APPLICATION NOTE

Atmel RFID Kits Overview

ATAN0075

RFID Kits Introduction

Atmel® offers several design and evaluation kits for a fast and easy way to test the LF-RFID technology but also developing the final product. The most important one is the Atmel ATA2270-EK3. It provides a complete self-contained tool to begin using RFID systems, even for users who are short on RFID experience. It supplies an LCD and control buttons to enable interaction with the RFID system. This stand-alone but also PC-GUI based system supports many of Atmel's RFID tag chips.

The second group of kits is based on two readers supplied by an external company. One of them is working at 125kHz (Atmel ATARFID-EK1) the other one at 134.2kHz (Atmel ATARFID-EK2) targeting access control applications and animal ID applications.

Third kit is the Atmel ATA6286-EK3. The evaluation kit for Atmel’s active RFID solution. This works at 2 frequency bands: 125kHz and 433MHz.

1. Atmel ATA2270-EK3 and Atmel ATA2270-U3

The Atmel® ATA2270-EK3 is an evaluation kit that supports a limited number of configurations in stand-alone mode. Support during the entire development phase is provided by the PC interface and the application software. Both tools enable full control of the tag configuration. This kit is AVR® ATmega128-based and provides all necessary source and object codes. An API (Advanced Programming Interface) allows control of the kit by user-written software. Registered kit users have access to an Atmel FTP server for firmware and software upgrades and also layout data in Gerber format with BOMs. For users having the predecessor kit ATA2270-EK2 the new reader daughter board (see Figure 1-3 on page 3) in the Atmel ATA2270-EK3 kit is available separately. The kit part number is ATA2270-U3

Figure 1-1. Atmel ATA2270-EK3 Content



Figure 1-2. Atmel ATA2270-EK3 Main Board



Figure 1-3. Atmel ATA2270-EK3 Reader Daughter Board

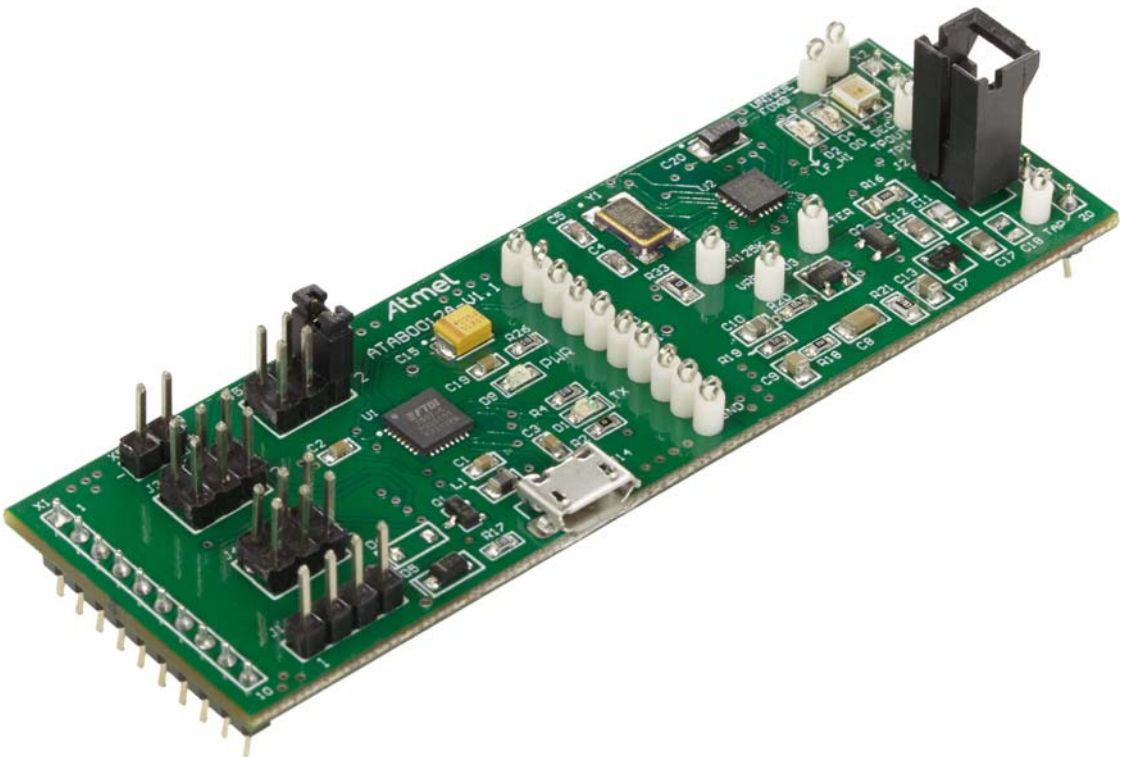


Figure 1-4. LCD Display with Unique Format Read Selection in Stand-alone Mode

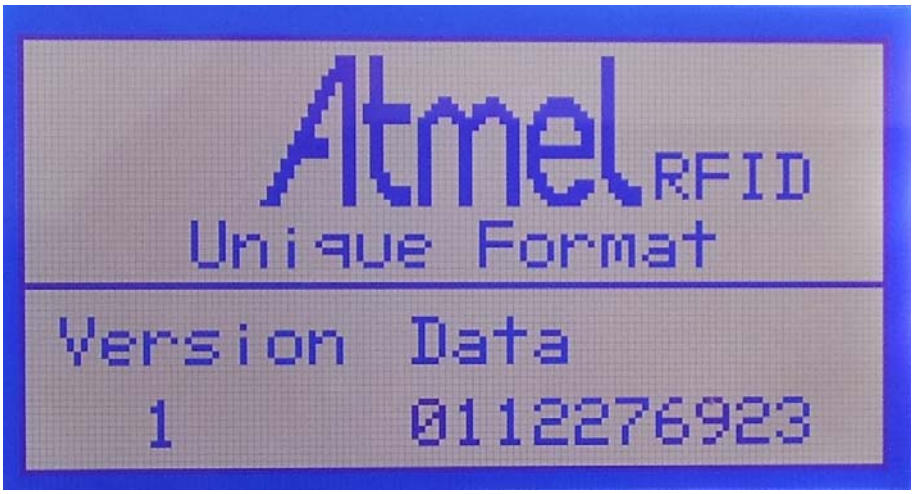


Figure 1-5. LCD Display with Unique Format Write Selection in Stand-alone Mode

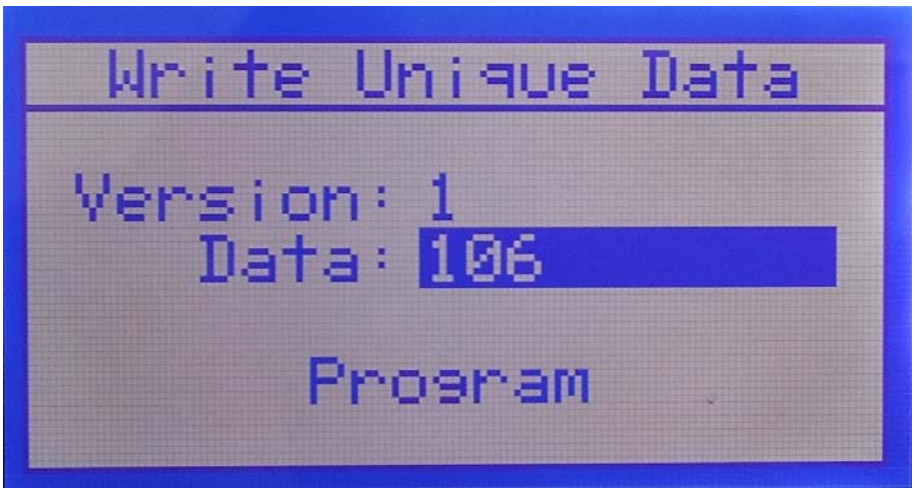


Figure 1-6. LCD Display with Animal ID Read Selection in Stand-alone Mode

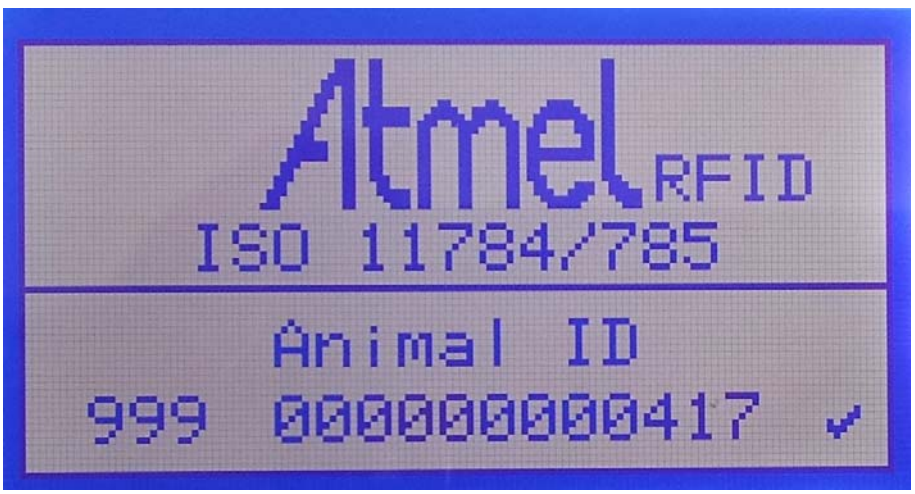


Figure 1-7. LCD Display with Animal ID Write Selection in Stand-alone Mode

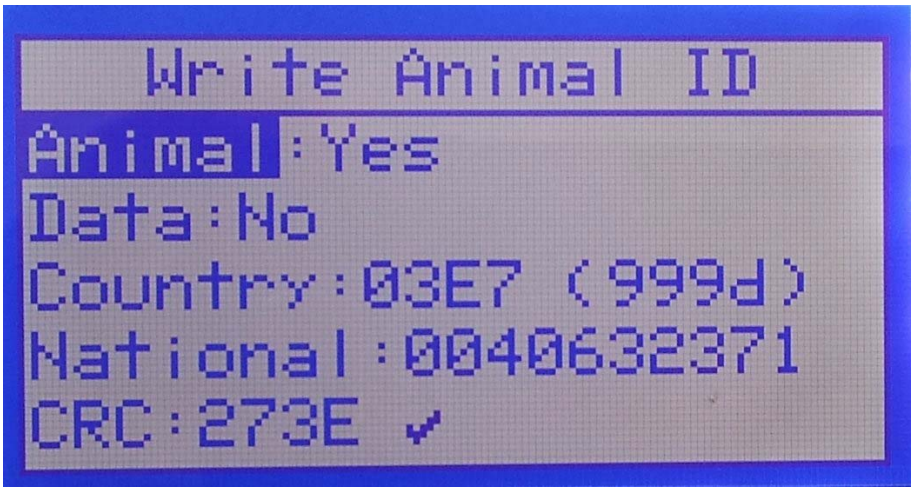


Figure 1-8. Atmel ATA2270-EK Graphical User Interface, Example for Atmel ATA5577

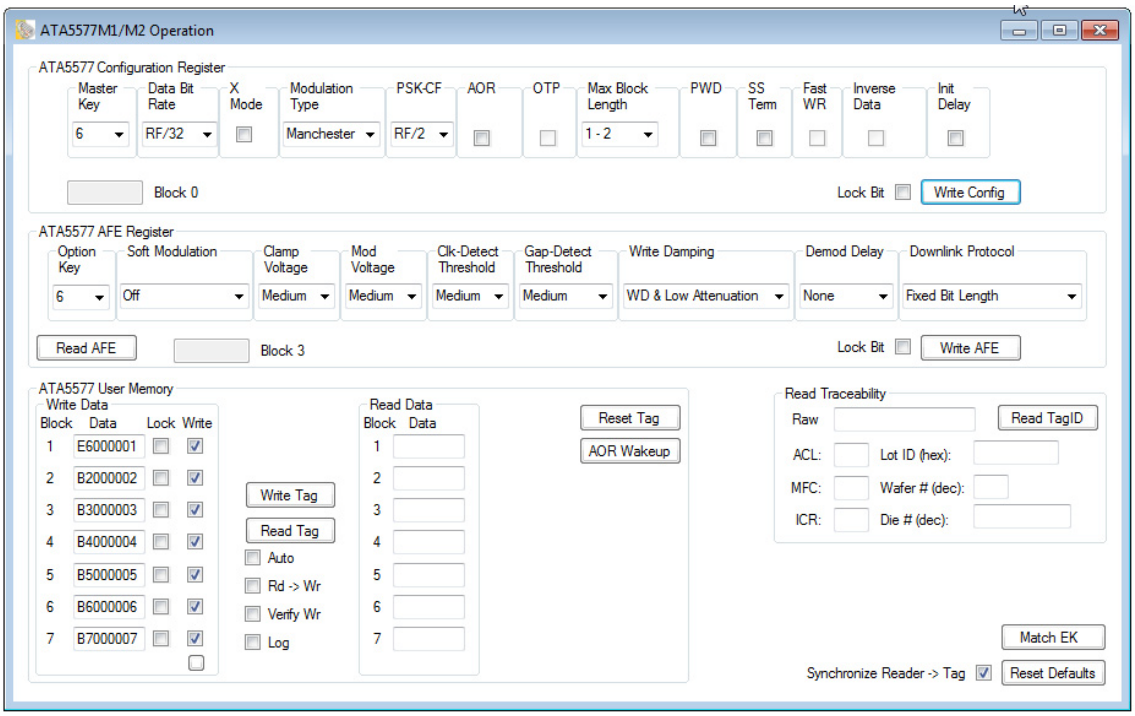


Figure 1-9. Atmel ATA2270-EK Graphical User Interface, Unique-ID Specific

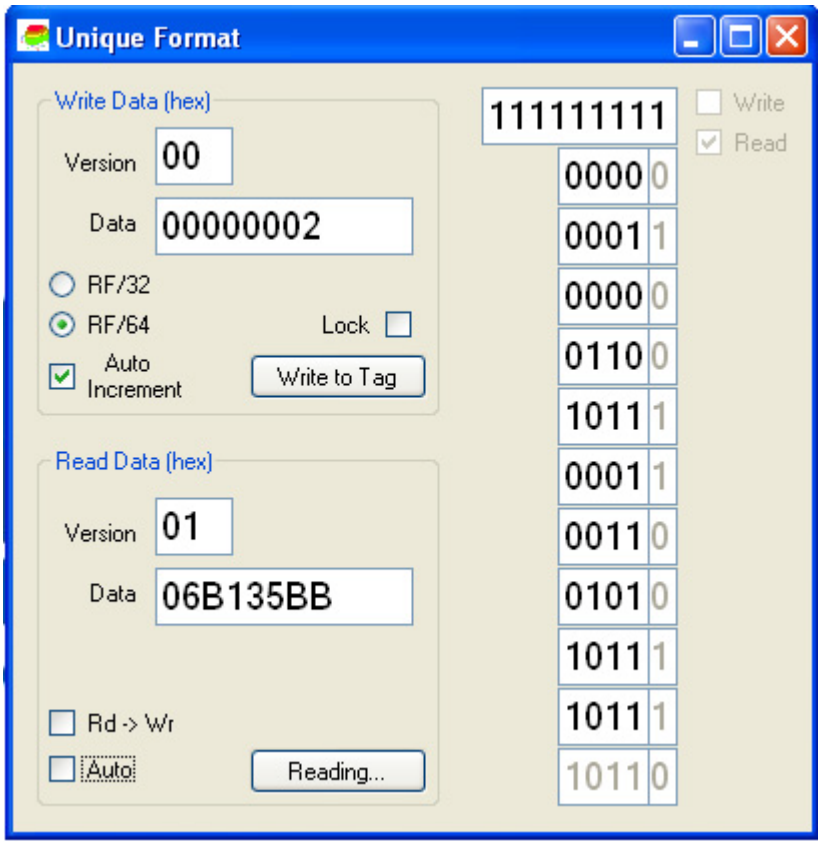
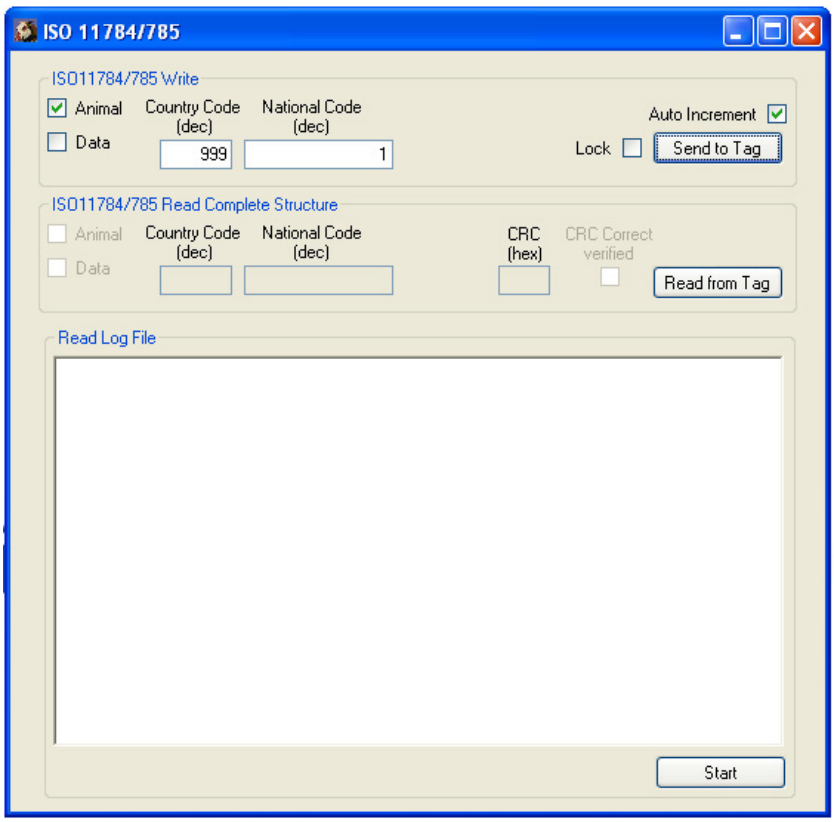


Figure 1-10. Atmel ATA2270-EK Graphical User Interface, Animal ID Application Specific



2. Atmel ATARFID-EK1 and Atmel ATARFID-EK2

The Atmel® kits ATARFID-EK1 and ATARFID-EK2 are based on a commercial reader/programmer supplied by the company GIS. The first version in the EK1 kit operates at 125kHz. It is best suited for access control, industrial, and any kind of consumer applications. This kit supports the very common Manchester and Biphase data coding but also FSK data coding. The EK2 kit operates at 134.2kHz according to the animal ID standards ISO 11784 and 11785 (FDX-A and FDX-B). Both kits allow the user to not only read the tags but also configure and program them. The readers have a USB connection and a PC-based user interface. Sample tags complete this kit. The PC software can be downloaded from the GIS website.

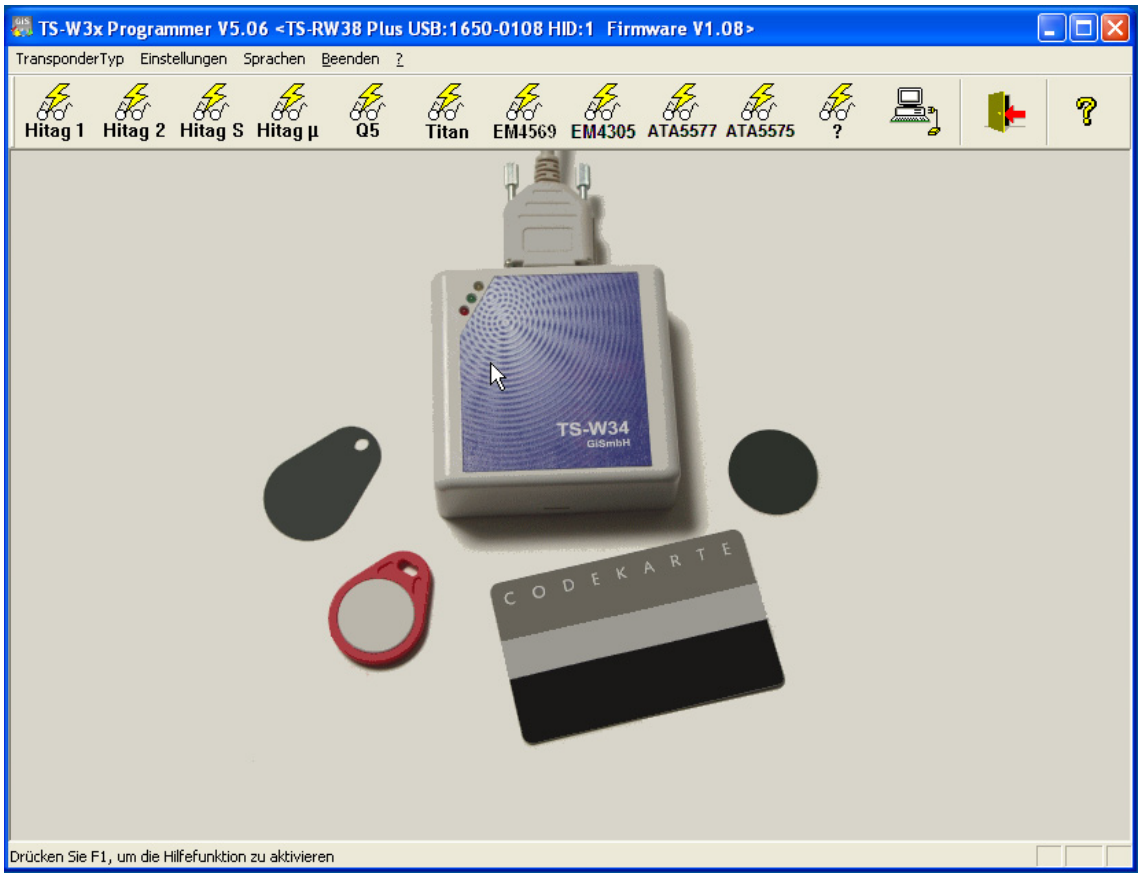
Figure 2-1. Content of the Atmel ATARFID-EK1: 125kHz Kit



Figure 2-2. Content of the Atmel ATARFID-EK2: 134.2kHz Kit



Figure 2-3. GIS PC Software: Atmel ATARFID-EK1 and EK2 Main Menu



3. Active RFID Kit ATA6286-EK3

The Atmel® ATA6286-EK3 is a complete system evaluation kit for active RFID applications. Typically these are identification applications where a larger operating distance and/or a higher amount of data storage space is required compared to passive RFID solutions. The difference to a passive RFID system is that the tag ASSP is supplied by a battery in the tag. Also, the ASSP is not state-machine-based but uses an Atmel AVR® MCU core. Atmel's active RFID system uses a unique combination of two different frequency bands: low frequency at 125kHz for the trigger and activation channel as well as for the data downlink path, and ultra-high frequency at 434MHz for the return and uplink path.

Figure 3-1. Content of the Atmel ATA6286-EK3 Kit



Figure 3-2. Atmel ATA6286-EK3 Active Tag Front

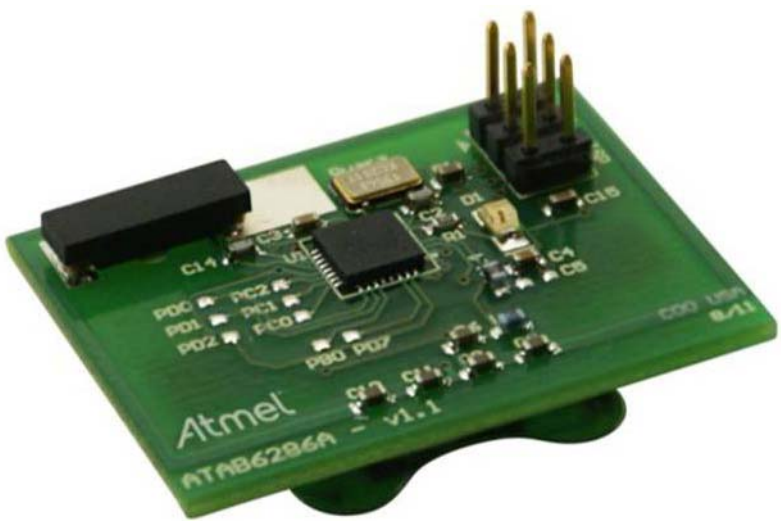


Figure 3-3. Atmel ATA6286-EK3 Active Tag Back

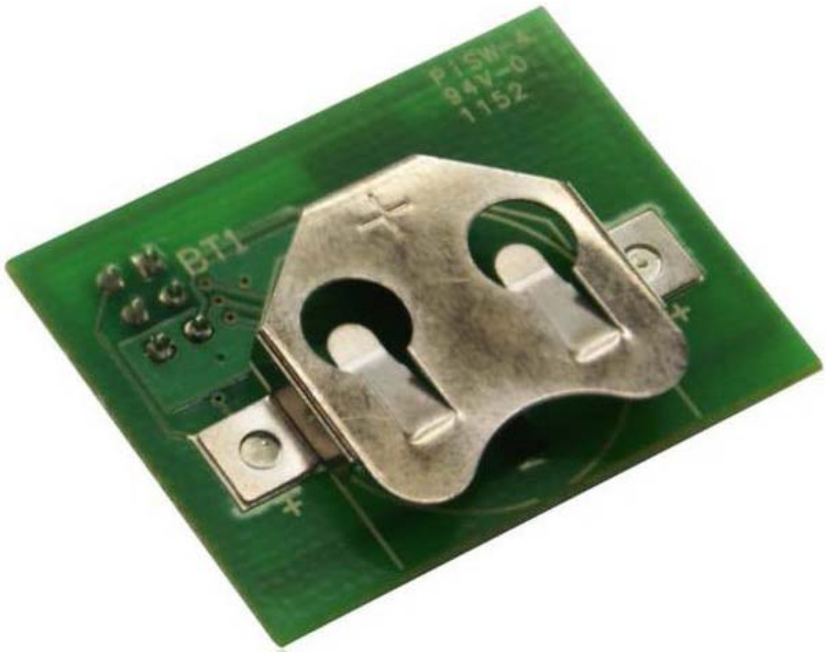


Figure 3-4. Atmel ATA6286-EK3 Main Board



Figure 3-5. Atmel ATA6286-EK3 Trigger and Transmit Board



Figure 3-6. Atmel ATA6286-EK3 Receiver Board



4. RFID Kits Overview

4.1 General Features

General	ATA2270-EK3	ATARFID-EK1	ATARFID-EK2	ATA6286-EK3
Evaluation kit	x	x	x	x
Commercial third-party device		x	x	
PC-controlled	x	x	x	
Stand-alone	x[1][2]			x
PC software	x	x	x	
Layout data and source code	x			
Serial interface (with USB converter option)	x			
USB interface	x[3]	x	x	x
Field frequency	125kHz/134.2kHz[4]	125kHz	134.2kHz	125kHz + 434MHz
Data coding	Manchester/ Biphase	Manchester/ Biphase/ FSK	Manchester/ Biphase/ FSK	Manchester
LCD display	x			x
LED indicator	x			
Keys and joystick	x			x
Buzzer	x			x

Notes:
1. One fixed mode
2. Continuously checks for 125kHz unique tags or 134.2kHz animal tags and indicates them with an LED signal when main board is switched off
3. For status information of the reader board
4. Exact reader frequencies are 125kHz and 133.3kHz

4.2 Kit Contents

Kit Contents	ATA2270-EK3	ATARFID-EK1	ATARFID-EK2	ATA6286-EK3
Main and interface board	x			2x
Reader antenna coil	x			
Compact reader		x	x	
Power supply 120V to 240V	x			2x
USB serial converter	x			
USB cable	x	x	x	
TX antenna coil				2x
Active tags				2x
Serial cable				x
RX antenna UHF				x

4.3 Supported RFID ASSP Devices

Supported RFID ASSP Devices	ATA2270-EK3	ATARFID-EK1	ATARFID-EK2	ATA6286-EK3
Atmel T5551/TK5551	x			
Atmel e5530/TK5530	x			
Atmel T5554	x(1)			
Atmel T5555 – “Q5”		x	x	
ATA5558	x			
Atmel T5557 compatible	x(2)			
Atmel T5557 extended	x			
Atmel ATA5567 compatible	x(2)			
Atmel ATA5567 extended	x			
Atmel ATA5570	x			
Atmel ATA5577	x	x	x	
Atmel ATA5575M1 and ATA5575M2	x	x (M1)	x (M2)	
Atmel ATA6286				x(3)

Notes:
1. To use the Atmel T5554 select tag type T5551 in the software.
2. This mode is only supported in the PC application software. All tag modes are programmable in this tool.
3. LF-Trigger IC Atmel ATA5279, UHF receiver IC Atmel ATA8202.

5. Revision History

Please note that the page numbers referred to in the following section refer to the specific revision mentioned, not to this document.

Revision No.	History
4980H-RFID-11/15	• Update for new kit ATA2270-EK3
4980G-RFID-02/15	• Put document in the latest template
4980F-RFID-06/13	• Complete document update
4980E-RFID-06/12	• Complete document update
4980D-RFID-03/11	• Section 1 “Description” on page 1 changed • Section 2 “LF-RFID Kit Comparison Chart - Table” on pages 2 to 3 changed
4980C-RFID-11/09	• Section 1 “Description” on page 1 changed • Section 2 “LF-RFID Kit Comparison Chart - Table” on pages 2 to 3 changed
4980B-RFID-12/08	• Section 1 “Description” on page 1 changed • Section 2 “LF-RFID Kit Comparison Chart - Table” on pages 2 to 3 changed





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