



LF, HF  
**RFID**  
PRODUCT OVERVIEW

**ATMEL**<sup>®</sup>

# RFID Product Overview

LF Tags (100 -150 kHz)						
	TK5551 <sup>1</sup>	ATA5558	e5561	ATA5570	ATA5577M1 <sup>2</sup>	ATA5577M2 <sup>2</sup> MEGAPADS
<b>Memory</b>						
Read only	–	–	–	–	–	–
Read/Write	X	X	X	X	X	X
User memory (bit)	224	1024	288	224	224	224
System memory (bit)	40	320	32	96	128	128
<b>RF Interface</b>						
Write protection	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise
ISO11784/11785	FDX-B	FDX-B		FDX-B	FDX-B	FDX-B
Modulation	ASK	ASK	ASK	ASK	ASK	ASK
Encoding	FSK, PSK, Manchester, Bi-phase, Binary	Manchester, Bi-phase, NRZ	Manchester, Bi-phase	FSK, PSK, Manchester, Bi-phase, NRZ	FSK, PSK, Manchester, Bi-phase, NRZ	FSK, PSK, Manchester, Bi-phase, NRZ
Bit rate [bits/s]	RF/8 to RF/128	RF/2 to RF/64	RF/32, RF/64	RF/2 to RF/128	RF/2 to RF/128	RF/2 to RF/128
Capacitor on chip	–	80 pF and 210 pF	–	0	0 <sup>4</sup> , 75 <sup>4</sup> , 130 <sup>4</sup> , 250 or 330 pF trimmed +/- 3%	250 or 330 pF trimmed +/- 3%
<b>Other features</b>						
Encryption	–	–	AUT64	–	–	–
Anti-collision function	AOR (Answer on Request)	Deterministic	–	AOR (Answer on Request)	AOR (Answer on Request)	AOR (Answer on Request)
Packages	Only available as transponder	Sawn Wafer	Wafer	SO8, Sawn Wafer, waffle pack	Sawn Wafer, waffle pack, micromodule, TSSOP8 <sup>3</sup>	Sawn Wafer, waffle pack, sticky tape <sup>4</sup>
Main application areas	Manufacturing, logistic, security control, access control, component authentication	Manufacturing, logistic, security control, access control, component authentication	Logistic, security control, access control, component authentication, anti- counter-feiting	Manufacturing, animal identification, security control, access control, component authentication	Manufacturing, logistic, transportation, animal identification, security control, access control, component authentication	Manufacturing, logistic, transportation, animal identification, security control, access control, component authentication
Transponder part no.	TK5551	ATA555815-PP	TK5561	–	ATA5577M1330-PP <sup>3</sup>	–
Sensor	–	–	–	Resistor interface 1 bit	–	–
Speciality	–	–	–	–	–	Gold Bump Mega Pads 200 x 400 micrometers

<sup>1</sup> Only available as transponder

<sup>2</sup> Successor of T5554, T5557, and ATA5567

<sup>3</sup> Planned

<sup>4</sup> On request

LF Reader IC (100 - 150 kHz)							
Part Number	Frequency	Type	Max. Bit Rate	Encoding Bi-phase Manchester	Package	Temperature [°C]	Vcc [V]
U2270B	125/134 kHz	R/W	5 Kbit/s	X X	SO16	-40 to +105	4.5 - 16

LF Design Kits	
Part Number	Description
ATA2270-EK1	This LF demonstration kit provides a completely self-contained means to begin using RFID systems. It includes an LCD and control buttons to enable interaction with the RFID system and supports the e5530/TK5530, T5551/TK5551, ATA5567(T5557), ATA5570, ATA5577, ATA5558 IDIC®s and U2270 from Atmel. Source code and reference designs are also included. This kit is supported by all the standard AVR development tools such as AVR Studio®, STK500, JTAGICE mkII, etc.
ATAK2270	This LF RFID kit is available to demonstrate the key features of various RFID products. The included software supports the following products: U2270B, TK5530/e5530, TK5551, TK5552/T5552, ATA5567 (T5557) comp. mode/enhanced mode and ATA5570. ATA5577 is also supported. The kit contains samples, a CD-ROM with installation software and product documentation, as well as all accessories needed.
TMEB8704	This LF RFID kit is available to demonstrate the key features of various RFID products. The included software supports the following products: U2270B, TK5530/e5530, TK5551, TK5552/T5552, ATA5567 (T5557) comp. mode and TK5561. The kit contains samples, a CD-ROM with installation software and product documentation, as well as all accessories needed.
ATAK2270UG	Upgrade kit for the TMEB8704 to upgrade to an ATAK2270
ATAB5570	The ATA5570 is based on the ATA5567, however, it is enlarged by an additional sensor input. The board is equipped with a switchable sensor resistor. Depending on the impedance, the memory data of the tag is sent in inverse or non-inverse mode. The board design is also suitable for testing other tag versions in SO8 packages.

## LF-RFID Front-end ICs

Part Number	Frequency	Type	User Memory [Bit]	Total Memory [Bit]	Bit Rate	Encoding		Package	Remark
						Bi-phase	Manchester		
U3280M	125/134 kHz	(R/W) <sup>1</sup>	512	512	0 - 10 Kbit/s <sup>2</sup>	X	Code	SS016	Provides power supply for $\mu$ C from RF field
U9280M	125/134 kHz	(R/W) <sup>1</sup>	512	512	0 - 10 Kbit/s <sup>2</sup>	X	X	SS020	U3280M with MARC4 ATAR092 <sup>3</sup> microcontroller

<sup>1</sup> Feature can be added by software control    <sup>2</sup> Theoretical value, actual minimum bit rate depends on the reader bandwidth    <sup>3</sup> 4 Kb ROM

## HF Tags (13.56 MHz)

Part Number	AT88SC0104CRF	AT88SC0204CRF	AT88SC0404CRF	AT88SC0808CRF	AT88SC1616CRF	AT88SC3216CRF	AT88SC6416CRF
<b>Memory</b>							
Size	128 bytes	256 bytes	512 bytes	1 Kbyte	2 Kbytes	4 Kbytes	8 Kbytes
Write endurance	100K cycles	100K cycles	100K cycles	100K cycles	100K cycles	100K cycles	100K cycles
Data retention	10 years	10 years	10 years	10 years	10 years	10 years	10 years
Organization	32 × 8 × 4	64 × 8 × 4	128 × 8 × 4	128 × 8 × 8	128 × 8 × 16	256 × 8 × 16	512 × 8 × 16
Number of zones	4	4	4	8	16	16	16
Identification area	128 bits	128 bits	128 bits	128 bits	128 bits	128 bits	128 bits
<b>RF Interface</b>							
ISO	14443 Type B	14443 Type B	14443 Type B	14443 Type B	14443 Type B	14443 Type B	14443 Type B
Frequency	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz
Baud rate	106 Kbps	106 Kbps	106 Kbps	106 Kbps	106 Kbps	106 Kbps	106 Kbps
Anticollision	Timeslot	Timeslot	Timeslot	Timeslot	Timeslot	Timeslot	Timeslot
Operating distance	up to 10 cm	up to 10 cm	up to 10 cm	up to 10 cm	up to 10 cm	up to 10 cm	up to 10 cm
<b>Security Options</b>							
Read/Write password	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encrypted password	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Symmetric dynamic authentication	4 × 64 bit keys	4 × 64 bit keys	4 × 64 bit keys	4 × 64 bit keys	4 × 64 bit keys	4 × 64 bit keys	4 × 64 bit keys
Stream encryption	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R/W encrypted checksum	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unique serial number	32 bit user prog.	32 bit user prog.	32 bit user prog.	32 bit user prog.	32 bit user prog.	32 bit user prog.	32 bit user prog.
Write protection	Zone or byte	Zone or byte	Zone or byte	Zone or byte	Zone or byte	Zone or byte	Zone or byte
Access keys	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encryption algorithm	64 bit key	64 bit key	64 bit key	64 bit key	64 bit key	64 bit key	64 bit key
Standard packages	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)	Die Tag (MX1, MY1) Module (MR1)
Temperature	-45° to +85°C	-45° to +85°C	-45° to +85°C	-45° to +85°C	-45° to +85°C	-45° to +85°C	-45° to +85°C
Tools	Eval./devel. kit	Eval./devel. kit	Eval./devel. kit	Eval./devel. kit	Eval./devel. kit	Eval./devel. kit	Eval./devel. kit

## HF Reader IC - CryptoRF

Part Number	Frequency	Type	Description	Package	Temperature	Vcc
AT88RF1354	13.56 MHz	R/W	13.56 MHz, ISO 14443 type B RFID reader	PDIP, 8 Id	-40°C to 85°C	3.0-5.5

## CryptoCompanion (Host Side Security IC, 2-wire Interface)

Part Number	Description	I/O	Temperature	Vcc
AT88SC016	Host side security IC for CryptoMemory and CryptoRF	TWI <sup>1</sup>	0° to 70°C	2.7-3.6

<sup>1</sup> TWI = I2C-compatible

## HF Demo Kits

Part Number	Description
AT88SCRF-ADK1 Yuma+	AVR-based CryptoRF DK Using Melexis® Reader IC
AT88SCRF-ADK2 Keen+	All Atmel solution on an AVR Platform with Reader, tag and development library
AT88SCRF-S7DK2P	CryptoRF Demonstration Kit with SkyTek™ Reader and Software Technology

Disclaimer: The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. EXCEPT AS SET FORTH IN ATMEL'S TERMS AND CONDITIONS OF SALES LOCATED ON ATMEL'S WEB SITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS AND PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Atmel makes no representation or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and products descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive application. Atmel's products are not intended, authorized, or warranted for use as components in application intended to support or sustain life.

## Product contact for HF RFID

1150 E. Cheyenne Mountain Boulevard  
Colorado Springs  
CO 80906 USA  
Tel: (+1) 719 540-1000  
Fax: (+1) 719 540-6800

## Product contact for LF RFID

Theresienstrasse 2  
Postfach 3535  
74025 Heilbronn, Germany  
Tel: (+49) 7131-67-3636  
Fax: (+49) 7131-67-3163

Email: [rfid@atmel.com](mailto:rfid@atmel.com)

© 2008 Atmel Corporation. All rights reserved.

Atmel®, logo and combinations thereof, AVR®, AVR Studio®, IDIC® and others are registered trademarks, TAGIDU™ and others are trademarks of Atmel Corporation or its subsidiaries. Other terms and product names may be trademarks of others.

Rev.: 4643B-RFID-10/08/02M

