

125 kHz RFID System



BLUEBOX GEN2 BASIC LF SHORT RANGE



RS232/RS485

Preface

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Safety Instructions / Warning - Read before start-up!

- The device may only be used for the intended purpose designed by the manufacturer. The operation manual should be conveniently kept available at all times for each user.
- Unauthorized changes and the use of spare parts and additional devices that have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or

automatically set parameters for a device or for an incorrect application of a device.

- Repairs may be executed by the manufacturer only.
- Only qualified personnel should carry out installation, operation, and maintenance procedures.
- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes.
- When working on devices the valid safety regulations must be observed.



IP65



This manual applies to the following devices:

Description:

Read / write 125 kHz RFID device with integrated antenna. Serial RS232/RS485 communication interface.

Read / write 125 kHz RFID device with one external antenna. Serial RS232/RS485 communication interface.

Order Number:

5121L

5131L



This manual is valid as of firmware version:

Order Number	Carrier	Front End
5121L	2.31	3.17d
5131L	2.31	3.17d

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1 Introduction

The **BLUEBOX GEN2 BASIC LF** hereinafter named **BLUEBOX** is a read/write RFID device for industrial application that communicates with a 'host' system (typically a PC or a PLC) through a RS232/RS485 serial line (item 5121L, item 5131L). The **BLUEBOX** acts as a joint through a set of commands between the host system and a RFID tag (or transponder) present near the antenna. The same 'master/slave' protocol is used for the communication between the host system ('master') and the **BLUEBOX** ('slave'), independently of the kind of connection (point to point, multidrop net). Through these communication channels, it is also possible to configure the functional parameters and to upgrade the firmware, the 'BLUEBOX Show' software of the SDK is foreseen to explicate these operations. Furthermore the **BLUEBOX** is able to handle 2 digital outputs (low side load) or 2 optoisolated digital inputs. The **BLUEBOX** is available with external RF antenna (item 5131L) or with integrated RF antenna inside the cover of the device (items 5121L). The **BLUEBOX** is equipped with useful removable screw terminal blocks in order to facilitate the electrical wiring, the internal fixing holes of the enclosure allow an easy installation.

2 Technical Specifications

This section provides details on the technical specifications of the **BLUEBOX**.

2.1 Electrical Features

This section provides details on the electrical features of the **BLUEBOX**.

2.1.1 1 Integrated Antenna Version (Item 5121L)

Power Supply	10 ... 36 Vdc
Power Ratings	3W
Operating Frequency	125 kHz \pm 2 kHz
Antenna	Integrated
Reading Distance	10 cm ¹
Supported Transponders	125 kHz Read Only and Read/Write transponders (e.g. Unique and Q5 by Sokymat, HITAG S and HITAG 1 by NXP, 555x by Temic, EM4x50 (TITAN), EM4305, EM410x, ...)
Communication Interface	Serial RS232 / RS485
Digital Inputs/Outputs	2 optoisolated I/O, Voltage 24Vdc As input: max current 10mA As output: max current 500mA
Status Display	3 LEDs, Buzzer
Connections	Removable screw terminal blocks (cable section: 0.5 ... 1.5mm ²)

2.1.2 1 External Antenna Version (Item 5131L)

Power Supply	10 ... 36 Vdc
Power Ratings	3W
Operating Frequency	125 kHz \pm 2 kHz
Antenna	External

¹ Reading distance depends on transponder type, antenna and environmental conditions.

Reading Distance	25 cm ²
Supported Transponders	125 kHz Read Only and Read/Write transponders (e.g. Unique and Q5 by Sokymat, HITAG S and HITAG 1 by NXP, 555x by Temic, EM4x50 (TITAN), EM4305, EM410x, ...)
Communication Interface	Serial RS232 / RS485
Digital Inputs/Outputs	2 optoisolated I/O, Voltage 24Vdc As input: max current 10mA As output: max current 500mA
Status Display	3 LEDs, Buzzer
Connections	Removable screw terminal blocks (cable section: 0.5 ... 1.5mm ²)

2.2 Mechanical Features

This section provides details on the mechanical features of the **BLUEBOX**.

Mechanical Features	
Dimensions	110 x 140 x 62 mm
Material	PC
Protection Class	IP65

2.3 Environmental Conditions

This section provides details on the environmental conditions of the **BLUEBOX**.

Environmental Conditions	
Operating Temperature	-20°C ... +65°C
Storage Temperature	-40°C ... +85°C
Humidity	Up to 95%, non condensing

² Reading distance depends on transponder type, antenna and environmental conditions.

3 Operating Features

In 'continuous' mode the **BLUEBOX** is characterized by the coexistence of 2 'parallel' and asynchronous activities: the transponder identification and the communication with the 'host' system. The 'continuous' identification activity interacts with the communication activity through a buffer that contains the code of the last identified transponder or the 0 code that indicates the absence of a transponder. Due to synchronization and filtering reasons, the buffer is handled by a parameter defined as 'hold time' (to be set in the range of 0 ... 99 seconds, default value 1 second) and allows to extend 'artificially' the presence of the transponder after it leaves the antenna's influence area; this behavior is observable looking at the 'ANT' LED status that is 'on' indicating the presence of a transponder. Through the command 'data request' it is possible to get the data contained in the buffer.

The **BLUEBOX** handles also a 31 elements FIFO queue which is combined with a 'filter time' parameter (to be set in a range of 0 ... 99 seconds, default value 1 second) that prevents the queue saturation in case of a transponder 'continuous' presence. When a transponder is identified, the **BLUEBOX** compares it to the previous read transponder. If the transponder is different (it is defined as 'new'), its code will be inserted in the queue and the filter time will be started. Otherwise (the transponder is the same of the previous read one), the **BLUEBOX** verifies if the filter time is expired. In this case (the filter time is expired), the transponder is defined as 'new' and will be processed as described above, otherwise only the filter time will be rearmed. Through the command 'queue data request' and the relative 'ack', it is possible to get the data contained in the queue and unload it.

In 'continuous' mode the **BLUEBOX** can be configured to obtain the behavior of a 'spontaneous' reader that will send a message on the RS232 / RS485 serial line. This feature is enabled (on) / disabled (off) by the switch 2 of the dip switch SW1 or using a flag in the general configuration of the reader.

- If configured and available an host can receive the 'spontaneous' message through the RS232 / RS485 serial port. The 'spontaneous' message is sent only once and no ACK/NAK reply message is implemented, see the protocol manual for details.



In case of a 'spontaneous' message send error, due to a connection or communication error, no further attempts will be made and the tag will be discarded!



BLUEBOX will hold onto a maximum of 20 tags when configured to use the 'spontaneous' message. Once the 20 tag limit is reached, the new tags will be discarded!

A subset of the 'continuous' mode is also defined:

- 'Trigger' mode: the activation and deactivation of the 'continuous' mode is triggered with inputs. The trigger could be level sensitive or edge sensitive depending on the 'extension time' setting (to be set in a range of 0 ... 99 seconds or 0 ... 99 minutes, default value 0 seconds).


The **BLUEBOX** allows the execution of 'on request' functions. During the execution of these functions, the 'continuous' identification activity will be suspended temporarily; the involved commands are relative to device configuration and tag read/write specific activities.

If not required, the 'continuous' identification activity can be disabled through a flag defined in the general parameters. In this case, the **BLUEBOX** will only execute the 'on request' commands already defined above.

3.1 General Parameters

This section provides details on the configurable general parameters of the **BLUEBOX**.

Parameter	Description	Range	Default
Device Address	Device address of the reader.	000 ... 255	255
Baud Rate	Communication baud rate on serial interface.	1200 2400 4800 9600 19200 38400 57600 115200	19200
Data Bits	Data bits on serial interface.	7 8	8
Stop Bits	Stop bits on serial interface.	1 2	1
Parity	Parity on serial interface.	None Even Odd	None

Parameter	Description	Range	Default
Code	Nibble coding.	Normal Reverse	Normal
Hold Time	Reading management hold time.	0 ... 99 seconds	1 sec
Filter Time	Reading management filter time.  Note that 0 setting is internally overwritten with 1 second.	0 ... 99 seconds 0 ... 99 minutes	1 sec
Buzzer Management	Buzzer management on 'new tag' event.	Disabled Enabled	Enabled
Output 1 Management	Output 1 activation on tag presence / new tag event (see the input/output parameters).	Disabled Enabled	Disabled
'Spontaneous' Mode	Spontaneous mode (see 'spontaneous' message configuration parameters). It is OR'ed with the dip-switch SW1-2 setting.	Disabled Enabled	Disabled
Trigger 'Continuous' Mode with Inputs	'Continuous' mode management with inputs (see the input/output configuration parameters).	Disabled Enabled	Disabled
'Continuous' Mode	'Continuous mode'.	Disabled Enabled	Enabled

The general parameters are managed through the 'Read General Parameters' and 'Write General Parameters' commands as described in protocol technical manuals where the parameters 1...7 fields and default values are:

1	2	3	4	5	6	7
Device Address	Serial1	Serial2	Hold Time	Standard	Filter Time	Functional Flags
0xFF	0x48	0x10	0x01	0x03	0x01	0x80

Where:

Parameter	Description
Device Address	Device address of the reader (0x00 ... 0xFF).
Serial1	Serial interface communication settings. <ul style="list-style-type: none"> High nibble: baud rate: <ul style="list-style-type: none"> 0x0: 1200 bps 0x1: 2400 bps 0x2: 4800 bps 0x3: 9600 bps




Parameter	Description
	<ul style="list-style-type: none"> ○ 0x4: 19200 bps ○ 0x5: 38400 bps ○ 0x6: 57600 bps ○ 0x7: 115200 bps • Low nibble: data bits: <ul style="list-style-type: none"> ○ 0x7: 7 bits ○ 0x8: 8 bits
Serial2	Serial interface communication settings. <ul style="list-style-type: none"> • High nibble: stop bits: <ul style="list-style-type: none"> ○ 0x1: 1 bits ○ 0x2: 2 bits • Low nibble: parity: <ul style="list-style-type: none"> ○ 0x0: None ○ 0x1: Even ○ 0x2: Odd
Hold Time	Reading management hold time: <ul style="list-style-type: none"> • Decimal 0 ... 99 for time in seconds (0 ... 99 seconds)
Standard	Tag identification standard: <ul style="list-style-type: none"> • High nibble: nibble coding: <ul style="list-style-type: none"> ○ 0x0: Normal ○ 0x1: Reverse • Low nibble: 0x3
Filter Time	Reading management filter time: <ul style="list-style-type: none"> • Decimal 0 ... 99 for time in seconds (0 ... 99 seconds) • Decimal 100 ... 199 for time in minutes (0 ... 99 minutes)
Flags	Flags. Single bits are dedicated to disable (0 value) or enable (1 value) functions: <ul style="list-style-type: none"> • Bit 7: Automatic buzzer management; • Bit 6: Automatic output 1 management; • Bit 5: Not used; • Bit 4: Not used; • Bit 3: 'Spontaneous' mode; • Bit 2: 'Continuous' mode triggered with inputs; • Bit 1: Not used; • Bit 0: 'Continuous' mode (0=enabled, 1=disabled)..

3.2 Configuration Parameters

This section provides details on the configurable operational parameters of the **BLUEBOX**.

3.2.1 Input/Output

This section provides details on the configurable input/output parameters of the **BLUEBOX**

Parameter	Description	Range	Default
Input 1 Mode	Input 1 activation / deactivation mode of the 'continuous' mode.  Note that this parameter become effective only after a reboot of the reader.	0 1 2	1
Input 2 Mode	Input 2 activation / deactivation mode of the 'continuous' mode.  Note that this parameter become effective only after a reboot of the reader.	0 1 2	0
Extension Time	'Continuous' mode activation / deactivation management with inputs extension time. <ul style="list-style-type: none"> In 'trigger' mode, if =0 the trigger is level sensitive, otherwise it is edge sensitive and this time defines the 'continuous' mode activation time extension.  Note that this parameter become effective only after a reboot of the reader.	0 ... 99 seconds 0 ... 99 minutes	0 sec

Where the input mode range means

- 0: Disabled;
- 1: ON -> Activate antenna; OFF -> Deactivate antenna;
- 2: OFF -> Activate antenna; ON -> Deactivate antenna;

The input 1 and 2 modes combination allowed are

Input 1 Mode	Input 2 Mode
ON -> Activate antenna; OFF -> Deactivate antenna	Disabled
OFF -> Activate antenna; ON -> Deactivate antenna	Disabled
Disabled	ON -> Activate antenna; OFF -> Deactivate antenna

Input 1 Mode	Input 2 Mode
Disabled	OFF -> Activate antenna; ON -> Deactivate antenna

The Input/Output parameters are stored in configuration page nr. 0x05 and are managed through the 'Read RAM/ROM Configuration Parameters' and 'Write RAM/ROM Configuration Parameters' commands as described in protocol technical manuals where the parameters 1...7 fields and default values are:



1	2	3	4	5	6	7
Input1 Mode	Input2 Mode	Extension Time	0x00	0x00	0x00	0x00
0x01	0x00	0x00	0x00	0x00	0x00	0x00

Where:

Parameter	Description
Input1 Mode	Input 1 activation / deactivation mode of the 'continuous' mode in 'trigger' mode: <ul style="list-style-type: none"> 0x00: Disabled 0x01: ON -> Activate antennas; OFF -> Deactivate antennas 0x02: OFF -> Activate antennas; ON -> Deactivate antennas
Input2 Mode	Input 2 activation / deactivation mode of the 'continuous' mode in 'trigger' mode: <ul style="list-style-type: none"> 0x00: Disabled 0x01: ON -> Activate antennas; OFF -> Deactivate antennas 0x02: OFF -> Activate antennas; ON -> Deactivate antennas
Extension Time	'Continuous' mode activation/deactivation management with inputs extension time. <ul style="list-style-type: none"> In 'trigger' mode, if =0 the trigger is level sensitive, otherwise it is edge sensitive and this time defines the 'continuous' mode activation time extension. And the values allowed are: <ul style="list-style-type: none"> Decimal 0 ... 99 for time in seconds (0 ... 99 seconds); Decimal 100 ... 199 for time in minutes (0 ... 99 minutes).

3.2.2 'Spontaneous' Message

This section provides details on the configurable 'spontaneous' message parameters of the **BLUEBOX**

Parameter	Description	Range	Default
Message on Serial RS232 / RS485	'Spontaneous' message on serial interface RS232/RS485 activation/deactivation.  Note that this parameter become effective only after a reboot of the reader.	Disabled Enabled	Enabled
Format	The 'spontaneous' message format. <ul style="list-style-type: none"> 0: Message is sent using BLUEBOX protocol rules; 1: Message is sent like in option 0x00, without any control character just ASCII string; 2: Message is sent like in option 0x01 but at the end CR will be appended; 3: Message is sent like in option 0x01 but at the end CR+LF will be appended. 4: Message is sent, without any control character, in ASCII form. Non printable chars (0x20..0x7E) are replaced with '.' (0x2E). 5: Message is sent like in option 0x04 but at the end CR will be appended. 6: Message is sent like in option 0x04 but at the end CR+LF will be appended.  Note that this parameter become effective only after a reboot of the reader.	0 1 2 3 4 5 6	0

The 'spontaneous' message parameters are stored in configuration page nr. 0x09 and are managed through the 'Read RAM/ROM Configuration Parameters' and 'Write RAM/ROM Configuration Parameters' commands as described in protocol technical manuals where the parameters 1...7 fields with default values are:

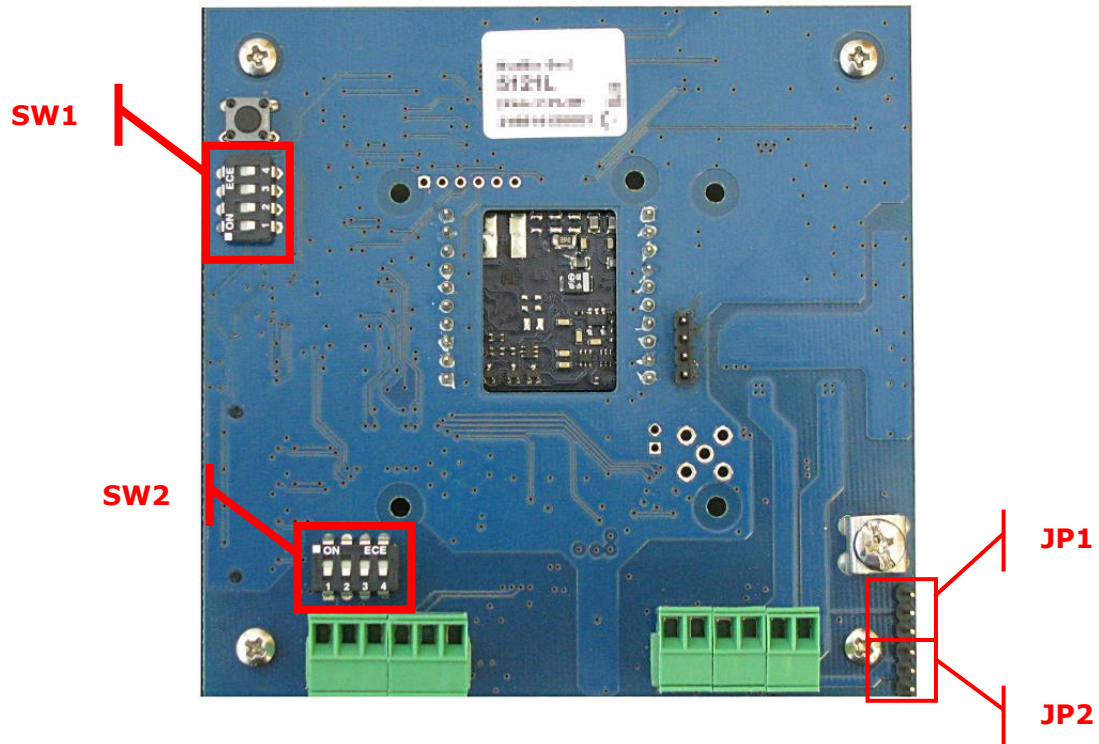
1	2	3	4	5	6	7
0x00	Interface	Format	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00	0x00	0x00

Where:

Parameter	Description
Interface	<p>The interface where to send the 'spontaneous' message activation/deactivation. Single bits are dedicated to enable (0 value) or disable (1 value) an interface:</p> <ul style="list-style-type: none"> • Bit 7: Not used; • Bit 6: Not used; • Bit 5: Not used; • Bit 4: Not used; • Bit 3: Not used; • Bit 2: Not used; • Bit 1: Not used; • Bit 0: Serial RS232/RS485.
Format	<p>The 'spontaneous' message format setup:</p> <ul style="list-style-type: none"> • 0x00: Message is sent using BLUEBOX protocol rules; • 0x01: Message is sent like in option 0x00, without any control character just ASCII string; • 0x02: Message is sent like in option 0x01 but at the end CR will be appended; • 0x03: Message is sent like in option 0x01 but at the end CR+LF will be appended. • 0x04: Message is sent, without any control character, in ASCII form. Non printable chars (0x20..0x7E) are replaced with '.' (0x2E). • 0x05: Message is sent like in option 0x04 but at the end CR will be appended. • 0x06: Message is sent like in option 0x04 but at the end CR+LF will be appended.

4 Hardware Settings

This section provides details on the hardware settings (dip-switches, solder jumpers, ...) of the **BLUEBOX**.



SW1

Dip 1	On: force 255, 19200, 8, n, 1.
Dip 2	On: enables 'spontaneous' mode on RS232 / RS485 serial line.
Dip 3	Not used.
Dip 4	Not used.

SW2

Dip 1	On: RS485 fail-safe resistor connected to +5V0.
Dip 2	On: RS485 fail-safe resistor connected to GND.
Dip 3	On: RS485 120Ω line termination resistor connected.
Dip 4	Not used.

JP1

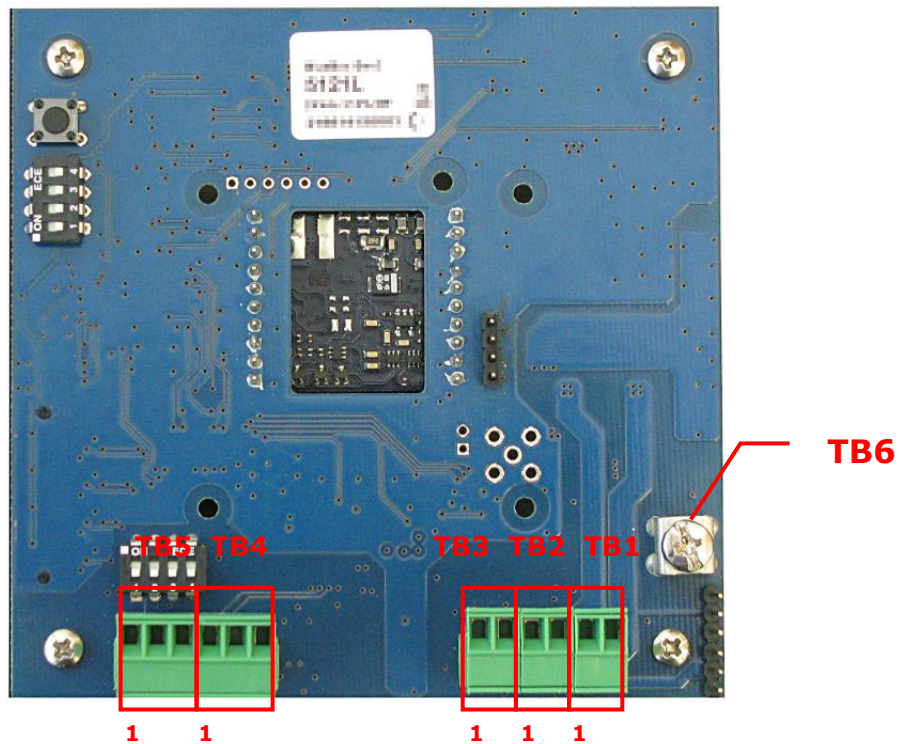
- | | |
|------------|--|
| 1-2 | Positive reference of inputs 1 and 2 internally connected to +PWR. |
| 2-3 | Positive reference of inputs 1 and 2 not internally connected. |

JP2

- | | |
|------------|--|
| 1-2 | Negative reference of inputs 1 and 2 internally connected to -PWR. |
| 2-3 | Negative reference of inputs 1 and 2 not internally connected. |

5 Connections

This section provides details on the connections of the **BLUEBOX**.



TB1: Main power supply.

Pin	No	Min	Typical	Max	Description
+PWR	1	10Vdc	12 / 24Vdc	36Vdc	DC power supply
-PWR	2				DC power supply return path

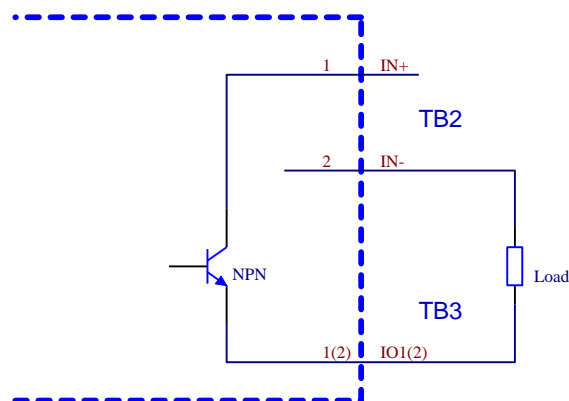
TB2: I/O power supply.

Pin	No	Min	Typical	Max	Description
IO+	1	18Vdc	24Vdc	36Vdc	Input / Output power supply (24Vdc)
IO-	2				Input / Output reference (0Vdc)

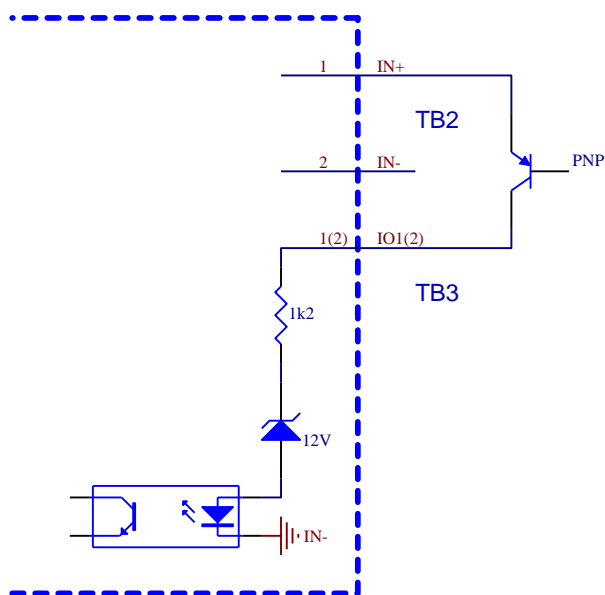
TB3: I/O connections.

Pin	No	Min	Typical	Max	Description
IO1	1				Input 1 / Output 1
IO2	2				Input 2 / Output 2

If Iox is used as output, the load has to be connected between Output pin 1 of TB3 (channel 1) or Output pin 2 of TB3 (channel 2) and IN- pin 2 of TB2; max applicable current is 500mA.



If Iox is used as input, a clean contact or PNP transistor has to be connected between IN+ pin 1 of TB2 and Input pin 1 of TB3 (channel 1) or Input pin 2 of TB3 (channel 2); max applicable current is 10mA.



TB4: RS232 connections.

Pin	No	Min	Typical	Max	Description
RS232 Tx	1				RS232 connection (to host)
RS232 Rx	2				RS232 connection (from host)
RS232 Gnd	3				RS232 connection (reference)

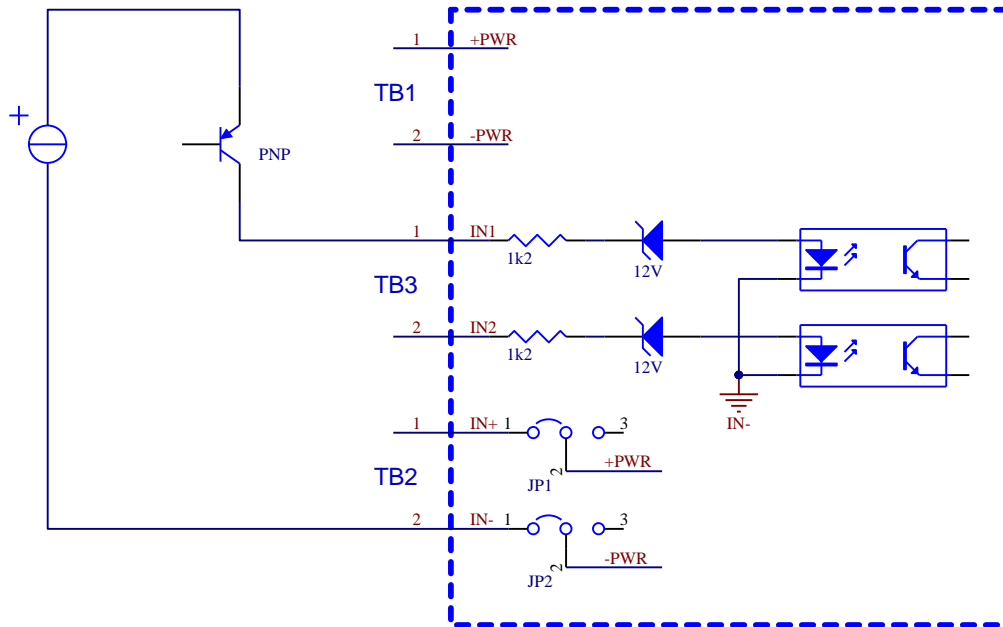
TB5: RS485 connections.

Pin	No	Min	Typical	Max	Description
RS485 RT+	1				RS485 connection (positive)
RS485 RT-	2				RS485 connection (negative)
RS485 Gnd	3				RS485 connection (reference)

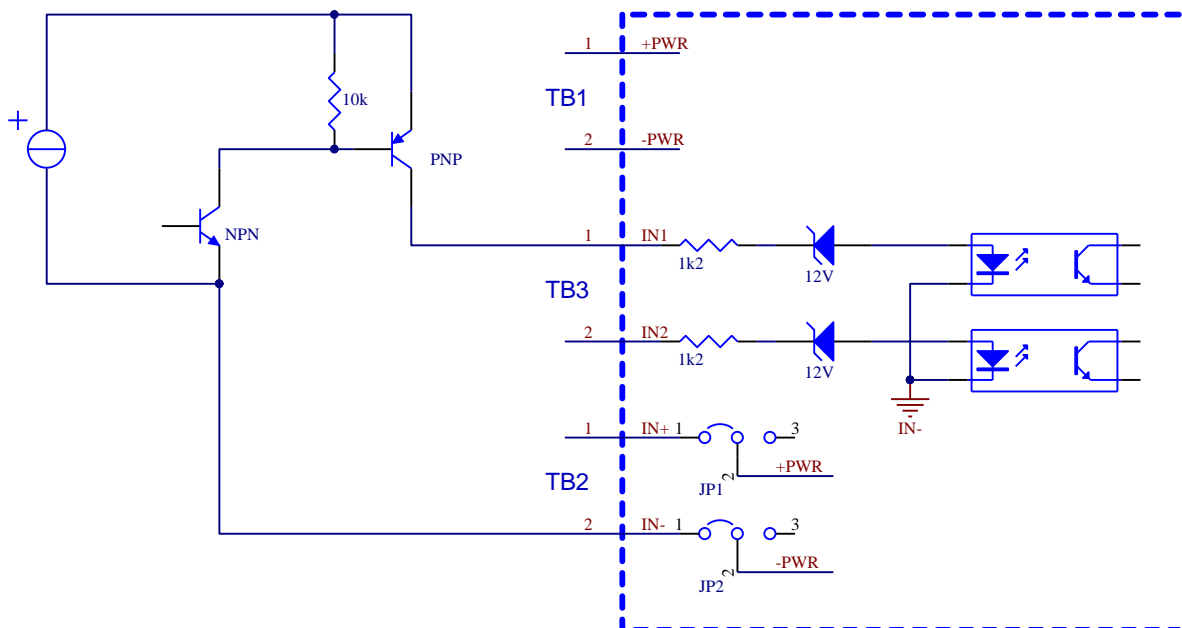
TB6: Protected earth.

6 Wiring Examples

A PNP output connected to the **BLUEBOX** digital input 1:



An NPN output connected to the **BLUEBOX** digital input 1:



7 Antennas

The **BLUEBOX** is available with internal antenna directly integrated on the device cover (items 5121L). Alternatively the **BLUEBOX** (items 5131L) is equipped with a connector for an external antenna that is available in various models (items 902xL and 922xL).

The read range of an RFID system always depends on various factors like antenna size, transponder size, transponder IC type, orientation between transponder and reader antenna, position of the transponder versus the reader antenna, noise environment, metallic environment, etc. Therefore all data about read ranges can only be typical values measured under laboratory conditions. In real live applications the read range may differ from the data mentioned in the datasheet.

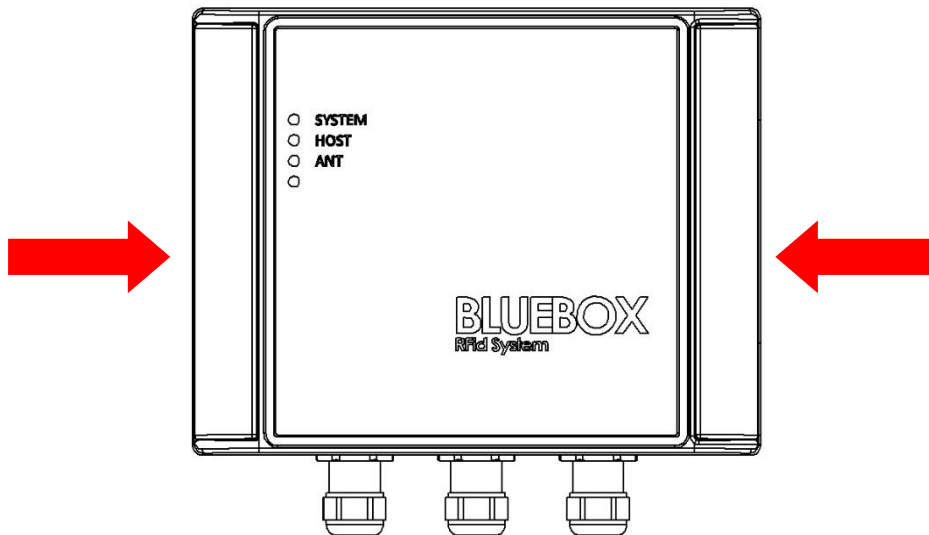
7.1 Integrated Antenna

The reader with integrated antenna has a maximum reading distance of about 100 mm measured between the **BLUEBOX** cover and a disk transponder with 50 mm diameter.

8 Installation

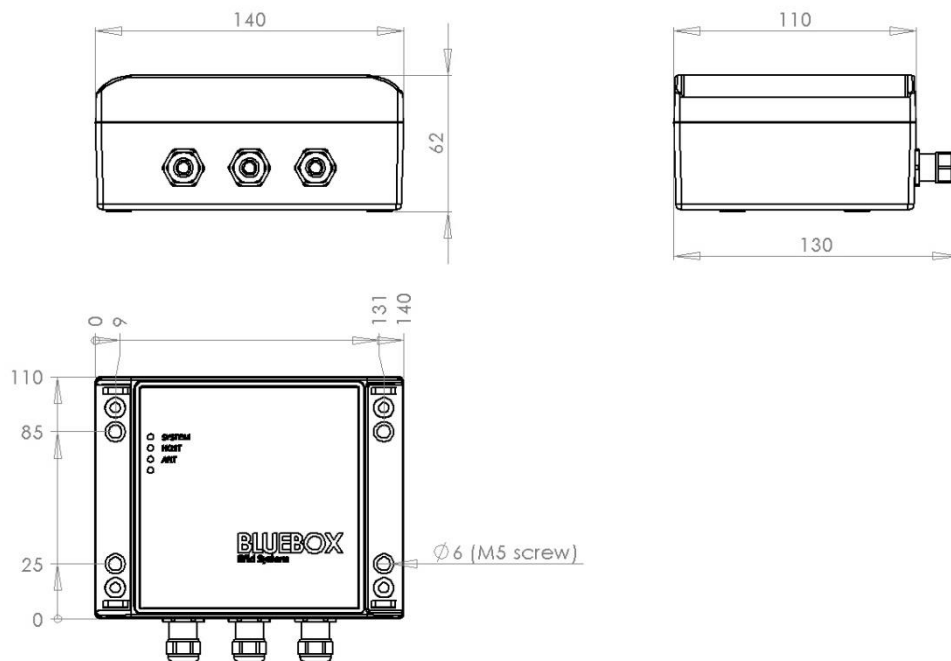
This section provides details on the installation and connection of the **BLUEBOX**.

1. Position the **BLUEBOX** and remove the lateral hinges of the enclosure (highlighted with red arrows in the image below). Fix the the enclosure to a support (wall, column, ..) using the 4 holes (already provided within the enclosure and highlighted with red arrows in the image below) and choosing suitable screws. Choose the appropriate location for the **BLUEBOX**. Ideally you should always keep the unit away from direct sunlight, high humidity, extreme temperatures, and sources of electromagnetic interference. Any combination of these conditions might degrade performance or shorten the life of the unit.

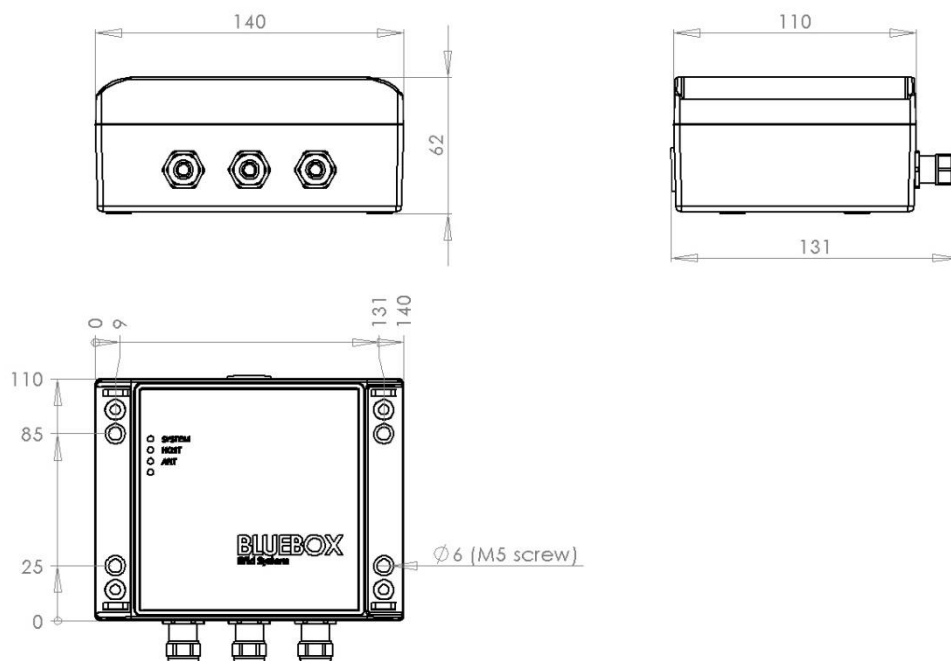


1. Connect the **BLUEBOX** to the serial RS232 line or serial RS485 line using a suitable cable as defined in connections section.
2. Power the **BLUEBOX** using an external power supply as defined in connections section and technical specifications. The boot sequence begins in either case when power is supplied to the **BLUEBOX**. This sequence typically completes within 5 seconds. After the boot sequence finishes, the **BLUEBOX** accepts commands, not before. The LED on the **BLUEBOX** alerts you to the status as defined in status indications section.

5121L:



5131L:
















All the dimensions are in mm.

9 Status Indications

At the top of **BLUEBOX** are placed LEDs which shows to the user about current activities and device status. The following tables provides the indicator states and flash rates.

State	Definition
On	The indicator is constantly on
Off	The indicator is constantly off
Blinking	The indicator turns on and off with a frequency of 2 Hz: on for 250 ms, followed by off for 250 ms
Slow Blink	The indicator turns on and off with a frequency of 1 Hz: on for 500 ms, followed by off for 500 ms

LED	Color	State	Meaning
SYSTEM	 (green)	Blinking	System running
	 (red)	On	System error (or system initialization)
	 (orange)	On	System upgrade
	 (off)	Off	Power supply for the device is missing or hardware defect
HOST	 (green)	Blinking	No HOST connection
	 (green)	On	HOST connection
	 (red)	On	System initialization
	 (off)	Off	Power supply for the device is missing or hardware defect (or system upgrade)
ANT	 (green)	Blinking	Antenna active, no tag detected
	 (green)	Slow Blink	Antenna not active
	 (green)	On	Antenna active, tag detected
	 (red)	On	Antenna error (or system initialization)
	 (off)	Off	Power supply for the device is missing or hardware defect (or system upgrade)

Buzzer:

- The buzzer is activated for 0.5 seconds at the end of the initialization phase.
- During normal operation, if the 'automatic' management of the buzzer is enabled by the flag defined in the general parameters, the buzzer is activated for 0.5 seconds at every identification of a 'new' tag.
- During firmware upgrade procedure, the buzzer is activated for 0.25 seconds at the end of the file download in case of no file errors detected, otherwise 5 short beeps (0.15 seconds) shall signal an error

10 Document Revision History

Date	Revision	Description
15/04/14	1.00	Initial release.
14/07/14	1.01	<p>Corrections in section 1.</p> <p>Corrections in the technical specification table (section 2).</p> <p>Added the device reset command (section 4.1).</p> <p>Corrections in the operating features (section 3), added parameters in the general configuration page and I/O configuration page and relatives commands (sections 4.2, 4.3, 4.5 and 4.6).</p>
30/03/15	1.02	<p>New firmware release reference in the first page.</p> <p>Added 57600bps and 115200bps baudrate support in section 3.1, 4.2 and 4.5.</p>
15/07/15	1.03	<p>Added the list of devices object of this manual in preface section.</p> <p>Corrections in the buffer/queue management description in section 3.</p> <p>Style corrections.</p>
04/10/16	1.04	<p>Updated the reader's firmware versions object of this manual.</p> <p>Changes in the technical specification formatting (section 2).</p> <p>Added the operating features and description of the configurable parameters (section 3).</p> <p>Deleted the supported transponders appendix.</p>
02/08/17	1.05	<p>Corrections in the operating features section.</p> <p>Added a warning to changed configuration parameters that become effective only after a device reset.</p>
01/02/19	1.06	<p>Updated the company name/logo and BLUEBOX logo.</p> <p>Updated the reader's firmware versions object of this manual.</p> <p>Minor changes and corrections in the configuration parameters.</p> <p>Added configuration for the 'spontaneous' message format.</p> <p>Minor changes in status indications.</p>

Date	Revision	Description
14/11/19	1.07	Updated the reader's firmware versions object of this manual. Changes and document fixes in all sections.