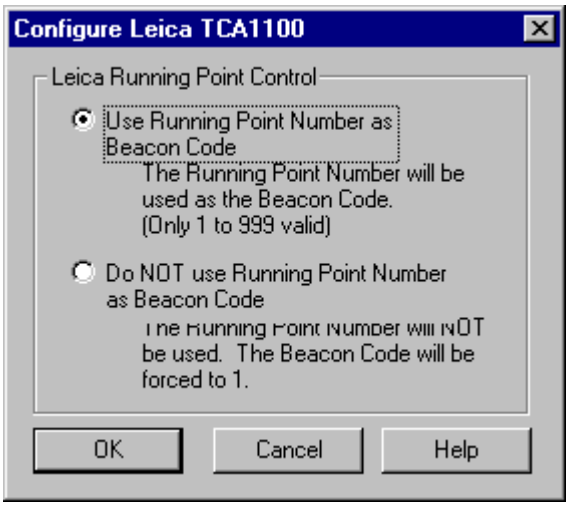
WinFrog Device Group:	**USBL**
Device Name/Model:	**Leica TCA1100**
Device Manufacturer:	**Leica AG** CH-9435 Heerbrugg, Switzerland Tel: ++41 71 727 31 31 Fax ++41 71 727 46 73 **Leica USA** 23868 Hawthorn Blvd. Torrence, CA 90505, USA Tel: (310) 791-5300 Fax: (310) 791-6108
Device Data String(s) Output to WinFrog:	Leica On Line Output Format 11(point #),21(Hz),22(V),31(slope dist.)
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	Type 309 (USBL)

DEVICE DESCRIPTION:
Automatic tracking total station used for positioning (above surface) structures from static or dynamic 'platforms'.

DEVICE CONFIGURATION INSTRUCTIONS:
Baud Rate: 2400
Data Bits: 8
Stop Bits: 1
Parity: N

One way (standard) RS-232 serial communication using pins 2(tx), 3(rx), and 5(ground).

WINFROG I/O DEVICES > CONFIG OPTIONS:
The Leica Total Station is accessed via the USBL device types. The Hydrophone and Beacon sub-devices are added along with the Leica TCA1100. Highlighting the device and right-clicking will open the Configure Leica TCA1100 dialog box as seen below.



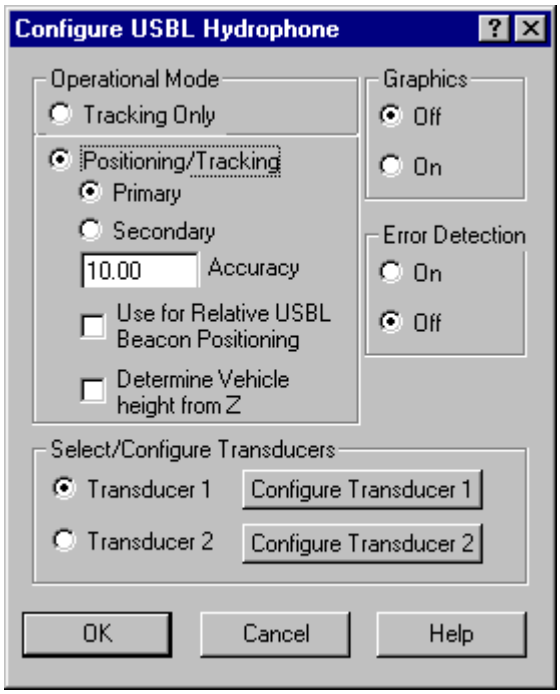
The running point number can be used to distinguish between different targets. If you assign different point numbers to different targets, WinFrog can then use the point number as the code. Select **Use Running Point Number as Beacon Code** and then enter each assigned point number as the code when editing each of the **BEACON** data items in Configure Vehicle Devices/Configure Beacon for each vehicle (see below).

If there is only one target then you can select the bottom radio button **Do NOT use Running Point Number as Beacon Code**. In this case the beacon code is assigned to 1 and you must enter 1 for the BEACON data item in the Configure Vehicle Devices/Configure Beacon option.

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:

As mentioned above, adding the Leica TCA1100 device to WinFrog creates two separate data items: the **USBL, Leica TCA1100, USBL HYDROPHONE** and the **USBL, Leica TCA1100, BEACON**.

The USBL Hydrophone is added to the vehicle, which has the total station set up, while the Beacon is added to the vehicle in which the prism(s) are located.



1. Configuration of the USBL Hydrophone

Operational Mode:
Set to **Tracking** for positioning or tracking of a structure/vessel relative to the Master Vessel. The Master Vessel (with the total station set up) would have to be positioned via GPS or other input. Set to **Positioning** and **Primary** if you want to position the Master Vessel relative to a stationary object. The Beacon (Prism) would therefore be located on the stationary object. Use the Secondary radio button if this is not the primary positioning source (i.e. if this is a comparison position).

Graphics:
Selecting the On radio button will display the device name and a square at the location of the total station, within the Graphics and Bird's Eye windows.

Error Detection:
By enabling this option, error detection codes are included in the Raw Files. This option is mainly for post analysis and future development.

Select/Configure Transducers:
Two total station locations can be configured for use, however it is advised that only one be used at any given time. By going into the Configure Transducer 1 (or 2) dialog box, you can configure the offsets for either of the two total stations. Refer to the previous window.

Calibration Corrections:
These values do not apply for total station operation. Set values as displayed above.

Offsets:
The offsets from the point the data is related to, to the transducer, are set to zero for total station operation. The **WinFrog Offsets, from CRP to Transducer** (Total Station) are set to similar values as would be applied to any device offset in Winfrog. For the above example, the total station is located 100 (m) aft, 8 (m) starboard and 12 (m) above the CRP.

2. Configuration of the USBL Beacon.

Calculation, Accuracy and Error Detection:
Set Calculation to Primary if the Prism is to be used for positioning, and assign a realistic accuracy. By setting Error Detection to 'On', errors are written to a file for post processing.

Code:
If more than one target is being used you can assign different point numbers to each in order to distinguish between them (refer to WinFrog I/O Devices > Config Options > Use Running Point Number as Beacon Code above). If only one target is being used you can assign a number to it or can select the WinFrog I/O Devices > Config Options > Do NOT Use Running Point Number as Beacon Code option and WinFrog will, by default, assign a code of 1 to the target and you can enter 1 in this option.

ROV Depth from USBL:
By setting this to Yes, the Prism height will be calculated.

LBL Calibration:
No calibration within WinFrog is required for operation of the total station.

Graphics:
By setting this option to On, a square and label will be displayed for the Prism location in the Graphics and Bird's Eye windows.

Offsets:
The Offsets are applied from CRP (of the structure/vessel) to the Prism Location. These values are set similar to values that would be applied to any device offset within WinFrog.

CONFIGURATION DETAILS:
The Leica TCA1100 requires the Auto Record function to be enabled for total station tracking. The following set up is required within the instrument:

Set the following under Main Menu - F1 (Extra):

On-line mode - OFF
Format memory card - NO
Remote control mode - ON

Note: If the instrument is to be used in a non-autotracking mode, you should set the Remote Control Mode to Off and output data by aiming the instrument and pressing the Rec Button.

Set the following under Main Menu - F3 (Config)

System date & time		
Define functionality	- Show all menus & keys (YES)	
	- Enable user config (YES)	
GSI Coms	- Set coms for output (2400 -8-N-1)	
	- Ensure that Protocol = NONE	
Geocom communication	- Parameters for uploading data. (N/A)	
Instrument ID	- N/A	
Autoexec Application	- where the unit starts (i.e. Main Menu)	
System Protection	- N/A	
User Configuration:	- Name	: Name of user config file
	- Lang.	: English
	- Rec. Format	: GSI 8 (Can also have GSI 16)
	- Dist.	: Metre (3 Dec.)
	- Angle	: 360 (4 Dec.)
	- Temp	: Celcius (not necessary)
	- Atm	: mbar (not necessary)
	- Coord. Display	: Northing / Easting
	- Hz - system	: Clockwise (+)
	- Face I	: V-drive left

Set the following under REC MASK

11(point No.)
21(Hz)
22(V)
31 (slope dist).

Note: These do not have to be input in ascending order, however, point number has to be first. The above can also be set under Display Mask if desired.

Set the following under Main Menu – F4 (Data). These values are optional.

Rec. Device	: Memory card (suggested)
Mem. size	: N/A
Free	: N/A
Point / Code	: #
File	: Name.GSI
File Size	: #
Options	: Input (N/A)
	: Search (N/A)

Set the following under Main Menu – F5 (Setup). These values are optional.

User Temp.	: Enter in a Temp Name
Rec. Device	: RS232
Meas. file	: ----------
Data file	: Name.GSI

Set the following under Main Menu – F6 (Measurements). These values are optional.

Point No.	: #
Hz	: DMS
V	: DMS
Slope dist.	: m.

Set the following under Additional Functions –(The aF…Button).

User template & Files

User temp.	- Cartesian
Rec. Device	- RS232.
Meas. File	- N/A
Data File	- anyfile.gsi

EDM Measuring Program.

EDM Type	- TCA1100.
Active	- Standard measurement.

Note: Make sure this setting is not in Tracking Mode

Compensator / Hz - corrections.

	- Compensator (Off).
	- Hz - Corr (Off)V - Angle Display
V-Angle	- Zenith.

Instrument Operation:

The purpose of this device is to enable the instrument to auto-track the target while outputting continuous measurements at either 1, 2, or 4 seconds.

To observe the prisms and position a structure/vessel, perform the following after the instrument is turned on:

- Check all settings as listed above.
- Set Hz by sighting a known azimuth referenced to the bow of the vessel.
- Press the Auto Record Function.
- Press the Dist. Button (F2) then the TRK Button (F2) after the first distance is received.

The instrument should lock onto the target and start outputting data. If it does not find the target press RETRY (F5) and it will scan a wider area until it finds the target, or sight the target again and retry.

To set the tracking parameters, hit the shift key (you can see the shift key will enable, by the small arrow on the right of the display window (the arrow then becomes larger enabling the Shift Menu). Now press Config. Here you can set either time or distance parameters. We will use only time and set to 1,2 and 4 seconds.

To set the Hz angle, accurately point at the Reference Object. Then press F6 (Meas.), then Hz0. Enter the RO angle and continue (if you are pointing to the Bow, then the Hz=0). The instrument will look for a prism to lock onto. If no prism is present, the instrument will return to the original sighting point. Now hit *continue* (one of the Function Keys), and the Hz0 is set to $0^{o}0'0"$.

Ensure that the logging device is RS232 and the parameters are the same as that set in the instrument, (i.e. baud rate, parity, etc.). Only 2400-8-N-1 will work.

If you are not outputting the data string listed previously, it may be because the REC settings are incorrect.

Note: When the instrument is powered down all settings are saved with the exception of:

1. *Compensator / Hz – corrections – must be turned off every time the instrument is turned on. If you want to initiate automatic compensators, the unit must be stable.*
2. *Under Main Menu - F3 (Config) | GSI Comms |Protocol (must be set back to None).*