
ATAK51003-V1 Quick Start Guide

Atmel ATAN0033

Kit Contents

The Atmel® ATAK51003-V1 Kit includes the following components:

- 1 × Atmel ATAB5279-V1.2 LF antenna driver
- 2 × LF antenna modules
- 1 × Atmel ATAB5782C-V1.0 RF receiver
- 1 × 433MHz – ¼ wave fixed – antenna
- 1 × Atmel ATA5272-EK1 immobilizer base station with microcontroller
- 1 × immobilizer antenna
- 1 × Atmel ATA5771/73/74-EK1: RF transmitter with Atmel ATtiny44V application board
- 1 × Atmel ATAB5791A-V1.0: RF transmitter, 3D LF PEPS receiver, 1D LF IMM
- 1 × Atmel ATA5795-EK1: RF transmitter, 1D LF IMM
- 1 × Atmel ATAB0001A-V2.0 car access interface board (includes Atmel ATmega2560, AT32UC3B1256-AUT)
- 1 × ISP adapter board
- 1 × USB cable
- 1 × DC 12 V power supply
- 1 × quick start user guide

The connection with the PC is provided via a mini USB port (see [Figure 1-1 on page 2](#)) by establishing a virtual COM port with the PC. Please install the USB windows driver provided in the installation software package.

2. Software Requirements

The Atmel® ATAK51003-V1 devices are shipped with the proper software already loaded. Also the interface ATAB0001A-V2.0 includes two MCUs which come preconfigured in the kit. To bring up the kit, the remaining steps in this section are not normally required and the reader can skip to [Section 2.1 “System Operation” on page 3](#).

The following steps are included in the case where upgraded F/W is needed.

The Atmel ATAB0001A-V2.0 board must be configured at 12V. Please insure that the jumper between +12V and LF_DR pins on J13 header is in place.

Atmel ATmega2560 placed on Atmel ATAB0001A-V2.0 can be programmed using either ISP or JTAG (see headers on the left of the board in [Figure 1-1 on page 2](#)).

Board controller which provides a USB interface to the Atmel ATAB0001A-V2.0 board can be programmed using the JTAG header placed in the board controller section.

When using the PC GUI please make sure the correct COM port is selected. Also set baud rate = 57600.

Program the Atmel ATmega2560 microcontroller as follows:

- Connect the ISP or JTAG cable from the programmer (e.g. JTAGICEII) to the respective header placed at the left end periphery of the interface board
- Setup 5V target supply (insert a 12V DC power plug into the Atmel ATAB5279)
- Select the “ATmega2560” device in the “Main” tab
- Select ISP or JTAG programming mode
- Perform “Read Signature” to be sure signature matches the selected device
- Select the “Fuse” tag and ensure
 - EXTENDED = 0xFF
 - HIGH = 0x91
 - LOW = 0xE2
- Select the “Program” tab and choose
 - “ATAK51003-V1_ATAB0001A-V2.hex” to program into the flash
 - “ATAK51003-V1_AOIP_BS.eep” to program into the EEPROM (**MUST BE DONE**). Note that to initially program the EEPROM, EESave fuse must be deasserted and the device memory must be cleared. It is best to reprogram EESave fuse after EEPROM programming to save the EEPROM configuration when programming FLASH memory.

- Notes:
1. After programming the Atmel ATAB0001A-V2, individual key fobs must be “Learned” to the system before use. See [Section 2.2 “Support Functions” on page 4](#).
 2. A more complete explanation of the hardware and software is provided in the official user guide ATAN0029 that can be downloaded from the Atmel website.

2.1 System Operation

The Atmel ATAK51003-V1 provides a complete Car Access Reference System showing three main functions and three support functions. These three main functions all operate seamlessly as they would in a real application using correct wireless and wired communication protocols. Status for all events is shown on the Atmel ATAB0001A-V2.0 LEDs and the PC GUI main screen. The PC GUI also includes auditory feedback as well as additional view boxes showing the content of the various messages.

- RF messaging (RKE and PEPS RF)
- LF wake up (PEPSLF)
- Immobilizer (IMM)

2.2 Support Functions

Before use each individual key fob must be paired to the vehicle controller. This is made possible through the “Learn” modes. There are three modes:

- RF - One way transfer of the RKE secret key from the fob to the vehicle (note that Atmel® ATA5791 is not supported, it is programmed using the LF learn mode).
- IMMO - Two way programming of new randomly generated secret keys from the vehicle into the fob for use in both RKE/PEPS and IMMO modes
- Clear - Erases all previously learned key fobs

It is possible to associate up to 4 separate key fobs (or transponders) with this system. The sequence of operation is as follows.

2.3 RKE Learn

1. Press SW5 on Atmel ATAB0001A-V2.0 (LED5 should turn ON)
2. Press the far RIGHT button on key fob (within 10s, while LED5 remains ON)
3. LED5 on Atmel ATAB0001A-V2.0 should blink once. (PC GUI should show a “graduation cap” icon)
4. Press SW5 to exit if finished or wait 10s

Note: Atmel ATAB5791A-V1.0 key fob does not support RKE key learn

2.4 Immobilizer Learn

1. Place key fob immobilizer coil within 2cm of base station (Atmel ATA5272-EK1) coil
2. Press SW4 on Atmel ATAB0001A-V2
3. LED5 on Atmel ATAB0001A-V2 should blink once. (PC GUI should show a “graduation cap” icon)

Note: Immobilizer learn supports key-vehicle pairing for immobilizer, PE and RKE functions.

2.5 RKE Operation

RKE is the most basic mode of wireless car access and consists of pressing a button on a key fob to lock/unlock the vehicle. The following sequence shows this functionality.

1. Press the far LEFT (LOCK) or CENTER (UNLOCK) buttons on the key fob
2. LED3 ↔ LED0 on the Atmel ATAB0001A-V2.0 should cycle left or right respectively if the AES encryption is valid. All other LEDs should be off. (PC GUI should show a locked or unlocked icon and corresponding sound).

2.6 PEPS Operation

PEPS is currently used only on the high-end car access systems and allows the driver to keep the key fob in their pocket or purse. The user does not need to directly interact with the key fob to enter/exit or start the vehicle. We show three different sequences of operation for this functionality that are as follows.

2.7 RSSI Calibration

RSSI Cal button (SW2) is used to establish vehicle's in/out boundary by placing the fob at the boundary line and pushing SW2 button to calibrate the RSSI measurement. The PEPS system uses this calibration step to determine if the fob is in the “outside” or the “inside” range of the vehicle.

2.8 PEPS Unlock

1. Put the key fob in the “outside” region
2. Press SW7 on Atmel® ATAB0001A-V2.0 to send door unlock command.
3. LED7 on Atmel ATAB0001A-V2.0 should turn ON and LED3 → LED0 on the ATAB0001A-V2.0 should cycle right if the AES encryption is valid. The LED4 should be ON if the fob is outside of the vehicle. (PC GUI should show an unlocked icon, green key fob, and corresponding sound).
4. With the key fob in the “inside” range pushing SW7 does not unlock the doors. The key fob is shown in red inside of the vehicle in the GUI window. LED3 ← LED0 on the Atmel ATAB0001A-V2.0 cycle left to indicate disallowed command. This shows if the key fob is locked inside the vehicle the doors cannot be unlocked by pulling/touching the door handle from the outside.

2.9 PEPS Lock (Key Forgotten Inside Vehicle)

1. Put the key fob within “inside” range of the vehicle system
2. Press SW6 on Atmel ATAB0001A-V2.0 to issue the door lock command
3. LED7 on ATAB0001A-V2.0 should turn ON and LED3 ← LED0 on the Atmel ATAB0001A-V2.0 should cycle left to indicate disallowed command. The LED4 should be ON. (PC GUI should show an unlocked icon, red key fob, and corresponding sound)

2.10 PEPS Lock (Key Removed from Vehicle)

1. Put the key fob in the “outside” range of the vehicle system
2. Press SW6 on Atmel ATAB0001A-V2.0 to issue the door lock command.
3. LED7 on Atmel ATAB0001A-V2.0 should turn ON and LED3 → LED0 on the Atmel ATAB0001A-V2.0 should cycle right if the AES encryption is valid. The LED4 should be ON. (PC GUI should show a locked icon, green key fob, and corresponding sound)

2.11 PEPS Start

1. Put the key fob within the “inside” range of the vehicle system
2. Press SW0 on Atmel ATAB0001A-V2.0
3. LED7 on Atmel ATAB0001A-V2.0 should turn ON and LED3 → LED0 on the Atmel ATAB0001A-V2.0 should cycle right if the AES encryption is valid. The LED4 should be OFF. (PC GUI should show an start icon, green key fob, and corresponding sound)
4. If the key is in the “outside” range of the vehicle the LED4 is switched ON and LED3 ← LED0 on the Atmel ATAB0001A-V2.0 cycle left indicating disallowed start engine request command.

Note: For backup starting where the key fob battery is dead or removed, see step 1 through 3 of the immobilizer operation.

2.12 Immobilizer Operation

The immobilizer is used to protect the vehicle from starting except when authorized by a valid user. This can be done with a stand-alone transponder all the way up to the full PEPS system (dead battery mode). In order to show just this function there is a special mode built in to the system.

1. Put the key fob immobilizer coil next to vehicle base station (Atmel ATA5272-EK1) coil (typically 2cm)
2. Press SW1 on Atmel ATAB0001A-V2.0 (SW0 will also try the backup Immobilizer circuit after first trying the PEPS start. This can be seen by removing the battery from the PEPS fob)
3. LED6 on Atmel ATAB0001A-V2.0 should turn ON and LED3 → LED0 on the Atmel ATAB0001A-V2.0 should cycle right if the AES encryption is valid. (PC GUI should show the start icon, Immobilizer Icon, and corresponding sound)

Note: For key fobs with the integrated 3D coil, the immobilizer function can be used on the X-axis (same axis as the independent coil) of this 3D coil or on an independent coil (L1). Selection of this is made by micro-jumper pins.



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