

LinTech

keeps you connected

Bluetooth™ RS232 Mini Adapter/S

Article number: 1409/S



Manual

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1. Introduction

1.1. General Description

The Bluetooth RS232 Mini Adapter/S is a *Bluetooth** adapter for use with the RS232 serial interface and can be connected to any piece of equipment displaying this interface.

The adapter is equipped with a high-performance rechargeable battery, so an external power source is not required. This makes the adapter particularly suitable in mobile applications.

No driver installation is required and the adapter functions fully independently of the operating system platform in use.

A Bluetooth connection between two devices is always in the form of a Master-Slave connection, i.e. one device always initiates the connection – this one is the Bluetooth Master device – e.g. PC/ Laptop or PDA with already integrated Bluetooth interface or with an Bluetooth USB Adapter , Bluetooth PCMCIA or other.

To set up a *Bluetooth** connection, you require such a *Bluetooth** Master device that supports the *Bluetooth** Serial Port Profile. After start searching for Bluetooth devices you will find LinTech RS232 Mini Adapter. From one PC/Laptop you can built up connection to only one or to more Bluetooth RS232 Adapters/S (max. 6). – Point-to-point or Point-to-multipoint- connection.



The Bluetooth RS232 Adapter/S is operational immediately upon switch-on.

An easy-to-use configuration programme is supplied with the adapter with which the user can configure the connection parameters of the Bluetooth RS232 Mini Adapter/S, such as the baud rate, parity, quantity of data bits...

For systems which do not operate under the Windows operating system, it is also possible to configure the adapter using AT commands.

The device is fitted with a high-power LI rechargeable battery. In mobile applications, where power consumption and operating time are of central importance, an automatic power management function is available, which switches the device into energy saving mode ('SNIFF' mode). This results in a considerable reduction in power consumption by the partner device.

A further important feature in this context is that the adapter really becomes operative when a signal is received at the serial interface. This means that the adapter is only in active mode once the device to which the Bluetooth RS232 Mini Adapter/S is connected has been switched on.

Our experience has shown that a multitude of requirements are placed on Bluetooth solutions. For this reason, the Bluetooth RS232 Mini Adapter/S has been conceived to enable its use for a large number of solutions.

If your individual application can not be implemented using the standard functions described in this handbook, please contact us.

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1.2. Package Contents

*Bluetooth** RS232 Adapter with standardised (male) RS-232 DSUB-9 plug connector
(Optionally available with DSUB-9 connector (female))

Charging unit (optional available with US/UK/AUS power adapter)

Mini-CD with handbook, AT-command overview and configuration software for use with Windows systems

2. Preparing for use

2.1 View of adapter

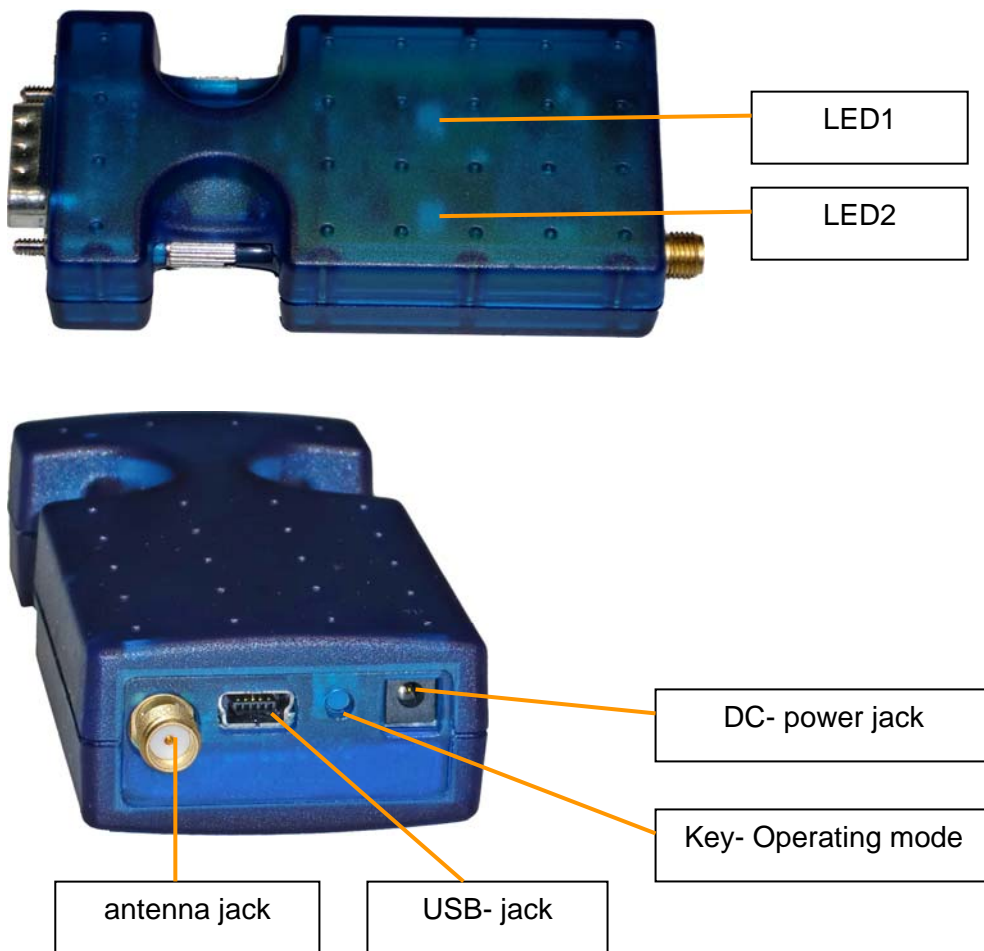


Illustration 1 View of Bluetooth RS232 Mini Adapter/S

2.2. Switching on

The standard configuration of the LinTech *Bluetooth** RS232 Mini Adapter/S is as follows:

Baud rate : 115200 Bit/s
Stop bit : 1
Parity : None
Data bits : 8
Bluetooth* PIN : 1234

Plug the adapter into the RS232 interface of the device that the RS232 Mini Adapter it is to be operated with.

The Bluetooth RS232 Mini Adapter/S recognises whether or not signals are incoming via the serial interface, i.e. whether the device is switched on or off.

If the device is switched on, the Bluetooth RS232 Mini Adapter/S changes into operating mode, LED 2 flashes rapidly for approx. 3 seconds and then slowly green.
(For LED sequences, please see the overview in section 4.)

If the device is switched off, the Bluetooth Adapter remains in Standby mode.

You can wake up the RS232-interface of the device by typing the push-button of the RS232-adapter, available from the hardware-version "E". You can activate this function permanently by using AT command: AT+FRS.

Should the RS232 Mini Adapter not switch into operational mode although it is switched on, please charge the battery.

Please be sure to have the Bluetooth Adapter in use during charging.

2.3. Charging the battery

The Bluetooth RS232 Mini Adapter/S is equipped with a high-performance rechargeable battery, so an external power source is not required. This makes the adapter particularly suitable in mobile applications.

We recommend charging the battery before using the device for the first time.

Please notify: connect charger first with BT RS232 adapter and afterwards with wall socket.

The battery can be charged either via the Mini- USB port or DC- jack. To avoid overcharging and faulty operation, always use the battery charger supplied and connect it to the appropriate socket at the rear of the Bluetooth RS232 Adapter/S (see III.1) .

The status of the charging process is indicated by LED1 on the upper surface of the Bluetooth Adapter (see III. 1)

LED 1	Meaning
RED	Battery is charging – charge duration to full capacity for empty battery approx. 2 hours
GREEN	Battery fully charged or RS232 Mini Adapter is being powered via the mains supply
OFF	RS232 Mini Adapter is not connected to the power supply

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2.4. Switching on for the first time

The Bluetooth RS232 Mini Adapter/S is equipped with a high-performance rechargeable battery, so an external power source is not required. This makes the adapter particularly suitable in mobile applications. We recommend charging the battery before using the device for the first time (see section 2.3).

The Bluetooth RS232 Adapter/S is operational immediately upon switch-on.

The standard configuration of the LinTech *Bluetooth** RS232 Mini Adapter is as follows:

Baud rate	: 115200 Bit/s
Stop bit	: 1
Parity	: None
Data bits	: 8
Bluetooth* PIN	: 1234

If you want to modify settings, you have to switch the adapter to configuration mode.

The Bluetooth RS232 Mini Adapter /S provides two services/ operating modes: **Normal mode** and **Configuration mode**.

In **Normal mode** a data connection is set up to the *Bluetooth** Adapter; the **Configuration mode** is used to configure the settings for the *Bluetooth** Adapter either via the Bluetooth connection or the serial interface.

Before the configuration of the Bluetooth connection can be changed, the device must be switched to configuration mode and a connection must exist to a Bluetooth device (for further information please see the corresponding section of the manual).

If you want to create a connection from another Bluetooth device to the RS232 Mini Adapter without changing the configuration, continue as outlined in the following sections.

2.5. The coupling process for setting up a Bluetooth data connection

To set up a *Bluetooth** connection, you require a second *Bluetooth** Master device that supports the *Bluetooth** Serial Port Profile. Please perform the coupling procedure as outlined in the following.

The first step is to initiate a device search using the *Bluetooth** partner device (integrated *Bluetooth** circuit, USB dongle, PCMCIA card, or similar) in the Bluetooth environment.

Here you should find displayed 'LinTech RS232 MINI', indicating that the Bluetooth RS232 Mini Adapter/S has been found.

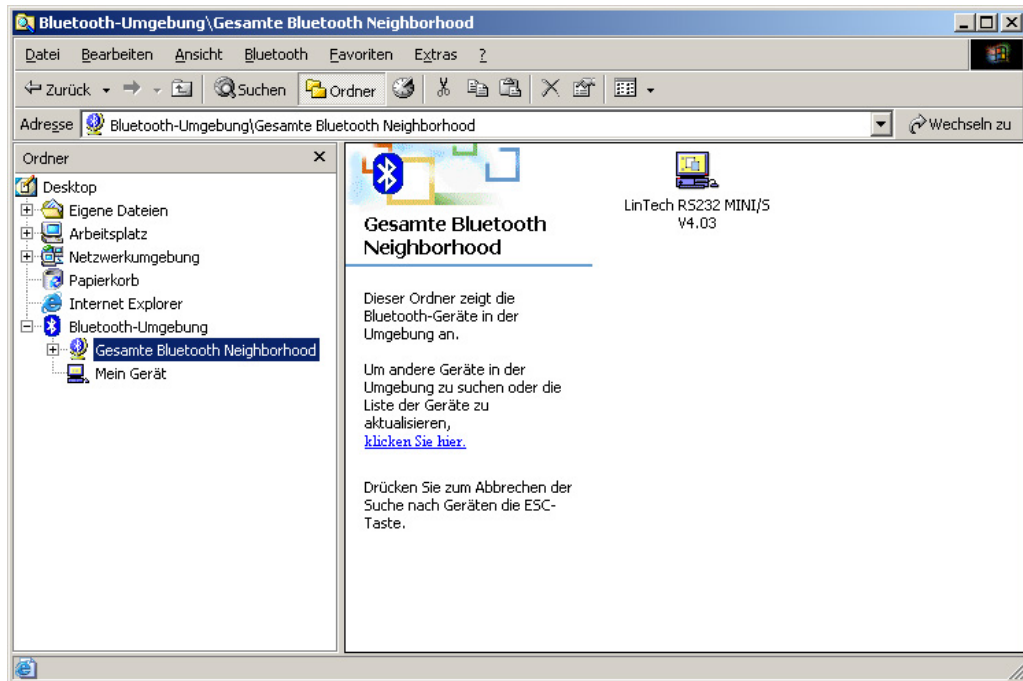


Illustration 2 Searching for device in the Bluetooth Manager

Now initiate the coupling procedure.

The standard-PIN/ Bluetooth key for the Bluetooth RS232 Mini Adapter/S is **1234**.

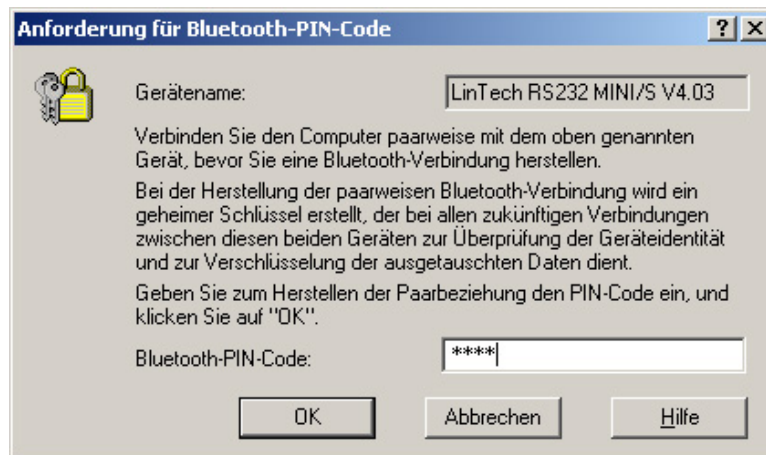


Illustration 3 Requesting Bluetooth PIN code

Once the coupling procedure has been completed, the Bluetooth RS232 Mini Adapter/S offers a serial service, by the name of COM-HARDWARE, using which you can connect the serial interface of the Bluetooth RS232 Mini Adapter/S with that of your equipment.

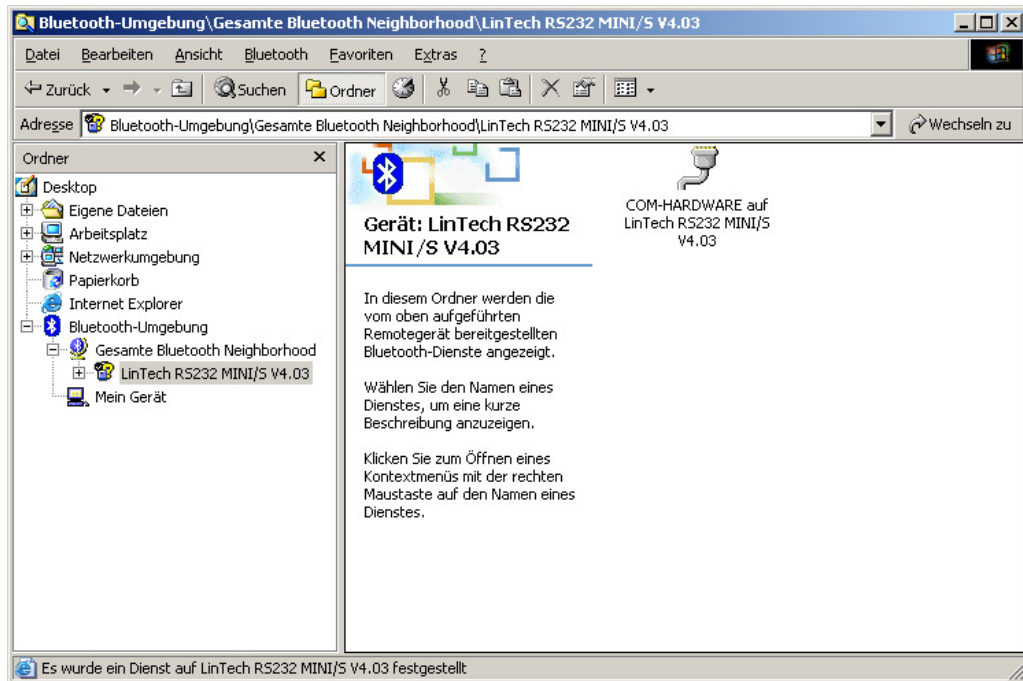


Illustration 4 Searching for device (service COM-HARDWARE)

2.6. Setting up a connection

For information on how to establish a connection, please consult the instructions supplied with your Bluetooth equipment.

In most cases, the Bluetooth environment provides you with virtual COM ports. The *Bluetooth** Serial Port Profile must be allotted to one of these COM ports. It is via this COM port that you communicate with the Bluetooth RS232 Mini Adapter/S .

3. Configuration

The Bluetooth RS232 Mini Adapter/S can be configured either via an existing Bluetooth connection or via direct connection to the serial interface of a PC.

In either case, it is first of all necessary to switch the Bluetooth Mini Adapter from normal mode to configuration mode (see section 3.2.)

3.1. Standard settings

The standard configuration of the LinTech *Bluetooth** RS232 Mini Adapter is as follows:

Baud rate	: 115200 Bit/s
Stop bit	: 1
Parity	: None
Data bits	: 8
Bluetooth* PIN	: 1234

An easy to use programme is provided with which you can alter standard settings and also access other features (such as activating SNIFF mode, connection properties, security settings etc.) via an existing *Bluetooth** connection or the serial interface of the adapter (see BlueTool manual).

For all those applications for which no Windows application is available, it is possible to perform the configuration by means of AT commands using any available terminal programme (section 3.6).

For configuration purposes, the LinTech RS232 Mini Adapter provides you with a special *Bluetooth** service. In other words, in addition to its normal operational mode, it is possible to use the Bluetooth adapter for configuration purposes and for changing from one operational mode into this configuration mode.

It is not necessary to remove the Bluetooth adapter from the device with which you are operating it before performing the configuration.

For information on how to switch between the two modes, please see the following section.

3.2. Changing between configuration mode and normal operation

Press the key on the rear side of the Bluetooth Adapter briefly (see Ill. 1).

LED2 will then flash continuously for about two seconds, following which LED2 flashes rapidly in short, green bursts for 3 seconds before changing to slow, short, red bursts.

When LED2 flashes in slow, short, red bursts, it means that the adapter is currently in configuration mode.

The serial Bluetooth service COM-CONFIG is now available.

If you press the key again for a short time, the Bluetooth adapter will return to normal operation. (LED2 again flashes continuously, after which LED2 flashes slowly in short green bursts).

When LED2 flashes slowly in short, green bursts, it means that the adapter is currently in normal operational mode.

The serial Bluetooth service COM-HARDWARE is now available.

3.3. Connecting to the configuration service

To be able to configure the Bluetooth RS232 Mini Adapter/S via Bluetooth, it is first necessary connect the Bluetooth partner device (Master) with the Bluetooth RS232 Mini Adapter/S configuration service. To do this, it is necessary to perform a service determination procedure in the Bluetooth manager of the Bluetooth partner device. The Bluetooth RS232 Mini Adapter/S offers the service COM-CONFIG.

Connect up to this service.

For information on performing this step, please consult the instruction manual received with your Bluetooth partner device.

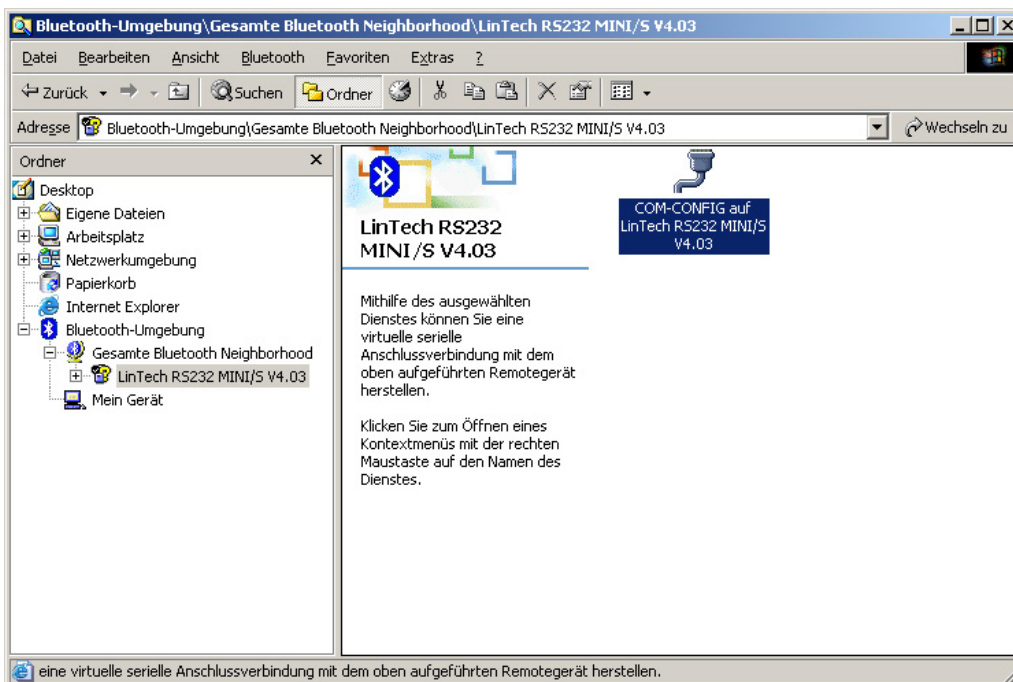


Illustration 5 Searching for device with the service-ID: COM-CONFIG

3.4. Connecting to the serial interface of the adapter – configuration using a physical serial interface

Once you have switched the Bluetooth RS232 Mini Adapter/S into configuration mode (section 3.2), plug the adapter into the serial interface of a personal computer.

3.5. Configuration using the LinTech BlueTool configuration programme

The LinTech RS232 BlueTool is an easy to use Windows configuration programme, with the aid of which you can perform all the settings required for the Bluetooth RS232 Mini Adapter/S easily and clearly. Please copy the programme from the cd supplied to a folder on your hard disc, and start the programme from the hard disc.

Before using the BlueTool configuration programme, it is necessary that a Bluetooth connection exists to the Bluetooth RS232 Mini Adapter/S which uses the configuration service of the Bluetooth RS232 Mini Adapter/S or a physical connection to a serial interface on your PC.
For further information, please consult the BlueTool manual.

3.6. Configuration using AT commands

In addition to the conventional method of using the BlueTool Windows configuration programme for configuring the Bluetooth RS232 Mini Adapter/S's connection parameters, it is also possible to perform the settings using AT commands.

This option is provided due to the fact that not all environments use Windows as an operating system. All that is required on your RS232 Bluetooth Mini Adapter partner device is a terminal programme, e.g. Hyperterminal.

If you wish to configure the Bluetooth RS232 Mini Adapter/S via an existing Bluetooth connection, the Bluetooth partner device must be connected to the configuration service of the Bluetooth RS232 Mini Adapter/S.

It is however also possible to configure the adapter using AT commands, by connecting it directly to the serial interface of a PC.

In either case, the Bluetooth RS232 Mini Adapter/S must be in configuration mode. For switching from normal mode to configuration mode, please consult the appropriate section of the manual (3.2)

Start the Terminal programme.

Connect the Terminal programme to the virtual Com port to which the COM-CONFIG service of the R232 Mini Adapter is connected (or to the COM port of the physical interface).

Select the following settings: baud rate 115200 Bit/s, 8 data bits, 1 stop bit, 1 start bit and no parity.

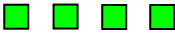





Once the connection has been successfully established, the terminal programme window will display a list of available AT commands.

Should this listing not be displayed, please enter `<AT!2>` followed by `<CR>`. This will effect a repeat display of the available commands.

The respective commands are entered in the terminal window; no echo is produced when the characters are inputted. All command inputs must be acknowledge by pressing `<CR>`.

All changes are implemented immediately and saved in the RS232 Mini Adapter.

4. Meaning of LED2

LED2 Sequence	Meaning
LED flashes green for approx. 3 seconds in short, rapid bursts 	RS232 Mini Adapter begins Slave mode operation
LED flashes green in slow, short bursts 	RS232 Mini Adapter is in normal operating mode – COM-HARDWARE service is active. Incoming connections are accepted.
LED flashes red in slow short bursts 	RS232 Mini Adapter is in Configuration mode – COM-CONFIG service is active. Incoming connections are accepted.
LED alternates rapidly between red and green 	A connection has been successfully established. Sniff mode is not active.
LED alternates slowly between red and green 	A connection exists. Sniff mode is active.
LED alternates for approx. 2 seconds between red, green and orange rapidly 	The RS232 Mini Adapter button has been pressed. Press briefly to change between Normal mode and Configuration mode. <i>OR:</i> Press continuously to change between Slave and Master mode.

5. Firmware Update

5.1. UpToDate – Software Update Tool for LinTech Bluetooth devices

To download the current firmware version to the RS232 Mini Adapter, please use the **UpToDate** software update tool for LinTech Bluetooth devices. For software and firmware updates, please visit www.lintech.de - downloads.

UpToDate supports the following operating systems:

MS Windows NT4.0
 MS Windows 2000
 MS Windows XP

Please consult the programme instructions for information on how to perform a firmware update.

UpToDate functions via the serial interface of the PC to which the Bluetooth RS232 Adapter/S is connected for the purpose of updating the firmware.

Before using **UpToDate** it is necessary to set the Bluetooth Adapter to Download mode – this is the only mode in which a software download can be performed.

The following section explains how to switch the Bluetooth RS232 Mini Adapter/S into Download mode.

5.2. Switching the Bluetooth Adapter to Firmware Download mode

The adapter must be switched off and disconnected from any device.
Press and hold the key and plug the power supply into the adapter.
LED 2 should now light up red – continue to press the key until LED2 changes to green.
The RS232 Mini Adapter is now in Firmware Download mode.

For all other information, please consult the instructions to the UpToDate software update tool for the Lintech Bluetooth Adapter.

*LED2 remains off as long as the Bluetooth RS232 Mini Adapter/S is in Firmware Download mode.
Please note also that the Bluetooth RS232 Mini Adapter/S must be connected via the charger unit for as long as it is in this mode.*

6. Overview of technical data

Transmission frequencies	2.402 GHz to 2.480 GHz	
Range	Up to 30 m	
<i>Bluetooth</i> * Interface:	Supported <i>Bluetooth</i> * profiles:	Generic Access Profile Serial Port Profile
Serial interface:	Transmission power: RS-232 DSUB-9 plug connector Baud rate: 1200 Bit/s - 230400 Bit/s	(class 2) max. 4dBm
Battery:	Lithium-Ion rechargeable battery, 3.7V/540mAh Standby time up to 10,000 hours Operating time up 10 hours (115.2 kBit/s) Charge time: < 2 h	
LED1:	Status display for battery	
LED2:	Status display for RS232 Mini Adapter	
Casing:	ABS translucent blue, dimensions 80x40x18 mm Weight including antenna and battery: 62 grams	
Operating temperature:	-30 - +60°C	
Charging temperature:	0 – +45 °C	
Storage temperature:	-30 - +45°C	

7. Agency and Regulatory Body Approvals

Bluetooth product operating in 2.4GHz band for Home and use.

7.1. Exposure to Radio Frequency Radiation

The radiated output power of the BT RS232 Mini Adaptor 1408/1409 are far below the FCC, Industry Canada and European Union radio frequency exposure limits. Nevertheless, the wireless radio shall be used in such a manner that the potential for human contact during normal operation is minimized. The internal wireless radio operates within guidelines found in radio frequency safety standards and recommendations which reflect the consensus of the scientific community.

The level of emitted energy emitted is far less than the electromagnetic energy emitted by wireless devices such as mobile phones. However, the use of wireless radios may be restricted in some situations or environments, such as aboard airplanes. If you are unsure of restrictions, you are encouraged to ask for authorization before turning on the wireless radio.

The FCC, Industry Canada and European Union have set a general guideline of 20 cm (8 inches) separation between the device and the body. This device should be used more than 20 cm (8 inches) from the body when wireless devices are on.

7.2. FCC Part 15 Radio Frequency Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Note: 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 correct the interference by one or more of the following measures:

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

Caution:

Pursuant to Part 15.21 of the FCC Rules for intentional or unintentional radiators, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

7.3. Industry Canada ICES-003 Emission Compliance Statement

This Class B digital apparatus meets the requirement of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.

7.4. European Radio Approval Information

The BT RS232 Mini Adaptor 1408/1409 are low power, wireless communication devices, operating in the 2.4 GHz band, intended for home or office use. The power output of this device is well below the RF exposure limits as set by the European Commission through the R&TTE directive.

The BT RS232 Mini Adaptor 1408/1409 can be operated in the following European Union and European Economic Area countries:

Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

7.5. Europe – EU Declaration of Conformity

This device complies with the R&TTE Directive 1999/5/EC, and the following standards:

EN 301 489-1 EN 301 489-17	Electromagnetic compatibility and radio spectrum matters(EMR); Electromagnetic compatibility (EMC) standard for radio equipment and services.
ETS 300 328-1: ETS 300 328-2:	Electromagnetic compatibility and radio spectrum matters (EMR); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation technique.

Low voltage Directive (Safety) 73/23/EEC as per:

EN 60950	Safety of information Technology Equipment
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7.6. Rest of World

Country restrictions apply for home and office use.

8. Battery statement – for your safety

The 1409 BT Rs232 Adapter is powered by a rechargeable LI-battery. Temperature extremes can affect the ability of your battery to charge. Use the battery only for its intended purpose.

Do not leave the adapter with battery in vehicles, directly sunlight, or other places where the temperature may rise above 60C Do not expose the battery to water or extreme moisture. Do not drop the battery or subject it to mechanical shocks.

Never use any charger or battery which is damaged..Batteries should be charged in Original manufacturer's Lilon specified charging equipment. Use of other chargers may cause excessive heat or even fire. Charge the battery after purchasing or when it has not been used for a long time before use.

Do not open the adapter. Do not short-circuit the battery. Batteries has to be replaced by authorized personal only. Caution: Risk of explosion if battery is replaced by an incorrect type. Please contact your dealer / manufacturer for get service informations.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery.

Do not dispose of batteries in a fire!
Dispose of batteries according to local regulations (e.g. recycling). Do not dispose of as household waste.