

AN11256

Migration guide CLRC663 to derivatives

Rev. 1.0 — 3 September 2012
239910

Application note
COMPANY PUBLIC

Document information

Info	Content
Keywords	CLRC663, MFRC631, MFRC630 and SLRC610, Software migration guide
Abstract	This document describes the principles of migrating from contactless reader IC CLRC663 to MFRC631, MFRC630 or SLRC610. A practical example is given to migrate from CLRC663 to SLRC610.



Revision history

Rev	Date	Description
1.0	20120903	First release

Contact information

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

For sales office addresses, please send an email to: salesaddresses@nxp.com

1. Introduction

1.1 Scope

The main target of this document is focused on explaining the steps to migrate from CLRC663 to MFRC631, MFRC630 or SLRC610. This document will give a short overview about the changes in soft and hardware

Protocol related communication to MIFARE cards is not scope of this document. For more information on card commands and how they are used, refer to the Example Project source code, the "NXP Reader library" document and the MIFARE application notes.

1.2 Audience

This document is intended for use by manufacturers wanting to migrate from CLRC663 to MFRC631, MFRC630 or SLRC610.

2. Hardware migration

From a hardware point of view nothing has to be changed. The MFRC631, MFRC630 and SLRC610 are fully pin compatible to CLRC663. The antenna matching also doesn't need to be changed. But be aware tuning and measurement of the reader antenna has always to be performed at the final mounting position to consider all parasitic effects, e.g. metal influence on quality factor, inductance and additional capacitance.

3. Software migration

3.1 General aspects

The CLRC663 device is designed to communicate in the following operation modes:

1. read/write mode supporting ISO/IEC 14443A/MIFARE
2. read/write mode supporting ISO/IEC 14443B
3. read/write mode supporting FeliCa scheme
4. read/write mode supporting ISO/IEC 15693
5. read/write mode supporting ICODE EPC UID/ EPC OTP
6. read/write mode supporting ISO/IEC 18000-3 Mode 3

The MFRC631 device is designed to communicate in the following operation modes:

1. read/write mode supporting ISO/IEC 14443A/MIFARE
2. read/write mode supporting ISO/IEC 14443B

The MFRC630 device is designed to communicate in the following operation modes:

1. read/write mode supporting ISO/IEC 14443A/MIFARE

The SLRC610 device is designed to communicate in the following operation modes:

1. read/write mode supporting ISO/IEC 15693
2. read/write mode supporting ICODE EPC UID/ EPC OTP
3. read/write mode supporting ISO/IEC 18000-3 Mode 3

The communication distance is dependent on different factors including primarily

- the reader and card antenna size
- antenna area
- coupling between antennas
- generated Reader HF field
- minimum H-Field required by card
- environmental influences and other aspects.

To setup the main protocol settings for MFRC631, MFRC630 or SLRC610 the “loadprotocol” must be used.

3.2 MFRC631 and MFRC630

For MFRC631 and MFRC630 the supported protocol numbers stay the same. So for both derivatives the “PHHAL_HW_RC663_RXTX_xxx” table, in the pphalHw_Rc663_Int.h file doesn't need to be changed.

3.3 SLRC610

For SLRC610 the protocol numbers have changed. So for both derivatives the “PHHAL_HW_RC663_RXTX_xxx” table, in the pphalHw_Rc663_Int.h file, need to be changed. This can be done as shown in the example below. Added to that a “RC610_specific” flag needs to be defined in the project.

PHHAL_HW_RC663_RXTX_xxx example for using SLRC610:

```

/*@}*/

/** \name RXTX settings for #PHHAL_HW_RC663_CMD_LOADPROTOCOL
*/
/*@{*/
#define PHHAL_HW_RC663_RXTX_I14443A_106    0x00U    /**<
ISO14443A Operating mode at 106kbit/s. */
#define PHHAL_HW_RC663_RXTX_I14443A_212    0x01U    /**<
ISO14443A Operating mode at 212kbit/s. */
#define PHHAL_HW_RC663_RXTX_I14443A_424    0x02U    /**<
ISO14443A Operating mode at 414kbit/s. */

```

```

#define PHHAL_HW_RC663_RXTX_I14443A_848      0x03U   /**<
ISO14443A Operating mode at 848kbit/s. */

#define PHHAL_HW_RC663_RXTX_I14443B_106     0x04U   /**<
ISO14443B Operating mode at 106kbit/s. */
#define PHHAL_HW_RC663_RXTX_I14443B_212     0x05U   /**<
ISO14443B Operating mode at 212kbit/s. */
#define PHHAL_HW_RC663_RXTX_I14443B_424     0x06U   /**<
ISO14443B Operating mode at 414kbit/s. */
#define PHHAL_HW_RC663_RXTX_I14443B_848     0x07U   /**<
ISO14443B Operating mode at 848kbit/s. */

#define PHHAL_HW_RC663_RXTX_FELICA_212      0x08U   /**< FeliCa
Operating mode at 212kbit/s. */
#define PHHAL_HW_RC663_RXTX_FELICA_424      0x09U   /**< FeliCa
Operating mode at 424kbit/s. */

#ifndef RC610_specific
#define PHHAL_HW_RC663_RXTX_I15693_1004      0x0AU   /**<
ISO15693 One-Out-Of-Four Operating mode. */
#define PHHAL_HW_RC663_RXTX_I15693_HIGH_SSC  0x0AU   /**<
ISO15693 High-Speed (RX) Operating mode (Single Subcarrier). */
#define PHHAL_HW_RC663_RXTX_I15693_FAST     0x0BU   /**<
ISO15693 Fast-Speed (RX) Operating mode (Single Subcarrier). */
#define PHHAL_HW_RC663_RXTX_I15693_100256   0x0CU   /**<
ISO15693 One-Out-Of-256 Operating mode. */
#define PHHAL_HW_RC663_RXTX_I15693_HIGH_DSC  0x0CU   /**<
ISO15693 High-Speed (RX) Operating mode (Dual Subcarrier). */
#define PHHAL_HW_RC663_RXTX_EPC_UID         0x0DU   /**< ICode
EPC/UID. */
#define PHHAL_HW_RC663_RXTX_I18000P3M3_DS_M2 0x0EU   /**< ICode
ISO18000-3 Mode3 424 kBit/s (M=2). */
else
#define PHHAL_HW_RC663_RXTX_I15693_1004      0x00U   /**<
ISO15693 One-Out-Of-Four Operating mode. */
#define PHHAL_HW_RC663_RXTX_I15693_HIGH_SSC  0x00U   /**<
ISO15693 High-Speed (RX) Operating mode (Single Subcarrier). */
#define PHHAL_HW_RC663_RXTX_I15693_FAST     0x01U   /**<
ISO15693 Fast-Speed (RX) Operating mode (Single Subcarrier). */
#define PHHAL_HW_RC663_RXTX_I15693_100256   0x02U   /**<
ISO15693 One-Out-Of-256 Operating mode. */
#define PHHAL_HW_RC663_RXTX_I15693_HIGH_DSC  0x02U   /**<
ISO15693 High-Speed (RX) Operating mode (Dual Subcarrier). */
#define PHHAL_HW_RC663_RXTX_EPC_UID         0x03U   /**< ICode
EPC/UID. */
#define PHHAL_HW_RC663_RXTX_I18000P3M3_DS_M2 0x04U   /**< ICode
ISO18000-3 Mode3 424 kBit/s (M=2). */
endif

#define PHHAL_HW_RC663_RXTX_I18000P3M3_DS_M4 0x0FU   /**<
ICode ISO18000-3 Mode3 424 kBit/s (M=4). */
#define PHHAL_HW_RC663_RXTX_I18000P3M3_QS_M2 0x10U   /**<
ICode ISO18000-3 Mode3 848 kBit/s (M=2). */
#define PHHAL_HW_RC663_RXTX_I18000P3M3_QS_M4 0x11U   /**<
ICode ISO18000-3 Mode3 848 kBit/s (M=4). */
/*@}*/

```

4. Legal information

4.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

4.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the

customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Evaluation products — This product is provided on an "as is" and "with all faults" basis for evaluation purposes only. NXP Semiconductors, its affiliates and their suppliers expressly disclaim all warranties, whether express, implied or statutory, including but not limited to the implied warranties of non-infringement, merchantability and fitness for a particular purpose. The entire risk as to the quality, or arising out of the use or performance, of this product remains with customer.

In no event shall NXP Semiconductors, its affiliates or their suppliers be liable to customer for any special, indirect, consequential, punitive or incidental damages (including without limitation damages for loss of business, business interruption, loss of use, loss of data or information, and the like) arising out of the use of or inability to use the product, whether or not based on tort (including negligence), strict liability, breach of contract, breach of warranty or any other theory, even if advised of the possibility of such damages.

Notwithstanding any damages that customer might incur for any reason whatsoever (including without limitation, all damages referenced above and all direct or general damages), the entire liability of NXP Semiconductors, its affiliates and their suppliers and customer's exclusive remedy for all of the foregoing shall be limited to actual damages incurred by customer based on reasonable reliance up to the greater of the amount actually paid by customer for the product or five dollars (US\$5.00). The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails of its essential purpose.

4.3 Licenses

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

4.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are property of their respective owners.

MIFARE — is a trademark of NXP B.V.

5. Contents

1.	Introduction	3
1.1	Scope	3
1.2	Audience	3
2.	Hardware migration.....	3
3.	Software migration.....	3
3.1	General aspects	3
3.2	MFRC631 and MFRC630.....	4
3.3	SLRC610.....	4
4.	Legal information	6
4.1	Definitions	6
4.2	Disclaimers.....	6
4.3	Licenses	6
4.4	Trademarks.....	6
5.	Contents.....	7

Please be aware that important notices concerning this document and the product(s) described herein, have been included in the section 'Legal information'.

© NXP B.V. 2012.

All rights reserved.

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

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 3 September 2012
239910

Document identifier: AN11256