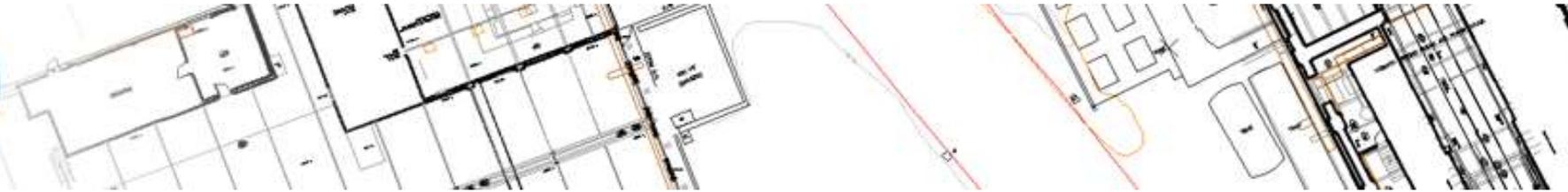


Instrument set up for TheoLt



Contents:

| | |
|-------------------------------------|----|
| GENERAL | 4 |
| Finding the Windows com port number | 5 |
| Windows version | 6 |
| TheoLt Instrument interface options | 7 |
| Leica TS06 Flexline | 8 |
| Leica TPS 1200 | 9 |
| Leica TPS 1200 Bluetooth connection | 10 |
| GeoMax Z80 | 12 |
| Leica TPS 400 | 13 |
| Leica TCRM 1105 | 14 |
| Sokkia SET x30R | 16 |
| Topcon GPT 3000 series | 17 |
| Trimble 5600 with Geodometer CU | 18 |

GENERAL

This manual describes common TST interfaces for TheoLt, it does not cover LDM devices which require Bluetooth connection. For set up information and CAD interface details please see the installed help guide in the program folder on the system.

It is advised the TST is checked for unit and direction of reading compatibility BEFORE survey is conducted. Familiarity with instrument type is recommended prior to field work.

Ensure the correct components are used for the system: Windows 8 and 10 require specific cables and Bluetooth connections which may be instrument specific. Instruments manufactured prior to 2015 may have legacy communications issues with current Windows versions. If in doubt consult the instrument documentation or the vendor for advice.

Units & direction of reading

The instrument should set up as follows:

Units: Angles: DMS (60 sec= 1 minute, 60mins= 1 deg)

Dist : Metres

Hz circle : right (clockwise) reading

V circle: (F1) Zenith = 0 Horizon =90

Data transmission: RS232

Data path: serial com port

RCS: Off/ inactive

TheoLt will send Cartesian co-ordinates to CAD based on the instrument data, it is advised the orientation and scale of the CAD plot is checked prior to survey.

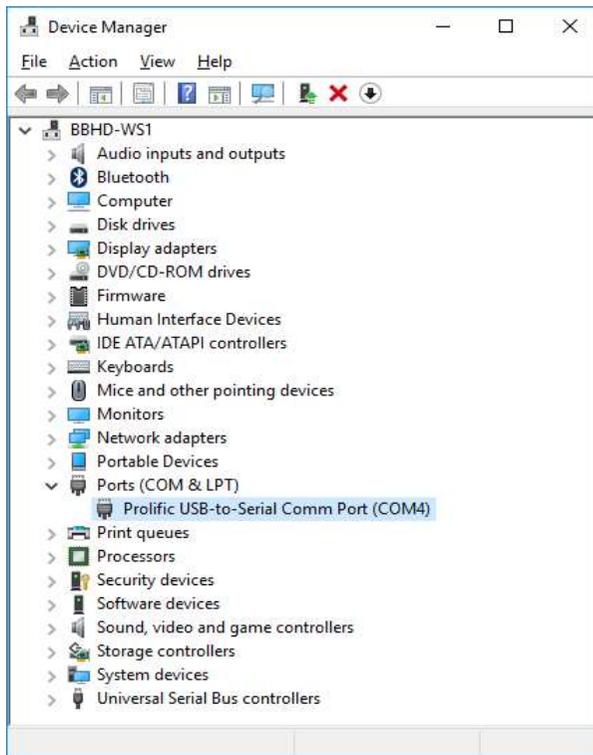
Dual keyboard instruments

Leica TPS 1200 and later instruments adopted reverse reading on the Face 2 (F2) keyboard for data sent from the instrument. For correct reading data should be called from TheoLt when reading on F2.

Finding the windows Com port number

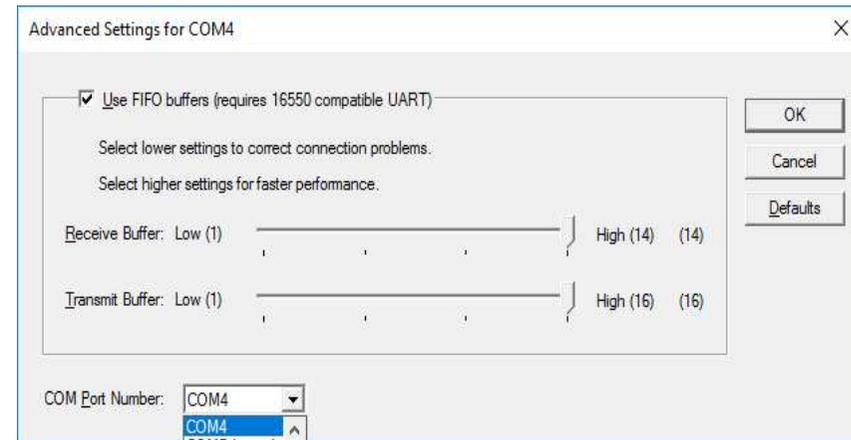
In Device Manager (right click on Windows start icon and select from list) locate the Ports (Com & LPT) and expand to see the assigned port number.

Ensure the correct cable is used for the windows version, Win8 and 10 require a GEV 267 cable. The cable requires the correct drivers to be present: <http://www.leica-geosystems.be/fl/73700.htm?cid=4226>



TheoLt requires the port number to be between 1 and 8.

The number can be re-assigned via the right click properties, port setting tab, advanced settings.



Bluetooth connections need Com port number assignment in the same way as the USB cable.

Windows version

USB cable issue

Windows 8 and higher will not support the Leica USB cable GEV 189. The correct cable is GEV 267.

Bluetooth issue

Windows 8 and higher supports Bluetooth version 4 using Serial Port Profile (SPP) 1.2. Hardware fitted with Bluetooth versions 1 and 2 are not automatically supported.

Achieving Bluetooth coms over Windows 8 and 10 requires compatibility of the SSP version.

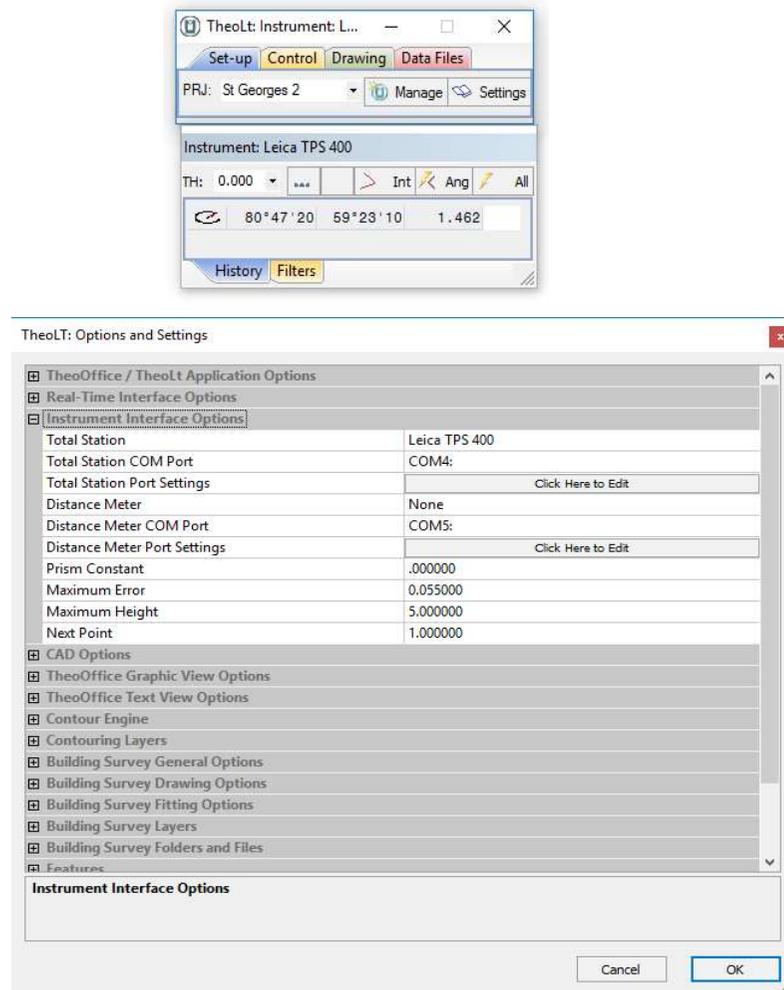
Bluetooth on *Leica Flexline* instruments has been found to be incompatible with Win 8 and 10.

Leica TPS 1200 models have been found to be compatible.

Installation of a legacy Bluetooth v2 dongle with correct drivers may resolve this issue for some systems.

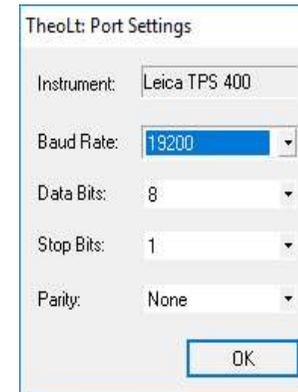
TheoLt Instrument interface options

In the *set up* tab select Settings and open the panel

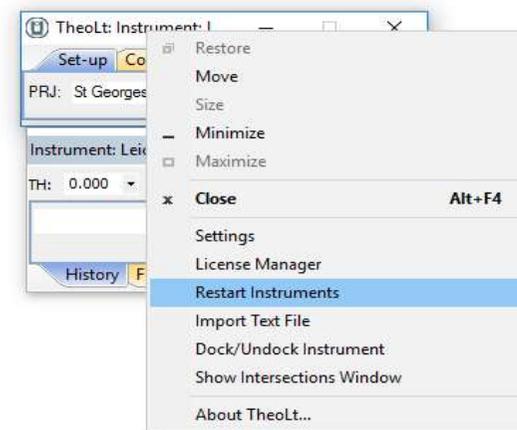


Expand the instrument interface options, select the instrument type, Com port (as indicated in Device Manager) and edit the Com port settings to agree with the instrument.

The user may wish to match the port settings from the instrument or set the instrument to agree with TheoLt.



To check the settings use a right click on the app title to find the 'Re-Start instruments' option on the context menu.



Leica TS06 Flexline

1. If your install of TheoLt doesn't have a selectable 'Flexline' in the Instrument panel in settings set TheoLt to use a Leica TPS 800 or similar instrument. Make a note of the coms settings for the selected instrument.

2. At the main menu on the instrument select 'Transfer' then 'export data'. Switch the 'To' option to 'RS232 interface' Accept 'measurements' as the data type.

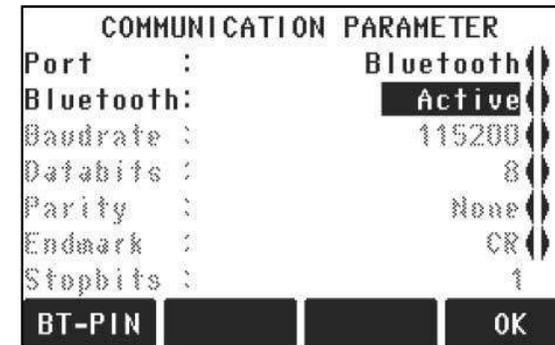


Set the job settings to 'send all data' Hit 'ok'

The next option is the data format: select 'GSI 16'

Ok the settings and revert to the main menu and go to the 'Settings' option.

3. Select the 'Com' menu and switch the Port to 'RS232', Deactivate Bluetooth if a cable is used and check the port settings are in agreement with TheoLt.



4. Restart the instrument and make sure TheoLt is using the correct comport for the data cable. The port settings should be in agreement with those set at 3 above. The port number is revealed in Device Manager (as shown on p5).

LEICA TPS 1200

Note that there are 3 coms options on the 1200: Bluetooth, 'Smart Handle' and the Lemo cable: the cable port is identified as 'Port 1' and Bluetooth as 'BT3'.

1. *Remove the CF card.* Power up the instrument and go to sub-menu 5 (Config), then select 4 (Interfaces) with CONT or the Enter key.

2..Select 'GSI Output' and press the 'USE' (F5) toggle so that GSI output has a selected port and a device (RS232 GSI) shown. Ensure all other modes (RCS etc) do NOT have a port assigned.

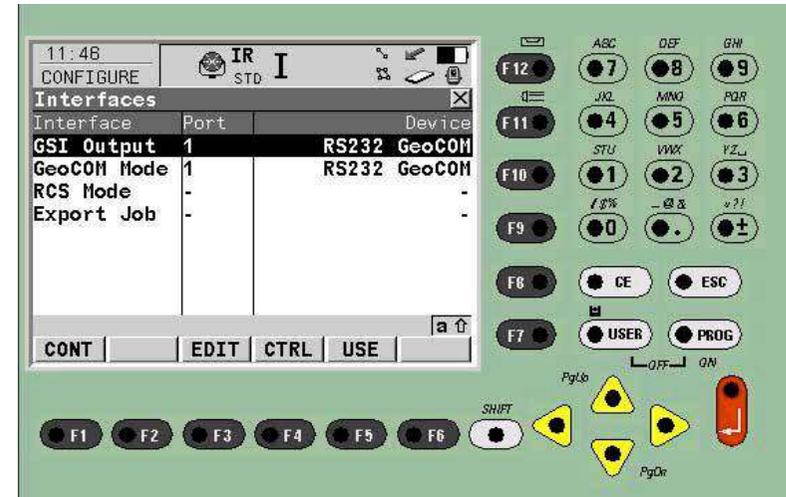
3. Select the 'Edit'(F3) key and set the

Protocol to: 'RS232 GSI'

GSI format to: 'GSI 16 Polar 2'

Set the Coms parameters with the DEVICE (F5) key. At the 'Devices' screen select each device shown and use the EDIT (F3) key to check the parameters for RS232 GSI and RS232 GeoCOM, they must match. Exit and save the settings with the CONT (F1) key.

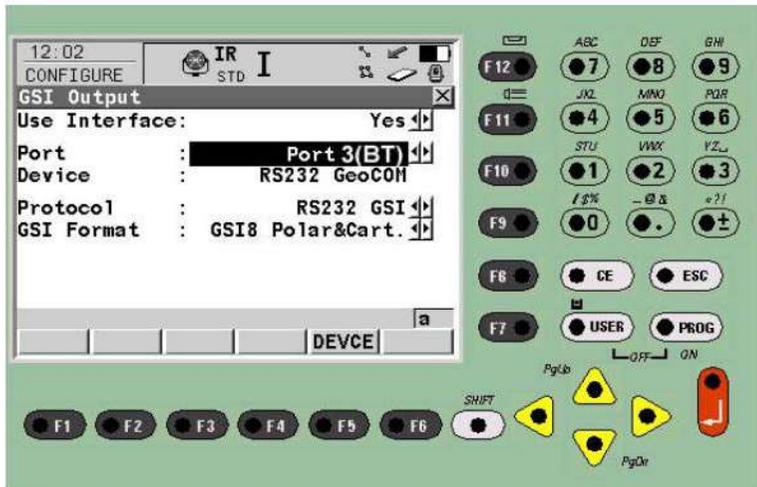
4. Return to the main menu and select 'Survey'. At the first measure screen select cont to get to the all key on Survey screen 1.



The desired outcome is to have 2 RS232 GeoCOM devices using port 1, one set to GSI output and the other set to GeoCOM mode.

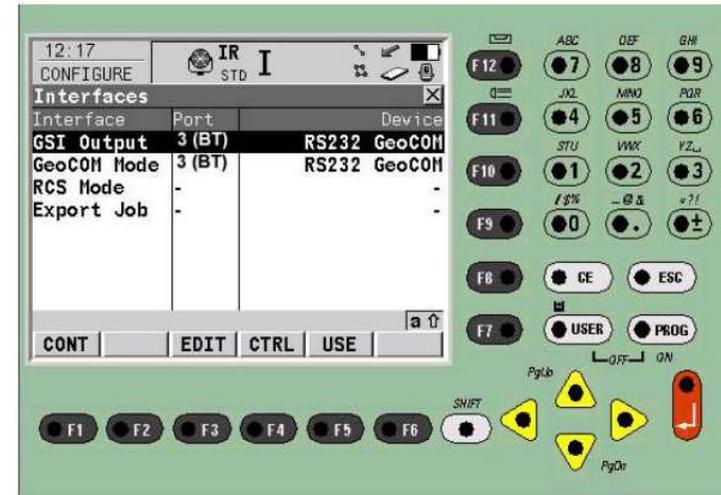
TPS 1200 Bluetooth connection:

Go to the interface settings, select the GSI out put and select Port 3 (BT) option

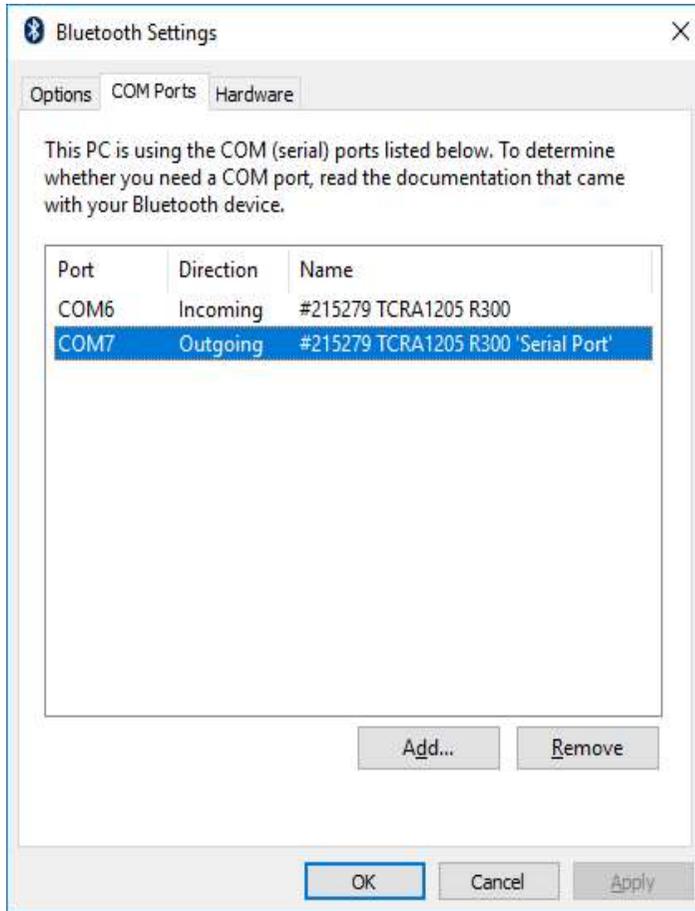


Now return to the interfaces screen and select CTRL for the 2 interfaces (GSI Output and GeoCOM mode) we will use. You may get a 'device is being used by another interface message...' on the instrument when you try to select the Port3 (BT). If this is the case you can make a custom device to copy the GSI Output and GeoCOM settings for port 1 and assign them to Port 3

Pairing code is 0000. Make sure the PC has Bluetooth up and the connection paired.



The Windows Settings, Bluetooth panel will give access to the properties of the the TST under 'More Bluetooth Options' to indicate the assigned port numbers.



Identify the *Outgoing* port and use the indicated port number for TheoLt (or for port number re-assignment in Device Manager- see p 5).

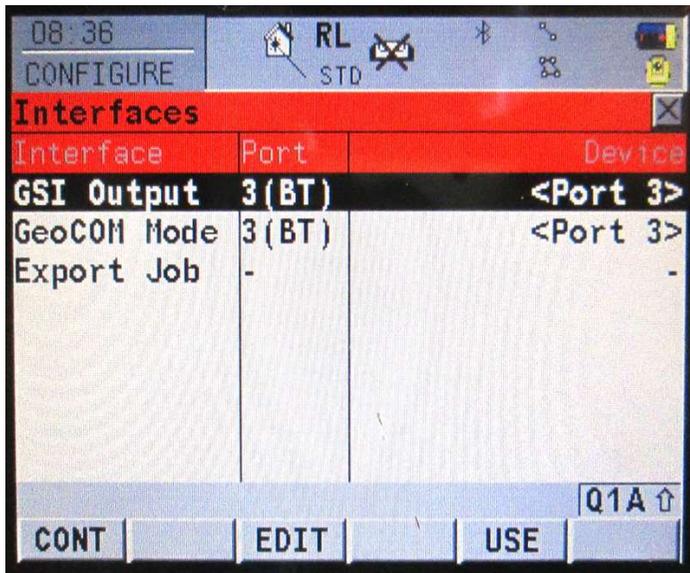
The CTRL option takes you to the configure screen where SRCH will allow you to search for the PC you want to connect to so that the ID address can be found.

Once the ID address is displayed select 'CONT' to save the setting and return through the interface menus to 'Survey'.

Note that the TST and TheoLt will need to be shut down and re-started to initiate pairing or a change in port numbering.

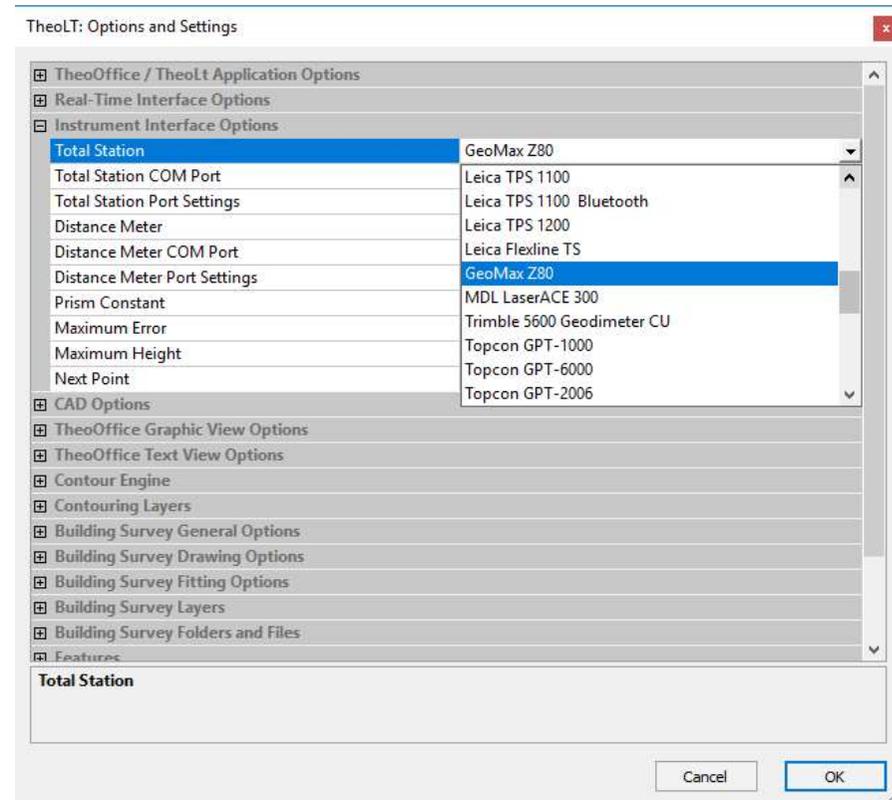
GeoMax Z80

The interface for GeoMax Zoom instruments is identical to the Leica TPS 1200 instruments. Edit the port settings as required:



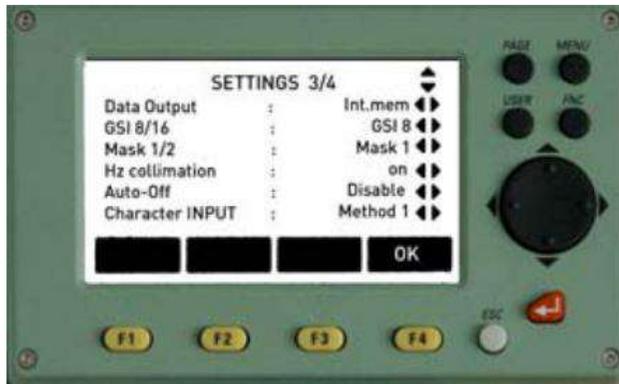
Select 'Leica TPS 1200' as the instrument in TheoLt settings if the Geomax is not shown in the installed list.

TheoLtr10 includes an interface for the GeoMax Z80, the interface is common to all GeoMax models with communication capability.



LEICA TPS/TCR 400

1. Select the RS232 data output



Press 'Menu', then 'F2' (Settings), then 'Page' twice (Settings page 3 of 4)

Check that 'Data Output' is set to 'RS232' (change option by using the side arrow on the navigation key)

Press 'F4' (OK)

2. Set up the Communication parameters

At the Menu screen, press 'F2' (Settings), then 'Page' once (Settings page 2 of 4)

Select the 2nd option: 'Communication Parameters'

Set the parameters to match TheoLt *instrument interface options* e.g: .

Baud-rate = 19200

Databit = 8

Parity = none

Endmark = CR/LF

Stopbit = 1

Use the arrow on the navigation key and 'enter' as required.

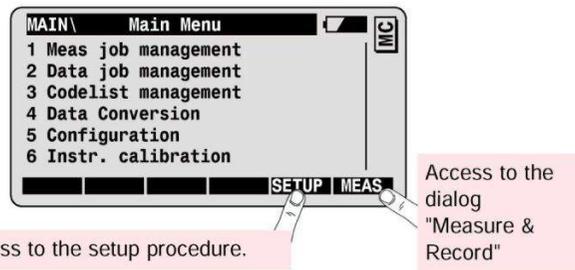
Press 'F4' (OK)



Note that the first shot taken with the All key will prompt a 'Record to RS232?' message on the instrument which should be confirmed with a Yes (F4) response.

LEICA TCRM1105

1. Navigate to the Main Menu, if required use *esc* to return to main menu from the start up screen.



2. Select SETUP or 1 from the sub-menu screen for *Meas job Management*.

3. Select

Meas job = RS232

Display Mask = Standard 1 [the default]

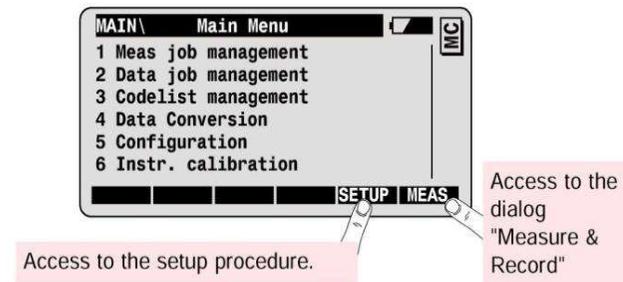
Rec Mask = Polar (8)

Use the indicated MEAS key to set the values and return to the Measure and record screen. The screen will indicate the selection of the RS232 by displaying the GSI online symbol in the top right.

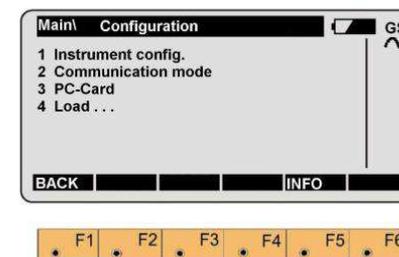
The MC symbol indicates the use of a memory card for data storage: this is incorrect for TheoLt operations. Remove the memory card.



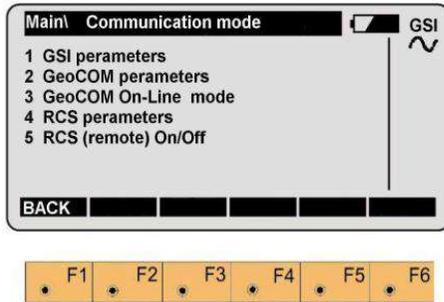
4. To set up the comms parameters return to the main menu and select 5 Configuration.



5. Select 2 Communication mode with the enter or '2' key.



6. Select option 1 'GSI parameters'



7. Select the settings to match the *Instrument interface options* in TheoLt e.g:

Baud rate: 2400

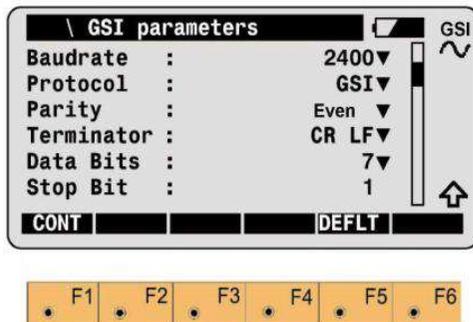
Parity: even

Terminator: CR/LF

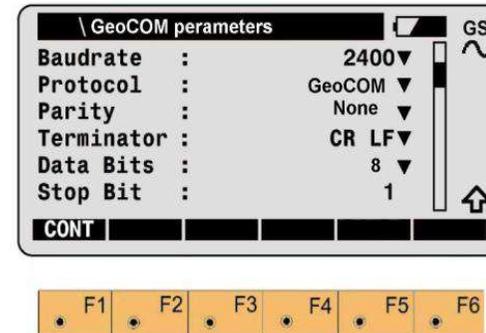
Data bits: 7

Stop bit: 1

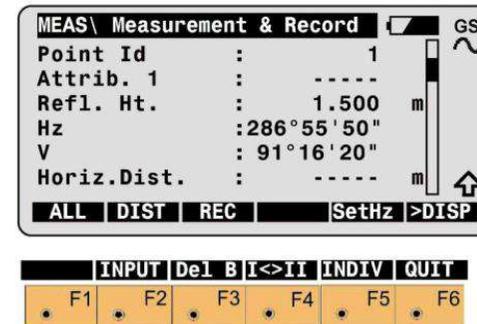
Use the CONT [F1] key to enter the settings and continue



8. To set the communications for robotic controls go back to step 6 and select *GeoCOM parameters* (option 2) and ensure the baud rate is in agreement with the GSI parameters note that the other settings should be set to the supplied defaults.



9. When using TheoLt instrument observation is controlled by the ALL [F1] key at the Measure and Record screen.



Sokkia Set x30R

To reach the communication settings, press the ESC key until the following is displayed:

```
SET530R SOKKIA
MEAS          MEM CNFG
```

Select F4, CNFG and then scroll down to Comms setup. Press Enter. The settings should be as displayed below

```
Baud rate :1200bps
data bits  :8bit
parity     :not set
stop bit   :1bit
check sum  :no
xon/xoff   :no
```

Once this is set, return to measure mode. For reflectorless operation with TheoLt, set the EDM Mode to Fine "S". Select EDM from the function key menu.

The instrument should now function under the control of TheoLt

```
EDM
MODE          :Fine S
reflector     :none
pc            :0
```

For ease of use, enabling recording and Data Output from the Instrument, a function key should be set to D_OUT.

This is detailed fully in the Sokkia Series 30R Operators Manual. As a guide, select CNFG as listed above. Then scroll down to Key Function. Press Enter. Select Define. Ensure that the last row of the key definitions contains the function D_OUT. When in MEAS mode, selecting the D_OUT key will send the observation to TheoLt.

Topcon GPT 3000 series

1. Set CL,RF on. To access the settings the instrument should be switched on with the F2 key held down.

```
PARAMETERS 2
F1:UNIT SET
F2:MODE SET
F3 OTHERS SET
```

Press F3 to select 'OTHERS SET' menu

```
OTHERS SET      1/5
F1:H-ANGLE BUZZER
F2:S/A BUZZER
F3 W-CORRECTION P▼
```

Press F4 key (p▼) to get to page 2

```
OTHERS SET      2/5
F1:NEZ MEMORY
F2:REC TYPE
F3 CR,LF        P▼
```

Press F3 (CR,LF)key

```
CR,LF          [ON]

[ON] [OFF] ---ENTER
```

Press F1 (ON) key and press F4 (ENTER) key. Return to OTHERS SET menu. Power off.

2. Set SD Data mode.

The instrument should be switched on with the F2 key held down.

```
PARAMETERS 2
F1:UNIT SET
F2:MODE SET
F3 OTHERS SET
```

Press F2 to select 'MODE SET' menu

```
MODE SET      1/5
F1:POWER ON MODE
F2:FINE/CRS/TRK
F3 HD&VD/SD   P▼
```

Press F4 key (p▼) to get to page 4

```
MODE SET      4/5
F1:COORD. CHECK
F2:EDM OFF TIME
F3 FINE READING P▼
```

Press the F3 (FINE READING) key

```
FINE READING
F1: 0.2MM
F2: 1MM
ENTER
```

Press F2 (1MM) key and press F4 (ENTER) key

```
MODE SET      1/5
F1:POWER ON MODE
F2:FINE/CRS/TRK
F3 HD&VD/SD   P▼
```

Return to MODE SET menu. Power off. The ESC key may be set to send data to TheoLt by re-assigning the function to 'REC' at 'Esc KEY MODE' in the MODE SET menu.

Trimble 5600 with Geodometer Cu

The instrument must be configured to output to serial using Table 0 (the default table). To do this, Press the menu button and then:

```
4 Data com
5 Test
6 Config
```

Select 4: Data com

```
1 Select Device
2 Create Table
3 Prg Tables
```

Select 1: Select device

```
1 Imem
2 Serial
3 Xmem
```

Select 2: Serial

```
Serial 10:47
Serial On?
```

Select :Yes [Enter]

```
Serial 10:47
Com = 1.8.0.9600
```

Check and select Yes [Enter]

```
Serial 10:47
Table = 0
```

Press 0 select Yes[Enter]

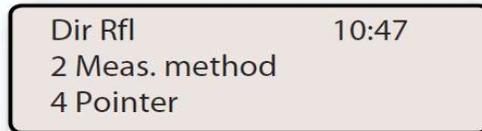
```
Serial 10:47
Reg Key?
```

To control the Instrument from TheoLt, Select No. Select Yes to measure from the instrument REG key.

```
Serial 10:47
Slave?
```

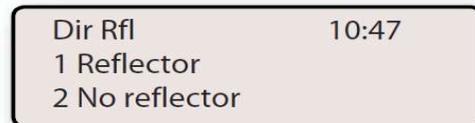
If 'No' was selected at previous stage select 'Yes' [Enter] The instrument will now return to the measurement screen.

To enable reflectorless measurement mode with a visible laser pointer press the menu button then select 7:



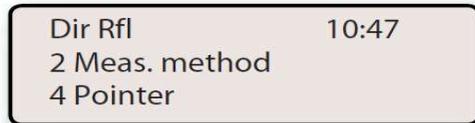
Dir Rfl 10:47
2 Meas. method
4 Pointer

Select 2 : Meas method



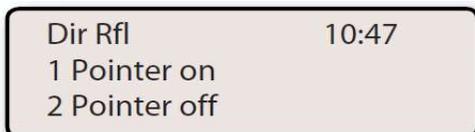
Dir Rfl 10:47
1 Reflector
2 No reflector

Select 2 : No reflector



Dir Rfl 10:47
2 Meas. method
4 Pointer

Select 4: Pointer



Dir Rfl 10:47
1 Pointer on
2 Pointer off

Select 1 :Pointer On.

Note : Communication with the Trimble 5600 is only possible with the Geodometer control unit. All other variants are non-operable.