

# M24LRxx application software user guide

# 1 Introduction

The purpose of this user manual is to teach how to use the M24LRxx tool kit with the *M24LRxx\_Application\_Software*. It describes the *M24LRxx\_Application\_Software* interface and its menus, and shows how to send commands to M24LRxx tags.

# Contents

1	Introc	luction	1
2	Tool I	kit desc	riptions
	2.1	M24LR	xx development kit
	2.2	M24LR6	64-R demonstration kit
	2.3	M24LR	xx starter kit
	2.4	M24I B	xx demonstration kit
3	How	to contr	ol the RF and I <sup>2</sup> C channels from your screen
	3.1	Starting	M24LRxx_Application_Software 13
		3.1.1	Choosing your tool kit
		3.1.2	Main menu
		3.1.3	Image Transfer Application menu16
		3.1.4	Demo STM32-PRIMER2 menu16
		3.1.5	Demo datalogger menu
		3.1.6	Demo ESL menu
		3.1.7	Tools menu
		3.1.8	Help menu
	3.2	Reader	application
		3.2.1	RF commands
		3.2.2	Inventory command
		3.2.3	Get System Info command21
		3.2.4	Viewing RF requests and answers
		3.2.5	Selecting the RF mode21
		3.2.6	Managing M24LRxx states22
		3.2.7	Read command
		3.2.8	Write command
		3.2.9	Write AFI command
		3.2.10	Write DSFID command27
		3.2.11	Lock AFI command
		3.2.12	Lock DSFID command
		3.2.13	RF password management28
		3.2.14	Additional feature: energy harvesting commands
	3.3	I <sup>2</sup> C con	nmands



		3.3.1	I <sup>2</sup> C READ commands	3
		3.3.2	I2C WRITE commands	3
		3.3.3	I2C PASSWORD commands40	)
4	Data	transfe	er management (picture demo)	)
	4.1	Check	communication	2
		4.1.1	Check communication by RF 43	3
		4.1.2	Check communication by I2C43	3
	4.2	Writing	g a picture to your M24LR64-R	ŀ
	4.3	Read/o	display the M24LR64-R memory content	3
5	DEM	ЮКІТ-М	24LR-A demonstration 48	}
	5.1	Check	ing RF communications 48	3
	5.2	Upload	ding a picture to your DEMOKIT-M24LR-A by RF	)
	5.3	Downl	oading a picture from your DEMOKIT-M24LR-A by RF	)
	5.4	Check	communications status 50	)
	5.5		your STM32-PRIMER2 to read the contents of the nce antenna through I <sup>2</sup> C 51	
6	Data	logger	demonstration	<u>}</u>
7	ESL	demon	stration	}
8	Revi	sion his	story	5



# List of figures

Figure 1.	RF reader (ISO 15693, RF 13.56 MHz)	. 7
Figure 2.	External antenna	
Figure 3.	Serial EEPROM USB reader	. 8
Figure 4.	I <sup>2</sup> C bus cable	. 8
Figure 5.	ANT1-M24LR-A reference antenna	. 8
Figure 6.	ANT2-M24LR-A reference antenna	. 8
Figure 7.	M24LR64-R in SO8 package	
Figure 8.	RF reader	
Figure 9.	PRIM2-M24LR-A reference antenna	
Figure 10.	STM32-PRIMER2	
Figure 11.	I <sup>2</sup> C & RF reader	
Figure 12.	ANT1-M24LR-A reference antenna	
Figure 13.	ANT2-M24LR-A reference antenna	
Figure 14.	M24LR64-R in SO8 package	
Figure 15.	DEMO-CR95HF-A demonstration kit	
Figure 16.	Application home page	
Figure 17.	Connection check by the software	
Figure 18.	Main menu	
Figure 19.	Reader application menu	
Figure 20.	show Image Transfer application	
Figure 21.	show Demo STM32-PRIMER2 menu	
Figure 21.	show Data logger menu	
Figure 22.	show demo ESL menu	
•	Tools menu	
Figure 24.		
Figure 25.	Help menu	
Figure 26.	RF user interface	
Figure 27.	Inventory button	
Figure 28.		
Figure 29.	Specific UID selected	
Figure 30.	Get System Info button	
Figure 31.	RF TAG REQUEST/ANSWER report	
Figure 32.	RF request and RF answer.	
Figure 33.	Selecting the Non-addressed mode	
Figure 34.	Selecting the Addressed mode	
Figure 35.	Selecting the Select mode	
Figure 36.	Device state management interface	
Figure 37.	Initiating a read operation	23
Figure 38.	Result of the read operation - Sector 00h	
Figure 39.	Result of the read operation - Sector 3Fh	
Figure 40.	Sector 0 block 0	
Figure 41.	Sector 0 blocks 1 to 5	
Figure 42.	Initiating a write operation	
Figure 43.	Fill with 55	
Figure 44.	Get Multiple Block Security Status button	
Figure 45.	Security status byte for sector 07	26
Figure 46.	Security status bytes for sectors 07 and 08	27
Figure 47.	Write AFI command	27
Figure 48.	Write DSFID command	27



Figure 49.	Lock AFI command	27
Figure 50.	Warning before locking the AFI field	28
Figure 51.	Lock DSFID command	28
Figure 52.	Warning before locking the DSFID field	28
Figure 53.	Warning displayed on the user interface	29
Figure 54.	Present-sector Password command	
Figure 55.	Present-sector Password command successful	29
Figure 56.	Present-sector Password command error	29
Figure 57.	Write-sector Password command	30
Figure 58.	Warning before changing the password	30
Figure 59.	Write-sector Password command successful	30
Figure 60.	Write-sector Password command error	30
Figure 61.	Lock-sector Password command	31
Figure 62.	Lock-sector Password command successful	31
Figure 63.	Lock-sector Password command error	31
Figure 64.	Energy harvesting commands button	31
Figure 65.	Energy harvesting command menu	32
Figure 66.	I2C User Interface window	33
Figure 67.	Button to switch between the RF and I2C interfaces	33
Figure 68.	Reading the memory array	34
Figure 69.	Result of a Read operation to the memory array	
Figure 70.	Reading the sector security status	
Figure 71.	Result of the read sector security status operation	
Figure 72.	Reading the I2C_Write_Lock bit area.	
Figure 73.	Result of the I2C_Write_Lock bit area read operation	
Figure 74.	Reading the system parameter sector	
Figure 75.	Result of the read system parameter sector operation	
Figure 76.	Writing to the memory array	
Figure 77.	Write cycle successful	
Figure 78.	Write cycle failed (no write cycle detected)	
Figure 79.	Result of the Write operation (003C)	
Figure 80.	Page Size field	
Figure 81.	Writing A1 to the memory array	
Figure 82.	Writing to the sector security status area	
Figure 83.	Result of the write to sector security status area operation	
Figure 84.	Writing to the I2C_Write_Lock bit area	
Figure 85.	Result of the write to I2C_Write_Lock bit area operation	
Figure 86.	Issuing an I2C Present Password command	
Figure 87.	Issuing an I2C Write Password command	40
Figure 88.	Warning	
Figure 89.	Write Password cycle successful	
Figure 90.	Write Password cycle failed (no cycle detected).	41
Figure 91.	show Image Transfer Application menu	42
Figure 92.	Check communication tool	42
Figure 93.	RF communication between the tag and the reader is OK	43
Figure 94.	No RF communication between the tag and the reader	43
Figure 95.	I2C communication between the tag and the reader is OK	
Figure 96.	Failed upload by I2C	43
Figure 97.	WRITE PICTURE TO M24LR64	
Figure 98.	Picture to be uploaded	44
Figure 99.	Selecting I2C to upload the picture	
Figure 100.	Uploading the picture by I2C	45



Figure 101.	Selecting RF to upload the picture
	Uploading the picture by RF
	I2C upload process successful
	I2C upload process failed
Figure 105.	RF upload process successful
	RF upload process failed
	READ M24LR64 CONTENT interface
•	Selecting I2C to download the picture
	Downloading the picture by I2C
	Selecting RF to download the picture
	Downloading the picture by RF
	Progress bar
-	The ST logo is displayed
Figure 114.	Error message
Figure 115.	Demo STM32-PRIMER2 application menu
Figure 116.	Check RF communication button
Figure 117.	RF communication ongoing between reader and reference antenna
Figure 118.	No RF communication between reader and reference antenna
Figure 119.	Upload frame
Figure 120.	Click to download Picture button
Figure 121.	HELLO WORLD picture downloaded
Figure 122.	ST logo downloaded
Figure 123.	Upload/download process going smoothly
Figure 124.	Upload/download process with errors
Figure 125.	Datalogger demonstration home page
Figure 126.	Datalogger setting menu
Figure 127.	show Demo ESL menu
Figure 128.	ESL setting menu





# 2 Tool kit descriptions

#### 2.1 M24LRxx development kit

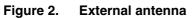
#### Ordering information: DEVKIT-M24LR-A

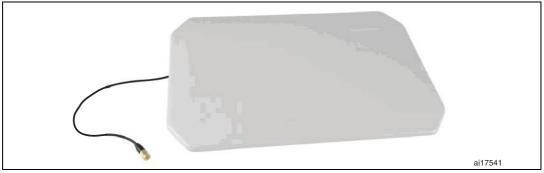
The development kit contains:

- A middle-range RF reader (ISO 15693, RF 13.56 MHz) interfaced via the USB bus and an external power supply to have a greater read range. *Figure 1* shows the RF reader.
- An external antenna, shown in *Figure 2*.
- A serial EEPROM USB reader, shown in *Figure 3*: it is an I<sup>2</sup>C bus reader (interfaced via the USB bus).
- An I<sup>2</sup>C bus cable to connect the serial EEPROM USB reader to the I<sup>2</sup>C bus of the reference antenna. *Figure 4* shows the cable to use.
- M24LR64-R reference antennas:
  - ANT1-M24LR-A shown in *Figure 5*: RF antenna size: 75 mm × 45 mm (2.9 in × 1.77 in)
  - ANT2-M24LR-A shown in *Figure 6*: RF antenna size: 20 mm × 40 mm (0.79 in × 1.57 in)
- M24LRxx samples in SO8 package (see Figure 7)

#### Figure 1. RF reader (ISO 15693, RF 13.56 MHz)













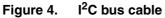




Figure 5. ANT1-M24LR-A reference antenna

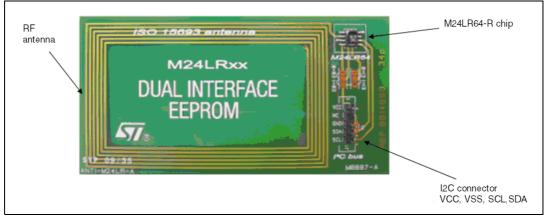
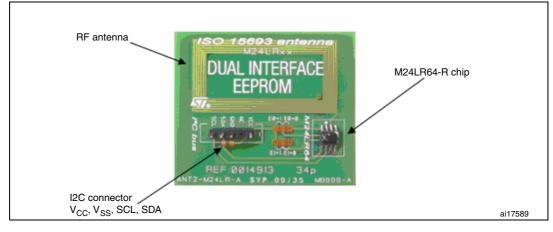


Figure 6. ANT2-M24LR-A reference antenna



Doc ID 16609 Rev 3







#### 2.2 M24LR64-R demonstration kit

Ordering information: DEMOKIT-M24LR-A

The demonstration kit contains:

- A middle-range RF reader (ISO 15693, RF 13.56 MHz) interfaced via the USB bus, shown in *Figure 8*
- An M24LR64-R reference antenna: PRIM2-M24LR-A shown in *Figure 9* RF antenna size: 20 mm × 40 mm (0.79 in x 1.57 in)
- Optional: STM32-PRIMER2 (to be ordered separately) shown in Figure 10

#### Figure 8. RF reader



#### Figure 9. PRIM2-M24LR-A reference antenna

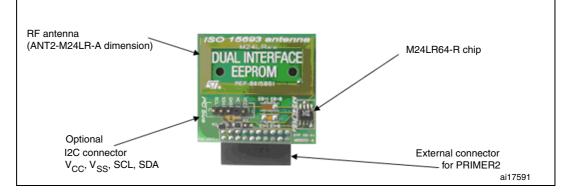




Figure 10. STM32-PRIMER2



1. Not included in the kit, to be ordered separately.

#### 2.3 M24LRxx starter kit

Ordering information: STARTKIT-M24LR-A

The starter kit contains:

- A short-range RF reader (ISO 15693, RF 13.56 MHz), interfaced via the USB bus (including the external I<sup>2</sup>C bus cable + connector) illustrated in *Figure 11*
- M24LR64-R reference antennas:
  - ANT1-M24LR-A shown in *Figure 12*: RF antenna size: 75 mm × 45 mm (2.9 in × 1.77 in)
  - ANT2-M24LR-A shown in *Figure 13*: RF antenna size: 20 mm × 40 mm (0.79 in × 1.57 in)
- M24LR64-R samples in SO8 package (see *Figure 7*)

#### Figure 11. I<sup>2</sup>C & RF reader

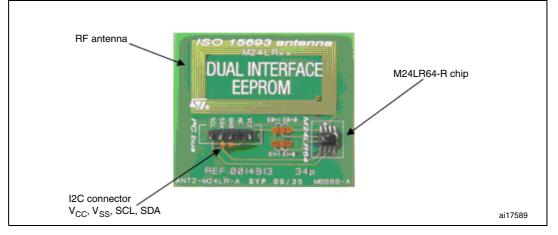






Figure 12. ANT1-M24LR-A reference antenna

#### Figure 13. ANT2-M24LR-A reference antenna



#### Figure 14. M24LR64-R in SO8 package



#### 2.4 M24LRxx demonstration kit

Ordering information: DEMO-CR95HF-A.

The DEMO-CR95HF-A is a demonstration kit used to evaluate the performances of ST CR95HF 13.56 MHz multiprotocol contactless transceiver.

It is powered through the USB bus and no external power supply is required. It includes a CR95HF contactless transceiver, a 47 x 34 mm 13.56 MHz inductive etched antenna and its associated tuning components.





### Figure 15. DEMO-CR95HF-A demonstration kit



# 3 How to control the RF and I<sup>2</sup>C channels from your screen

## 3.1 Starting *M24LRxx\_Application\_Software*

Before starting, you must have:

- previously installed all the drivers. For how to install the required drivers, please refer to UM0863: "M24LRxx tool driver install guide"
- connected the reader's USB cable

#### 3.1.1 Choosing your tool kit

On the PC desktop, double click on the *M24LRxx\_Application\_Software* icon. On launching the software, you will be prompted to select the kit you wish to use as shown in *Figure 16*.

57	
MizaLaga	
	_
Cancel	
	Cancel

#### Figure 16. Application home page

Select your kit from the list below and press the OK button:

- STARTER KIT
- DEMO KIT (USB based)
- DEMO KIT (based on the RS232 port old version)
- DEVELOPMENT KIT
- DEMO-CR95HF-A



If you select DEMO KIT (USB based), you can also play with the SERIAL EEPROM USB reader by checking the box to add the Serial EEPROM USB reader.

Once the kit has been selected, the software checks that the selected readers are well connected. A progress bar appears during the check as shown in *Figure 17*.

Dual interface	EEPROM
DEMO KIT (USB based)	check to add Serial EEPROM USB Reader
OK	Cancel
STMICROELEC All rights reserved @ 2009 STM	

Figure 17. Connection check by the software

If a problem occurs, a window appears to indicate what the problem is:

- If the development kit is used, the problem could be:
  - medium-range RF reader not plugged in the USB port
  - medium-range RF reader driver not installed
  - I<sup>2</sup>C bus reader not plugged in the USB port
  - I<sup>2</sup>C bus reader driver not installed
- If the demo kit is used, the problem could be:
  - medium-range RF reader not plugged in the USB port
  - medium-range RF reader driver not installed
- If the starter kit is used, the problem could be:
  - Short-range RF reader not plugged in the USB port
  - Short-range RF reader driver not installed

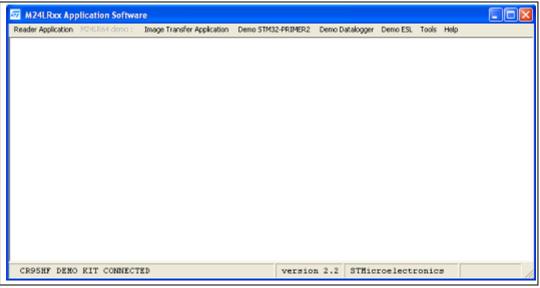


#### 3.1.2 Main menu

If all the drivers have been installed correctly, and the selected readers have been plugged, the window shown in *Figure 18* appears.

The connection status of the readers as well as the version of the software are displayed at the bottom of the window.

Figure 18. Main menu



You can use the menu at the top of the window to select several applications:

#### **Reader Application menu**

Click **Reader Application** and select a product from the list (see *Figure 19*) to manage all the I<sup>2</sup>C and RF commands of LRxxx (RFID) and M24LRXX (Dual Interface EEPROM) products.

Figure 19. Reader application menu





#### 3.1.3 Image Transfer Application menu

*Figure 20* shows the Image Transfer Application menu.

Select **show Image Transfer application** to upload or download a picture to or from the M24LR64-R by RF or I<sup>2</sup>C.

#### Figure 20. show Image Transfer application



#### 3.1.4 Demo STM32-PRIMER2 menu

Figure 21 shows the Demo STM32-PRIMER2 menu.

Select **show Demo STM32-PRIMER2** to upload or download a picture to or from the M24LR64-R by RF.

Pictures are formatted to be usable by the "Dual EE" firmware of your STM32-PRIMER2 demo.

Refer to UM0850 for details on how to use Dual EE.

# Image Transfer Application Demo STM32-PRIMER2 Demo Datalogger Demo ESL Tools Help show Demo STM32-PRIMER2 Show Demo STM32-PRIMER2 Demo ESL Tools Help Show Demo STM32-PRIMER2 Version 2.2 STMicroelectronics Image Transfer Application

#### Figure 21. show Demo STM32-PRIMER2 menu



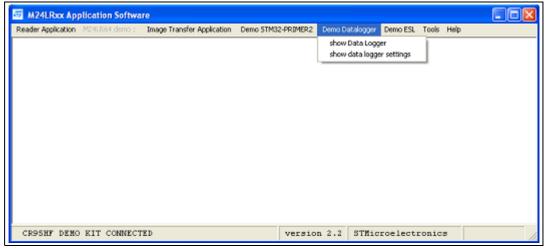
#### UM0853

#### 3.1.5 Demo datalogger menu

Figure 22 shows the Data Logger menu.

Select **show Data Logger** to launch the data logger demonstration. This application performs temperature acquisition and displays a graphical representation of the data. Refer to *Section 6: Datalogger demonstration* for a description of this demonstration application.

Figure 22. show Data logger menu



#### 3.1.6 Demo ESL menu

Figure 23 shows the ESL Demo menu.

Select **Show ESL demo** to configure your M24LRxx as an ESL (electronic shelf label) and display the ESL data of your device.

Refer to *Section 7: ESL demonstration* for a detailed description of this demonstration application.

Figure 23. show demo ESL menu

🔯 M24	LRxx Ap	plication Softwa	re					
Reader A	pplication	M24LR64 demo :	Image Transfer Application	Demo STM32-PRIMER2	Demo Datak	ogger Demo ESL	Tools Help	
						show D	emo ESL	
CR95	HF DEMC	KIT CONNECT	ED	versio	n 2.2 S	TMicroelectr	conics	



#### 3.1.7 Tools menu

*Figure 24* shows the Tools menu.

Select **stop animation** to stop the animation in the reader application interface.

#### Figure 24. Tools menu

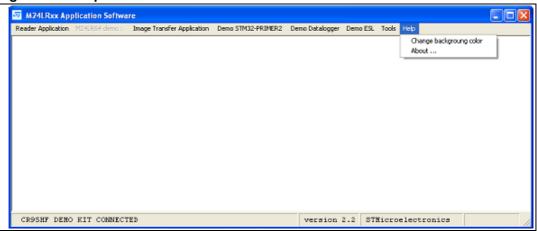
open *.bin file with BinEdit open write password log file dear write password log file stop animation		Demo STM32-PRIMER2	Deno Datalogger	Demo ESL	Tools Help	
					open *.bin file with BinEdit open write password log file dear write password log file	

#### 3.1.8 Help menu

Figure 25 shows the Help menu:

- **Open \*.bin file with BinEdit** gives you access to a freeware for reading binary files (\*.bin format).
- Change background color allows you to change the color of the main window.
- **About** provides information about the software.

#### Figure 25. Help menu





#### 3.2 Reader application

Select Reader Application in the main menu and choose a product from the list:

LRIxx for ISO15693 RFID products

Figure 26. RF user interface

• M24LRxx for Dual Interface EEPROM products.

The following section describes the **Reader Application** menu for an M24LR64-R device.

#### 3.2.1 RF commands

The *RF user interface* opens (see *Figure 26*). Using this interface you can send any command to the LRIxxx or M24LRxx tag present in the RF reader field. Refer to the datasheet for a detailed description of the RF commands.

DUAL INTERFACE EEPROM - M24LF	R64					X
Show I2C Commands	RF	Use	r II	nterface		
	multiple read Read with block Security Status	sector	MEM block	ORY seen by RF datas	555	Present password
Get Multiple Block Security Status	rom 0000 to 001F		0000 0001 0002	FF D8 FF E0 00 10 4A 46 49 46 00 01		Write password
Write	A9 34 07 65		0003 0004 0005	01 01 00 60 00 60 00 00 FF E1 00 72		Lock sector
	Cat fundam Infe		0006 0007 0008 0009	45 78 69 66 00 00 49 49 21 00 08 00 00 00 01 00		Warning
UID DSFID	Get System Info           System infos           JID         E0022C1343910511		000A 000B 000C 000D	69 87 04 00 01 00 00 00 11 00 00 00 00 00 00 00		There is no way to retreive RF or I2C
	SFID FFh AFI FFh	00	000D 000E 000F 0010	00 00 00 00 01 00 86 92 02 00 3D 00 00 00 2C 00	xx	password. If you change a Password,
B	Aemory size 07FFh Block size 03h IC reference 2Ch		0011 0012 0013	00 00 00 00 00 00 43 52 45 41 54 4F		please don't forget it.
Non-addressed mode O Add	dressed mode 🛛 Select mode		0014 0015 0016 0017	52 3A 20 67 64 2D 6A 70 65 67 20 76 31 2E 30 20		0226 0103FFE0022C1343910511
SELECT STAY C	QUIET RESET to READY		0017 0018 0019 001A	31 2E 30 20 28 75 73 69 6E 67 20 49 4A 47 20 4A		DUAL
Write AFI 00	Lock AFI		001B 001C 001D	50 45 47 20 76 36 32 29 2C 20 64 65		INTERFACE
Write DSFID 00	Lock DSFID		001E 001F	66 61 75 6C 74 20 71 75		

The **Show I2C Commands** button is used to switch from the RF user interface to the  $I^2C$  user interface.



#### 3.2.2 Inventory command

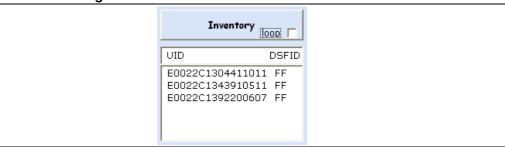
The **Inventory** button launches an Inventory command and thus detects the tags present in the RF field. The command is associated with an anticollision algorithm to detect each tag individually (see *Figure 27* and *Figure 28*).

The **Loop** option is used to loop on inventory commands. It is selected (or deselected) by checking (or unchecking) the box next to **Loop**.

#### Figure 27. Inventory button



#### Figure 28. Three tags detected



You can select a tag in the list of detected UIDs by clicking on the desired UID in the list as shown in *Figure 29*. The selected UID will then be used in all RF requests sent in Addressed mode.

#### Figure 29. Specific UID selected

UID         DSFID           E0022C1304411011         FF           E0022C1343910511         FF           E0022C1392200607         FF	E0022C1304411011 FF E0022C1343910511 FF	Inventory lo	op <b>F</b>
E0022C1343910511 FF	E0022C1343910511 FF	UID	DSFID
E0022C1392200607 FF	E0022C1392200607 FF		
		E0022C1392200607	FF



#### 3.2.3 Get System Info command

The Get System Info button launches a Get System Info command, thus filling the System info fields.

Figure 30.	Get System	Info button
------------	------------	-------------

Get System Info		
	System info	
UID	E0022C1301310912	
DSFID	AAh	
AFI	AAh	
Memory size	07FFh	
Block size	03h	
IC reference	2Ch	

#### 3.2.4 Viewing RF requests and answers

#### Figure 31. RF TAG REQUEST/ANSWER report

RF TAG REQUEST report
RF TAG ANSWER report

The **RF TAG REQUEST report** button shows the RF request sent by the RF reader to the tag.

The **RF TAG ANSWER report** button shows the RF answer from the tag, detected by the RF reader.

*Figure 32* shows an example of a reader's RF request and the corresponding answer from the tag.

#### Figure 32. RF request and RF answer

0A200000
00FFD8FFE0A65B

The RF read request is at address 0000. The RF answer is the read data: FF D8 FF E0.

#### 3.2.5 Selecting the RF mode

The RF ISO 15693 protocol allows the user to communicate in RF in three different modes: the Non-addressed mode, the Addressed mode and the Select mode. For further details, please refer to the M24LRxx datasheet.

The Non-addressed, Addressed or Select mode can be selected by clicking on the desired mode as shown in *Figure 33*, *Figure 34* or *Figure 35*.

#### Non-addressed mode

Selecting the Non-addressed mode clears the bits 5 and 6 in the Request\_flags of the RF request (bit 5 = 0, bit 6 = 0).

The request is executed by any M24LRxx device (please refer to the M24LRxx datasheet for details).



#### Figure 33. Selecting the Non-addressed mode

```
• Non-addressed mode
• Addressed mode
• Select mode
```

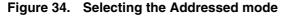
#### Addressed mode

Selecting the Addressed mode clears bit 5 and sets bit 6 in the Request\_flags of the RF request (bit 5 = 0, bit 6 = 1).

The request is addressed. The UID field is present (please refer to the M24LRxx datasheet for details).

After an Inventory command (see *Section 3.2.2: Inventory command*), you will be able to click on an UID to select a specific tag. The desired UID will be sent with the request if the Addressed mode is chosen.

If no specific UID tag is selected, the device sends "00 00 00 00 00 00 00 00" instead of the UID value.



C Non-addressed mode
----------------------

#### Select mode

Selecting the Select mode sets bit 5 and clears bit 6 in the Request\_flags of the RF request (bit 5 = 1 and bit 6 = 0).

The request is executed only by the M24LRxx device in the Select State (please refer to the M24LRxx datasheet for details).

To select a tag, refer to the *SELECT* paragraph below, and to the M24LRxx datasheet (Select paragraph).

#### Figure 35. Selecting the Select mode

O Non-addressed mode O Addressed mode O Select mode

#### 3.2.6 Managing M24LRxx states

The M24LRxx can be in different states: Power-off, Ready, Quiet and Selected (refer to the M24LRxx datasheet for details).

The interface shown in *Figure 36* is used to send three types of RF request to place the M24LRxx in one out of three specific states: Selected, Quiet and Ready.

#### Figure 36. Device state management interface

#### SELECT

The **SELECT** button is used to send a Select RF request with the UID of a specific tag (*Section 3.2.2: Inventory command*) (refer to the M24LRxx datasheet for details).



If no tag was selected after the Inventory request, the device sends "00 00 00 00 00 00 00 00" instead of the UID value.

#### **STAY QUIET**

The **STAY QUIET** button is used to send a Stay Quiet RF request (refer to the M24LRxx datasheet for details).

#### **RESET TO READY**

The **RESET TO READY** button is used to send a Reset to Ready RF request (refer to the M24LRxx datasheet for details).

#### 3.2.7 Read command

#### Figure 37. Initiating a read operation



By pressing the Read button, you launch RF requests to read the contents of the M24LRxx EEPROM from the block address specified in the **from** field to the block address specified in the **to** field.

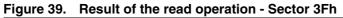
The result of the read operation is displayed in the **MEMORY seen by RF** area (see *Figure 38* to *Figure 41*).

From **0000** to **07FF** reads all M24LRxx EEPROM contents. *Figure 38* and *Figure 39* only show the results for sector 0 and sector 3F, respectively.



	MEMORY seen by RF		
sect	tor block	datas	555
	0000		
	0001		
	0002		
	0004		
	0005		
	0006		
	0007		
	0008		
	0009	00 00 01 00	
	0002	69 87 04 00	
	0005		
	0000		
	0001		
	0008		
	000F		
00			XX
	0011		
	0012		
	0013		
	0015		
	0016		
	0017		
	0018		
	0019		
	0012	4A 47 20 4A	
	001E	50 45 47 20	
	0010	76 36 32 29	
	0011		
	0018		
	001F	74 20 71 75	

Figure 38. Result of the read operation - Sector 00h



	MEW	ORY seen by RF	
sector	block	datas	555
	07E0	FF FF FF FF	
	07E1	FF FF FF FF	
	07E2	FF FF FF FF	
	07E3	FF FF FF FF	
	07E4	FF FF FF FF	
	07E5	FF FF FF FF	
	07E6	FF FF FF FF	
	07E7	FF FF FF FF	
	07E8	FF FF FF FF	
	07E9	FF FF FF FF	
	07EA	FF FF FF FF	
	07EB	FF FF FF FF	
	07EC	FF FF FF FF	
	07ED	FF FF FF FF	
	07EE	FF FF FF FF	
	07EF	FF FF FF FF	
ЗF	07F0	FF FF FF FF	XX
	07F1	FF FF FF FF	
	07F2	FF FF FF FF	
	07F3	FF FF FF FF	
	07F4	FF FF FF FF	
	07F5	FF FF FF FF	
	07F6	FF FF FF FF	
	07F7	FF FF FF FF	
	07F8	FF FF FF FF	
	07F9	FF FF FF FF	
	07FA	FF FF FF FF	
	07FB	FF FF FF FF	
	07FC	FF FF FF FF	
	07FD	FF FF FF FF	
	07FE	FF FF FF FF	
	07FF	FF FF FF FF	

Use the arrows on the keyboard to change the sector or block to be read.

From 0000 to 0000 reads block 0 in sector 0 as shown in Figure 40.

Doc ID 16609 Rev 3



#### Figure 40. Sector 0 block 0

	MEWO	DRY	seen l	by RF	
sector	block		data		 555
00	0000	FF	D8 FF	EO	XX

From 0001 to 0005 reads the blocks 1, 2, 3, 4, 5 in sector 0 as shown in *Figure 41*.

#### Figure 41. Sector 0 blocks 1 to 5

MEMORY seen by RF				
block		data		555
0001	Γ	OO 10 4A 46		
0002		49 46 00 01		
0003		01 01 00 60		XX
0004		00 60 00 00		
0005		FF E1 00 72		
	block 0001 0002 0003 0004	block 0001 0002 0003 0004	block         data           0001         00         10         4Å         46           0002         49         46         00         01           0003         01         01         00         60           0004         00         60         00         00	block         data           0001         00         10         4Å         46           0002         49         46         00         01           0003         01         01         00         60           0004         00         60         00         00

How to read the memory area with the RF Interface:

- The first column (sector) indicates the sector read.
- The second column (block) indicates the address of the block read.
- The third column (**data**) shows the contents of the M24LRxx at the specified addresses.
- The fourth column (**sss**) gives the sector security status.

Example: in *Figure 41* above, the data **49 46 00 01** means:

- 49 (49h Hex) is the first piece of data read in block number 0002 (sector 0)
- 46 (46h Hex) is the second piece of data read in block number 0002 (sector 0)
- 00 (00h Hex) is the third piece of data read in block number 0002 (sector 0)
- 01 (01h Hex) is the fourth piece of data read in block number 0002 (sector 0)

#### 3.2.8 Write command

The **Write** button launches RF requests to write data to the M24LRxx EEPROM from the block address specified in the **from** field to the block address entered in the **to** field.

In Figure 42, the Write command fills the blocks 0000h to 001Fh with "A1 34 09 67".

Figure 42. Initiating a write operation

	from 0000 to 001F	
Write	A1 34 09 67	
	Fill with	

You can choose to write the same byte four times by changing the value in the **Fill with** field. In the example below, the byte 55 is to be written four times.



#### Figure 43. Fill with 55

```
55 55 55 55
Fill with <mark>55</mark>
```

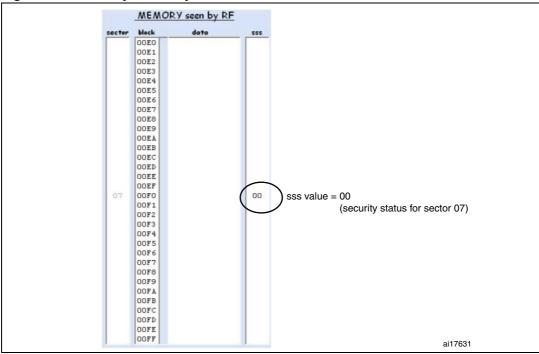
#### Get Multiple Block Security Status command

The **Get Multiple Block Security Status** button launches RF requests to read the security statuses of the blocks that correspond to the address range specified in the **from** and **to** fields.

#### Figure 44. Get Multiple Block Security Status button

Addresses are managed in the same way as for read operations. In *Figure 45* the security status byte is shown for the blocks with addresses ranging between 0x00E0 and 0x00FF (sector 07).







*Figure 46* shows the security status bytes for the blocks located at addresses 00FAh to 0109h (sector 07 & sector 08).

Figure 46.	Security status bytes for sectors 07 and 08
------------	---

	MEMOR	Y seen by RF		
sector	block	data	555	
	OOFA			
	OOFB		$\sim$	
07	OOFC		00	Sector security status SSS value = 00 for sector 07
	OOFD			
	OOFE			
	OOFF			
	0100			
	0101			
	0102			
	0103		$\sim$	
08	0104		00	Sector security status SSS value = 00 for sector 08
	0105			
	0106			
	0107			
	0108			
	0109			ai17632
				al17632

#### 3.2.9 Write AFI command

The **Write AFI** button launches a Write AFI command. The data in the dedicated field next to the **Write AFI** button are written to the AFI register.

#### Figure 47. Write AFI command

Write AFI		Data to be written to the AFI register
	$\bigcirc$	ai17636

#### 3.2.10 Write DSFID command

The **Write DSFID** button launches a Write DSFID command. The data in the dedicated field next to the **Write DSFID** button are written to the DSFID register.

#### Figure 48. Write DSFID command



#### 3.2.11 Lock AFI command

The **Lock AFI** button launches a Lock AFI command. The execution of this command locks the AFI field *permanently*.

#### Figure 49. Lock AFI command

Lock AFI				
----------	--	--	--	--

Caution: Once the AFI field has been locked, it cannot be unlocked.

For this reason, a warning (shown in *Figure 50*) is displayed before locking the AFI. To abort the Lock AFI command, click on **Cancel**. To confirm the command, click on **OK**.



#### Figure 50. Warning before locking the AFI field

DUAL	. INTERFACE EEPROM: Lock AFI command
1	WARNING : there is no way to unlock the AFI field after a Lock AFI command
	OK Cancel

#### 3.2.12 Lock DSFID command

The **Lock DSFID** button launches a Lock DSFID command. When executed, this command locks the DSFID field permanently.

Figure 51. Lock DSFID command	Figure 51.	Lock DSFID	command
-------------------------------	------------	------------	---------

Lock DSFID	

Caution: Once the DSFID field has been locked, it cannot be unlocked.

This is the reason why a warning (shown in *Figure 52*) is displayed before locking the DSFID field. To abort the Lock DSFID command, click on **Cancel**. To confirm the command, click on **OK**.

#### Figure 52. Warning before locking the DSFID field

DUAL IN	TERFACE EEPROM: Lock DSFID command
⚠	WARNING : there is no way to unlock the DSFID field after Lock DSFID command
	OK Cancel

#### 3.2.13 RF password management

The user interface displays a warning concerning password changes: you should be very careful when you change a password because there is no way of retrieving forgotten RF passwords. You have to remember the new passwords you enter. The sectors locked by a password can only be unlocked if you can provide the correct password. *Figure 53* shows the displayed warning.

By default, the RF and I<sup>2</sup>C passwords are '00 00 00 00'.



	Present password	
	Write password	
	Lock sector	
	Warning	
	There is no way to retreive RF or 12C password. If you	
	change a Password, lease don't forget it.	

Figure 53. Warning displayed on the user interface

#### **Present-sector Password command**

The **Present password** button issues a Present-sector Password command with the data filled in the **password data** field and the selected password number.

Figure 54. Present-sector Password command

Present password select password number 1 password data 0000	select password numbe	r 1 💌 2 3
Go		

The result of the Present-sector Password command appears in the RF answer field. *Figure 55* shows a successful command, and *Figure 56* shows an example where an error occurred.

Figure 55.	Present-sector	Password	command	successful
------------	----------------	----------	---------	------------

078F0 : Present Password OK
-----------------------------

#### Figure 56. Present-sector Password command error

010F68EE : Present Password NOT OK



#### Write-sector Password command

The **Write Password** button issues a Write-sector Password command with the data filled in the **password data** field and the selected password number.

#### Figure 57. Write-sector Password command

	Write password	
selec	ct password number 2	
pass	word data AEF54B56	
	Go	

When you press the **Write password** button, a warning pops up to prevent any unwanted password change. To abort the Write-sector Password command, click on **Cancel**. To confirm the command, click on **OK**.

#### Figure 58. Warning before changing the password

DUAL	INTERFACE EEPROM: Password management 🔀
1	Warning : there is no way to retreive an I2C or RF Password Please, remember it !
	OK Cancel

Figure 59. Write-sector Password command successful

|--|

Write Password HS

#### Figure 60. Write-sector Password command error

	01120C25 : Write Password NOTOK	
--	---------------------------------	--

#### Lock-sector Password command

The **Lock sector** button issues a Lock-sector Password command with the data configured in the **select sector number**, **select password number** and **select lock config** fields.



		Lock se	ctor		
se	elect :	sector number	21 💌		
se	elect p	password number	2 💌		
se	select lock config				
		pwd presented	pwd not presented		
G	00	Read Write	Read No Write		
C	01	Read Write	Read Write		
0	5 10	Read Write	No Read No Write		
C	11	Read No Write	No Read No Write		
		G	õ		

Figure 61. Lock-sector Password command



#### Figure 63. Lock-sector Password command error

01119717 : Lock Sector NOT OK

#### 3.2.14 Additional feature: energy harvesting commands

M24LRXXE devices, such as the M24LR16E-R, have the Energy Harvesting capability.

Clicking the **Display Energy Harvesting commands** button (see *Figure 64*) opens a new window which allows to manage Energy Harvesting (see *Figure 65*). Several RF commands are available:

- Click the **Read config byte** button to send a ReadCfg command to the M24LRXXE and display the value of the config byte.
- Click the Write E.H. config button to send a WriteEHCfg command to the M24LRXXE in order to change EH configuration (EH\_MODE and EH config bits).
- Click the **Write D.O. config** button to send a WriteDOCfg command to the M24LRXXE and change Digital Output config.
- Click the **Check E.H. enable** button to send a CheckEHEn command to the M24LRXXE and display the value of this Control Register.
- Click the Reset/Set EH buttons to send a SetRstEHEn command to the M24LRXXE and deactivate/activate energy harvesting (when possible)

Refer to the datasheets for full details on energy harvesting commands.

#### Figure 64. Energy harvesting commands button

Display Energy Harvesting
commands



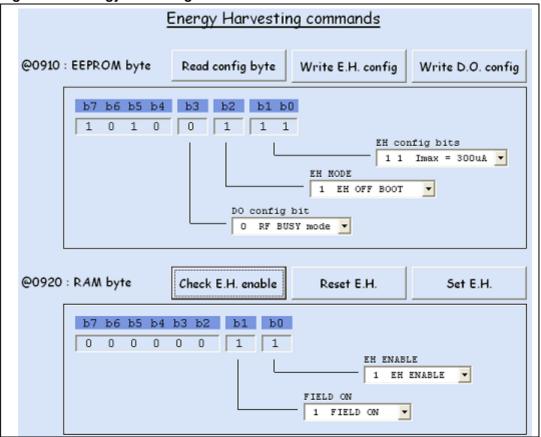


Figure 65. Energy harvesting command menu

# 3.3 I<sup>2</sup>C commands

You can use the I2C *User Interface window*, illustrated in *Figure 66*, to exchange data between a tag connected to the I2C reader and the M24LRxx.



DUAL INTERFACE EEPROM - M24LR64		×
show RF interface I20	User Interface	
I2C READ       • Memory         Address       Address         from       0000       to         0000       to       007F         • Sector Security Status (system)       • I2C write Lock bits (system)         • I2C write Lock bits (system)       • System Parameter Sector (system)         • Sector Security Status (system)       • Read         I2C WRITE       • Memory         • Sector Security Status (system)         • Address         from       0110         to       0113         Page Size       •         Write Memory (memory area)       # I E3 B6 07         At E3 B6 07       Fill with         Write Password       •         Present Password       •         Present Password       # Present	OSET LITTEF face           MEMORY seen by I2C           sector         nemery         datas           0000         FF D8 FF E0         0000           0000         FF D8 FF E0         0000           0000         01 04 A 46         0000           0001         01 04 06         01 01 00           0010         00 60 00         000           0014         FF E1 00 72         0018 45 78 69 66           001C         00 00 04 94 9         0020 24 00 00 01 00           0022         00 00 00 01 00         0022 00 00 00           0024         00 00 01 00         0024 00 00 01 00           0022         01 00 00 00         0038 01 00 86 92           0033         01 00 86 92         00336 01 00 86 92           00338         01 00 86 92         00336 01 00 86 92           0034         00 00 00 00 00         0038 65 67 20 76           0050         52 34 20 67         0054 64 2D 6A 70           0050         52 34 20 67         0055 65 720 76           0055         51 22 73 69         0064 6E 67 20 49           0064         65 73 20 74         0070 76 65 32 29           0074         22 0 64 65         0074 22 0 64 65 <tr< th=""><th>Warning         There is no way to         retreive RF or I2C         password. If you         change a Password,         please don't forget it.</th></tr<>	Warning         There is no way to         retreive RF or I2C         password. If you         change a Password,         please don't forget it.

Figure 66. I2C User Interface window

With the **Show RF interface** button (*Figure 67*) you can switch from the RF user interface to the  $I^2C$  user interface.

#### Figure 67. Button to switch between the RF and I2C interfaces



#### 3.3.1 I<sup>2</sup>C READ commands

The **Read** button issues read commands to the M24LRxx connected to the I2C reader. To do so, select the I2C READ area, and then press on the **Read** button.

#### Read command to the memory array

To read the memory array, select **Memory** from the list and specify the address range to be read. Then click on the **Read** button. Addresses are managed in the same way as for RF commands (see *Section 3.2.7: Read command*).

*Figure 68* shows an example where the user decides to issue a Read Memory operation from address 0010h to address 003Fh.



#### Figure 68. Reading the memory array

12C READ	• Memory
	Address Address from 0010 to 003F
	🛇 Sector Security Status (system)
	I2C write Lock bits (system)
	🗧 System Parameter Sector (system)
	<u>R</u> ead



	WEW	0	RY seen b	y 12C
sector	memory		data	
	0010		00 60 00	00
	0014		FF E1 00	72
	0018		45 78 69	66
	001C		00 00 49	49
	0020		2A 00 08	00
	0024		00 00 01	00
00	0028		69 87 04	
	002C		01 00 00	00
	0030		1A OO OO	00
	0034		00 00 00	00
	0038		01 00 86	92
	003C		02 00 3D	00

*Figure 69* illustrates the result of the Read operation to the memory array. The first column shows which sector is read. The second column indicates the address of the first byte in the page. Then the third column gives the data.

Let us take the example corresponding to the data < 69 87 04 00 >

69 (69h Hex) is data for address 0028h (sector 0)

87 (87h Hex) is data for address 0029h (sector 0)

04 (04h Hex) is data for address 002Ah (sector 0)

00 (00h Hex) is data for address 002Bh (sector 0)

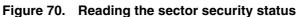
#### Reading the sector security status

To read all the sector security status bytes (RF block security), select **Sector Security Status (system)** then press the **Read** button.

*Figure 70* shows how to launch an operation to read the sector security status.



neau	ing the secto	Si Security Status		
	<u>12C READ</u>	Memory		
		Sector Security Stat	us (system)	
		I2C write Lock bits (	(system)	
		🔘 System Parameter Se	ctor (system)	
			<u>R</u> ead	
	head		<ul> <li>Sector Security Stat</li> <li>I2C write Lock bits (</li> </ul>	<u>I2C READ</u> C Memory C Sector Security Status (system) C I2C write Lock bits (system) C System Parameter Sector (system)





MEMORY seen by I2C			_
system		555	
0000		00 00 00 00	
0004		00 00 00 00	
0008		00 00 00 00	
000C		00 00 00 00	
0010		00 00 00 00	
0014		00 00 00 00	
0018		00 00 00 00	
001C		00 00 00 00	
0020		00 00 00 00	
0024		00 00 00 00	
0028		00 00 00 00	
002C		00 00 00 00	
0030		00 00 00 00	
0034		00 00 00 00	
0038		00 00 00 00	
003C		00 00 00 00	

#### Reading the I2C\_Write\_Lock bit area

To read the 2C\_Write\_Lock bit area (I2C sector security), select **I2C write lock bits** (system) and press the **Read** button.

*Figure 72* shows how to launch an operation to read the I2C\_Write\_Lock bit area.

#### Figure 72. Reading the I2C\_Write\_Lock bit area

1	2C READ	© Memory		
		○ Sector Security Stat ● I2C write Lock bits ( ○ System Parameter Se	(system)	
			Read	



gure 73.	Result of the I2C_V	Vrite_L	ock bit area read	I op
		MEMO	DRY seen by I2C	
		evetem	I2C write lock bits	
			00 00 00 00	
		0804	00 00 00 00	
		· · · ·		

#### Fic

#### Reading the system parameter sector

To read the data in the system parameter sector, select System Parameter Sector (system) and press the Read button.

Figure 74 shows how to launch an operation to read the system parameter sector.

#### Figure 74. Reading the system parameter sector

<u>12C READ</u>	Memory		
	<ul> <li>Sector Security State</li> <li>I2C write Lock bits (second state)</li> </ul>		
	<ul> <li>System Parameter Sec</li> </ul>		
		<u>R</u> ead	

#### Figure 75. Result of the read system parameter sector operation

MEN	MEMORY seen by I2C			
system	n	sector para	neters	
0900		FF FF FF	FF	
0904		FF FF FF	FF	
0908		FF FF FF	FF	
0900		FF FF FF	FF	
0910		FF FE OO	00	
0914		12 34 56	78	
0918		9A BC 02	EO	
0910		2C FF 07	03	
,	<u></u>			

Please, refers to the M24LR64-R datasheet for the system parameters.

#### 3.3.2 **I2C WRITE commands**

The Write button is used to issue write commands to the M24LRxx connected to the I2C reader. The button is located in the I2C WRITE area of the I2C User Interface window (see Figure 66).

To issue a command, select the I2C WRITE area and press the Read button.

#### Write command to the memory array

To write to the memory array, select **Memory** and choose the address range to be written. Then press the Write button. Addresses are managed is the same way as for RF commands (see Section 3.2.7: Read command).

Figure 76 shows how to launch a write operation to the memory array.



Figure 76.	Writing to the	e memory array
------------	----------------	----------------

12C WRITE	Memory
	Sector Security Status (system)
	I2C write Lock bits (system)
	🛇 System Parameter Sector (system)
Address	Address
from 0000	to 003F Page Size 4 💌
Write Memory (mem	nory area)
12 34 56 78	Fill with <u>W</u> rite

In this example, a write operation is issued to write the data < 12 34 56 78 > to EEPROM memory addressees 0000 to 003F by I2C communication.

Note that in the I2C answer, you are notified of whether the write cycle succeeded or failed (see *Figure 77* and *Figure 78*).

### Figure 77. Write cycle successful

### Figure 78. Write cycle failed (no write cycle detected)

Write Fail : NO WRITE Cycle
-----------------------------

*Figure 79* shows the result of the write operation.

### Figure 79. Result of the Write operation (003C)

	MEWO	DR.	/ seen b	y 12C
sector	memory		datas	:
	0000	1	2 34 56	78
	0004	1	2 34 56	78
	0008	1	2 34 56	78
	000C	1	2 34 56	78
	0010	1	2 34 56	78
	0014	1	2 34 56	78
	0018	1	2 34 56	78
	001C	1	2 34 56	78
00	0020	1	2 34 56	78
	0024	1	2 34 56	78
	0028	1	2 34 56	78
	002C	1	2 34 56	78
	0030	1	2 34 56	78
	0034	1	2 34 56	78
	0038	1	2 34 56	78
	003C	1	2 34 56	78

You can write 1, 2, 3 or 4 bytes by playing with the Page Size field.

#### Figure 80. Page Size field

Page Size	4
	1 2 3 4



*Figure 81* shows how to write "A1" to EEPROM memory address 0005.

Figure 81. Writing A1 to the memory array

I2C WRITE    Memory
Sector Security Status (system)
I2C write Lock bits (system)
🔿 System Parameter Sector (system)
Address Address
from 0005 to 0005 Page Size 1 💌
Write Memory (memory area)
A1 Fill with <u>W</u> rite

### Writing to the sector security status area

To write to the sector security status area, select **Sector Security Status (system)** and type the address range to be written, then press the **Write** button. Addresses are managed is the same way as for RF commands (see *Section 3.2.7: Read command*).

Please note that the I2C password has to be presented successfully prior to writing to the Sector Security Status area.

Figure 82 shows how to write to the sector security status area.

### Figure 82. Writing to the sector security status area

12C WRITE	Memory						
	Sector Security Status (system)						
	I2C write Lock bits (system)						
	🛇 System Parameter Sector (system)						
Address	Address						
from 0000	to 0003 Page Size 🛛 💌						
CWrite SSS (System	n area)						
AE F3 21 00	Fill with <u>W</u> rite						

Figure 83 shows the result of the operation.



10 3000	or security statu
MEMO	ORY seen by I2C
system	555
0000	AE F3 21 00
0004	00 00 00 00
0008	00 00 00 00
0000	00 00 00 00
0010	00 00 00 00
0014	00 00 00 00
0018	00 00 00 00
001C	00 00 00 00
0020	00 00 00 00
0024	00 00 00 00
0028	00 00 00 00
002C	00 00 00 00
0030	00 00 00 00
0034	00 00 00 00
0038	00 00 00 00
003C	00 00 00 00

Figure 83. Result of the write to sector security status area operation

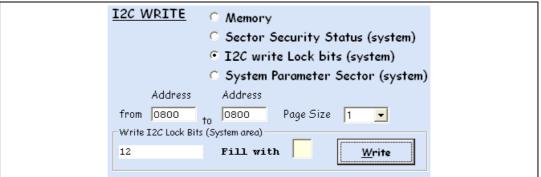
# Writing to the I2C\_Write\_Lock bit area

To write to the I2C\_Write\_Lock bit area, select **I2C write lock bits (system)** and fill the address range to be written, then press the **Write** button. Addresses are managed is the same way as for RF commands (see *Section 3.2.7: Read command*).

Please note that the I2C password has to be presented successfully prior to writing to the I2C\_Write\_Lock bit area

*Figure 84* shows how to launch a write operation to the I2C\_Write\_Lock bit area.

### Figure 84. Writing to the I2C\_Write\_Lock bit area



*Figure 85* shows the result of the operation.

#### Figure 85. Result of the write to I2C\_Write\_Lock bit area operation

MEWO	DRY seen by I2C
system	I2C write lock bits
0800	12 00 00 00
0804	00 00 00 00



# 3.3.3 I2C PASSWORD commands

In the I2C PASSWORD area of the I2C User Interface window (see *Figure 66*), select **Present Password** to be able to send an I2C Present Password command. The button at the bottom right-hand side of the I2C PASSWORD area will indicate **Present**.

In the same area, select **Write Password** to be able to send an I2C Write Password command. The button at the bottom right-hand side of the I2C PASSWORD area will indicate **Write**.

# I2C Present Password command

To issue an I2C Present Password command, select **Present Password** and type the I2C password into the **Present Password** field.

Figure 86 shows how to launch an I2C Present Password command.

### Figure 86. Issuing an I2C Present Password command

12C PASSWOR	<u>RD</u> © Present Pass © Write Passw	
Present Password		
AE 45 80 63	Fill with	<u>P</u> resent

In this example, an I2C Present Password command is sent with the I2C password <AE 45 80.63 >.

### **I2C Write Password command**

To issue an I2C Write Password command, select **Write Password** and type the I2C password into the **Write Password** field.

Figure 87 shows how to launch an I2C Write Password command.

#### Figure 87. Issuing an I2C Write Password command

Write Password 54 13 4B C8 Fill with Write	12C PASSWORD	<ul> <li>Present Password</li> <li>Write Password</li> </ul>	l
		Fill with	Write

In this example, an I2C Write Password command is sent with the I2C password <54 13 4B C8 >.

A warning (see *Figure 88*) was added to prevent unwanted password changes.



Figure 88.	Warning	
	DUAL INTERFACE EEPROM: Password management	
	Warning : You are going to change the I2C password by sending a Write I2C Password command. There is no way to retreive an I2C or RF Password. Please, remember it !	
	ОК	

Note that in the I2C answer, you are notified of whether the write cycle succeeded or failed (see *Figure 89* and *Figure 90*).

### Figure 89. Write Password cycle successful

Write Password Ok : prog time = 7.7 ms
--

# Figure 90. Write Password cycle failed (no cycle detected)

|--|



# 4 Data transfer management (picture demo)

Select **show Image Transfer Application** from the main menu of the *M24LRxx\_Application\_Software* application.

## Note: M24LR64-R reference antennas are required to play this demonstration.



### Figure 91. show Image Transfer Application menu

The show Demo application allows you to play with the M24LR64-R device with both interfaces: I2C and RF.

With this demo you can load a picture by RF or I2C (.jpeg file of 2 Kbytes) into the M24LR64-R device. You can also download and display the contents of the memory by I2C or RF. If JPG-like contents were previously loaded into the EEPROM, you will be able to visualize them.

# 4.1 Check communication

This tool help you test the I2C or RF communications between the M24LR64-R device and the reader.

ر در م	CHECK COMMUNICATIO	on <sub>1</sub>
	check RF communication	
	check I2C communication	

# Figure 92. Check communication tool

UM0853

If you want to use the RF interface to check communications, click on the **check RF** communication button. If you want to use the I2C bus, click on the **check I2C** communication button.

# 4.1.1 Check communication by RF

After clicking on **check RF communication**, the button changes to **running** as shown in *Figure 93*.

If the circle next to the **running** button is green, the communication by RF between the M24LR64-R and the reader is OK.

### Figure 93. RF communication between the tag and the reader is OK

- CHECK COMMUNICATION -	
running	
check I2C communication	

If the circle next to the **running** button is red, the communication by RF between the M24LR64-R and the reader is NOT OK

### Figure 94. No RF communication between the tag and the reader

ſ		
	check I2C communication	

# 4.1.2 Check communication by I2C

After clicking on **check I2C communication**, the button changes to **running** as shown in *Figure 95*.

If the circle next to the **running** button is green, the communication by I2C between the M24LR64-R and the reader is OK.

### Figure 95. I2C communication between the tag and the reader is OK

Г	CHECK COMMUNICATION		
	check RF communication		
	running		

If the circle next to the **running** button is red, the upload by I2C failed.

### Figure 96. Failed upload by I2C

Г	CHECK COMMUNICATION		
	check RF communication		
	running		



# 4.2 Writing a picture to your M24LR64-R

In the show Demo application window, go to the WRITE PICTURE TO M24LR64 area (see *Figure 97*), and choose the picture you would like to upload into the memory. Click on the picture to select it.



Figure 97. WRITE PICTURE TO M24LR64

In Figure 98, the ST logo was chosen as an example.

# Figure 98. Picture to be uploaded



After selecting the picture, you need to choose which of the I2C or RF interface you will use to upload it to the memory of the M24LR64-R device.

To upload it by I2C, click on **I2C** as shown below.

# Figure 99. Selecting I2C to upload the picture

2- select the transf	fer path
• I2C 🔹 🖡	۶F

You then have to click on the Upload by I2C button as shown in Figure 100.



# Figure 100. Uploading the picture by I2C

3	3- Upload Picture to M24LR64
	Upload by I2C

To upload the picture by RF, click on  $\ensuremath{\mathsf{RF}}$  as shown below.

# Figure 101. Selecting RF to upload the picture

5				
	2- selec	t the tr	ransfer path	
	(	120	• RF	

You then have to click on the **Upload by RF** button to launch the upload process (see *Figure 102*).

### Figure 102. Uploading the picture by RF

3- (	Jpload Picture to M24LF	٤64
	Upload by RF	

You can use the CHECK COMMUNICATION area to verify whether the data are written successfully or not.

If the I2C bus was used, click on **check I2C communication**. The color of the circle will tell you if the upload process was successful (green circle like in *Figure 103*) or failed (red circle like in *Figure 104*).

### Figure 103. I2C upload process successful



### Figure 104. I2C upload process failed



If the RF interface was used, click on **check RF communication**. The color of the circle will tell you if the upload process was successful (green circle like in *Figure 105*) or failed (red circle like in *Figure 106*).

#### Figure 105. RF upload process successful





### Figure 106. RF upload process failed



# 4.3 Read/display the M24LR64-R memory content

In the show Demo application window, the READ M24LR64 CONTENT area allows you to display the contents of the memory on your computer screen if the picture was uploaded.

### Figure 107. READ M24LR64 CONTENT interface



You first have to select which of the I2C or RF interface you will use to download the picture from the memory of the M24LR64-R.

# To download it by I2C, click on **I2C** as shown below.

### Figure 108. Selecting I2C to download the picture

1- select the transfer path	
• 12C • RF	

You then have to click on the **Upload by I2C** button to launch the upload process (see *Figure 109*).

#### Figure 109. Downloading the picture by I2C



To download the picture by RF, click on **RF** as shown below.



### UM0853

# Figure 110. Selecting RF to download the picture

You then have to click on the **Upload by RF** button to launch the upload process (see *Figure 111*).

### Figure 111. Downloading the picture by RF



The application reads the contents of the EEPROM. A progress bar (shown in *Figure 112*) indicates that the process is running.

### Figure 112. Progress bar



If the download process is successful, the picture is displayed on the screen like in *Figure 113*. Otherwise, an error message appears (see *Figure 114*).

# Figure 113. The ST logo is displayed



#### Figure 114. Error message



You can use the CHECK COMMUNICATION area to verify whether the data were read successfully or not.

If you used the I2C bus to download the picture, click on **check I2C communication**. The color of the circle will tell you if the upload process was successful (green circle) or failed (red circle).

If you used the RF interface to download the picture, click on **check RF communication**. The color of the circle will tell you if the upload process was successful (green circle) or failed (red circle).



# 5 DEMOKIT-M24LR-A demonstration

The demonstration application menu, shown in *Figure 115*, is intended for use with the DEMOKIT-M24LR-A kit. All the pictures are in bitmap format to be compliant with the STM32-PRIMER2 firmware and LCD screen driver.

Note:

M24LR64-R reference antennas are required to play this demonstration.

### Figure 115. Demo STM32-PRIMER2 application menu

JUAL INTERFACE EEPROM - DEMO M24LR64	
DUAL INTERFACE EEPI	ROM
Click on one picture to transfer it by RF into your M24LR64	
Hallo Welt 世界您好	Click on download to read from your M24LR64 by RF

# 5.1 Checking RF communications

To check the RF communication between the reader and the reference antenna, press the **check RF communication** button (see *Figure 116*). The button changes to **running**. If the RF communication between the reader and the reference antenna is good, the circle is green like in *Figure 117*. If there is no RF communication between the reader and the reference antenna, the circle appears red like in *Figure 118*.

### Figure 116. Check RF communication button



# Figure 117. RF communication ongoing between reader and reference antenna





Figure 118. No RF communication between reader and reference antenna



# 5.2 Uploading a picture to your DEMOKIT-M24LR-A by RF

Use the frame shown below to upload a picture by RF.

### Figure 119. Upload frame



Click on a picture to upload the picture in bmp format to the M24LR64-R by RF.

You can use the three additional icons on the right-hand side (HELLO WORLD, HALLO WELT...) to decrease the upload time (3 seconds versus 20 seconds).

# 5.3 Downloading a picture from your DEMOKIT-M24LR-A by RF

Press the **click to download Picture** button shown below to download a picture by RF. Once downloaded, the picture appears next to the button as shown in *Figure 121* and *Figure 122*.

### Figure 120. Click to download Picture button

Download picture	
Click on download to read from your M24LR64 by RF	



### Figure 121. HELLO WORLD picture downloaded



### Figure 122. ST logo downloaded



# 5.4 Check communications status

You can use the CHECK COMMUNICATION area to verify whether the data were written or read successfully or not.

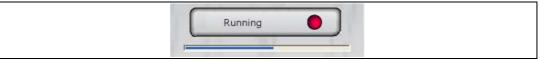
The green circle (*Figure 123*) indicates that the RF upload/download process is going smoothly.

The red circle (*Figure 124*) indicates that errors are occurring during the RF upload/download process.

#### Figure 123. Upload/download process going smoothly



### Figure 124. Upload/download process with errors





# 5.5 Using your STM32-PRIMER2 to read the contents of the reference antenna through I<sup>2</sup>C

If the picture was uploaded by RF as described above, you will be able to display it on the LCD screen of your STM32-PRIMER2.

Please refer to the UM0850 user guide to configure your STM32-PRIMER2 and use the embedded software.



# 6 Datalogger demonstration

The datalogger demonstration must be used in conjunction with the DATALOG-M24LR-A datalogger reference board. Refer to UM0925 "Using the M24LR64-R datalogger reference design" and AN3209 "Developing your M24LR64-R datalogger application for temperature acquisition" for a detailed description of the datalogger reference board and application.

To run the datalogger demonstration:

- 1. Select **Show Datalogger** to display the User Interface for Datalogger demo (see *Figure 125*).
- 2. Select **Show Datalogger Setting** to display the Datalogger setting menu (see *Figure 126*).



DUAL INTERFACE EEPROM - Datad opper demo	<u> </u>
Start Acquisition M Trace Graph	
-	
STMicroelectronics	
STANDORGGUOINUS	www.st.com

#### Figure 126. Datalogger setting menu

ataLogger Setting	delay rate
	□ Overwrite when memory is full





# 7 ESL demonstration

The ESL demonstration allows to use the M24LRxx devices as electronic shelf labels (ESLs).

To run the ESL demonstration:

- 1. Select **show demo ESL** from the main menu to launch the ESL application (see *Figure 127*).
- 2. Several parameters can be set to configure your ESL device (see *Figure 128*):
  - Logo
     Check the French (PROMO) or English logo (DISCOUNT) to indicate that a special price is proposed. Check the blank logo if no special price is applied.
  - Price trend arrow
     Check the up or down arrow to indicate if the price has been increased or decreased, or the blank arrow if no indication is required.
  - Enter the product price
  - Enter text in ASCII format in Line 1 and Line 2 to display the name and a brief description of the product.
- 1. To write the data in your ESL-like M24LRxx:
  - a) Emerge the M24LRxx in your reader RF field.
  - b) Click the Transfer data to your ESL button.
- 2. To read and modify the data contained in your ESL-like M24LRxx:
  - a) Emerge the M24LRxx in your reader RF field.
  - b) Click the **Read ESL configuration** button. A window is then displayed at the right of the ESL demo - configuration tool area (see *Figure 128*). It shows the type of discount, the product description, as well as the price and the price trend.

### Figure 127. show Demo ESL menu





DUAL INTERFACE EEPROM	
ESL demo - Configuration tool	France red withe Chateeu du Soliel Chateeu du Soliel Chateeu du Soliel Chateeu du Soliel
read ESL configuration transfer data to your ESL	
STMicroelectronics	



# 8 Revision history

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Date	Revision	Changes
28-Jan-2010	1	Initial release.
10-Oct-2011	2	<ul> <li>Extended document scope to the whole M24LR64xx family.</li> <li>Added Section 2.4: M24LRxx demonstration kit.</li> <li>Updated Figure 16: Application home page, Figure 18: Main menu.</li> <li>Updated Section : Reader Application menu.</li> <li>Updated Figure 20: show Image Transfer application, Figure 21: show Demo STM32-PRIMER2 menu.</li> <li>Added Section 3.1.5: Demo datalogger menu and Section 3.1.6: Demo ESL menu.</li> <li>Updated Figure 24: Tools menu and Figure 25: Help menu.</li> <li>Updated Section 3.2: Reader application.</li> <li>Added Section 3.2.14: Additional feature: energy harvesting commands.</li> <li>Added Section 6: Datalogger demonstration and Section 7: ESL demonstration.</li> <li>Updated disclaimer on last page.</li> </ul>
28-Oct-2011	3	Changed document title.



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