

Smartcard-Booster LEGIC Installation Guide



2012-02-21

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1 INTRODUCTION

The Smartcard-Booster LEGIC is an active dual ID tag enabling simultaneous identification of the inserted LEGIC smart card and the embedded vehicle ID resulting in rapid driver and vehicle monitoring.

A LEGIC smart card can be placed in the device (representing driver ID). Additionally a separate ID is programmed in the Smartcard-Booster (representing vehicle ID). Once configured, the Smartcard-Booster allows a driver ID badge together with its embedded vehicle ID to be read from a distance up to 10 meters (33 feet) in combination with NEDAP TRANSIT readers. This solution substantially enhances the level of security when controlling activities of vehicles that are regularly used by different drivers. Additionally a fully integrated vehicle and personnel access solution can be implemented.

For more details about the NEDAP TRANSIT reader refer to the TRANSIT installation guide.

The combined vehicle and driver identification is a unique NEDAP patented feature. Optionally the vehicle-ID can be sacrificed if more information from the LEGIC card is required.

The Smartcard-Booster LEGIC supports LEGIC Advant and Prime cards.
NEDAP can also supply Booster devices that are able to read NEDAP, EM410x, HID prox or Mifare cards.

The Booster was developed based upon the unique patent of the Nedap dual band technology. This technology enables reading of the low frequency credit card sized tag by the TRANSIT microwave reader. The microwave technology in the 2.45GHz band allows identification at a distance up to 10 meters, even at high speeding passage.

Key features:

- Combined vehicle and driver identification
- Easy interior mounting
- Push button activation
- Expected lifetime up to 5 years.
- Replaceable batteries (2 x AAA)

FCC ID: CGDBOOSTER6 and IC: 1444A-BOOSTER6

Compliance statement

This device complies with part 15 of the FCC Rules and to RSS210 of Industry Canada.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and**
- (2) this device must accept any interference received, including interference that may cause undesired operation.**

Déclaration Conformité

Cet appareil se conforme aux normes RSS exemptés de license du Industry Canada.

L'opération est soumise aux deux conditions suivantes

- (1) cet appareil ne doit causer aucune interférence, et**
- (2) cet appareil doit accepter n'importe quelle interférence, y inclus interférence qui peut causer une opération non pas voulu de cet appareil.**

Warning (Part 15.21)

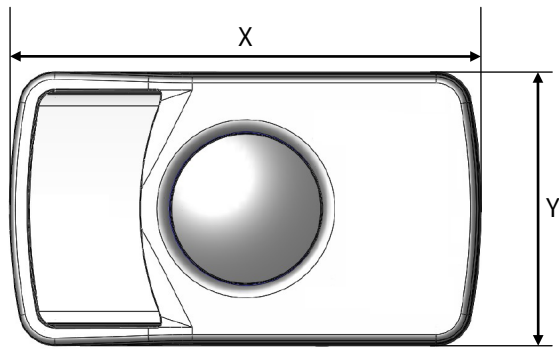
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2 INSTALLATION

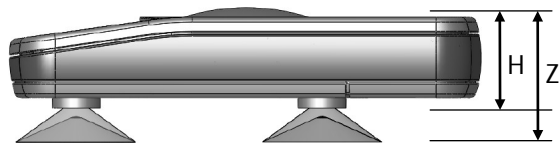
2.1 DIMENSIONS

The Smartcard-Booster is easily mounted on the interior of the car's windshield by means of suction cups. Users should ensure the visual contact between the Booster and any TRANSIT reader is unobstructed with items such as stickers or metalized windshields (see also chapter 2.3 about solar control windshields).

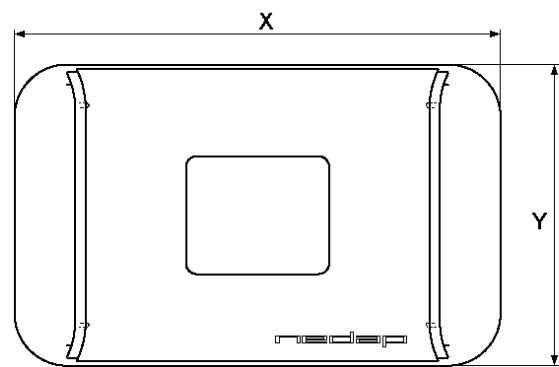
Note: The suction cups must be faced toward the reader to achieve maximum reading distance.



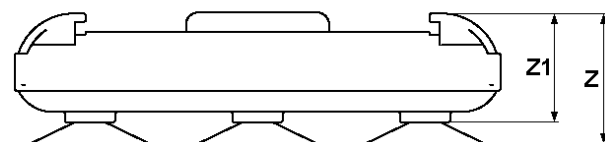
Dimension		inches	millimeters
Overall length	X	4.37"	111
Overall width	Y	2.56"	65
Overall height	Z	1.26"	32
Body height	H	0.95"	24



Smartcard-Booster 2G dimensions



Dimension		inches	millimeters
Overall length	X	4.57"	116
Overall width	Y	2.83"	72
Overall height	Z	1.22"	31
Body height	Z1	1.02"	26



Smartcard-Booster dimensions

2.2 TEMPERATURE CONSIDERATIONS

The Smartcard-Booster is designed to operate within the extreme temperature ranges, which often occur behind a vehicle's windshield during the winter or summer seasons (-20°C to 85°C). However the LEGIC card inserted in the Booster may not be designed to withstand such temperatures and could suffer damage as a result.

Nedap advises to remove the LEGIC card when not in use.

CAUTION: DO NOT LEAVE CARD IN ACCESS DEVICE WHEN LEAVING THE VEHICLE, AS THIS PRESENTS A SECURITY RISK.

CAUTION: DO NOT LEAVE CARD IN ACCESS DEVICE FOR LONG PERIODS OF TIME IN EXTREME HEAT, AS THIS MAY DAMAGE THE CARD.

2.3 SOLAR CONTROL WINDSHIELDS

From 1997 onwards several car manufacturers introduced vehicles with solar control windshields. The solar control windshields are equipped with a metalized coating, which can block the TRANSIT signal from the Booster mounted on the inside of the windshield of the vehicle.

Most of these windshields have a metal free zone where transponders can be mounted. The metal free zone of metalized windshields is most often found in the middle of the windshield behind and slightly below the rear view mirror. In vehicles manufactured after 1998 the metal free zone should be indicated on the window.

We advise the owner to contact the local car dealer if it is not clear where the aperture is exactly positioned in a certain vehicle and where the transponder should be mounted.

3 CONFIGURATION

The Smartcard-Booster LEGIC is configured by means of configuration cards. This configuration card is a LEGIC Advant transponder that contains all the information that is required to find the user's segment and read the data. The Smartcard-Booster LEGIC only accepts a configuration card after configuration is enabled with a master token card.

A newly purchased booster will accept any master token card. Once a master token has been inserted, the booster will only accept that specific master token and cannot be reconfigured with other master tokens.

3.1 CONFIGURATION CARD SET

The configuration card set contains 3 cards that have the exact same stamp.

- The master token IAM n/31 enables the programmer to write the configuration card.
- The master token SAM n/31 enables the booster to accept the configuration card.
- The configuration card.

Note: Previously the set contained only 2 cards. The IAM n/31 card was accepted on the Booster as well as on the programmer.

A special master token SAM n/32 or IAM n/32 can be purchased to perform a 'master token withdraw'. This will reset the booster so that it accepts any master token (just like a maiden booster). The 'withdraw' master token should have the exact same stamp as the original master token.

3.2 CONFIGURATION PROCEDURE

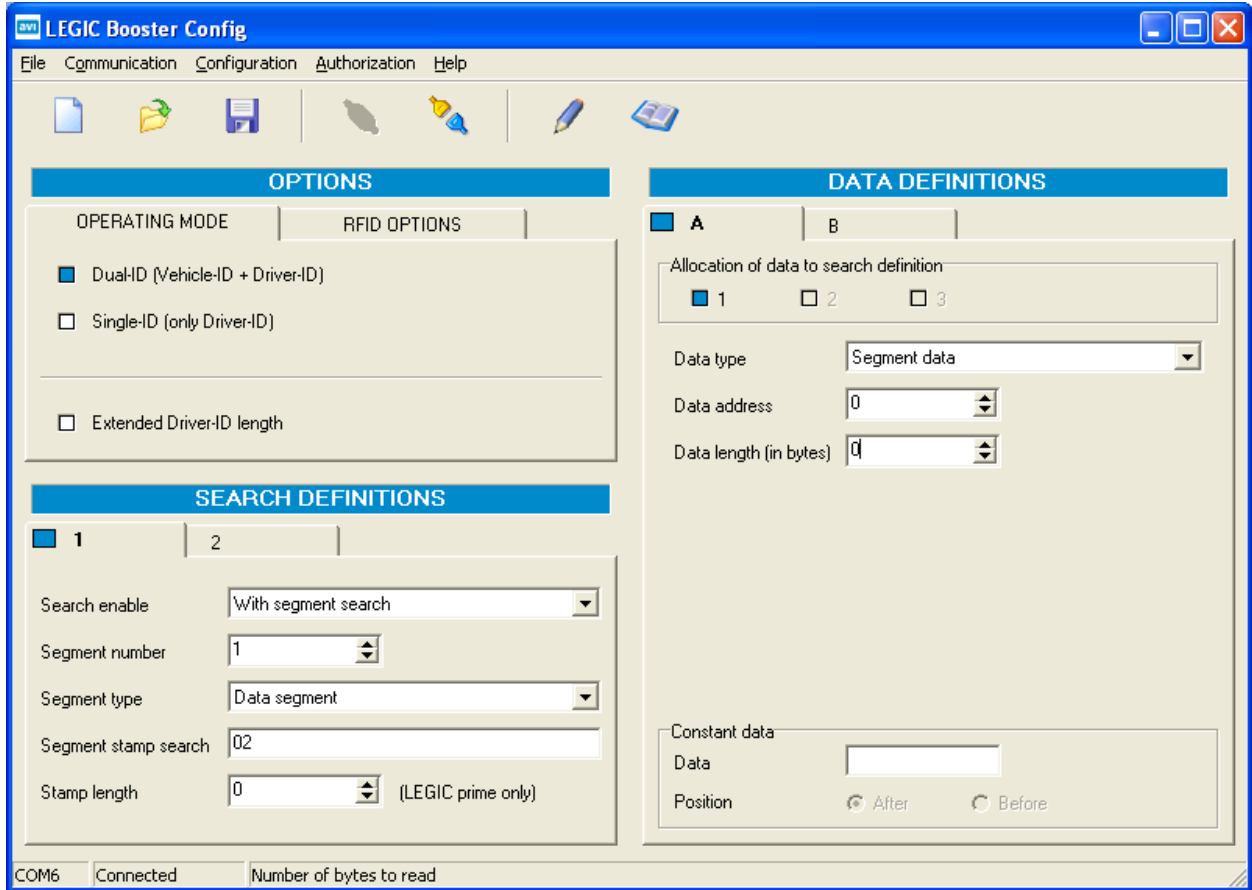
Follow the procedure below to configure the Smartcard-Booster LEGIC for your application.

1. Insert the master token card in the Booster and push the button.
The Booster sounds the buzzer with an increasing frequency (). The Booster will now accept your configuration data card.
2. Insert the configuration data card in the Booster and push the button.
The Booster sounds the buzzer with a decreasing frequency () to indicate that the configuration is accepted. Now your booster will read the LEGIC smart cards that meet the conditions defined in your configuration.

3.3 CONFIGURATION SOFTWARE

NEDAP has developed a software application that allows system integrators to create configuration cards. This software can be downloaded from our website www.nedapavi.com.

Note: A LEGIC Advant programmer is required. For example the KABA B-Net 91 07.



LEGIC Booster Config software

3.3.1 CREATE A CONFIGURATION CARD

The configuration card contains the information which user cards are supported and which data on these cards must be read. Follow the procedure below to create a configuration card.

1. Specify the OPTIONS (see chapter 3.3.1.1)
2. Specify the SEARCH DEFINITIONS (see chapter 3.3.1.3)
3. Specify the DATA DEFINITIONS (see chapter 3.3.1.4)
4. Load the Master Token IAM.
Place the master token card on the programmer and click 'Authorization', 'Add'.
The message 'Authorization accepted' should appear.
5. Write the configuration into a transponder.
Place the booster configuration card on the programmer and click 'Configuration', 'Write TXP'.
The message 'Configuration data written' should appear.

The configuration can be saved in a bcf-file.

3.3.1.1 OPERATING MODE

Operating modes:

<i>Dual-ID (Vehicle-ID + Driver-ID)</i>	Driver-ID max. 40 bits (=5 bytes) from LEGIC smart card.
<i>Single-ID (only Driver-ID)</i>	Driver-ID max. 80 (=10 bytes) bits from LEGIC smart card.

Extended Driver-ID operating modes:

<i>Dual-ID (Vehicle-ID + Driver-ID)</i>	Driver-ID max. 88 bits (=11 bytes) from LEGIC smart card.
<i>Single-ID (only Driver-ID)</i>	Driver-ID max. 128 bits (=16 bytes) from LEGIC smart card.

3.3.1.2 RFID OPTIONS

<i>Enable ISO15693</i>	<ul style="list-style-type: none"> ■ The ISO15693 protocol is always enabled because it is required to read the configuration cards.
<i>Enable ISO14443A</i>	<ul style="list-style-type: none"> ■ Enables reading ISO14443A cards.
<i>Enable LEGIC prime</i>	<ul style="list-style-type: none"> ■ Enables reading LEGIC Prime cards.
<i>Enable Inside Contactless</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Enables reading Inside Contactless cards (UID only).
<i>Enable FeliCa</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Enables reading Sony Felica cards (UID only). Requires Smartcard-Booster LEGIC 2G.
<i>Enable ISO14443B</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Enables reading ISO14443B cards. Requires Smartcard-Booster LEGIC 2G.

3.3.1.3 SEARCH DEFINITIONS

Specify what to search for on the LEGIC card. Up to 3 search definitions can be specified. If no match is found on search definition 1, then it will search for the second.

<i>Search enable</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Disabled <input type="checkbox"/> No authentication ■ With segment search
<i>Segment number</i>	Number of the desired segment or start segment for searching with segment search stamp. First segment is segment number 1.
<i>Segment type</i>	Segment type to be read. <ul style="list-style-type: none"> <input type="checkbox"/> Any segment type ■ Data segment <input type="checkbox"/> Access segment
<i>Segment stamp search</i>	Search string to search a segment with a specific stamp.
<i>Stamp length (prime only)</i>	Stamp length for access to LEGIC prime transponders. This parameter is not interpreted with LEGIC Advant transponders.

3.3.1.4 DATA DEFINITIONS

Specify which data to read. Up to 3 data definitions can be defined (A, B and C). These data definitions can be allocated to one or more search definitions.

Please make sure that the total length of the data does not exceed the maximum (depending upon the operating mode. See chapter 3.3.1.1). The total data length is determined by the data type, data length, constant data for all allocated data definitions. When the data length for the search definition exceeds the maximum the data will be truncated.

<i>Allocation of data to search definition</i>	Allocate the data definition to one or more search definitions. It is also possible to have more than one data definition allocated to the same search definition.
<i>Data type</i>	Type of transponder data to be read. <input type="checkbox"/> Unique ID <input type="checkbox"/> Segment stamp <input checked="" type="checkbox"/> Segment data
<i>Data address</i>	Start address of the first byte to read. Address 0 is the first byte. See also the 'Stamp length' setting in the search definition for prime transponders.
<i>Data length (in bytes)</i>	Number of data bytes to read.
<i>UID options</i>	UID formatting options: <input type="checkbox"/> Alignment left or right <input type="checkbox"/> Include size <input type="checkbox"/> ISO14443A reverse byte order (0x11223344 -> 0x44332211) <input type="checkbox"/> LEGIC Prime format (0x11223344 -> 0x11443322)
<i>CRC type</i>	CRC calculation across the read data (only for segment data) <input checked="" type="checkbox"/> No CRC calculation <input type="checkbox"/> CRC calculation with 8 bits <input type="checkbox"/> CRC calculation with 16 bits
<i>CRC address</i>	Address of CRC when reading data.
<i>CRC options (prime only)</i>	CRC calculation for LEGIC prime transponders coverage. <input type="checkbox"/> Stamp <input type="checkbox"/> WRP/WRC/RD
<i>Constant Data</i>	For each data definition optionally 1 or 2 bytes of constant data can be added. This data can be located before or after the transponder data.

3.3.2 EXAMPLE CONFIGURATION

In this chapter will be explained how to setup the configuration to accept LEGIC transponders with a Kaba Group Header segment.

3.3.2.1 OPERATING MODE

<i>Operating mode</i>	Dual-ID	Vehicle-ID and driver-ID.
<i>Extended Driver-ID length</i>	no	not used

3.3.2.2 RFID OPTIONS

<i>Enable ISO15693</i>	yes	LEGIC Advant enabled
<i>Enable ISO14443A</i>	no	not used
<i>Enable LEGIC prime</i>	yes	LEGIC prime enabled
<i>Enable Inside Contactless</i>	no	not used
<i>Enable FeliCa</i>	no	not used
<i>Enable ISO14443B</i>	no	not used

3.3.2.3 SEARCH DEFINITION

<i>Search enable</i>	With segment search	Search for a segment.
<i>Segment number</i>	1	Start searching at segment 1.
<i>Segment type</i>	Data segment	Segment must be a data segment.
<i>Segment stamp search</i>	02	Segment stamp should start with 02.
<i>Stamp length</i>	4	KGH defines a stamp length of 4 bytes.

3.3.2.4 DATA DEFINITION

<i>Allocation of data to search 1 definition</i>		Allocate data to search definition 1.
<i>Data type</i>	Segment data	Read data from the searched segment.
<i>Data address</i>	0	Start reading at first byte after the stamp.
<i>Data length</i>	3	Read 3 bytes.

3.3.3 BOOSTER CONFIG FILES

Your configuration can be saved into a Booster Config File (*.bcf). These files contain all the configuration settings as you have defined them. Saved Booster Config Files can be easily opened from within the File menu.

3.4 TESTING THE CONFIGURATION

The configuration can be tested on your read/write unit with the LEGIC cards that should be supported. This test can be performed before the configuration cards are created and without any Boosters.

3.4.1 SETUP TEST ENVIRONMENT

First the configuration must be transmitted to the programmer.

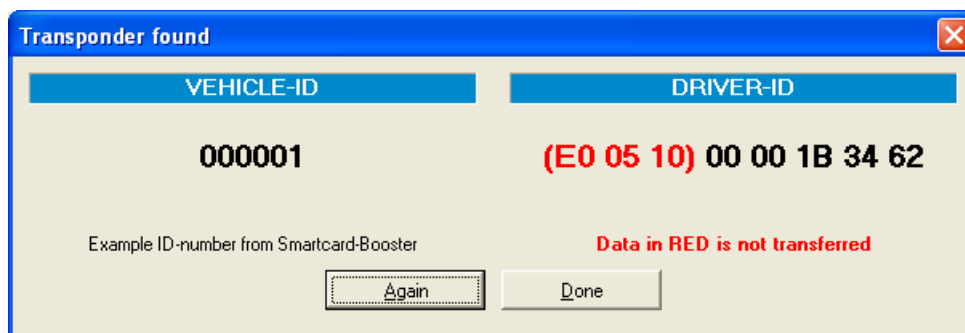
This is done by clicking 'Configuration', 'Test' and 'Setup configuration in read/write unit'. The message 'Setup Test Configuration completed successfully' should appear.

The test configuration is written into the programmer's RAM IDB settings.

3.4.2 START TESTING

Start reading by clicking 'Configuration', 'Test' and 'Start Reading' (or press F9).

When a transponder is found that meets the configured search definitions a message appears with the data that was read.



Read data information message

The reading can be aborted by clicking 'Configuration', 'Test' and 'Stop Reading' (or press Shift + F9).

4 USAGE INFORMATION

4.1 USING THE SMARTCARD-BOOSTER LEGIC

Place the Smartcard-Booster behind the windscreen of your vehicle as described in chapter 2.

The driver inserts his card and pushes the button on the Booster.

A beep should indicate that the card was successfully read.

The TRANSIT reader can identify your LEGIC card up to a distance of 10 meters now.

After 5 seconds the Booster returns into standby mode.

The driver should remove the LEGIC card from the Booster when leaving the vehicle.

4.2 READING THE SMARTCARD-BOOSTER LEGIC

The Smartcard-Booster is battery operated passive tag. The information from the tag is sent to the reader by a method called modulated backscatter. This means that the reader's transmitted signal is modified in such way that it can be recognized by the reader.

The examples below assume that a TRANSIT PS270 reader with P81 firmware is used and show the messages transmitted on the RS-232 interface to a host system (TXD). Refer to the reader firmware manual for more details about the reader communication protocol.

Dual-ID mode

The Smartcard-Booster cannot be identified until the driver inserts his card and pushes the button. Once the button is pushed the booster reads the inserted card and sounds the buzzer upon a successful read. Both vehicle-ID and driver-ID are transmitted to the reader. After 5 seconds the Smartcard-Booster automatically deactivates.

Example: vehicle-id = 123, driver-id = 7100944, TXD = U00000001230007100944^{C_RL_F}

If 'Extended Driver-ID length' is enabled, the following message is transmitted to the host.

Example: vehicle-id = 123, driver-id = 7100944, TXD = Y00000001230000000000000007100944^{C_RL_F}

Single-ID mode

The Smartcard-Booster is 'sleeping' until the driver inserts his card and pushes the button. The LEGIC smart card is read and the data is transmitted to the host system. After 5 seconds the Smartcard-Booster automatically deactivates again.

Example: driver-id = 87111111117100944, TXD = U0087111111117100944^{C_RL_F}

If 'Extended Driver-ID length' is enabled, the following message is transmitted to the host.

Example: driver-id = 87111111117100944, TXD = Z000000000000087111111117100944^{C_RL_F}

5 BUZZER INDICATIONS

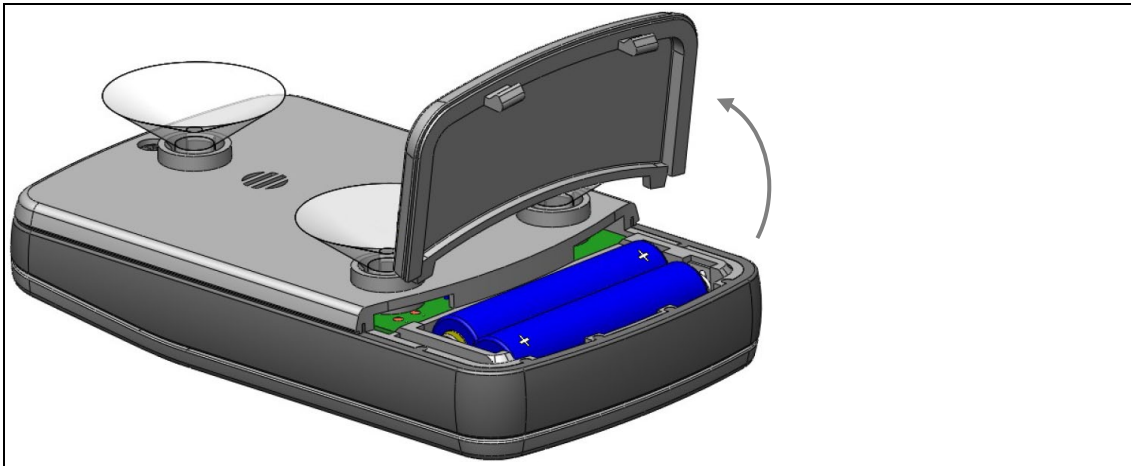
The Smartcard-Booster's built-in buzzer gives audible feedback upon various conditions. The table below describes the buzzer indications.

DESCRIPTION	BUZZER
Button pushed	key click
Transponder read	1 high beep
Transponder read (no match with search definitions)	1 low beep
Transponder failed to read (or no card)	no beep
Master Token accepted	3 beeps increasing frequency
Configuration card read successfully	3 beeps decreasing frequency
Configuration card not accepted	1 long low beep
Configuration card read failed (e.g. card removed)	3 long low beeps
Power on (configuration preserved)	6 beeps increasing frequency
Busy launching	2 beeps increasing frequency (repeating for 15 sec)
Busy initializing (please wait)	2 long high beeps
Configuration reset	3 high beeps
Battery low (only Smartcard-Booster LEGIC 2G)	...- - -...

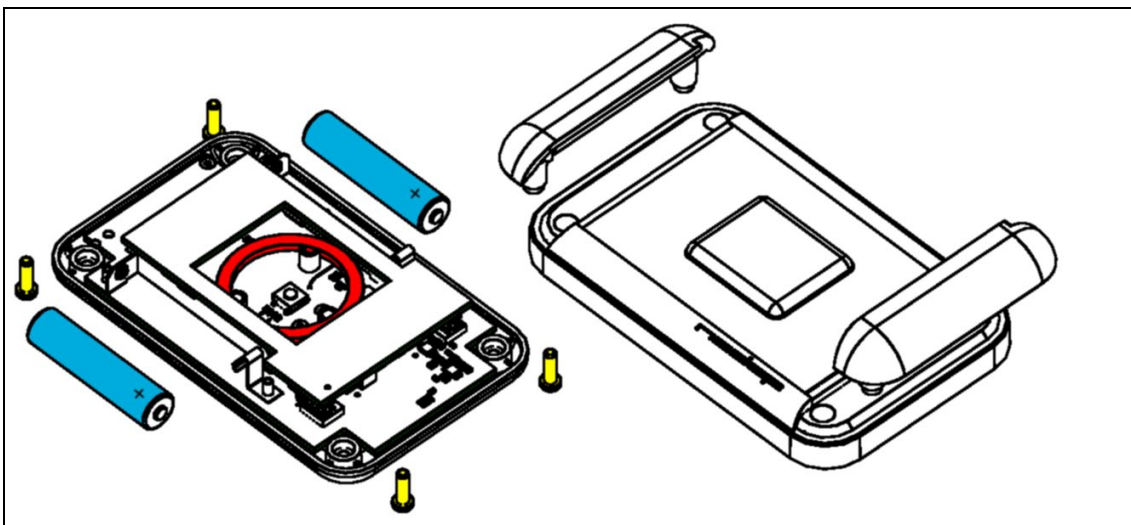
6 BATTERY REPLACEMENT

The Smartcard-Booster contains two replaceable non-rechargeable AAA batteries. The average lifetime of these batteries is approximately 5 years. When replacement becomes necessary follow the procedure below.

1. Open the battery compartment.
2. Remove both batteries. Follow local environment protection laws / regulations for disposal of used batteries.
3. Replace with two new batteries of the same type. Make sure that the polarity matches the indicated polarity.
4. Close the battery compartment and verify if the booster is working properly.



Battery replacement smartcard-booster 2G



Battery replacement smartcard-booster

A TECHNICAL SPECIFICATIONS

ITEM	SPECIFICATION
Dimensions	111 x 65 x 32 mm
Weight	120 gram
Protection	IP32 (approx. NEMA 2)
Operating temperature	-20°C ... +60°C
Storage temperature	-40°C ... +85°C
Relative humidity	10% ... 93% (non condensing)
Identification range	Typically 10 meters (line-of-sight required)
Power supply	2 x AAA batteries, expected lifetime up to 5 years
Certifications	Directive 1999/5/EC, EN300 330, EN60950, EN50357, EN50364, EN301 489

B PART NUMBERS

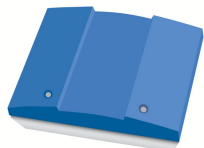
SMARTCARD-BOOSTER LEGIC 2G



Smartcard-Booster LEGIC 2G

part number: 9961798

TRANSIT LONG RANGE READER



TRANSIT PS270 long range reader

part number: 9990410