



LF, HF  
**RFID**  
PRODUCT OVERVIEW

**ATMEL**<sup>®</sup>

# RFID Product Overview

LF Tags (100 - 150 kHz)							ATA5570	ATA5577M1 <sup>2</sup>	ATA5577M2 <sup>2</sup>	ATA5575M1	ATA5575M2
							e5561	MEGAPADS		MEGAPADS	
							ATA5558	ATA5577M1 <sup>2</sup>		ATA5577M2 <sup>2</sup>	
							TK5551 <sup>1</sup>	ATA5577M1 <sup>2</sup>		ATA5577M2 <sup>2</sup>	
<b>Memory</b>											
Read only	-	-	-	-	-	-	-	-	-	-	-
Read/Write	X	X	X	X	X	X	X	X	X (OTP)	X (OTP)	X (OTP)
User memory (bit)	224	1024	288	224	224	224	224	224	64, 128	64, 128	96, 128
System memory (bit)	40	320	32	96	128	128	128	128	8	8	8
<b>RF Interface</b>											
Write protection	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise	Blockwise	Memory complete	Memory complete	Memory complete
ISO11784/11785	FDX-B	FDX-B	FDX-B	FDX-A, FDX-B	FDX-A, FDX-B	FDX-A, FDX-B	FDX-A, FDX-B	FDX-A, FDX-B	-	-	FDX-A, FDX-B
Modulation	ASK	ASK	ASK	ASK	ASK	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	FSK, PSK, Manchester, Bi-phase, NRZ	FSK, PSK, Manchester, Bi-phase, NRZ	Manchester	Manchester	Diff. bi-phase, FSK
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	RF/2 to RF/128	RF/2 to RF/128	RF/64	RF/64	RF/32, RF/50
Capacitor on chip	-	80 pF and 210 pF	-	0	0 <sup>1</sup> , 75 <sup>1</sup> , 130 <sup>1</sup> , 250 or 330 pF, trimmed +/- 3%	250 or 330 pF, trimmed +/- 3%	250 or 330 pF, trimmed +/- 3%	250 or 330 pF, trimmed +/- 3%	250 or 330 pF, trimmed, +/-3%	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)	AOR (Answer on Request)	AOR (Answer on Request)	-	-	-
Packages	Only available as transponder	Sawn wafer	Wafer	SO8, sawn wafer, wafer pack	Sawn wafer, wafer pack, micromodule, TSSOP8 <sup>3</sup>	Sawn wafer, wafer pack, sticky tape <sup>4</sup>	Sawn wafer, wafer pack, sticky tape <sup>4</sup>	Sawn wafer, wafer pack, sticky tape <sup>4</sup>	Sawn wafer	Sawn wafer	Wafer, 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-feeding	Manufacturing, animal identification, security 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	Manufacturing, logistic, transportation, animal identification, security control, access control, component authentication	Manufacturing, logistic, transportation, animal identification, security control, access control, component authentication	Access control, manufacturing, logistic, security control	Access control, manufacturing, logistic, security control	Animal identification, manufacturing, logistic, waste management
Transponder part no.	TK5551	ATA555815-PP	TK5561	-	ATA5577M1330-PP <sup>3</sup>	-	-	-	-	-	-
Sensor	-	-	-	Resistor interface 1 bit	-	-	-	-	-	-	-
Speciality	-	-	-	-	-	-	-	-	Mega pads, 200 x 400 micrometers, with or without gold bumps	Mega pads, 200 x 400 micrometers, with or without gold bumps	Mega pads, 200 x 400 micrometers, with or without gold bumps

<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	Package	Temperature [°C]	Vcc [V]
U2270B	125/134 kHz	R/W	5 Kbit/s	Bi-phase Manchester	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, ATA5575, ATA5577, ATA5558 IDIC <sup>®</sup> s and U2270B from Atmel. Source code and reference designs are also included. This kit is supported by all the standard AVR <sup>®</sup> development tools such as AVR Studio <sup>®</sup> , STK <sup>®</sup> 500, JTAGICE mkl, etc.
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	AT88RF04C	AT88SC0808CRF	AT88SC1616CRF	AT88SC3216CRF	AT88SC6416CRF
<b>Memory</b>					
Size	512 bytes	1 Kbyte	2 Kbytes	4 Kbytes	8 Kbytes
Write endurance	100K cycles	100K cycles	100K cycles	100K cycles	100K cycles
Data retention	10 years	10 years	10 years	10 years	10 years
Organization	128 × 8 × 4	128 × 8 × 8	128 × 8 × 16	256 × 8 × 16	512 × 8 × 16
Number of zones	4	8	16	16	16
Identification area	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
Frequency	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
Anticollision	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
<b>Security Options</b>					
Read/Write password	Yes	Yes	Yes	Yes	Yes
Encrypted password	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
Stream encryption	Yes	Yes	Yes	Yes	Yes
R/W encrypted checksum	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.
Write protection	Zone or byte	Zone or byte	Zone or byte	Zone or byte	Zone or byte
Access keys	Yes	Yes	Yes	Yes	Yes
Encryption algorithm	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)
Temperature	-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

## 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
AT88CK201STK	Small-sized ISO 14443-B RFID complete solution and reference design kit
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
AT88CRF-S7DK2P	CryptoRF demonstration kit with SkyTek™ reader and software technology

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Rev.: 4643C-RFID-11/09/03M

