

BLUEBERRY



USER MANUAL

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Introduction to BlueBerry UHF

Contents inside the pack

- BlueBerry RFID Reader
- USB cable A-type male - micro USB male
- CD

BlueBerry components

Blue LED: to indicate operation and battery level

on/off switch and scanner activation



Figura 1: BlueBerry components

Button , LED and beeper usage

























Action	Light Displayed	Light Sequence	Beep Sequence	Status - Function	
				Off	
1 sec. hold				Start Devices	
				Power On	
1 click				Scanning	Scan Functions
				Tag Found	
				Bluetooth Transmission of TAG ID	
2 sec. hold				Shutdown	
				Battery Low	Battery Status
USB connected				Battery Recharge	
plugging USB				Start Devices	
				Battery Low no operations allowed	

Table 1: Button , LED and beeper usage

Technical specifications

MAN/MACHINE INT	1 function key for RFID read activation Speaker 2 LED for device operation signaling
INTERNAL DEVICES	RFID reader ETSI version frequency: 865,6 – 867,6 MHz number of channels: single or 4 hopping channels channel occupancy: in accordance with ETSI EN 302 208 and ETSI EN 300 328 power: 200mW standard: EPC Class1 Gen2 read range: 10-20 cm with Far Field Tag, 2 cm with Near Field Tag RFID reader FCC version frequency: 902,55 – 927,7 MHz number of channels: 50 hopping channels (compliant to FCC part 15) channel occupancy: in accordance with FCC part 15 power: 200mW standard: EPC Class1 Gen2 read range: 10-20 cm with Far Field Tag, 2 cm with Near Field Tag (*) Embedded antenna
INTERFACES	Micro USB type B Bluetooth
PROCESSOR	Texas Instruments MSP 430 (16 bit RISC a 16MHz)
POWER SUPPLY	High-capacity and long term Li-Ion Batteries (can afford 1000-3000 readings) 5Vdc (operation and recharge of batteries) via micro USB
WORKING TEMPERATURE	-10°C - 70°C
DIMENSIONS	Width 6,8 cm – height 4,2 cm – depth 1,8 cm
WEIGHT	30 g
PROTECTION DEGREE	IP65

(*) depending on the TAG

Table 2: Technical specifications

Instructions for use

Installation

When BlueBerry is connected to the computer for the first time, if an internet connection is available, an automatic installation will take place. If the internet connection is not available or no suitable driver is automatically found, download driver and installation guide at the following link:

<http://www.ftdichip.com/Drivers/VCP.htm>

Connection of BlueBerry to the computer

Connect BlueBerry to the computer to reload the battery, to configure the device through the TT_RFID_Configurator application, to carry out operation testing through the TT_RFID_PCDemo

application or to send commands to it according to the specific TERTIUM Technology protocol (see TERTIUM_RFID_Reader_Protocol.pdf).

Connect BlueBerry to a high-power USB port.

Once connected, the state of the LEDs and the acoustic signal will indicate the state of the RFID reader as explained in the paragraph Charging the battery.

NOTE: when BlueBerry is connected to the computer through USB, the Bluetooth interface is disabled.

Disconnection of BlueBerry

To disconnect BlueBerry from the computer, simply disconnect the USB cable. The reader switches off automatically.

Connection of BlueBerry through Bluetooth

To connect BlueBerry through Bluetooth to any device supplied with this kind of interface such as a computer or smartphone, it is necessary to switch on the reader with the button being sure that it is not connected to any terminal by USB. When BlueBerry is connected to the computer through USB, the Bluetooth interface is disabled.

Once it is switched on, BlueBerry is visible through Bluetooth with the name TERTIUM_BB_yyyyyyU while the pin code in order to access is 0000 by default. The shown name and the pin code are changeable by the user.

Charging the battery

BlueBerry is equipped with an internal, non-user-replaceable, rechargeable battery. The high performing Li-Ion battery guarantees an extent of 1000-3000 readings.

A discharged battery is completely charged in about 3 hours.

To recharge BlueBerry, connect it to the computer. The reader automatically switches on and the state of the battery charge is signalled by the blue LED: when the battery is charging, the LED blinks; when it is fully charged, the LED remains on fixed (for further details to see Table 1).

Control of the battery level

When the BlueBerry is switched on with the button, the following situations related to the battery's charge level may occur:

- an acoustic signal and a fixed blue LED: charged battery
- no acoustic signal and quickly blinking blue LED: battery charge very low. No operations are possible in this condition; if the reader is not switched off, it will automatically switch off after 10 sec. It is recommended to charge BlueBerry up to complete recharge.

If the blue LED starts to blink slowly during normal use of BlueBerry, it means that very little charge is left. The reader will only have a few minutes of autonomy.

If you continue to use it, the LED will begin to blink quickly signalling a very low battery charge as described above.

When BlueBerry is connected to the computer, the following situations related to the battery's charge level may occur:

- an acoustic signal and a fixed blue LED: charged battery
- an acoustic signal and blinking blue LED: battery charging. In this condition, it is possible to operate with BlueBerry connecting to it with an any serial Terminal program or using the applications provided with the CD (*TT_RFID_Configurator* or *TT_RFID_PCDemo*)

In Table 1, you can see the activities of the blue LED and of the acoustic beeper related to the battery level.

Reading distance

BlueBerry is equipped with an integrated antenna, for the reading of TAG RFID, located above the button as shown in Figure 1.

The ideal reading distance and condition for BlueBerry UHF is as follows.

NOTE: the reading distance varies based on the type of TAG. Also, metal objects and surfaces located very near BlueBerry can notably invalidate the reader's performance.

BlueBerry UHF reader supports the EPC Class 1 Gen 2 standard. The reading distance is 10-20 cm for far field TAG RFID and of maximum 2cm with TAG near field.

The optimal conditions of reading are obtained positioning the TAG inside the field pointed out in Figure 2 (the figure is for example purpose only and doesn't represent the real antenna radiation pattern).

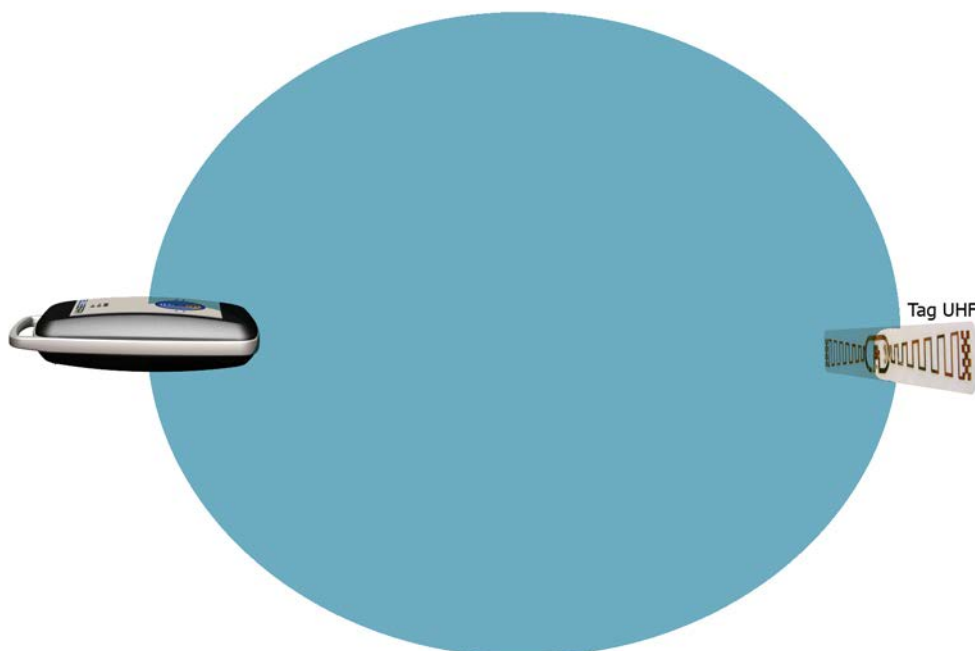


Figura 2: read field of BlueBerry UHF

Configuration of BlueBerry

BlueBerry is an RFID reader able to read one or more TAGs and to transmit data via Bluetooth or USB to any device provided with such interfaces.

BlueBerry is a highly configurable device: it is possible to choose scanning activation mode, the scanning timeout, the enabling/disabling of the signalling LED and the acoustic beeper, the frame format, etc.

The configuration can be done through the serial commands, as described in the document *TERTIUM_RFID_Reader_Protocol.pdf* or more simply through the *TT_RFID_Configurator* application supplied with the CD.

To configure BlueBerry using *TT_RFID_Configurator*, connect BlueBerry to the computer with the USB cable and execute the application; in the section "Device selection", select the BlueBerry UHF device to configure and the COM to which it is connected. Click on the "Connect to device" button. If the connection is successful, the LED next to the Com becomes green and the state of the device and the firmware version will be indicated below (e.g. "Status: Connected v1.4").

Click on the button "Read config" to read the current configuration of BlueBerry.

The *TT_RFID_Configurator* screenshot with the default configuration of BlueBerry UHF is as follows.

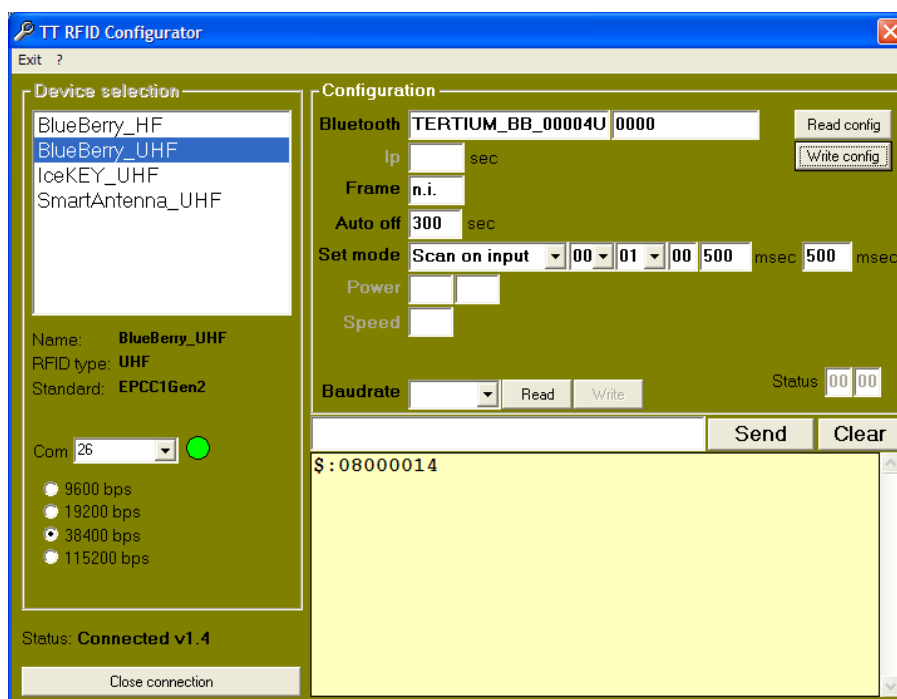


Figura 3: TT_RFID_Configurator

To save the changes made in the Bluetooth, Auto off and Set mode fields, click on the button "Write config" .

Bluetooth

The Bluetooth fields show the name of the selected device and the pin code of the Bluetooth interface. The Bluetooth fields are not available when connecting via Bluetooth.

Auto off

It is the time of automatic switching off of BlueBerry. The auto-switching off mechanism is not active when BlueBerry is connected to the computer with the USB cable or in the "Scan on time" mode.

Set mode



Figura 4: selection fields in Set mode

Operation modes

"Normal mode"

In this mode BlueBerry operates only as a slave peripheral therefore it is only possible to send commands through the serial USB or Bluetooth interface.

To carry out a scanning, it is necessary to send an INVENTORY command. The yellow LED will turn on fixed during the scanning time (the *Tscan* scanning timeout that can be configured by the user is equal to 500ms by default). If a TAG is identified, an acoustic beep will be heard and the yellow LED will blink 2 times. Immediately after, BlueBerry will send the ID of the identified TAG on the active connection, USB or Bluetooth, and 3 louder acoustic beeps will be heard while the yellow LED will blink 3 times.

The "Normal mode", therefore the possibility to send commands to BlueBerry, will still remain active when the reader is configured in the other modes.

Scanning mode "Scan on input"

In this mode, the scanning is started pressing the button. The yellow LED will remain fixed on during the scanning time (the *Tscan* scanning timeout that can be configured by the user is equal to 500ms by default).

If a TAG is identified, an acoustic beep will be heard and the yellow LED will blink 2 times.

Immediately after, only if USB or Bluetooth connection is active, BlueBerry will send the ID of the identified TAG on the active connection and 3 louder acoustic beeps will be heard while the yellow LED will flash 3 times (see Table 1 Scan Function section).

Scanning mode "Scan on time"

In this mode, a scanning session with regular intervals, *Tinterval*, will be started. *Tinterval* can be selected by the user (500ms by default). The yellow LED will remain fixed on during the scanning

time (the *Tscan* scanning timeout that can be configured by the user is equal to 500ms by default). If a TAG is identified, an acoustic beep will be heard and the yellow LED will blink 2 times. Immediately after, only if USB or Bluetooth connection is active, BlueBerry will send the ID of the identified TAG on the active connection and 3 louder acoustic beeps will be heard while the yellow LED will blink 3 times.

Scanning mode "Scan on power on"

In this mode, a scanning session will start when switched on. The yellow LED will remain fixed on during the scanning time (the *Tscan* scanning timeout that can be configured by the user is equal to 500ms by default).

If a TAG is identified, an acoustic beep will be heard and the yellow LED will blink 2 times.

Subsequently, the yellow LED keeps on blinking for maximum time equal to *Tinterval* awaiting a USB or Bluetooth connection. If the reader finds an active connection within *Tinterval*, the data will be sent and three louder acoustic beeps will be heard while the yellow LED will blink 3 times.

Boot-loader mode

Not available for this product

Activation and deactivation of the LED and the acoustic beep

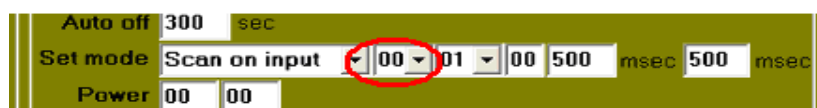


Figura 5: TT_RFID_Configurator - activation and deactivation of the LED signal and the acoustic beep

It is possible to disable the yellow LED and the acoustic beep when a TAG is identified as described in the operation modes. Select "01" in the set mode field showed in Figure 5, to disable these. Select "00" to reactivate them.

ID format



Figura 6: TT_RFID_Configurator – frame form sent

To select the ID format sent by the reader containing the ID, modify the field frame type in Figure 6 as follows:

- Selecting "00", the frame containing the ID of the identified TAGs will have the structure of the TERTIUM protocol (see document TERTIUM_RFID_Reader_Protocol.pdf). In this mode READ, WRITE, LOCK and KILL commando work only with TAGs with EPC number = 96 bits and NSI = 0.
- Selecting "01", BlueBerry sends the ID of the identified TAGs, each one followed by CRLF. In this mode READ, WRITE, LOCK and KILL commando work only with TAGs with EPC number = 96 bits and NSI = 0.
- Selecting "02", the frame containing the ID of the identified TAGs will have the structure of the TERTIUM protocol but the EPC field consists of the PC number + EPC number (see document TERTIUM_RFID_Reader_Protocol_App_A.pdf). In this mode even in READ, WRITE, LOCK and KILL commands the EPC field must contain the PC number so they work with TAGs with extended EPC number range (up to 128 bits) and NSI other than zero as well.

- Selecting “03” in the field, BlueBerry sends the ID of the identified TAGs, each one with an Horizontal Tab as a prefix and CRLF as suffix.

Maximum number of TAGs to scan



Figura 7: TT_RFID_Configurator - setting of the maximum number of scanned IDs to be sent

It is possible to limit the number of scanned IDs to send modifying the field indicated in Figure 7.

- Writing “00” in the field, the reader will return all the IDs of the identified TAGs (the maximum number of detectable TAG is 6).
- Writing “01” in the field, if the reader identifies only one TAG, it will returns its ID; if it identifies more than one TAG, it will send an error string as result.
- Writing a number n in the field, the reader will return n ID of the identified m TAGs (with $m > n$).

Baudrate



Figura 8: TT_RFID_Configurator - configuration of the baud rate of the USB serial interface

Modify the Baudrate field for change the speed of the USB serial interface.

Click on the “Read” button to read the current baudrate.

Select one of the possible speeds from the menu and click on “Write” to save the setting.

The new baudrate will be activated in the following switching on of the device.

Sending commands with TT_RFID_Configurator

With the *TT_RFID_Configurator* application, it is possible to send the commands of the TERTIUM Technology protocol to BlueBerry (see *TERTIUM_RFID_Reader_Protocol.pdf*). Simply insert the command in the field next to “Send” button, Figure 3, and click on the “Send” button. The sent command and the response of the reader or an error message are shown in the underlying window .

Configuration for TT_RFID_BlackBerryDemo and BlueBerryPC

TT_RFID_BlackBerryDemo is a Blackberry application that allows receiving the IDs of the TAGs identified by BlueBerry through Bluetooth interface.

Before using *TT_RFID_BlackBerryDemo*, it is necessary to configure BlueBerry so that the fields circled in red have the values indicated in Figure 9. This configuration corresponds to the default configuration of BlueBerry devices.

note: to allow an automatic Bluetooth identification of BlueBerry with BlackBerry, it is necessary that the beginning of the name shown in the field (Bluetooth field of *TT_RFID_Configurator*) is TERTIUM_. It is possible to modify the following part of the name. This configuration is recommended for BlueBerryPC application as well (easy application for a quick test of the Bluetooth interface contained in *TT_Bluetooth_PCDemo* installation package) but you can choose even different value for ID_format parameter.

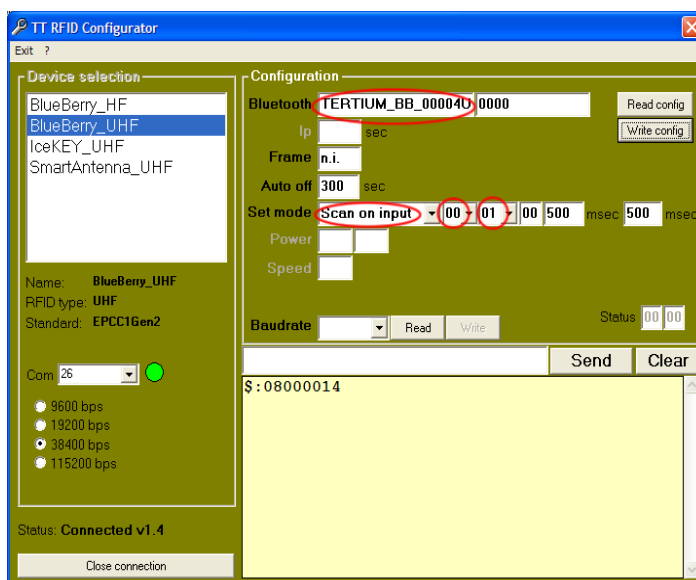



Figura 9: TT_RFID_ Configurator - necessary configuration for the use of TT_RFID_BlackBerryDemo

Other information and support

Declaration of conformity

Manufacturer	TERTIUM Technology S.r.l. Via Picotti,8 56124 Pisa
Product	BlueBerry UHF
Description	UHF reader with Bluetooth interface
Conformity standard ETSI version	EMC: EN 301.489-3, EN 301.489-1 [Art. 3.1b – 99/05/CE] LV: EN 60950-1 [Art. 3.1a – 99/05/CE] EMF: EN 50364 [Art. 3.1a – 99/05/CE] Radio conformity: ETSI EN 302 208, ETSI EN 300 328

The present document declares that BlueBerry UHF product is compliant with the standards described above and they meet the essential requirements expressed in the European Directive 99/05/CE and FCC rules.


 Dr. Marco Consani

Based on these declarations, the product can bear the following mark:



Federal Communication Commission (FCC) Notice

FCC certified: FCC ID: Y6D0793573982315U

Part 15.19 Warning Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. 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 UNDESIRE OPERATION.

Part 15.21 Warning Statement

The user manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

SAMPLE

NOTE: THE **GRANTEE** IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Part 15.105(b) Warning Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Disposal

According to art.13 of the Legislative Decree dated 25 July 2005, no.151 (implementation of the European directive 2002/96/EC) the disposal of electric and electronic equipment (WEEE) must not be carried out as urban waste, but it must be done separately following specific guidelines. Such obligation is expressed by the following symbol, applied on the container. The disposal will be managed by the producer and therefore the consumer wishing to get rid of the device shall contact the producer and shall follow the procedure he has adopted to collect aforementioned waste.

**RoHS Conformity**

BlueBerry has been realized using materials and constructive processes conforming to the limits imposed by the directive 2003/108/CE (RoHS) concerning the use of dangerous substances in electronic products.

Warranty

TERTIUM Technology guarantees that this product will be exempt from material defects of production and conforming to the stated technical data, under conditions of normal use, for the period of one year-old from the date of purchase. The warranty covers the reparations but it is void if TERTIUM Technology determines that the product has been damaged following improper installation, abuse, not authorized reparations or modifications.

The slip (receipt) or freight bill can be issued.

Assistance

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Precautions of use

Attentively read all the precautions of use and the operating instructions before use.

If necessary, clean the device with a dampened cloth. Do not immerse in water. Do not directly apply detergents on the product.

The device has not been designed for use in processes or machineries for the monitoring and the safety of human life or for medical treatments.

The reparations can be carried out only by TERTIUM Technology technical personnel.

Legal notes

TERTIUM Technology declines every responsibility in relation to possible damages, losses of income or any other damage resulting from the use of this product.

The content of this manual cannot be brought anywhere without the permission of the producer.

The technical specifics of the product and the information brought in the manual are subject change without notice; for the latest information, visit www.tertiumtechnology.com