

# AN10994

## Pegoda EV710 Documentation and Sample Guide

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Application note  
COMPANY PUBLIC

### Document information

Info	Content
<b>Keywords</b>	EV710, Documentation and Sample Guide, SAM AV1, SAM AV2, RC523
<b>Abstract</b>	This application note gives details on how to receive documentation and samples for operation of the Pegoda EV710.



**Revision history**

Rev	Date	Description
1.1	20130521	Reference of NXP Docstore updated ( <a href="#">section 3.2</a> )
1.0	20120709	Initial version.

**Contact information**

For more information, please visit: <http://www.nxp.com>

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## 1. Introduction

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NXP Semiconductors' MFRC523, the well established multiprotocol contactless reader IC, is the basis of new evaluation system solutions. The MFEV710 is targeted to be a first step in NXP's cards and reader products and to give guidance to PC based application development.

The readers EV710 is a contactless Reader/Writer compliant to the ISO/IEC14443 standard and able to handle data rates of 106 kBit, 212 kBit, 424 kBit and 848 kBit.

The [EV710](#) (evaluation kit for RD710) is based on NXP MFRC523 and can be operated in connection with a MIFARE SAM EV1. A SAM module can be used for key storage and enhanced crypto operation to increase the security level.

Both readers use the NXP Cortex M3 LPC1768  $\mu$ Controller. MFRC523 reader IC is a highly integrated reader IC solution for contactless communication purposes at 13.56 MHz.

The readers EV710 is designed to work with an external [AN700 antenna](#) to achieve an optimum reading performance for contactless applications.

Both readers provide several communication interfaces on board such as: USB, RS232, RS485 (RS422), Ethernet (via LPC\_ extension board), JTAG (a JTAG IEEE 1149.1 compliant interface for debugging)

### 1.1 Scope

This application note gives direction, how to receive documentation to start the operation with new generation of the Pegoda.

## 2. Pegoda Distribution

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### 2.1 EV710

The EV710 has the following components:

- RD710 Pegoda Reader based on RC523
- USB cable
- CD including all relevant public documentation (see 3.1)
- packaged together in one box.

The 12NC, the NXP type for this product is:

9352 941 66599 MFEV710

The EV710 can be requested as a sample from your sales representative from the NXP sample desk in Hongkong over the following address: <https://extranet.nxp.com/>

If you need in addition sample cards or the MIFARE SAM AV2, please inform your sales representative, as we will provide you over this channel additional sample material.

If more volumes are required, the product can be ordered over the normal NXP order channel by your sales representative.

## 3. Documentation

### 3.1 Public Documentation

Together with the reader, you will receive a full set of documentation and SW. The CD holds a 'NXP Semiconductor' directory with a number of subdirectories, which are described in the following.

Within the 'NXP Semiconductor' directory one can find a file, called 'CD Contnet.pdf', which gives an overview of all provided documentation. By simply clicking on one item, it is possible to open directly from this file documentation.

#### 3.1.1 Folder: 'Drivers'

This folder provides the drivers to be installed together with the Pegoda for the following Windows versions (32 as well as 64 bit version):

Window7  
WindowsXP  
Windows Vista

An installer is provided for an easy installation.

For users that wish to build NXP Pegoda driver from source code all required components are available in the Subfolder: 'Pegoda Implementation of the USB driver'. The Application Note 'Pegoda RD710 Implementation of the USB drive' shows how the needed libraries of the driver need to be included.

#### 3.1.2 Folder: 'MIFARE Documentation\'

This folder provides public datasheets of contactless card ICs from the MIFARE card portfolio, where the product can be used to start to understand the functionality provided on the card:

MF1ICS50 MIFARE 1K Data Sheet  
MF1ICS70 MIFARE 4K Data Sheet  
MF0ICU2 MIFARE Ultralight C Data Sheet  
MF0ICU1MIFARE Ultralight Data Sheet  
MF1PLUSx0y1 MIFARE Plus X Short Data Sheet  
MF1SPLUSx0y1 MIFARE Plus S Short Data Sheet  
MF3ICD21, MF3ICD41, MF3ICD81 MIFARE DESFire EV1 Short Datasheet

as well as the leaflets from MIFARE Plus and Ultralight C.

#### 3.1.3 Folder: 'Reader documentation\'

This folder provides the documentation of the Pegoda EV710 and is such the core folder for the implementation.

The following application notes help you to make the first steps with the evaluation kit:

Application Note: Example Project Pegoda  
Application Note: Hardware Design Guide Pegoda  
Application Note: Quick Start Up Guide Pegoda  
Application Note: Software Design Guide Pegoda  
Application Note: Pegoda Toolchain Information

Application Note: Pegoda Amplifier

The Antenna Tuning Calculation helps to understand how the antenna was tuned.

This folder also provides the public datasheet of the contactless reader IC used within EV710:

115235 MFRC523 Contactless reader IC

#### 3.1.3.1 Folder: 'PCB design'

The folder 'PCB design' is within the 'Reader documentation'-folder and provides the gerber-files as well as the source files for the layout of the reader.

#### 3.1.3.2 Folder: 'Cortex M3'

The folder 'Cortex M3' is within the 'Reader documentation'-folder and provides the firmware and its documentation in a separate folder, as well as documentation on the cortex itself.

For historical reasons not only the latest firmware version (v2.2) is included but also the previous one located in the folder 'firmware\_v1\_3'.

If the documentation is updated or new information is available, it will be announced over e-mail through our sales force to you.

### 3.1.4 Folder: 'SAM documentation'

This folder provides the documentation of the MIFARE SAM AV2:

Application Note: Symmetric key diversifications  
Application Note: MIFARE SAM AV2 Documentation and Sampling  
P5DF072EV2/T0PD4090 MIFARE SAM AV1 data sheet  
P5DF081 MIFARE SAM AV2 data sheet

as well as the MIFARE SAM AV2 leaflet and a SW 'TestWinscard', a PC/SC demo for application development with the MIFARE SAM AV2 in –X-functionality with script functionality. Additionally a program 'MIFARE\_SAM\_Version\_Check' is included to check some information the used MIFARE SAM.

### 3.1.5 Folder: 'Software and Tools'

This folder provides a set of software and the video 'PegodaOpensourceToolchaneSetup.wmv' showing directions how to install the required toolchain on your PC to build the firmware source code. The small program 'Pegoda2Go.exe' enables you to check the basic functionality of the Pegoda without installing any additional software.

Also the public version of 'MIFARE discover' is contained in this folder. Please refer to the Application Note 'AN10992 Quick Startup Guide Pegoda', where you find the first direction to install and operate the MIFARE discover

The public version of the 'NXP Reader library' contains the source code to do developments as described in Application Note 'AN10990 Example Project Pegoda'.

### 3.2 Strictly Confidential Documentation and Software

Detailed documentation and software of either export controlled or CC certified products are strictly confidential. As such an NDA is needed to receive the documentation and software from NXP. If an NDA is available, the documentation can be requested via NXP Docstore: <https://www.docstore.nxp.com/>. If no NDA is available please contact your local NXP sales office.

Pegoda EV710 offer the following support strictly confidential Software available over above described channel:

**MIFARE discover, export controlled;** Doc-id: 1866xx<sup>1)</sup>

Please refer to the Application Note Quick Startup Guide Pegoda, where you find the first direction to install and operate the MIFARE discover, a PC-tool for the development and generation of applications for our MIFARE card portfolio.

**NXP Reader library, export controlled;** Doc-id: 1717xx<sup>1)</sup>

In addition to the public version this contains code for the support of security relevant products, e.g. MIFARE DESFire.

Whenever the already received Software was updated, one will be informed automatically via e-mail.

Detailed full data sheets are also available over this channel for the following products:

MIFARE DESFire EV1 (MF3ICD81/41/21)  
MIFARE Plus (MF1(S)PLUS)  
MIFARE SAM AV2 (P5DF081)

1) xx stands for the version number, e.g. 165410 is version 1.0 of document 1654



## 4. References

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- [1] MFRC523 Contactless reader IC Data sheet, available on NXP web, Doc.-Id.: 1152\*\*<sup>1)</sup>
- [2] MF1ICS50 MIFARE 1K Data Sheet, available on NXP web, Doc.-Id.: 0010\*\*
- [3] MF1ICS70 MIFARE 4K Data Sheet, available on NXP web, Doc.-Id.: 0435\*\*
- [4] MF0ICU2 MIFARE Ultralight C Data Sheet, available on NXP web, Doc.-Id.: 1714\*\*
- [5] MF0ICU1MIFARE Ultralight Data Sheet, available on NXP web, Doc.-Id.: 0286\*\*
- [6] MF1PLUSx0y1 MIFARE Plus X Short Data Sheet, available on NXP web, Doc.-Id.: 1635\*\*
- [7] MF1SPLUSx0y1 MIFARE Plus S Short Data Sheet, available on NXP web, Doc.-Id.: 1870\*\*
- [8] MF3ICD21, MF3ICD41, MF3ICD81 MIFARE DESFire EV1 Short Datasheet, available on NXP web, Doc.-Id.: 1456\*\*
- [9] P5DF072EV2/T0PD4090 MIFARE SAM AV1 short data sheet, available on NXP web, Doc.-Id.: 1897\*\*
- [10] P5DF081 MIFARE SAM AV2 short data sheet, available on NXP web, Doc.-Id.: 1917\*\*
- [11] Application Note: AN10990 Example Project Pegoda
- [12] Application Note: AN10991 Hardware Design Guide Pegoda
- [13] Application Note: AN10992 Quick Start Up Guide Pegoda
- [14] Application Note: AN10993 Software Design Guide Pegoda
- [15] Application Note: AN11002 Pegoda Toolchain Information
- [16] Application Note: AN11003 Pegoda Amplifier
- [17] Application Note: AN11240 Pegoda RD710 Implementation of the USB driver
- [18] Application Note: AN10922 Symmetric key diversifications, available on NXP web
- [19] Application Note: AN10975 MIFARE SAM AV2 Documentation and Sampling, available on NXP web
- [20] Software: MIFARE discover, available over BL-ID docu control, Doc.-Id.: 1866\*\*
- [21] Software: NXP Reader library including Sample Projects, available via BL-ID docu control: Doc.-Id.: 2003\*\*
- [22] Software: TestWinScard, available on NXP web

<sup>1)</sup> \*\* ... document version number

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#### Purchase of NXP ICs with ISO/IEC 14443 type B functionality



This NXP Semiconductors IC is ISO/IEC 14443 Type B software enabled and is licensed under Innovatron's Contactless Card patents license for ISO/IEC 14443 B.

The license includes the right to use the IC in systems and/or end-user equipment.

RATP/Innovatron  
Technology

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**MIFARE Plus** — is a trademark of NXP B.V.

## 6. Contents

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<b>1.</b>	<b>Introduction .....</b>	<b>3</b>
1.1	Scope .....	3
<b>2.</b>	<b>Pegoda Distribution .....</b>	<b>4</b>
2.1	EV710 .....	4
<b>3.</b>	<b>Documentation .....</b>	<b>5</b>
3.1	Public Documentation .....	5
3.1.1	Folder: 'Drivers' .....	5
3.1.2	Folder: 'MIFARE Documentation\' .....	5
3.1.3	Folder: 'Reader documentation\' .....	5
3.1.3.1	Folder: 'PCB design\' .....	6
3.1.3.2	Folder: 'Cortex M3\' .....	6
3.1.4	Folder: 'SAM documentation\' .....	7
3.1.5	Folder: 'Software and Tools' .....	7
3.2	Strictly Confidential Documentation and Software .....	8
<b>4.</b>	<b>References .....</b>	<b>9</b>
<b>5.</b>	<b>Legal information .....</b>	<b>10</b>
5.1	Definitions .....	10
5.2	Disclaimers .....	10
5.1	Licenses .....	10
5.2	Trademarks .....	10
<b>6.</b>	<b>Contents .....</b>	<b>11</b>

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