

- when it has to be **right**

**Leica**  
Geosystems



# DISTO™ connectivity overview

Version: 1.0

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# DISTO™ connectivity

## 0 Index

0	Index.....	2
1	Version History.....	3
2	Purpose of document.....	4
3	DISTO connectivity overview.....	4
3.1	Product overview.....	4
3.2	Bluetooth Functionality Overview.....	5
3.3	WLAN Functionality Overview.....	5
4	Bluetooth Overview.....	6
4.1	Bluetooth Compatibility Chart.....	7
4.2	Interface functionality.....	8
4.2.1	App Mode.....	8
4.2.2	Keyboard Mode.....	9
4.2.3	GSI Mode.....	10
5	WLAN Overview.....	10
6	Open questions.....	11
7	Addendum.....	11
8	General Overview.....	12

# DISTO™ connectivity

## 1 Version History

Date	Version	Shortsign	Information
23.11.15	V1.0	MAUJ	Document set up

# DISTO™ connectivity

## 2 Purpose of document

The purpose of this document is to illustrate the current status of DISTO connectivity. It shall also give an overview of the possibilities over APIs and device functionality.

## 3 DISTO connectivity overview

DISTOs are being listed with the according radio technology and the individual functionality provided.

### 3.1 Product overview

D110	D510	D810	S910	D3aBT	D8
					
					
Bluetooth 4.0 (accessory)				Bluetooth 2.1	

3D Disto	S910
	
	
USB 2.0 802.11 a/b/g Ad-Hoc	802.11 b/g/n Access Point & Client Mode

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## 3.2 Bluetooth Functionality Overview

DISTO model vs. Functionality	Distance	Distance Unit	Inclination	Inclination Unit	Magnetic Direction	Remote Control	Keyboard Numbers Mode	Keyboard Text Mode	Transmit Pressed Key	Model Identifier
DISTO D110	■	■				■				■
DISTO D510	■	■	■	■						■
DISTO D810 touch	■	■	■	■	■	■	■	■		■
DISTO S910*	■	■	■	■	■	■	■	■		■
DISTO D8	■	■	■	■		■			■	
DISTO D3aBT	■	■	■	■		■			■	

\*P2P measurement results in 3D only available over WLAN

## 3.3 WLAN Functionality Overview

DISTO model vs. Functionality	Distance	Inclination	3D Polar Coordinates	Motorization	Live Image	Single Snap images
Leica 3D Disto	■	■	■	■	■	■
DISTO S910	■	■	■			■

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## 4 Bluetooth Overview

Bluetooth is a well-known standard for wireless connectivity and interoperability. Since it was introduced in 1998 there have been four versions of Bluetooth. The biggest step with these four versions has been from Bluetooth 3.0 to Bluetooth 4.0 (also known as Bluetooth Low Energy or Bluetooth Smart).

If your product bears this logo..	.. it is a device like
 <b>Bluetooth</b> It is operates with <ul style="list-style-type: none"> <li>- Bluetooth 1.0</li> <li>- Bluetooth 2.0</li> <li>- Bluetooth 2.1</li> <li>- Bluetooth 3.0</li> </ul>	
 <b>Bluetooth</b> SMART It operates with <ul style="list-style-type: none"> <li>- Bluetooth 4.0 (in accessory mode)</li> </ul>	
 <b>Bluetooth</b> SMART READY it operates with: <ul style="list-style-type: none"> <li>- Bluetooth 1.0</li> <li>- Bluetooth 2.0</li> <li>- Bluetooth 2.1</li> <li>- Bluetooth 3.0</li> <li>- Bluetooth 4.0 (in master mode to control accessories)</li> </ul>	

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## 4.1 Bluetooth Compatibility Chart

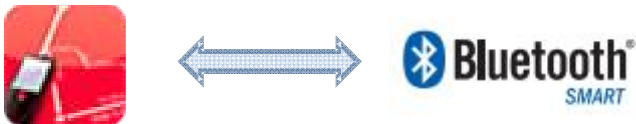
If your product bears this logo...	It's compatible with products bearing any of these logos...
	  
	 
	

# DISTO™ connectivity

## 4.2 Interface functionality

There is a range of individual functionality that is provided via Bluetooth, depending on the DISTOs capability and the usability.

### 4.2.1 App Mode



The app modes provides the user a feature to transmit the whole set of measurement data a DISTO is collecting with a single measurement. Depending on the DISTO this contains:

There are three ways to transmit data:

- by triggering a distance measurement with the DIST button
- by triggering a distance measurement via a remote command from the peer-device
- by sending the main line from the DISTO with a dedicated key

Every time a distance measurement gets triggered, the complete set of sensors is triggered, if the sensor-values are displayed within the HMI. This means that during a cross-inclination-error (tilted instrument), inclination or direction does not get transferred.

In addition to this, for every value the unit, which is configured on the DISTO, is being transferred as well. This provides the benefit to the API that app displays the measurement result in the same unit as on the DISTO.

### Remote Measurements available

Action	Remarks
Laser On	Turns on the laser. The HMI shows the laser status as well. During tracking this command is ignored
Laser Off	Turns off the laser. The HMI shows the laser status as well. During tracking this command is ignored
Distance	Triggers a distance measurement, the HMI shows the result and the measurement data is transferred as used over the characteristics. This command is ignored during tracking.
Tracking	Starts tracking... the HMI changes its display status to tracking as well. Every measurement gets transmitted via the characteristics
TrackingStop	Stops tracking, HMI stops min/max display.

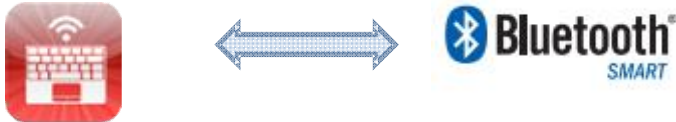
### Connection terminology

With the App mode the DISTO can be used generally with every Bluetooth Smart Ready device. To use this app mode it is required to have a Software on the other side which can handle the DISTO service, as it is proprietary made from Leica and not an official standard.




# DISTO™ connectivity


## 4.2.2 Keyboard Mode



In the text mode the DISTO acts as a keyboard. This means that the DISTO transmits keystrokes instead of values within the DISTO service.

The keyboard mode is divided into two different modes:

Text Mode 	Result on DISTO	Transmitted Text	(Distance, Area, Volume)	
		1.234m	1.234m	1.234m2
	245 ¾ in	245 ¾ in	245.75 ft2	245.75 ft3
	18' 8" 9/32	18'18"9/32	18.69ft2	18.69ft3
	12.2yd	12.2yd	12.2yd2	12.2yd3

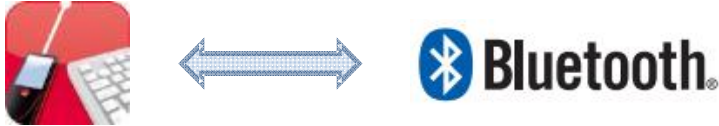
Numbers Mode 	Result on DISTO	Transmitted Text	(Distance, Area, Volume)	
		1.234m	1.234	1.234
	245 ¾ in	245.75	245.75	245.75
	18' 8" 9/32	18.69	18.69	18.69
	12.2yd	12.2	12.2	12.2

### Connection Terminology

This mode is highly depending on the Bluetooth Smart Connection Terminology regarding Keyboard functionality (HID Class Definition). This means that the operating system must be able to identify the DISTO as a keyboard and handles it as a keyboard. For this connection method, the communication between a DISTO and a Smartphone must be encrypted (without passkey authentication). Also a DISTO is bonded to a device. Once connected to a peer device, the peer device remembers the DISTO and vice versa. Once a DISTO™ is connected

## DISTO™ connectivity

### 4.2.3 GSI Mode



The GSI mode is only supported by Bluetooth 2.1 containing DISTOs such as the DISTO D8 and DISTO D3aBT / D330o.

The protocol that is used is GSI, which is intended to be used with a serial interface (UART).

Functionality available:

- Distance
- Inclination
- Trigger Remote Measurement

## 5 WLAN Overview

The Leica 3D DISTO™ contains four major sensors for measuring:

- Distance measurement module with viewfinder
- Vertical angle sensor with axis drive
- Horizontal angle sensor with axis drive
- Tilt sensor

The sensor interface can be accessed via these two modules:

- USB module
- WiFi module

The Leica DISTO™ S910 contains four major sensors for measuring:

- Distance measurement module with viewfinder
- Vertical angle sensor
- Horizontal angle sensor
- Tilt sensor

The sensor interface can be accessed via the WiFi module.

Both devices accept only one connection at a time. All previous established connections are being terminated when establishing a new one. Every command issued to the sensor will be responded with an acknowledge or an error.

# DISTO™ connectivity

## Network Topology

The **Leica 3D Disto** has an Ad-Hoc WLAN module built in. This means that the peer devices requires the support of the Ad-Hoc networks. Android does not support Ad-Hoc. The IP Address is configured static for both peers within the network.

The Leica 3D Disto can also be used with a USB cable. Therefore a RNDIS interface driver is required, to enable the communication to the 3D Disto with Ethernet over USB. The IP configuration stays as for WLAN.

The **DISTO S910** has two modes of operation. An access point mode and a client mode.

In the **access point mode**, the DISTO S910 creates a WIFI network. Passkey can be enabled or disabled on the device itself. The DISTO S910 also acts as DHCP server, where the IP address of the peer device is assigned automatically.

Using the DISTO S910 in **client mode** puts the DISTO S910 into infrastructure mode. The DISTO S910 now acts as a DHCP client and waits for IP address assignment. Once the DISTO was connected to a network, it will remember the network (and optional it's credentials) and will reconnect, if network in range.

## 6 Open questions

If you have questions, please contact [disto\\_software\\_support@leica-geosystems.com](mailto:disto_software_support@leica-geosystems.com)

















## 7 Addendum

Bluetooth Information: [www.bluetooth.org](http://www.bluetooth.org)








Detailed DISTO information: <http://ptd.leica-geosystems.com/>

Purchase a DISTO: <http://lasers.leica-geosystems.com/>

Register your DISTO: <http://myworld.leica-geosystems.com/>

Overview		API			
					
<b>D110 D510</b> 	 Bluetooth 4.0 required		 since version 6.0	 since version 4.0.3	 since Windows 8
					
					
<b>D810 S910</b> 	 Bluetooth 4.0 required		 since version 6.0	 since version 4.0.3	 since Windows 8
					
			 since version 7.0	 since version 4.3	 since Windows 8.1
<b>D3aBT D8</b> 	 Bluetooth 2.1 required				
			 No apple chip built in DISTO	 since version 2.2	 since Windows 7
					
<b>3D Disto S910</b> 	 WLAN required	<b>S910</b>			
		<b>3D Disto</b>	 since version 9.0	 Ad-Hoc not supported	 since Windows 7

**Legend**

	App Mode
	GSI Mode
	Keyboard Mode
	Works Already
	Not yet working
	Doesn't work
	not implemented

Detailed profile description can be found in the API package. Please ensure that your DISTO™ is updated to the latest firmware. You can find the latest firmware in the download section of the DISTO on our web-page.