enclosed floppy disk or CD includes driver libraries for parallel and serial communication. Executable code and the C-source code is included for Borland C++ V4.52
For details of the parallel library please refer to the description of MIFARE® Hardware Independent Low Level Functions.
For details of the serial software library please refer to the description of MIFARE® Specification of the Software Requirements;

Additionally the source code of an example 8052 library is included. This program is developed for Keil C Rev. 4.1.

Some demonstration and evaluation programs are included. For details please refer to the documentation of the programs.

Some examples of programs in the C-source code will show you the basics of MIFARE® application programming.

1.5 Related documentation

MIFARE® documents may be attached as printed papers or may be stored on the included CD. The MIFARE® CD contains all necessary documents to use the demonstration system freely accessible.
Some CONFIDENTIAL or SECURED, STRICTLY CONFIDENTIAL documents are read protected with secret passwords. Those documents are not necessary to use the demonstration system. They contain detailed information for system integration or card manufacturing. You will be asked to sign a Non-Disclosure-Agreement before those documents or the secret passwords are handed over. Please refer to the corresponding explanation on the CD or contact your local PHILIPS Semiconductors sales office for further information how to obtain those passwords.

Documents which are included in the MFEV500 package

- MIFARE Demonstration System MFEV500 User Guide (this document)
- MIFARE Demonstration System MFEV500 Description of the Hardware
- MIFARE Standard Card IC MFICS50 Functional Specification
- MIFARE Light MF1ICL10 Functional Specification
- MIFARE Application Directory Standard
- MIFARE Standardised Card IC Type Identification Procedure
- MIFARE MFRD260 Serial reader Product Specification
- MIFARE Multiapplication Demonstration Program
  (applies only for software package revisions up to 17)
- MIFARE Windows Application Demo User Manual
  (applies only for software package revisions higher than 17)

Further related documentation which may be requested separately. Those documents are generally regarded as CONFIDENTIAL or SECURED, STRICTLY CONFIDENTIAL. Please contact your local PHILIPS Semiconductors sales office for further information how to obtain those documents.

MIFARE Hardware Independent Low Level Functions
MIFARE Collection of Application Notes
MIFARE Core Module MCM Specification
MIFARE Serial Reader Specification of the Software Requirements
MIFARE MFCM200 Product Specification
MIFARE PC -Libraries for Windows 3.x
MIFARE Design of MFCM500 Read/Write Antennas
MIFARE Design of MFCM200 Read/Write Antennas
MIFARE Card IC Coil Design Guide

2 Installation

2.1 Serial mode (default):

- Connect 9 pin serial cable with RWD and PC-serial port
- Connect antenna to RWD
- Adjust jumpers according to serial mode (after delivery this is the default mode)
  (refer to the description of the MIFARE® demonstration system hardware)
- Turn on power of PC
- Connect RWD with 12 V DC via external power connectors

2.2 Parallel mode:

- Adjust the I/O page (base address) at the PC-board to 330_{hex} (default). Configuration is possible from 200_{hex} to 400_{hex} in steps of 10_{hex} with the command mif_init() from the library.

  In order to change the base address on the PC plug-in card please use the 8-way DIL-switch. The information on which address belongs to which switch is printed on the PCB next to the DIL-switch.
  The switch position 'ON' corresponds to '0'.

SW6	SW5	SW4	SW3	SW2	SW1
A9	A8	A7	A6	A5	A4
OFF	OFF	ON	OFF	ON	OFF
'1'	'1'	'0'	'1'	'0'	'1'
3		5			

  Switches 7 and 8 are not in use.

  With the above switch position the base address is adjusted to 350_{hex}.
  Evaluation and demonstration programs can be adjusted to different base addresses as well. Instruction how to perform base address adjustment may be found in the software documents.

- Turn off PC power (when cables are connected or removed the power of the PC has to be turned off !!)
- Insert PC board
- Connect RWD with antenna cable
- Adjust jumpers according to parallel mode
  (refer to the description of the MIFARE® demonstration system hardware and serial system)
- Connect 37 pin flat cable with RWD and PC-board
- Connect antenna to RWD
- Turn on power of PC
- Start evaluation or demonstration program

Definitions

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics section of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

Life support applications

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