

iPAQ LTM Installation Guide



Wireless Network

Leica
Geosystems



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It is important that the manufacturer's safety precautions and instructions for the setup and operation of the equipment are followed carefully.

Please refer to the Application PC, Windows CE Device and the Wireless Network Component Manuals and read them carefully before switching on any items.

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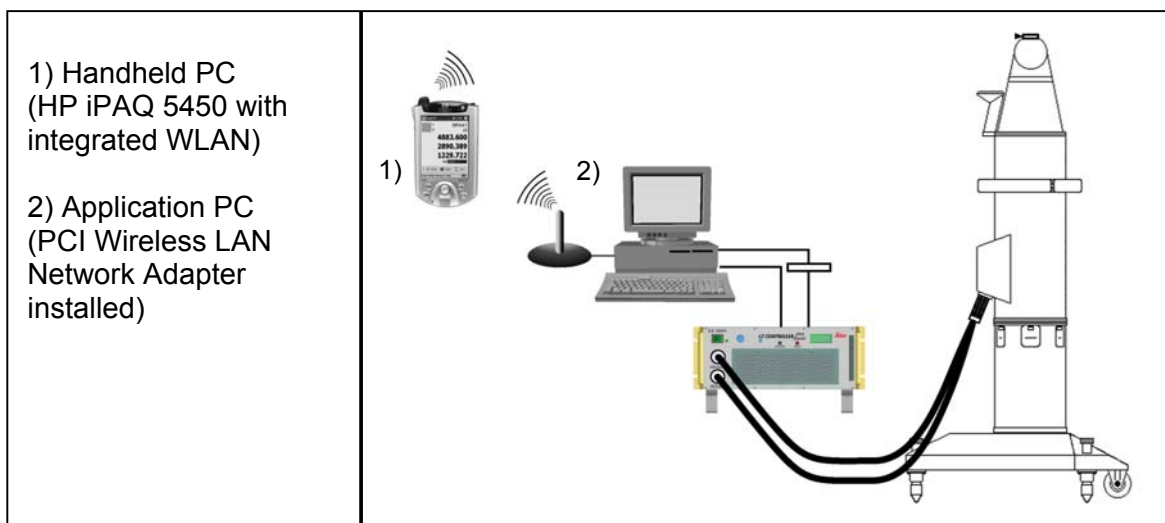
Change History

Version	Changes	Who	Date
1.1	Initial Version	SCHRO	01/05/00
1.2	Update for Pocket PC's (PPC2002)	STEMA	06/03/03
1.3	New Chapter 2.2.1.3, Network Installation for OS PPC2003 New Chapter 7.1, Troubleshooting iPAQ WLAN	STEMA / READ	10/12/03

1 Introduction

The Wireless Network Installation Guide for Application PC's / Remote Control Devices (Windows CE) contains information you need for setting up a Wireless Network Topology between a Desktop PC/Notebook PC and a Handheld Pocket PC with WLAN capability.

With a standard IEEE 802.11b PCI Wireless LAN Network Adapter installed in the Application PC (Desktop PC) and the WLAN (Wireless LAN) Adapter installed in a Windows CE Device (Handheld PC), you can exchange data between your Application PC and Windows CE Device without any cables. Multiple Windows CE Devices can access the same Application PC in this configuration, although multiple Windows CE Devices can't communicate with each other. A Notebook PC can also replace the Desktop PC in this configuration.



The whole documentation is based on a single system network setup as shown in Appendix A.

In case of several Laser Tracker systems placed in the range of the wireless network, you must change certain network parameters. This modification ensures that the systems do not interfere with each other. For details how to setup this network please refer to the iPAQ User's Guide Manual.

1.1 Safety Precautions

1.1.1 Safety Standards

It is important that the manufacturer's safety precautions and instructions for the setting up and operation of the equipment are followed carefully.

1.1.2 Wireless Notices

In some environments, the use of wireless devices may be restricted. Such restrictions may apply aboard airplanes, in hospitals, near explosives, in hazardous locations, etc. If you are uncertain of the policy that applies to the use of this device, please ask for authorization to use it prior to turning it on.

1.1.2.1 U.S. Regulatory Wireless Notice

This product emits radio frequency energy, but the radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact with the antenna during normal operation is minimized.

1.1.2.2 Canadian Regulatory Wireless Notice

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

The term "IC:" before the certification/registration number only signifies that the Industry Canada technical specifications were met.

1.1.2.3 European Union Notice





Products bearing the CE marking comply with the R&TTE Directive (1999/5/EC), EMC Directive (89/336/EEC), and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- ✓ EN 55022 (CISPR 22)—Electromagnetic Interference
- ✓ EN 55024 (IEC61000-4-2, 3, 4, 5, 6,8, 11)—Electromagnetic Immunity
- ✓ EN61000-3-2 (IEC61000-3-2)—Power Line Harmonics
- ✓ EN61000-3-3 (IEC61000-3-3)—Power Line Flicker
- ✓ EN 60950 (IEC 60950)—Product Safety
- ✓ EN 300 328—Technical requirements for radio equipment
- ✓ ETS 300 826 or EN 301 489-17—General EMC requirements for radio equipment

1.1.3 Meaning of Symbols

The symbols used throughout this Wireless Network Installation Guide have the following meanings:

	CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or appreciable material, financial and environmental damage. The symbol is also used to alert against unsafe manipulations.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and effective manner.

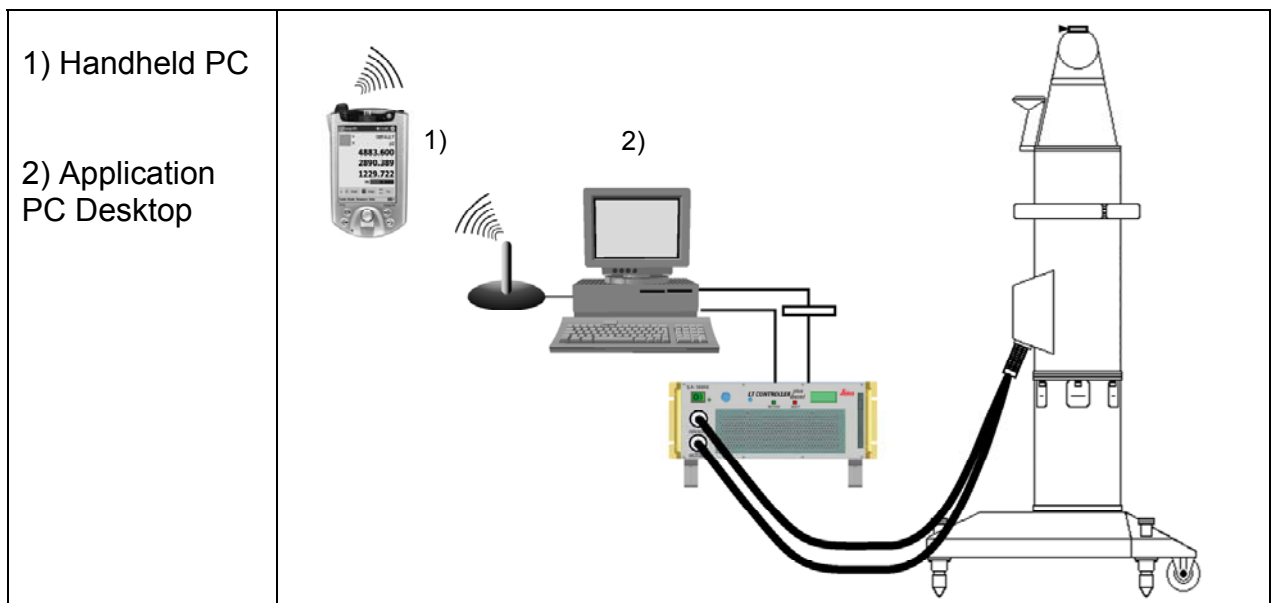
2 Wireless Adapter Installation

2.1.1 Desktop Installation Overview

Network members:

- Desktop PC
Equipped with:
 - standard IEEE 802.11b PCI Wireless LAN Network Adapter
 - Axyz LTM 1.4.1 upwards installed
- Handheld PC (HP iPAQ 5450) with WLAN capability
Axyz iPAQ LTM Software installed

These two members are exchanging data via Wireless Network Communication based on the TCP/IP protocol.

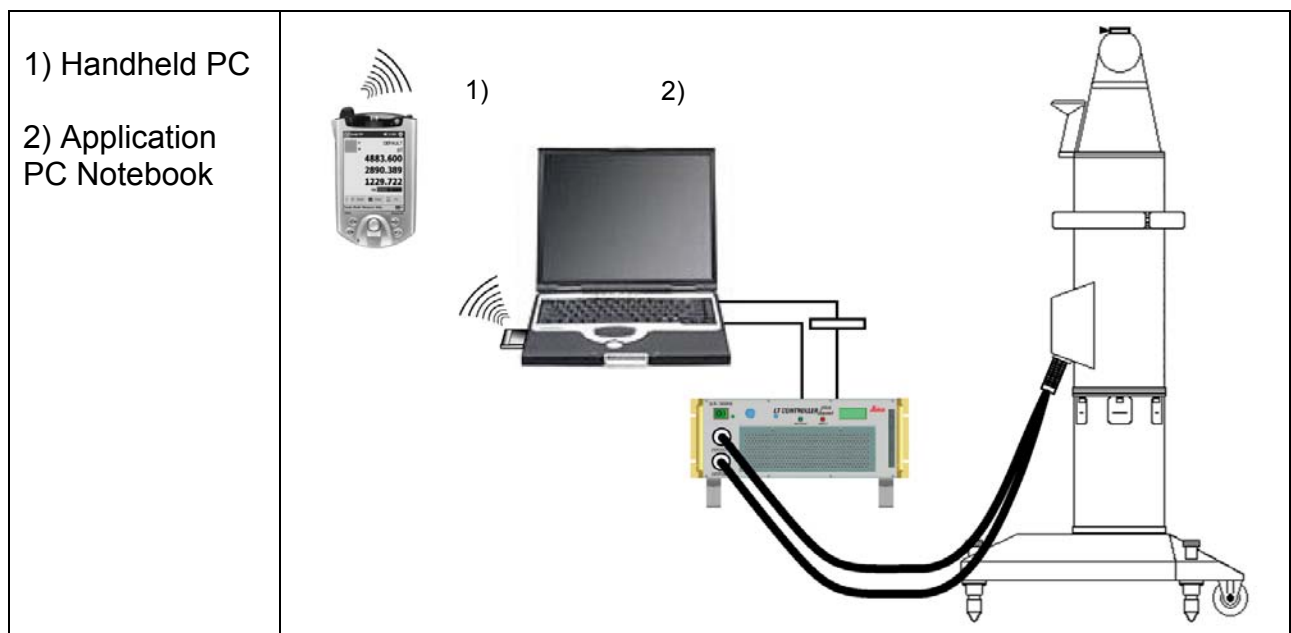


2.1.2 Notebook Installation Overview

Network members:

- **Notebook PC**
Equipped with:
 - standard IEEE 802.11b PCMCIA Wireless LAN Network Adapter
 - Axyz LTM 1.4.1 upwards installed
- **Handheld PC (HP iPAQ 5450) with WLAN capability**
Axyz iPAQ LTM Software installed

These two members are exchanging data via Wireless Network Communication based on the TCP/IP protocol.



2.2 Installation Procedure

This manual contains a general description of the installation of the respective networking devices. Since the installation procedure can slightly change between different network brands, this description should be taken as a general guide only. However, the main installation steps are for all adapters the same.



For detailed installation guides please refer to the manufacturers installation manuals.

Installation Steps for Desktop PC's

- Turn off your computer and unplug it from the wall outlet
- Remove the computer cover
- Insert the Wireless LAN Network Adapter in a free PCI-bus slot
- Replace the computer cover
- Plug the computer back into the wall outlet.
- Install the device drivers
- Install Axyz 141 upwards on Application PC
- Install iPAQLTM on Handheld device
- Adjust WLAN settings on Application PC and Handheld device

Installation Steps for Notebook PC's

- Insert the Wireless LAN Network Adapter in PCMCIA slot (PC Card Type II)
- Install the device drivers
- Install Axyz on Application PC
- Install iPAQLTM on Handheld device
- Adjust WLAN settings on Application PC and Handheld device



Some Network adapter manufacturers do recommend installing the drivers prior to attaching/ inserting the Hardware to the computer.

2.2.1 Detailed Installation Procedure

The following pages describe how to install and configure the respective Network device on a Notebook with Win2000 Operating System.

This guide is based on D-Links DWL Wireless Adapter Family. These cards are based on the IEEE 802.11b Standard, thus other manufacturers adapters can be installed in a similar way.

Please note: The D-Link AirPlus USB Adapter is not supported for NT.

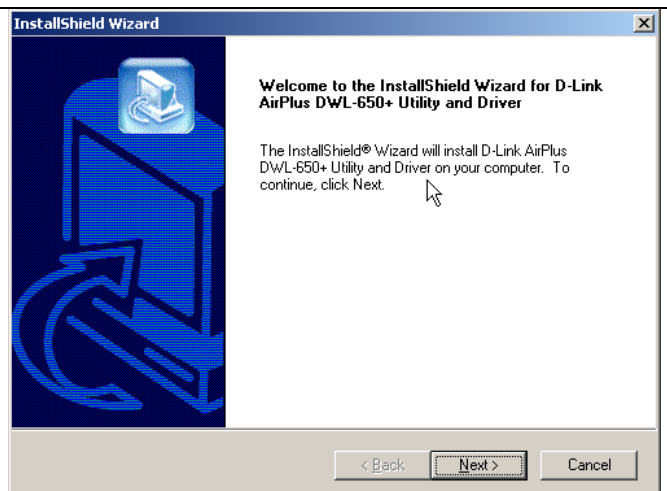
2.2.1.1 Application PC, Network Installation

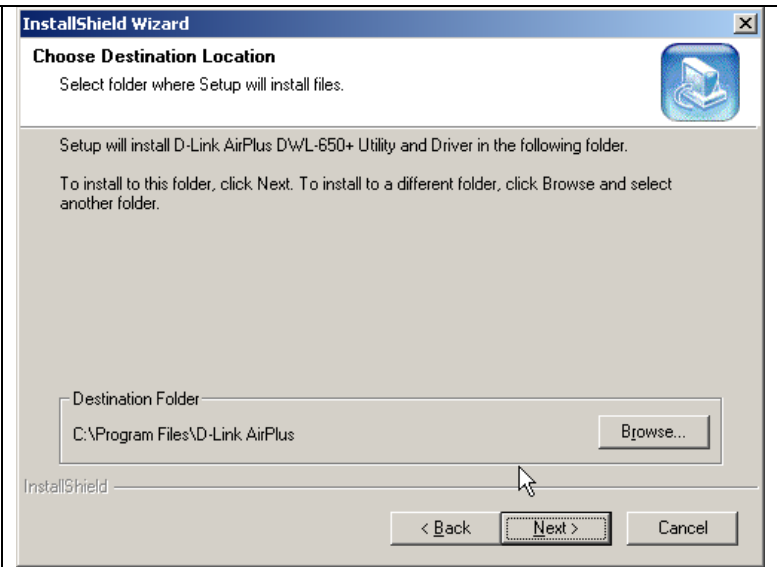
Before inserting the PCMCIA to the Notebooks Card Slot, it is recommended to install the appropriate drivers.

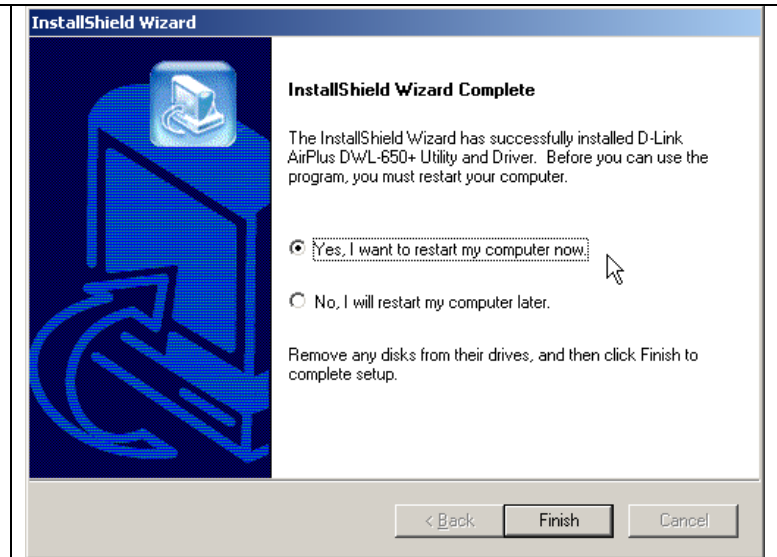
Insert the D-Link Installation CD into your CD Reader and click Install Drivers...

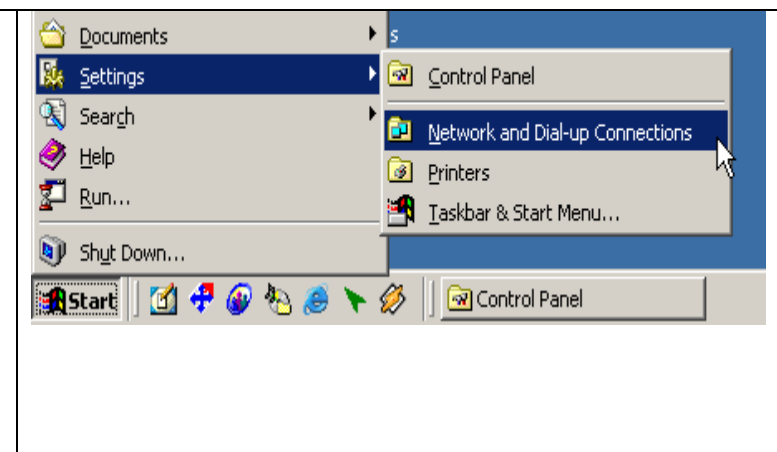


The Install Shield Wizard will guide you through the installation process

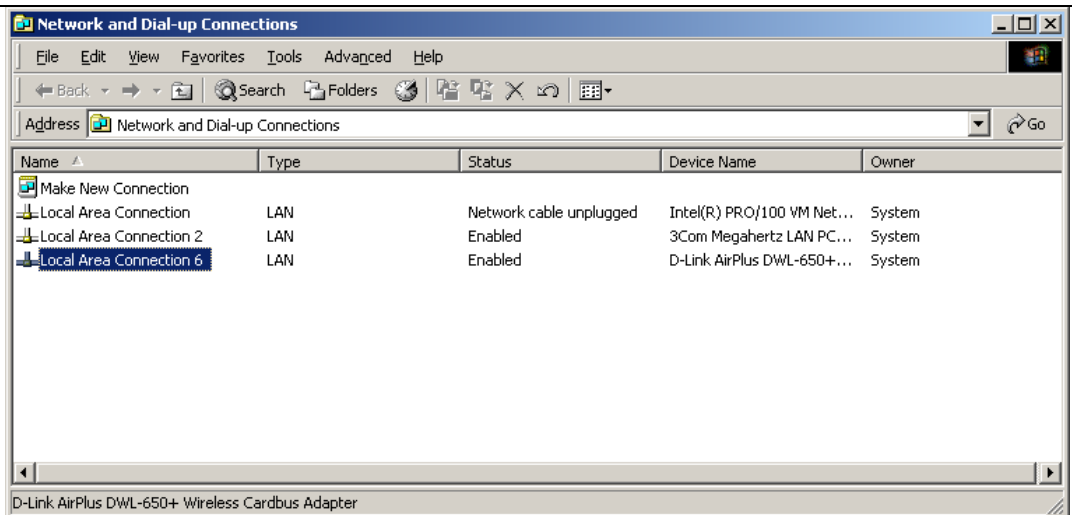


<p>Specify a destination directory, and click next to install the device drivers.</p>	 <p>InstallShield Wizard Choose Destination Location Select folder where Setup will install files.</p> <p>Setup will install D-Link AirPlus D\WL-650+ Utility and Driver in the following folder. To install to this folder, click Next. To install to a different folder, click Browse and select another folder.</p> <p>Destination Folder C:\Program Files\D-Link AirPlus</p> <p>< Back Next > Cancel</p>
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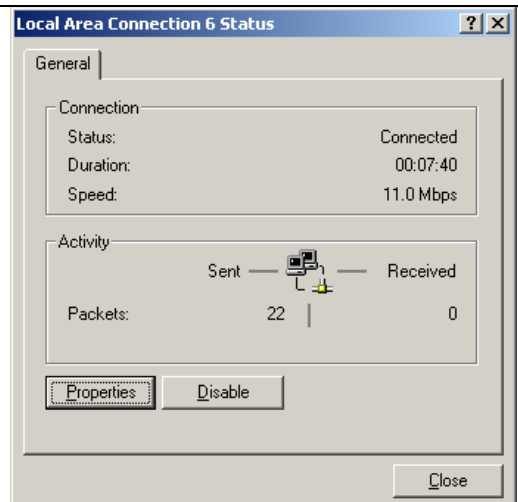
<p>Shutdown the machine when prompted. Before switching on the Computer again, insert the PCMCIA Wireless Network Adapter to a suitable PC card slot.</p>	 <p>InstallShield Wizard Complete</p> <p>The InstallShield Wizard has successfully installed D-Link AirPlus D\WL-650+ Utility and Driver. Before you can use the program, you must restart your computer.</p> <p><input checked="" type="radio"/> Yes, I want to restart my computer now. <input type="radio"/> No, I will restart my computer later.</p> <p>Remove any disks from their drives, and then click Finish to complete setup.</p> <p>< Back Finish Cancel</p>
---	--

<p>The card will be recognized after the reboot. A 'Digital signature' message may appear, select YES to finalize the driver installation.</p> <p>Click on <i>Settings, Network and Dial-up Connections</i> to enter the Network settings</p>	 <p>Documents Settings Search Help Run... Shut Down...</p> <p>Control Panel Network and Dial-up Connections Printers Taskbar & Start Menu...</p> <p>Start Control Panel</p>
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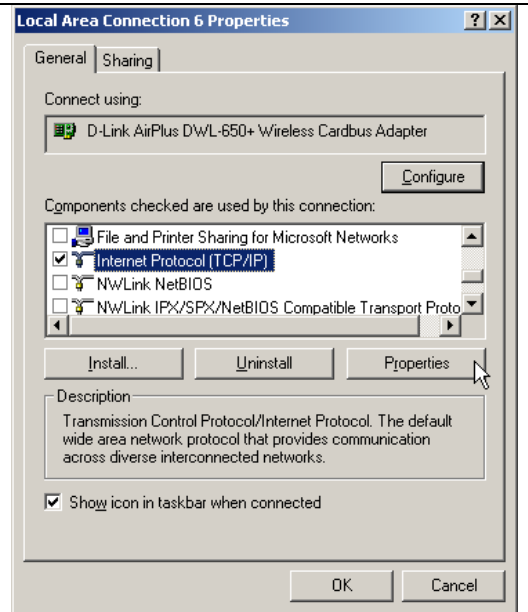
Right Mouse Click on the respective LAN Connection shows the Property dialog box.



Click on *Properties* to enter
The network settings.

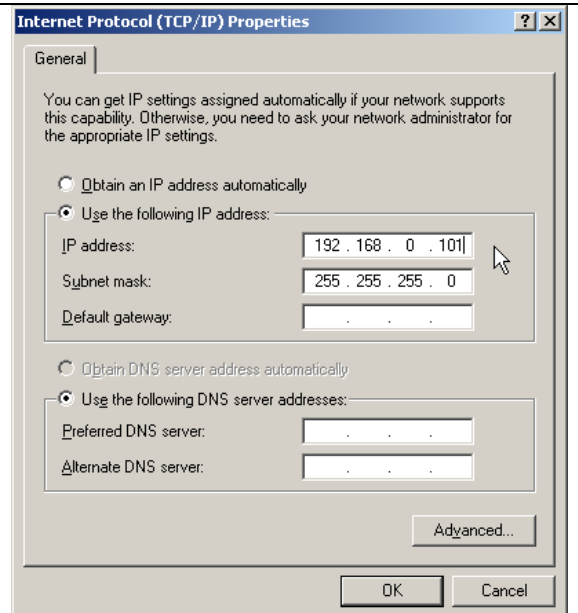


Check TCP/IP Protocol for use and enter the Internet Protocol Properties via pressing the *Properties* Button again.

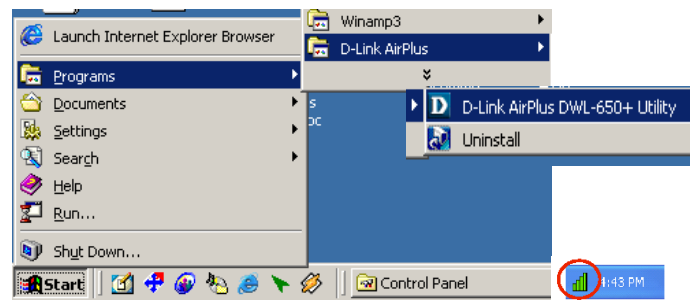


Assign here the IP Address which will be used for the communication with the Handheld device. Details of TCP/IP address settings are described within in the next chapter.

Press *OK* to Apply the new settings and to close the LAN settings dialog.



Open the Wireless card utility to change the behavior of the Wireless Network adapter. Please note that this utility may look different, depending on the type and manufacturer of the card. However, the principle is with all devices the same

**SSID:**

Service Set Identifier. This is the name assigned to the wireless network, Leave this value 'default'

Wireless Mode:

Use 'Ad-hoc' mode to communicate with the Handheld device. (=point-point connection)

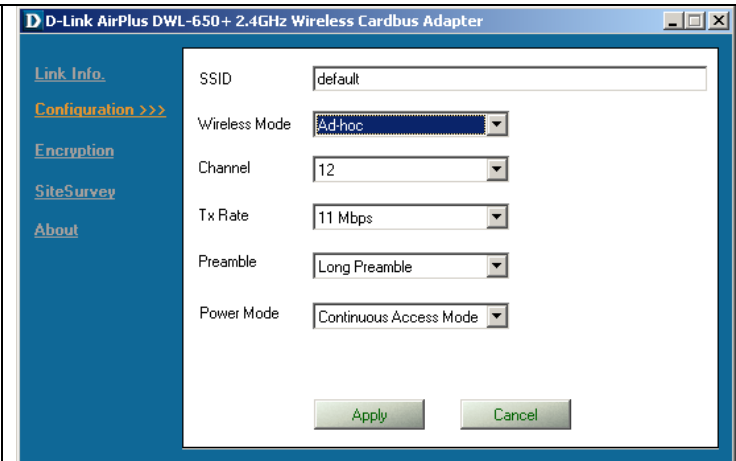
Channel:

The same channel, which is set here, needs to be set on the HandheldPC.

TxRate:

Transmission Rate. Set this Rate to 11Mps or Auto.

For detailed explanations of the remaining settings please refer to manufacturers installation manuals.



Please note that the supported channels may vary in different countries. Refer to HP's WLAN guide, chapter Channel setting to get detailed information of the several countries.

Encryption

Data Encryption is not recommended for Axyz use.
To use it anyway, refer to manufacturers documentation.

The screenshot shows the 'Encryption' configuration window. It includes a 'Data Encryption' checkbox (unchecked), an 'Auth. Mode' dropdown set to 'Auto', a 'Passphrase' input field, and a 'Done' button. Below, there are four 'Default Key' entries, each with a 'Network Key' input field and a 'Key Length' dropdown set to '64 bits'. A 'Key Format' dropdown is set to 'HEX'. 'Apply' and 'Cancel' buttons are at the bottom.

Site Survey, Link Info

These two items provide you with additional information about the current wireless connection(s).

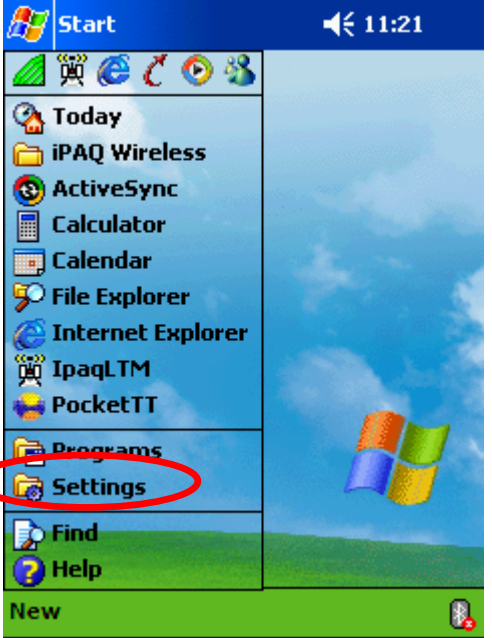
The screenshot shows the 'Site Survey' configuration window. It features an 'Available Network' table with columns for BSS/IBSSID, SSID, WEP, and AP. One entry is visible: C2-AD-EF-4F-42-2D, default, No, No. There are 'Refresh' and 'Connect' buttons. Below is a 'Profile' section with a 'default' profile and 'Add', 'Remove', and 'Properties' buttons.


The screenshot shows the 'Link Info' configuration window. It displays 'Status' as 'Associated IBSSID=C2-AD-EF-4F-42-2D', 'SSID' as 'default', 'Tx Rate' as '11 Mbps', and 'Channel' as '12'. It includes 'Link Quality/Signal Strength' progress bars and a 'Data Rate' section with 'Transmit' and 'Receive' rates (both 0 Kbps) and a scale from 0 to 10000.

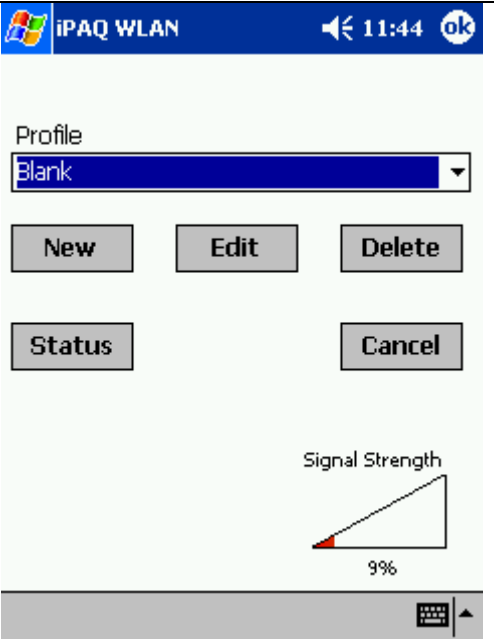


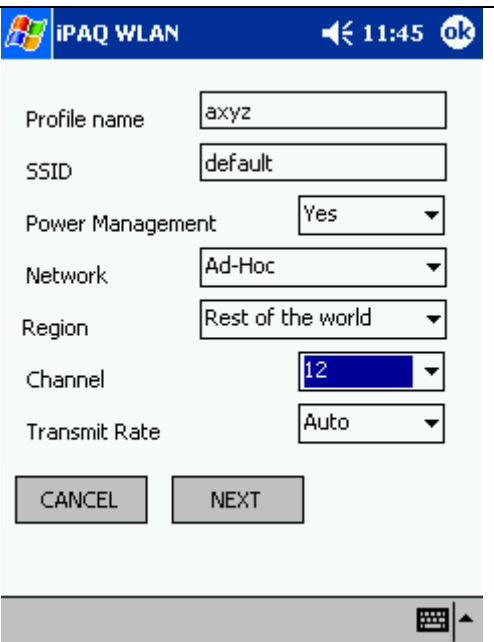
Please note that all described wireless properties can be changed in control panel / Network and Dial-up Connections/ configuration of the respective wireless network card.

2.2.1.2 Handheld PC PPC2002 , Network Installation

<p>Switch on the hp iPAQ. Choose 'Settings' to enter The Control Panel of the Pocket PC.</p>	 <p>The screenshot shows the Start menu of a handheld PC. The menu items are: Today, iPAQ Wireless, ActiveSync, Calculator, Calendar, File Explorer, Internet Explorer, IpaqLTM, PocketTT, Programs, Settings (circled in red), Find, and Help. The time is 11:21.</p>
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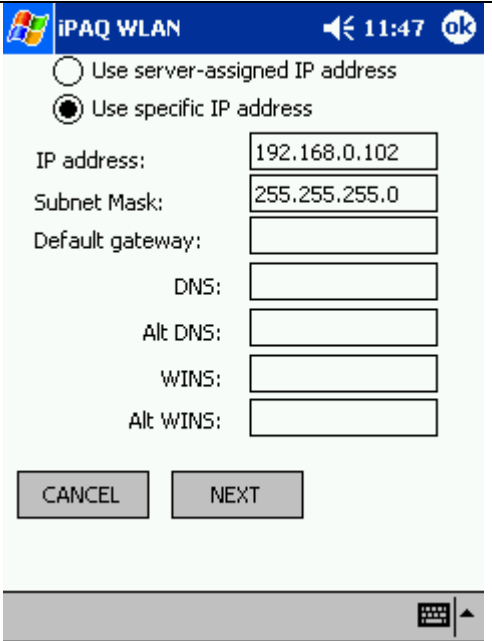
<p>Click <i>iPAQ WLAN</i> in <i>SystemSettings</i> to enter the Network dialog.</p>	 <p>The screenshot shows the Settings application. The options are: About, Asset Viewer, Backlight, Bluetooth, Clock, Expansion Pack, iPAQ Audio, iPAQ WLAN (circled in red), and iTask Settings. The time is 11:22. At the bottom, there are tabs for Personal, System, and Connections.</p>
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<p>Pressing <i>NEW</i> allows to create a new User defined WLAN profile.</p>	
--	--

<p>Name your <i>profile</i>, and enter same values for <i>SSID</i>, <i>Network</i>, <i>Channel</i> and <i>Transmit Rate</i> like before in the Network Adapter Installation of the Application Computer.</p> <p>Press <i>Next</i> to continue</p>	
---	---




Please note that the supported channels may vary in different countries. Refer to HP's WLAN guide, chapter Channel setting to get detailed information of the several countries.

<p>Assign here the unique IP Address which will be used for the communication with the Host computer (Axyz LTM). Details of TCP/IP address settings are described within in the next chapter.</p>	 <p>The screenshot shows the 'iPAQ WLAN' configuration window. At the top, there are two radio buttons: 'Use server-assigned IP address' (unselected) and 'Use specific IP address' (selected). Below these are several input fields: 'IP address' (192.168.0.102), 'Subnet Mask' (255.255.255.0), 'Default gateway', 'DNS', 'Alt DNS', 'WINS', and 'Alt WINS'. At the bottom, there are 'CANCEL' and 'NEXT' buttons.</p>
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<p>Encryption</p> <p>Data Encryption is not recommended for Axyz use. To use it anyway, refer to manufacturers documentation.</p> <p>Button <i>Finish</i> completes the WLAN configuration</p>	 <p>The screenshot shows the 'iPAQ WLAN' configuration window. It features a 'Wireless Encryption (WEP)' dropdown menu set to 'Disabled'. Below it is a 'WEP Keys' dropdown menu set to 'Hexadecimal'. There are four input fields labeled 'Key 1', 'Key 2', 'Key 3', and 'Key 4'. A 'Key number' dropdown menu is set to '1'. At the bottom, there are 'CANCEL' and 'FINISH' buttons.</p>
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Status gives you a complete overview about the WLAN settings of your iPAQ Handheld device.

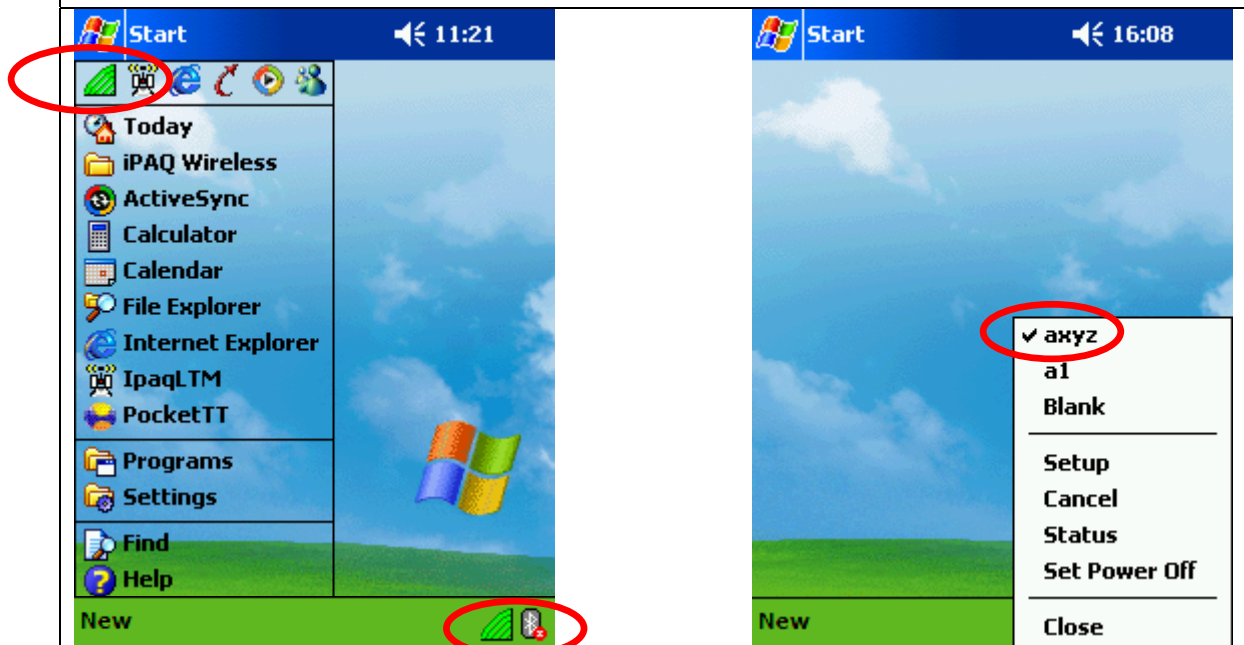


The screenshot shows a 'Status' window with the following information:

- Access Point ID: default
- Encryption: Disabled
- Network Type: Ad-Hoc
- Channel: 12
- Transmit Rate: Auto
- Software Versions: Software version: 4.0.1.15, Driver version: 2.2.2.36
- Hardware Revision: Firmware version: 0.90.5.149, 6.3 (9/5/2002)
- MAC address: 00-02-8A-3A-98-C5
- IP Address: 192.168.0.102

Buttons for 'Refresh' and 'Advanced' are visible at the bottom.

The green WLAN symbol switches the WLAN mode on. This is indicated in the lower right edge of the Handheld device. Clicking on that icon opens a popup menu in which the actual profile can be set.



The first screenshot shows the Start menu with the WLAN icon circled in red. The second screenshot shows the context menu for the WLAN icon, with the 'xyz' profile selected and circled in red.



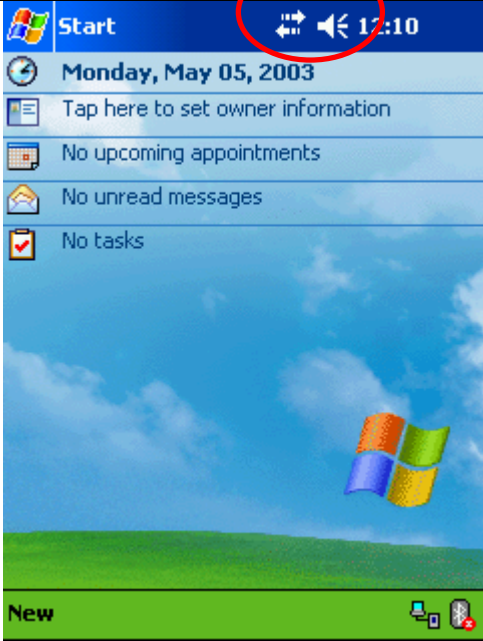
- Start
- 11:21
- Today
- iPAQ Wireless
- ActiveSync
- Calculator
- Calendar
- File Explorer
- Internet Explorer
- IpaqLTM
- PocketTT
- Programs
- Settings
- Find
- Help
- New


- Start
- 16:08
- xyz
- a1
- Blank
- Setup
- Cancel
- Status
- Set Power Off
- Close

2.2.1.3 Handheld PC PPC2003 , Network Installation

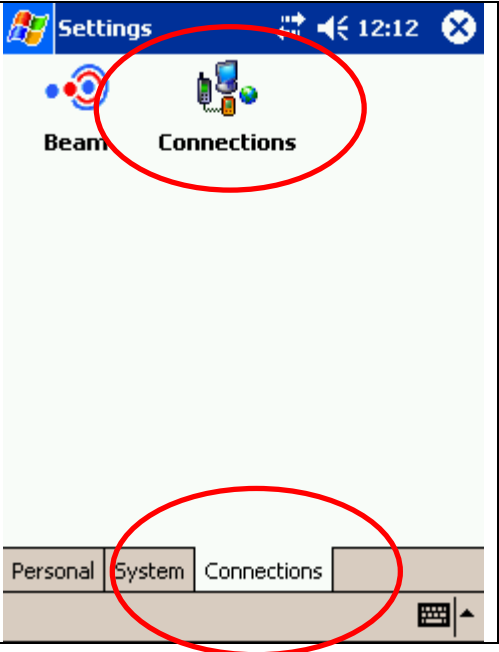
With the release of the latest Operating System PocketPC 2003, Microsoft introduced a lot of enhancements, particularly in wireless networking.

The following steps are required for setting up the Wireless Network Communication on PPC2003 OS, in order to use iPAQ LTM remote control Software. The new OS will be delivered with any new iPAQ PocketPC.

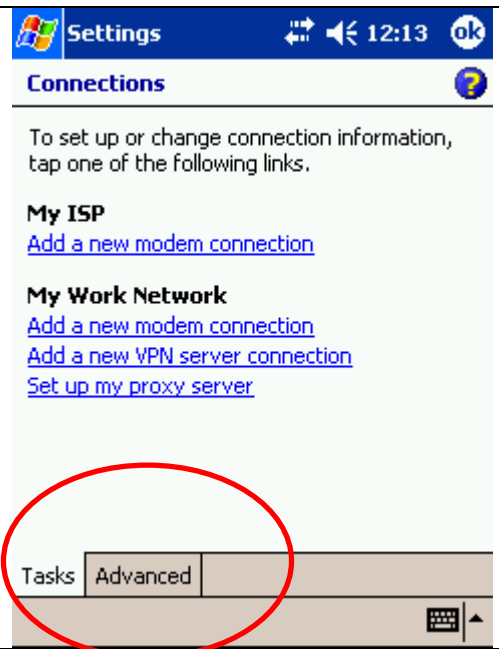
<p>Wireless Status is shown in the Title bar and no longer in the lower right corner.</p> <p>Symbol  indicates that there is no network connected at the moment.</p> <p>Symbol  indicates that there is a valid Network Connection. Tapping onto the Symbol shows the current quality of the Network Connection.</p>	
--	---

<p>IPAQ Wireless must be switched on/off via Starting Tree. Within a separate dialog it is possible to enable Bluetooth and WLAN wireless possibilities.</p>	
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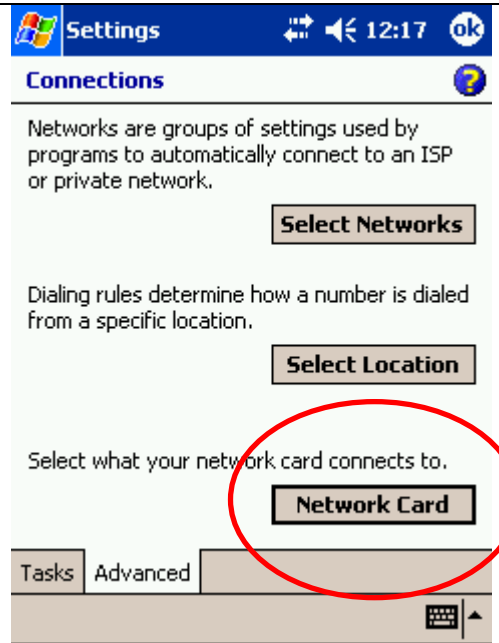
In StartingTree/Settings, browse to Connections tab and the Connections icon.

A screenshot of the Settings application interface. The title bar at the top says "Settings" and shows the time as 12:12. Below the title bar, there are two main icons: "Beam" and "Connections". The "Connections" icon, which depicts various network devices, is circled in red. At the bottom of the screen, there is a navigation bar with three tabs: "Personal", "System", and "Connections". The "Connections" tab is also circled in red.

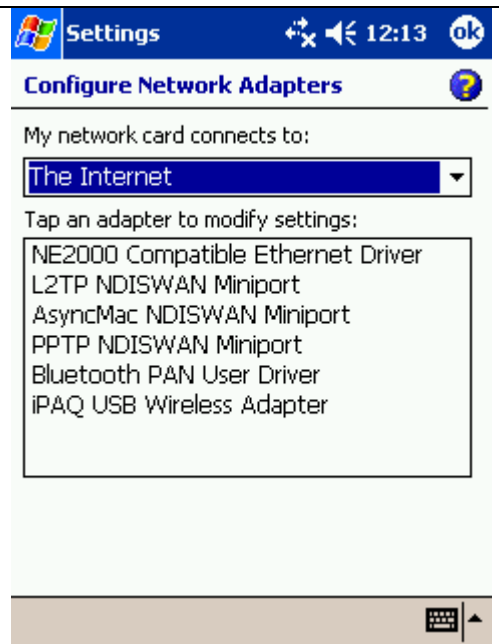
This will open a new Settings dialog. Browse to advanced tab, to reach the next dialog.

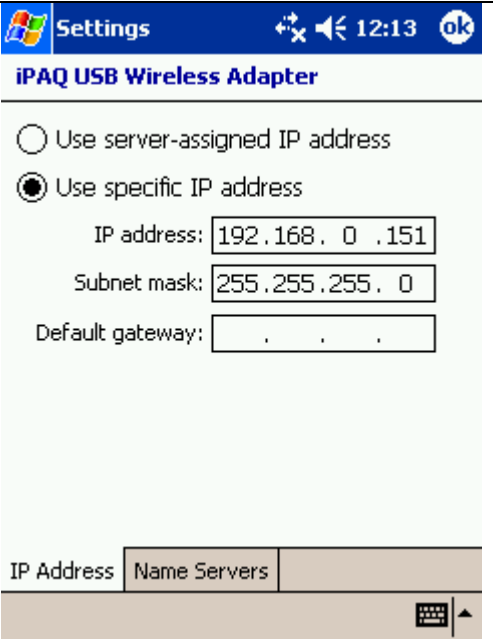
A screenshot of the "Connections" settings dialog. The title bar says "Settings" and shows the time as 12:13. The main heading is "Connections". Below this, there is a message: "To set up or change connection information, tap one of the following links." Underneath, there are two sections: "My ISP" with a link "Add a new modem connection", and "My Work Network" with links "Add a new modem connection", "Add a new VPN server connection", and "Set up my proxy server". At the bottom, there is a navigation bar with two tabs: "Tasks" and "Advanced". The "Advanced" tab is circled in red.

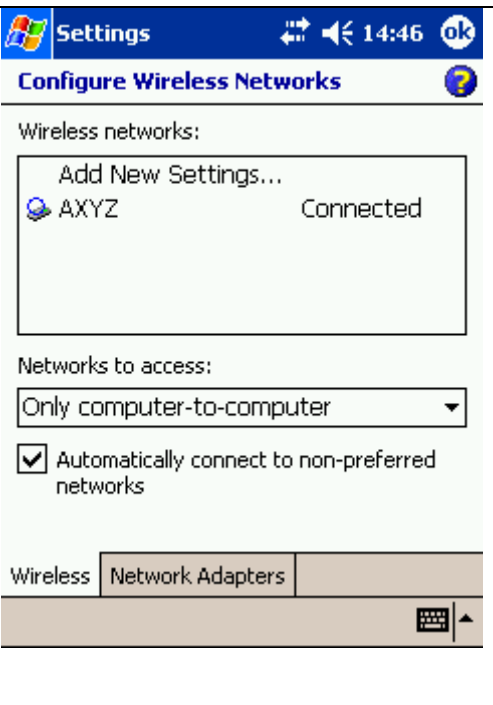
Press Network Card to configure the WLAN Network Adapter.



Click on iPAQ USB Wireless Adapter to reach the TCP/IP settings of the WLAN Adapter.



<p>Specify here the unique IP address for the PocketPC.</p>	 <p>Settings 12:13 ok</p> <p>iPAQ USB Wireless Adapter</p> <p><input type="radio"/> Use server-assigned IP address</p> <p><input checked="" type="radio"/> Use specific IP address</p> <p>IP address: 192.168.0.151</p> <p>Subnet mask: 255.255.255.0</p> <p>Default gateway: . . .</p> <p>IP Address Name Servers</p>
---	---

<p>As soon as a valid network connection is detected (e.g. XYZ), the operating system displays a list of all available networks. This dialog can be reached via Start/Settings/Connections</p> <p>The name of the network is corresponding the SSID specified in the application PC.</p> <p>To delete a listed network name, touch the name for 3 sec. with the stylus and choose on the appearing pop-up menu "remove settings"!</p>	 <p>Settings 14:46 ok</p> <p>Configure Wireless Networks ?</p> <p>Wireless networks:</p> <p>Add New Settings...</p> <p>XYZ Connected</p> <p>Networks to access:</p> <p>Only computer-to-computer</p> <p><input checked="" type="checkbox"/> Automatically connect to non-preferred networks</p> <p>Wireless Network Adapters</p>
---	--



It is no longer needed to manually specify the channel and the speed of the network connection. The system is scanning the environment and is able to detect the respective settings automatically. Therefore, it is mandatory to setup the Application Network Settings, prior the ones of the iPAQ.

Further settings for the detected network are possible but not needed for the iPAQ LTM installation.

Settings 12:18 ok

Configure Wireless Network

Network name:

If this network connects to work via a VPN, select The Internet.

Connects to:

This is a device-to-computer (ad-hoc) connection

General Authentication

Settings 12:18 ok

Configure Network Authentication

Data encryption (WEP Enabled)

Network Authentication (Shared mode)

The Key is provided for me automatically

Network key:

Key index:

Enable network access using IEEE 802.1X

EAP type:

Properties

General Authentication

2.3 Wireless Network Topology

2.3.1 TCP/IP Address Settings

For our purpose we will setup a local wireless network topology.



This Network is not connected to a House Network.

The network will have two members. One member will be our main Application PC (Desktop/Notebook) and the other one will be the Windows CE Device (Handheld PC). To be able to identify each member in a Network they have to have a unique TCP/IP Address.

We will use a TCP/IP address from the “Private Network Class C”:

Class	From IP Address	To IP Address	Subnet Mask	Max. Computers per Network
C	192.168.0.1	192.168.255.255	255.255.255.0	255



Private IP addresses are assigned by an Internet standard called RFC 1597

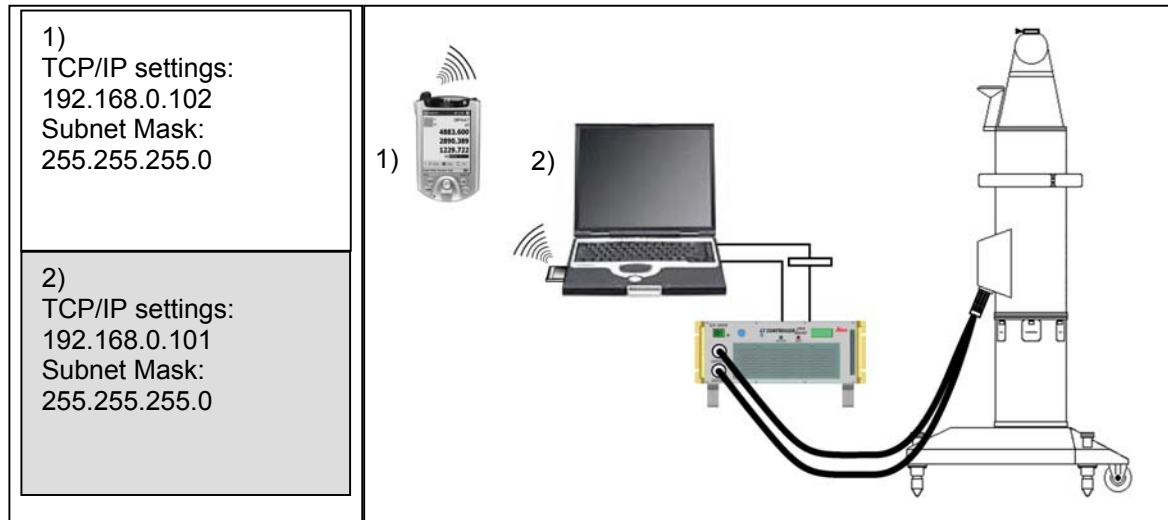
Private network IP addresses aren't valid on the Internet; you can use them only to connect private networks for a home or small business. No conflict results if the machines on the private network occasionally dial into an Internet service provider or if you later connect the private network to the Internet using software called a proxy server.



If your system will be connected to the House Network, then please get in contact with your responsible System Administrator for the TCP/IP configuration. DO NOT USE THE SETTINGS DESCRIBED IN THIS MANUAL.

We will use the following TCP/IP Addresses:

Pocket PC (iPAQ 5450) Subnet Mask:	192.168.0.102 255.255.255.0
Application PC (Desktop/Notebook) Subnet Mask:	192.168.0.101 255.255.255.0



To set the TCP/IP Address for the Wireless LAN Network Adapters refer to the previous Chapters.



Please note that each device needs its own unique IP number. It's impossible to give twice the same IP address within the same Network.

3 HP iPAQ 5450 Pocket PC Installation

3.1 System Requirements

3.1.1 Operating System

- Pocket PC 2002 ~ WinCE 3.0
- Pocket PC 2003 ~ WinCE 4.X

3.1.2 Hardware

- WLAN-Interface (built in on HP iPAQ 5450)

3.2 ActiveSync® 3.5

3.2.1 Introduction

ActiveSync enables you to synchronize the information on your Desktop PC with the information on your Handheld PC. This service is needed to upload/copy any files from a Desktop PC onto a Handheld PC (and vice versa).



You need to install ActiveSync on your Application PC, This software is to be found on the iPAQs companion CD which comes with the handheld device

<http://www.microsoft.com/windowsce/products/download/activesync.asp>



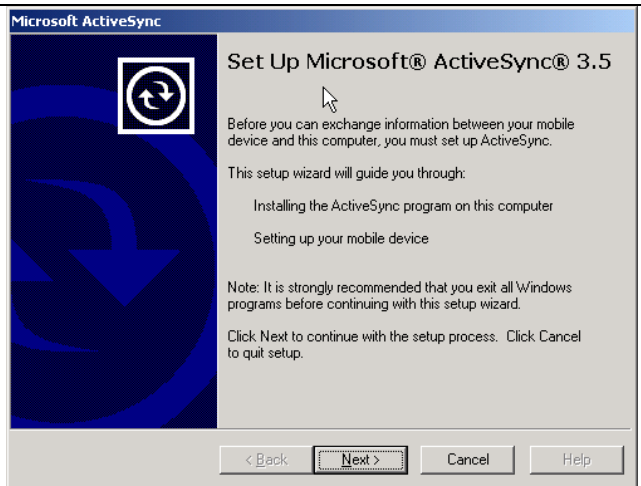
Before installing ActiveSync, ensure your Pocket PC cradle is not yet connected to your computer. Connect the cradle only after you have finished installing ActiveSync.

Start the ActiveSync installation from iPAQs companion CD or from a previous Internet Download.

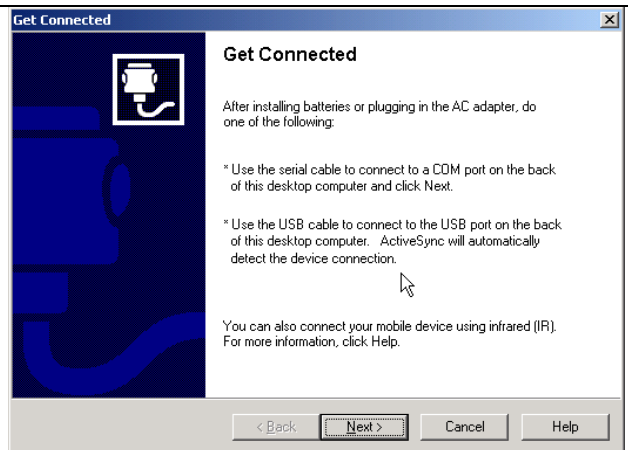
Click **YES** to Continue.





The setup wizard guides you through the installation process.

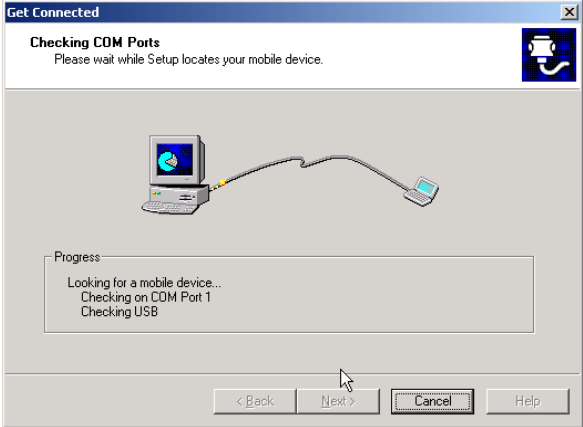


It is recommended to use the USB port of your Application PC to get connected to your Pocket PC.

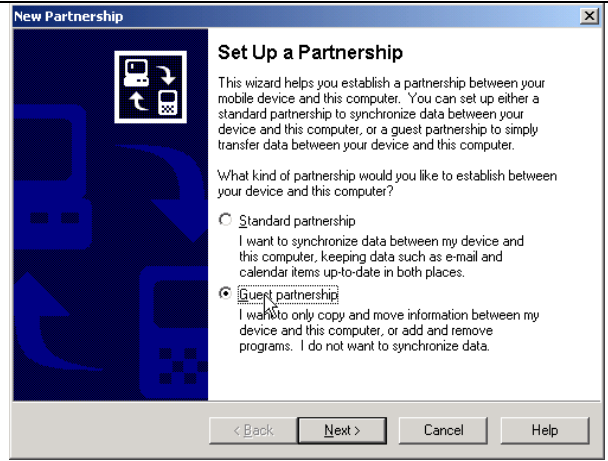


<p>The operating System is recognizing, that the cradle was attached to your computer. This may take several minutes.</p>	
---	--

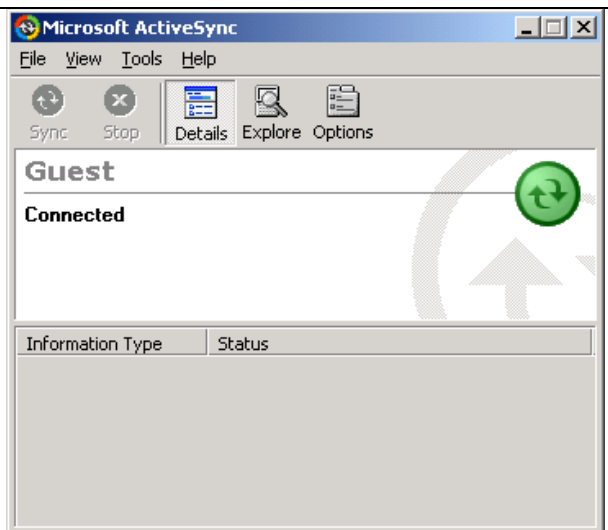
<p>Attach the PocketPC back to the cradle.</p>	
--	--

<p>The System is trying to locate the PocketPC</p>	
--	--

To exchange data, it is necessary to establish a Partnership with the PocketPC. Since data have to be copied from the Application PC to the PocketPC, setting up a guest Partnership is enough. Press *Next*



You should be now connected to the mobile device. For more details and troubleshooting refer to the manufacturers manuals.

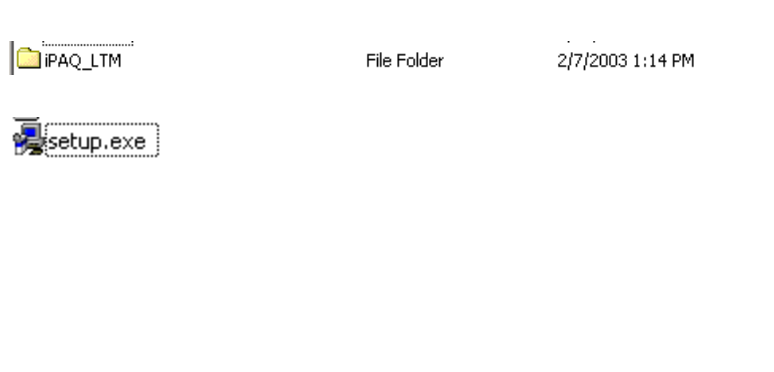
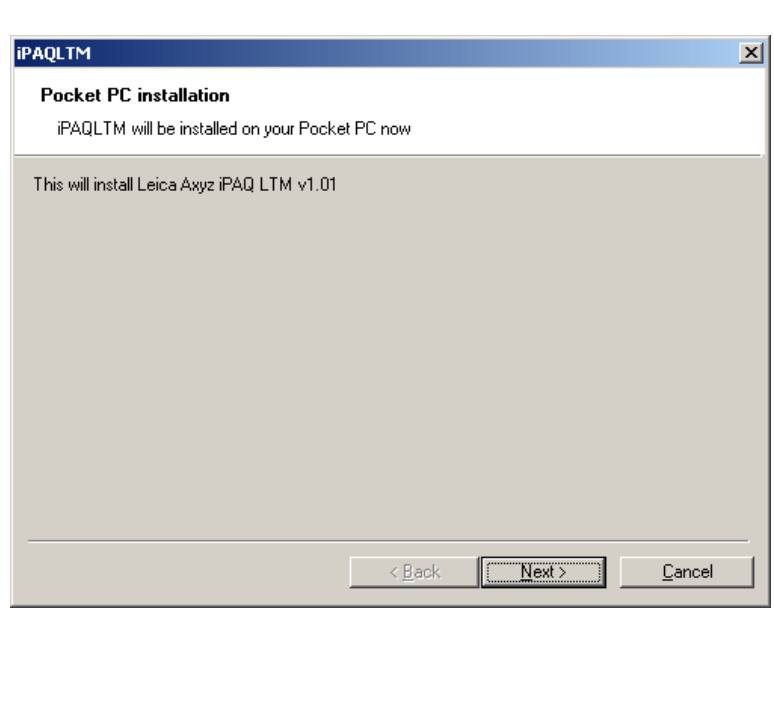


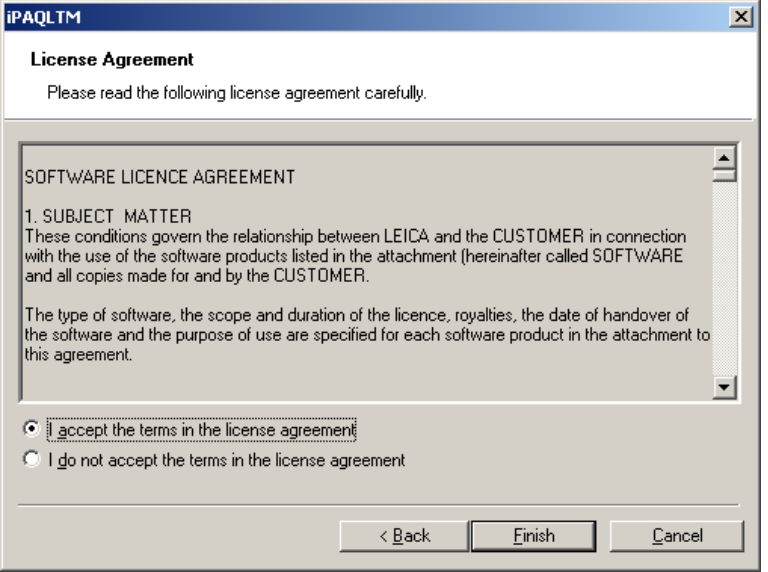
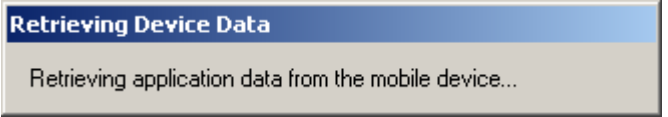
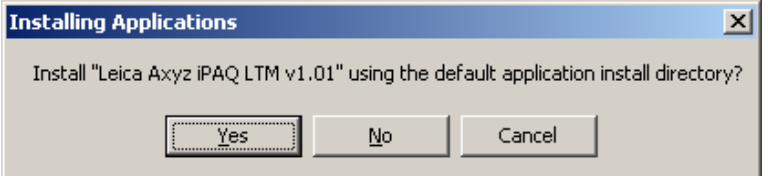
4 Installation of iPAQ LTM Remote Software

4.1 Installation Procedure



Before the installation of iPAQ LTM, it is expected that ActiveSync is installed. (previous Chapter)

<p>Browse the Axyz (141SP1 and onwards) Installation CD, Open iPAQ_LTM directory and execute setup.exe.</p>	
<p>The installation wizard will guide you through the setup process.</p>	

<p>After accepting the license agreement click <i>Finish</i> to start the installation process.</p>	
<p>The System starts to communicate with the PocketPC via ActiveSync.</p>	
<p>Choose Yes to install IPAQ LTM to the default installation directory.</p>	

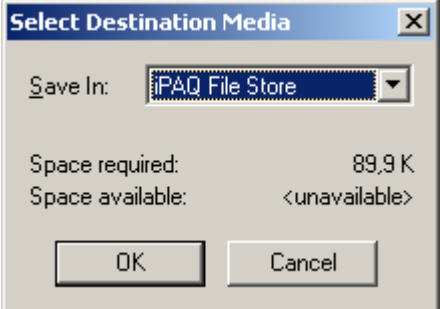
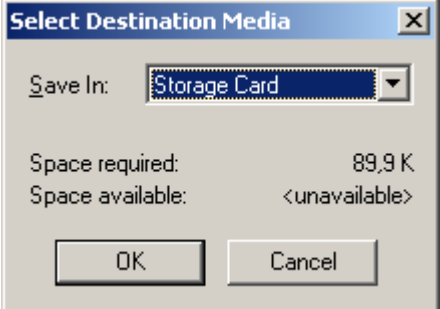
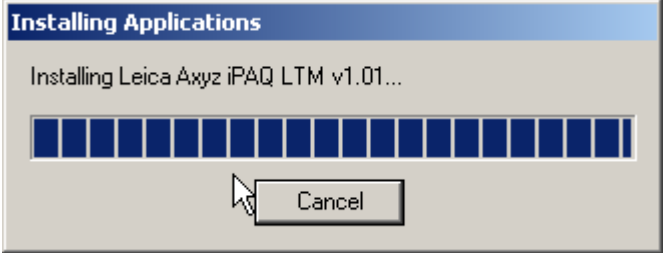
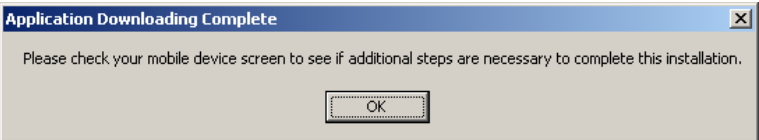


IPAQ 5450 has two different storage types.

The default storage type is volatile, which means that all data in this memory is lost when backup battery gets empty!

But it is also possible to install IPAQ LTM to a non-volatile storage or to an additional SD Memory Card. Even if the backup battery is removed, the application remains in the memory in that case.

To do so press NO on the previous dialog!

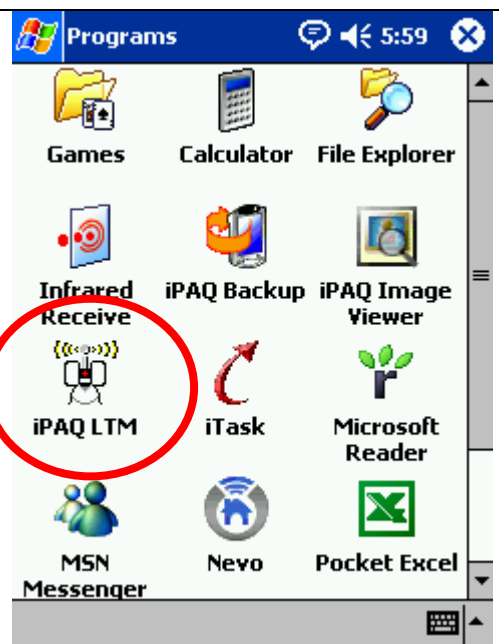
<p>Use this option to install on the non-volatile storage.</p>	
<p>Use this option to install on an additional storage card.(not included)</p>	
<p>Necessary data will be copied to the desired storage media.</p>	
<p>After pressing OK, iPAQ LTM installation process is finished.</p>	

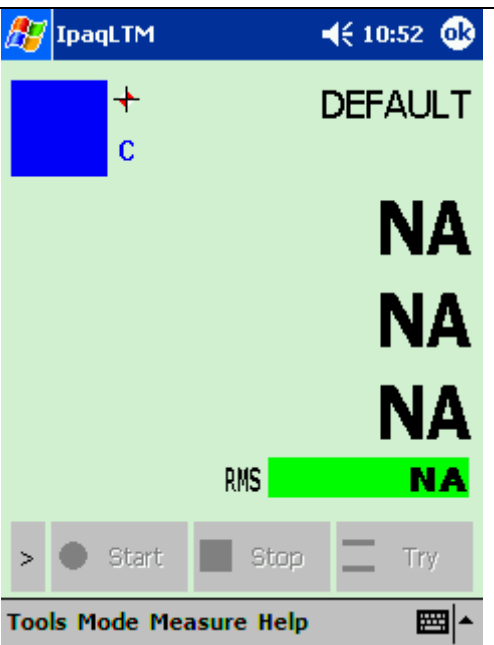
IPAQLTM is installed and accessible from the Start tree of your PocketPC.

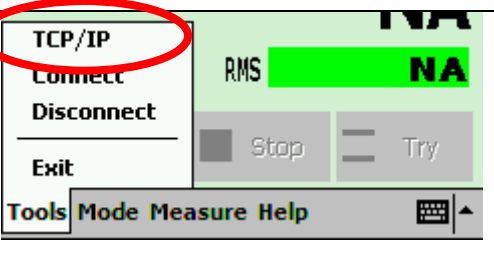
To start Axyz iPAQLTM click entry *Programs*....

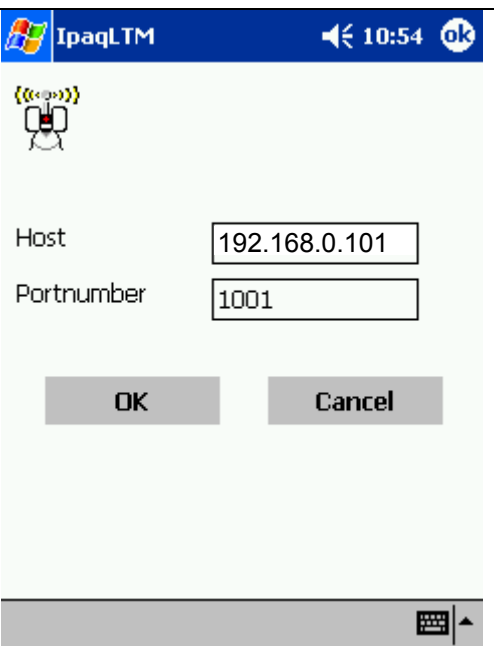


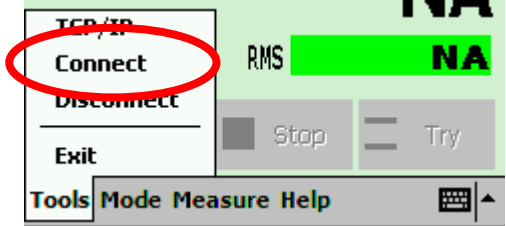
.. and tap the iPAQLTM Icon.....

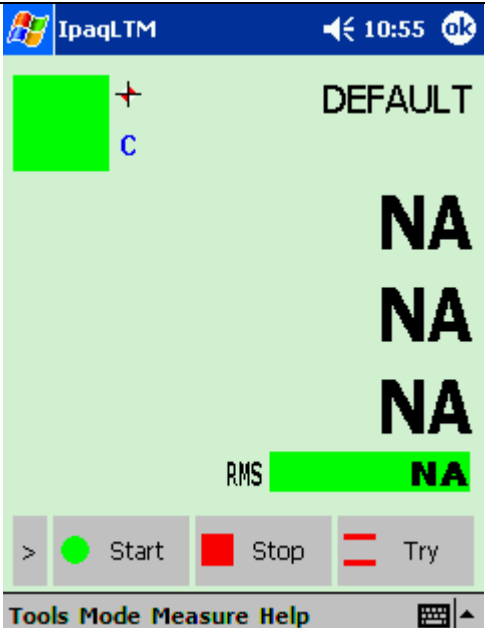


<p>The blue colored status box indicates that iPAQ LTM Remote is not yet connected to the Application computer.</p>	
---	--

<p>Click on Menu Tools to enter TCP/IP configuration.</p>	
---	---

<p>Host: Enter here the TCP/IP Address of the Master Station (Application PC).</p> <p>Port: The Port Address is a parameter, which is kept in the Axyzsys.ini File with default of 1001</p>	
---	--

<p>Ensure that WLAN is switched on your PocketPC.</p> <p>Then click Menu <i>Tools</i> Connect to establish a wireless connection.</p>	
---	--

<p>The status indicator changes to green. The device is ready for measuring.</p>	
--	---



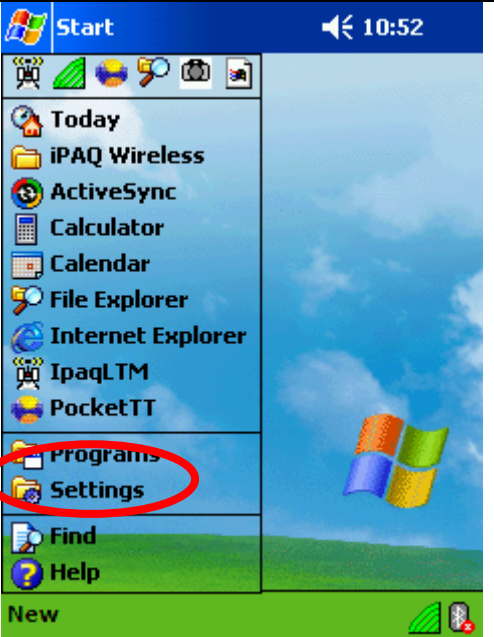
In order to communicate with Axyz, LTM with a measurement window needs to be opened.

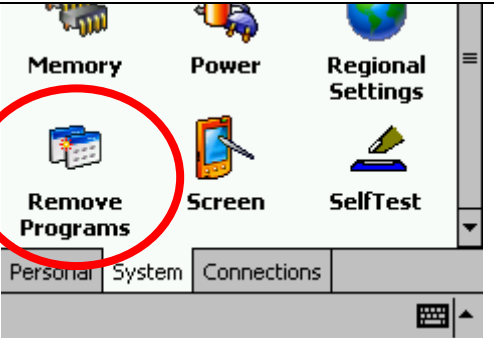



If the system performance slows down and gets indolent or seems to hang up during the connection process, perform a soft reset on the pocket pc and try to do the following steps:

- Ensure to have set the correct IP addresses within your Systems
- Switch when necessary WLAN power off to be able to change the settings on the iPAQ
- switch WLAN on again and launch iPAQLTM

4.2 Uninstall Procedure

<p>To uninstall iPAQ LTM enter the system settings via <i>Start, Settings...</i></p>	 <p>A screenshot of the Windows Start menu. The 'Settings' option is circled in red. Other visible options include Today, iPAQ Wireless, ActiveSync, Calculator, Calendar, File Explorer, Internet Explorer, IpaqLTM, PocketTT, Programs, Find, and Help. The taskbar at the bottom shows 'New'.</p>
--	--

<p>.. and tap <i>System</i> pane, <i>Remove Programs</i>.</p>	 <p>A screenshot of the System settings pane. The 'Remove Programs' icon is circled in red. Other icons include Memory, Power, Regional Settings, Screen, and SelfTest. The bottom tabs show 'Personal', 'System', and 'Connections'.</p>
---	---

<p>Choose the application which should be deleted from the PocketPC and press <i>Remove</i>.</p>	 <p>A screenshot of the 'Remove Programs' dialog box. The list of programs in storage memory includes 'cetoolbox.com Pocket Screen Capture' and 'Leica Axyz IPAQ LTM v1.01', with the latter selected. A 'Remove' button is visible below the list. At the bottom, it shows 'Total storage memory available: 30912k' and a link to 'Adjust memory allocation'.</p>
--	--

5 Axyz LTM Remote Software

5.1 Introduction

Axyz iPAQ-LTM is a program that is running on a Pocket PC Device. The program supports reduced functionality of the Axyz LTM module. The communication between the Handheld Device and the Application PC is done via a wireless network connection. The communication is based on the TCP/IP protocol.

LTM-Remote works almost like mirror function of the Axyz LTM Module (Display). Only functions which request entry of parameters can not be operated from iPAQ-LTM.



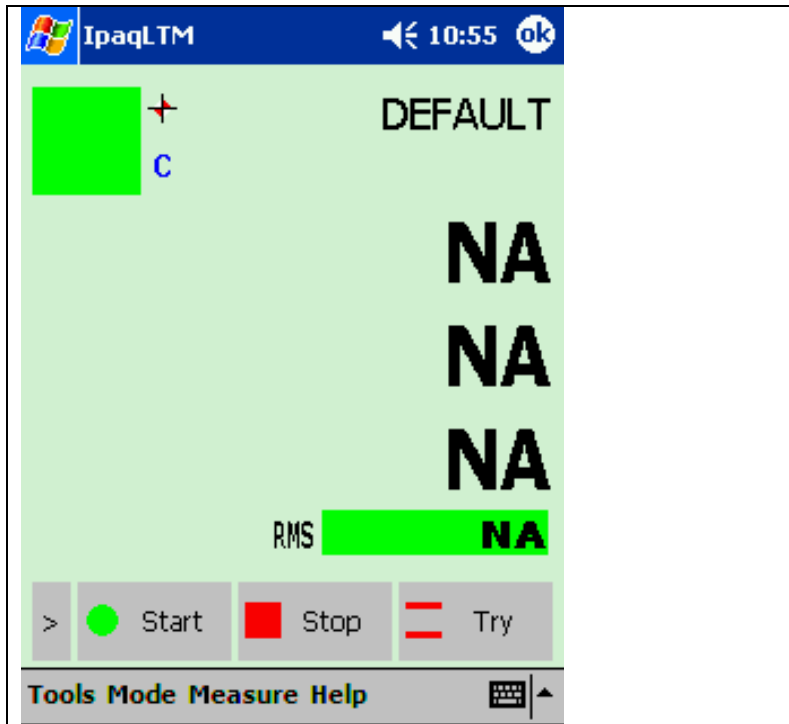
Axyz iPAQ-LTM and Axyz LTM are synchronized. E.g. any change of measurement type in Axyz LTM will immediately update Axyz iPAQ-LTM and vice versa!

Standard Measurement View, Axyz LTM

The screenshot displays the 'Leica Axyz LTM - Test1.Axyz' application window. The main display area shows measurement data for 'DEFAULT/point11'. The data includes X, Y, and Z coordinates in millimeters (mm) and their respective RMS values. The X coordinate is 141.109 mm with an RMS of 0.000. The Y coordinate is 64.140 mm with an RMS of 0.000. The Z coordinate is 127.041 mm with an RMS of 0.000. The overall RMS Value for the station is 0.002. The interface also shows a 'Station Status' window with various parameters like Sensor Type (LTD500), Tracker Number (SN93001), and Laser Status (Laser ready). The status window indicates the station is 'Oriented'.

Coordinate	Value (mm)	RMS
X	141.109	0.000
Y	64.140	0.000
Z	127.041	0.000
Overall RMS Value		0.002

Standard Measurement View, LTM-Remote



5.2 Available Functionality Overview

- Start Measure
- Stop Measure
- Try Measure
- Set Point ID
- Increment Point ID
- Decrement Point ID
- Positioning Laser (Go Location, Go Birdbath)
- Select Measurement Modes:
 - ✓ Standard
 - ✓ Build Points
 - ✓ Build Shape
 - ✓ CAD Build InspectNo Parameters can be changed
(e.g. in Build: Selection of Reference points).
All settings have to be set in advance at the AP computer.
- Select Measurement Types:
 - ✓ Stationary
 - ✓ Continuous
 - ✓ Circle Center
 - ✓ Sphere Center
 - ✓ GridNo changes on the measurement settings can be done
(e.g. Time sep., # of Points,...).
All settings have to be set in advance at the AP computer.
- Remote Control View

5.2.1 Summary of Buttons

Start

Once a measurement mode or method has been selected and any changes made to the data collection parameters, use this selection to start measurement and record the results in the database.

Stop

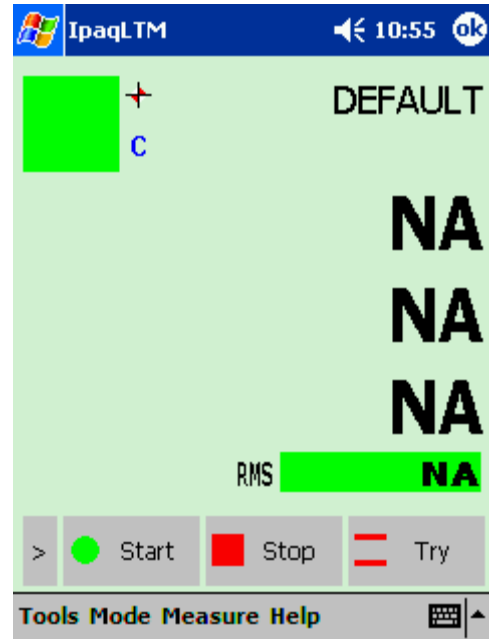
This stops storage or display of any data being continuously recorded.

Try

This is an alternative to Start and has the same function except that it does not store any data in the database. It is used simply to make a quick check

>

Tapping the '>' sign switches in between the three different Button Views



Set Point ID

To re-define the identifier for the next measured point in the current measurement window

Note: Unlike at the Axyz LTM, this button does not allow to set any parameters. All parameter definitions have to be set at the Axyz LTM.

Inc ID

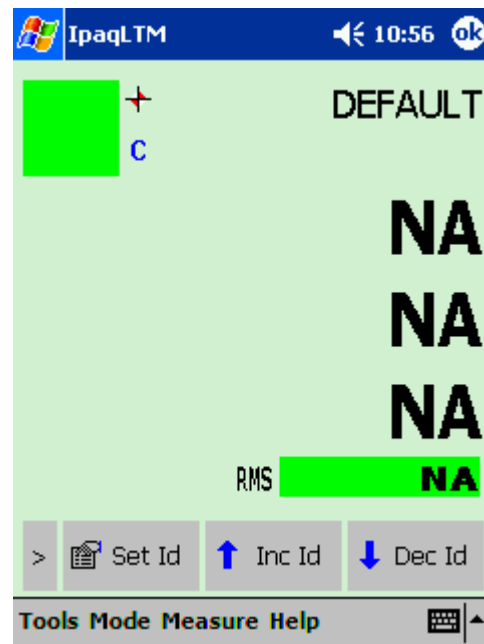
Moves to the next point in a Build list, or increments the point ID by 1 for the next point to be measured in normal measurement.

Dec ID

Moves to the previous point in a Build list, or decreases the point ID by 1 for the next point to be measured in normal measurement.

>

Tapping the '>' sign switches in between the three different Button Views



Go BB

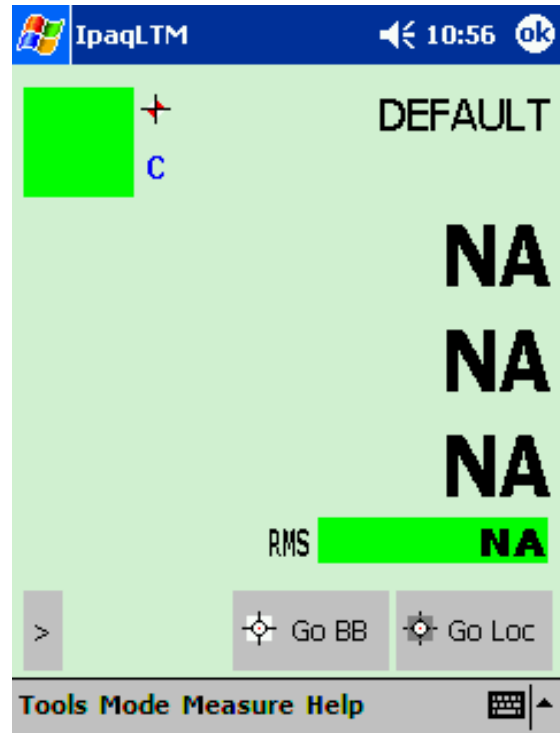
This command sets the angular values, which defines the current location of the reflector when placed in the Home Point (Birdbath). If the reflector is in position the beam locks on and the distance is set to the defined Birdbath value for the current reflector.

Go Location

This command allows placing the reflector in a previously measured position and locks onto and sets the distance for the IFM. Coordinate values from the appropriate station may define the position.

>

Tapping the '>' sign switches in between the three different Button Views



5.2.2 Summary of Menu bars

5.2.2.1 Menu Tools

<p>The Status indicator is displayed blue, since there is no Network connection established yet!</p>	
--	--

Tools Menu

TCP/IP

This opens the TCP/IP dialog.

Host: Enter here the TCP/IP Address of the Master Station (Application PC).

Port: The Port Address is a parameter, which is kept in the Axyzsys.ini File with default of 1001

Connect

Establishes a network connection to the Application PC. This

is indicated by changing the Status indicator color to red or green respectively. The first time after the LTM client has been started the connection has to be established manually by a click on '*Connect*'. As from this moment the connection mechanism is automated. Whenever the connection is lost, the client tries to re-establish the connection.

Disconnect

Disconnects iPAQ LTM from the network.

Exit

Exits the Application



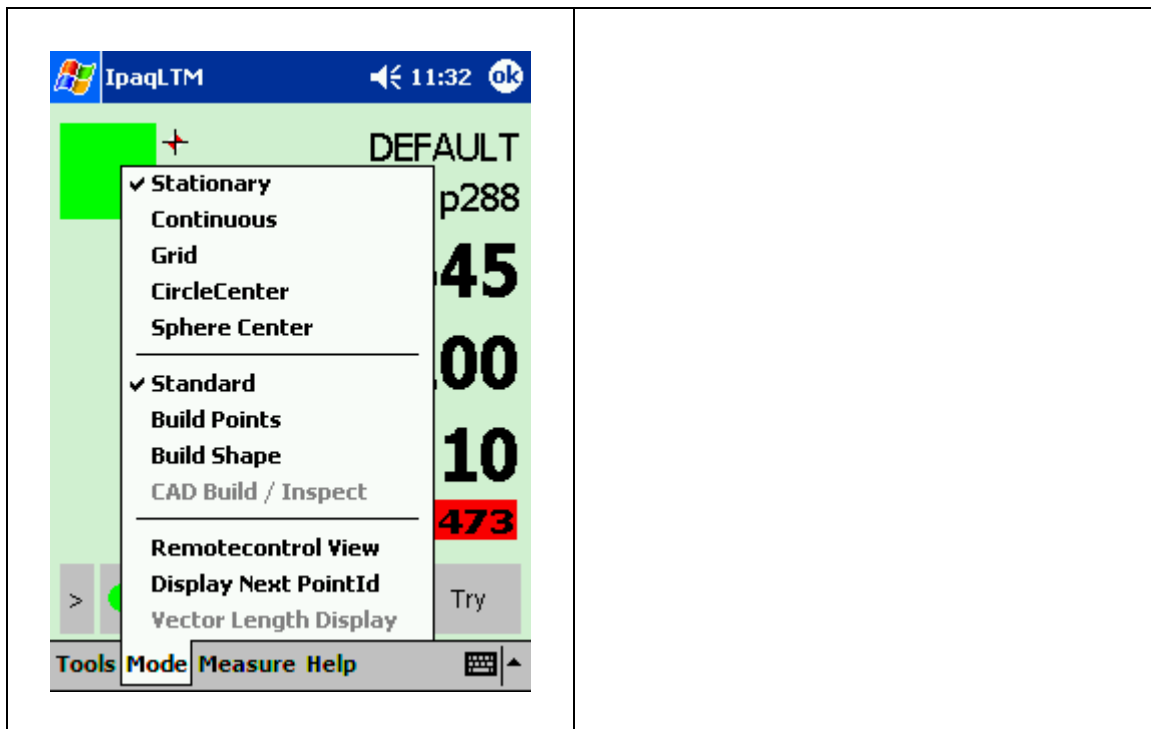
Important: Connection can only be established if a Measurement View in Axyz LTM is opened!



If the system performance slows down and gets indolent or seems to hang up during the connection process, perform a soft reset on the pocket pc and try to do the following steps:

- **Ensure to have set the correct IP addresses within your Systems**
- **Switch when necessary WLAN power off to be able to change the settings on the iPAQ**
- **switch WLAN on again and launch iPAQLTM**

5.2.2.2 Menu Mode



Available Measurement Types



Stationary: *[Menu: Mode/Stationary]*

This method is used for measuring to a fixed reflector position, either using the IFM or ADM (if available). Averaging a number of measurements derives the pointing and the averaged measurement is available for use by the Orientation Module and Single Point Solution.



Continuous: *[Menu: Mode/Continuous]*

This method is used to record a related set of points generated dynamically, such as the sweep of a robot arm or a reflector scanned across the surface of an object.



Grid: *[Menu: Mode/Grid]*

In grid measurement a 3D grid of planes or surfaces is defined. Every time the reflector moves through a surface a point is recorded, which means that multiple points can be recorded on the same surface. The technique is similar to continuous measurement by change of coordinate.

**Circle Center:** *[Menu: Mode/CircleCenter]*

A stepped cylindrical adapter can be used to locate a point indirectly. By scanning a reflector around the step, reflector positions on a circle can be recorded. The center of the circle lies on the axis of the cylinder. This center is automatically derived from the best-fitting circle and defines the required point, which is assigned the type entered.

**Sphere Center:** *[Menu: Mode/SphereCenter]*

A fixed stationary point such as a hole center can be measured indirectly with an adapter which has a spherical surface and by scanning a reflector across and in contact with the sphere's surface.

The measured reflector positions also lie on a spherical surface with the same center as the adapter. This center is automatically derived from the best-fitting sphere and defines the required point, which is assigned the type entered.

Available Measurement Modes, refer to next chapter for detailed information

**Standard Mode:** *[Menu: Mode/Standard]*

Standard mode offers a number of methods for making 3D static point measurements and 3D dynamic point recording.

**Build Points:** *[Menu: Mode/Build Points]*

A list of points to be built is selected from the reference points. If a point is input manually, the list only contains the one point. The manually input point is not stored in the reference area but can be stored in the object area by subsequent measurement as a normal measured point.

**Build Shapes:** *[Menu: Mode/Build Shapes]*

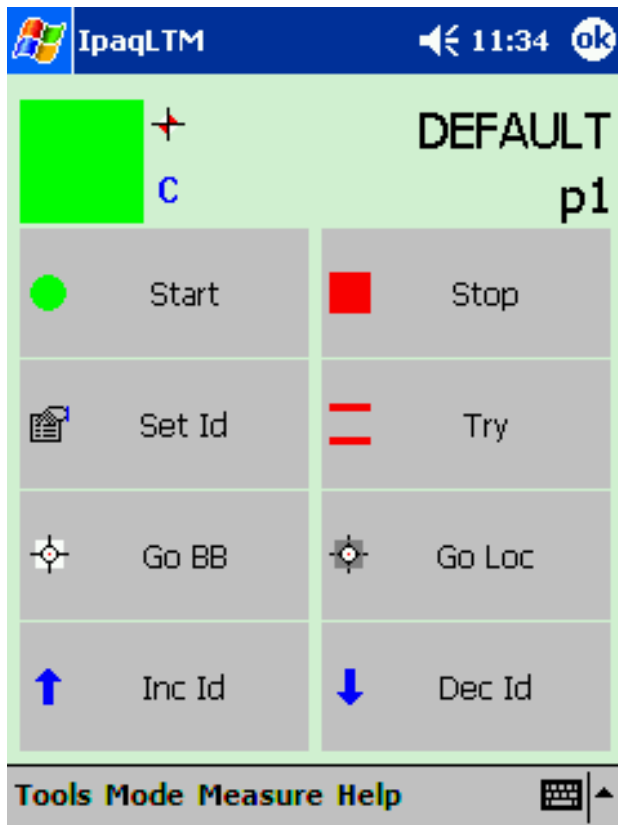
Is used to manually set out points on a standard **Axyz** shape surface (e.g. cylinder) or check the offsets of existing points from a standard surface.

**CAD Build Inspect** *[Menu: Mode/CAD Build/Inspect]*

Is used to Build or Inspect CAD data selected in Axyz CAD. Single Points with their deviations to the CAD can be stored.

RemoteControlView

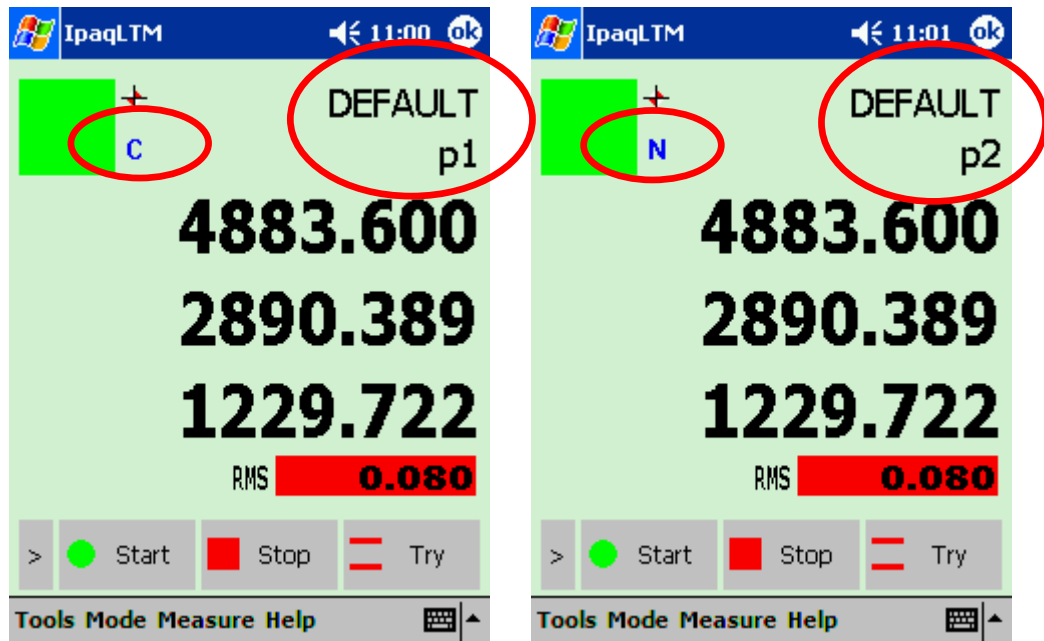
[Menu: Mode/ RemoteControlView]



This option allows toggling in between the general iPAQ LTM Measure View and the new RemoteControlView.

This RemoteControl View allows to quickly access the main functionalities of LTM by using the Touch Screen capability of the Pocket PC.

Additionally the Status indicator, the actual measurement type view and the current/next point ID is visible.

Display Next PointID: *[Menu: Mode/ Display Next PointID]*

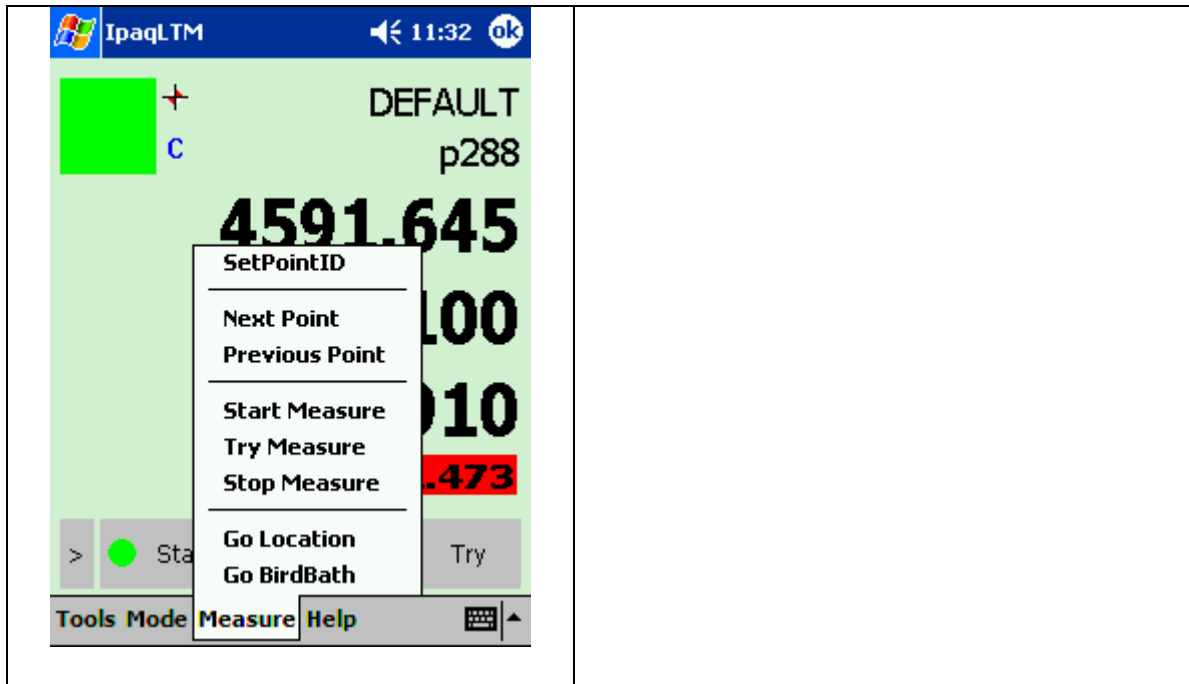
This toggles the View of the measurement ID. Character 'C' in the upper left corner indicates that the current PointID is displayed, 'N' the Next Point ID.

Vector Length Display: *[Menu: Mode/ Vector Length Display]*

This toggles the way of displaying the Build Difference. Instead of the individual components, only one value, the vector length is displayed.

The Vector Length Display is only in Build Modes available!

5.2.2.3 Menu Measure



These functionalities are accessible via Buttons also!

Set Point ID: *[Menu: Measure/SetPointID]*

To re-define the identifier for the next measured point in the current measurement window

Note: Unlike at the Axyz LTM, this button does not allow to set any parameters. All parameter definitions have to be set at the Axyz LTM.

Next Point: *[Menu: Measure/ Next Point]*

Moves to the next point in a Build list, or increments the point ID by 1 for the next point to be measured in normal measurement.

Previous Point: *[Menu: Measure/ Previous Point]*

Moves to the previous point in a Build list, or decreases the point ID by 1 for the next point to be measured in normal measurement.

Start Measure: *[Menu: Measure/ Start Measure]*

Once a measurement mode or method has been selected and any changes made to the data collection parameters, use this selection to start measurement and record the results in the database.

Try Measure: *[Menu: Measure/ Try Measure]*

This is an alternative to Start and has the same function except that it does not store any data in the database. It is used simply to make a quick check

Stop Measure: *[Menu: Measure/ Stop Measure]*

This stops storage or display of any data being continuously recorded.

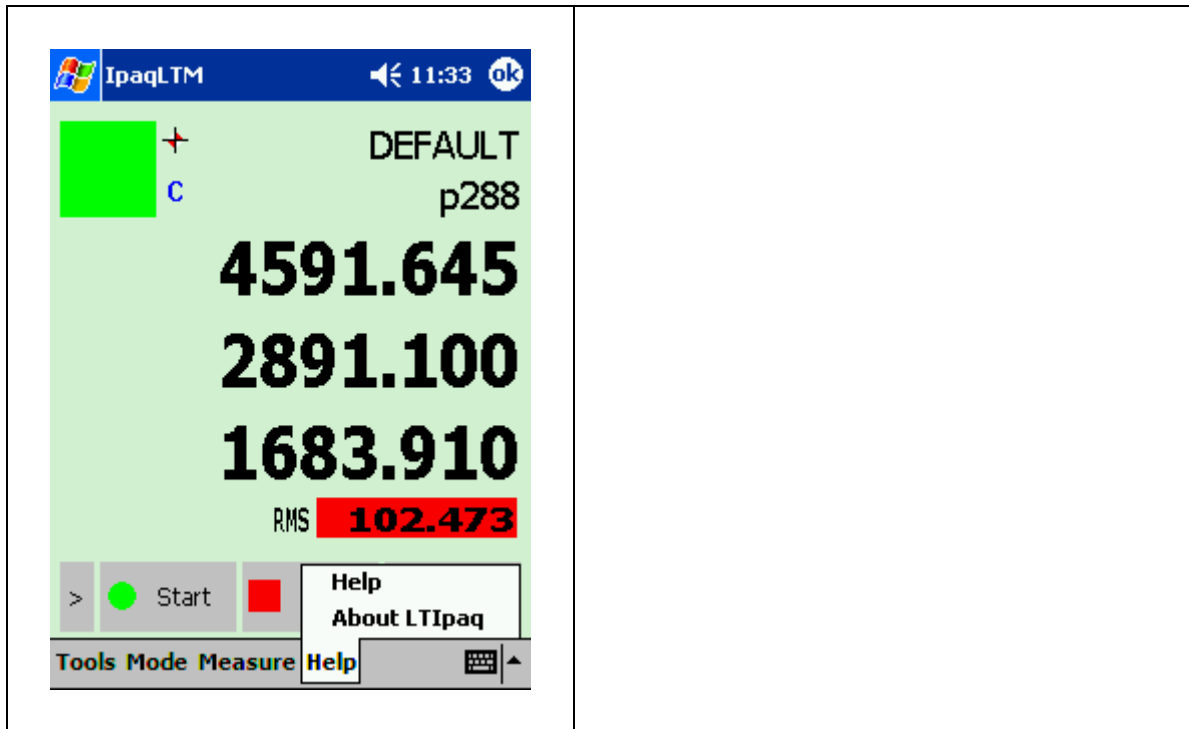
Go Location: *[Menu: Measure/ Go Location]*

This command allows placing the reflector in a previously measured position and locks onto and sets the distance for the IFM. Coordinate values from the appropriate station may define the position.

Go BirdBath: *[Menu: Measure/ Go BirdBath]*

This command sets the angular values, which define the current location of the reflector when placed in the Home Point (Birdbath). If the reflector is in position the beam locks on and the distance is set to the defined Birdbath value for the current reflector.

5.2.2.4 Menu Help



Help: [Menu: Help/Help]

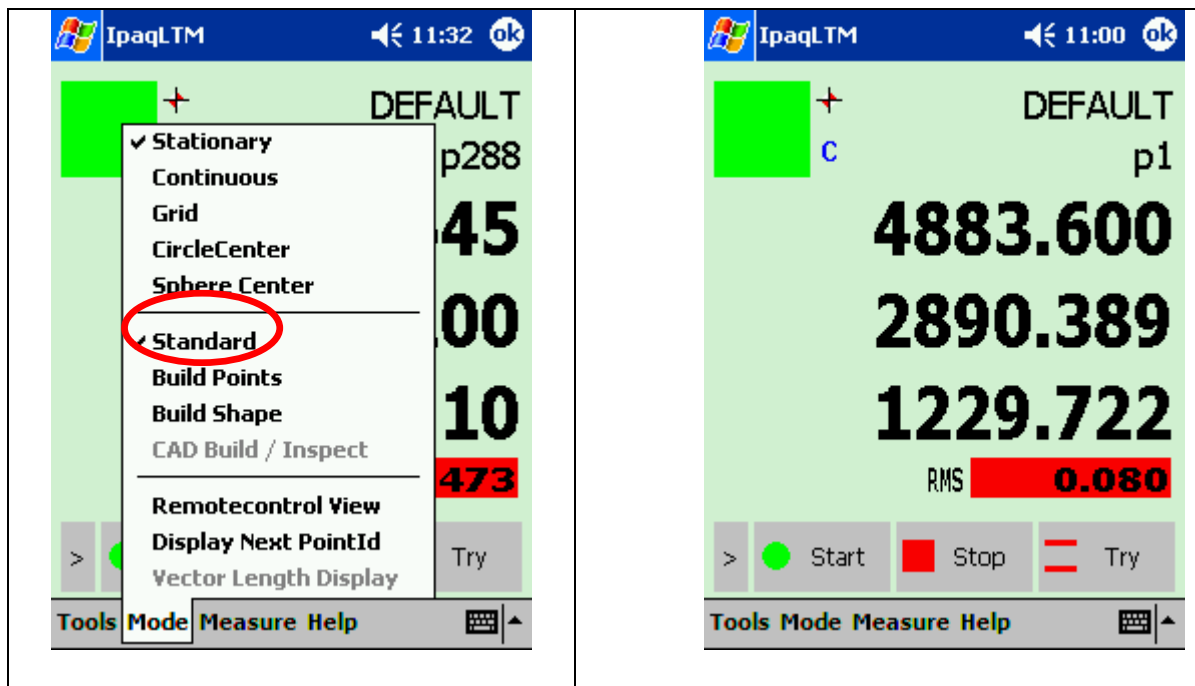
This menu refers to the User Manuals

5.3 Measurement modes

5.3.1 Standard Measurement Mode

Menu Point "Mode"
Select Standard

And select the Measurement Type you need "Stationary",
"Continuous", "Grid", "Circle Center" or "Sphere Center".



Measurement Status:

The measurement window has, in the top left hand corner, an indicator of measurement status resembling a traffic light. The example shows the color coding, together with the meaning. If the ADM is in use, the letters "ADM" are superimposed on the indicator.

WP/Pt ID:

The Work Piece and the Point ID are displayed in two separate fields (field length: max. 16 characters).

Coordinates:

The coordinates are displayed in the current coordinate and unit system set in CDM.

RMS Value/Mean Error:**RMS Value:**

For stationary points located by circle fit, sphere fit or averaged location, this is the RMS value of the corresponding residuals for the current measurement. The RMS Value is displayed in the current coordinate -, unit system and color-coded based on the Tolerance settings set in LTM.

Mean Error:

For stationary points located by circle fit, sphere fit or averaged location, this is the variance factor (mean error) of the corresponding residuals. The Mean Error is displayed in the current coordinate -, unit system and color-coded based on the Tolerance settings set in LTM.

The Label of the Total RMS/Mean Error Display has to be set in Axyz CDM, menu "Settings" for Weightings and Quality Statistic.



Settings like:

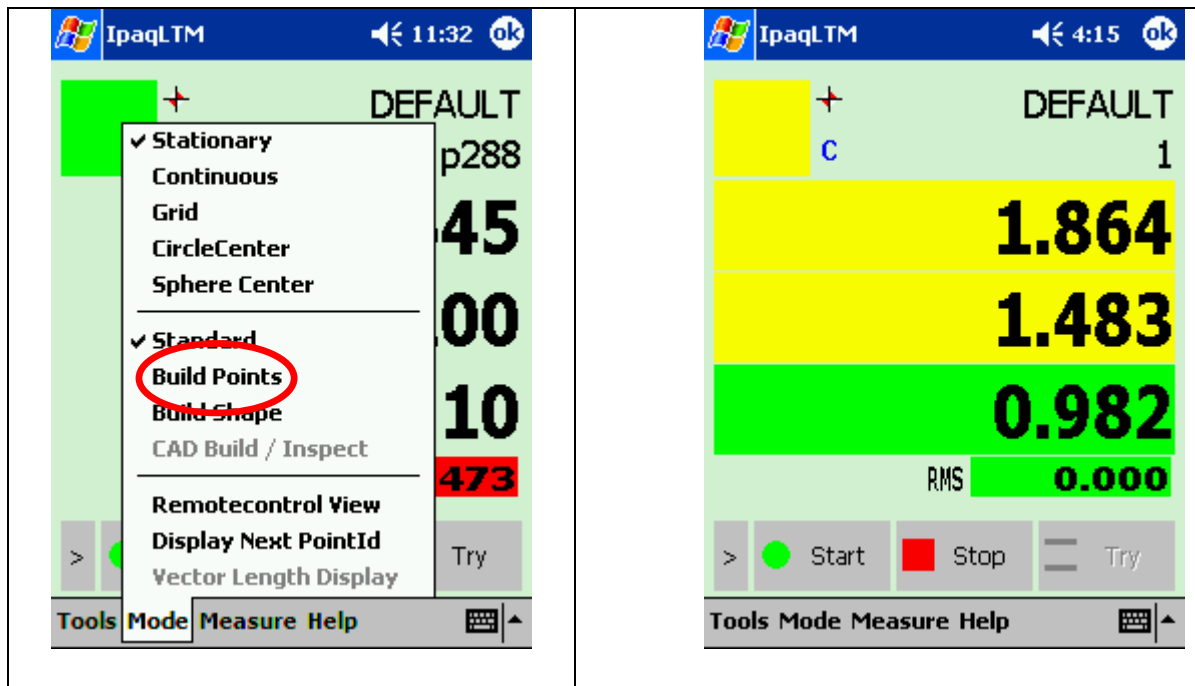
- Collection Interval
- Filter Specifications
- Measurement Count
- Miscellaneous

Have to be set at Axyz LTM Module.

5.3.2 Build Points

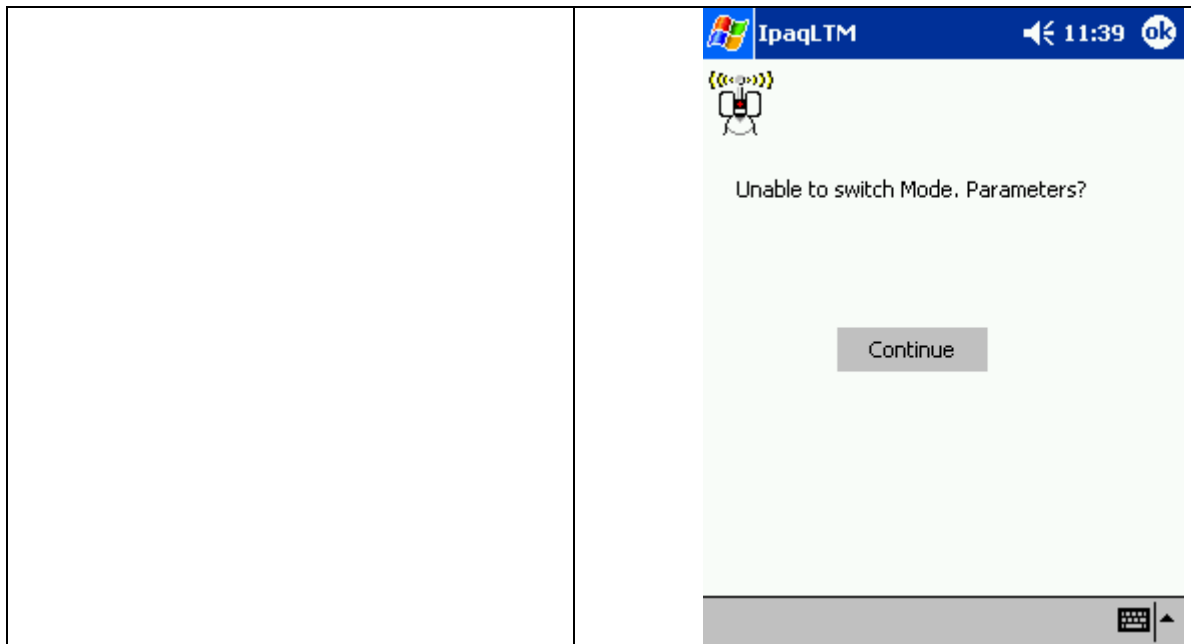
To indicate accuracy, the builder differences uses color-coding according to defined tolerance levels. To define the colors and warning levels (tolerance levels), see Tracker Warnings (LTM).

Menu Point “Mode”
Select “Build Points”



The selection of the reference points and the settings must be done at the Axyz LTM/CDM Module.

Following error message appears if reference points are not previously selected.



To indicate accuracy, the builder differences uses color-coding according to defined tolerance levels. To define the colors and warning levels (tolerance levels), see Tracker Warnings (LTM).

5.3.3 Build Shapes

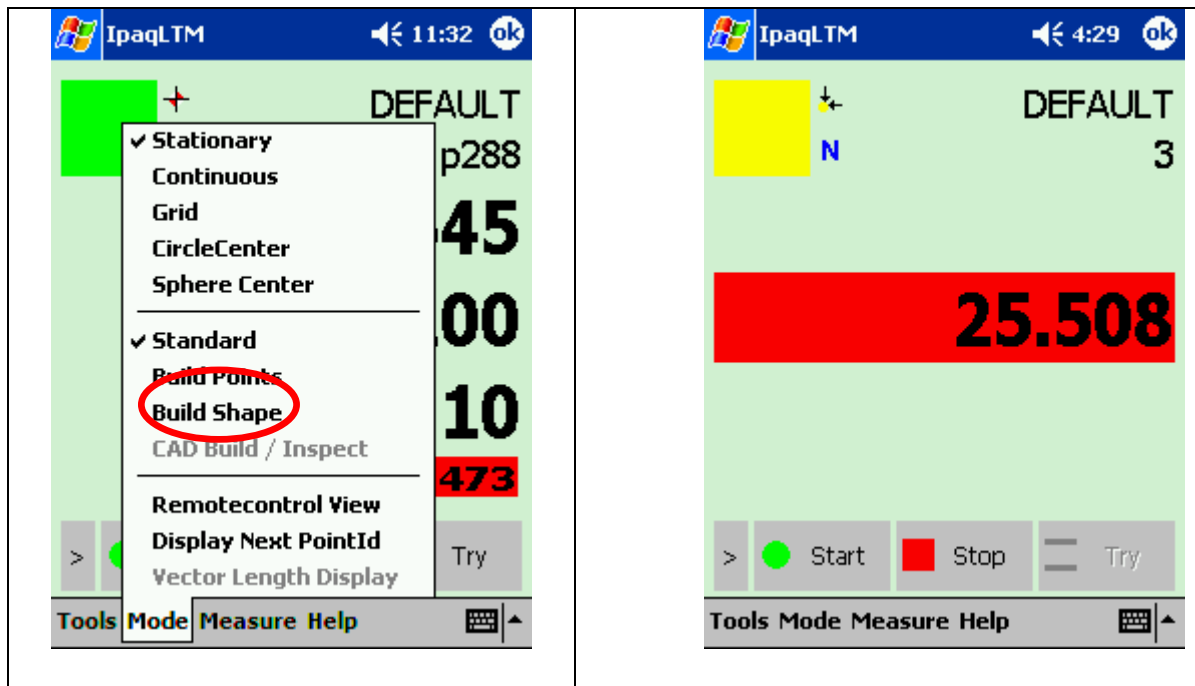
Build/inspect shapes has two objectives:

- To check how an existing object surface conforms to one of the standard **Axyz** shapes such as a sphere or cylinder.
- To set out points on one of these standard surfaces.

When a reference shape has been defined the reflector is tracked and the measurement view shows the perpendicular offset of the current reflector position from the defined surface.

Menu Point “Mode”

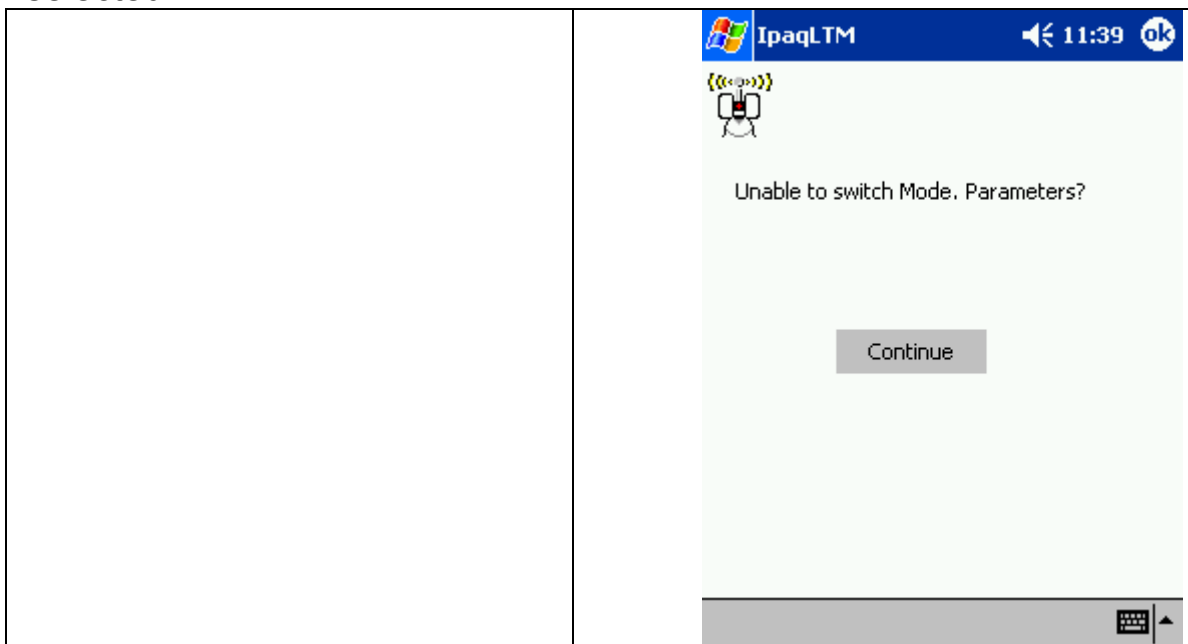
Select “Build Shapes”





The selection of the shape type and the settings must be done at the Axyz LTM/CDM Module.

Following error message appears if shape type is not previously selected.



To indicate accuracy, the builder differences uses color-coding according to defined tolerance levels. To define the colors and warning levels (tolerance levels), see Tracker Warnings (LTM).



If a reflector offset is to be taken into account, settings have to be made at the Axyz LTM.

5.3.4 CAD Build/Inspect

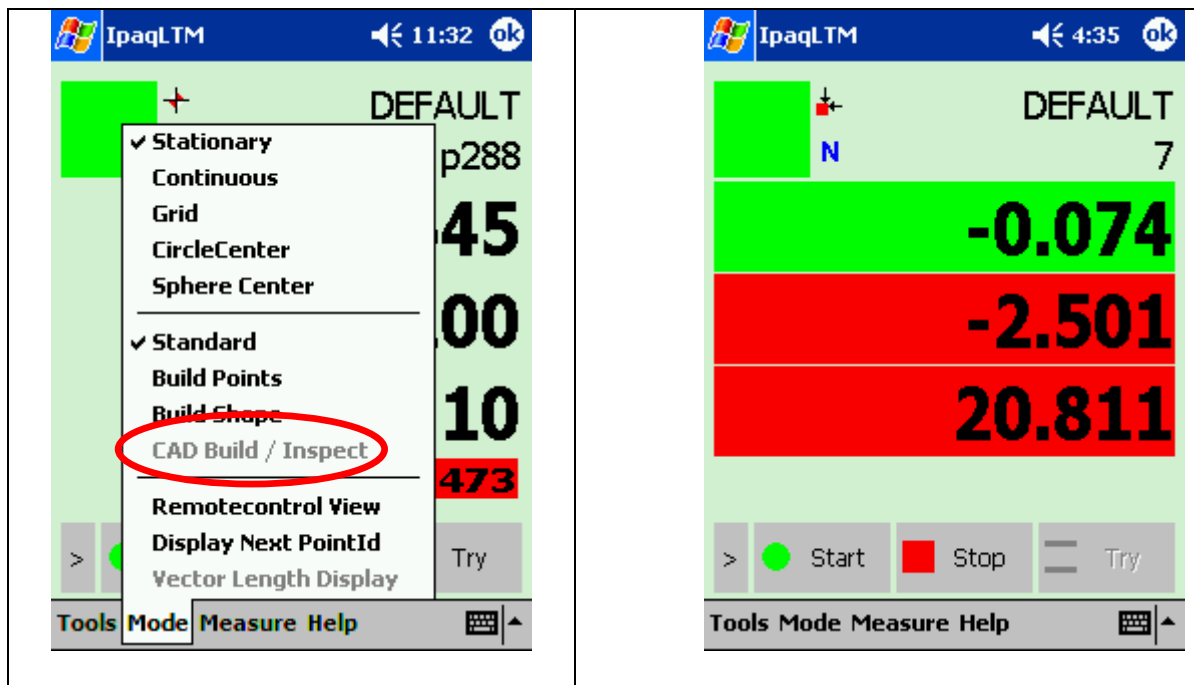
CAD Build/inspect has two objectives:

- To check how an existing object surface conforms to CAD data.
- To set out points on the CAD data.

When a reference CAD has been defined the reflector is tracked and the measurement view shows the perpendicular offset of the current reflector position from the defined surface.

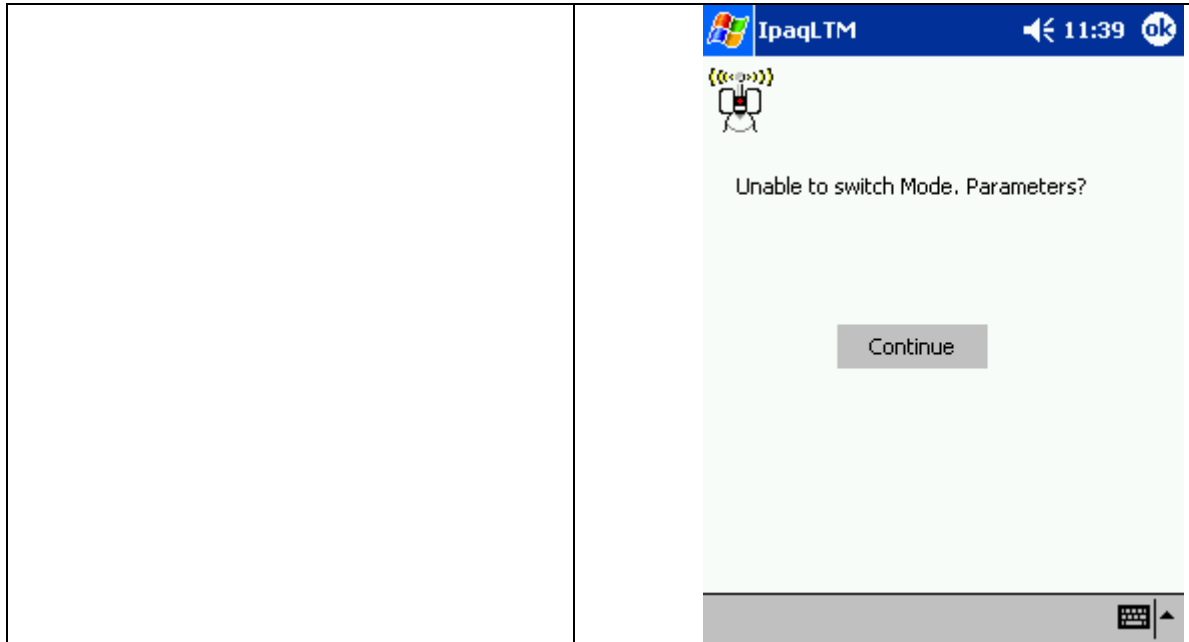
Menu Point “Mode”

Select “CAD/Build Inspect”



The selection of the CAD and the settings must be done at the Axyz LTM/CAD/CDM Module.

Following error message appears if shape type is not previously selected.



To indicate accuracy, the builder differences uses color-coding according to defined tolerance levels. To define the colors and warning levels (tolerance levels), see Tracker Warnings (LTM).



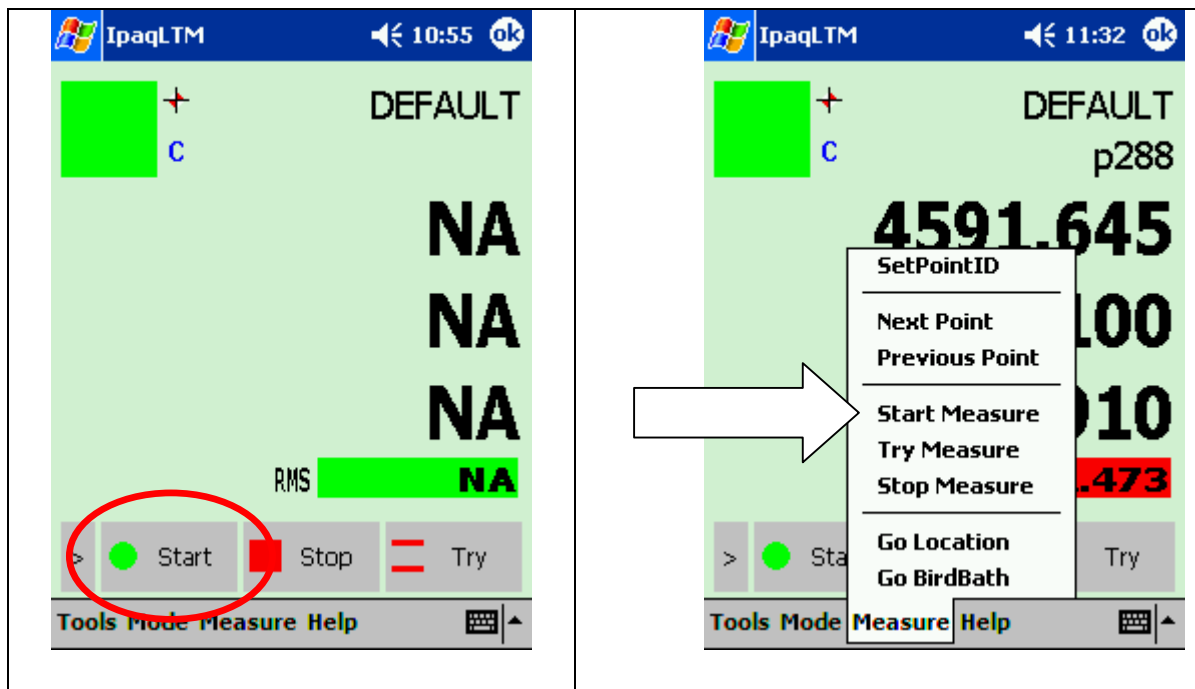
If a reflector offset is to be taken into account, settings have to be made at the Axyz LTM.

5.4 Standard Functions

5.4.1 Start Measure

Menu "Measure"

Select "Start Measure" Or button Start



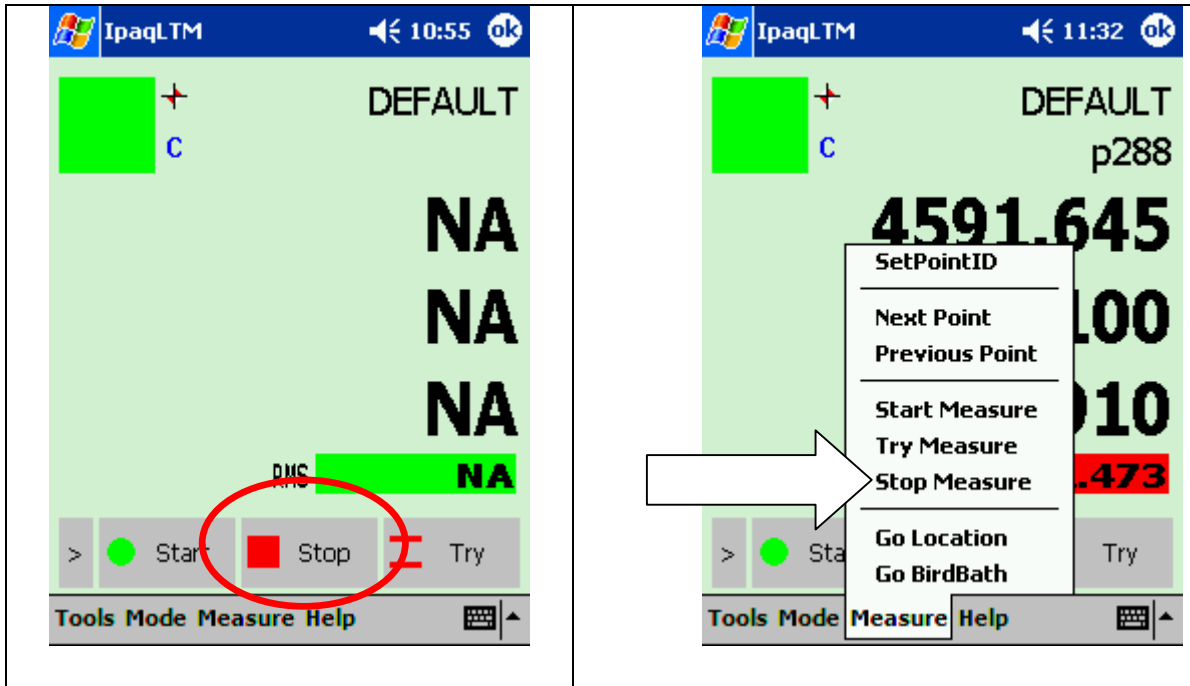
“Start measurement and store”

Once a measurement mode or method has been selected and any changes made to the data collection parameters, use this selection to start measurement and record the results in the database.

5.4.2 Stop Measure

Menu "Measure"

Select "Stop Measure" Or button Stop



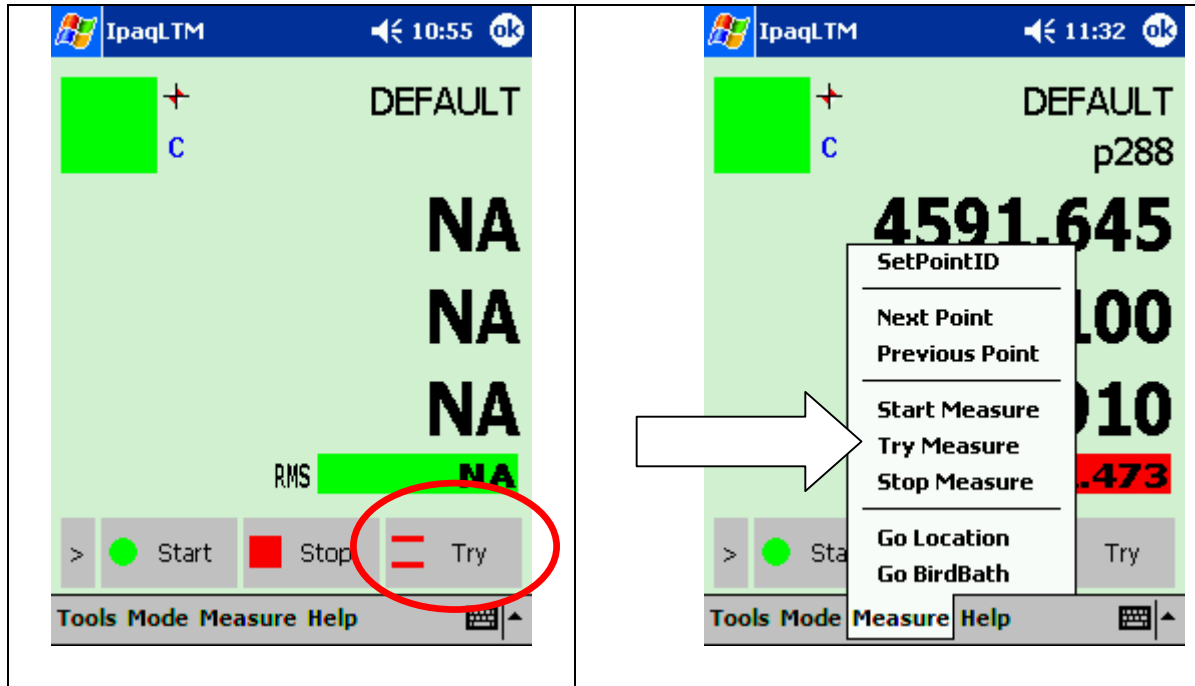
"Stop measurement process"

This stops storage or display of any data being continuously recorded.

5.4.3 Try mode

Menu "Measure"

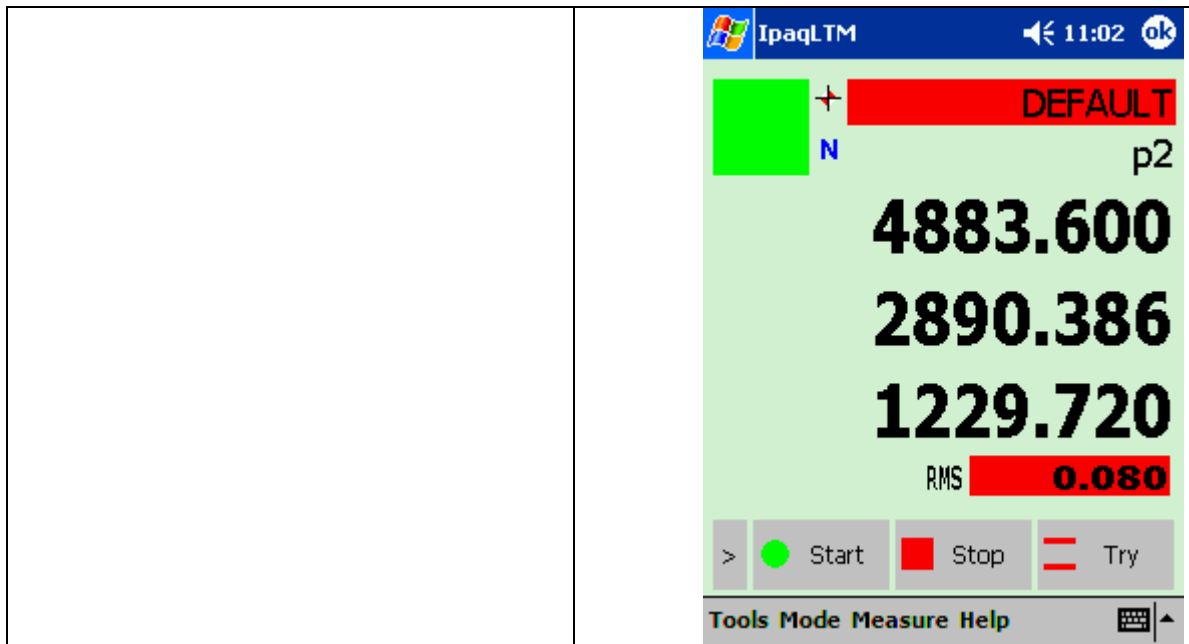
Select "Try Measure" Or button Try



"Start measure no storage"

Once a measurement mode or method has been selected and any changes made to the data collection parameters, use this selection to start measurement and display the results.

This is an alternative to Start and has the same function except that it does not store any data in the database. It is used simply to make a quick check.

**WP/Pt ID:**

The Work Piece is displayed with a red background color.

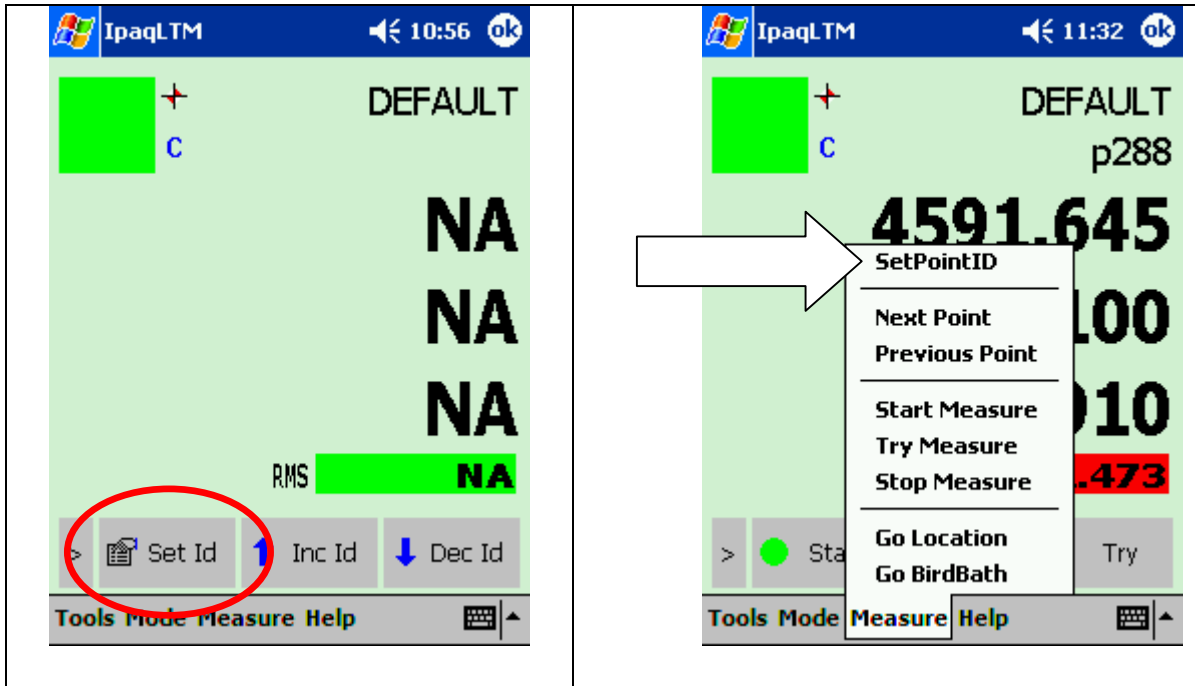


Try can be selected in any mode. (Standard, Build, Inspect)

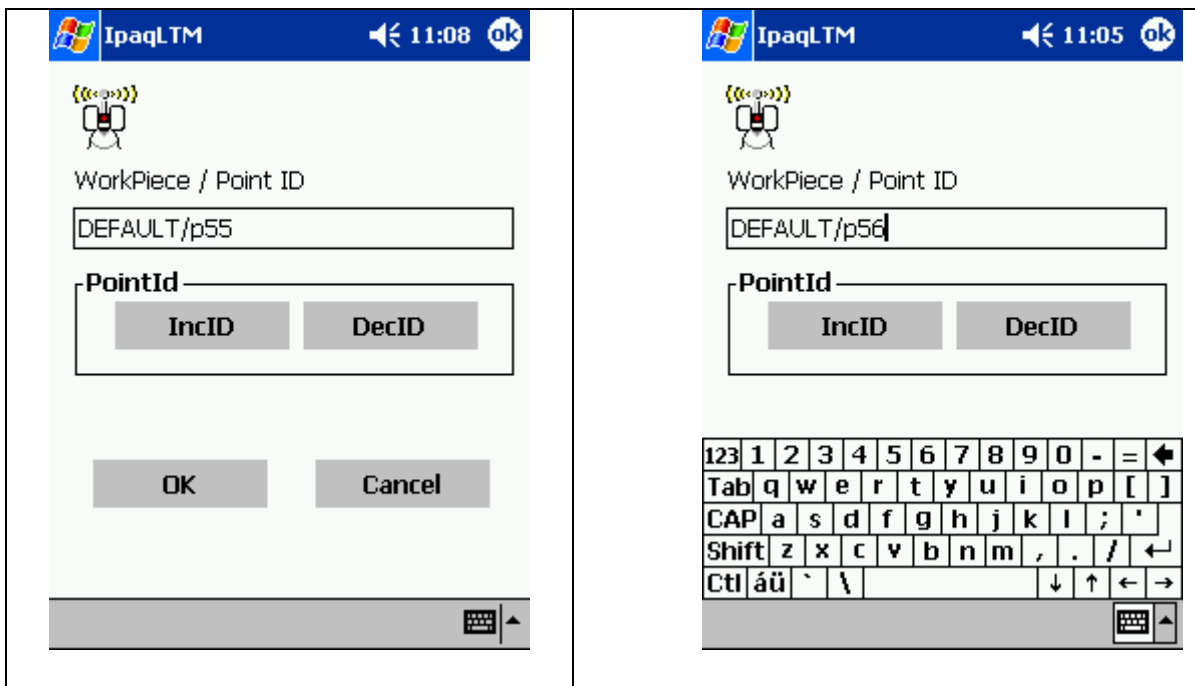
5.4.4 Set Point ID

Menu "Measure"

Select "SetPointID..." Or button Set ID



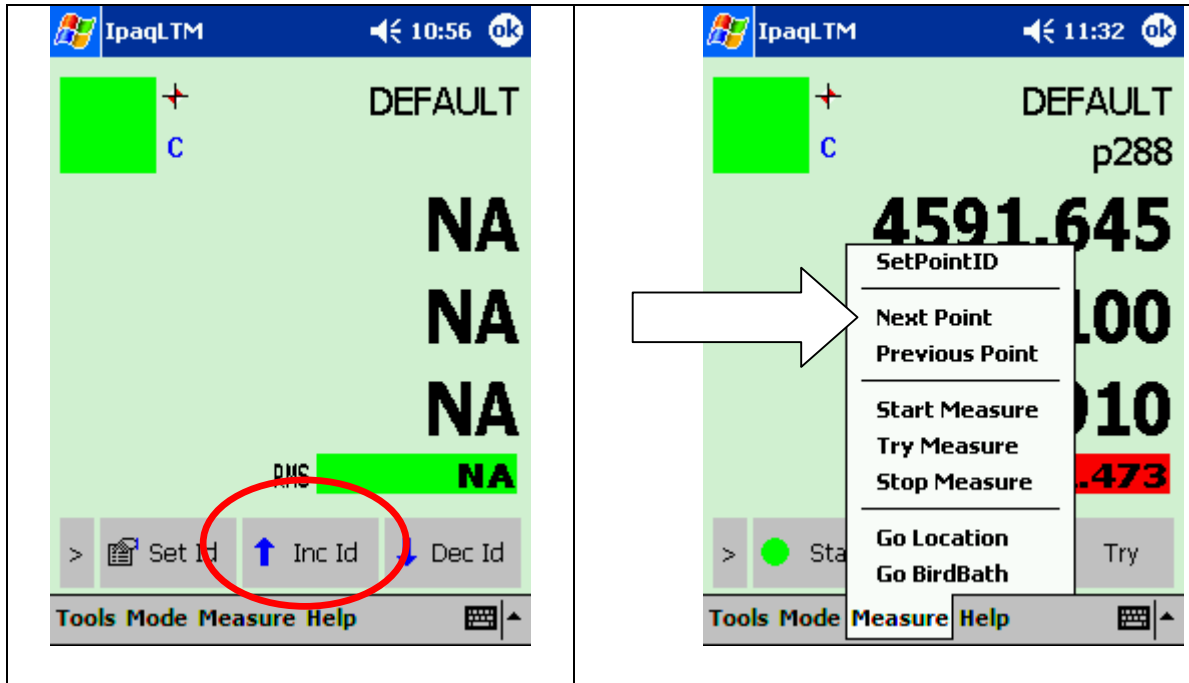
The Point ID for the next measurement can be set.



5.4.5 Next Point

Menu "Measure"

Select "Next Point" Or button IncID



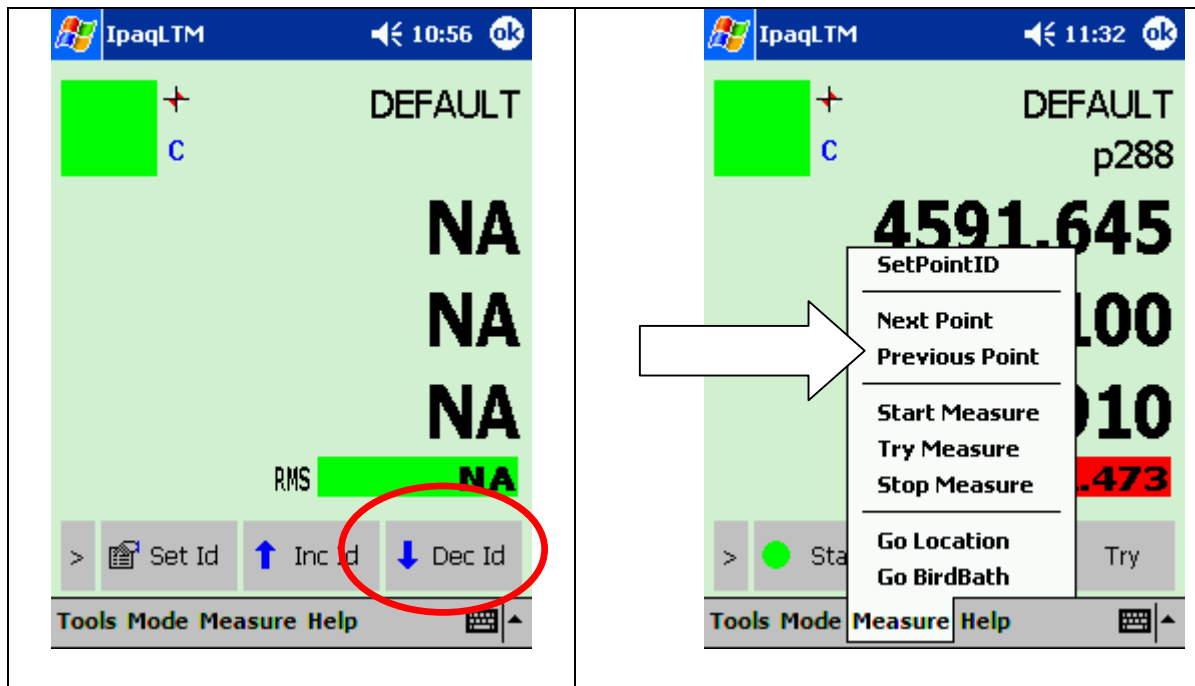
"Next Point process"

Moves to the next point in a Build list, or increments the point ID by 1 for the next point to be measured in normal measurement mode.

5.4.6 Previous Point

Menu "Measure"

Select "Previous Point" Or button DecID



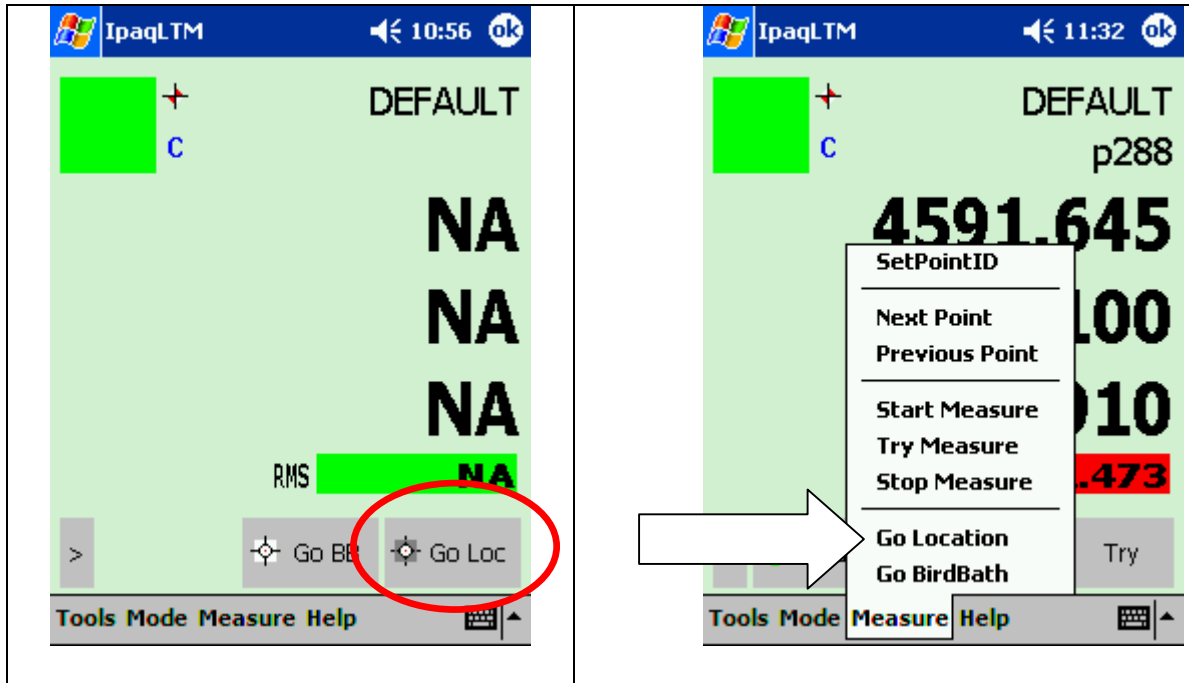
"Previous Point process"

Moves to the previous point in a Build list, or decreases the point ID by 1 for the next point to be measured in normal measurement.

5.4.7 Go Location

Menu "Measure"

Select "Go Location" Or button Go Loc



"Go Location process"

This is used to lock onto the reflector at a particular location.

The Go Location Point input assumes a pre-measured or entered point of the type Coordinate.

Input Parameters:

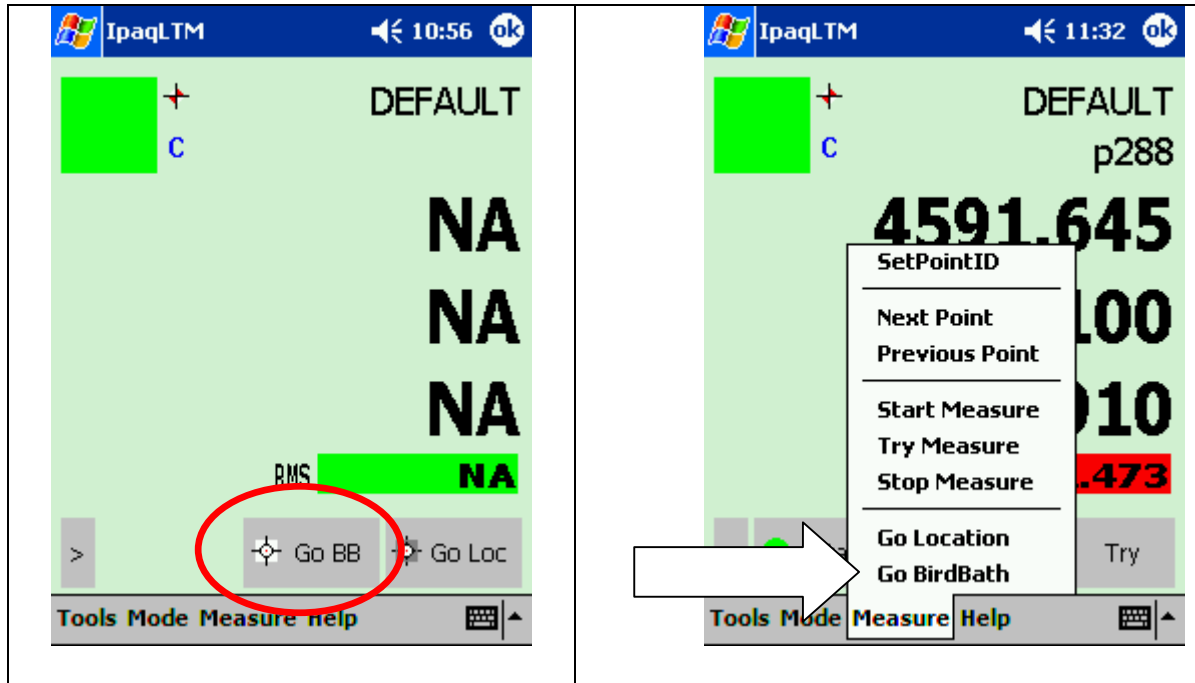
- Station: Active station (no user input)
- Type: Coordinate (no user input)
- Point ID: div. (user input required)

If the instrument has an ADM, and the flag "Read ADM Distance" is set in the Stationary parameter list, then the ADM is automatically used to measure the distance to the location. However the reflector must be further than the minimum ADM distance (approx. 2m) for this measurement.

5.4.8 Go BirdBath

Menu "Measure"

Select "Go BirdBath" Or button Go BB



“Lock onto reflector in the Birdbath”

This command sets the angular values, which define the current location of the reflector when placed in the Home Point (Birdbath). If the reflector is in position the beam locks on and the distance is set to the defined Birdbath value for the current reflector.

To get the reference distance the beam is driven to the BirdBath location. Make sure the correct reflector is placed previously at the BirdBath.

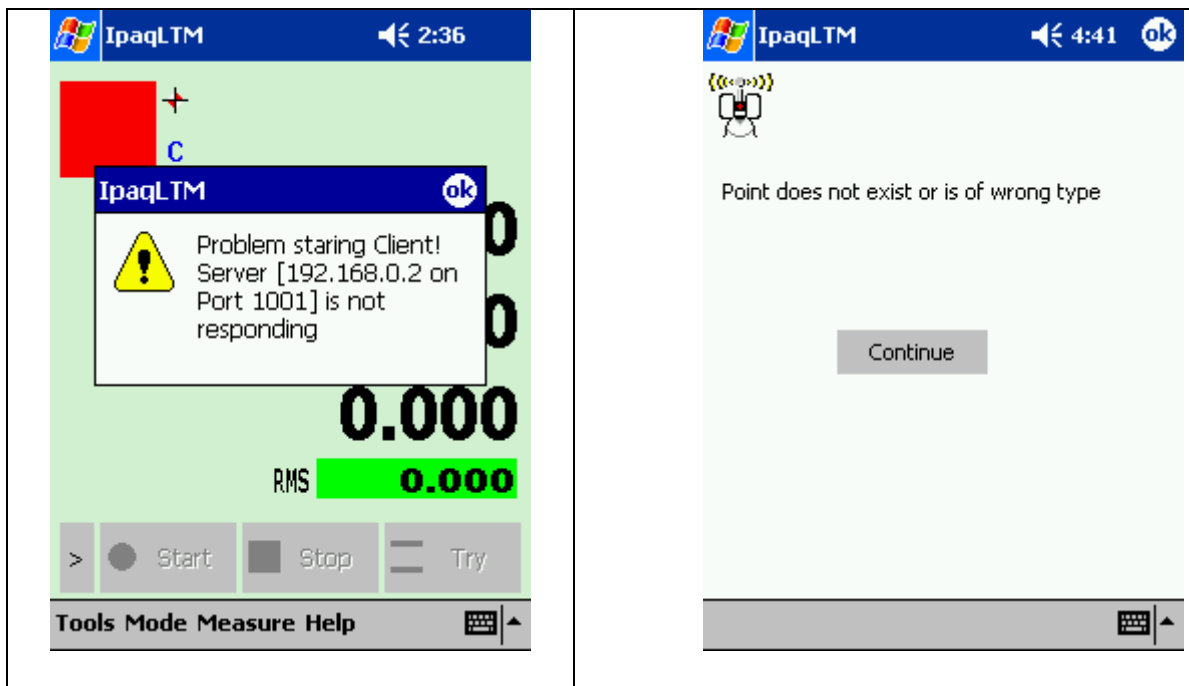
5.5 Error Messages

5.5.1 Problem starting Client

This error message appears when the IP address defined in **TCP/IP Configuration** dialogue is not the same address (see chapter 4.1) as the TCP/IP address of the Master Station (AP computer).

5.5.2 Point does not exist

This error message appears when in the **Go Location** dialogue a wrong WP/Pt ID is entered. E.g. the point does not exist in the Axyz DM database.



5.5.3 Unable to switch mode

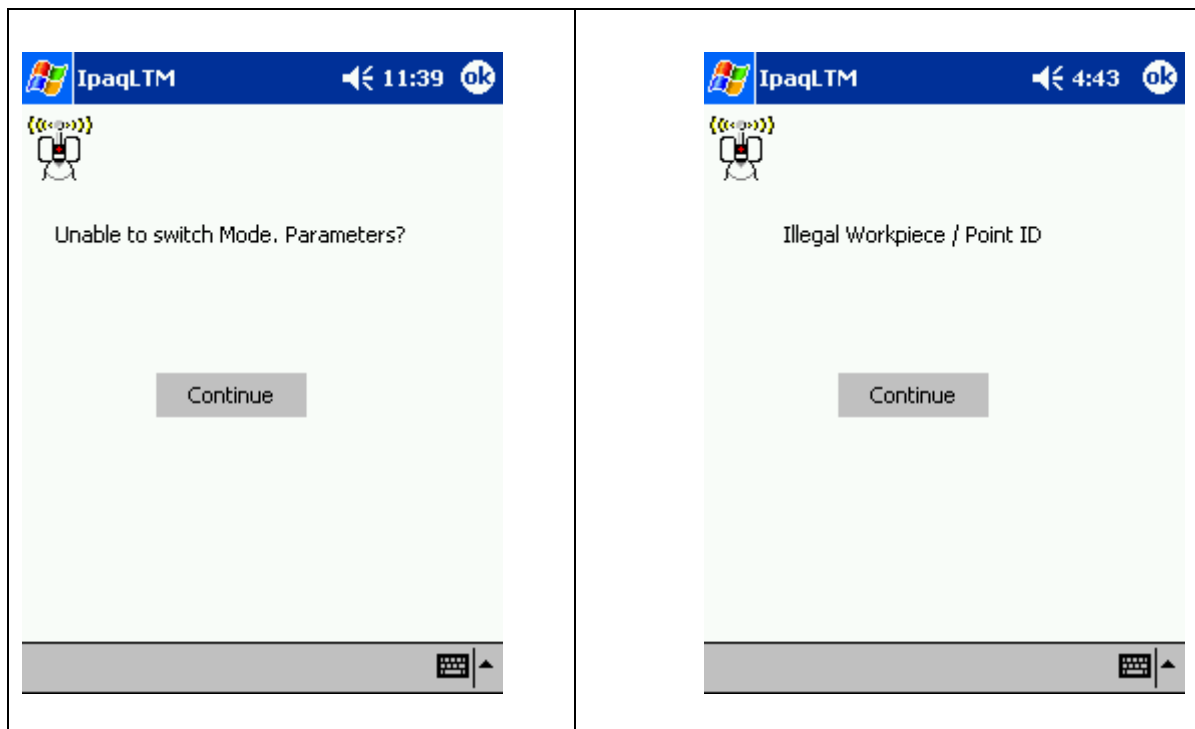
This error message appears when switching from the standard mode to build points or build shapes mode. Under these modes is some parameter missing.

E.g. Build Points: No reference points are selected.

E.g. Build Shapes: No shape type is selected.

5.5.4 Illegal Workpiece / Point ID

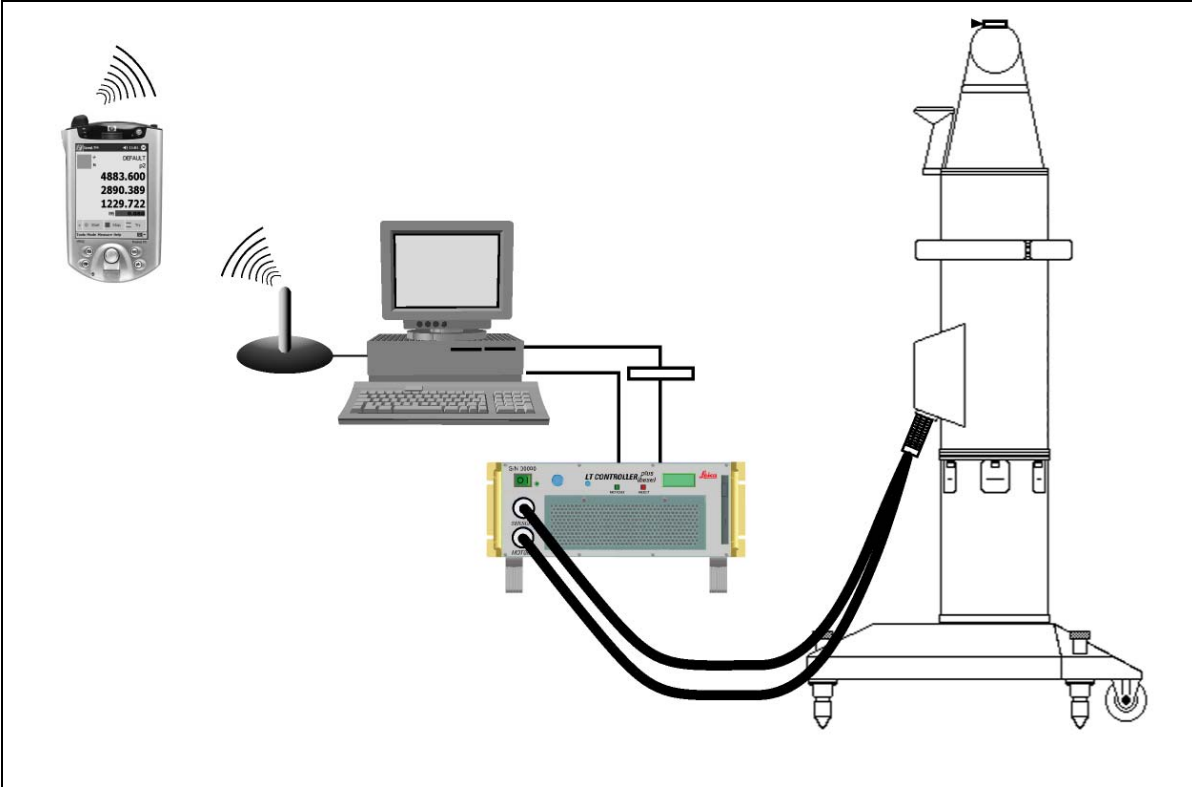
This error message appears when in the **Set Point ID / Go Location** dialogue a wrong WP/Pt ID is entered. E.g. too many characters used for the point ID (>16Char.).



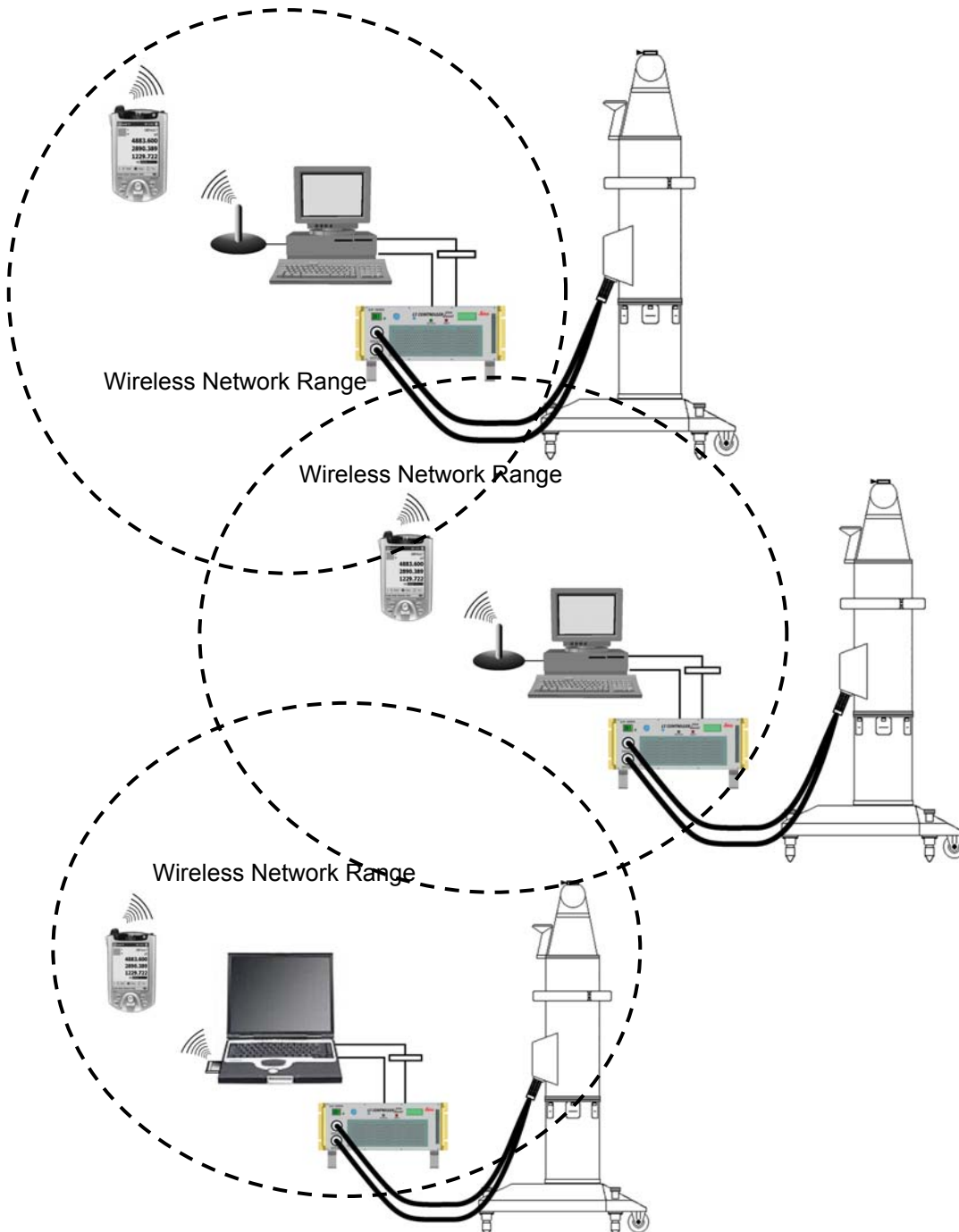
6 Appendix A

6.1 Wireless Network Topology

The whole documentation is based on a single system network setup as shown below.



In case of several Laser Tracker systems placed in the range of the wireless network, you must change certain network parameters. This modification ensures that the systems do not interfere with each other. For details how to setup this network please refer to the manufacturers User's Guide Manuals.



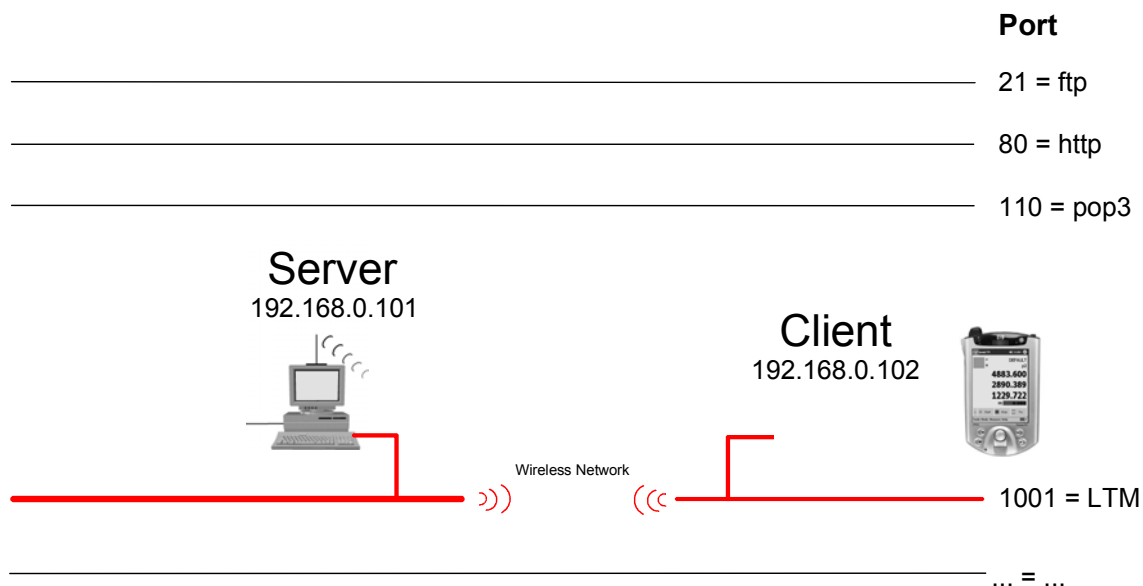
6.2 Port Numbers (TCP/IP Protocol)

When a single server provides several TCP/IP services, clients need a way to identify which of these services they wish to use. Port numbers provide such a method.

When a TCP/IP service starts up, it registers with the local machine's network software and asks to receive all traffic directed to certain ports. The network software then forwards all incoming traffic on those ports to that service.

If a server registers a service on a port that's already in use, it receives an error code. Allowing two services to register the same port would be ambiguous; the network software would again be unable to identify which service should receive traffic arriving on that port.

By default, HTTP servers listen on port 80. If a system administrator wants to run several kinds of server software at the same time on the same machine, the administrator must configure each piece of the software to listen on a different port number. In our network setup the LTM Remote server service communicates on port 1001. As shown below you see some example services, which are running on specific port numbers.



In case of the port 1001 is occupied by any different service, you have to rearrange the port configuration for LTM Remote. Choose any free port number and change the setting in the Axyzsys.ini file:

```
[RemoteLTController]
Portnumber=1001
```

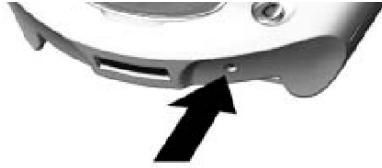
If you change the port number in the Axyzsys.ini file you also have to change the TCP/IP Settings in the File menu of Axyz LTM Remote (Handheld PC) to the corresponding port number (see LTM Training Manual, chapter K3, TCP/IP Settings).

7 Appendix B

7.1 Troubleshooting iPAQ WLAN Connection

Which LED indicates a successful Wireless connection?	<p>Close to the iPAQ Antenna, are 3 LED's positioned on the left upper corner. The LED on the top is used for WLAN status indication.</p> <p>Status indication:</p> <ul style="list-style-type: none"> • Flashing with a orange light: No wireless connection established • Flashing with a green light: Wireless connection established • If the top LED is switched off, the iPAQ Wireless functionality is not enabled > Start > iPAQ Wireless > Switch on "WLAN" (green = ON)
No Connection, top LED on the left upper corner is flashing green	<p>This happens if the connection on the Application PC has been disabled during a successful connection!</p> <p>Application PC: Double e click the Local Area Connection (Device Name: D-Link Air Plus) and enable it again (W2000: Start > Settings > Network and Dial-up Connections). Start the D-Link Air Plus USB Utility and rescan the network.</p>
Search the iPAQ IP with the ping command	<p>Start on the Application PC the command console and search the IP-Address of the iPAQ. Enter in the command line:</p> <pre>C:\>ping 192.168.0.102</pre> <p>Note: Enter with the <i>ping</i> command the correct IP address you specified for the iPAQ Wireless Adapter. (Chapter 2.2.1.2 or 2.2.1.3)</p>

<p>No Connection established, top LED on the left upper corner is flashing orange</p>	<p>Application PC (AP): Is the Network Status enabled?? (W2000: Start > Settings > Network and Dial-up Connections) Double click the Local Area Connection (Device Name: D-Link Air Plus) and enable it.</p> <p>Start the D-Link Air Plus USB Utility and Rescan the network. If the Utility shows in the menu SiteSurvey no available network, then no connection is established (to be sure: use “refresh” button)! Check the iPQA settings!</p> <p>If the top LED on the left upper corner is flashing orange and the iPAQ is listing a proper network with the status “connected” (Start > setting > tab: Connections > Connection > tab: Advance > Network Card > tab: Wireless), connect this network name again (keep with the stylus 3sec. on the listed name and choose “Connect” of the appearing pop-up menu.</p> <p>Note: Although on the iPAQ the status next to the network name appears with “connected”, the network could be not connected (be aware of the LED indication)</p>
<p>Start LTM.exe and try to connect, but LTM.exe blocks the iPAQ system for a few seconds. LMT.exe is not working!</p>	<p>No wireless connection to the Application PC established! Verify the used TCP/IP settings in the LTM.exe settings (Chapter 5.2.2.1). This problem could occur as well, if there is no proper running WLAN hardware on the AP available.</p> <p>Check the AP Settings! If you installed a different WLAN Adapter than one of the recommended D-Link products, please verify the IEEE 802.11b conformity.</p>

<p>iPAQ lost LTM.exe after an empty battery switched of the device.</p>	<p>Store the LMT.exe during installation in the nonvolatile storage. Chapter 4.1 choose option "iPAQ File Store" for installation (nonvolatile flash chip on the PDA hardware)</p>
<p>After troubleshooting, still no connection possible >> Reset iPAQ</p>	<p>Reset the iPAQ with the stylus (reset switch next to the cradle connector)</p> 



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