RusAutomation

PICO-BT and Software PICO-TALK

Operating Instructions

Thank you very much that you have decided to buy our Bluetooth®-Module PICO-BT.

The PICO-BT is state-of-the-art Bluetooth® technology.

In order to achieve best possible result with your PICO-BT please read these operating instruc-tions carefully. Should subsequently anything be unclear, or should you have any suggestions re-garding your new PICO-BT, please do not hesi-tate to contact one of our authorised dealers. We will gladly help you.

Introduction

This manual depicts the installation and the operation of the PICO-Talk software as well as the use of the PICO-BT Bluetooth interface manufactured. It is possible, with the help of the PICO-BT interface, to control modules and sensors, which are activated via the IMP bus protocol, via Bluetooth. The software PICO-Talk was designed for the operating system Microsoft ® Windows Mobile TM 6.0 and, in interaction with PICO-BT, enables the activation of the mentioned sensors and modules using standard Microsoft ® Windows Mobile TM 6.0 PDAs with Bluetooth interface.

Operating Instructions for Data Logger globeLog

As of May 2009

Contents

1 PICO-BT Hardware Description

Delivery Scope:
1. PICO-BT Module
2. Wall Power Supply 12V/DC
3. Charging Adapter (7-pole coupling socket to DC)
4. Retainer (belt clip)
5. Protective Cap
6. Manual
7. Software PICO-Talk

Description
1. ON/OFF button (press 2 seconds)
2. 7-pole socket for connection of the sensor and charger
3. 4 LEDs for indication of the different operation modes:
    Blue Indicator, if device is activated
    White Connected via Bluetooth.
    Red PICO-BT sends data to the sensor
    Yellow PICO-BT receives data from the sensor

Illustration 1.1: PICO-BT

Height		36mm
Width		63mm
Length		98mm
Weight		(with storage battery) approx. 230g
Power Consumption	Power Down Condition	approx. 86µA
	Idle Condition	approx. 20mA
	Connected	ca. 100mA with Sensor ca. 10mA without Sensor
	Measuring	approx. 450mA
Operating Systems	Tested with	Windows Mobile ™ 6.0
		Microsoft ® Windows XP ™
Connectable Sensors		PICO64, PICO32, PICO-IPH
Bluetooth		Bluetooth Specifcation 2.0
Operating Temperature		20°C to 70°C
Charging Temperature		10°C to 50°C
Charging Voltage		Nom. 12V, Max. 15V, Min. 12V
Charging Time		When completely discharged approx. 2h
Storage Battery		Ni-MH (4 x 1.2V) (AA), 1000mAh, >1500 Measurements
IMP-Bus Port Settings		8 Data Bytes, 2 Stop Bits, Odd Parity

Table 1: Technical Data

1.1   Charging the Storage Battery

If (after activation of your PICO-BT module) the blue LED blinks 1x, 2x, 3x, or if the module can not be switched on after a certain time of operation, you must recharge the eternal storage battery of your device. The frequency of blinking will increase with decreasing storage battery voltage.

Illustration 1.2: PICO-BT Charging Device

In order to charge the PICO-BT interface, please connect the plug (Illustration 1.2 (2)) of the provided charging device (Illustration 1.2 (1)) with the charging plug (Illustration 1.2 (3)) and subsequently connect this array with the 7-pole plug of the PICO –BT depicted in Illustration 1.1 under (2). The blue LED will be blinking during the charging process and will distinguish as soon as the storage battery is completely charged.

IMPORTANT: **The PICO-BT module has to be switched ON before charging.**

You can charge your PICO-BT module with any DC power source with a supply voltage between 9V and 15V (e.g. via an adapter for the cigarette lighter in your car). The recommended charging voltage is 12V.

1.2   PDA for Field Deployment

For field deployment, as a „ruggedised" PDA, we recommend the RPDA 626 manufactured by the company Andres Industries AG[1], which we can also provide in a pre-configured version. The RPDA 626 is based on the MyPal 626 PDA produced by the company ASUSTek and is equipped by the Andres Industries AG for field deployment with a robust and splash water-proof casing.

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[1] http://www.andres-industries.de/

Delivery Scope

- Docking Station
- Allen Key
- USB Cable 0,5m
- Wall Charging Device (100...240V/AC-50/60Hz 0,3A)
- Adapter Plug Set
- CD and RPDA 626 User Manual
- RPDA 626 Quick Start Instructions

Technical Data

CPU	Marvell XScale ® Processor, 312MHz.
Operating System	Microsoft ® Windows Mobile ™ 6.0 (Pocket PC).
Display	3.5" High Resoloution transflective TFT LCD Touchscreen,VGA with 65,000 colours, Resoloution 240x320.
Memory	28MB Flash ROM and 64 MB SDRAM.
Battery	1200mAh Lithium Ionic Storage Battery - exchangeable, available as an option - 3000 mAh exchangeable Storage Battery
Dimensions	approx. 131,5 x 82 x 26,5 mm.
Protection Category	IP65
Interfaces	USB 1.1, Bluetooth v2.0 (EDR), W-LAN (IEEE 802.11b/g), SIR (115.2 kbps Max.), Docking Port.

2 Installation of PICO-Talk

In order to install PICO-Talk on your Microsoft ® Windows Mobile TM 6.0 – compatible PDA, you require an up-to-date version of the Microsoft software Active Sync (Version 4.5 at the point of time these operating instructions are printed) on your Windows PC. You will find detailed instructions regarding the installation of Active Sync on the Microsoft[2] websites.

You can identify, if Active Sync is installed on your PC and operational, as exemplified in the illustration on the right hand side, at an according icon on your task bar.
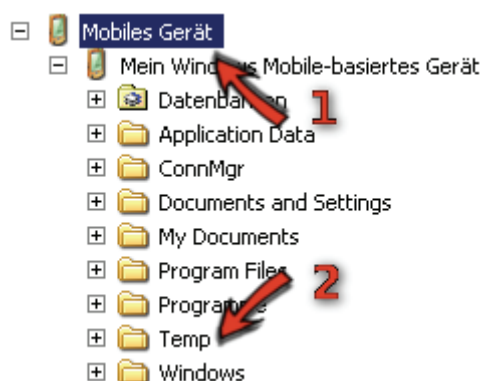
In the next step, connect your PDA with the PC. After a short initialisation phase, you will find an according icon to your PDA. For this, also see the illustration on the left hand side.
Open the directory tree of your PDA and navigate to the folder „Temp".

Now download the software PICO-Talk from our internet page[3] and copy the file pico-talk.cab into the folder „Temp" on your PDA. The final step of the installation is conducted directly on your PDA. Here, actuate the file explorer, as depicted in Illustration 2.1, navigate into the folder "Temp", and from there, execute the installation routine of the software PICO-Talk via a click on to the symbol of the file ipico-talk.cab.

Illustration 2.3: Initialisation of the Installation of PICO-Talk

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[2] http://www.microsoft.com

As can be seen in the Illustration 2.2, you can follow the progress of the installation by means of a progress bar. After completion of the installation, you will receive an according confirmation message. In addition, a new entry will be created in the start menu. The software PICO-Talk is now installed.
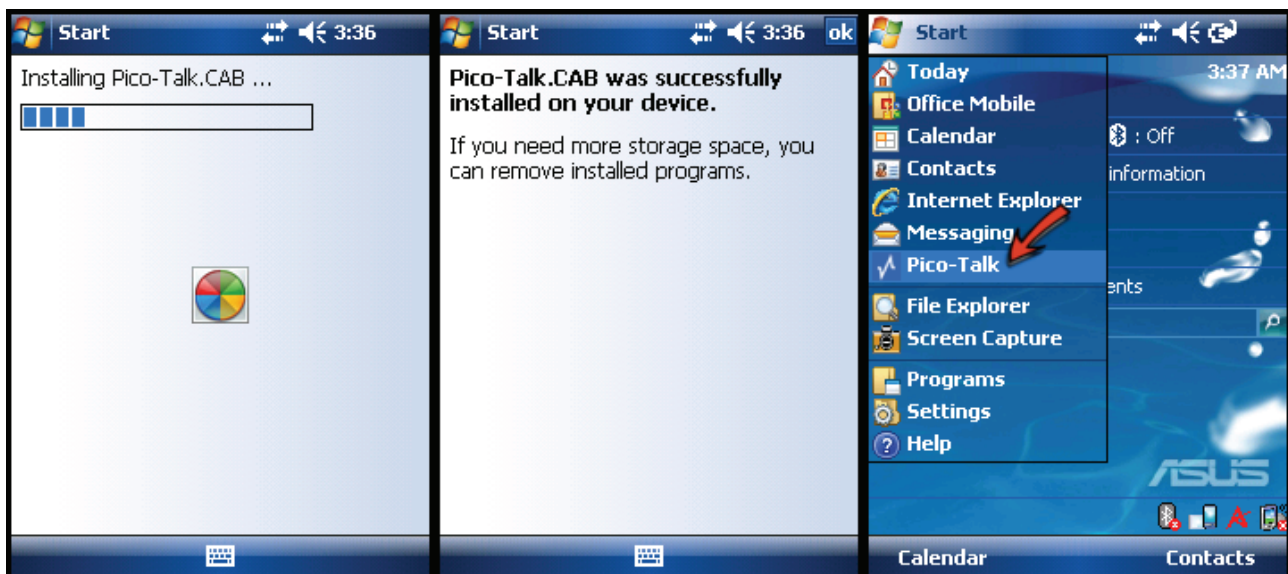

Illustration 2.4: Completion of the Installation of PICO-Talk

3 Connection of PICO-BT to a PDA

Activate your PDA 4 and the PICO-BT module on your PDA and, from the start menu, select the entry Settings, as depicted in Illustration 3.1. Navigate to the index card tab Connections, and from there, initiate the Bluetooth-Setting-Dialogue. You will reach the Bluetooth-Manager via a click on to the shortcut indicated by the arrow **(4).**

Illustration 3.5: Initialisation of the Bluetooth-Manager

You can establish a serial communication interface to your PICO-BT via Bluetooth. For this purpose, as depicted in Illustration 3.2, first actuate the button NEW. You are now in the Connection Assistant. Here, select the top list entry „Explore a Bluetooth Device". And subsequently click on to „Next". After a short search time, your PIC-BT device should now appear in the connection assistant. Select your PIC-BT device and click on to "Next".

Illustration 3.6: Selection of the PICO-BT Device

In the next menu, as depicted in Illustration 3.3, select the entry IMPBUS in the section Service Selection. Then click on to „Next". Your PDA will now attempt to establish a port to your PICO-BT device. This may take a moment time. You may possibly be required to enter a key. In this case, enter 0000. If the operation is completed, this will be confirmed by an according message (shortcut established). You can close the connection assistant via a click on to the Finish button. You will now see a new connection for your PICO-BT in the Bluetooth Manager. With this, your PICO-BT module is now connected with your PDA.
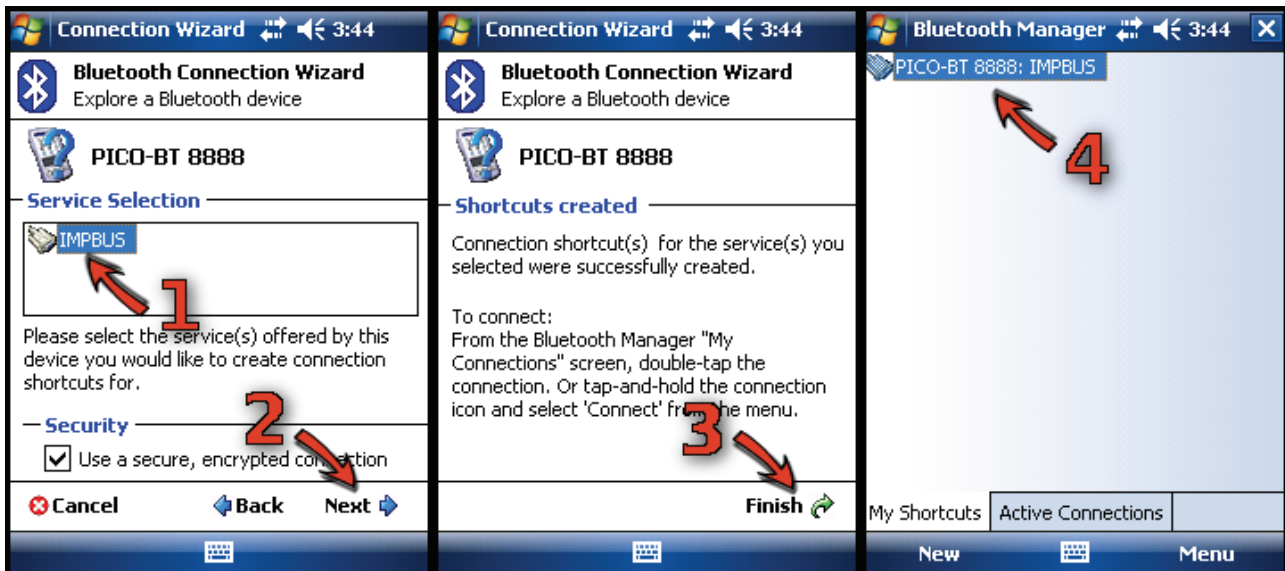
Illustration 3.7: Establishment of the Bluetooth Port

Close the Bluetooth Manager. You will now be in the Bluetooth settings. As a final step, as depicted in Illustration 3.4, there select the index card tab Services. There, mark Serial Port under Services and click on to "Advanced..". Out of the next dialogue window, note down the presented value for the COM port ~(Output). (In the example depicted by Illustration 3.4, this would COM8). Usually, this procedure must only be conducted once. Your PDA will memorise the port so that you will only have to take care that your PICO-BT module and the Bluetooth function of your PDA are activated.
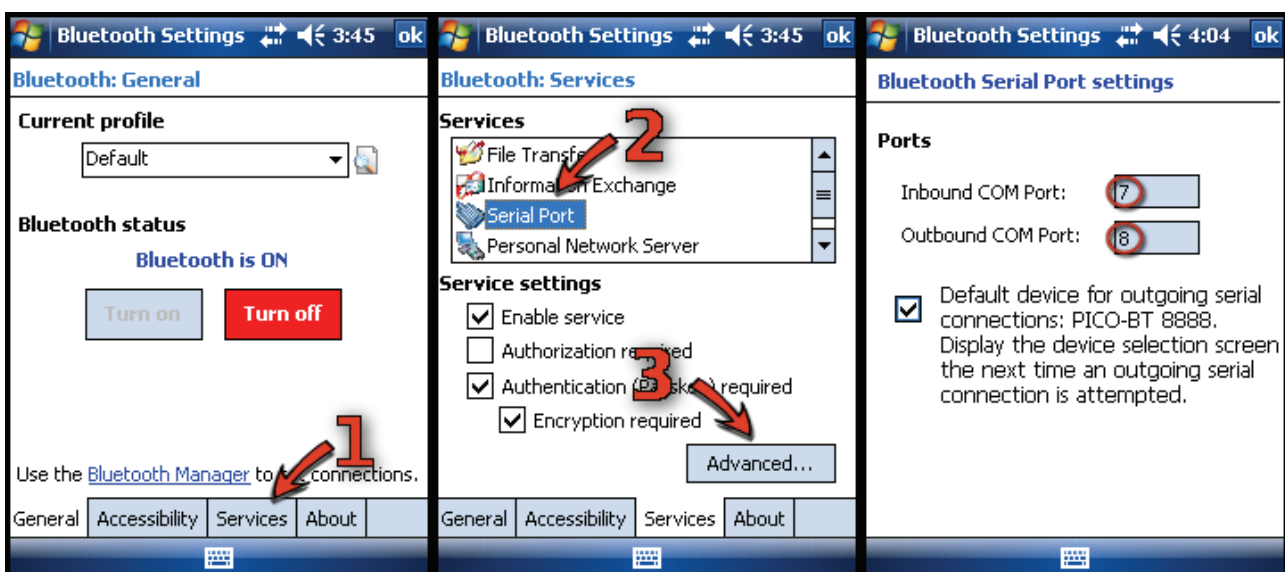

Illustration 3.8: COM-Port Values

4 Function and Operation of PICO-Talk

PICO-Talk is a software compatible with Microsoft ® Windows Mobile TM 6.0 which enables you to communicate with all new sensors via the PICO-BT Bluetooth interface.

4.1 Brief Instruction

As son as you have installed the PICO-Talk software (see Chapter 2) and established the Bluetooth port/connection of your PDA to your PICO-BT (see Chapter 3), there is only one more step until you can conduct your first measurement.

Start the programme PICO-Talk with the help of the newly established entry in your Start Menu. Then, as depicted in Illustration 4.1, click on to the button Menu. Once you are in the menu, click on to Configuration. In the configuration dialogue, now enter the identification for the deployed serial port. In the example depicted in Illustration 4.1 this is COM8. PICO-Talk is now ready to conduct measurements.
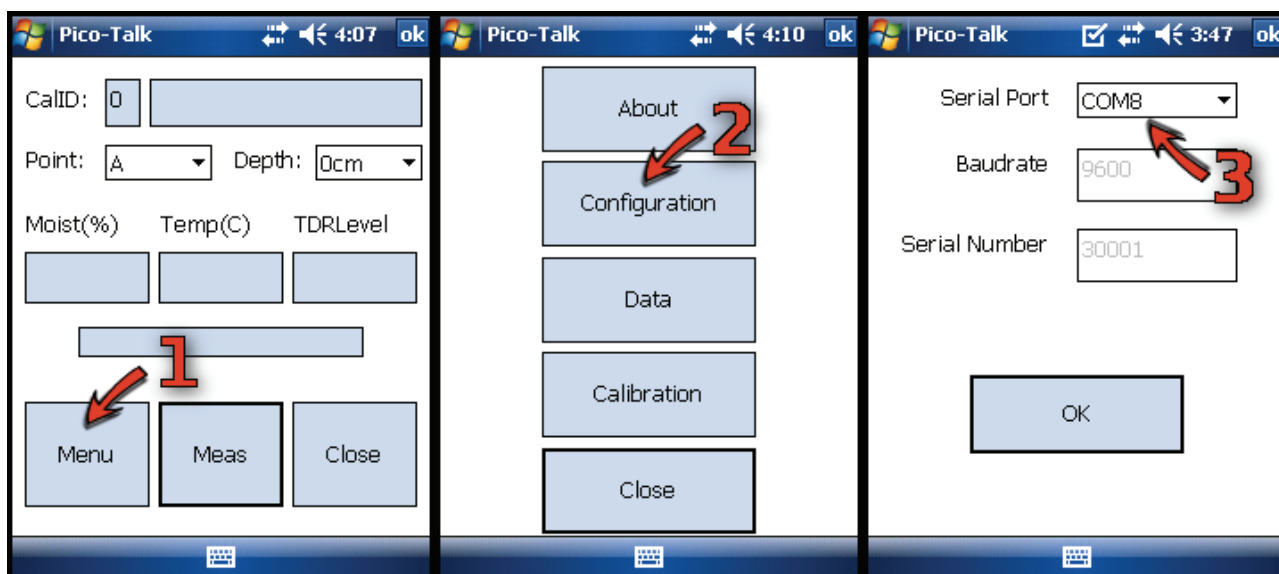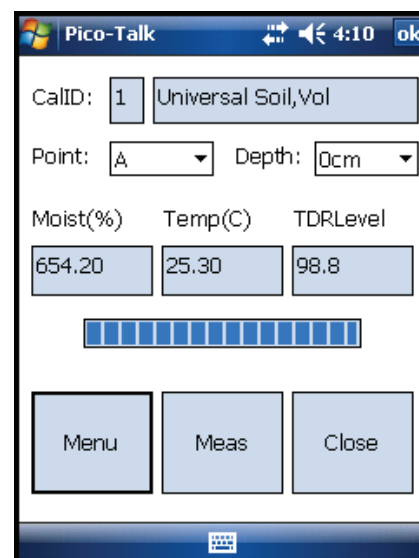

Illustration 4.9:Setting of COM-Port

Verify, if the Bluetooth on your PDA and your PICO- BT are activated and your sensor is correctly connected to the PICO-BT interface.   Start the PICO-Talk and click on to "Measure". The first measurement should be presented within a few seconds.

4.2   The PICO-Talk Measurement Dialogue

In order to conduct a measurement, verify that your PICO-BT interface is switched on and the   Bluetooth interface at your PDA is activated. Then initiate the software PICO- Talk on your Microsoft ® Windows Mobile TM 6.0 PDA. After initialisation of the software, you will immediately be in the measurement dialogue. As exemplified by Illustration 4.2, you can specify (select a predefined designation out of the list or enter an own designation) a measuring point at (1) and a measuring depth at (2) for the intended measurement. These values, together with measurement results, are stored for later evaluation (see also Chapter 4.4).
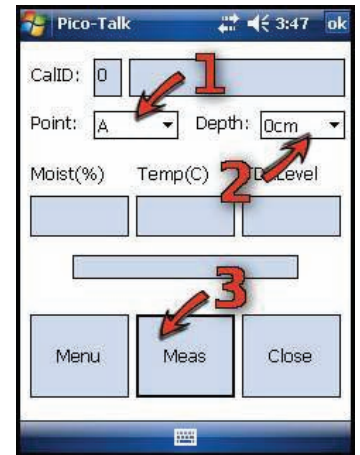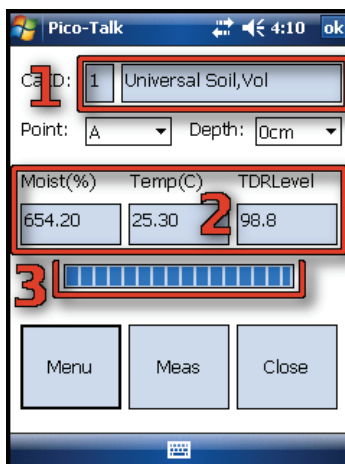
Illustration 4.10: The Measurement Dialogue

To trigger the measurement, subsequently click on to the button "Measure". After completion of the measurement, as depicted in Illustration 4.3, you can directly read off the measurement results in Section (2). The progress bar (3) displays the progression of the measurement. Section (1) presents the pre-set calibration of your sensor. Please deduct the detailed instructions regarding the calibration pre-setting from Chapter 4.3. The established measurement values are automatically stored in the central measurement file (for this, also see Chapter 4.4).

Illustration 4.11: The Measurement Result

4.3   Selection of a Material Calibration Setting

Sensors of the type PICO32 and PICO64 dispose of an internal memory for up to 15 different material calibration settings. The software PICO-Talk and the PICO-BT interface provide the option to very simply switch between these calibration settings.

Start the PICO-Talk on your PDA. Then, as depicted in Illustration 4.4, open the menu and click on to Calibration. PICO-Talk will now read out the material calibration stored in your sensor. This process may take a few seconds. In the subsequent dialogue window, you will see a table comprising all available calibrations. The currently active calibration is marked with an A in the second column.

Mark the desired calibration in the table and click on to „Set Active" in order to change the calibration of your sensor. To go back to the measurement dialogue, close the calibration dialogue and subsequently the menu with the Close button.
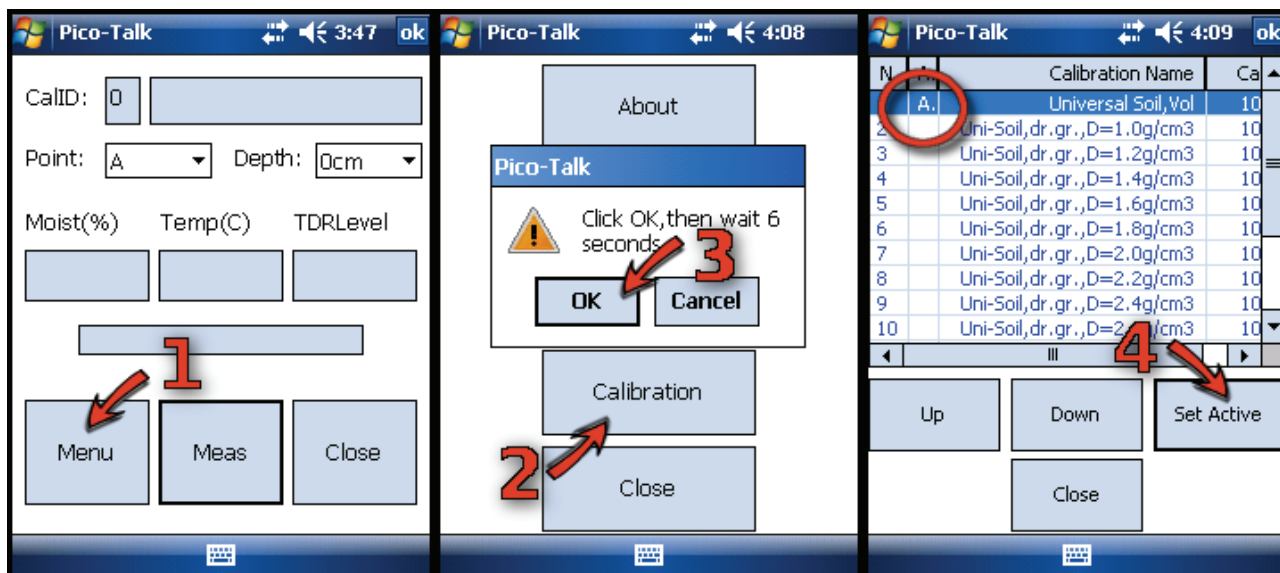

Illustration 4.12: Selection of a Material Calibration Setting

4.4   Administration of the stored Measuring Data

All measurements which you conduct with PICO-Talk are instantaneously stored on your PDA. Within a limited scope, PICO-Talk offers you the option to administrate this stored measuring data. For this purpose, start the PICO-Talk and ensure that your PICO-BT is activated and that your sensor is connected.
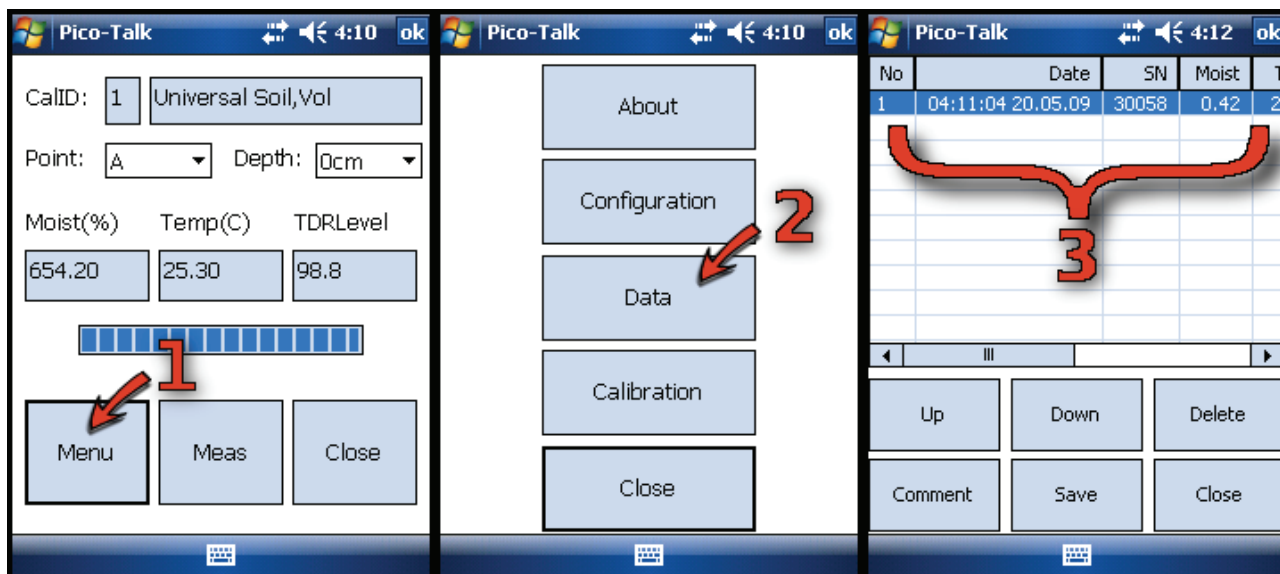

Illustration 4.13: The Measuring Data Memory

In the next step, conduct measurement as depicted in Chapter 4.1. Now, as illustrated in Illustration

4.5, open the menu dialogue after completion of the measurement. There you will see a table with the history of your stored measuring data (3). You have the option here, to add an additional comment to each measuring data record and to save the measuring data. If you scroll the bottom "Scroll Bar" to the right, you will be able to recognise that no values or only standard values have been allocated to the last three fields "Measure Point of the record", "Measure Depth of the record", and "Comment of the record".

In order to process these fields, mark the according measuring data record in the table and, as depicted in Illustration 4.6, click on to the button „Comment". A new dialogue window will then open up.
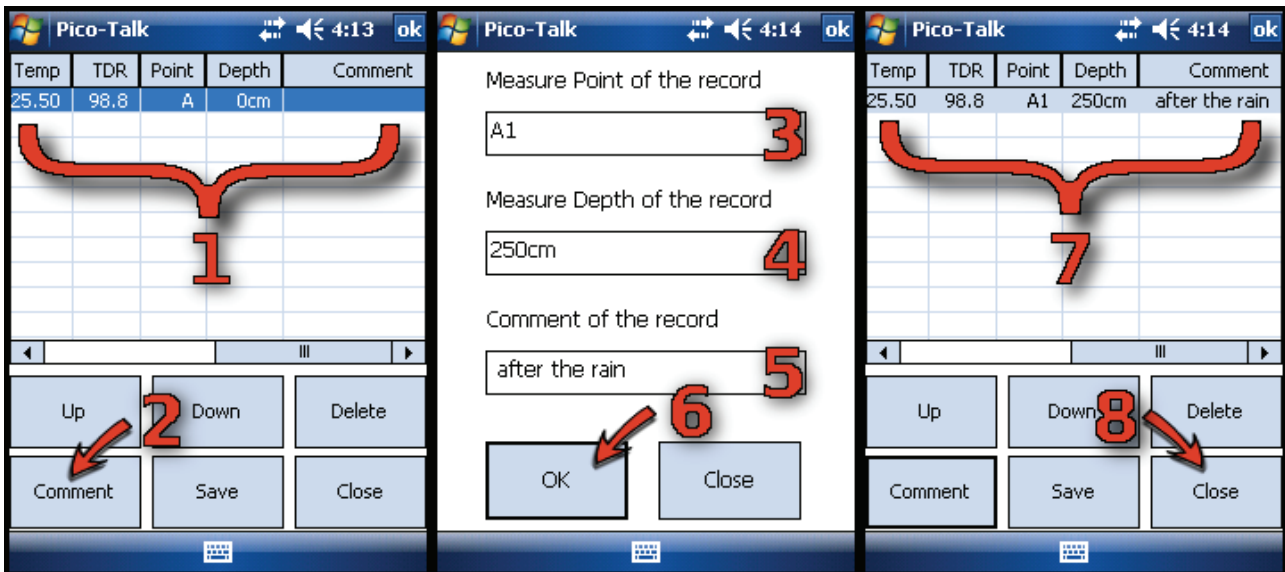

Illustration 4.14: Comments to the Measuring Data

Here you have the option, possibly with the ON-Screen keyboard, to enter a name for the measuring point (max. four characters), a measuring depth, and an additional comment. Then store any conducted modifications via the OK button. The programme will subsequently return to the measuring data dialogue. You can also directly enter the according values in the window of the measuring data dialogue (see also Chapter 4.2).

PICO-Talk stores all collected measurement values on your PDA in the file MeasData.txt. You can find this file via the path „My Device⇨ Programme ⇨ Pico-Talk". There is the option to export the stored data into an „extra file" for eventual later evaluation. For this purpose, as illustrated in Illustration 4.7, click on to the button „Save". A new dialogue window will then open up. Here **(2)**, you can select, if the measuring data intended for storage will subsequently be deleted out of the central data memory and you can choose, if the data file name of the „extra file" shall consist of the Date & Serial Number of the last queried sensor or merely out of the date of the measurement. Save the data by clicking on to the OK button. You can retrieve this data via the path „My Device⇨ Programme ⇨ Pico-Talk ⇨MD".
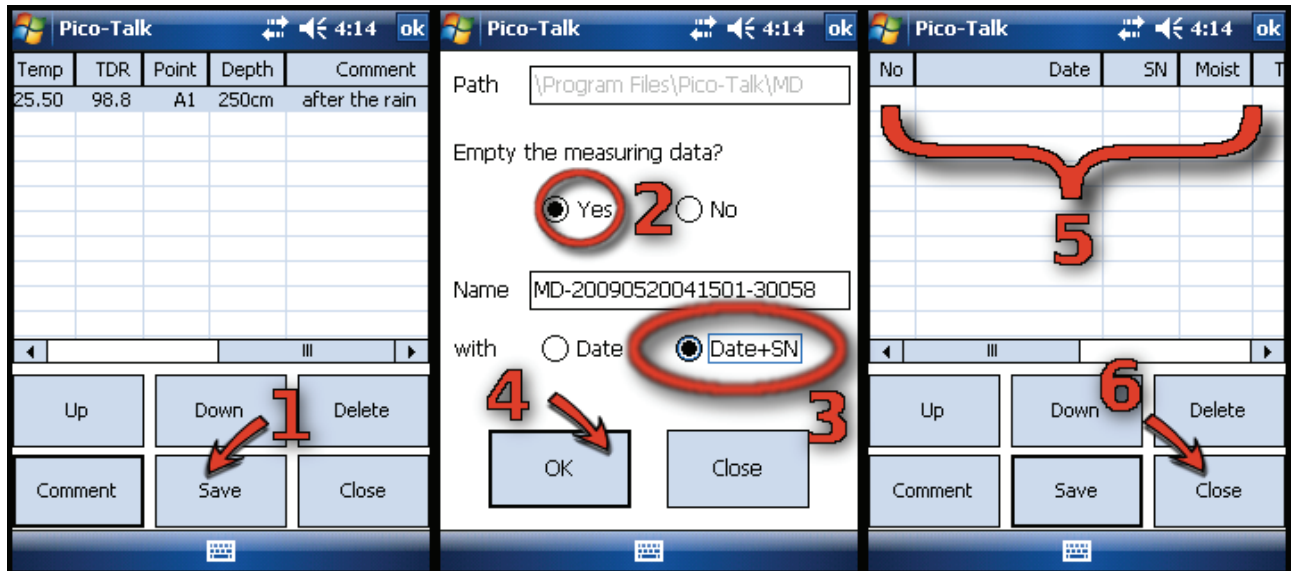

Illustration4.15:Storage of the Measuring Data

You will find detailed instructions on how to transport the stored measuring data to your PC for further processing in Chapter 5.1.

5 Connection of PICO-BT to a PC

In addition to the connection of the PICO-BT interface to a Microsoft® Windows Mobile TM 6.0 PDA, you also have the option to use PICO-BT at an Windows XP® PC equipped with a Bluetooth adaptor.
For information regarding the connection and commissioning of your Bluetooth adaptor, please consult the documentation of the according manufacturer. The Bluetooth adaptor of the company Firma LogiLink[4] has proven to be very suited.

Proceed as follows in order to connect PICO-BT to your PC: Open the Bluetooth control panel (Start ⇨ System Control ⇨ Bluetooth-Devices).Click on to "Add" in the subsequently generated dialogue window.
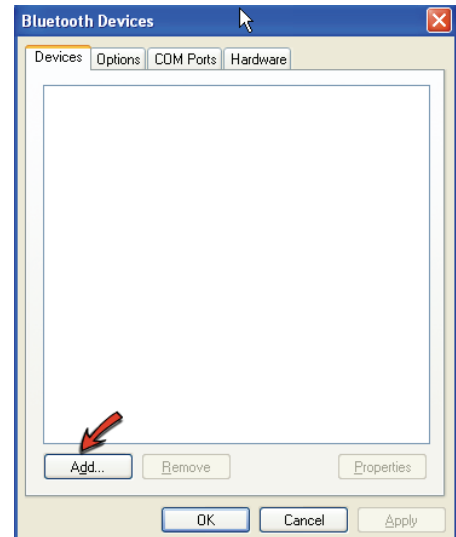The "Assistant for adding Bluetooth-devices" will now open up.

Illustration 5.16: Control Panel

In the next step, as depicted in Illustration 5.2, mark the checkbox at (1) and then   click on to „Next". The subsequently generated window should then gradually present all available Bluetooth devices. Should your PICO-BT not appear within a few seconds, check if your device is activated. As soon as your PICO-BT device appears in the list, mark the same with mouse (3) and click on to „Next". The passkey for the connection of the PICO-BT with the PC must be entered in the next dialogue window.

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[4] http://www.logilink.org/

Illustration 5.17: Bluetooth Assistant

For this purpose, as depicted in Illustration 5.3, select the option "Use the passkey found in the documentation" **(1)** and enter 0000 as key. Now click on to "Next". The devices will now be connected. Once this procedure is completed, please note down the values for „Outgoing COM Port" and „Incoming COM Port". In the example **(4)** depicted by Illustration 5.3, these values are be COM7 and COM8. Close the assistant by clicking on to the button "Finish".
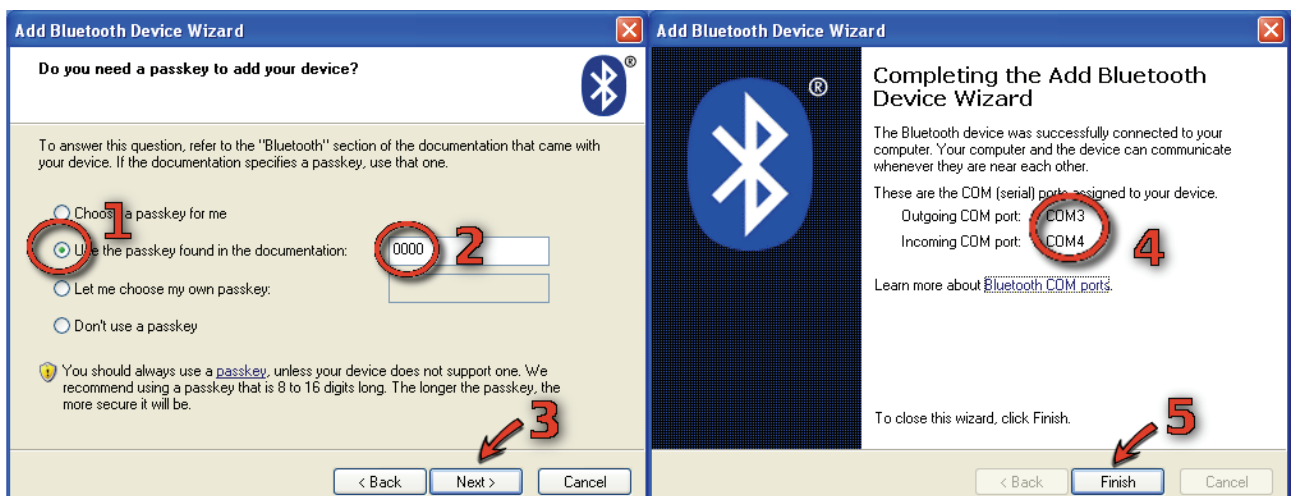

Illustration 5.18: Bluetooth Assistant

Your PICO-BT should now be presented in the tab Devices on the Bluetooth control panel. Under the tab COM-Connection, you have an additional option to access the values for the incoming and outgoing COM port. Your PICO-BT is now connected to your Windows XP ® PC.
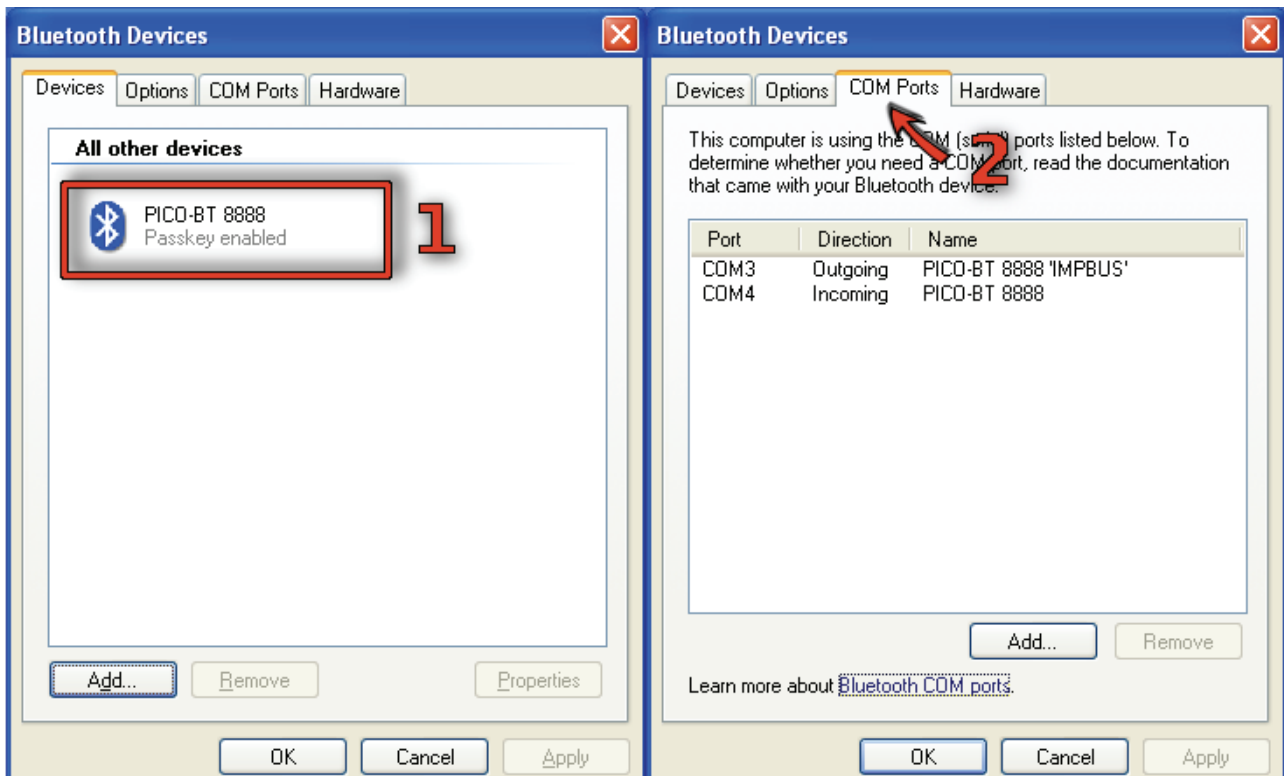
Illustration 5.19: Bluetooth Control Panel

5.1   Transport of the Measuring Data to a PC

As already depicted in Chapter 2, you require the Microsoft software Active Sync ® for the general exchange of data between your Microsoft ® Windows Mobile TM 6.0 PDA and a PC. In order to be able to access the data stored on your PDA, connect the PDA with the PC and, as depicted in Illustration 5.5, navigate to the folder PICO-Talk.
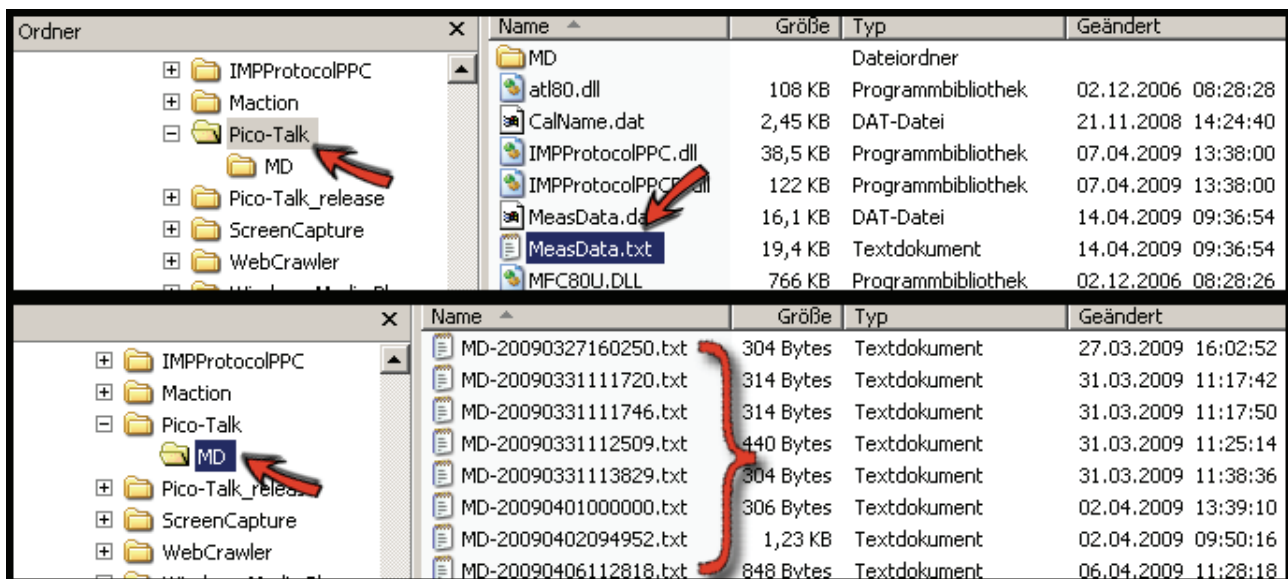

Illustration5.20: Memory location of the Measuring Data

As already mentioned in Chapter 4.4, the measuring data are located in the central measuring data

file MeasData.txt and also in the various files under the folder MD. Hereby, the data file MeasData.txt represents the central measuring data file. The folder MD contains the „extra data files" depicted in Chapter 4.4. You can simply copy and also delete the measuring data from here on your PC per „Drag-'n-Drop".

5.2   Format of the Measuring Data

The measuring data files are pure text files and, as depicted in Illustration 5.6, comprise 8 columns with the measured values (moisture, temperature, TDR-Level), the date and, if required, the respectively added comments (measuring point, measuring depth, comment). Due to the table-like structure of the measuring data files, it should not be difficult to export the data e.g. into Excel or Access.

#	; Date	SN	Moist(%)	Temp(C)	TDR	MeasPoint	MeasDepth	Comment
1	; Date	SN	Moist(%)	Temp(C)	TDR	MeasPoint	MeasDepth	Comment
2	11:32:37 06.04.09	30001	4.43	21.50	101.6	A	0cm	
3	11:32:47 06.04.09	30001	4.43	21.50	101.6	B	0cm	
4	11:32:52 06.04.09	30001	4.43	21.50	101.6	C	10cm	Messung 1
5	10:21:20 07.04.09	30001	4.43	23.10	101.5	C	10cm	Messung 2
6	10:21:32 07.04.09	30001	4.43	23.10	101.5	A	0cm	
7	10:21:43 07.04.09	30001	4.43	23.20	101.5	A	0cm	
8	10:22:07 07.04.09	30001	4.43	23.20	101.5	A	0cm	
9	10:22:46 07.04.09	30001	4.43	23.40	101.5	A	0cm	
10	10:22:55 07.04.09	30001	4.43	23.50	101.5	A	0cm	
11	10:23:07 07.04.09	30001	4.43	23.50	101.5	A	0cm	

Illustration 5.6 Example of a Measuring Data File

6 Operation of PICO-BT at a Standard PC

Even though the PICO-BT is primarily designed to be used in interaction with a Microsoft ® Windows Mobile TM 6.0 PDA and the software PICO-Talk, it is also possible, with the help of the software TRIME-Tool, to activate all sensors connectable to the PICO-BT from a standard Bluetooth-compatible Windows XP ® PC.

6.1   Installation of the Software TRIME-Tool

Download the software TRIME-Tool initiate the installation with a double-click

on to the data file Trime Tool
Setup.msi.

6.2   Operation of the Software TRIME-Tool

After the start of the programme, you will be in the main window of the TRIME-Tool application. In order to be able to utilise the software, a few basic settings must first be configured. For this purpose, as illustrated in the illustration on the right hand side, click on to on to the entry Bus in the task bar, and there, on to the menu item Configuration.
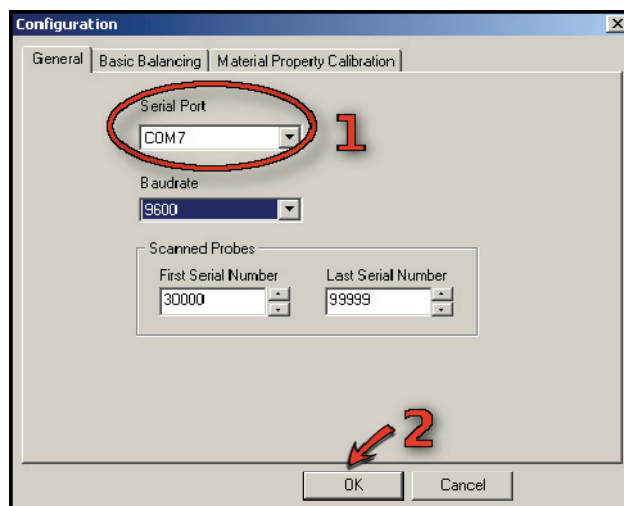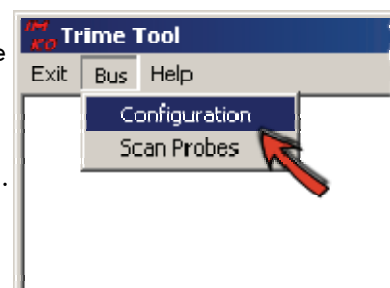

Illustration 6.22: Configuration Dialogue

A dialogue window containing three index card tabs will now open up. As depicted in Illustration 6.2, now, in the tab General, set the serial port to the value of the outgoing COM interface of your Bluetooth adaptor. In the example in Chapter 5, Illustration 5.4, this is COM7. Store your settings with a click on to the OK button.

Attention! The software TRIME-Tool can only activate the COM-Ports COM1 to COM9. If you intend to allocate the Bluetooth connection to a higher COM-Port, it may be necessary to change this accordingly in the system control.
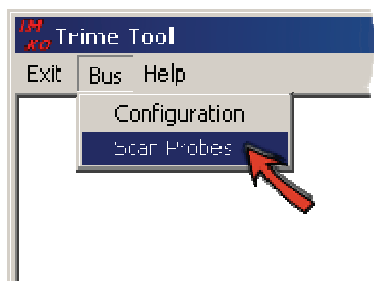
To conduct your first trial measurement, as illustrated in the illustration on the right hand side, click on to the entry Scan Probes in the task bar. TRIME-Tool will now attempt to identify the sensor connected to your PICO-BT. A new dialogue window will now open (Illustration 6.3) in which your sensor will be listed.
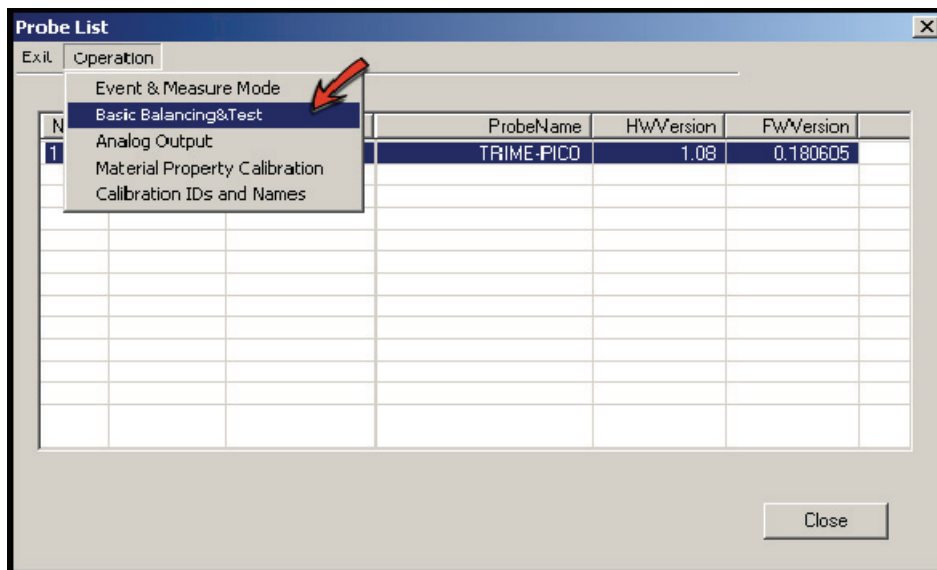
Illustration 6.23: Probe List Dialogue Window

In the next step, as depicted in Illustration 6.3, select the entry Basic Balancing\&Test located in the dialogue window Probe List under the menu item Operation. Subsequently, a new dialogue will open up.
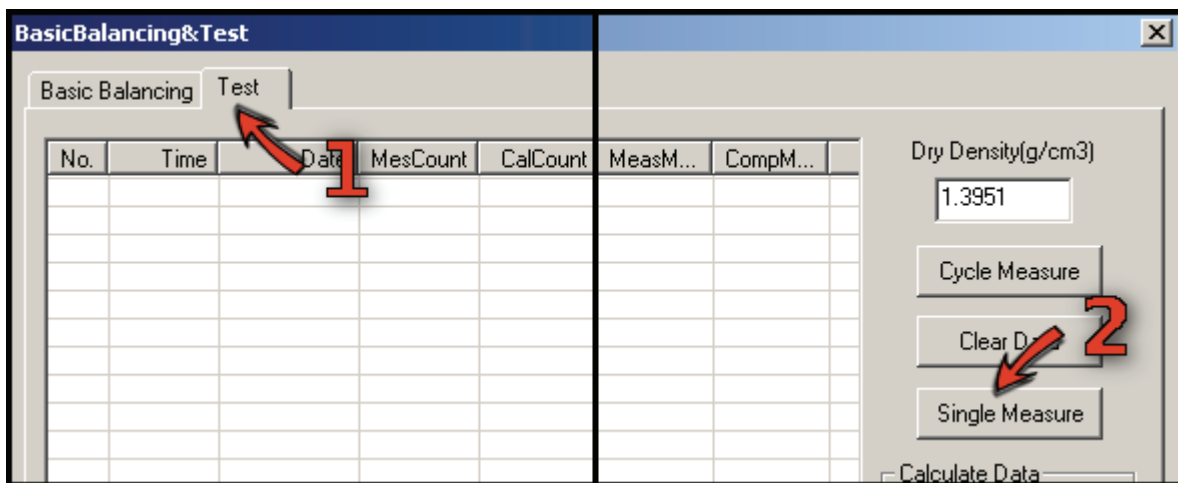

Illustration 6.: Probe List Dialogue Window

As depicted in Illustration 6.4, select the index card tab Test and click on to the button Single Measure located on the right hand side of the dialogue window. One measurement will now be initiated with the sensor at your PICO-BT module. After completion of the measurement, the respective result will be presented in the list as a new entry. As the programme TRIME-Tool is actually designed as a programme for the trial and calibration of sensors, all internal sensor parameters are listed in addition to the usual measuring values. The most important measuring values are, as depicted in illustration 6.5: **(1)** Material Humidity, **(2)** TDR-Amplitude und **(3)** Material Temperature.
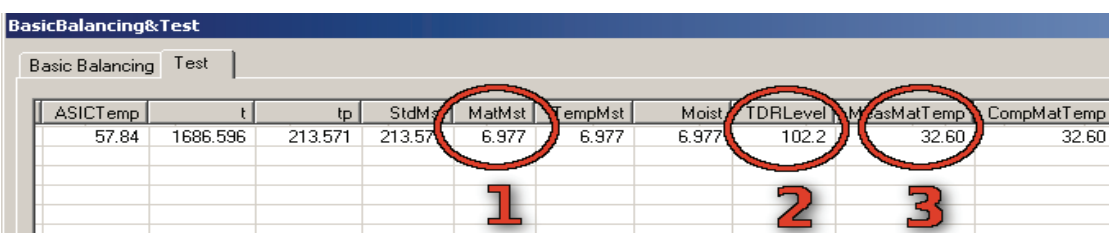

Illustration 6.24: Measurement Results

7 System Examples

7.1   Soil Humidity Sensor TRIME-PICO64

TRIME-PICO64 Soil Humidity Sensor with integrated Soil Temperature Measurement Function

- large measuring volume
- the best solution for heterogeneous and stony soils

7.2   Soil Humidity Sensor TRIME-PICO32

TRIME-PICO32 Soil Humidity Sensor with integrated Soil Temperature Measurement Function

- ideal for irrigation control and soil humidity monitoring
- ideal for sandy and argillaceous soils

7.3   Soil Humidity Sensor TRIME-PICO IPH/T3

TRIME-PICO IPH/T3 for fast, reliable and non-destructive recording of in-depth humidity profiles.

- large measuring volume
- ideal for soils with high conductivity characteristics